Swift Sensors SS3-615 Wireless Universal Analog Sensor Adapter Configuration Guide

This document outlines the process for selecting, connecting, and configuring an analog transducer for use with the Swift Sensors SS3-615 Wireless Universal Analog Sensor Adapter. Follow the steps carefully to configure the software settings to ensure accurate and quality measurements with your transducer. If at any time you would like additional confirmation or help making your connections, please contact Swift Sensors directly and our Customer Success team will be happy to assist you.

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Using the Swift Sensors Console

For readers who are new to Swift Sensors, you can follow the instructions in this document more easily if you understand a few basic concepts of the Console. The following descriptions assume you are using the Console in its default setup. As you use the system more, you may want to create your own custom dashboards and views to highlight the most important information related to your system and facility or facilities being monitored.
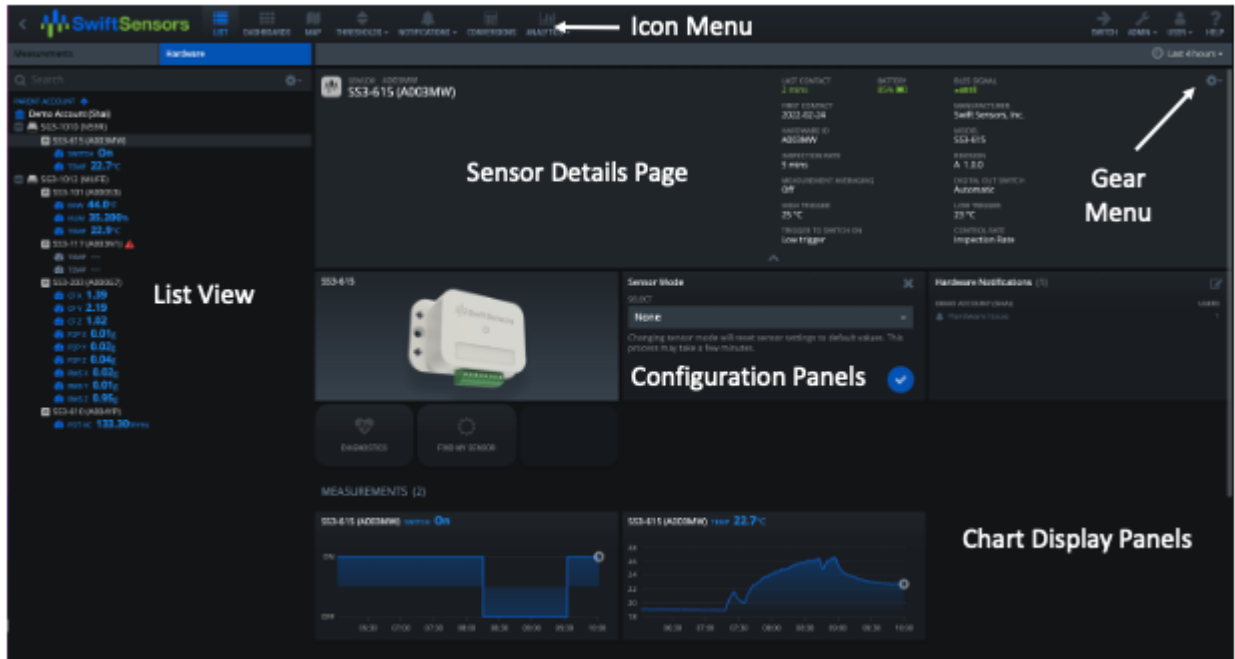
1. **List View - Sensor Hardware and Measurements**
    The List View shows all of your sensors on the left-hand side of the screen. Each Sensor (hardware) can have one or more Measurements associated with it. For example, the SS3-101 Wireless Ambient Temperature sensor generates three different measurements - temperature, humidity, and dew point. Each sensor is displayed in the List View with its associated Measurements under it.

2. **Sensor and Measurements Details Page**
    When you click on a Sensor or a Measurement in the List View, its associated Details show up on the right-hand side of the screen. For example, if you click on a Sensor Name or Model Number (Hardware ID) entry in the List View, its associated Sensor Details Page appears on the right side of the screen. Likewise, when you click on a Measurement in the List View, its associated Measurement Details Page appears. To change the detailed settings of a sensor or measurement, you must select the Edit Settings from the Gear Menu (⚙) in the upper right corner of the screen. When you select Edit, a screen that allows you to change settings appears.

3. **Configuration Panels** - In addition to the native settings, the details pages also show a collection of Panels for settings or information related to the selected sensor or measurement. For example, the Sensors Detail Page also includes Panels for:
   ○ An Picture of the Sensor
   ○ Hardware Notifications that are associated with that Sensor
   ○ Charts displaying historical data for any Measurements associated with that Sensor. In the case of the SS3-101 Wireless Ambient Temperature Sensor, three charts appear on the Sensor Details Page (Temperature, Humidity, and Dew Point)

   To edit or assign values from a Configuration Panel - for example, to select which Notification you would like to assign to a particular Measurement - you select the Pencil icon in the upper right-hand corner of the Panel.
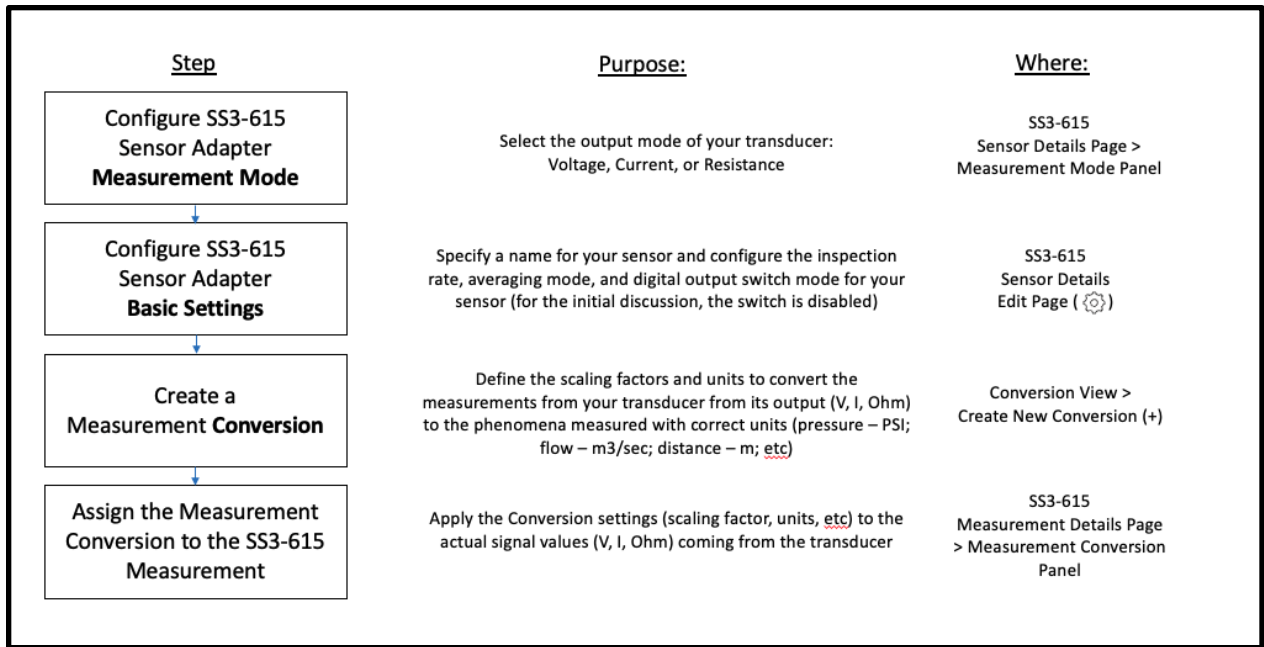
4. **Conversion View**
   Conversions are equations that you create to convert values from one form to another. For example, you may have current sensors that return values in Amps and you'd like to calculate the power associated with that signal. To do this, create a Conversion that multiplies the current value measured by 120 (assuming the mains power is 120V) to convert the current signal to a power measurement in Watts.

   Conversions are a key concept for using the SS3-615 as you will create a conversion from a voltage, current, or resistance returned from your sensor into a measurement representing pressure, flow, level, distance, or other value the sensor is measuring.

Configuration Process Overview:

The table below outlines a high-level description of the steps needed to configure the SS3-615.

Step	Purpose:	Where:
Configure SS3-615 Sensor Adapter **Measurement Mode**	Select the output mode of your transducer: Voltage, Current, or Resistance	SS3-615 Sensor Details Page > Measurement Mode Panel
Configure SS3-615 Sensor Adapter **Basic Settings**	Specify a name for your sensor and configure the inspection rate, averaging mode, and digital output switch mode for your sensor (for the initial discussion, the switch is disabled)	SS3-615 Sensor Details Edit Page (⚙)
Create a Measurement **Conversion**	Define the scaling factors and units to convert the measurements from your transducer from its output (V, I, Ohm) to the phenomena measured with correct units (pressure – PSI; flow – m3/sec; distance – m; etc)	Conversion View > Create New Conversion (+)
Assign the Measurement Conversion to the SS3-615 Measurement	Apply the Conversion settings (scaling factor, units, etc) to the actual signal values (V, I, Ohm) coming from the transducer	SS3-615 Measurement Details Page > Measurement Conversion Panel

# Detailed Example: Connect a Float Level Transducer to the SS3-615 Sensor Adapter

In this example, we describe the process of configuring and wiring a float level sensor with the SS3-615 Wireless Universal Analog Sensor Adapter. The transducer used is an Omega LVR500 Series Float Level Sensor, Model LVR36, which outputs a 4-20 mA signal corresponding to the level of a liquid stored in a tank up to 36 inches deep. First, we'll outline the steps to configure the measurement settings in the Swift Sensors Console, followed by hardware and wiring considerations.

After describing the process for connecting the LVR36 level transmitter, we'll configure the Digital Out Switch on the SS3-615 to enable an alarm light/sound when the level measured is too high or low.

Configuring the SS3-615 Settings for Basic Measurements

Step 1: Select the Measurement Mode

Click on the SS3-615 Sensor in the List View. From the Sensor Mode Panel, select "Electric Current" to configure the SS3-615 to receive a current signal from the LVR36.
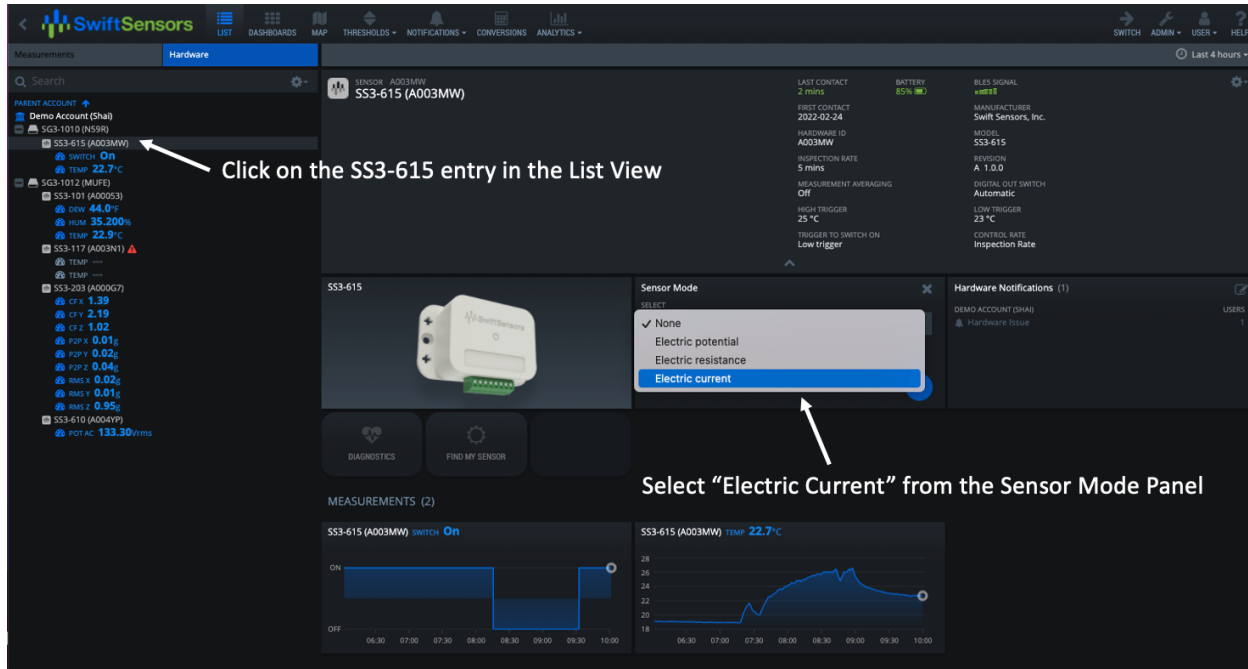
After making this selection, the Sensor Mode Panel shows an image of the pinout settings of the SS3-615 useful for wiring.
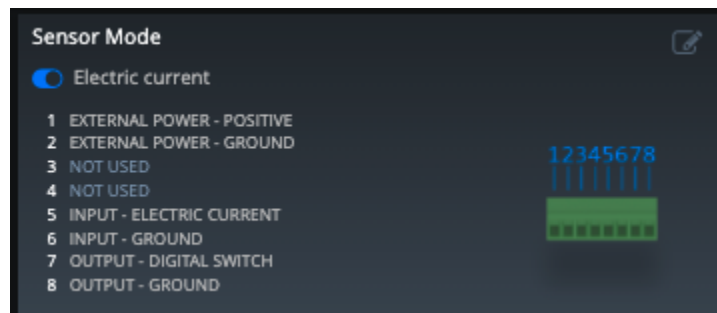

Step 2: Configure the SS3-615 Sensor Settings

Click on the Gear icon in the upper right corner of the SS3-615 Sensor Details Page and Select "Edit". The Edit Sensor Details Page appears. Set the following values in the Edit Details Page as shown in the image below:

- Name and Description: **Enter a descriptive name for the sensor**
- Inspection Rate: **2 Min** (Measurements will transmit to the Internet once every two minutes)
- Measurement Averaging: **On** (The sensor takes a measurement once every 6 seconds. These values will be averaged over the 2 minute inspection period and sent as one value every 2 minutes)


Gear Menu
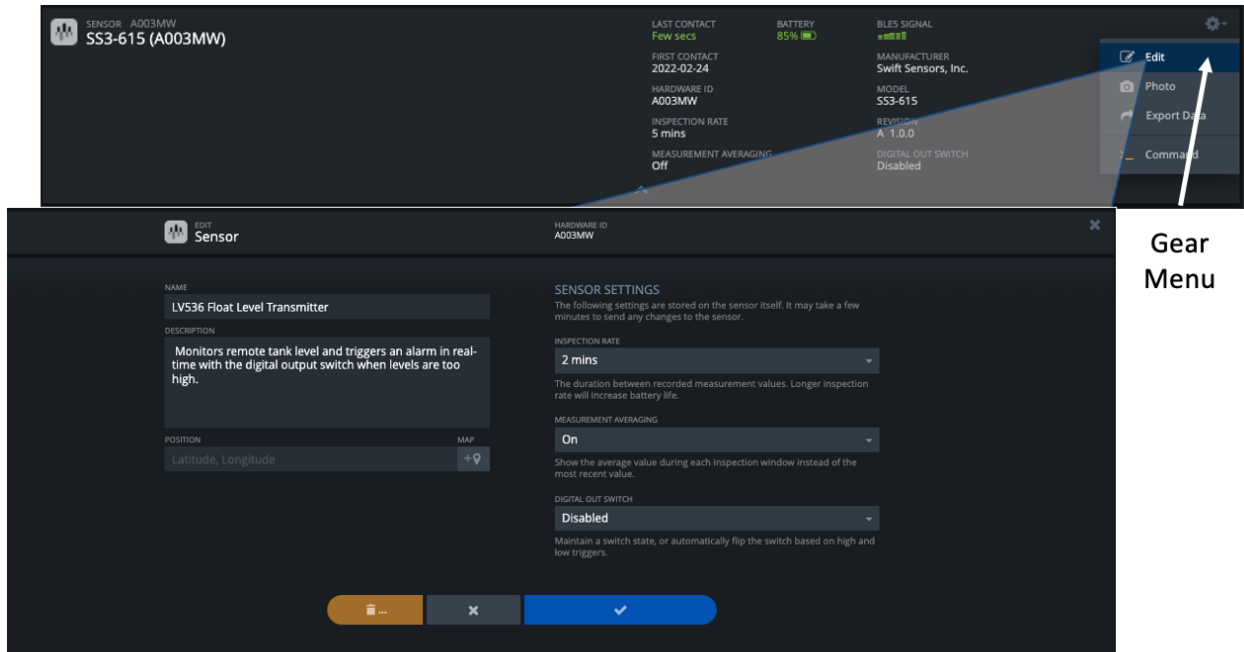
Step 3: Create a Measurement Conversion to Convert the Current Measurement to Level

Click on "Conversions" in the Menu Icon Bar at the top of the screen. Select the "+" sign at the top of the screen to create a new conversion. The New Conversion Edit Page appears as shown below. Enter the following values to convert the current signal to a level value in inches.

- Conversion Type: **Measurement**
- Conversion Formula: **Linear**

- Name: **Float Level Conversion**
- Input Property: **Electric Current**
- Input Unit: **Milliamps**
- Input Values
  - From: **4**   To: **20**

[Type here]   6

- Output Property: **Distance**
- Output Unit: **Inches**
- Output Values:
    - From: **1.9**   To: **35.25**   (The sensor considers the areas below 1.9 inches and above 35.25 inches in the tank to be dead zones)
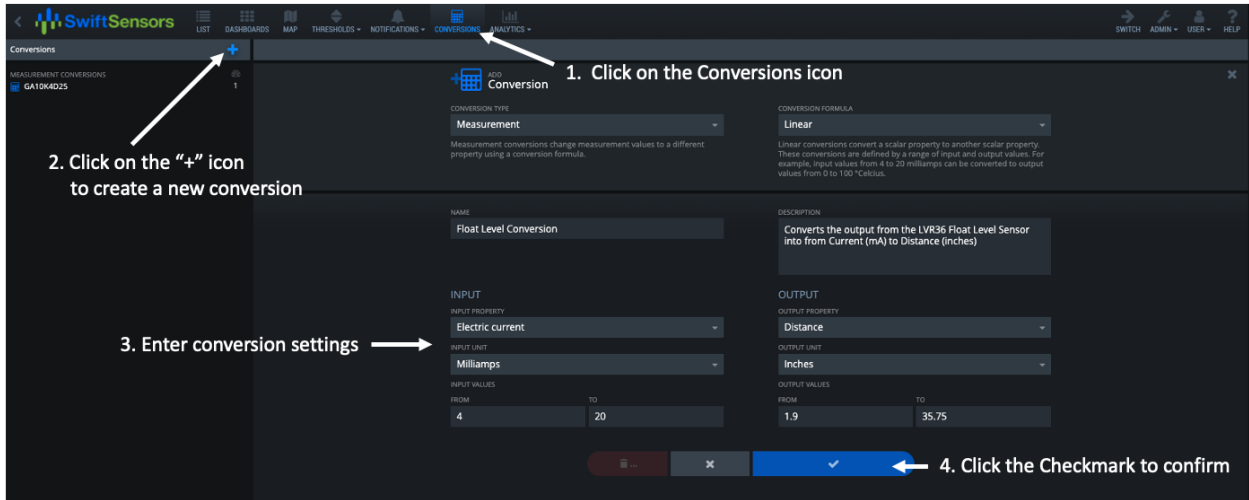
Step 4: Assign the LVR36 Level Conversion equation to the SS3-615 Measurement

Click on the "List View" icon in the icon menu bar at the top of the screen to display the list of Sensors and Measurements on the left side of the screen. Click on the "XXX" Measurement under the SS3-615 Sensor to display the Measurements Details Page. From the Measurement Conversion Panel, click on the Pencil icon and select "LVR36 Conversion to Level" as shown in the image below:
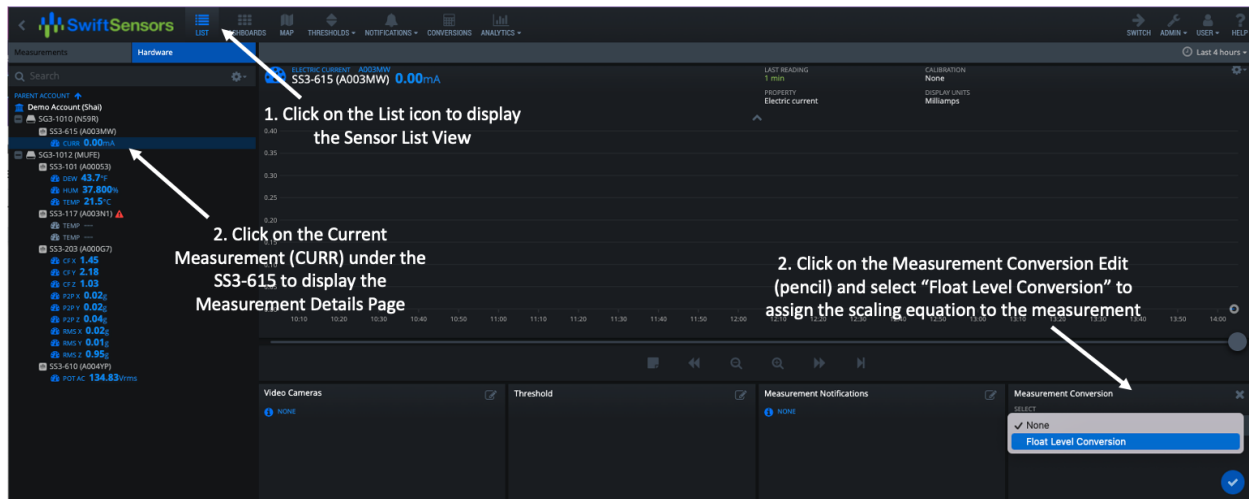
This completes the basic configuration of your sensor settings to acquire the current measurement values from the LVR36 Float Level Sensor and convert them to a Level measurement in inches. You can now use this measurement to set thresholds and generate notifications if the level goes above or below your defined threshold values.

# Use the Digital Out Switch to Generate a Real-Time Alarm

The SS3-615 has a built-in simple control loop that you can program to read the measured value on the sensor and set a digital output switch in real time. Rather than transmitting the measurement to the internet and using thresholds in the Console to generate a notification, you can effectively perform a similar action in the firmware of the SS3-615, and automatically trigger the digital out switch value based on the measurement value. For the example in this paper, we'll configure the control loop so that when the level of the tank goes above 30 inches, the digital out switch will be enabled, which triggers a reset on the PLC controlling the system which will then trigger a pump to start emptying the tank..

The following steps outline how to configure the Digital Out Switch settings on the SS3-615 to perform this operation.

Enable the SS3-615 Digital Out Switch

Select the SS3-615 in the List View to display the Sensor Details Page. Click on the gear icon to edit the sensor settings. When the resulting SS3-615 Edit Sensor Details page appears, you

will notice that the default setting for the Digital Out Switch mode is Disabled. Select "Automatic" for the Digital Out Switch mode.
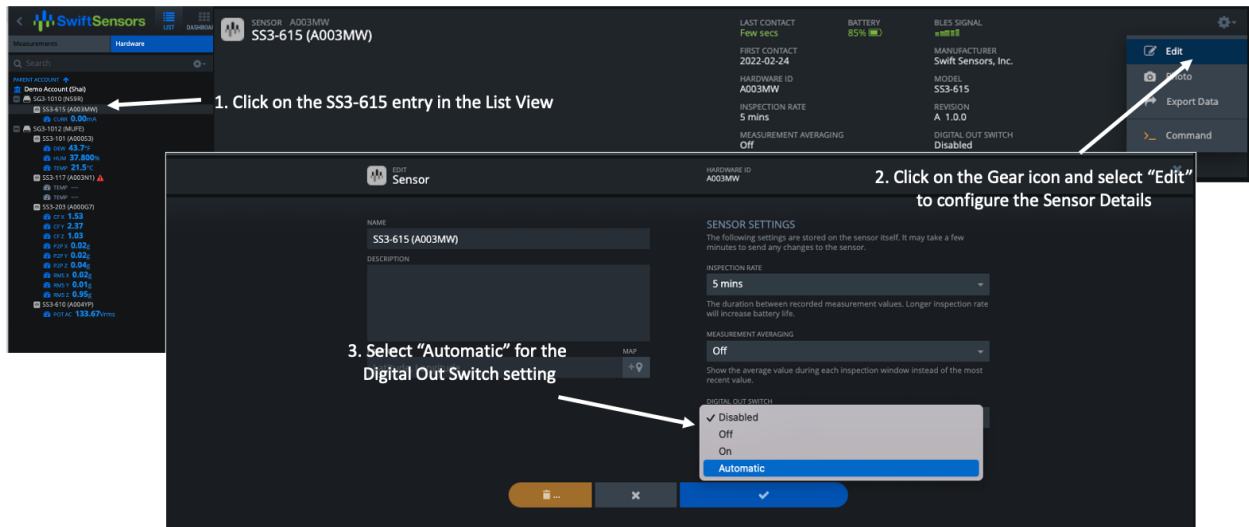
Configure Digital Out Switch Settings

When you enable the Digital Out Switch by selecting Automatic, you will notice the settings for configuring the Digital Out Switch behavior appears. Enter the values below to configure the simple on-board control loop and click on the blue Checkmark to confirm your changes:

- High Trigger: **30 Inches**
- Low Trigger: **24 Inches**
- Trigger to Switch On: **High trigger**
- Control Rate: **30 sec**

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recent value.

DIGITAL OUT SWITCH

Automatic

Maintain a switch state, or automatically flip the switch based on high and low triggers.

HIGH TRIGGER

30   in

Flip the switch if the measurement rises above this value in automatic mode.

LOW TRIGGER

24   in

Flip the switch if the measurement falls below this value in automatic mode.

TRIGGER TO SWITCH ON

High trigger

The trigger used to turn the switch on in automatic mode. The other trigger will turn the switch off.

CONTROL RATE

30 sec

The measurement sample rate that controls the switch in automatic mode.

Based on these settings, the sensor will measure the output from the LVR36 Float Level Transmitter, convert that current signal into a distance/level measurement represented in inches, and enable the digital switch out when the level goes above 30 inches. The switch will trigger a reset that triggers a pump to start to empty the tank. Once the tank level goes below 24 inches, the digital switch will be disabled. The chart below illustrates these steps:
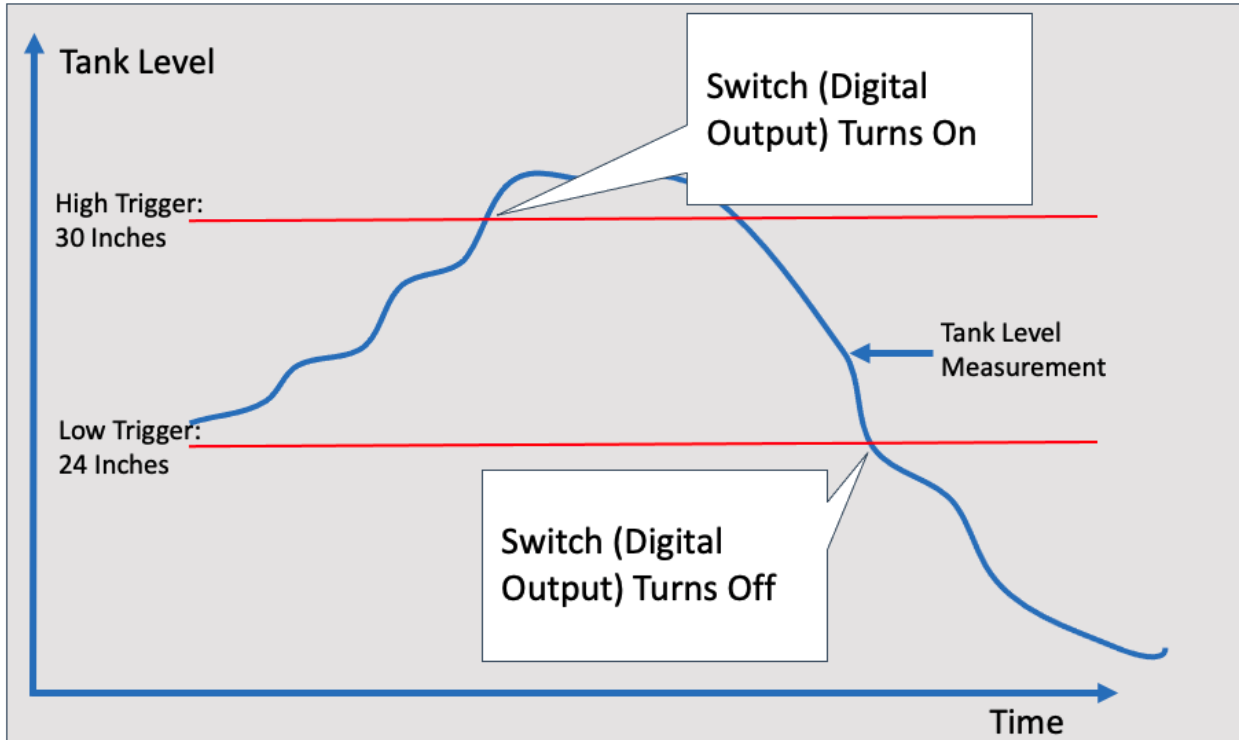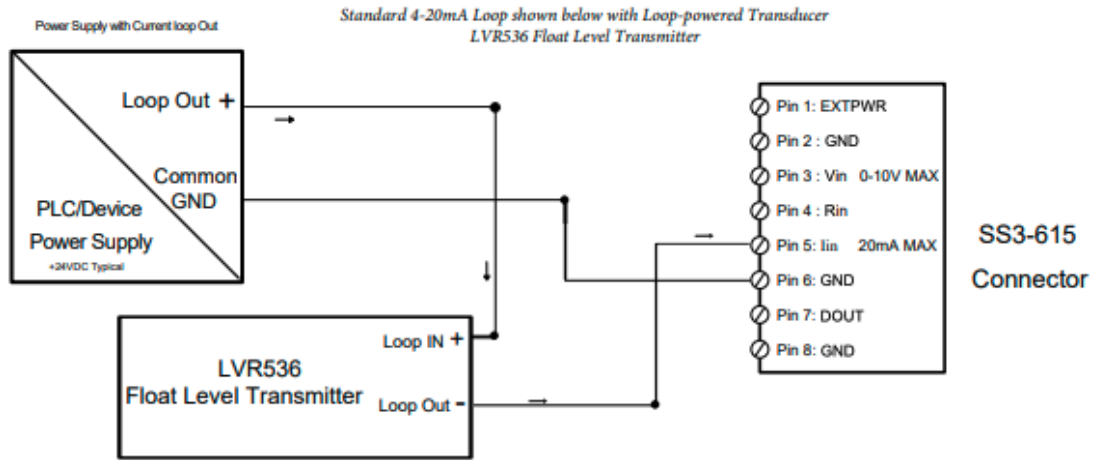
SS3-615 Wiring Considerations:

The SS3-615 Wireless Universal Analog Sensor Adapter has three different modes for accepting voltage, current, or resistance-based transducers. For a more complete description of wiring options and recommendations, please refer to the product datasheet. [link]

For the example described in this paper, the LVR536 Level Sensor and the SS3-615 adapter are both powered by a PLC (in our example, the PLC is triggered to reset the system when the alarm condition is true). The wiring diagram for connecting the LVR536 Float Level Transmitter to the SS3-615 is shown below:
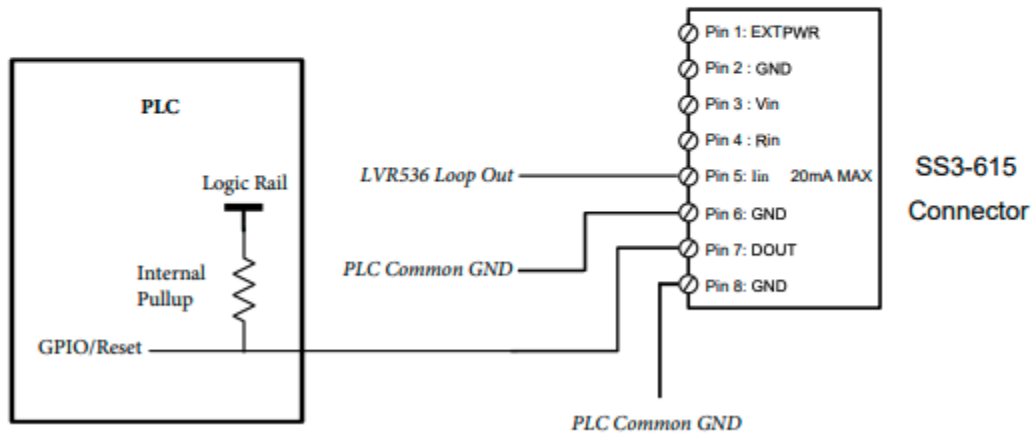
Loop-Powered Transducers with 4-20mA Output

Standard 4-20mA Loop shown below with Loop-powered Transducer
LVR536 Float Level Transmitter

Power Supply with Current loop Out

PLC/Device Power Supply
+24VDC Typical

Loop Out +

Common GND

LVR536 Float Level Transmitter

Loop IN +

Loop Out -

Pin 1: EXTPWR
Pin 2 : GND
Pin 3 : Vin 0-10V MAX
Pin 4 : Rin
Pin 5: Iin   20mA MAX
Pin 6: GND
Pin 7: DOUT
Pin 8: GND

SS3-615 Connector

The wiring diagram for the Digital Out Switch is shown below:

DOUT Use Case Example: Logic Control

Operation of Use Case: Logic Control for GPIO/Reset Signal
DOUT Trigger may be used to control Logic Level signals (up to +24vdc)

PLC

Logic Rail

Internal Pullup

GPIO/Reset

LVR536 Loop Out

PLC Common GND

Pin 1: EXTPWR
Pin 2 : GND
Pin 3 : Vin
Pin 4 : Rin
Pin 5: Iin   20mA MAX
Pin 6: GND
Pin 7: DOUT
Pin 8: GND

SS3-615 Connector

PLC Common GND

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Conclusion

The Swift Sensors SS3-615 Wireless Universal Analog Sensor Adapter enables you to connect almost any analog sensor to the internet, and at the same time implement a real-time simple control loop to measure and react to conditions using a digital out switch.