MicroStrain by HBK Technical Note

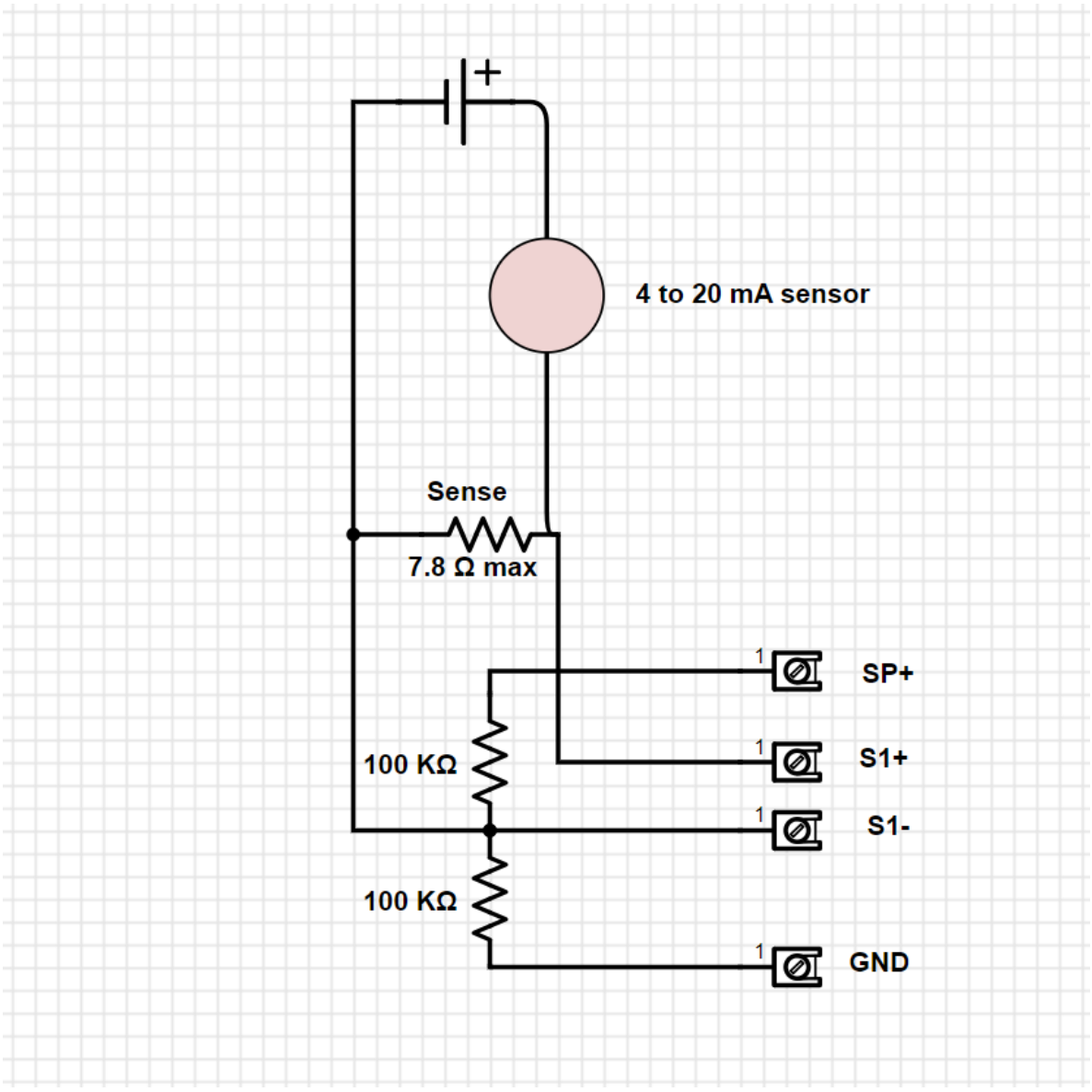
V-Link-200® Wireless Voltage Node

Connecting and calibrating a 4 to 20 mA sensor on one of the four differential channels

This example is using a 0 – 100 PSI , 4 to 20 mA sensor

Connections

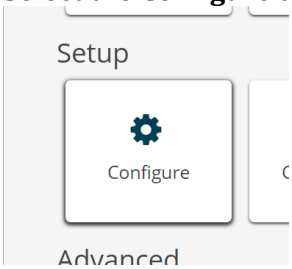
- **Place qty 2 100 KΩ resistors between SP+, S#- and GND as shown**
- **Place sense resistor, 7.8Ω max (156mV ÷ 20 mA, between S#+ and S#-**
  - **Measure the sense resistor prior to installing with ohm meter to get precise value**
  - **5.1 Ω for this example**
- **Connect 4 to 20 mA sensor to power supply and sense resistor as shown**



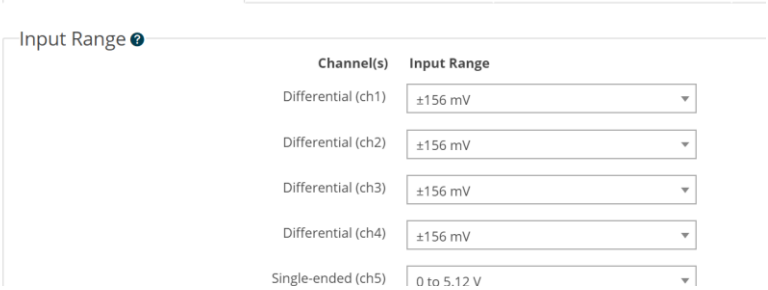
Calibration

DO NOT POWER THE 4 to 20 mA SENSOR AT THIS TIME

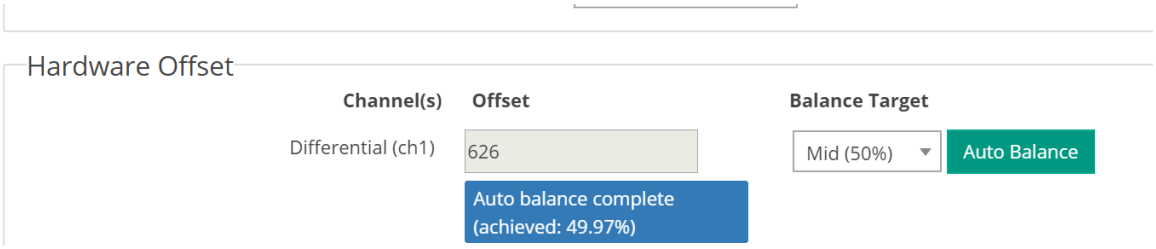
Select the Configure tile



Select the ±156 mV range

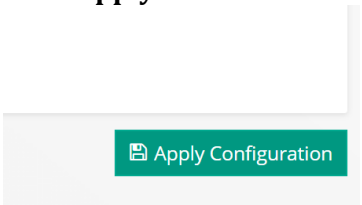


Short together S#+ and S#-
Verify Mid for the Target and click the Auto Balance button



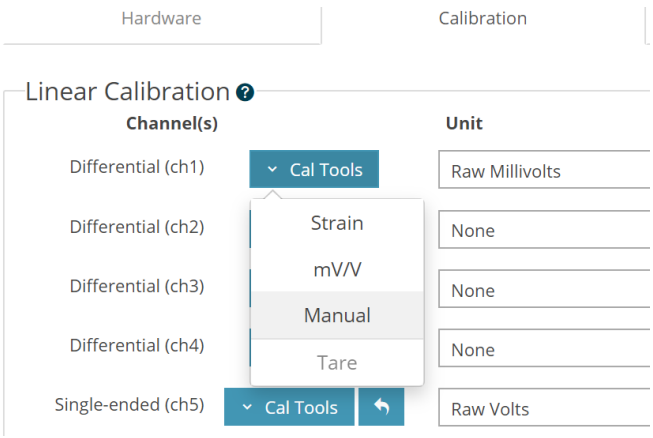
The achieved balance should be very close to 50%

Click Apply



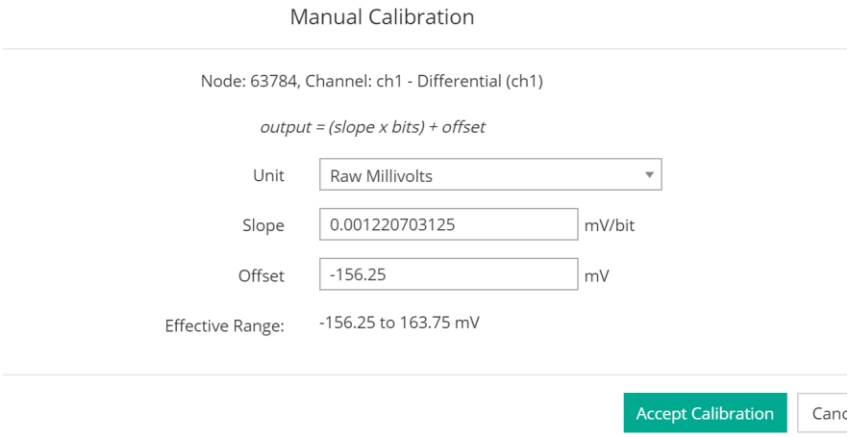
Select the Calibration tab

Select the channels Cal Tools button and click on Manual



<u>To output mV</u>

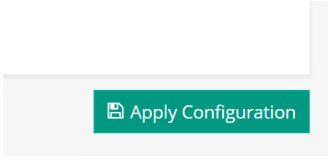
Selecting Raw Millivolts should populate the Slope and offset as shown, if not populate the slope and offset using the table below. Click Accept Calibration button



Input Range	[Gain]	Slope	Offset
±156 mV	[16]	0.0012207031	-156.25
±78.1 mV	[32]	0.0006103516	-78.13
±39.0 mV	[64]	0.0003051758	-39.06
±19.5 mV	[128]	0.0001525879	-19.53
±9.76 mV	[256]	0.0000762939	-9.77
±4.88 mV	[512]	0.0000381470	-4.88
±2.44 mV	[1024]	0.0000190735	-2.44
±1.22 mV	[2048]	0.0000095367	-1.22

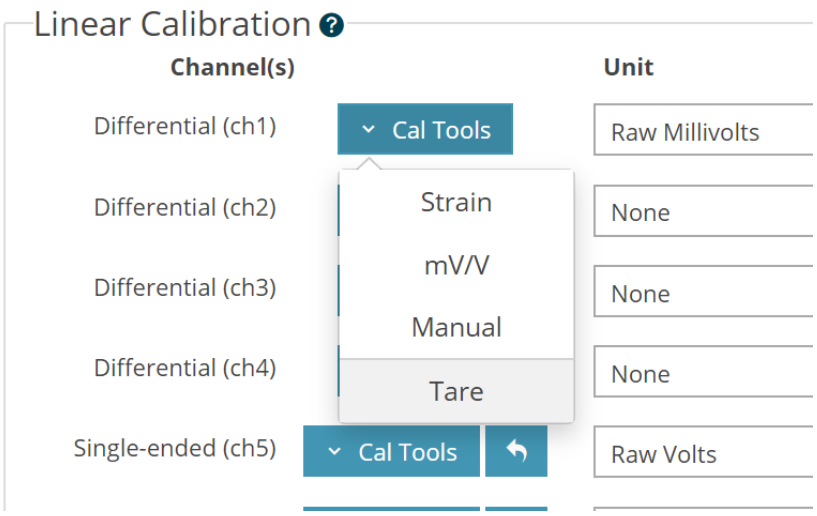
Table 5 - Raw Voltage Output

Click the Apply Configuration button



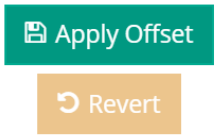
With short still in place

go back to the Cal Tools and select Tare



Click the sample now button several times, while observing the Current Measurement.

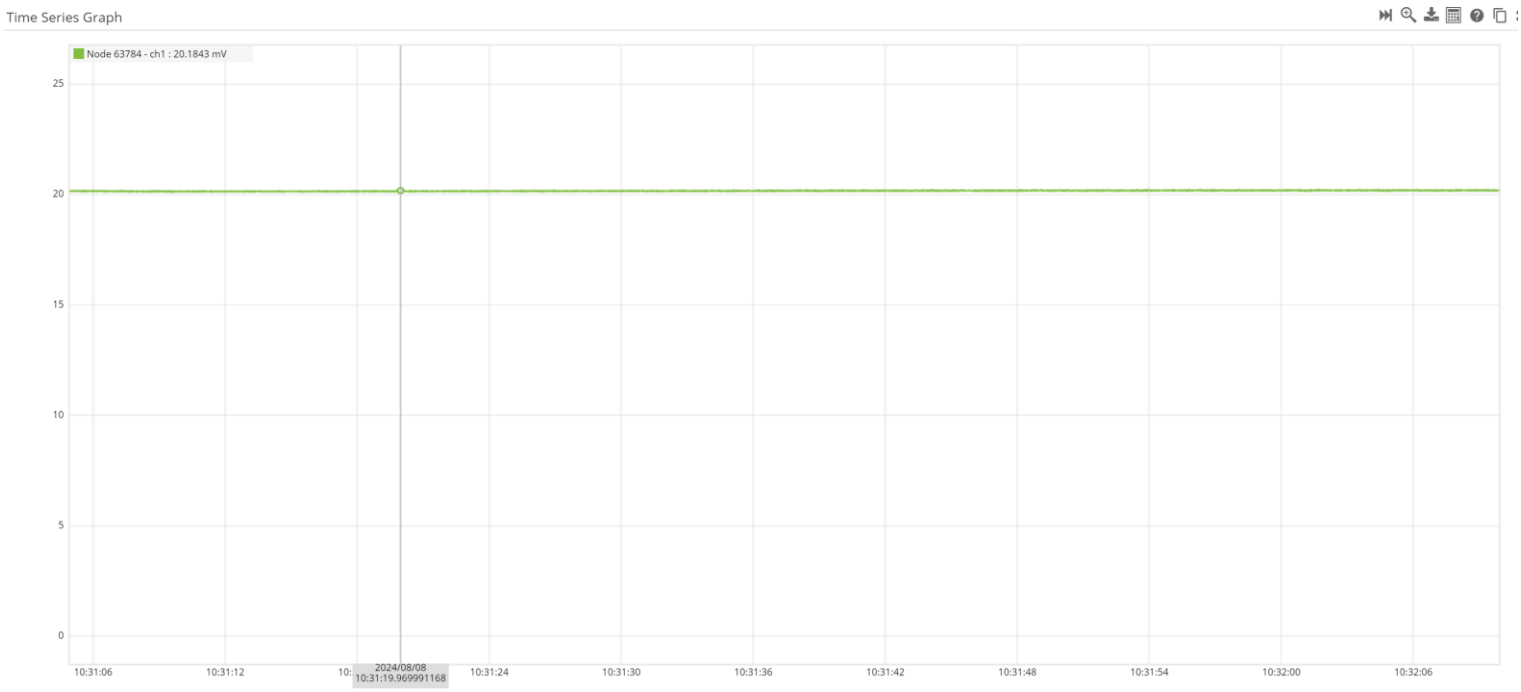
Once a steady number is seen there, click the Apply Offset button



Remove the short

Close the calibration and configuration screens

Power up the 4 to mA sensor and collect data. With no load on the 4 to 20 mA sensor there should be ~20.4 mV (4 mA x sense resistor Ω)



If able, apply the max load to the 4 to 20 mA sensor and observe if the max mV is ~102 mV (20 mA x sense resistor Ω)

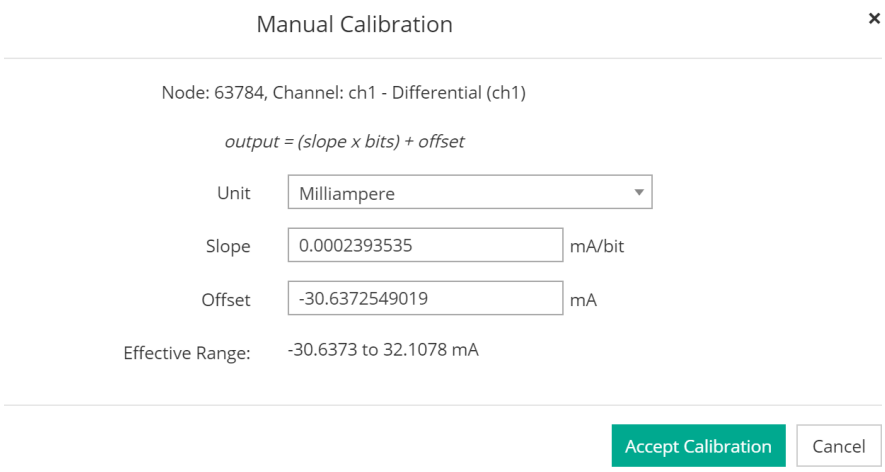
<u>Note: If the signal is negative and positive was expected, either swap the leads on S#+ and S#- and recalibrate, or swap the signs on the slope and offsets.</u>

<u>To output mA</u>

Take the Slope and Offset values from the table above and ÷ the value by the measured sense resistor

Slope
0.0012207031 ÷ 5.1 = 0.0002393535
Offset
-156.25 ÷ 5.1 = 30. 6372549019

In the Manuel Cal tool, select Milliampere and enter the calculated mA slope and offset

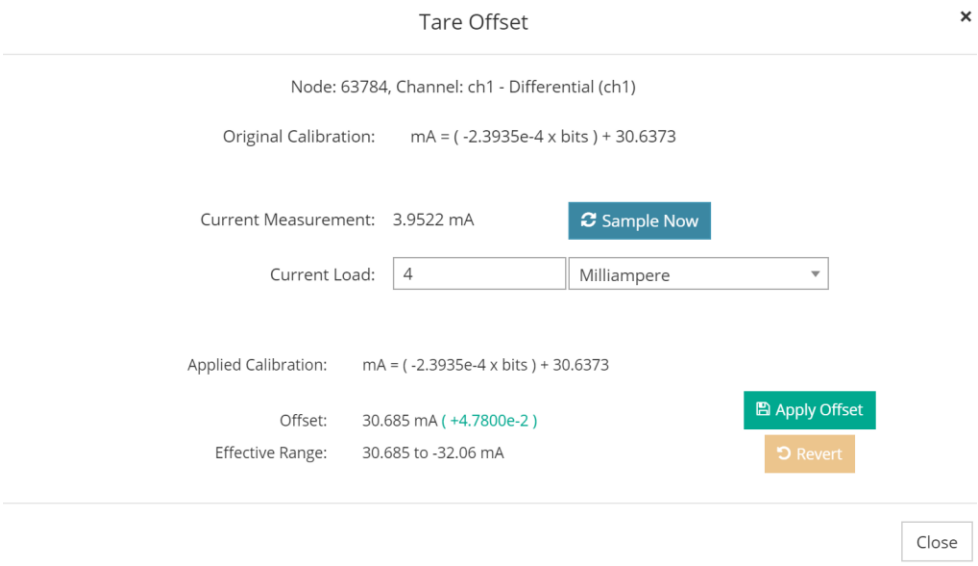


Accept Calibration and Apply Configuration

Power up the 4 to 20 mA sensor with no load, output should be 4 mA

Go to the Tare tool

Enter Current Load of 4 Milliampere
Click the Sample Now button several times to get a steady Current Measurement value
Click Apply Offset



Close Tare and Configuration screen

Set the node sampling and verify that with no load on the 4 to 20 mA sensor that the signal is ~4 mA

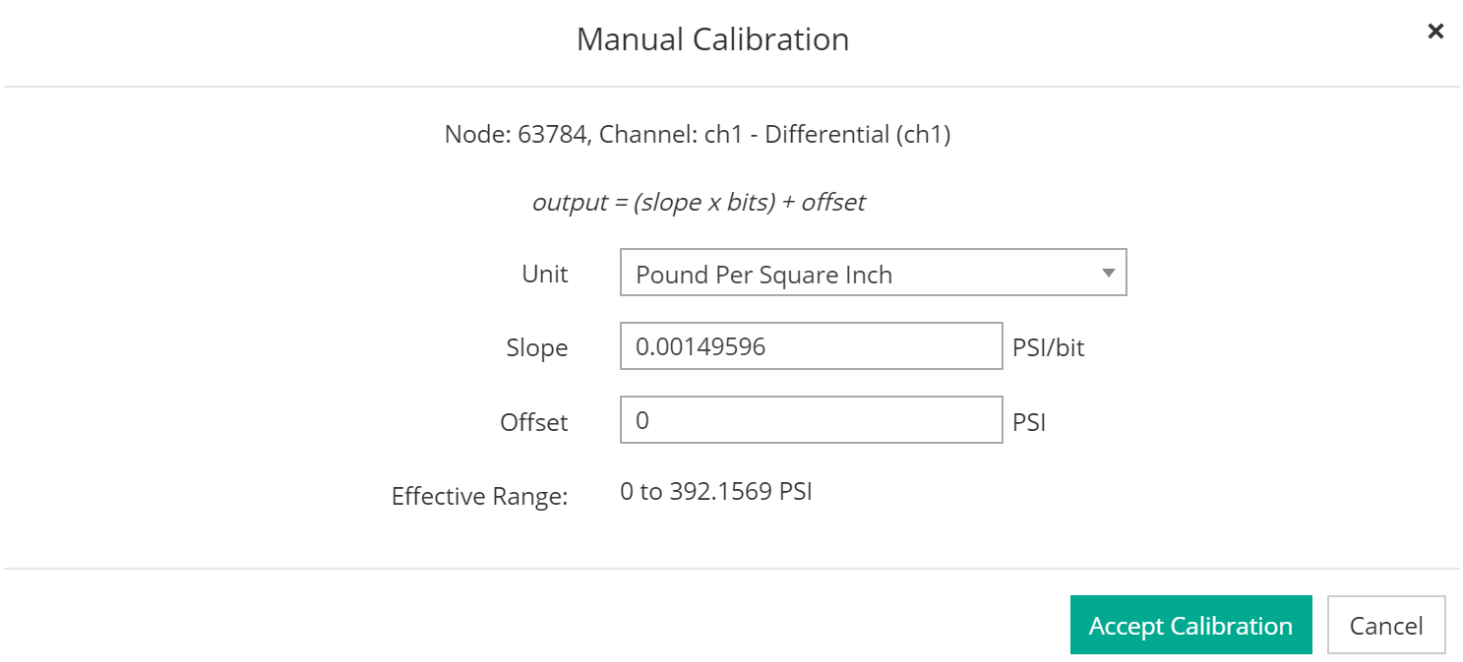
If able, apply the max load to the 4 to 20 mA sensor and observe if the max mA is ~20 mA

To output engineering unit

Calculate the engineering unit slope

			min	max	
Slope			0	100	psi
0.001220703	mV/Bit		20.4	102	mV
				100	PSI range
				81.6	mV range
		mV Range ÷ PSI Range		1.22549	PSI/mV
		PSI/mV x mV/Bit		0.001496	PSI/bit

Manual enter the Unit and slope, can leave the offset as 0 as the next step is to Tare



Accept Calibration and Apply Configuration

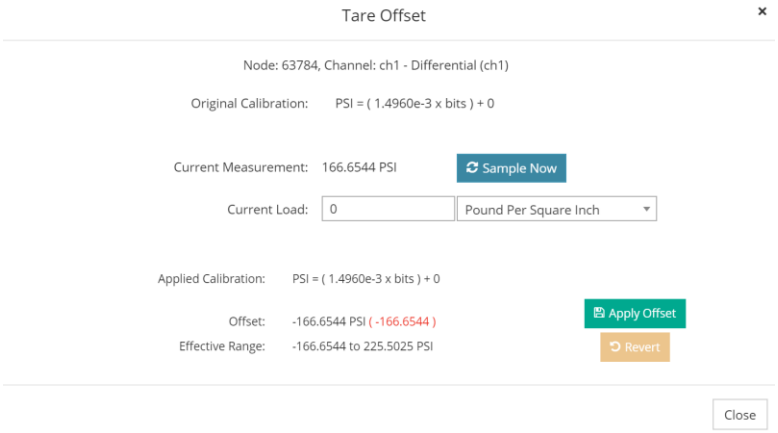
Go to the Tare screen

With no load on the 4 to 20 mA sensor

Leave the Current Load at 0

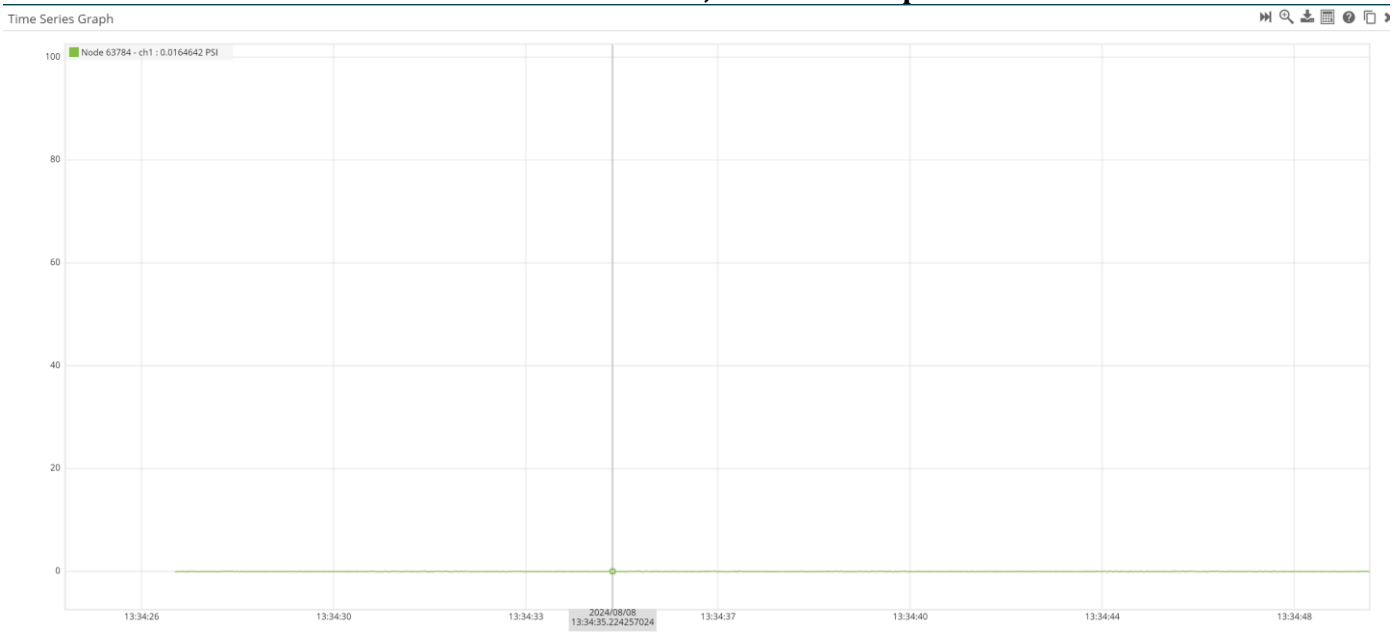
Click the Sample Now button several times to get a steady Current Measurement

Click the apply Offset button



Close the Tare and Configuration screen

Collect data with no load on the 4 to 20 mA sensor, for this example should be ~0 PSI



If able, apply the max load to the 4 to 20 mA sensor and observe if the max engineering unit matches the sensor rating.

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