SG-Link-200® Connecting and calibrating mV/V sensors

Component Overview

The SG-Link-200 is a 3-channel wireless analog sensor node with 3 differential input channels (strain channels) designed to support strain gauges and load cells.



Series U9C Miniature Tension/Compression Loadcell with 2 mV/V Output sensitivity and 100 LBF full scale range used for the following examples.





Connecting the Load Cell to the SG-Link-200

 Connect the wires of the sensor to one of the SG-Link-200 differential input channels (channels 1-3) according to the below diagram (reference the <u>SG-LINK-200 Quick Start</u> <u>Guide</u>):



Note: If the output goes down when load is applied to the sensor reverse the green and white wires in the SG-Link-200.

Configuring the SG-Link-200 in SensorConnect

- 1. Open SensorConnect and power on the SG-Link-200.
- 2. From the node list select the node being tested.
- 3. Click on the **Configure** tile under the Control options.



4. Take the sensitivity of the sensor and multiply it by the channel excitation voltage. In the case of the SG-Link-200 the excitation voltage is **2.5V**. The result of this will allow you to select the appropriate Input Range. See the below example.

Example:

| _oadcell output sensitivity: | 2mV/V |
|------------------------------|-----------------------------|
| Excitation voltage: | 2.5V |
| Result: | 2mV/V x 2.5V = 5.0mV |

In this example you would want to select **+/- 19.532mV** from the Input Range dropdown options.



MicroStrain Sensing Technical Note

| Excitation Voltage 😨 | 2.5 V 💌 | |
|-----------------------|---------------|----------|
| Input Range 🝘 | | |
| Channel(s |) Input Range | |
| Differential (ch1 |) ±19.532 mV | |
| | Gain: 4 | * |
| Differential (ch2 |) ±312.5 mV | |
| | Gain: 8 | |
| Differential (ch3 |) +156.25 mV | |
| | Gain: 16 | |
| Low Pass Filter @ | +78 125 m\/ | |
| Channel(s | Gain: 32 | |
| | , 100 000 mV | |
| Differential (ch1-ch3 |) ±39.063 mv | |
| | duin. of | _ |
| | ±19.532 mV | |
| | Gain: 128 | * |

5. Click on the **Calibration** tab.

| Hardware | Calibration | D | Sampling | Power |
|---------------|----------------------|-------------|----------|----------|
| | Excitation Voltage 🛿 | 2.5 V • | | |
| Input Range 🛛 | Channel(s) | Input Range | | |
| | Differential (ch1) | ±19.532 mV | | ~ |
| | Differential (ch2) | ±39.063 mV | | <i>•</i> |
| | Differential (ch3) | ±39.063 mV | | 7 |

6. Click on **Cal Tools**, then select **mV/V**.

| Hardware | | Calibration 0 | Sampling | Power |
|----------------------------------|---------------|---------------|----------|--------------------------------------|
| Linear Calibration Channel(s) | 0 | Unit | | Calibration |
| Differential (ch1) | ✓ Cal Tools ① | Microstrain | Ŧ | = (-1.8025e-3 x bits) + 17354.752 |
| Differential (ch2) | Strain | Microstrain | | = (-1.7594e-3 x bits) + 15604.3584 |
| Differential (ch3) | mV/V | Microstrain | • | = (-1.7419e-3 x bits) + 15488.2051 |
| | Manual | | | |
| | Tare | | | |



- 7. Enter the sensor's output sensitivity into the mV/V max capacity input field.
- 8. Enter the sensor's full scale range into the Max Capacity input field.
- 9. Enter the Unit desired from the drop-down menu.

| mV/V Calibration | | | | × |
|------------------|---------------------|------------------|--------------------|--------|
| Node: 32743, Cha | annel: ch1 - Differ | ential (ch1) | | |
| Sensitivity: 2 | | mV/V | | |
| Max Capacity: 10 | 0 | Pound | Ŧ | |
| 2 | Slope: 4.6566 | e-5 lbs/bit | | |
| C | Offset: -390.62 | 5 lbs | | |
| Effective R | ange: -390.62 | 5 to 390.625 lbs | | |
| | | | Accept Calibration | Cancel |
| | | | | |
| | | | | |

10. Click on Accept Calibration.



11. Click on Apply Configuration.



12. Go back to the Cal tools and Select Tare

| Hardware | | Calibration 0 | Sampli | ng | Power |
|----------------------|----------------|---------------|--------|------------------|-----------------------|
| Linear Calibration @ | | | | | |
| Channel(s) | | Unit | | Calibration | |
| Differential (ch1) | Cal Tools | Pound | v | = (4.6566e-5 x | : bits) - 390.625 |
| Differential (ch2) | Strain | Microstrain | Ψ. | = (-1.7594e-3 : | x bits) + 15604.3584 |
| Differential (ch3) | mV/V Manual | Microstrain | ~ | = (-1.7419e-3 ; | x bits) + 15488.2051 |
| | Tare | | | | |



13. With no load on the load cell (or to zero out with a pre-loaded sensor) Click the **Sample Now** (a good idea here is to click the Sample Now button several times and observe the current Measurement remains approx. same value).

| Tare Offset | | | | × |
|----------------------|--------------------------------|-----------------|--------------|---|
| Node: 3 | 2743, Channel: ch1 - Differe | ntial (ch1) | | |
| Original Calibrati | on: lbs = (4.6566e-5 x b | its) - 390.625 | | |
| Current Measureme | ent: 0.4772 lbs | C Sample Now | | |
| Current Lo | ad: 0 | Pound | Ŧ | |
| Applied Calibration: | lbs = (4.6566e-5 x bits) - 3 | 90.625 | | |
| Offset: | -391.1022 lbs (-0.4772) | | Apply Offset | |
| Effective Range: | -391.1022 to 390.1478 lbs | | D Revert | |

- 14. Click the **Apply Offset** button to write the value to the node.
- 15. Under the Device section, click on the node, then click on the **Sample** tile from the Control panel.



16. Enable the channel being tested with the Sensor and the other sampling desired.

| Net | Network Settings: 🔽 Synchronized 🛛 🔽 Lossless 🖗 Protocol: 🛛 LXRS 💌 | | | | | | | |
|-----|--|-------------------|--|--|-------------|----------------|---------|--------|
| ~ | Node | Channels Sampling | | | Data Type 🚱 | Log/Transmit 🕑 | % Total | Status |
| ~ | 32743 | 1 active 🔹 | 64 Hz continuously | | float 🔹 | Transmit 🔹 | 3.13% | ✔ Ok |
| | | Raw Cha | annels 🕑 ential (ch1) ential (ch2) ential (ch3) | | | | | |



17. Once node is all configure Click Apply and Start Network.



18. Click the Data tab, then click on +Add Widget.



19. Select the Time Series widget.

| + Add Widget | | | | |
|---|-------------------------------|--------------|-----------------|--|
| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | -0.1138 | |
| Time Series | Linear Gauge | Radial Gauge | Numeric Display | |
| | Channel Tree Exts 500001 | | 14 14 14 | |

20. Select the node and channel to view the data output in the time series widget.





MicroStrain Sensing Technical Note



21. With no load (or at the pre-loaded value the channel was Tared at) the data coming in should be approx. zero

22. If possible, place known loads on the sensor to verify calibration.

