Wireless Sensor Nodes

Measuring Inclination with a G-Link®-LXRS®

OVERVIEW

The G-Link®-LXRS® wireless node is designed for use as an accelerometer, but with quick modifications to the calibration values it can also be used as a +/- 45° inclinometer. The measurement resolution will be better with +/- 2 *g* node than with a +/- 10 *g* node, but either will achieve an accuracy of +/- 2°.

Using the G-Link -LXRS as an inclinometer is accomplished using the node's factory calibration values and a Microsoft Excel® calculator available from the LORD MicroStrain® website.

PROCEDURE

1. **Find the factory calibration values:** The node calibration certificate is provided with the node when it is purchased. It includes the calibration values for *slope* and *offset* for each channel. Locate the calibration values on the certificate. Alternatively these values can be retrieved from the node memory by looking at the channel configuration in Node Commander® (*Figure 1 - Node Calibration Values*).

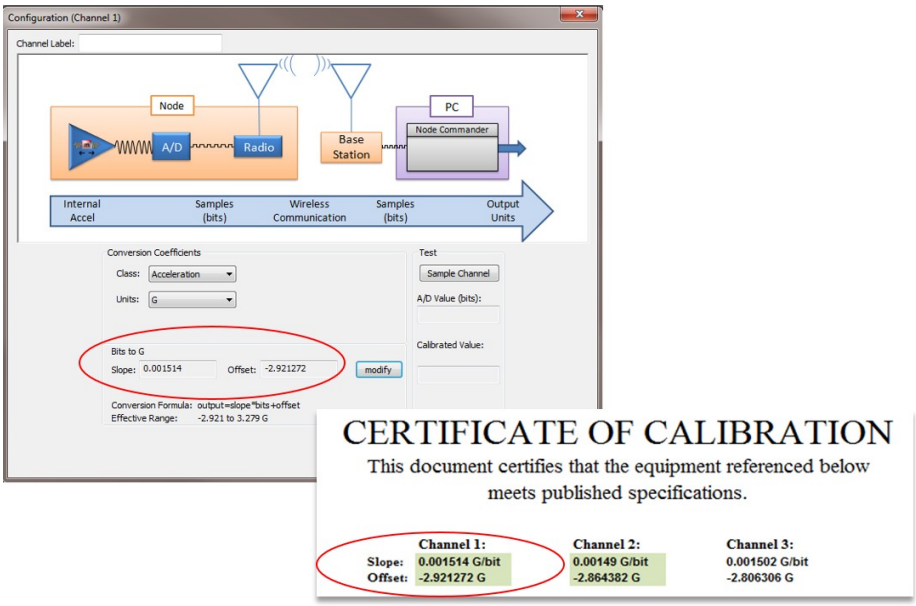

Figure 1 - Node Calibration Values

2. **Open the calculator:** Click the link below to download the inclination calculator from the LORD MicroStrain® website. It will launch automatically in Microsoft Excel®.

   G-Link Inclination Calculator

3. **Calculate the new slope and offset value:** In the calculator, enter the current factory calibration values in the corresponding fields (*Figure 2 - New Calibration Values*). Up to two channels can be calculated at once. The new calibration values are displayed on the graph as the formula $y = mx + b$, where m equals the new slope value and b equals the new offset value.

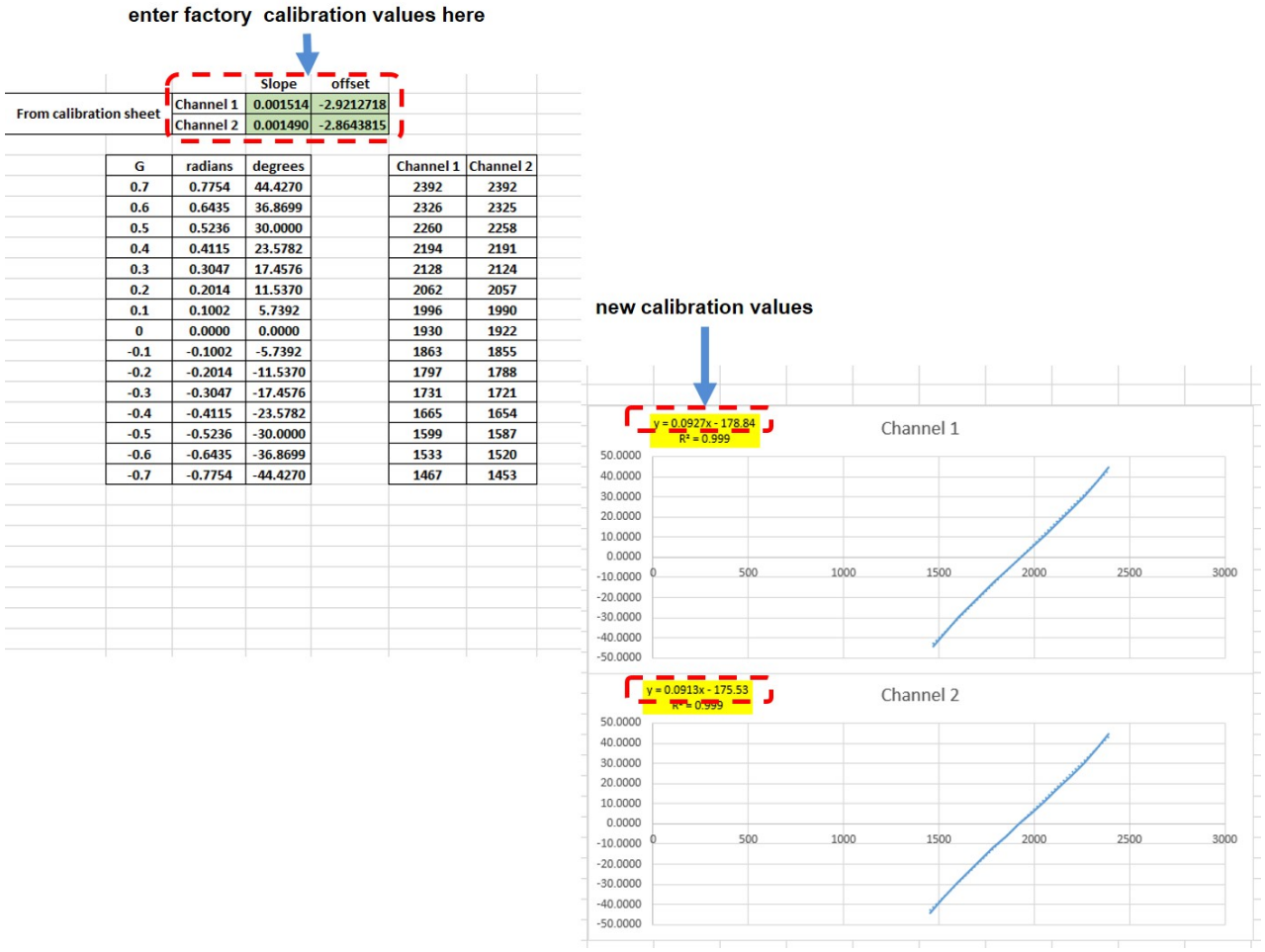

Figure 2 - New Calibration Values

4. **Enter the node configuration menu:** Open Node Commander®, and establish communication with the node through the gateway. Open the node configuration menu by right-clicking on the node name and selecting Configure > Configure Node. Check the Channel Enabled check box next to the channel

name, and then the channel Configure button to open the channel configuration menu (*Figure 3 - Modify Calibration Values*).

5. **Change the units:** In the configuration window, change the conversion coefficients class to Custom Units and the units to Degrees (deg).

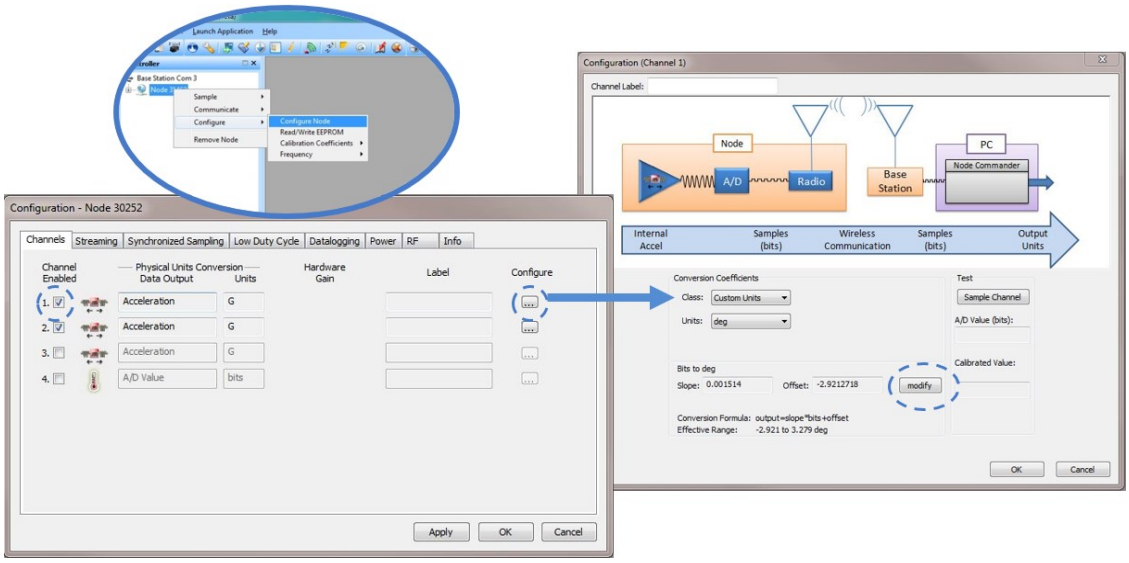

Figure 3 - Modify Calibration Values

6. **Enter the new calibration values:** Use the Modify button to allow entering of the new values in the channel configuration window. Select Lock when completed and exit the menu (*Figure 4 - Enter New Values*).

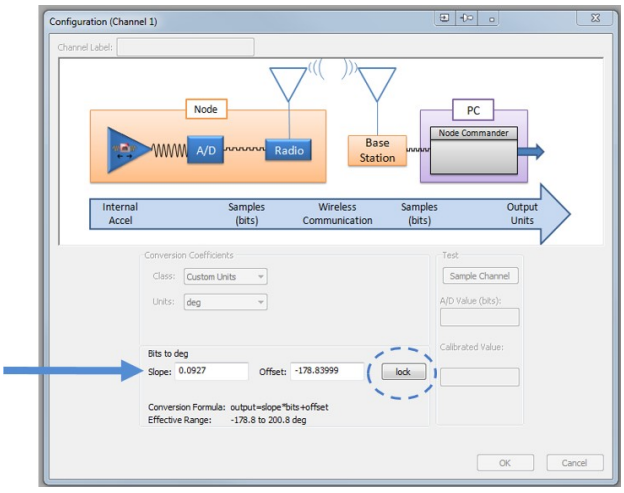

Figure 4 - Enter New Values

8. **Repeat for channel two and apply the settings:** Modify the channel 2 units and calibration values, as determined in the inclination calculator. Apply, and exit the configuration menus.

9. **Measure inclination:** Start node sampling in Node Commander®, and view the acquired data. Data acquisition can be monitored locally in Node Commander or remotely using the SensorCloud™ platform on an Ethernet-enabled network (*Figure 5 - Measuring Inclination with SensorCloud™*). Tilt the node on each on the axes with the new calibration values, and verify the outputs.

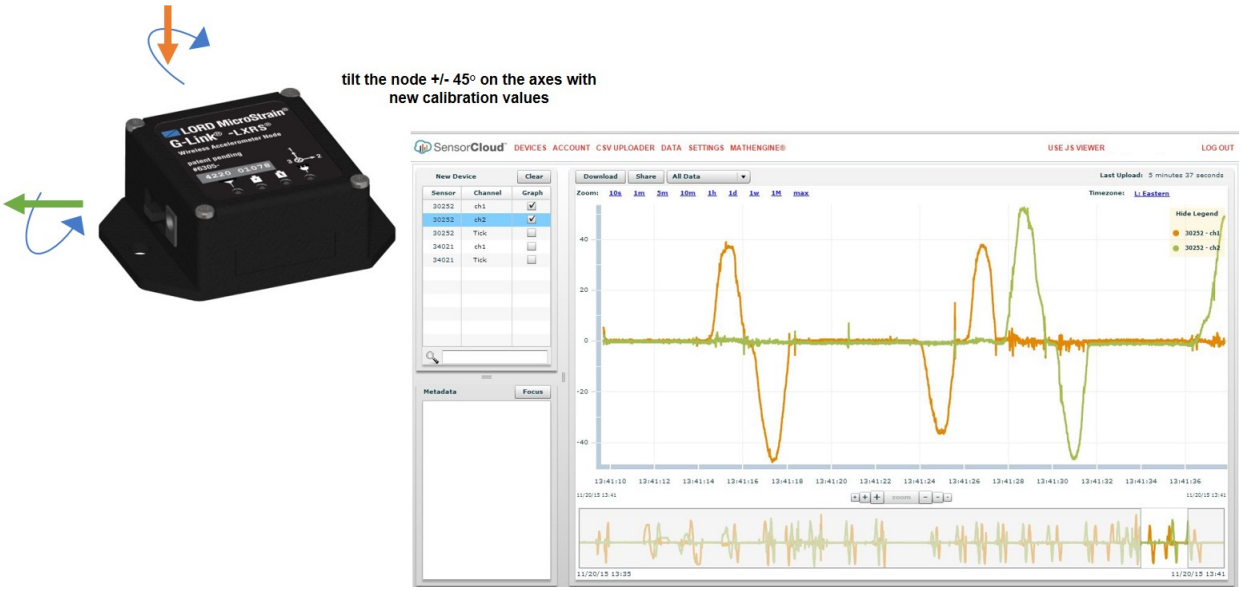

Figure 5 - Measuring Inclination with SensorCloud™