V-Link®-LXRS® and SG-Link®-LXRS®

Using Pressure Transducers

Overview

The LORD MicroStrain® V-Link®-LXRS® Wireless 7 Channel Analog Input Sensor Node will support pressure transducers on channels 1, 2, 3 and 4 and the SG-Link®-LXRS® Wireless 2 Channel Analog Input Sensor Node will support pressure transducers on channel 1. This technical note explains use of a typical pressure transducer with SG-Link®-LXRS® and Node Commander® software; the V-Link®-LXRS® mirrors the instruction.

Pressure Transducer

For our example, we are using a Viatran Model 817 pressure transducer. The Model 817 is a submersible instrument designed to give accurate level measurement in up to 1,200 feet of water, and is used for both general water applications and corrosive applications.

Wiring

Refer to the Model 817 Installation Data Manual (page 4) and the SG-Link®-LXRS® Quick Start Guide (frame 2C) to connect the sensor to the node.

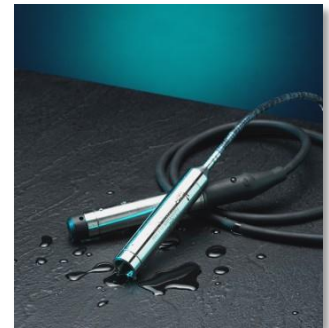| Model 817 Pressure Transducer		SG-Link-LXRS	
Lead color	*Lead use*	*Pin number*	*Pin nomenclature*
Red	+ Power	1	VXC
Black	+ Signal	2	S+
Green	- Power	4	GND
White	- Signal	3	S-
Shield	GND	4	GND

Table 1: *Wiring*

Figure 1: *Model 817 Pressure Transducers*

Step 1

- Locate the specific calibration sheet provided by the pressure transducer manufacturer and any other documents as necessary to determine the following parameters:
  - Calibration Voltage
  - Full Scale Reading
  - Measurement Range
- We find the Calibration Voltage embossed on the barrel of the transducer (10 V).
- We find the Full Scale Reading (86.073 mV) on the calibration document, as shown in Figure 2.
- We find the Measurement Range embossed on the barrel of the transducer (20 feet).
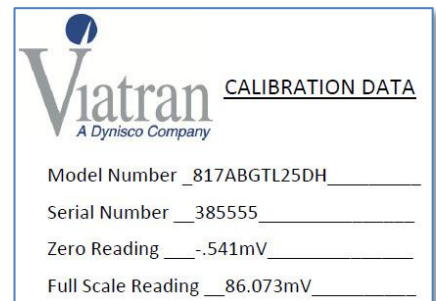

CALIBRATION DATA

Model Number _817ABGTL25DH_____

Serial Number __385555_____

Zero Reading ___-.541mV_____

Full Scale Reading __86.073mV_____

Figure 2: *Calibration Document*

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Step 2

- Download our Pressure Transducer Calculator here. It is a Microsoft Excel spreadsheet (.xlsx).
- Open the spreadsheet and enter values in the green boxes as follows:
  - Enter 10 in the green Calibration Voltage cell of the spreadsheet.
  - Enter 86.073 in the green Full Scale Reading cell of the spreadsheet.
  - Enter 240 in the green Rated Depth cell of the spreadsheet. We are electing to make our engineering units (EU) in **inches** instead of **feet**, i.e., 20 feet * 12 inches =240 inches as our Measurement Range.
  - Enter 104 in the green User Settable Gain cell of the spreadsheet. 104 is the default Hardware Gain of the SG-Link®-LXRS®.
- Following our inputs, we see a result of ~201 generated as our Max Node Output using the Low-scale Balance. This 201 is 201 inches; our setup, as we have done it, allows us to measure water depths of 0 to 201 inches.
- **Note:** by varying the User Settable Gain and the Balance (high, mid, low), we would be able to make setups with higher and lower resolution, and differing ranges. Please speak with your LORD MicroStrain® support engineer if further detail is needed.

	A	B	C	D	E	F	G	H	I	J
1	Calibration Voltage	10.00	V				Node Gains			
2	Full Scale Reading	86.07	mV		V-Link-LXRS			SG-Link-OEM-LS		SG-Link-1CH-LXRS
3	Full @ 3V exc	25.82	mV		mV Range	Gain		Gain		Gain
4	Rated Depth	240.00	EU		±70mV	21		20		104
5					±50mV	30		40		
6	Full Range V	51.64	mV		±20mV	75		80		
7	Optimal Gain	58.00			±10mV	147		160		
8	User Settable Gain	104.00			±5mV	291		320		
9	Full Scale Input V	28.85	mV		±2.5mV	569		640		
10	Full Range V w gain	5370.96	mV max 3V		±1mV	1214		1280		
11	Full Range (+/-)	268.11	EU		±600nV	2222		2560		
12					±350nV	3799				
13	Slope	0.06546	EU per Bit		±100nV	13074				
14					Max Node Output		Min Node Output			
15	Using High-scale Balance (~3072 bits)				33.51		-201.08			
16	Using Mid-scale Balance (~2048 bits)				134.05		-134.05			
17	Using Low-scale Balance (~1024 bits)				201.08		-33.51			

Figure 3: *Pressure Transducer Calculator*

Step 3

- Establish communication as normal between the SG-Link®-LXRS® and Node Commander® software.
- Right-click the node and a drop-down menu will appear.
- Click Configure.
- Click Configure Node and the Configuration screen will appear.
- Click the Channels tab.
- Enable channel 1 only by clicking the checkbox; disable channels 2, 3 and 4.
- Click the Configure button (…) to the right of channel 1 and the Channel 1 Configuration screen will appear.
- Select 104 (default) in the Hardware Gain drop-down.
- Select the Low auto-balance radio button.
- Click the Auto-Balance button and an Information window will appear indicating Channel 1 has been balanced to ~2048 bits.
- Click OK and the Information window will disappear.
- Select Custom Units in the Class drop-down.

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- Select Other in the Units drop-down; Other will now represent 'inches'.
- Click the Modify button.
- Enter 0.06546 in the Slope textbox; this value is pulled from the orange Slope cell, calculated in our spreadsheet.
- Enter a temporary value of 0 in the Offset textbox; we will change this shortly.
- Click the Lock button.
- Click OK and the Channel 1 Configuration screen will disappear.
- Click the Streaming tab.
- Uncheck the Continuous Streaming checkbox.
- Enter 20000 in the Sweeps numberbox (~27 seconds).
- Click Apply.
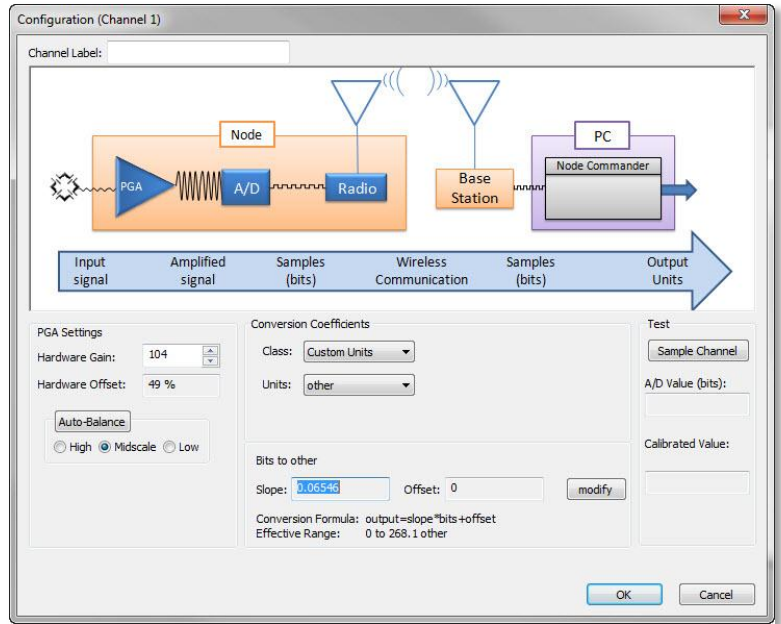- Click OK and the Configuration screen will disappear.

Figure 4: Channel 1 Configuration Screen

Step 4

- Right-click the node and a drop-down menu will appear.
- Click Sample.
- Click Stream.
- Click Start and channel 1 will plot left to right as a green plot line.
- When the stream is ended, observe the mean value of the plot line. In our example in Figure 5, we see a mean value of 132.95.
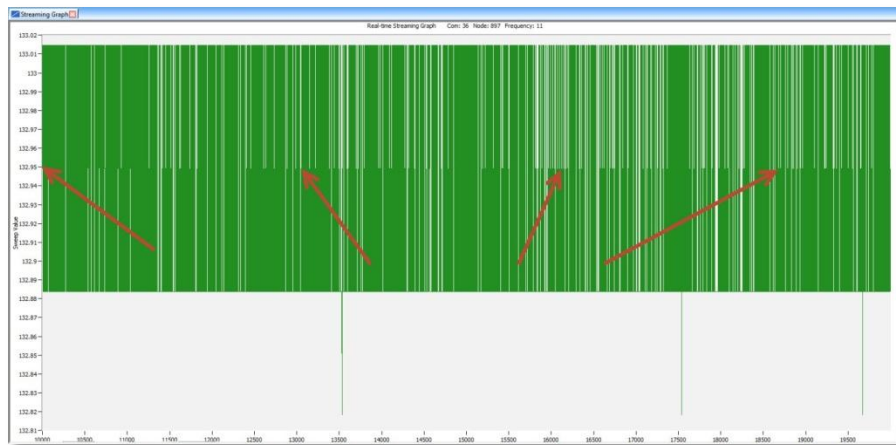

Figure 5: Streaming Graph

- Right-click the node and a drop-down menu will appear.
- Click Configure.
- Click Configure Node and the Configuration screen will appear.
- Click the Channels tab.
- Click the Configure button (…) to the right of channel 1 and the Channel 1 Configuration screen will appear.
- Click the Modify button.
- Enter a value of -132.95 into the Offset textbox; we add the minus to subtract the offset of 132.95 and zero the output.

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- Click the Lock button.
- Click OK and the Channel 1 Configuration screen disappears.
- Click OK and the Configuration screen disappears.
- Again, right-click the node and a drop-down menu will appear.
- Click Sample.
- Click Stream.
- Click Start and channel 1 will plot left to right as a green plot line.
- Observe that channel 1 is now streaming at about 0 (zero).
- **Note:** As a result of our configuration, the engineering units on the Y-axis are in 'inches'; that is to say 'inches of depth'. The pressure transducer will be measuring 0 inches of depth as it sits on your bench as you perform this setup.
- The system is now configured and ready for use.

Support

LORD MicroStrain® support engineers are always available to expand on this subject and support you in any way we can.