

SG-Link[®] -RGD-LXRS[®] Installation Guide

Best Practices for Gauging, Wiring, and Node Installation

OVERVIEW

The SG-Link[®] is a versatile, ruggedized, four-channel analog input node with an integrated accelerometer. The node housing is designed to be installed directly over a strain gauge rosette for easy integration and maximum circuit protection. Strain gauges with an impedance greater than or equal to 350 ohms can be used with the SG-Link[®] -RGD[®].

The node comes with a replaceable battery and a flexible strain gauge bonding cable. The bonding cable connects to the node terminals and is installed underneath the node with the strain gauge to protect them from damage. The node can then be sealed to protect the entire assembly from moisture in harsh environments.

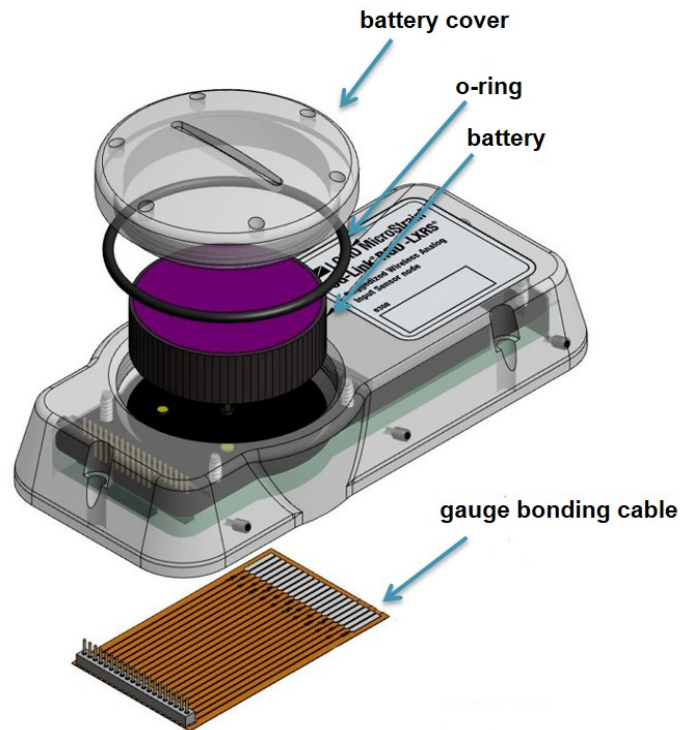


Figure 1 - Node Components

BEST PRACTICES

This technical note provides a best practices guide for gauge and node installation. The recommended method is to install the node over the gauges, epoxy it in place, and back-fill the gauge cavity with sealant. This will offer the greatest protection. Other options include installing the node over the gauges and fastening with screws and routing wires through the holes in the node housing to external gauges (and fastening with either method). The following instructions are for the recommended method.

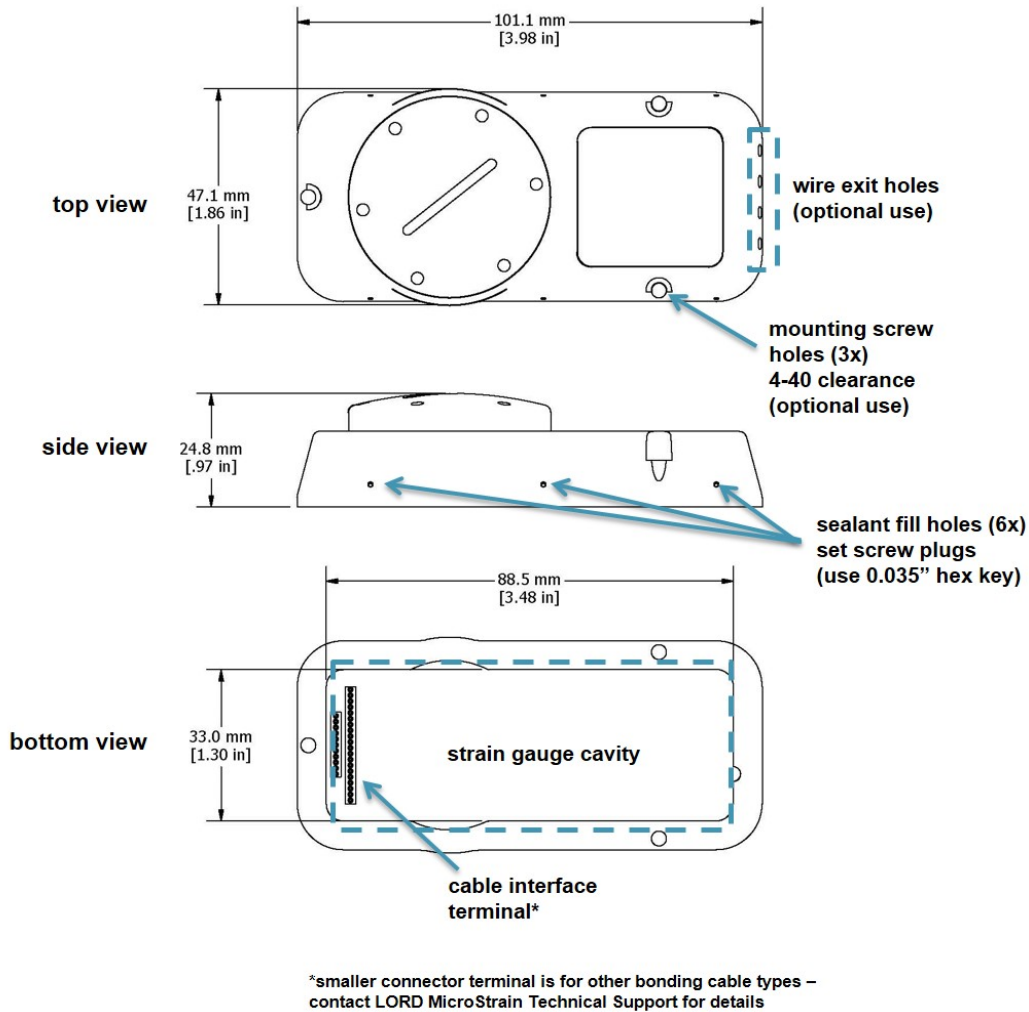


Figure 2 - Node Interface and Dimensions

TOOLS AND MATERIALS

Gauge installation and wiring:

- Node and bonding cable
- Gauges
- Gauge bonding adhesive
- Gauge application tape
- Sandpaper
- Water
- Lint free cloth or paper towels
- Soldering iron and solder
- Denatured alcohol

Node installation

- High-strength adhesive sealant (such as Sikaflex[®] 255 FC or equivalent)
- Caulking gun with small nozzle (~1/4")
- Flexible injectable sealant (such as Self-Leveling Green, or equivalent)
- Two-part epoxy gun and mixing tip that fits the sealant injection holes (#2 hole size)
- Hex key - 0.035"
- Nitrile gloves and paper towels

GAUGE INSTALLATION

The strain gauge and bonding cable installation process is completed in six major steps.

1. *Test fit* the strain gauge, bonding cable, and node location on the measurement surface to ensure the node will fit over the gauge and cable in the final installation. Verify the node will not be in the way of any other parts of the assembly. If necessary, there are holes in the node housing to run wires out to gauges, if they cannot be installed underneath it. However this will not provide as much protection to the gauges.
2. *Prepare* the measurement surface where the gauge will be installed. It is imperative this surface is properly prepared to ensure proper adhesion and strain measurement.
3. *Mark* the location and orientation of the gauge on the measurement surface. Mark a location for the bonding cable next to the strain gauge that will ensure it is within the node cavity when installed.
4. *Place* the gauge in position using strain gauge tape.
5. *Bond* the gauge to the measurement surface using strain gauge epoxy.
6. *Repeat* the placement and bonding process for the bonding cable.

The entire process must be done carefully and takes practice to perfect. The following link is to a video produced by the University of Alberta¹ that describes the process in detail.

[Strain Gauge Installation Tutorial](#)

NOTE

For accurate strain data, strain gauge installation must be completed in compliance with strain gauge manufacturer recommendations and industry standard processes such as *ASTM E1237-93, Standard Guide for Installing Bonded Resistance Strain Gauges*. Failure to properly attach and connect the gauges will result in erroneous data.

GAUGE WIRING

Connect the strain gauge to the bonding cable using strain gauge wire. Solder the wire to the bonding cable and strain gauge solder pads in accordance with wiring diagram below. Keep the wires as short as possible and as close to the same length as each other to minimize measurement error. After soldering, clean the contacts with denatured alcohol as needed.

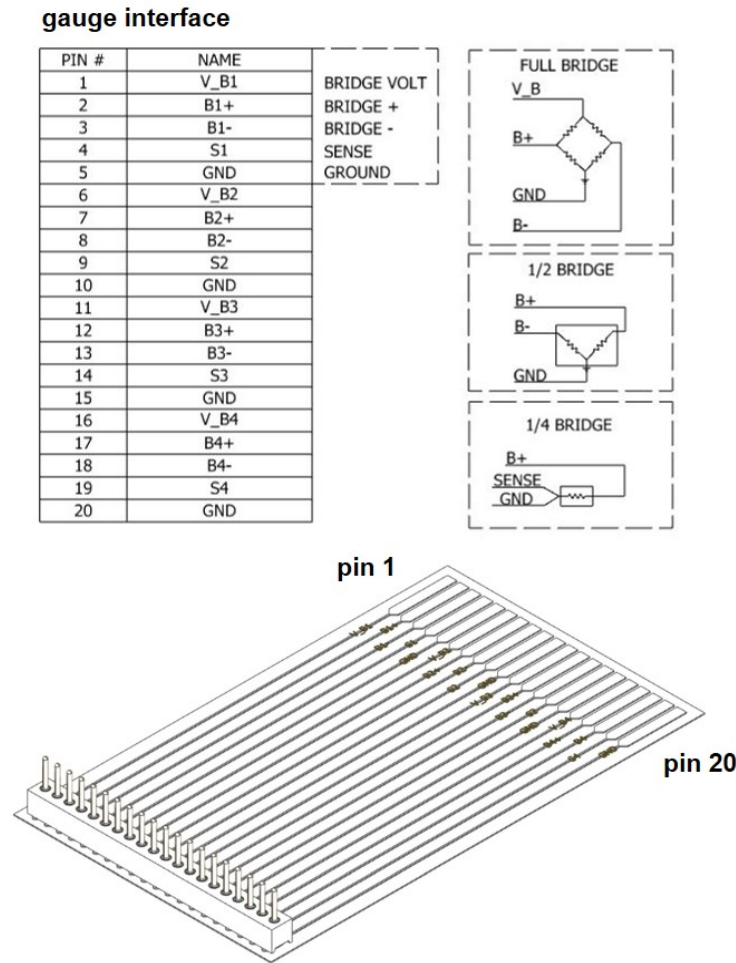


Figure 3 - Gauge to Cable Wiring

GAUGE AND NODE TEST

Before final installation, it is recommended that the assembly be tested. Connect the bonding cable to the node, and use the LORD MicroStrain® Node Commander® software to run a sensor calibration routine. Refer to the sensor settings and sensor calibration sections of the SG-Link® -LXRS® user manual for detailed instructions. If the calibration is successful the node is ready for final installation.

NODE INSTALLATION

1. *Place* the node over the gauge and cable to verify fit. Remove the backing from the double-sided tape that is on the bottom of the node.
2. *Connect* the bonding cable to the node terminal.
3. *Adhere* the node to the mounting surface with the double-sided tape. Apply a bead of high-strength adhesive sealant around the perimeter of the node where it meets the mounting surface, covering the wire exit holes. Use a tool or finger to press and smooth the adhesive into the edges of the node. Wipe adhesive from the sealant injection holes and allow to cure.
4. *Remove* the appropriate set screws (two or more) from the sealant injection holes. One is used to inject the sealant, and the others are air vents. Select the holes based on the orientation of the gauge (horizontal or vertical mounting), and on which will prevent the sealant from leaking out.
5. *Seal* the strain gauge cavity by injecting a flexible sealant, and allow to cure.

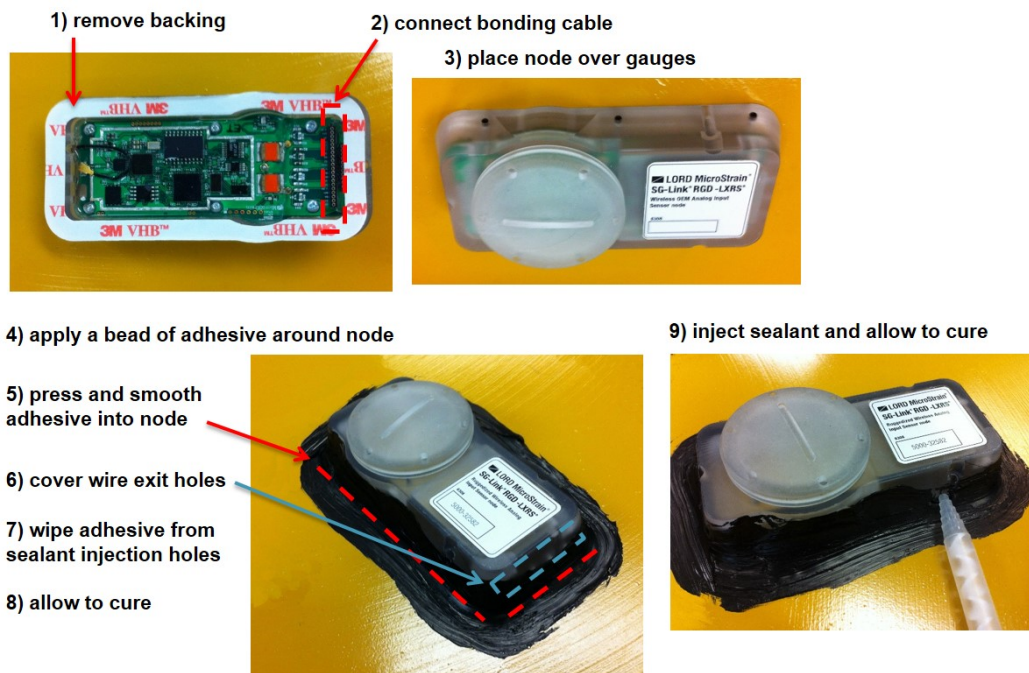


Figure 4 - Node Installation

Installation is now complete. Refer to the LORD MicroStrain[®] Wireless Sensor Network software user manuals for node initialization and data acquisition instructions.

References

¹Dyck, Michael and Hoffman, Scott. June 14, 2012. *Strain Gauge Installation Tutorial*(video). University of Alberta Telerobotic and Biorobotic Group. Retrieved from Web May 23, 2016. <https://www.youtube.com/watch?v=s4Bq8MvwbyU>.

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