



SHUNT CALIBRATION AND SIGNAL NOISE

TECHNICAL NOTE #9

The sensing technology for many pressure transducers is based on a Wheatstone bridge configuration. One option end users select is called Shunt Calibration or Shunt Cal.

Shunt Cal Purpose & Operation

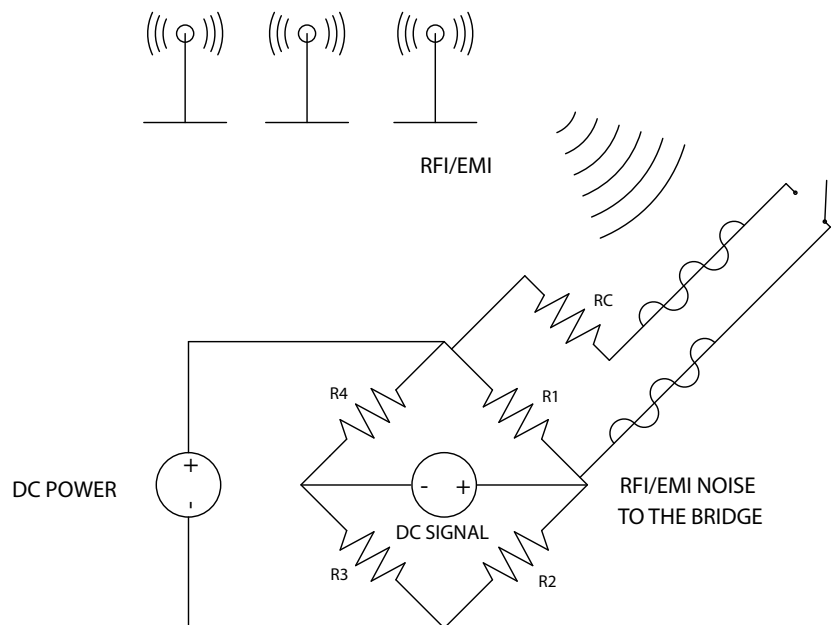
Shunt calibration of a Wheatstone bridge-based sensor allows a convenient method of periodically checking the span of that sensor. It also allows you to test the signal conditioner used in conjunction with this type of transducer. This shunt cal provides a 2 point check, the zero reading and an upper range reading. The basic principle of a shunt cal is to place a fixed precision resistor across (shunted) one leg of the Wheatstone bridge.

The shunt cal operation doesn't qualify as a calibration since no pressure is applied to the sensor but provides for a quick simulation as if pressure is being applied to the sensor and gives a predetermined output signal. This shunt calibration works by unbalancing the Wheatstone bridge, thus allowing a predetermined signal to be sent out. The shunt resistor that is in parallel to the bridge simulates what would happen if pressure were applied to the bridge.

Shunt Cal & Signal Noise

The shunt cal option has been used successfully for many years and in many applications. The issue some applications run into is signal noise. As seen in the simple schematic labeled **Diagram 1**, the shunt cal is activated thru an external end user supplied switch which is wired thru the transducer's electrical connector. These 2 wires are run to the shunt resistor which is directly wired to the sensor's bridge. If there is any external EMI/RFI noise, it can be picked up on these shunt wires and applied directly to the bridge. This can generate a significant amount of signal noise, depending on the unit's environment. Some applications can run 5, 10 or 15 ft of cable which acts like an antenna to the shunt cal and sensor bridge.

Shunt Cal & Signal Noise
Diagram 1



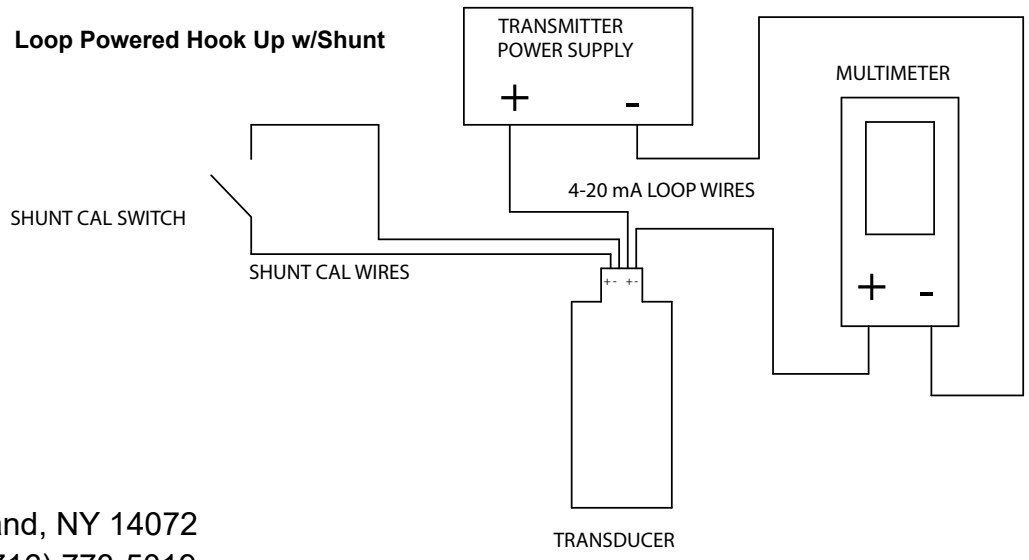
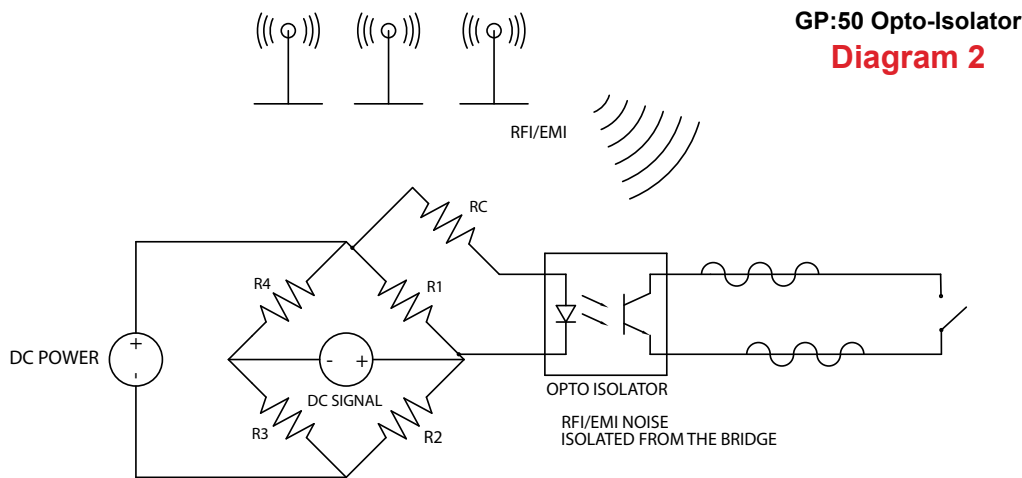


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Eliminate Shunt Noise

One option to eliminate this shunt noise is to provide an isolation between the sensors bridge and the external shunt cal wires. The option GP:50 provides is an Opto-isolator, which is in-line with the shunt cal wires as shown in the simplified schematic labeled **Diagram 2** below. This Opto-isolator blocks the external shunt cal wires from being in direct electrical contact with the bridge during normal operation. This isolated shunt option provides the same installation as the older version of shunt cal and just requires the same external switch to activate the shunt cal. This isolation will remove any potential EMI/RFI from entering the bridge thru the shunt cal wires.



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