



SHUNT CALIBRATION OPERATION

Technical Note #5

Many GP:50 models offer an internal shunt calibration feature that allows a quick 2-point field setup.

This shunt calibration feature provides a predetermined percent of span signal without the need for a calibrated pressure source and allows the device to remain in line while testing.

Shunt cal provides an easy means of setting up a panel meter or DAQ system, setting alarm trip points or providing a way to verify the system is live and functioning properly.

It also provides the ability to re-range some devices without the need for a pressure source.

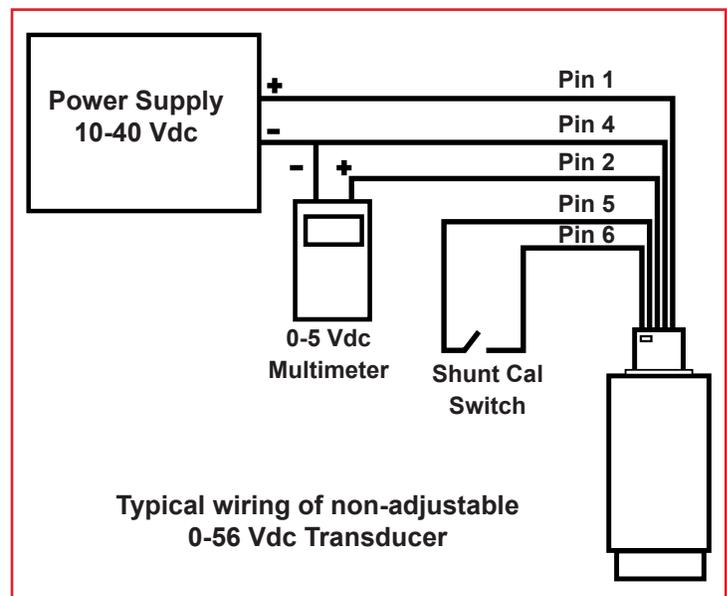
This tech note will help define and provide procedures for operation of the shunt cal feature in both rangeable and fixed range devices.

Fixed range or devices with limited zero and span adjustment:

On fixed range or devices with zero and span adjustments but without rangibility features the shunt cal provides a simple 2 point check on the system or ability to setup a panel meter or DAQ system.

Most GP:50 transducers with shunt cal require that 2 of the electrical terminations or pins be shorted together to activate the shunt cal. Some of our devices require power be applied to the two electrical terminations and are polarity sensitive in order to activate the shunt cal. Our model series 370 comes std. with this type of shunt cal. If uncertain which type you have contact the factory with your model no.

Most GP:50 transducers with shunt cal option provide a buffered shunt cal. This buffered shunt provides noise immunity not found with many other devices that offer shunt cal. All buffered shunt cal circuits are polarity sensitive and polarity must be observed for proper operation. The positive side of the shunt cal must not be tied to ground.



In order to operate these types of devices short or apply power to the appropriate pins. The pin-out can be found either on the performance certificate, marked on the transducers nameplate, our website or by contacting the factory with the model number or serial number.

With power applied to the transducer and wired properly, a zero reading should be observed. If a 2 wire 4-20mA device is being used a 4 mA reading should be observed. Activate the shunt cal as described above, the output should then increase to the appropriate percentage of full scale as ordered. For example if a 80% shunt cal value was ordered on a 4-20mA device when the shunt cal is activated approximately a 16.8mA reading should be observed. Deactivated the shunt cal will return the device to 4 mA. The same operation holds true for 0-5 VDC units also.



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Devices with ranging options:

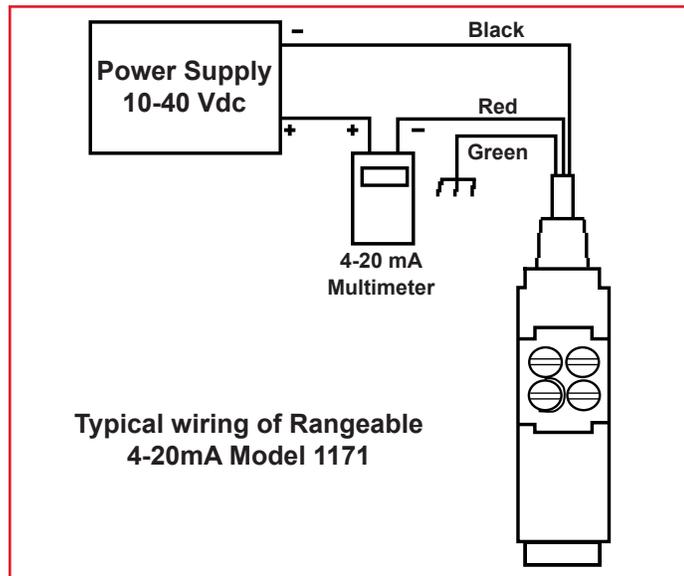
GP:50 offers models that provide a shunt calibration as well as ranging or turn down options. By providing a know shunt reading the unit can be re-ranged in the field without a pressure source.

In the example below we refer to GP:50's Model 1171 rangable transmitter. The Model 1171 utilizes GP:50's magnetically coupled zero, span and shunt calibration feature. These magnetic adjusts provide a hermetically sealed device with field rangable features. These adjust provide protection of the electronics to explosive gasses or fluids so as to prevent an explosion or possible contamination issues.

The adjustments on the Model 1171 are: #1 –Coarse Zero, #2 Fine Zero, #3 Shunt Cal Switch & #4 Span adjust. (See diagram at right)



If the transmitter is installed in a system where the mA output can easily be read then the only tools required are a flat blade screw driver and a calculator to determine the correct calibration values. A multimeter is required if the mA reading cannot be determined from the system it is installed in or if this is done a bench top calibration. (See diagram at lower left)



The shunt calibration value is provided with every device and can be found either marked on the side of the device or on the performance spec sheet.

The transmitter must be wired and powered but with no pressure applied to the unit.

If all is functioning well a 4 mA reading should be evident on the multimeter. If 4 mA is not read, adjust the zero screw until 4 mA is obtained via the zero adjust screws. The Model 1171 has both a coarse (#1) and fine (#2) zero adjust.

Next we need to set the desired full scale pressure reading.

In this example we will use a shunt cal value of 1,050 PSI as indicated on the Performance Cert or marked on the transmitter. The transmitter's pressure range is 5,000 PSI and we would like to re-range to 3,000 PSI.

First the shunt calibration value can be determined by the following formula/ ratio:

Shunt Calibration Pressure Value(Found on Performance cert)/Desired Span PSI = Shunt Cal Current(mA)/ Desired Span Current (mA) + 4 mA(offset)

$$1,050 \text{ PSI}/3,000 \text{ PSI} = \text{Shunt Current}/16\text{mA} = 5.6\text{mA} + 4\text{mA} = 9.6\text{mA}$$

When the shunt calibration circuit is activated we need to adjust the span to 9.6mA in order to re-range the transmitter to a 0-3,000 PSI range.

Next activate the shunt cal circuit by turning the #3 screw to the 3:00 position. You will see the mA reading move up from the 4 mA zero that we previously set.

Now adjust the span screw (#4) until the mA reading is at 9.6mA.



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Next turn the shunt cal circuit off by turning the #3 screw to the 12:00 or 6:00 position. If the transmitters zero is not exactly 4mA turn the zero adjust until it is and then turn the shunt cal on again to verify this is still at 9.6mA.

The GP:50 Model 1171 has very little to no interaction between zero and span so typically this isn't required or a very small interaction is possible when the full 5:1 turn down is required.

The transmitter is now re-ranged for a 0-3,000 PSI operation with a 4-20mA output.

Caveat

The re-ranging feature of the shunt cal is not a true calibration. A true calibration requires a known pressure source, such as a dead weight tester. The shunt cal feature simulates a pressure signal and has some inherent inaccuracies. Typical inaccuracy is related to the sensors inaccuracy, typically +/-0.15% FSO. However, application factors such as frequency and amplitude, environmental exposure, media type, etc can effect the sensors characteristics which may cause inaccuracies in the shunt calibration signal over time. It is always best where signal accuracy is critical to perform regular calibrations to verify sensor and shunt cal accuracy.

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