

## EXAMINING GROUNDS WHEN MAKING 4-20

## CURRENT LOOP MEASUREMENTS

### Ensure Accurate Readings with Galvanically-Isolated Devices

**4-20 mA (milliamp) measurements** are common in many industrial applications, including process monitoring and machine condition monitoring. However, to perform accurate measurements, users must take several precautions beforehand. In our latest **White Paper**, [CAS DataLoggers](#) covers the basics of 4-20mA current loop measurements in an industrial setting.

### Examining Grounds to Diagnose Feedback:

Many of our callers working in industrial applications such as process control want a data logger which can connect to sensors with a 4-20mA output. These dataloggers can log current at a high degree of accuracy.

Users in this field know that grounding is needed as a safety precaution against electrical shock. However, it's less well known that while grounding can prevent many power issues, it can also create serious issues of its own. For example, a good grounding layout is necessary to prevent **ground loop feedback**, which interferes with measurement accuracy.

When preparing to take current measurements, users in factories and plants often find that their grounds are not actually at the same potential. Taking AC and DC readings with a voltmeter and getting a nonzero result will confirm this. As noted above, this current flow can cause inaccurate measurements due to feedback, signal noise etc.



## Use a Datalogger with Galvanically-Isolated Inputs:

Although this source of feedback is prevalent and difficult to resolve, it can be addressed by using a well-designed measurement system. When taking 4-20 mA current measurements, you can increase accuracy by selecting a data logger with **galvanically-isolated inputs** which are less vulnerable to picking up ground noise.

## Diagnosing Ground Loop Feedback:

When two or more connected electrical devices access more than one path to the ground, a **ground loop** forms which carries unintended current. Resistance then changes these currents into voltage fluctuations which cause signal noise. This corrupts the devices' program signals.

You're mostly likely to get ground loops in the ground conductors of your electrical equipment wherever two or more circuits share the same conductor or current path.

Eliminate ground loops by sending all signal grounds to a common point. If it's necessary to use more than one grounding point, the signal must be isolated on one side and grounding from its neighbor(s). You can also use shielded cables for low currents.

## Isolating Power Sources:

In 4-20mA datalogging applications, it's important to isolate the loop power source. This allows you to tie the output ground to another ground. If your specific application doesn't allow this, you can instead power all your measurement devices and sensors from one outlet.

For more information on [4-20 mA Dataloggers](#), or to find the ideal solution for your application-specific needs, contact a **CAS Data Logger Applications Specialist** at (800) 956-4437 or visit our website at [www.DataLoggerInc.com](http://www.DataLoggerInc.com).