Ground or Earth Loops

Most analogue (4 to 20) mA loops are grounded at a single point. Problems occur when there is more than one grounding point because earth potentials will not be the same. This means current will flow between earth points causing errors or noisy signals.

If the (4 to 20) mA signal is connected to multiple instruments which have non isolated inputs this can cause problems. Typically an earth loop will cause an unstable 4/20mA signal. A simple way to remove ground loops is to use signal isolators such as the Status SEM1000 series.

Sometimes leakage through mineral insulated probes can give an undesired path to earth and cause errors, use of a temperature transmitter with an isolated input can help remove this type of problem.

Thermocouple probes are the most common that can have a grounded junction. For this reason, all Status thermocouple transmitters are isolated. So when ever sourcing a thermocouple transmitter check it has isolation between input and output. This is not normally a problem with RTD sensors but in some applications isolation is required. In this case the Status SEM210, SEM310 and SEM1610 can provide isolation for RTD inputs.