

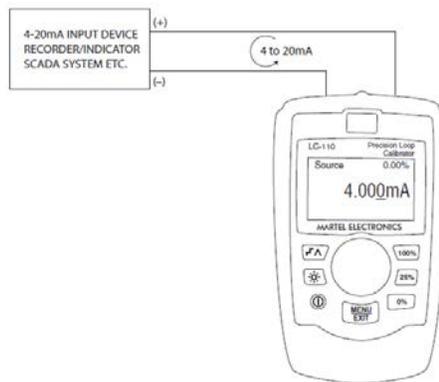
## Application Note: Loop Calibrators – 2 Wire or 4 Wire?

Loop calibrators are the most common calibration and troubleshooting tool used in the instrumentation field. A loop calibrator normally can generate and measure the 4 to 20 milliAmp (mA) signal used in instrumentation loops, hence, the name.

Many of these calibrators like our [LC-110](#) also have other features and capabilities, but we're going to focus on the simulation or generation function for this application note.

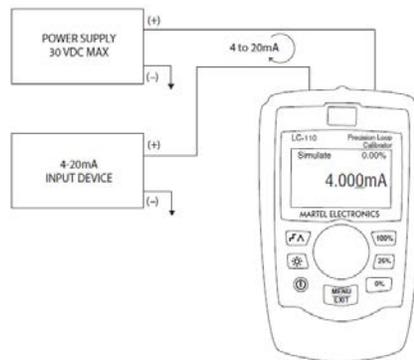
Here is a picture of the [Martel LC-110](#) Loop Calibrator.

As you can see it has two test leads, but the most common usage is in so-called 4-wire mode. It's called four wire because it simulates the 4 to 20 mA signal as though it were coming from a 4-wire transmitter. This means the source of power for the mA signal comes from the battery in the calibrator itself.



The most common applications for this mode are control valve testing or stroking, calibrating indicators and recorders and other devices that don't provide a 24 VDC instrument power supply.

Conversely, in 2-wire simulation mode, the loop calibrator acts like a 2-wire instrument transmitter. It uses loop power from an outside instrument power supply to generate a controlled 4 to 20 mA signal.



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This mode is most often used for troubleshooting instrument loops and providing an input to an instrument that has a built-in 24 VDC instrument power supply.

In addition to the quick-set-knob, the LC-110 has manual and automatic 25% of scale stepping, and slow and fast ramping of the mA signal. If you are looking for a loop calibrator with some HART Communications/Diagnostics, check out the [LC-110H](#).

You can find out more about loop calibrators on our web site, [www.martelcalibrators.com](http://www.martelcalibrators.com).