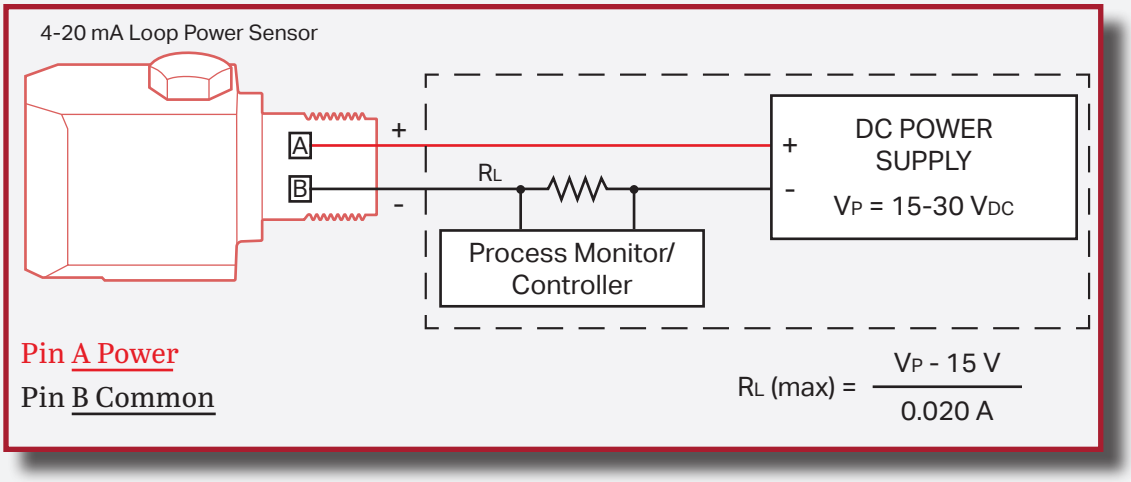
Connecting & Powering Loop Power Sensors

Loop Power, 4-20 mA Output Vibration Sensors

The purpose of the 4-20 mA analog current loop is to transmit the signal from an analog vibration sensor over a distance in the form of a current signal. CTC's loop power sensors output a 4-20 mA current that is proportional to the overall vibration of the equipment or machinery they are monitoring. This output current has a range of 4 to 20 mA (4 mA normally representing the sensor's zero-level output, and 20 mA representing the sensor's full-scale output).

Only two wires are required to send the current signal and also supply power to the sensor. A loop supply voltage is used to power the remote sensor. Pins 3 and 4 of an M12 connection are not used. The remote sensor regulates the loop current such that the loop current represents the value of the parameter being measured by the sensor. A series resistor R_L at the loop power supply converts this current to a voltage that can be used by the process monitor/controller to record or distribute the parameter being measured.

Typical Loop Powered Circuit



Loop Resistance Calculations

Standard Loop Powered Sensors

$$R_L\ (max) = \frac{V_P - 15\ V \times (1\ mA/.001\ A)}{20\ mA}$$

Intrinsically Safe Loop Powered Sensors*

$$R_L\ (max) = \frac{V_P - 12\ V \times (1\ mA/.001\ A)}{20\ mA}$$

Power Source Voltage (V_P)	Typical R_L (max) (Non-IS Sensors)	Typical R_L (max) (IS Sensors)
20	250	100
24	450	300
26	550	400
30	750	600

*Note: Typical Loop Powered Circuit will include an IS Barrier in the Circuit.

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Dual Output 4-20 mA Loop Power Sensors

Dual output loop power sensors also provide a secondary output of temperature, measured in degrees Centigrade (°C). Dual Output 4-20 mA Loop Power Sensors are a three-wire technology where Pin A is the positive 4-20 mA power, Pin B is a shared common, and Pin C is a positive temperature.

Typical Three Wire Loop Powered Circuit