

4-20 mA

VIBRATION MONITORING



**PROTECTION & RELIABILITY
INSTRUMENTS**



4-20 mA technology can be used to measure temperature, pressure, flow and speed as well as the overall vibration of rotating machines. Adding a vibration sensor/transmitter to the machine provides a critical measure of the machine's health, and can be used to identify changes in balance, alignment, gears, bearings, and many other potential faults.

How it works

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 4-20 mA current signal. The current signal generated is proportional to the overall vibration of the equipment or machinery that is being monitored. This output current has a range of 4-20 mA, with 4 representing the minimum and 20 representing maximum amplitudes (within the range of 4-20 mA). The 4-20 mA signal output is proportional to the defined amplitude generated within a specified frequency band. Therefore, the signal does not include data from frequencies outside the frequency band, but includes all vibration (critical and non-critical faults) within that band.

What We Offer

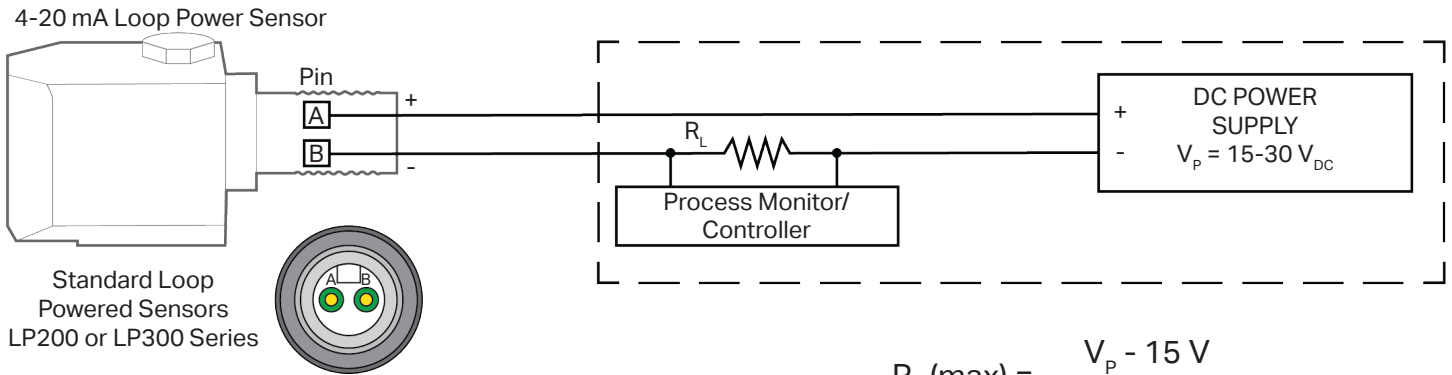
CTC offers a wide array of 4-20 mA output solutions for industrial applications. CTC's standard 4-20 mA loop powered vibration sensors are available with velocity or acceleration, alongside temperature output measurements options. CTC's loop powered sensor line also includes a dual output option, with both 4-20 mA output and dynamic output configurations in one sensor. Other options include 24 V_{DC} powered transmitters that power standard IEPE accelerometers and convert the vibration to a powered 4-20 mA signal. These transmitters also offer a 4-20 mA output for temperature when coupled with CTC dual output vibration and temperature sensors.



A loop power vibration sensor/transmitter like the LP200 Series (4-20 mA proportional to vibration measured in velocity) or the LP300 Series (4-20 mA proportional to vibration measured in acceleration) can be mounted on the machine and added to the control loop. As the overall vibration of the machine changes, the 4-20 mA output will vary proportionally.



Only two wires are required to supply power to the sensor and send the current signal. A loop supply voltage is used to power the remote 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.



$$R_L (\text{max}) = \frac{V_P - 15 V}{0.020 A}$$

Dual output power sensors provide a secondary output of dynamic vibration. These secondary outputs could be acceleration or velocity and are combined in three different loop power sensor configurations.

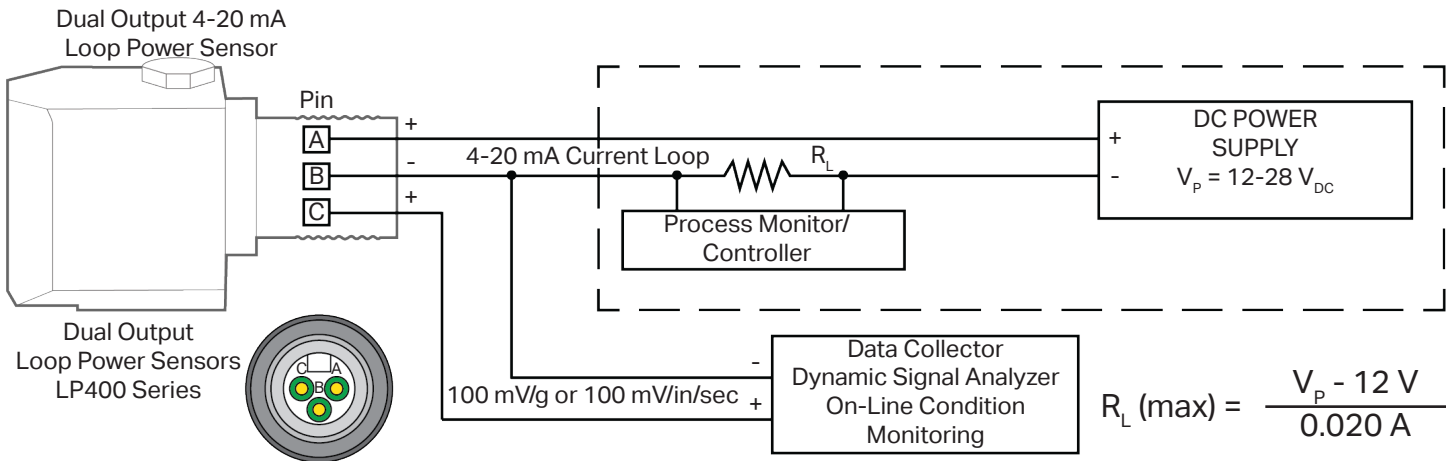
LP401 Series – overall velocity (4-20 mA) and dynamic velocity (100 mV/in/sec)



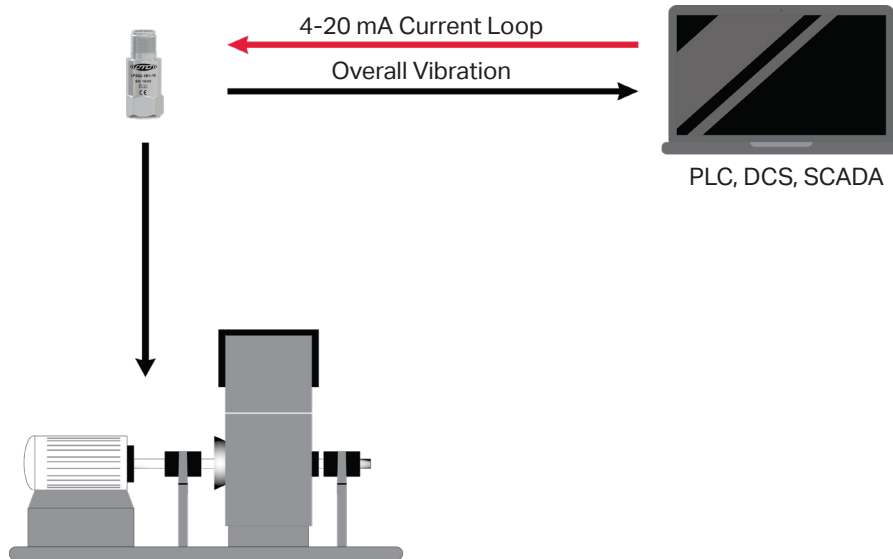
LP402 Series – overall velocity (4-20 mA) and dynamic acceleration (100 mV/g)



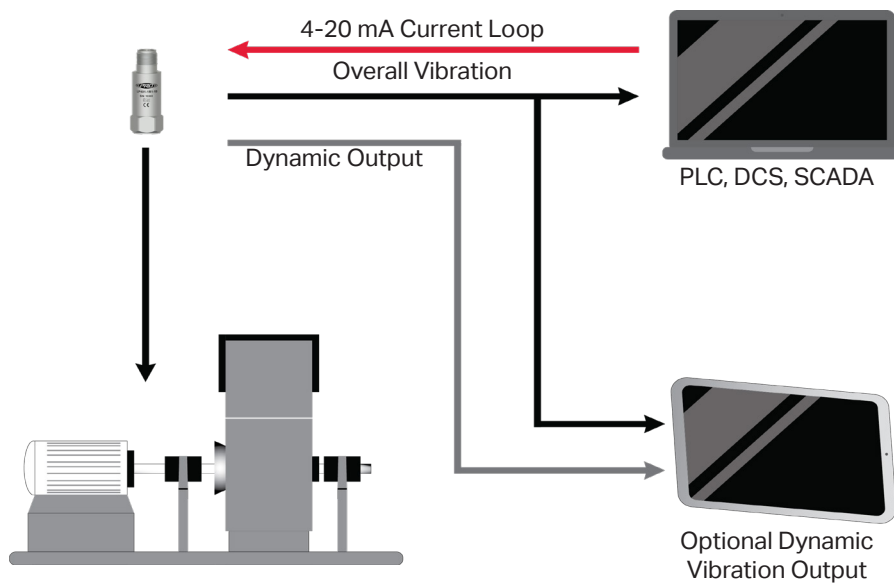
LP404 Series – overall acceleration (4-20 mA) and dynamic acceleration (100 mV/g)



LP200 & LP300 Series



LP400 Series



DUAL OUTPUT LP23X AND LP33X SERIES

Dual output LP23X and LP33X Series sensors contain an integrated circuit to measure the temperature inside the sensor case. The temperature output is monitored in the form of mV_{DC}/°C using a voltmeter across pins C & B of the sensor when the circuit is powered by the 4-20 mA loop at pins A & B. The DC voltage output is proportional to temperature from -40 °C (0.10 V_{DC}) to +100 °C (1.35 V_{DC}) or -40 °F (0.10 V_{DC}) to +212 °F (1.35 V_{DC}). This output can be trended in voltage to monitor the change in temperature of the machine.

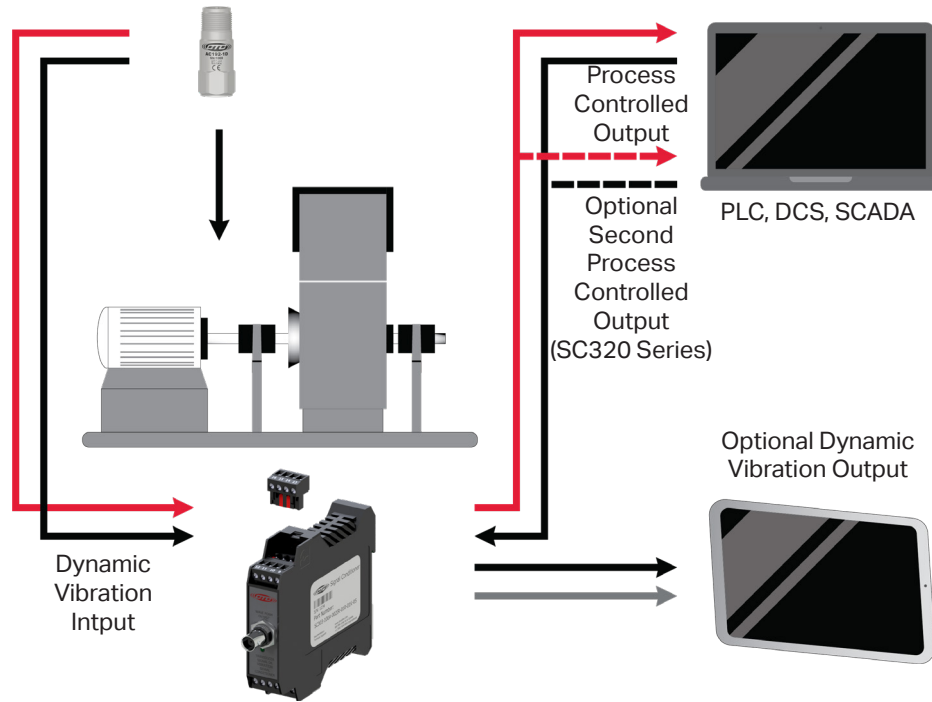


HAZARDOUS RATED SENSORS

CTC offers the Intrinsically Safe LP800 and LP900 series of sensors for hazardous locations.



Signal conditioners can be used in conjunction with standard dynamic accelerometers, piezo velocity sensors, or displacement probes. The Signal Conditioner accepts the dynamic input and converts it to a proportional 4-20 mA output for the PLCs, DCS or SCADA system. The Signal Conditioner can be adjusted in the field so that the scaling and filters match your application. The dynamic vibration signal is available from a standard BNC connection on the front of the Signal Conditioner, or as an optional output from the terminal block.



Signal Conditioner Provides Selectable Adjustments of all Scales and Ranges

The Signal Conditioner is also compatible with the TA202, TA204, TA231, TA233, TA235 and TA284 series dual output vibration and temperature sensors. The signal conditioner in combination with any of these sensors will provide one 4-20 mA output proportional to vibration, and a second 4-20 mA output proportional to temperature.

PMX Series

- 1-2 channel process control enclosure with display and relay or display only
- Relays trigger alarm or shutdown
- 4-20 mA output



SCD100 Series

- 4 channel compact vibration monitoring system
- Dynamic external links
- Sunlight viewable display
- SPDT (Form C) 2 relays each
- For use with accelerometers, piezo velocity sensors & proximity probes



SCE Series

- Provides 4-20 mA signals along with dynamic outputs from remotely installed accelerometers to PLC/DCS systems and portable data collectors
- Accommodates 1-8 SC300 Series signal conditioners factory wired to DC power supply (100 - 240 VAC)
- Available in fiberglass and stainless steel enclosure options — NEMA 4X (IP66) rated
- 15 to 140 °F (-10 to 60 °C) temperature rated



CTC is the world leader in the design and manufacture of industrial accelerometers, piezo velocity transducers, 4-20 mA vibration sensors, and proximity probes as well as all related mounting hardware, cabling, and junction boxes. Our products enable efficient vibration monitoring for predictive maintenance in a wide variety of industries. Industries served include cement, mining, petrochemical, food & beverage, auto, steel, wind, paper & pulp, power generation, water & wastewater treatment, pharmaceutical, hospitals, bottling, and more. Our mission is to offer the widest variety of accelerometers and vibration hardware products, which are compatible with data collectors and online monitoring systems, as well as the tools for installation.



The CTC product line features vibration analysis hardware for heavy industry.

All CTC products are backed by our unconditional, lifetime warranty. If any CTC product should ever fail, we will repair or replace it at no charge.

All stock products qualify for a full refund if returned in new condition within 90 days of shipment. Build to order products qualify for a 50% refund if returned in new condition within 90 days of shipment. Custom products are quoted and built specifically to the requirements of the customer, which may include completely custom product designs or private labeled versions of standard products for OEM customers. Custom products ordered are non-cancellable, non-returnable and non-refundable.

