CTC LP802 Intrinsic Safety Loop Power Sensors Owner's Manual

VIBRATION ANALYSIS HARDWARE

LP802 Series
Product Manual

Contents

Introduction

4-20 mA Vibration Monitoring Process Overview

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 . It can be used to dentify changes in balance, alignment, gears, bearings, and many other potential faults . 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 overall amplitude generated within a defined 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 .

LP802 Series Overview

Each LP802 sensor that is approved for Intrinsic Safety must meet or exceed the requirements for standards recognized by the countries that would use the sensors .

Specific Conditions of Use:

Specific ambient conditions of use include -40°F to 176°F (-40°C to 80°C) for all LP Series

Special Conditions for Safe Use:

None

Intrinsically Safe Information

Compliance with the Essential Health and Safety Requirements

Assured by compliance with EN60079-0:2004, EN60079-11:2007, EN6007926:2007, EN61241-0:2006, EN61241-11:2007

ATEX Related Nameplate Markings

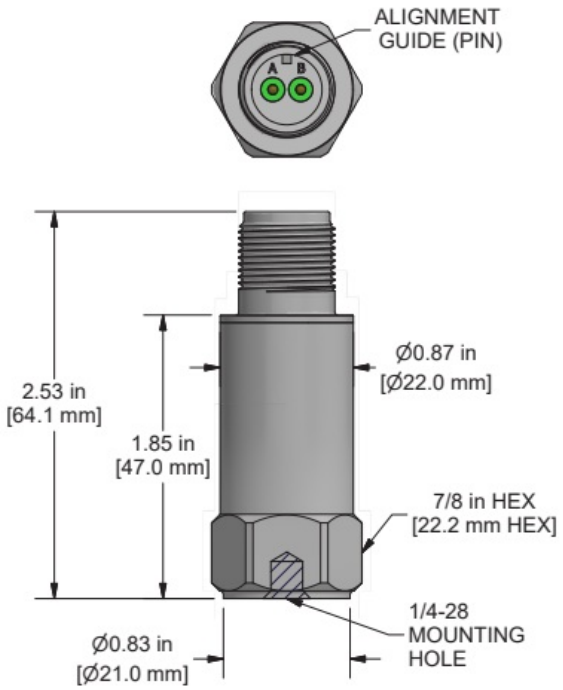
The following is a complete recapitulation of ATEX nameplate markings so the customer has complete ATEX information for specific conditions of use .

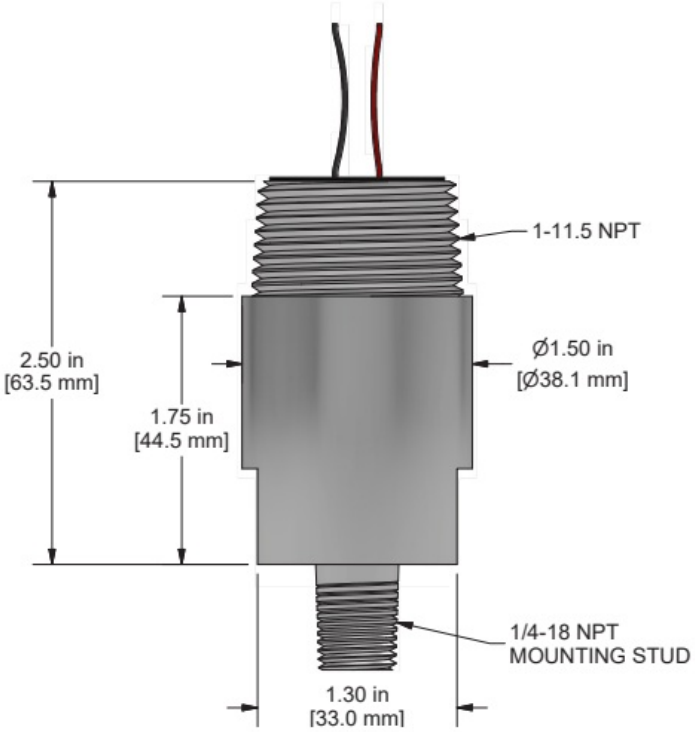
INTRINSICALLY SAFE
SECURITE INTRINSEQUE
Ex ia IIC T3 / T4
Ex iaD A20 T150 °C (T-Code = T3) / T105 °C (T-Code = T4)
DIP A20 IP6X T150 °C (T-Code = T3) / T105 °C (T-Code = T4)
AEx ia IIC T3 / T4
AEx iaD 20 T150 °C (T-Code = T3) / T105 °C (T-Code = T4)
CLI GPS A,B,C,D
CLII, GPS E,F,G, CLIII
CLI, ZONE 0, ZONE 20
OPERATING TEMP CODE: T4
AMBIENT TEMP RANGE = -40 °C TO +80 °C
CONTROL DRAWING INS10012
Ex ia IIC T3 -54 °C < Ta < +125 °C
Ex ia IIC T4 -40 °C < Ta < +80 °C
Ui=28Vdc Ii=100mA
Ci=70nF Li=51µH Pi=1W
CSA 221421
KEMA 04ATEX1066
LP80*, and LP90* Series – Temperature Code: T4
Ambient temperature range = -40 °C to 80 °C

Product Specifications

Power Input	15-30 Vdc supply voltage required
Band-Pass Filter	The vibration sensor contains a band-pass filter, consisting of a low-pass a nd a high-pass .
Analog Output	Full-scale output of 4-20 mA
Operation	Filters the signal, and normalizes the output to the specified full-scale outpu t . Performs a true RMS conversion and transmits this data in a 4-20 mA for mat (if RMS is chosen) .
Temperature Range	-40°F to 176°F (-40°C to 80°C)

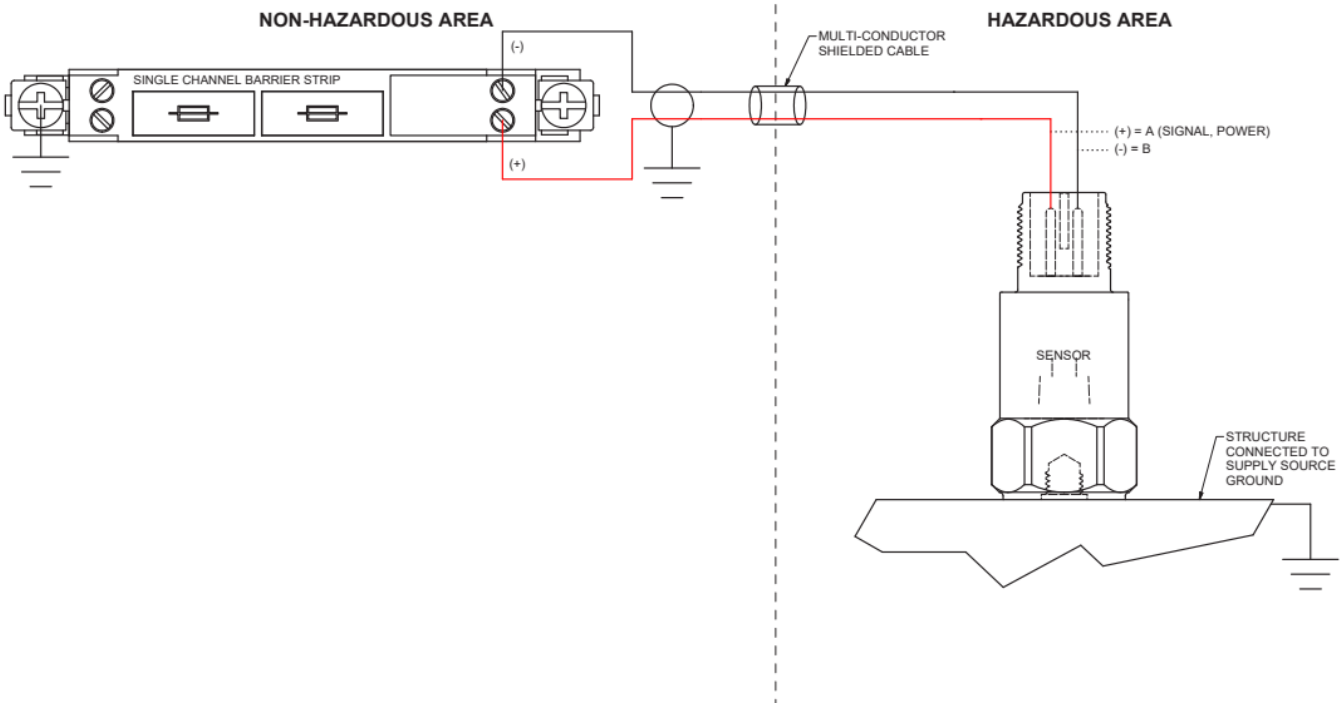
Dimension Drawings





Wiring

The Intrinsic Safety Control Drawing INS10012 below shows the installation requirements for CTC IS Sensors . As shown, properly installed barriers are required to limit the energy the sensor can receive . Cabling brings the signal from the sensor to the Zener diode barrier or galvanic isolator, which is the energy-limiting interface . The signal is transferred through the barrier (which can be located in a Class I Div 2 or non-hazardous area) to measurement equipment, such as a data collector or junction box, for further processing .



NOTES:

- Unspecified barrier strip shown
- See safety barrier manufacturer installation manual for information on proper wiring of sensor cables to the terminal blocks of the safety barrier
- Wire color for clarity only

Loop Resistance Calculations

Standard Loop
Powered Sensors

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

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

*Instrinsically Safe Loop Powered Sensors
***Note:** Typical Loop Powered Circuit will include an Intrinsically Safe Barrier in the Circuit

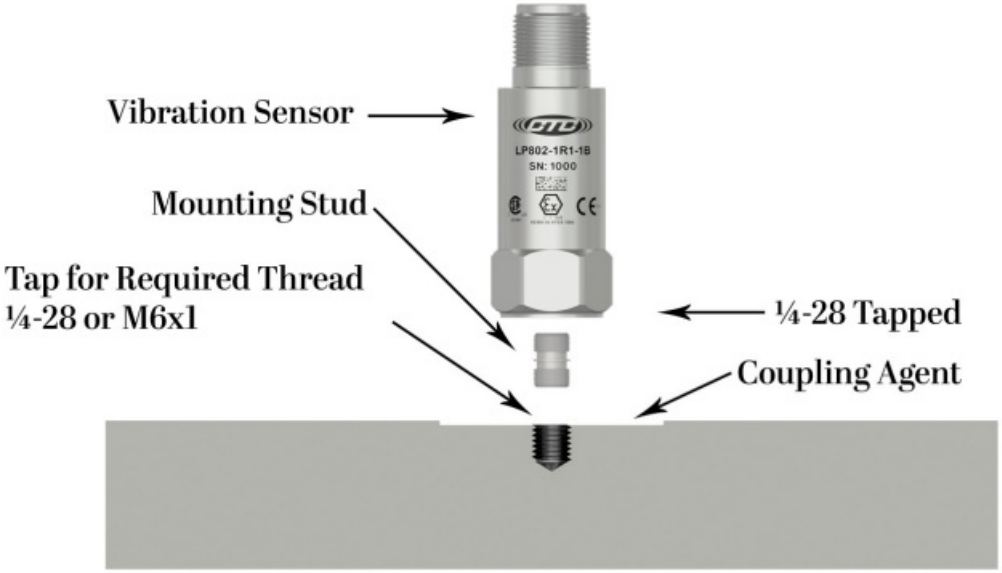
Power Source Voltage (Vp)	Typical RL (max) (Non-IS Sensors)	Typical RL (max) (IS Sensors)
20	250	100
24	450	300
26	550	400
30	750	600

Measurement

FULL-SCALE MEASUREMENT RANGE	ACTUAL VIBRATION, IPS	EXPECTED OUTPUT (mA)
0 – 0.4 IPS (0 – 10 mm/s)	0	4
	0.1 (2.5 mm/s)	8
	0.2(5.0 mm/s)	12
	0.3 (7.5 mm/s)	16
	0.4 (10.0 mm/s)	20
0 – 0.5 IPS	0	4
	0.1	7.
	0.2	10.
	0.3	14.
	0.4	17.
	0.5	20
0- 0.8 IPS (0 – 20 mm/s)	0	4
	0.2 (5.0 mm/s)	8
	0.4 (10.0 mm/s)	12
	0.6 (15.0 mm/s)	16
	0.8 (20.0 mm/s)	20
0 -1.0 IPS (LP800 Series)	0	4
	0.1	6.
	0.25	8
	0.5	12
	0.75	16
	1	20
0 – 2.0 IPS (LP800 Series)	0	4
	0.25	6
	0.5	8
	0.75	10
	1	12
	1.	14
	2.	16
	135	18
	2	20

Installation

Tighten the sensor to the mounting disk using 2 to 5 ft-lbs of mounting force.



– The mounting torque is important to the frequency response of the sensor for the following reasons:

- If the sensor is not tight enough, proper coupling between the base of the sensor and the mounting disk will not be achieved .
- If the sensor is over tightened, stud failure may occur .

– A coupling agent (such as MH109-3D epoxy) will maximize the high frequency response of your hardware, but is not required .

Permanent/Stud Mounting Surface Preparation

1. Prepare flat surface using a spot face tool and pilot drill hole using a CTC spot face installation tool .
2. The mounting surface should be clean and free from any residue or paint .
3. Tap for required thread (¼-28 or M6x1) .
4. Install sensor .
   – Suggested Installation Tool Kit: MH117-1B

Warranty and Refund

Warranty
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 .
Refund
All stock products can be returned for a 25% restocking fee if returned in new condition within 90 days of shipment . Stock products qualify for free cancellation if your order is cancelled within 24 hours of purchase . Built-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 .

Mm-Lp802/Rev B

Documents / Resources

	CTC LP802 Intrinsic Safety Loop Power Sensors [pdf] Owner's Manual LP802 Intrinsic Safety Loop Power Sensors, LP802, Intrinsic Safety Loop Power Sensors, Safety Loop Power Sensors, Loop Power Sensors, Power Sensors, Sensors