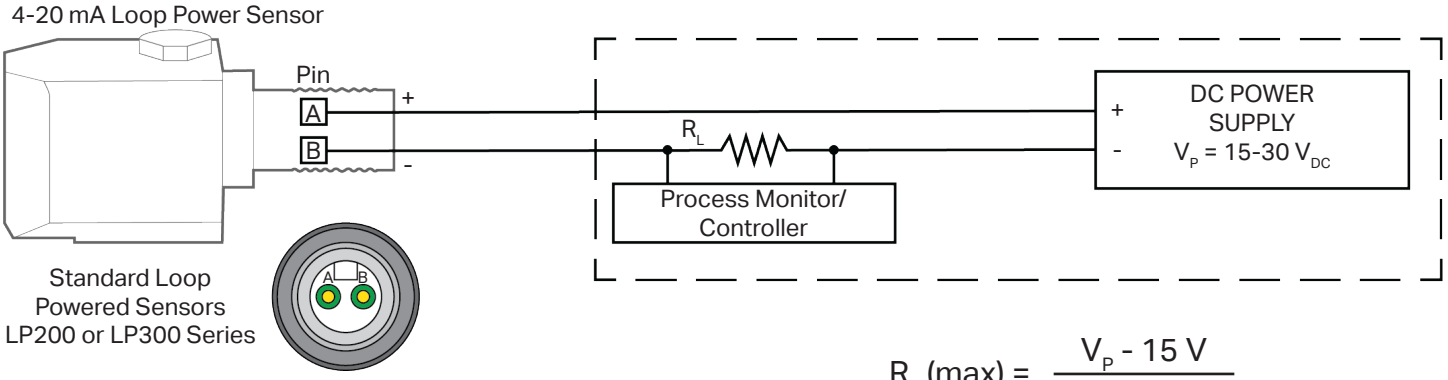
Loop Power, 4-20 mA Output Vibration Sensors

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. PRO'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 4-20 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. 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



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

Loop Resistance Calculations

Standard Loop Powered Sensors

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

***Instrinsically Safe Loop Powered Sensors**

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

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

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

PROTECTION & RELIABILITY
OPTIMIZATION INSTRUMENTS
A CTC COMPANY

Product Manual

MNX10008 / REV C

MODEL LP202, LP204, LP302, LP304

Loop Powered 4-20 mA Sensors

Contents

Section I
Overview

Introduction

This document contains information on the operation, installation and maintenance of the Loop Powered 4-20 mA Output Vibration Sensor.

Description

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. PRO line accelerometers output a low voltage (mV) which is proportional to the overall vibration of the equipment or machinery they are monitoring. This is converted to a proportional output current, with the range of 4-20 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 a remote sensor. 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.

POWER INPUT:	**20-32 VDC**
BANDPASS FILTER:	The Vibration Sensor contains a band-pass filter, consisting of a low-pass and a high-pass. The cutoff frequencies are specified at time of order.
ANALOG OUTPUT:	Full scale output of 4-20 mA
OPERATION:	Filters the signal, and normalizes the output to the specified full-scale output. Per-forms a true RMS conversion and transmits this data in a 4-20 mA format (If RMS is chosen).
ELECTRICAL:	18-30 VDC
DIMENSIONS:	See Data Sheet.
TEMPERATURE RANGE:	-40 degrees C to +85 degrees C

Table 1. Specifications

Note: Specifications on a particular Sensor may be obtained from the unit's datasheet, or call an Application Engineer for more information.

Section II
Installation

Typical Loop Powered Circuit

1. Attach positive (+) input from the power supply to Pin A, onto the sensor, and the negative (-) input from the power supply to Pin B of the sensor.

NOTE: Install an ammeter and/or load resistor (R_L) in line with the output, Pin B.

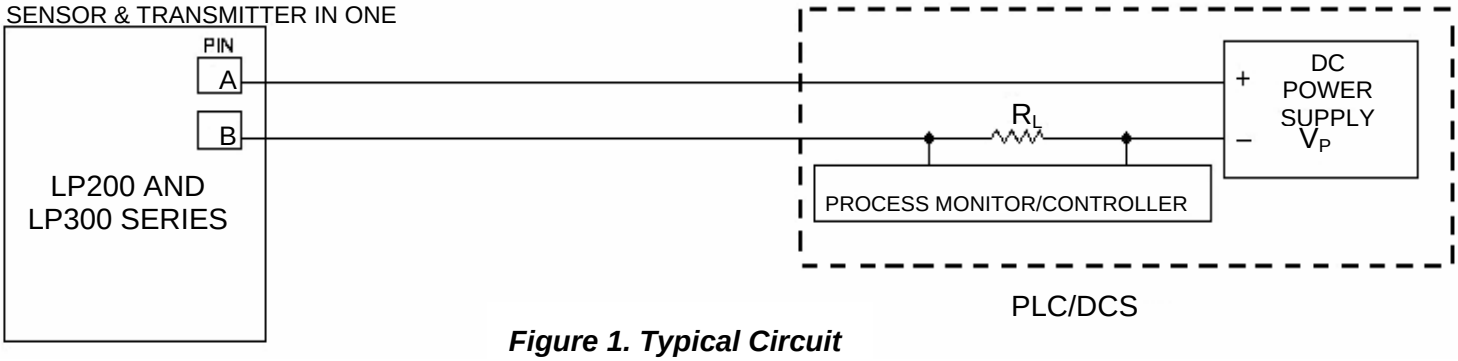


Figure 1. Typical Circuit

Loop Resistance Calculations

Maximum loop resistance can be calculated by:

$$RL_{(max)} = \frac{V_{power} - 12V}{20mA} \times \frac{1mA}{.001A}$$

Section III
Operation

Operating Procedure

1. To operate, make sure that all wires are properly connected, and then apply power.
2. Measurements- when reading the current output, use the following table for expected output. If your range is not listed here, contact CTC for details.

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 mm/s)	20
0 - 0.5 IPS	0	4
	0.1	7.2
	0.2	10.4
	0.3	13.6
	0.4	16.8
	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 (LP200 SERIES) 0-1.0 g (LP300 SERIES)	0	4
	0.1	5.6
	0.25	8
	0.5	12
	0.75	16
	1	20
0-2.0 IPS (LP200 SERIES) 0-2.0 g (LP300 SERIES)	0	4
	0.25	6
	0.5	8
	0.75	10
	1	12
	1.25	14
	1.5	16
	1.75	18
	2	20

Table 2. Expected Output Ranges

Section IV
Maintenance

General

There are no customer replaceable parts. This Sensor has been designed for trouble-free service under normal operating conditions.

Warranty

If any PRO product should ever fail, we will repair or replace it at no charge, as long as the product was not subjected to misuse, natural disasters, improper installation or modification which caused the defect.

CONTACT INFORMATION:
Connection Technology Center, Inc (CTC)
7939 Rae Blvd.
Victor, NY 14564
1-800-999-5290 (US & Canada) 1-585-924-5900 (International)
sales@ctconline.com – www.ctconline.com