

CTC AppNotes

A series of technical documents written by members of the CTC community

Signal Conditioners or Loop Powered Vibration Transmitters? That is the Question!

With the changes that are slowly occurring in manufacturing, many companies are moving from active data acquisition via route based data collection, to a more passive type of set-up. One that many managers feel provides better constant monitoring, generally via permanently installed and powered sensors outputting overall vibration signal via 4-20 mA systems. This edition of CTC's AppNotes will attempt to explain some of the differences and similarities between our two most popular 4-20 mA output selections and why one may be preferred over another.



LP202-1R2-1D—Two wire loop powered transmitter requires 18-30 volts power supplied

Loop Powered vibration transmitters

Loop powered vibration transmitters, generally referred to as "LP's", use a standard type of IEPE accelerometer that would normally be used to take dynamic data, but before the data is transmitted out of the accelerometer, the data is converted on the internal circuit board to an overall 4-20mA output with a pre-selected set of fixed parameters. These pre-selected parameters include the full scale range of the vibration, whether the 4-20 mA output is proportional to peak or RMS values and will also include a filtered frequency span. A sample description might be: 0-2 inches full scale range, RMS, 3Hz - 2500Hz frequency span.

Signal Conditioners

CTC's PRO brand SC200 series signal conditioners operate on a slightly different principal. In this case a standard dynamic accelerometer is utilized. The signal conditioner, operating on 24V DC power, supplies IEPE current to the sensor which provides its full dynamic output to the signal conditioner. The SC200 then transforms the signal from a field selectable frequency band into an overall value that is output as a powered 4-20mA signal to the PLC or other control system. Caution should be exercised in connecting the SC200 to whatever monitoring system is used. The control system should not supply power to the output loop from the signal conditioner, the common wire from the 4-20 mA

loops cannot be shared and must remain isolated from other commons on the same control card or input series. This may require some technical assistance in determining the exact card to use for a given application. (Note: the SC200 does provide optional 0-5 V or 0-10 V outputs proportional to vibration that do not require isolated commons).

Selecting the right one for your application

Product selection depends on three important pieces of information; machine accessibility, process criticality and baseline operating vibration. If the machine is easily accessible, process critical and has a good baseline vibration history, an LP sensor can usually be easily specified that will provide a 4-20 mA loop to the PLC or other system. In this scenario, if the machine goes into alarm, then a qualified vibration technician will be able to access the machine with a portable accelerometer and data collector to gather dynamic vibration data for diagnostic purposes.

If the machine in question is not readily accessible or does not have a baseline vibration history but is still process critical, then a signal conditioner with a permanently mounted accelerometer will probably be justified. Dynamic acceleration data for diagnostics can be accessed directly from the BNC on the front of the signal conditioner for inaccessible machines, and the signal conditioner can be adjusted in the field after a good baseline vibration history is established. Whichever choice is made, 4-20mA signals will be able to add confidence that important process critical machinery is continuously protected.

If you have any questions or for further information please contact CTC directly via Email at dgripe@ctconline.com or jsmith@ctconline.com or feel free to call 1-800-999-5290 in the US and Canada or +1-585-924-5900 internationally.



SC200 series Signal Conditioner. Provides 4-20 mA and 0-5 V or 0-10 V outputs proportional to vibration

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If any CTC vibration analysis hardware product should ever fail, we will repair or replace it at no charge.