Pairing SC300 Series Signal Conditioners with PRO Proximity Probe Drivers

Signal conditioning refers to the process of converting a sensor's analog output signal to a digitally configured process signal usable by a data acquisition system or a PLC/DCS control system. The CTC SC300 Series Signal Conditioners can take a dynamic voltage (mV) signal from an accelerometer or proximity probe and convert it into a 4-20 mA, 0-20 mA, 0-5 V, or 0-10 V process signal. This signal can be run back into a control/monitoring system, providing valuable real-time data on the machine's operating condition.

Signal Conditioners are valuable tools that can help protect the most critical assets in a plant while increasing safety and efficiency. As industrial processes evolve and improve over time, the need for digital output signals will become more common as competitive global market environments and environmental standards pressure operators to extract as much value as possible from their assets.

The CTC SC300 Series Signal Conditioner can be used with any PRO Series Proximity Probe Driver with voltage output to provide a 4-20 mA digital output signal proportional to peak-to-peak vibration. This can be an excellent, cost-effective solution for end users who prefer a simplified process signal as input to their local machinery protection or control system.

When a PRO Proximity Probe system is used with a Signal Conditioner, it will filter out the DC portion of the dynamic voltage signal of the Probe Driver. The oscillating AC portion of the signal is then converted into a 4-20 mA (or other process signal format) signal proportional to the target material's peak-to-peak vibration amplitude relative to the probe system.

The configuration of the signal conditioner will determine the filtering and scaling of this vibration output signal. The SC300 Series Signal Conditioners have a micro-USB port on their faceplate that allows end users to configure the filter and output settings in the field via the free SC300 Series configuration software offered at ctconline.com.

However, this provides a similar output to CTC's PRO 4-20 mA radial drivers. As a result, for most new installations, CTC recommends purchasing 4-20 mA current drivers instead of a proximity probe system plus signal conditioner to save on costs and eliminate unnecessary equipment. SC300 Series Signal Conditioners are ideal for cases where voltage probes are already installed (or in stock), and the end user would like to get a 4-20 mA output, or where specialty configurations are desired. Utilizing an SC300 Series Signal Conditioner will allow for additional configuration options to modify the 4-20 mA signal, including selecting a specific frequency range to monitor, different scaling options, alternative methods of measuring the severity of vibration like Pk-Pk, Peak, or RMS, and customized output smoothing features to avoid false alarms or trips.

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How To Configure an SC300 Signal Conditioner for use with a PRO Proximity Probe Driver

There are a few signal conditioner configuration settings that are required in order for the SC300 in conjunction with a CTC PRO Proximity Probe System to function properly.

These options can be preconfigured at the CTC facility at the time of order, or in the field by the end user by connecting the micro-USB port on the faceplate of the SC300 unit to a computer running the free Signal Conditioner Configuration Software offered on the CTC website: ctconline.com.

1) The Input Units should be set to displacement mils or mm.
2) The Input Source should be set to match the sensitivity of the proximity probe system being used.
3) IEPE power should be set to "OFF."
4) The "Full Scale Range" will determine the peak-to-peak vibration amplitude scaling measured in mils.
5) The "Output Unit" should be configured to "mils."
6) The "Measurement" option should be configured to "Peak-Peak."
7) The "High Pass Filter" and "Low Pass Filter" options will determine what frequency range your SC300 will measure. Any vibrations occurring outside of the configured frequency range will be filtered out by the signal conditioner unit.

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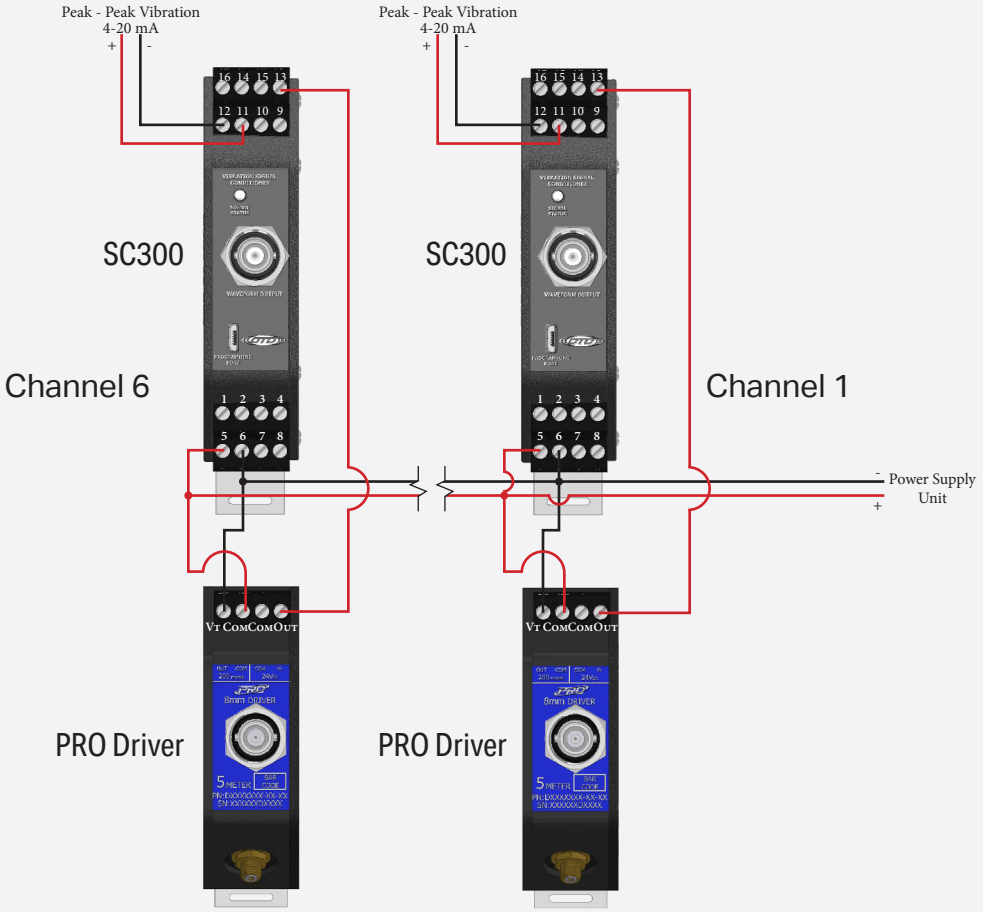

Wiring a PRO Proximity Probe Driver with an SC300 Signal Conditioner

Since the SC300 is a positive voltage device and the PRO Proximity Probe Driver is a negative voltage device, special considerations must be made when wiring them in conjunction with one another when using the same 24 VDC power supply.

The +24 V signal coming from the power supply should be wired into the first Signal Conditioner unit at Terminal 5; from there, it should also be tied to either COM terminal on the driver. The negative output from the power supply should be tied to terminal 6 of the signal conditioner unit and the VT terminal of the probe driver.

A 30 Watt 24 VDC power supply will power six SC300 signal conditioners, and six PRO Drivers wired together. To avoid brownouts and ensure the most reliable monitoring system, CTC recommends using multiple power supplies or a power supply >30 Watts for any application requiring more than six vibration channels.

Suppose an operator would like to take a reading of the unfiltered dynamic voltage signal from the Proximity Probe System. In that case, it is best practice to access it via the BNC Jack located on the face plate of the probe driver. A system that is wired the same as the figure above should NOT take dynamic voltage readings from the BNC Jack located on the SC300 Signal Conditioner unit.