VIBRATION ANALYSIS HARDWARE

Wiring

Connecting & Powering Accelerometers

VIBRATION ANALYSIS HARDWARE

IEPE Power

Integrated Electronic Piezo Electric (IEPE) power supplies are an integral part of today's modern data collectors, dynamic signal analyzers, and on-line condition monitoring systems used for vibration analysis. **The IEPE platform is a two-wire technology where Pin A is positive, and Pin B is negative.** The power and signal for the accelerometer or Piezo velocity sensor is found on the positive wire (Pin A), and the circuit common is located on the negative wire (Pin B).

The IEPE Power supply provides a constant current source of 2 to 10 mA with a supply voltage of 18 to 30 volts. Internally, the accelerometer or Piezo velocity sensor uses the supply current and voltage to power the integrated circuit that converts the change output of the PZT ceramic element to a voltage and amplifies the output of the accelerometer or integrates and amplifies the output of the Piezo velocity sensor.

Located inside the data collector, dynamic signal analyzer, and on-line condition monitoring systems, the IEPE power supply also plays an essential role in separating the AC vibration signal from the DC operating (bias) voltage. By using a decoupling capacitor, the IEPE circuit can provide the AC vibration signal for processing by the data collector, dynamic signal analyzer, or on-line condition monitoring system without the large DC voltage component. This provides a very clean vibration signal for analysis in the time waveform and FFT.

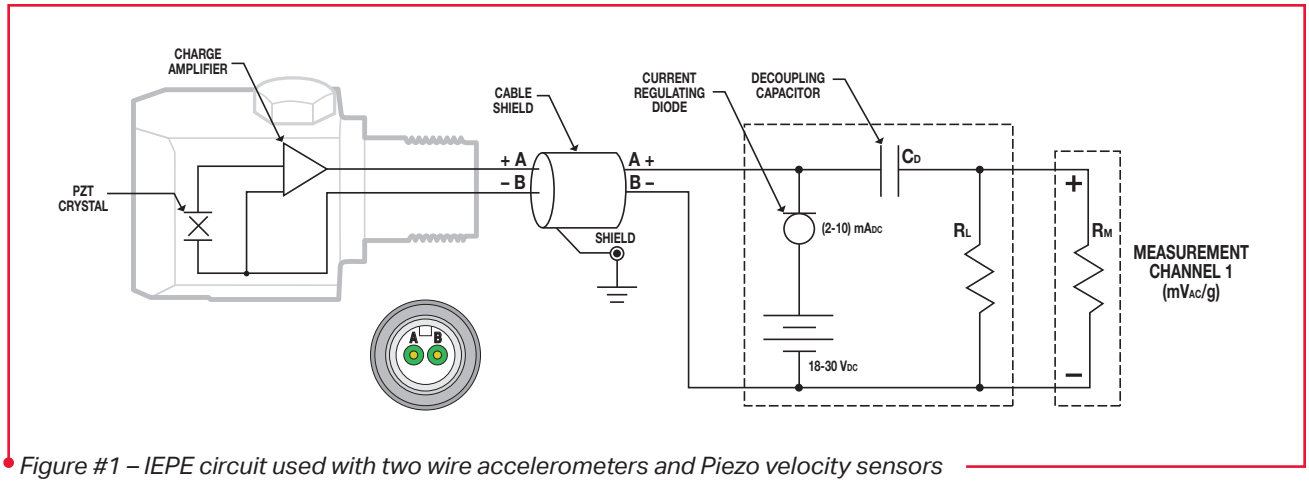

Figure #1 – IEPE circuit used with two wire accelerometers and Piezo velocity sensors

IEPE Sensor Wiring

Relative to Figure #1, for a two-wire accelerometer or Piezo velocity sensor, the positive wire would be connected to Pin A, and the negative wire would be connected to Pin B.

Dual Output Vibration and Temperature Sensors

Dual output vibration and temperature sensors also employ IEPE technology and an integrated circuit to measure the temperature. **Dual output vibration and temperature sensors are a three-wire technology where Pin A is positive vibration, Pin B is a shared common, and Pin C is positive temperature.** Dual output vibration and temperature sensors are available in Centigrade and Kelvin temperature scales.

Centigrade Temperature Output

The TA102 (100 mV/g), TA104 (100 mV/g), TA131 (10 mV/g), TA133 (500 mV/g), and TA135 (500 mV/g) series provide an mV/g vibration output and a 10 mV/°C temperature output. IEPE power must be applied to the vibration circuit to measure the temperature. Please reference Figure #2.

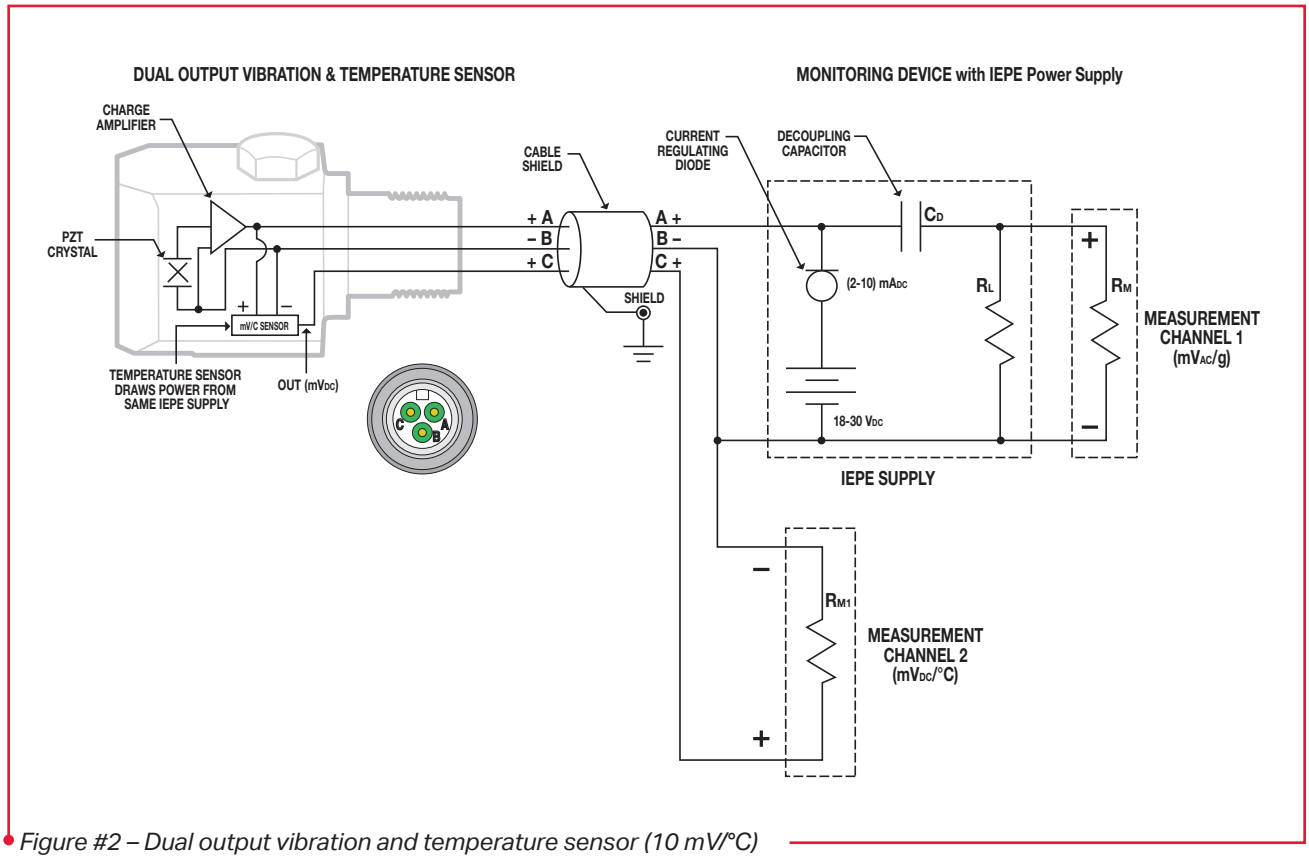

Figure #2 – Dual output vibration and temperature sensor (10 mV/°C)

Centigrade Wiring

Relative to Figure #2, for a three-wire vibration and centigrade temperature sensor, the positive vibration wire would be connected to Pin A, the negative wire would act as a shared common and be connected to Pin B, and the positive temperature output would be connected to Pin C. In this configuration, the temperature output will be directly measured as a DC voltage across Pin C (positive) and Pin B (negative).

Kelvin Sensors

The TA172 (100 mV/g), TA174 (100 mV/g), and TA178 (100 mV/g) series provide an mV/g vibration output and a 10 mV/K temperature output. IEPE power must be applied to the vibration circuit and temperature circuit to measure the temperature. This will require two channels in the data collector, dynamic signal analyzer, or on-line condition monitoring system with two IEPE power supplies. Note that the temperature output is DC coupled (decoupling capacitor removed from circuit) Please reference Figure #3.

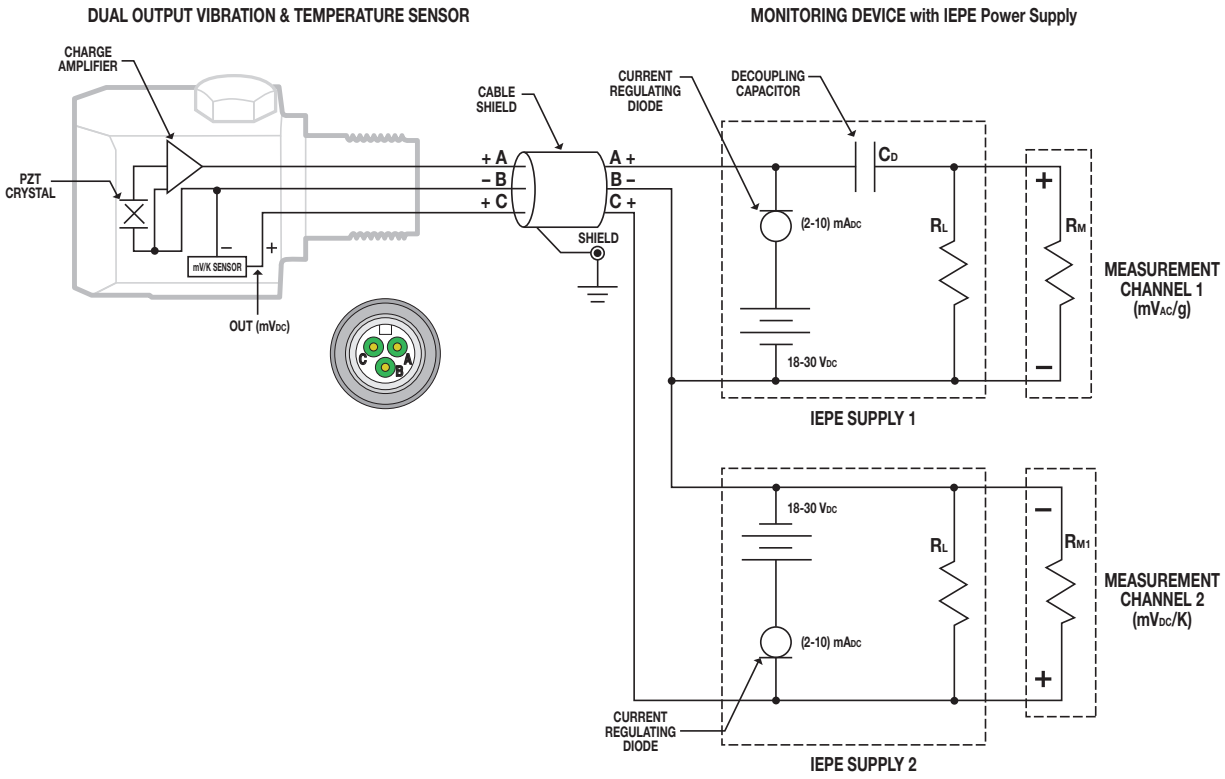

Figure #3 – Dual output vibration and temperature sensor (10 mV/K)

Kelvin Wiring

Relative to Figure #3, for a three-wire vibration and Kelvin temperature sensor, the positive vibration wire would be connected to Pin A, the negative wire would act as a shared common and be connected to Pin B, and the positive temperature wire would be connected to Pin C. In this configuration, the temperature output will be measured as a DC voltage across Pin C (positive) and Pin B (negative) of the IEPE circuit. **Remember, this will require two channels in the data collector, dynamic signal analyzer, or on-line condition monitoring system with two IEPE power supplies. Note that the temperature output is DC coupled (decoupling capacitor removed from circuit).**

Bi-Axial Accelerometer Wiring

The bi-axial accelerometers offer two axes of measurement in one accelerometer package.

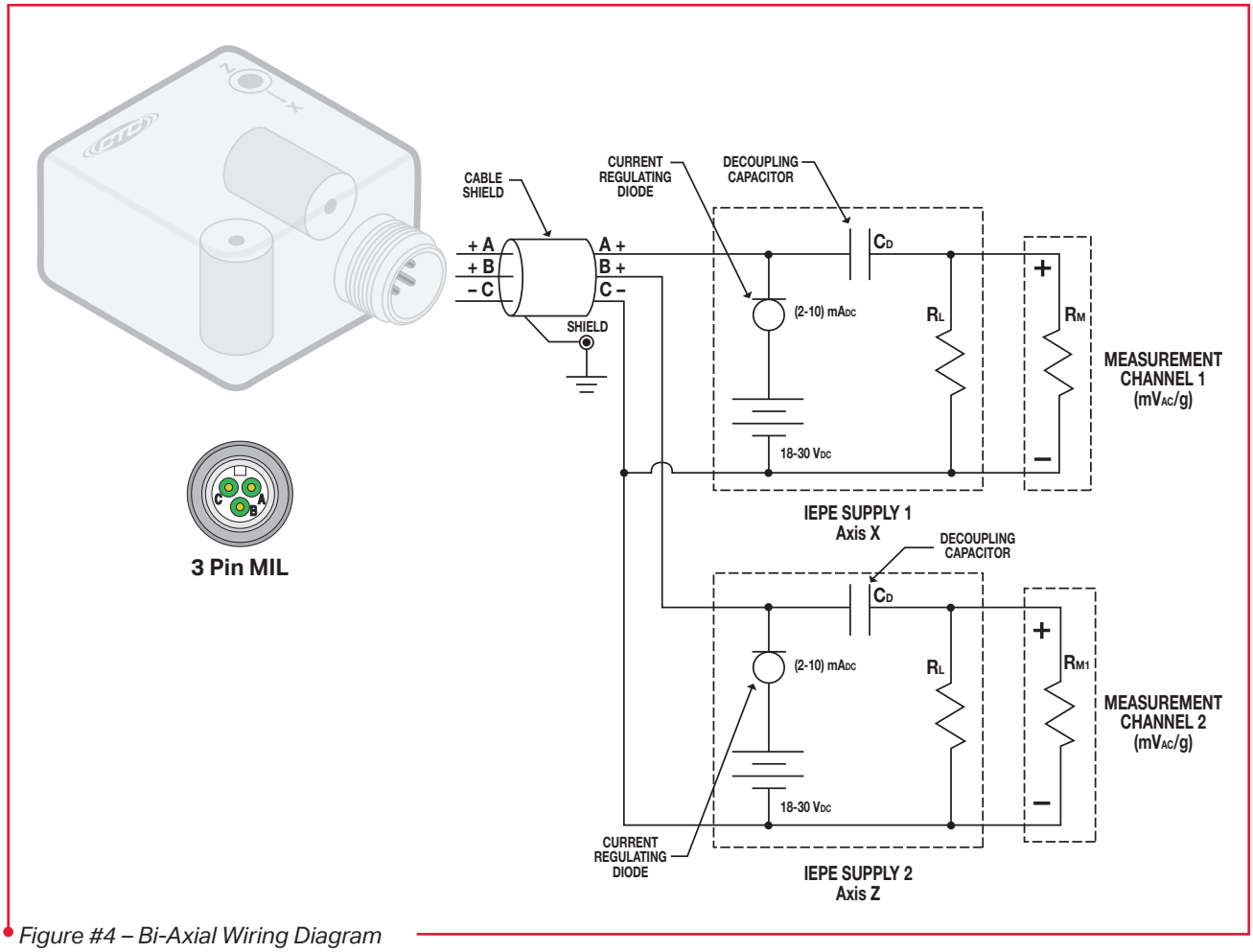

Figure #4 – Bi-Axial Wiring Diagram

As shown in Figure #4, the 3 pin output includes:

- Pin A = Axis X (Integral cable color = green)
- Pin B = Axis Z (Integral cable color = white)
- Pin C = Common (Integral cable color = black)

This would be typical for the AC119 series providing bi-axial outputs of 100 mV/g.

Tri-Axial Accelerometer Wiring

The tri-axial accelerometers offer three axes of measurement in one accelerometer package.

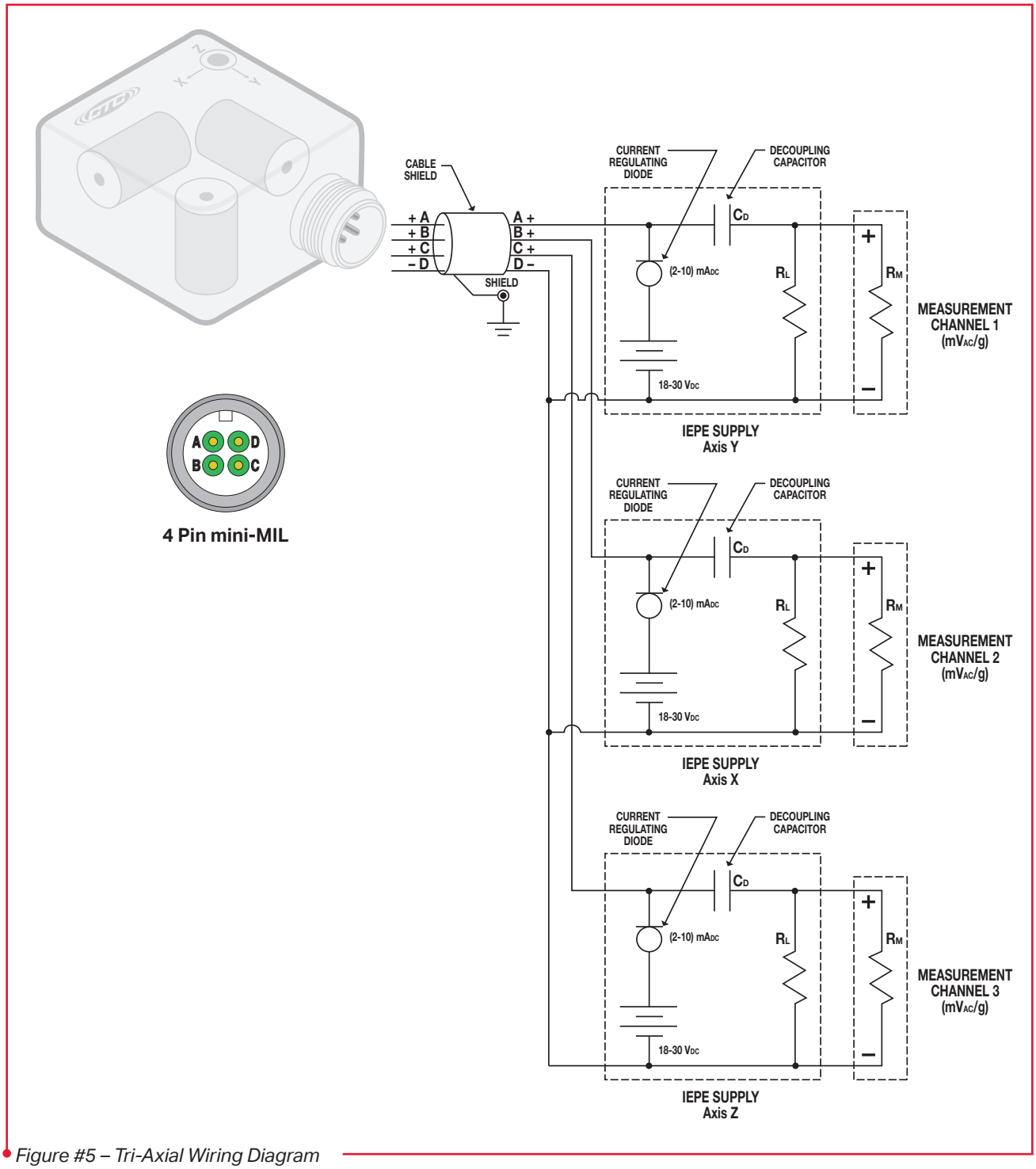

Figure #5 – Tri-Axial Wiring Diagram

As shown in Figure #5, the 4 pin output includes:

- Pin A = Axis Y (Integral cable color = red)
- Pin B = Axis X (Integral cable color = green)
- Pin C = Axis Z (Integral cable color = white)
- Pin D = Common (Integral cable color = black)

This would be typical for the AC115 series, AC230 series, and AC360 series proving tri-axial outputs of 100 mV/g or the AC132 series and AC232 series providing tri-axial outputs of 10 mV/g.

Negative Voltage Accelerometers

The AC162 series (25 mV/g), AC165 series (100 mV/g), and AC166 series (100 mV/g) accelerometers work on a negative voltage platform. All three accelerometers are compatible with monitoring and protection systems manufactured by Bently.

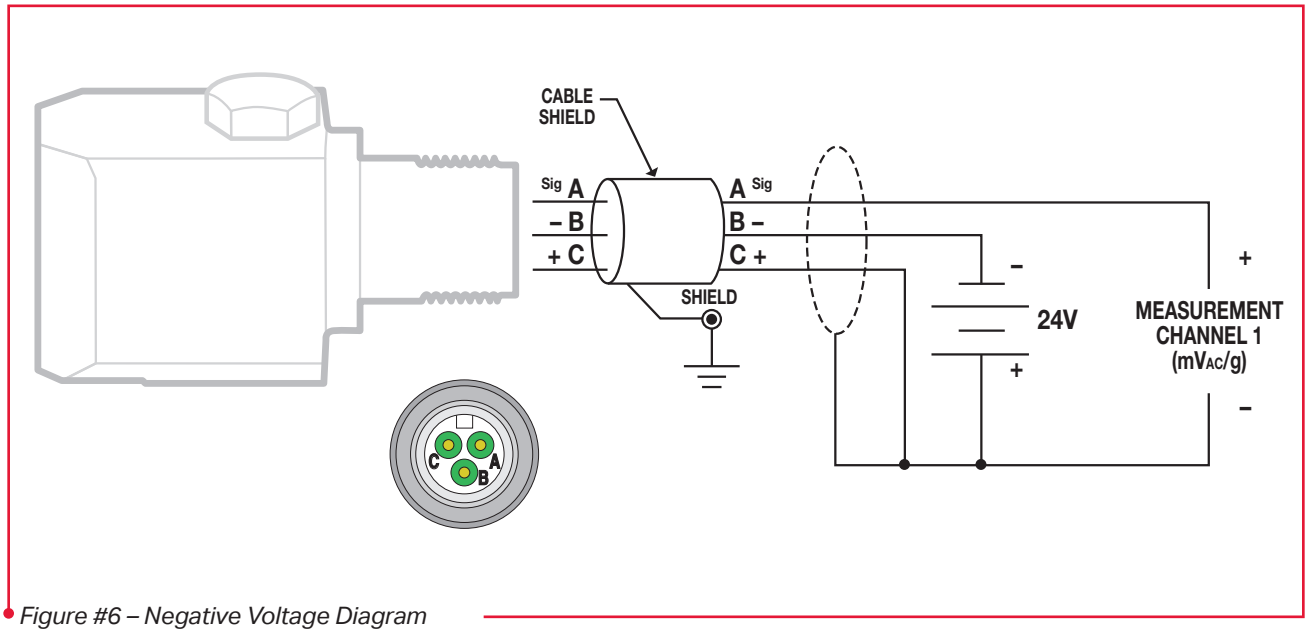

Figure #6 – Negative Voltage Diagram

As shown in Figure #6, the 3 pin output includes:

- Pin A = Vibration Signal
- Pin B = Negative 24 VDC Power
- Pin C = Positive 24 VDC Power (Common)

Low Power Accelerometers

The AC312 and AC314 series (25 mV/g), accelerometers work on a 3-5 VDC voltage platform. Both of these accelerometers use <20 µA of current and are designed for wireless applications where battery life is a priority.

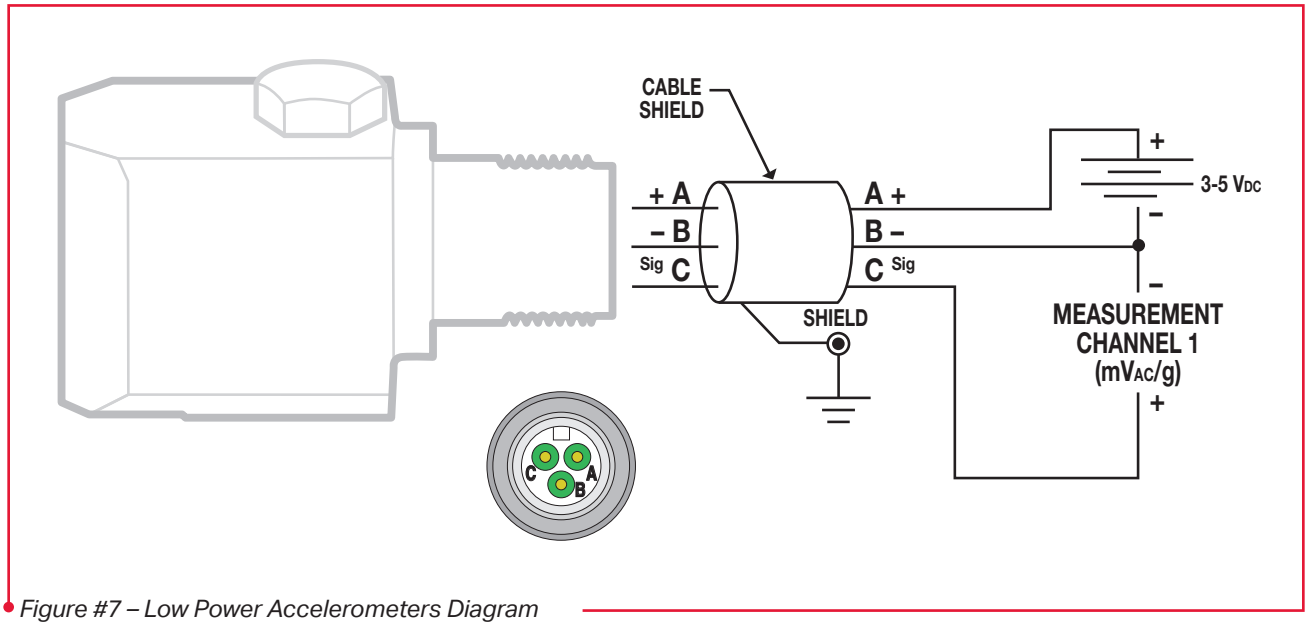

Figure #7 – Low Power Accelerometers Diagram

As shown in Figure #7, the 3 pin output includes:

- Pin A = Positive Power
- Pin B = Common
- Pin C = Vibration Signal

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.

VIBRATION ANALYSIS HARDWARE

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.