

Powering ICP® Accelerometers



All ICP® sensors require a constant power source for proper operation. A typical sensing system includes an ICP® sensor, ordinary two conductor cable and a basic constant current power supply (as shown in fig. 1)

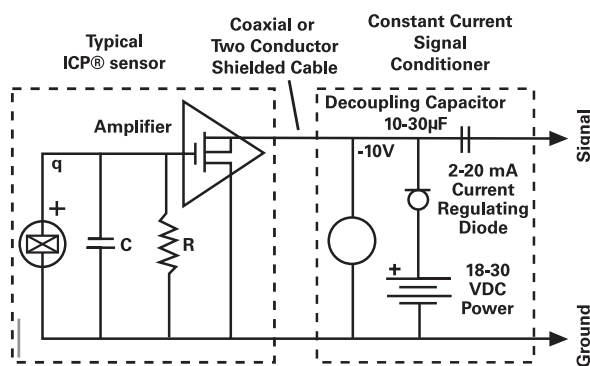


Figure 1. Typical ICP® Sensor System

Typical ICP® Sensor System

The signal conditioner consists of a well-regulated 18 to 30 VDC source (battery or line-powered), a current-regulating diode (or equivalent constant current circuit), and a capacitor for decoupling (removing the bias voltage) the signal. The voltmeter, VM monitors the sensor bias voltage (normally 8 to 14 VDC) and is useful for checking sensor operation and detecting open or shorted cables and connections. The current-regulating device is used in place of a resistor for several reasons. The very high dynamic resistance of the diode yields a source follower gain which is extremely close to unity and independent of input voltage. Also, the diode can be changed to supply higher currents for driving long cable lengths. Constant current diodes, as shown in Figure 2, should be used in ICP® signal conditioners. (The correct orientation of the diode within the circuit is critical for proper operation.) Except for special models, standard ICP® sensors require a minimum of 2 mA for proper operation.

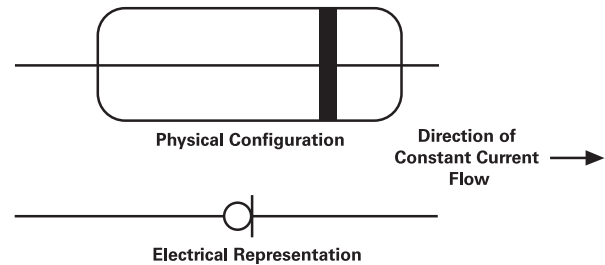


Figure 2. Constant Current Diode

Constant Current Diode

Present technology limits this diode type to 4 mA maximum rating; however, several diodes can be placed in parallel for higher current levels. All line-powered signal conditioners should use higher capacity (up to 20 mA) constant current circuits in place of the diodes, particularly when driving long signal cables.

Decoupling of the data signal occurs at the output stage of the signal conditioner. A 10 to 30 µF capacitor shifts the signal level to essentially eliminate the sensor bias voltage. The result is a drift-free AC mode of operation.

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REFERENCES

1. PCB PIEZOTRONICS Inc.

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