

CTC AppNotes

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

Understanding Accelerometer Specifications - The Basics

Accelerometer datasheets include a tremendous amount of information. Periodically we will examine the datasheets to explain the most relevant details of the sheet that need to be understood in order to select the correct accelerometer for your application.

The basics - Sensitivity, Frequency Response and Dynamic range.

Sensitivity

Sensitivity is the nominal output value of the sensor, generally specified in mV/g (millivolts/g). It is usually accompanied by a tolerance value. As we will be using the data sheet for AC292-series sensors our sensitivity is nominally 100 mV/g. The tolerance value is expressed as a percentage of the

Specifications	Standard
Part Number	AC292
Sensitivity ($\pm 5\%$)	100 mV/g
Frequency Response ($\pm 3\text{dB}$)	18-900,000 CPM
Frequency Response ($\pm 10\%$)	60-600,000 CPM
Frequency Response ($\pm 5\%$)	600-300,000 CPM
Dynamic Range	± 80 g, peak

Fig. 1 AC292 Series Sensor Specifications.

overall nominal sensitivity. In the case of the AC292, the tolerance is $\pm 5\%$. This means that the sensors actual output when sensing a vibration of 1 g can be anywhere from 95 millivolts to 105 millivolts. All CTC sensors are sent out with a calibration sticker showing the actual tested output from the sensor when shaken at 1 g at 100 Hz.

Frequency Response

On a premium sensor like the AC292 series, with a sensitivity tolerance of $\pm 5\%$, CTC always expresses the frequency response in three steps. Five percent,



AC292-1D Sensor

10 percent and 3 dB. As industrial vibration analysis depends on trending of values to determine when a machine condition is worsening, exact measurements are typically not required. The frequency response values are normally acceptable for use even at 3 dB. The frequency response of

our AC292 sensors is $\pm 5\%$ from 10 Hz to 5000 Hz (600 to 30000 CPM). This is the "sweet spot" of the sensor where the readings are most accurate; it is also the frequency band where the majority of all vibration readings are taken in the industrial world. The $\pm 10\%$ value allows the analyst to understand when the data may be a little less precise than the 5% range. As mentioned above the ± 3 dB response is still acceptable for trending analysis, but some do not quite understand the logarithmic scale, to clarify ± 3 dB can be interpreted as a $+29\%/-41\%$ range.

Dynamic Range

Dynamic range is the maximum vibration the accelerometer can accurately sense before the electronics of the sensor are saturated with too much signal for the amplifier board to process. When the sensor becomes saturated by the excessive vibration, the amplifier board effectively turns itself off and on and resets itself if the vibration has dropped below the saturation level. Analysts should ensure that they determine the Maximum frequency response required before selecting their sensors.

If you have any questions feel free to contact CTC directly. Call toll free 1-800-999-5290 in the US/Canada or +1-585-924-5900 internationally, or alternatively, email techsupport@ctconline.com.