Cheat Sheet: Accelerometer Specifications Guide

Specification	Tricky Examples
Accelerometer Type There are three main types of accelerometers: capacitive MEMS, piezoelectric, and piezoresistive. The datasheet *should* tell you what type it uses because the accelerometer type defines which applications it works best for.	**MEMS (or maybe not listed)** Generally means it's capacitive. **IEPE** Integrated Electronic Piezoelectric.
Frequency Response or Bandwidth A tolerance band of sensitivity deviation across a range of frequencies. Be certain that the low frequency goes to 0 hertz if you need a DC response for integration or measuring "slow" accelerations (think human motion type).	**2 to 4000 Hz ±3dB** This means that the accelerometer output can have an error as much as +40% to -30% from nominal over the frequency range of 2 to 4000 Hz. There *should* be a provided plot to clarify the performance across the frequency range.
Sensitivity Defines the rate at which the sensor converts mechanical energy to an electrical signal. This information needs to be communicated to the data acquisition and/or signal conditioning system to accurately determine the amplitude of the data output.	**3.0 pC/g** This is a charge mode piezoelectric accelerometer that will need a signal conditioner so that a voltage output can be measured with your DAQ system.
Measurement Range Specifies the acceleration range the accelerometer can measure. It is likely to be able to handle higher accelerations outside this range. Be sure to select an accelerometer with a measurement range 2 to 4 times that of what you are looking to actually measure to enable measurement of unanticipated events.	**Not provided but sensitivity is defined as 50 mV/g** The measurement range can be calculated by dividing the DC voltage supply (should be listed on the datasheet) by the sensitivity. For example, say we have a 10 volt supply, the measurement range is ±100g (10/0.05/2).
Noise Defines the lowest level of acceleration the accelerometer can provide before the data is just electrical noise, i.e. no conclusions can be drawn from the data.	**100 µg/√Hz from 2 Hz to 10 kHz** To calculate the RMS value of this noise the spectral noise must be squared, then integrate over the frequency range and take the square root of the result.
Resolution This defines the smallest measurable acceleration increment. Most often specified in bits which defines the number of parts the signal can be divided into.	**14-bit** There are 2^14 (16,384) bins, so for a ±50g accelerometer the smallest increment is 0.006g.
Filtering If you are looking at a digital part or a system some filtering will be required to prevent aliasing. The filter type, order, and frequency should be provided; if not, assume there is no filtering.	**5th order Butterworth** Butterworth is the type of filter. The order defines the frequency response angle, the higher the better to adequately filter out unwanted frequencies.
Temperature Sensitivity Accelerometers are mechanical systems and as such they will be influenced by temperature. This specification defines how sensitive the accelerometer is to temperature. If the accelerometer will be in an environment with a wide temperature range, this parameter is very important.	**-0.3%/°C** The sensitivity deviates negative 0.3% per degree difference from the reference temperature. For example an accelerometer calibrated at 25C will have a sensitivity 16.5% higher than nominal at 80C.
Transverse Sensitivity Defines how sensitive the accelerometer is to accelerations orthogonal (90 degrees) to the primary axis.	**<10%** Less than 10% of the acceleration amplitude in the X axis for example will be measured by the Z axis accelerometer channel.
Triaxial Indicates that the accelerometer can measure in all 3 axes.	**Not Listed** Assume it's single-axis.