CONVERTING THE SIGNAL OUTPUT OF A DC ACCELEROMETER TO ACCELERATION (G)

One of the most common application questions we receive from first-time users of a DC accelerometers is, “How do I transpose the electrical output of the accelerometer to an engineering unit?”

This conversion is best done by referring to the sensitivity (mV/g) and zero output (mv) values on the calibration certificate shipped with each accelerometer. These values are typically located at the top right corner of the calibration certificate along with other specifications and identifying information (Figure 1).

Figure 1: Calibration Data from Calibration Certificate

Calibration Certificate

Issue Date: 11/11-2008	Device under test (DUT): Accelerometer
Excitation voltage (Vdc): 10.00	Manufacturer: MEAS
Zero signal output (mV): 9.32	Model name: 52-0200-10-240-XY
Input resistance (Ω): 4110	Serial number: E000039
Output resistance (Ω): 4088	Calibration frequency range: 20 Hz-2800 Hz
Temperature (°C): 24	Sensitivity at 100 Hz: 0.9932 mV/g
Relative humidity (%): 40%	Transverse sensitivity: %
	g Range: 200

When one plugs the respective sensitivity and zero output values into the following equation (Figure 2), along with the measured output reading from the accelerometer, the acceleration in g is easily calculated.

Figure 2: Formula to Calculate Acceleration

Acceleration (g) = [output reading (mV) – zero output (mV)] / sensitivity (mV/g)

Example: Let’s assume a measurement was taken with the accelerometer identified in Figure 1 above and the output reading was 90 mV. Below is the resulting Acceleration (g)

Acceleration (g) = (90-9.32) / 0.9932
= 80.68 / 0.9932
= 81.23238

To ensure accuracy of accelerometer readings, each accelerometer should be calibrated every 12 months.

Calibration Services

The Vibration Sensors Business Group in California and its two manufacturing facilities in China and France now offer factory calibration and test services for these types of accelerometers:

- Piezoresistive
- Variable Capacitance
- Piezoelectric (PE)
- Integrated Electronics Piezoelectric (IEPE)

They offer NIST (US), DKD (Germany), COFRAC (France) traceable calibration services on sensitivity at 100 Hz (102 or 120 Hz in Europe). Sensitivity reference frequencies other than 100/102/120Hz are available upon request as are A2LA and ISO-17205 calibrations.

All Plug and Play accelerometers shipped from MEAS China have ISO-17025 certification.

Users of TE/Measurement Specialties accelerometers can expect one-week turnaround for full frequency response tests from 10 Hz through resonance and for transverse cross-axis sensitivity testing.

Calibration of accelerometers not manufactured by TE/Measurement Specialties may take longer depending on availability of test fixtures and the manufacturer's specifications.

Environmental testing over temperature, centrifuge testing and shock calibration are also offered on a case-by-case basis.

Inquiries

Address all inquiries on operation or applications to your nearest Sales Representative, or to the Vibration Applications Support as follows:

NORTH AMERICA

Measurement Specialties, Inc.,
a TE Connectivity Company
45738 Northport Loop West
Fremont, CA 94538
Tel +1 800 767 1888
Fax +1 510 498 1578
pfg.cs.amer@meas-spec.com

EUROPE

Measurement Specialties (Europe), Ltd.,
a TE Connectivity Company
Impasse Jeanne Benozzi CS 83163
78340 Les Clayes-sous-Bois, France
Tel +33 (0) 130 79 33 00
Fax +33 (0) 134 81 03 59
pfg.cs.emea@meas-spec.com

ASIA

Measurement Specialties (China), Ltd.,
a TE Connectivity Company
No. 26 Langshan Road
Shenzhen High-Tech Park (North)
Nanshan District, Shenzhen 518057 China
Tel +86 755 3330 5088
Fax +86 755 3330 5099
pfg.cs.asia@meas-spec.com

TE.com/sensorsolutions

08/2015