

# dynamic sensor & calibration tips

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## Greetings!

### Welcome to Issue #66

We value your readership of our newsletter each month and are always willing to answer any questions you may have. We received a reader question regarding re-calibration of used sensors and whether or not the original manufacturer's published specifications from nominal are as important as the re-calibration data. The full question and answer discussion is below.

If you have any questions about topics you've seen here or have any topics you would like to see covered in this newsletter, [please send me an email](#) and we will try to make sure it is discussed. Thanks for reading!

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### Tip of the Month: InterLaboratory Comparison Programs

Some vendors sponsor no-charge InterLaboratory Comparison (ILC) programs, sometimes referred to as "Round Robins"...ask yours if they do.

### Technical Exchanges

[Cincinnati IRIS Show \(Independent Representatives Information Services\)](#)

May 7, 2013

[International Instrumentation Symposium](#)

May 13-17, 2013

[SAE Noise & Vibration Conference](#)

May 20-23, 2013

### Quick Links

[PTB](#)

[NIST](#)

[ISO TC 108](#) - Mechanical vibration, shock and condition monitoring

### Does a Manufacturer's Nominal Spec Matter?

One of our "Dynamic Sensors and Calibration" newsletter readers recently sent me an email about a concern they encountered with some pre-owned 'Brand X' accelerometers which they purchased from an e-commerce website.

#### nmic Performance

- ◊ Charge Sensitivity: 10.0 pC/g  $\pm 2\%$
- ◊ Open Circuit Voltage Sensitivity: 5.2
- ◊ Accelerometer Capacitance: 1,600 p
- ◊ Mounted Resonant Frequency: 30,0

The reader explained that the sensors performed "fine" in the lab, but that the recent re-calibration certificate provided to them by TMS showed that although the sensors' frequency response was fine, the reference sensitivity was out of tolerance from the manufacturer's stated maximum deviation from nominal. Here is the discussion that followed:

### [Click to read full discussion](#)

[modalshop.com/calibration.asp?ID=819](http://modalshop.com/calibration.asp?ID=819)

### Technology Fundamentals of Microphone Types Excerpted from, "The Microphone Handbook" by PCB Piezotronics

When an object vibrates in the presence of air, the air molecules at the surface will begin to vibrate, which in turn vibrates the molecules adjacent to them. This vibration will travel through the air as oscillating pressure at frequencies and amplitudes determined by the original sound source. The human ear transforms these pressure oscillations, or sound, into electrical signals that are interpreted by our brains as music, speech, noise, etc. Microphones are designed, like the human ear, to transform pressure oscillations into electrical signals. These signals can be recorded and analyzed to tell us information about the original source of vibration or the nature of the path the sound took from the source to the

[ISO TC 108/SC 3](#) - Use and calibration of vibration and shock measuring instruments  
[ISO TC 108/SC 6](#) - Vibration and shock generating systems  
[SAVE \(Formerly SAVIAC\)](#)  
[Vibration Institute](#)  
[Equipment Reliability Institute \(ERI\)](#)  
[TMS Video Vault](#)  
[Learn More Calibration](#)

### Previous Newsletters

#### [Dynamic Sensor & Calibration Tips #65](#) -

What's Happening at NIST?; Benefits of ICP® Operation in Vibration Calibration References

#### [Dynamic Sensor & Calibration Tips #64](#) -

Explaining Uncertainty; Video - Calibration Tutorial

### Select Newsletter Articles by Topic

#### [Function and Structure of Accelerometers](#)

#### [Similarities Between Charge and ICP Operation](#)

#### [Selecting Accelerometers for Mechanical Shock](#)

#### [Master List of Topics \(T.O.C.\)](#)

### PCB Group Companies

#### [The Modal Shop Systems & Service Website](#)

#### [PCB Piezotronics Sensor Website](#)

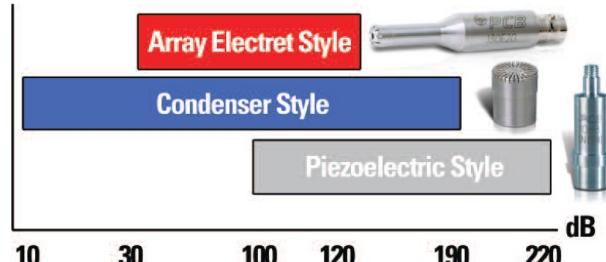
#### [IMI Monitoring Website](#)

#### [Larson Davis Acoustics Website](#)

#### [PCB Load & Torque Website](#)

#### [SimuTech FEA Website](#)

microphone.



This is exhibited in testing of noise reducing materials. Sound pressure must be analyzed in the design stages to not only protect the materials around it, but also to protect the mechanism designed to perceive it, the human ear. Like the human ear, microphones are designed to measure a very large range of amplitudes typically measured in decibels (dB), and wide ranges of frequencies measured in hertz (Hz). Microphones measure sound pressure. There are a few different designs for microphones...

[Click to read full article](#)

[modalshop.com/calibration.asp?ID=820](http://modalshop.com/calibration.asp?ID=820)

### Blast From The Past: Primary vs Secondary Calibration



The question often asked is, "When (or even why) do I need primary calibration?" Metrologists are also curious to know, "What does it cost?"

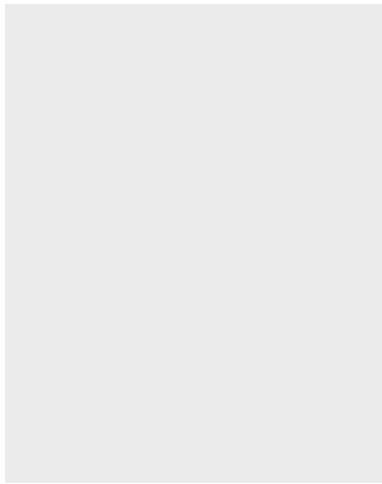
The short answer to "who needs it?," is that primary calibration (as covered in ISO16063-11) is the standardized means to obtain the absolute minimum in uncertainty. But to fully answer this question, one needs to first consider the reasons for calibration. This discussion answers the question from the angle of uncertainties, costs and throughput rates.

[Click to read full article](#)

[modalshop.com/calibration.asp?ID=201](http://modalshop.com/calibration.asp?ID=201)

Thanks for joining us for another issue of Dynamic Sensor & Calibration Tips. As always, please, speak up and [let us know what you like](#). We appreciate all feedback: positive, critical or otherwise. Take care!

Sincerely,



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