

CTC AppNotes

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

Sensor Settling Time

As newer and more powerful (and FASTER) data collectors come on the market, it is important to remember that some of the older and previously installed sensors have not been upgraded to more modern technology. So settling the sensor prior to taking a reading is an important step towards obtaining good consistent data.

What is settling time?

Settling time can be described as the amount of time you must wait to make a vibration measurement after:

- Turning the power on
- Connecting the sensor
- “Mounting” the sensor (connecting the magnet mounted sensor to the machine)

Electrical	
Settling Time	<2 Seconds
Voltage Source (IEPE)	18-30 VDC
Constant Current Excitation	2-10 mA
Spectral Noise @ 10 Hz	8 µg/√Hz
Spectral Noise @ 100 Hz	4 µg/√Hz
Spectral Noise @ 1000 Hz	2 µg/√Hz

Figure 1—All CTC accelerometers specify their settling time along with other pertinent electrical data.

There are four primary components that must all be “at the ready” prior to taking the data collector readings.

- 1. Mounting.** The sensor must be properly mounted and not “in motion” prior to powering the sensor.
- 2. Sensor.** Once the sensor is mounted, it must have time to allow the internal mechanics to stop any excessive motion caused by the mounting or repositioning of the sensor.
- 3. IEPE power.** Whether the supplied by the data collector or by an independent power supply, this is the main thing that must be working properly. Even small fluctuations in current/voltage supply can affect the output from the sensor.
- 4. Measurement system.** This is your analyzer or other data acquisition system. Even though

these generally settle within a few milliseconds it is still possible for the eager analyst to punch their record button twice in rapid succession before the data collector is ready to take a second reading.

What problems can occur if the system has not settled?

- **Ski Slope**— A large DC voltage component swamps the low frequency region of the spectrum causing a “ski slope”. To correct this the analyst needs to wait for all components of the system to settle before taking a measurement. Most sensors settle from powering on in under 2 seconds.
- **Unwarranted Spikes in the Spectrum**— These can be caused by slamming the sensor and magnet onto the machine and attempting to take a reading before the system has settled. If a sensor has been slammed onto the machine it usually requires a settling time in the neighborhood of 4 seconds for the sensor to settle and for the power supply to de-couple and settle. This can be avoided by gently rocking the magnet onto the machine.

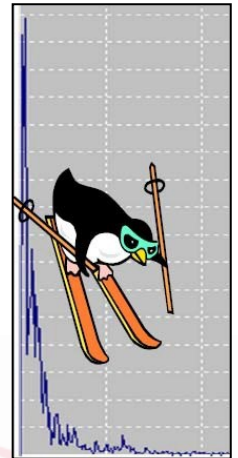


Figure 2— Ski slopes can cause real problems for a vibration analyst.

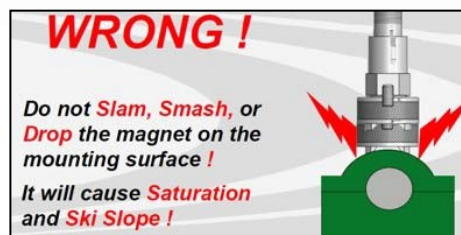


Figure 3— Allowing a magnet mounted sensor to slam onto the machine will cause saturation, ski slopes and spikes.

If you have any questions or for further information please feel free to contact CTC directly via e-mail techsupport@ctconline.com or call 1-800-999-5290 in the US and Canada or +1-585-924-5900 internationally.

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