

# CTC AppNotes

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

November 15, 2008

## Vibration Monitoring on Cooling Towers

### Executive Summary

Cooling towers are frequent choices for vibration monitoring due to their often critical role in maintaining operational efficiencies. In this edition of CTC AppNotes we will present some basic information on sensor



usage and placement for monitoring fans, motors and gearboxes on cooling towers.

## Monitoring Rotating Equipment on Cooling Towers

Cooling towers, due to their generally exposed locations, and sometimes hazardous configurations, offer many challenges to effective monitoring.

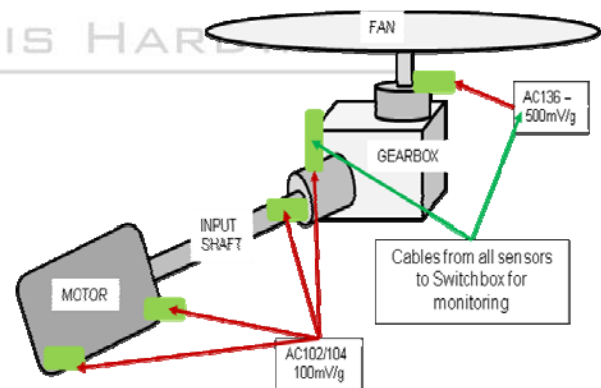


## Connection Technology Center Staff

There is nothing like balancing on a couple of 2 x 4s over a gigantic bowl of possibly toxic soup with a rotating axe a few inches overhead. This is a perfect spot for permanently mounted sensors wired out to a junction box in a safe location.

Cooling towers are designed to provide cooled water through heat transfer using evaporation. They come in many varieties from small single cell units to large multi-cell configurations. Any of these that include rotating parts need measurement and analysis of vibration to improve reliability and extend equipment life.

The machinery generally consists of three phases; motor, gearbox, and fan. In order to provide maximum reliability, all three phases should be monitored. To accomplish this accelerometers are generally placed at key places on the motor, gearbox and fan bearings. Typically vibration sensors are mounted on the bearing surface\* in the horizontal, vertical and axial directions.



For maximum coverage, 6 sensors would be used on both the motor and gearbox for total of 12 sensors per installation. General purpose sensors like CTC's AC102 and AC104 series sensors rated at 100 mV/g would be recommended for applications

\*

If any CTC vibration analysis hardware product should ever fail, we will repair or replace it at no charge.

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over 30 CPM (0.5 Hz). Low frequency applications from 12 CPM to 30 CPM (0.2 to 0.5 Hz) should use a 500 mV/g sensor like CTC's AC135 or AC136 series accelerometers.

Using the correct cabling to take the signal to a switch box located in a more easily accessible area is important as well.



Teflon jacketed or armored cables are usually selected for this purpose. CTC offers CB111 Teflon jacketed cable and CB206 Armored cables with several choices of connector for this purpose. These should be connected to a Switch box such as SB102-12C (which would also be able to pass the signal through to a remote monitoring system such as a DCS, PLC or SCADA System).



\*See CTC AppNote "Basics of Sensor Mounting"

Parts included in this discussion:

AC102-1A - 100 mV/g accelerometer  
AC104-1A - 100 mV/g accelerometer  
AC135-1A - 500 mV/g accelerometer  
AC136-1A - 500 mV/g accelerometer  
SB102-12C – 12 Channel Switchbox  
CB111-B2A-030-Z 30ft. Teflon jacketed cables.

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If you have any questions or comments or for further information please contact CTC directly:

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