

September 6, 2010

Inverter Testing

There is no need to be intimidated when testing motors that are powered by VFDs. Although there seems to be the thought of some unknown “Black Box” technology at work, it can be easily understood visually. Using the MCEMAX tester online and two simple Power Analysis tests, allows us to see the current carrying components and their health.

Viewing the Voltage and Current Time Domain of a Power Analysis test on the *input* of the drive, we can see the voltage supplied to the drive and the individual semi-conductors used to rectify the voltage in the current waveform. By visually inspecting the current waveform, we should see three individual currents all producing an alternating positive/negative “M” hump pattern waveform. All three phases should be symmetrical. Any asymmetrical waveforms or current flow in between humps in a phase can be indicative of a pending semiconductor failure.

During a Power Analysis capture on the *output* of the drive, we can see the voltage production of the drive and the reaction in current from the motor. Viewing the Voltage and Current Time Domain, we can see the output IGBT (Isolated Gate Bi-polar Transistor) components and their triggering. Selecting only the Phase-to-Phase voltage patterns (scale x 4 or 8) we can see the individual cycles of the PWM (Pulse Width Modulation). Once again look for symmetry. All three phases should be producing identical waveforms. If they are not, we know the drive gate drive circuit is not functioning properly or we have a failing IGBT.

For more information on VFD's read *VFD Motor Testing* at <http://www.pdma.com/PdMA-articles.php> and *VFD Testing and Analysis* at <http://www.pdma.com/PdMA-application-notes.php>.

You are invited to submit an Electric Motor Testing Tip of your own and receive a free PdMA mug or hat if we publish it! Contact Lou at 813-621-6463 ext. 126 or lou@pdma.com.