



A Leader in Electric Motor Testing

Tip Of The Week

May 4, 2015

Ready For a Long Hot Summer, Part 1

As summer approaches, it becomes extremely important to keep your motors running as cool as possible. For every 10° C increase in winding temperature, the expected life of a motor is reduced by one-half. Any action you can take to reduce a motor's operating temperature will therefore allow you to get more value out of each motor and reduce maintenance and repair costs.

The Power Analysis test included in every EMAX and MCEMAX® tester is an excellent tool for monitoring several factors that affect a motor's operating temperature. The Power Analysis test samples ten cycles of current and voltage and provides many key indicators that allow you to evaluate the voltage supplied to a motor and look for high resistance connections in the power circuit.

One factor that will affect your motor's operating temperature is the harmonic content in the phase-to-phase voltage supplied to a motor. Voltage harmonics are components of the voltage signal with a frequency that is a multiple of the line frequency. Harmonics are created by non-linear loads such as Variable Frequency Drives. A high level of voltage harmonics will produce many negative effects, but the most critical for fault zone analysis of motor circuits is that the operating temperature will be higher than that of a motor supplied with a clean voltage signal. The *Motors and Generators* standard published by the National Electrical Manufacturers Association (NEMA MG-1) recommends derating a motor supplied with a voltage signal with high levels of harmonic content. Derating a motor means reducing its maximum load to less than nameplate values in order to compensate for extreme operating conditions. NEMA's MG-1 standard provides a formula to calculate Harmonic Voltage Factor, which is used to indicate the effect that the voltage harmonics will have on a motor's operating temperature, and also provides a derating curve based on Harmonic Voltage Factor. PdMA's Power Analysis test provides both the Harmonic Voltage Factor calculation and the NEMA derating factor so that you can make sure your motor is operating below the maximum load suggested by NEMA.

Next week's Tip of the Week will continue the discussion about how to use the Power Analysis test to monitor conditions that contribute to increased operating temperatures of your motors.

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.