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Power Analysis Testing

Proper power analysis captures can be verified by viewing the phasor diagram. The phasor diagram displays the voltage and currents in a 360 degree graphical format. This diagram makes it easy to identify the connections made with the voltage leads and current probes.

All three phases, voltages and currents, should be separated by approximately 120 electrical degrees. The degrees of separation are dependent upon the percentage of loading and any voltage or current imbalance. When proper, the phasor diagram is symmetrical with each voltage having a corresponding current following relative to load. The software will display a “smiley face” relative to voltage rotation only.

In some instances it is possible to observe what appears to be a good phasor diagram, but a careful review of the results page, tells another story. For example, a power analysis of a 2200hp motor shows about a 94% load, an impedance imbalance of 7.62%, and power factors of 0.08, 0.08, and 0.07 (not reasonable for a fully loaded motor). After looking at the phasor again it is noted that the separation of the voltage and currents were too wide for a motor running at 94% FLC (full load current), so corrections were made using the corrections menu. Currents 1 and 2 were swapped, then currents 2 and 3 were swapped. That correction closed the gap of voltage and current on the phasor diagram. A revisit to the results page then showed a .90% impedance imbalance and power factors of 0.83, 0.83 and 0.82.

Utilize all the information provided by the PdMA tester to insure proper data collection.

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.