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# Tip Of The Week

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## Voltage Imbalance on a VFD

Voltage imbalance is one parameter monitored in the Fault Zone Analysis. When performing testing downstream of the VFD, a Voltage Imbalance of 1% triggers a caution alarm. In analyzing the situation, it is noticed that the phase-to-phase voltages show a slight imbalance (1%), but, the phase-to-neutral voltages show a significant imbalance (>5%). Is this a bad situation or not?

A large (>5%) phase-to-neutral voltage imbalance is a common occurrence when testing downstream of pulse width modulation (PWM) VFDs. Based on a small phase-to-phase voltage imbalance (1%), the typical assumption is the VFD system is operating properly. Thus, there is no issue with a large phase-to-neutral imbalance (on the order of 5% to 25%) unless the imbalance is caused by a grounded phase (phase-to-neutral voltage imbalance would typically be > 80% in that situation).

Due to the vector addition of pulses to create a sine wave, coupled with a lack of ground reference, phase-to-neutral voltage imbalances are not necessarily representative of issues when testing VFDs. However, phase-to-phase voltage imbalances should be addressed immediately.

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.