PowerFlow
APPLICATION NOTE
PRODUCTS AND INFORMATION FOR POWER PROFESSIONALS

TurPower Associates Application Note #110

Motor Testing Solutions

Electric motors do not just “burn up,” but rather fail for a variety of reasons including shorts, opens, ground leakage, or other system problems. The majority of motor failures are due to insulation failure.

To evaluate system problems from utility or building wiring, first check for a loose connection on the motor. Then check the voltage upstream to make sure it is within 10% of the rated voltage of the motor. Next check voltage on the overload relay, and replace if zero. If voltage is present, the problem is downstream from the starter. If contacts are burned or welded, use a clamp-on ammeter to test inrush current and resize the relay if necessary.

Use an insulation tester to expose possible impending failure on shaded-pole motors. An insulation tester can also be used on motors with large windings that have inductive impedance.

If the motor has a thermal switch, check for continuity across contacts and heater elements, as well as resistance across the starting and running windings. Perform a similar continuity check of centrifugal switches.

Check the capacitor on capacitor-start motors with an ohmmeter to ensure that the capacitor can hold a charge and the capacitor readings go from zero to infinity with no change over the time of the test.

With three-phase motors, check basic winding with an insulation tester to prolong motor life. An insulation test phase-to-phase, phase to ground, and stator to rotor will reveal developing deterioration and head off total breakdown.

For dc motors, check brushes and their holders. An insulation tester will help detect shorts from winding to case or winding to winding, as well as opens within a winding. Similarly,, a high current, low resistance ohmmeter can perform bar-to-bar testing for shorts between turns of the cummutator or grounds to the shaft. Additional diagnostic tests like polarization index and dielectric absorption can determine if there is moisture in the motor windings.

Megger’s New Meg-10-01 Insulation Tester

Motor Test Equipment

A fully functional insulation tester will address most testing requirements. TruPower Associates and Megger offers a variety of models from handheld test equipment to the new MEG10-01, 10kV insulation tester with internal storage.

System tests can be addressed with a 3-phase power meter with recording capabilities, like Megger’s PA9 Plus power analyzer. This unit can record cycle by cycle current to determine motor inrush for load studies and unbalances. The PA9 Plus can also provide power factor and harmonics information.

In addition, Megger provides insulation testers, ohmmeters, power clampmeters, phase sequence indicators, phase sequence/motor rotation testers, and more. Call TruPower Associates for more details and to select the best motor testing equipment for your application.

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