



Reliable Solutions
Today!

FOX-TRACKS



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ELECTRIC MOTOR SERVICE, LLC

861 W. College St.
Murfreesboro, TN 37129
Ph. 615-893-0542
Fax. 615-893-8547

24 HOUR EMERGENCY SERVICE

Website: www.foxbroselectric.com
e-mail: fox@foxbroselectric.com

VARIABLE FREQUENCY DRIVES INDUCE SHAFT CURRENTS IN AC MOTORS

Due in large part to an increased focus on energy savings, the use of pulse-width-modulated (PWM) variable-frequency drives (VFDs) to control AC motors has grown dramatically over the last few years. While they offer low operating costs and high performance, VFDs are not without their problems. Shaft currents induced by VFDs can lead to motor failures. Without some form of mitigation, shaft currents travel to ground through bearings, causing pitting, fusion craters, fluting, excessive bearing noise, eventual bearing failure, and subsequent motor failure.

ELECTRICAL DAMAGE TO BEARINGS

Due to the high-speed switching frequencies used in PWM inverters, all variable frequency drives induce shaft current in AC motors. The switching frequencies of insulated-gate bipolar transistors (IGBT) used in these drives produce voltages on the motor shaft during normal operation through electromagnetic induction.

POSSIBLE SOLUTIONS

Insulated bearing journals and ceramic bearings have provided some resistance to the problem. However, they are both costly, and these both force the current to seek another path to ground, such as through an attached pump or tachometer.

Conductive grease, in theory, would provide a lower-impedance path through the bearing and would bleed off shaft current through the

bearing without the damaging discharge.

Unfortunately, the conductive particles in these lubricants increase mechanical wear to the bearing, rendering the lubricants ineffective and often causing premature failures. This method has been widely abandoned as a viable solution to bearing currents.

A Metal Grounding brush contacting the motor shaft is a more practical and economical way to provide a low-impedance path to ground, especially for larger NEMA-frame motors. However, these brushes pose several problems of their own. They are subject to wear, they collect contaminants, they are subject to oxidation buildup, and they require maintenance on a regular basis.

A MORE COMPLETE SOLUTION

The AEGIS SGR™ Conductive MicroFiber Bearing Protection Ring offers a unique combination of benefits unmatched by other technologies. It is a low-cost solution that can be applied to virtually any size AC motor in virtually any VFD application. With hundreds of thousands of discharge points, the SGR channels shaft currents around the AC motor bearings, and protects them, and the attached equipment, from electrical damage.

UNFORTUNATELY, this problem does not occur in all VFD applications, and no one has been able to predict which applications will experience the problem. We offer the AEGIS SGR™ shaft ring as a modification to your rebuilt or new motor. Ask your salesperson for details.