



Variable Frequency Drives

Match Geothermal Power Generation to Demand

When they think of renewable energy, most people think of solar and wind. And for good reason. The sun shines and the wind blows virtually everywhere in the world. But geothermal power generation requires fissures in the earth's crust that allow heat from the earth's mantle to turn groundwater into steam. The steam spins a turbine, producing electricity. So viable sites for geothermal plants are fewer in number.

Another difference between geothermal energy and other forms of renewable energy is that it is more predictable and reliable. Unlike wind or solar power, which are dependent on the weather or the time of day, geothermal power generation is highly consistent and predictable... so predictable that most geothermal plants do not need battery banks to match power generation to demand. Instead, they rely on variable frequency drives to regulate the speed of large power generators and of various subsystems including VFD-driven deep-well line shaft pumps for district heating.

But VFDs Can Damage Pump Motor Bearings

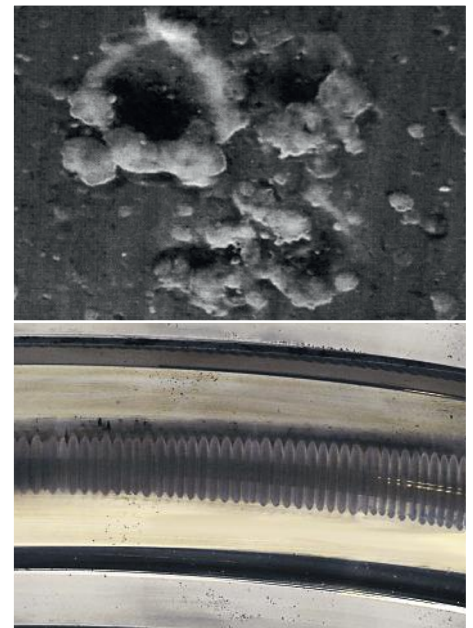
VFD-induced voltages on motor shafts can discharge through motor bearings, causing pitting, frosting, fluting, and total bearing failure in as little as 3 months!

The Need for Shaft Grounding on VFD-Driven Motors

Pump motor failures can cost hundreds of thousands to millions of dollars in repairs and lost revenues and can endanger public health and safety. To ensure the reliability of VFD-driven pump motors and systems, bearing protection is needed.

Proven Long-Term Bearing Protection

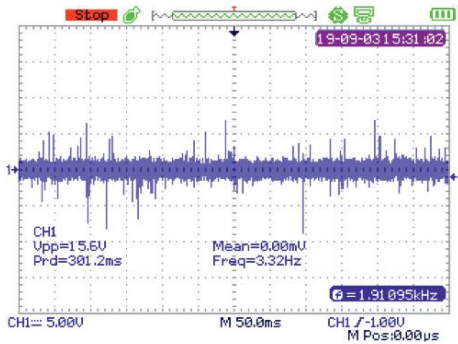
By providing a very-low-impedance path from motor shaft to ground, AEGIS® Shaft Grounding Rings ensure the reliable, long-term operation of VFD-driven pumping systems. Proven in millions of installations worldwide, AEGIS® Rings provide unmatched bearing protection of the full L-10 life of the motor.



Prevent EDM Pitting and Fluting Damage

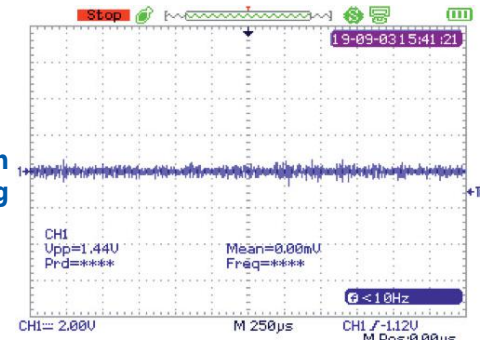
AEGIS® Rings Reduce Shaft Voltages to Non-Damaging Levels

Without
AEGIS® Ring



15.6 V Peak-to-Peak

With
AEGIS® Ring



1.4 V Peak-to-Peak

Applications

Auxiliary Services Pumps

- Process pumps
- Axially split, single-stage pumps
- Segmental ring section pumps

Circulating Water Pumps

- Vertical wet-pit pumps
- Horizontal, between bearings, single-stage pumps

Heat Transfer Fluid Pumps

- Multistage, double-case vertical pumps
- Overhung process pumps
- Pumps for secondary recirculation, overflow, make-up, and storage

Condensate Extraction Pumps

- Vertical multi-stage canned pumps
- Vertical turbine canned pumps

Production Well Pumps

- Vertical deep well line shaft pumps

Re-Injection Well Pumps

- Axially split, between bearings, single-stage pumps
- Process booster pumps
- High-pressure, multi-stage barrel re-injection pumps



AEGIS® Split Shaft Grounding Ring installed on vertical deep well line shaft pump at a geothermal power station in Iceland.



Geothermal heat pumps deliver water at a temperature of 70 degrees directly from the ground.