



## Bearingless Motor Design (20150060-1)

Technology ID

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### AC Homopolar Motor Topology

A novel AC homopolar motor topology is extremely efficient, and with minimal maintenance required, it drives down operating costs. The motor comes with an optional outer-rotor/inner-stator, as well as a single set of windings that provide both torque and magnetic suspension without using rare-earth permanent magnets or a separate set of armature coils. The design enables a predictive, smart operating real-time health monitoring machinery system that eliminates the need for additional sensors. By eliminating radial magnetic bearings and reducing components for an integrated solution, this design allows lower acquisition costs than traditional solutions.

### Bearingless Motor Design

Integrated solutions that leverage the motor's magnetic field to create magnetic bearing forces on the shaft eliminate the need for radial bearings and source of friction, energy losses and oil migration. The technology uses the same stator windings/coils and can use a standard variable speed drive for operation. The oil-free, quiet, reliable and high efficiency motor has applications in HVAC systems, large industrial blowers, turbines, compressors and healthcare.

#### BENEFITS AND FEATURES OF BEARINGLESS AC HOMOPOLAR MOTOR:

- Novel, clean technology: up to 80% energy savings; up to 40% lower costs of goods
- Contact-free, magnetic levitation
- Extreme reliability: nearly eliminates maintenance
- Real-time health monitoring by leveraging integrated sensors and Internet of Things technology
- Dual purpose winding for providing torque and magnetic suspension
- Greater efficiency in movement and operation
- Reduced footprint size allows for more industrial applications
- Bearing-less design without permanent magnets
- Simpler to manufacture: machine can function as both a magnetic bearing and a motor
- Higher rotational speeds due to the robust, magnet-free rotor
- Nearly eliminates self-discharge due to the machine's iron losses during idling times

**Phase of Development** - Working prototype

#### Researchers

Eric Severson, PhD

*Postdoctoral Researcher, Department of Electrical and Computer Engineering, College of Science and Engineering*

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