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Technologies Of The Year -- MagnaDrive Adjustable Speed Drive

MagnaDrive Corp. promises energy savings, reduced maintenance.

Imagine an easy-to-install industrial technology that reduces energy consumption, eliminates mechanical vibrations and electronic harmonics, relaxes alignment tolerances and cuts maintenance needs.

Sound too good to be true?

"This is something that no one even knew was possible," says Ken Black, senior applications engineer for MagnaDrive Corp., Seattle. "This is a new animal in the zoo."

The MagnaDrive Adjustable Speed Drive (ASD) is based on the principles of standard AC eddy current variable speed drives but does not need an AC motor to create the electromagnetic fields. The MagnaDrive ASD uses powerful rare-earth Neodymium-iron-boron (NdFeB) magnets that are far more powerful than conventional iron magnets. The magnets, which became commercially available in the early 1980s, retain their properties for more than 20,000 years and endure temperatures up to 350 F.

"I see this technology as so innovative and so disruptive to rotating equipment, that I believe there will be applications that are going to drastically change how industry manages torque in the future because of it," says Ron Woodard, president and CEO of MagnaDrive.

In the construction of a MagnaDrive ASD, a plate studded with NdFeB magnets is connected to the system load, while a copper conducting plate is connected to the motor. As the motor rotates, the relative motion between the magnets and the copper plate creates a magnetic force arising from eddy currents induced in the copper plate. This force causes the load to turn. The amount of torque applied to the load is controlled by the width of the air gap between the motor and load. A smaller air gap increases the magnetic fields at the copper plate and increases the torque.

The ASD delivers the energy savings and speed control benefits associated with variable frequency drives (VFDs) but is easier to install and maintain because it is a mechanical rather than a computer/electronic technology. According to MagnaDrive,

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installations of their ASDs have allowed motors to be run with energy savings of up to 66% depending upon the application.

Additionally, the MagnaDrive ASD differs from conventional drives by having the motor disconnected from the load. Vibrations that may occur on one side of the air gap are not

transmitted, meaning less wear on motor parts, lower maintenance costs, and increased motor life when compared with conventional drives. This disconnection also enables the motor to be run on inconsistent electrical power, unlike VFD systems, which can be damaged by inconsistent power. This can be a significant advantage in emerging markets. Another advantage of the motor/load disconnection is that it enables the MagnaDrive ASD to be "soft started". It allows the motor to operate at its optimum running torque and eliminates the need for a higher start-up torque, which is needed with conventional motors because they have to start themselves and the load simultaneously. In the MagnaDrive ASD, the motor and load can be started separately. In a number of MagnaDrive ASD installations, this allows the use of smaller motors and eliminates power spikes or brownouts.

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