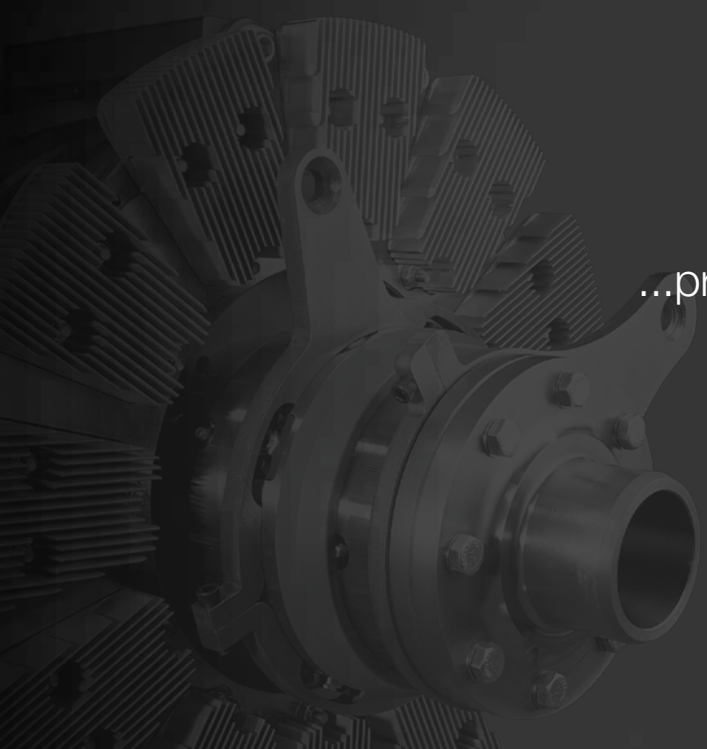
POWER GENERATION



Breakthrough Technology for Process Control

...provides innovative sustainable solutions, improves safety and lowers expenses

MagnaDrive™

RELIABLE › EFFICIENT › SUSTAINABLE › SAFE

More than just a coupler

MagnaDrive Couplings and Adjustable Speed Drives are unrivaled in providing the highest availability of process equipment at the lowest maintenance cost.

Power Generation operations are always looking for products that increase equipment uptime, reduce maintenance costs, improve safety, lower energy consumption and increase energy efficiencies.

With the continuing rise in the cost of inventory, maintenance, and energy combined with budget restrictions and more difficult governmental regulations, the MagnaDrive couplings and Adjustable Speed Drive's may be the answer to many of Power Generation's process control issues. We provide a full line of very low maintenance couplings exceling in processes subject to vibration, periodic load seizures, pulsating loads, thermal expansion, and shock loading, without the safety issues associated with fluid couplings.

For Variable Torque applications such as most fans and pumps where there is a need to vary speed, MagnaDrive offers a line of Adjustable Speed Drives which combine the mechanical benefits of the standard couplers and adds the ability to adjust the load speed. Since the ASD is mechanical, it avoids the problems or limitations of electrical solutions such as VFD's.

By eliminating the physical connection between motor and load, vibrations are isolated and reduced so alignment problems disappear, meaning there is no effective wear and tear on the equipment during normal operation. During load seizure or over-torque conditions, the load can be immediately disconnected from the motor. The disconnected, cushioned start is ideal for softly starting and accelerating sensitive, expensive equipment.

The result is minimized life cycle costs of all the equipment, maximized safety and uptime, and the greatest possible return on investment.

MagnaDrive disconnected torque transfer technology for couplings and adjustable speed drives is the right solution for many of Power Generations unique requirements.

MagnaDrive robust Couplings and Adjustable Speed Drives are the ideal solution for Power Generation operations where maximum uptime and equipment life are equally as important as safe, clean, green products with reduced energy cost.

MagnaDrive couplings and Adjustable Speed Drives transfer torque across an air gap replacing the physical connection between motor and load. The advantage of the air gap in combination with no physical connection is that it helps: reduce harmful vibrations, allow for misalignment, minimize wear and tear on equipment, eliminate side loading, limit peak torque transmitted, and generally increase motor and equipment life. The MagnaDrive couplings also reduce energy consumption when applied to variable torque equipment. The result is a lower total cost of ownership driven by greatly reduced maintenance requirements, less process down-time, and a reduction in energy consumption.

Here are just a few MagnaDrive applications in the Power Generation operations:

Pumps
- Boiler Feed
- Cooling Tower
- Condensate
- Vaccuum
- Slurry
- River Intake
- Reactor Feed
- Centrifugal
- Circulation
- Water

Fans
- Induced Draft
- Forced Draft
- Bag House
- Furnace
- Primary
- Cooling Tower
- Drying
- Turbine
- Desulfenizing
- Fluid Drive
- Scrubber Booster

Blowers
- Centrifugal
- Scrubber

Bulk Handling
- Conveyor

Other Equipment
- Crushers
- Feeders
- Pulverizers
- Preheaters
- Compressors
- Clink Grinder

Energy Savings Couplings

$(HP_1/HP_2) = (Flow_1/Flow_2)^3$

Proportion of Max Flow (Flow1/Flow2)	Flow Reduction (1-Flow1/Flow2)	Power Consumption (HP1/HP2)	Power Consumption (1-HP1/HP2)
99%	1%	97%	**3%**
98%	2%	94%	**6%**
97%	3%	91%	**9%**
96%	4%	88%	**12%**
95%	5%	86%	**14%**
90%	10%	73%	**27%**

Energy Savings May be Greater Due to Reduced Vibration and Misalignment Tolerance of MagnaDrive Air Gap

Affinity (or "Fan") Laws

- Torque transmitted and speed are reduced by increasing the coupling air gap
- A 3% reduction in speed and flow yields a 9% energy savings
- A 5% reduction in speed and flow yields a 14% energy savings
- A 15% reduction in speed and flow yields a 39% energy savings
- Energy savings my be greater due to reduced vibration and misalignment tolerance of MagnaDrive air gap

Ideal For Applications:

- Vibration issues
- Pulsating Loads
- Periodic Load Seizure
- Thermal Expansion
- Shock Loading
- Tight Space Constraints
- Higher Starting Inertia/Torque

Benefits:

- No Physical Connection Between Motor and Load
- Eliminates Vibration Transfer Between Motor and Load
- Permits Shock Loading
- Increases Seal and Bearing Life
- Cushioned Start/Stop
- Accepts Misalignment
- Low Maintenance, Lower System Downtime
- Simple Installation
- Efficient Torque Transfer
- Up to 70% Energy Savings
- Lowest Total Cost of Ownership
- Green Technology

Safe. Rugged. Available. Even in the toughest duty.

Minnesota Power – MGTL Couplings on Air Preheaters

Challenge

Minnesota Power was experiencing vibration problems on their air pre heaters.

In an effort to correct this problem, Minnesota Power implemented a preventive maintenance procedure that required all couplings to be re-greased during every outage. Each re-greasing would tie up three maintenance technicians for three days. Worse yet, the reduction in vibration levels accomplished by the re-greasing would only last a couple of weeks before the vibration would return.

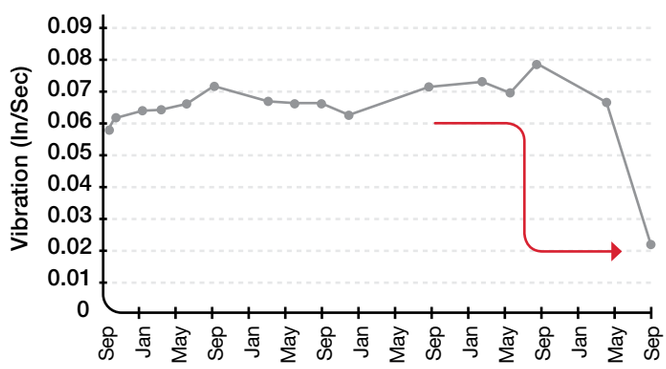
Result

Minnesota Power's vibration problems on their air preheaters have been completely eliminated.

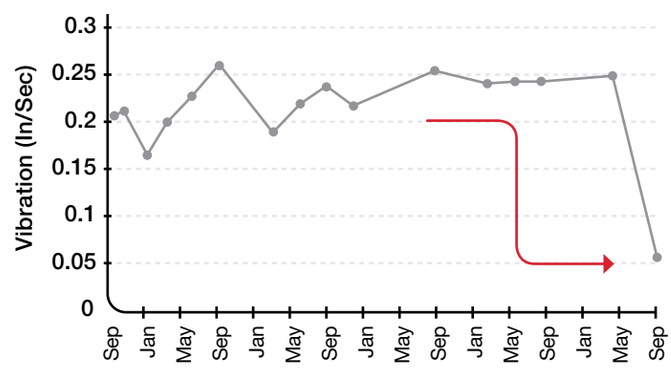
Minnesota Power's vibration problems on their air preheaters have been completely eliminated. Their readings indicate more than an 80% reduction in vibration. Minnesota Power estimates that prior to implementation of the MagnaDrive MGTL Couplings, they were spending an average of nine days each year per air preheater on repairs and maintenance caused by misalignment corresponding to a non energy operating cost of approximately $21,600 annually.

Despite having to pay more for the MagnaDrive Couplings than for the traditional couplings, Minnesota Power found the investment in the MagnaDrive Couplings to be the best choice. Even without taking into account the significant savings from reduced downtime due to lower vibration levels, Minnesota Power was able to pay back its increased investment in less than 6 months.

Vertical Axis Vibration Measurement
75% reduction*



Horizontal Axis Vibration Measurement
80% reduction*



In a real application after the installation of the MagnaDrive coupling, system vibration readings show a 75% reduction in vibration vertically and an 80% reduction horizontally: The MagnaDrive Coupling eliminates the need for precision alignment, a process that is critical for hydraulic couplings. The MagnaDrive Coupling also eliminates the risk of environmental contamination from the hydraulic fluid. Even without taking into account the significant savings from reduced downtime due to the lower vibration levels with the MagnaDrive couplings most customers report an ROI of less than 6 months.

Green Disconnected Torque Technology

MagnaDrive products continually demonstrate a significant reduction in energy consumption when connected to variable torque equipment. Most of the fans and pumps installed worldwide are oversized by 10%-15%; no engineer wants to run the risk of under sizing equipment! However, when this equipment is oversized, flow must be reduced to reach desired operating capacity. That's why most valves and dampers are always partially closed. This is like running your car with one foot on the gas pedal and the other on the brake; a great deal of energy is completely thrown away. Some operators create a bypass system where the excess flow is returned to circulation; this is also inefficient and consumes even more energy. Another way to reduce flow is to trim the pumps impeller but this reduces the pumps efficiency, can be expensive, and is a permanent change. VFDs (Variable Frequency Drives) are also an option to reduce flow by reducing speed. This can be an expensive proposition, especially since many processes have a fixed load and the VFD ends up operating at one fixed speed; VFD's also do not provide the misalignment tolerance or other mechanical benefits. MagnaDrive's standard couplings can be adjusted to reduce the load speed and flow without the expense or waste of other solutions. Where you do have a variable load, the MagnaDrive ASD is available. The resulting savings in power can be substantial.

"Green" Energy Saving Product

An extraordinary Value for Power Generation Operations

MagnaDrive Couplings for constant or variable torque applications, and ASDs for variable torque applications, are simple, rugged mechanical devices. Because they operate virtually maintenance-free years at a time, they assure process availability and save energy 24/7 over equipment's lifetime. Completely reliable in demanding environments and always durable, they are inherently safe and earth-friendly. In short, there simply is no better solution to fulfill all the requirements of Power Generation.

- Delivers savings in maintenance and operating costs that are not possible with other technologies
- Durable with upto 20+ year lifetime
- No requirement for protection from harsh, humid or dusty environments
- Maximizes uptime for continuous duty operations
- Minimizes vibration
- Tolerates misalignment, increasing equipment life
- Requires minimal infrastructure, simple mechanical installation
- Limited spare parts to inventory
- No endless maintenance
- Does not require special cooling environments, associated wiring and additional power control equipment
- Does not generate harmonic interference that can reduce system efficiencies and interfere with other electronic equipment
- Tolerates "dirty" power and is not affected by electrical storms, surges or drops
- Earth friendly, requiring almost no oil or lubrication and produces no contaminants
- No longer need to interlock load disconnect with control system
- Unlike VFDs there is no limit on number of ASDs that can be installed

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