Presenting

The ‘Soft-Start’ Magnetic Coupling and Belt Drive Adapter

Combined with our Energy Saving Adjustable Speed Drive (ASD) Technology

Philip ‘Chip’ Corbin III, CEO & Inventor, Flux Drive, Inc.
Soft-Start Magnetic Coupling

The Flux Drive magnetic ‘flexible’ coupling transfers torque across an air gap by means of magnetic induction.

This patented magnetic coupling means that there are no parts to wear out or replace, as is the case in common flexible rubber, grid or gear type couplings.
Coupling Components

- Patented - *Induction Type* Rotor Design
  (Note: this is *NOT* an eddy current device)
- Magnetic Can with Permanent Magnet Array
Benefits of the Flux Drive Coupling

A ‘Game-Changing’ Soft-Start Capability

- Eliminates high peak power demands during starting
- Extends motor life by reducing starting torque
- Allows a motor to be sized for the load
- Reduces vibration due to transferring torque across the ‘soft-torque’ air gap
- Coupling failures from high torque ‘spikes’ are now eliminated
Soft-Start
Power vs. Time

Power (w)

Time (s)

Flux Drive  Rigid Coupling

Power Turned Off
Performance

High Efficiency in Compact Size

- 98.5% efficient at full power
- Maximum torque transfer of the ‘soft-start’ coupling is limited to 140% of design torque
- Develops much higher torques than permanent magnet-to- magnet couplings (i.e., scaling to 1000 hp ++)

Actual speed / torque characteristics of a Flux Drive® ASD or Coupling

The starting and peak torque curve can be modified by changes in the rotor design.
Flux Drive
Soft-Start Coupling Products

Belt Driven Coupling
Belt / Sheave adaptor
on back of Magnet Can

In-line Coupling
Installs between motor and load
Flux Drive ASD (adjustable speed drive) is a mechanical power–transmission device that provides speed control and substantial energy savings for centrifugal load applications such as pumps and blowers.
How we Do It

Patented Permanent Magnet, Induction Rotor Technology

- Rotor moving into Can – load goes to full speed
- Rotor moving out of Can – load reduces in speed
Flux Drive ASD features

A ‘Game-Changing’ Adjustable Speed Solution

- Provides adjustable speed control that saves energy by following affinity curves
- Allows for slow and controlled starting, either manual or automatic
- Can operate in highly sensitive and harsh environments
- Does not create harmful electrical harmonics
- Compatible with medium voltage motors
- Has all the benefits noted with the Flux Drive ‘soft-start’ coupling
Flux Drive
Adjustable Speed Drives

Belt Driven (ASD)
Sheave adaptor on back of Magnet Can

In-line (ASD)
Installs between motor and load
# Product Comparison

<table>
<thead>
<tr>
<th>Product Feature</th>
<th>FLUXDRIVE</th>
<th>Eddy Current Drives</th>
<th>VFD's</th>
<th>Fluid Couplings and Drives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller size per unit of torque output</td>
<td>Yes</td>
<td>No</td>
<td>—</td>
<td>Yes</td>
</tr>
<tr>
<td>Easy to install, Easy to maintain</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Fewer moving parts / No Leaks</td>
<td>Yes</td>
<td>No</td>
<td>—</td>
<td>No</td>
</tr>
<tr>
<td>Runs in rain, dirty or hot environments</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Damaging Harmonics / Vibration - Cavitation</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Contact Information

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Create a closed magnetic circuit that mirrors the role of the electro-magnetic circuit of the AC motor.

Introduce an induction rotor that can be slid in and out of the closed magnetic circuit to control the output speed of the motor.
Adjustable Speed Drive Cut Away

Can with Permanent Magnets

Movable Induction Rotor (in – out of can)
Other Benefits of the Flux Drive Coupling

- Reduces vibration due to transferring torque across the ‘soft-torque’ air gap
- Reduced vibration extends pump mechanical seal life and the bearing life of all rotating components.
- Simplified alignment procedure using gap spacers that does not require laser alignment system (up to 0.020” offset misalignment in the air gap is allowable)
- Vibration is often reduced by more than a factor of 2
- Coupling failures from high torque ‘spikes’ are now eliminated
- The torsional vibration is also reduced due to the ‘soft-torque’ benefit
- Motor runs cooler due to running at design / constant RPM
Performance

- Operates with 1.5% slip at full power / HP
- Design operating temperature of the air cooled rotor is less than 50 degrees F rise above ambient at full power / HP
- Maximum torque of the ‘soft-start’ coupling is limited to 140% of design torque (motor current) during the start-up transient and full power operation
- The Flux Drive design does not use ‘eddy currents’ like other permanent magnet couplings and is therefore more efficient (i.e., 98.5% efficient @ 1.5% slip)
- Develops much higher torques than permanent magnet – to- magnet couplings (i.e., scaling to 1000 hp ++)
CONCLUSION

Flux Drive Products:

• Reduce power required to operate machinery at variable speeds compared to throttling valves and eddy current couplings
• Eliminates introducing harmonic frequencies that cause distortion in the electrical systems
• Eliminates the need to install complex electronic filtering systems to reduce %THD to acceptable levels
• Reduces the ambient noise associated with VFDs and other competitive products
• Reduces the life cycle costs of replacing and repairing expensive electronic components of other electronic drives
• Reduces peripheral costs (e.g., separate harmonic filter rooms and air conditioning) involved with introducing a single (or multiple) VFDs to a system requiring speed control
• Provides cost effective operations in harsh environments (saltwater, heat, etc.)
• Allows medium voltage motor applications to have an ASD that does not increase in price dramatically due to the higher voltage requirement of electronic drive products (VFDs)