



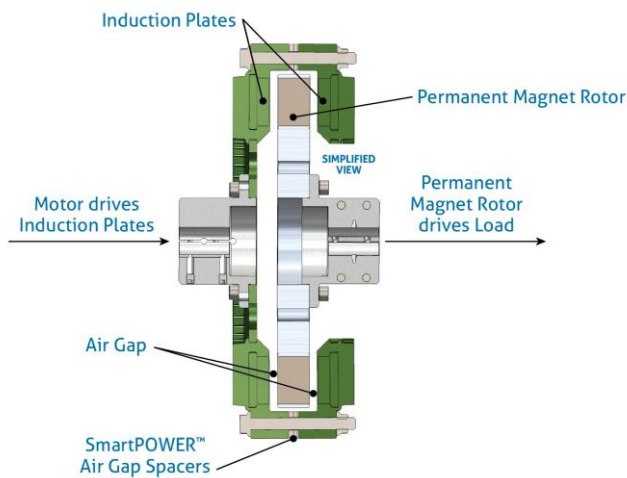
SmartCOUPLING™ BENEFIT BRIEF

DROP-IN MISALIGNMENT CORRECTION!

One of the most unique aspects of the Flux Drive **SmartCOUPLING** is its ability to transmit torque across an air gap, using powerful rare-earth magnets to connect the motor and load with no physical contact. For applications that are difficult to align, or those that tend to become easily misaligned over time, **there is simply no other coupling solution that provides such immediate and long lasting benefits.**

HOW IT WORKS

The Inline Flux Drive **SmartCOUPLING** (FSC-IL) is comprised of two independent parts: 1) the induction rotor body (green) and 2) the permanent magnet rotor (grey). As shown at left, the induction body is typically connected to the motor shaft while the magnet rotor connects to the load shaft.

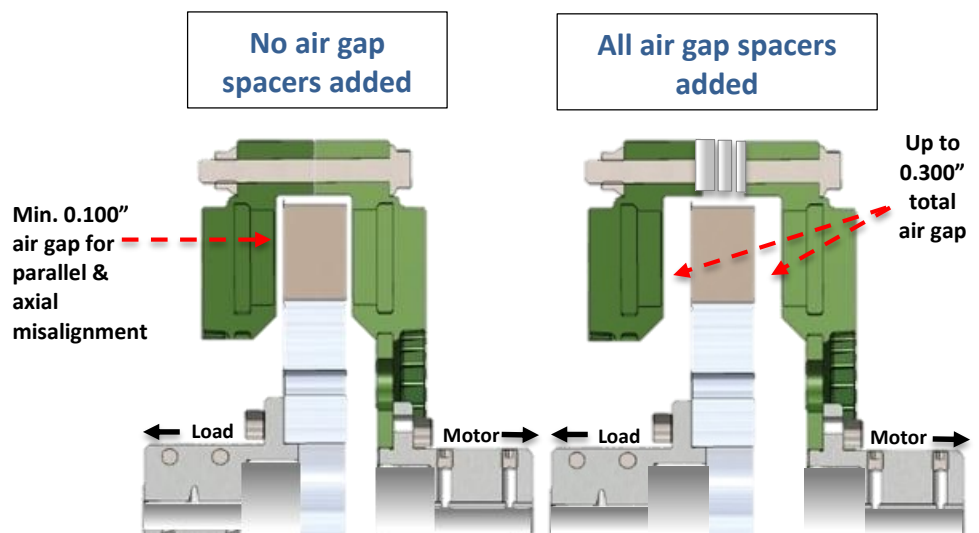


When mounted to their respective shafts, there is no physical contact between the magnet rotor and induction rotor body. The air gap measures a minimum of 0.100" on all sides, but can be increased by adding **SmartPOWER™** air gap spacers that increase the air gap the two side of the induction body – thus increasing the air gap between the induction plates and the magnet rotor.

PARALLEL AND AXIAL MISALIGNMENT CORRECTION

As is common knowledge, laser aligning motor and load shafts properly is a tedious task that requires a skilled hand. Even if a pump and motor are perfectly aligned to start, looseness, thermal growth, and other factors can easily throw a system out of alignment over time – leading to a vicious circle of further vibration and misalignment that eventually destroys the equipment. With the **SmartCOUPLING**, the physical connection is completely eliminated. Parallel misalignment of up to 0.100" is possible with absolutely no increase in vibration or misalignment forces. In addition, no maintenance is ever required – the only coupling with absolutely **Nothing to Wear Out!**

Further, in applications where axial shaft movement is common (from thermal shaft growth, loose pump/motor bearings, or other factors) a minimum of 0.100" in movement is also allowed. If axial movement is extreme, additional air gap spacer shims can be added to allow an air gap of up to 0.300" on each side of the permanent magnet rotor.



EXCESSIVE ANGULAR MISALIGNMENT ALLOWED

The same air gap that allows parallel (offset) and axial misalignment also accommodates angular and compound misalignment. As shown at right, the **SmartCOUPLING** magnet rotor can be severely misaligned between the induction plates. As long as there is no physical contact, the coupling continues to transmit its full torque capacity with no increase in system vibration. Depending upon the model of **SmartCOUPLING** selected, angular misalignment of up to 4.5 degrees is possible.

NO VIBRATION INCREASE FROM EXCESSIVE MISALIGNMENT

Bearing Life Equation:

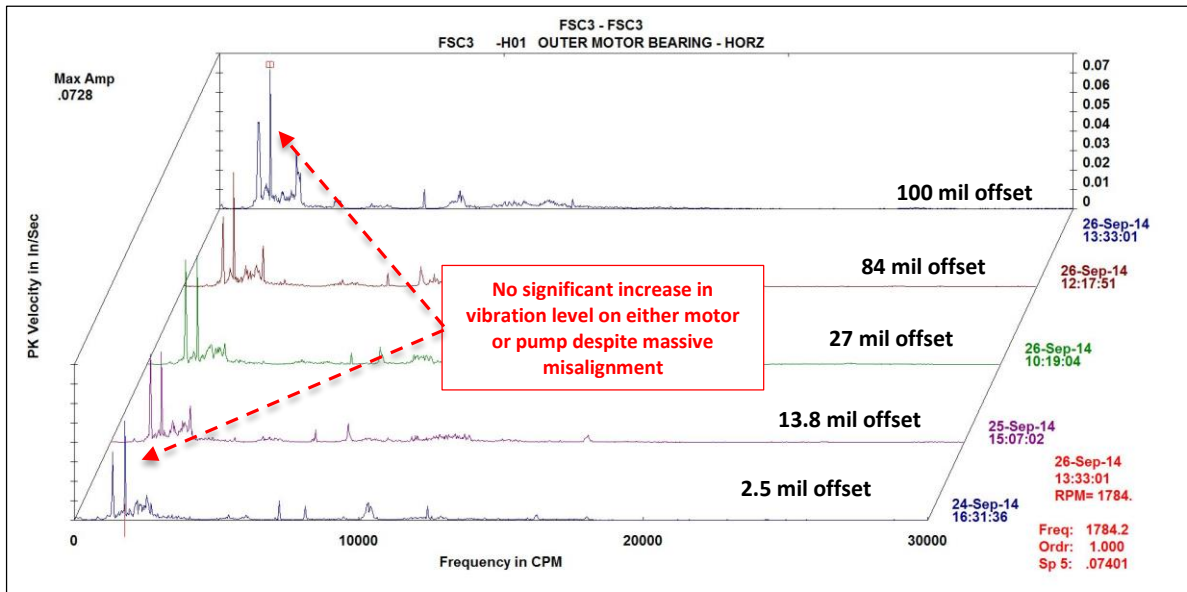
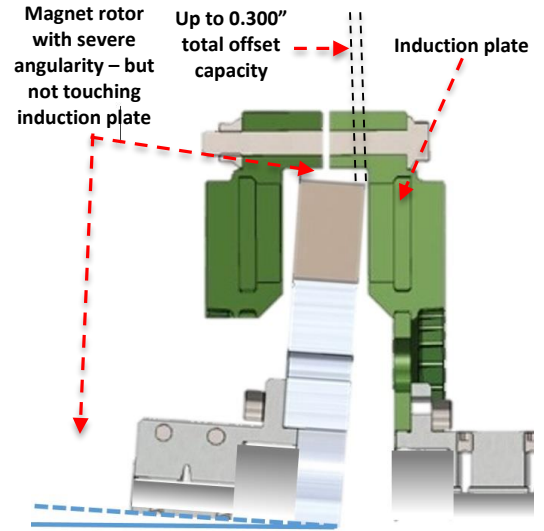
$$L_{10} = (16,666/RPM) \times (RATE/LOAD)^3$$

Misalignment by itself isn't the culprit in decreased equipment life

though – it's the additional load/force applied to the shafts, bearings and seals that truly does the damage.

Consider the equation for bearing life (L_{10}) above. Increasing the bearing load from misalignment has an exponential (cubic) negative effect on the lifespan of the bearing. Based on this equation, misalignment forces that double the total load on the bearing will result in an eight times reduction in bearing life!

With all other flexible coupling types, increased misalignment leads to just such an increase in force and vibration levels. This is not the case with the SmartCOUPLING. The plot below shows vibration as measured on a motor as parallel offset was increased in steps from 2.5 mils to 100 mils. Even with the motor and pump misaligned a full 0.100" (100 mils), there is no increase in the level of vibration measured on the motor. Identical results were noted for the pump end as well. In fact, simply installing the SmartCOUPLING in place of elastomeric, grid, gear or disc pack couplings, while making no other changes to the system, will often reduce vibration levels by 2-3 times.



Finally, the SmartCOUPLING also provides load speed adjustment for better process control and energy savings! See our website or other 'Benefit Briefs' for a discussion of this significant additional feature!



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