

Eddy Current Clutch Repair

Eddy current clutches by whatever name...need to be understood by your plant maintenance staff

The eddy current clutch on your stamping press or pump has gone down for the count, and you need solutions fast. Before you call, though, it's a good idea to do a quick review on how eddy current clutches work, what parts they are made up of, which parts are most likely to wear out the fastest, and what the typical repair process looks like. And it doesn't hurt to know what your options are on the off-chance that you can't get your eddy current clutch fixed.

What is an Eddy Current Clutch?

Eddy current clutches go by quite a few names, including eddy current drives, magnetic drives, magnetic clutches, or eddy current clutches. They are a type of variable speed drive system which depends on an electromagnetic clutch to vary the output speed and torque of a constant speed motor. As an alternative to **VFDs** (variable frequency drives, which change input power to control the speed of the motor) they are known for being more reliable and rugged in some demanding applications.

How Do Eddy Current Clutches Work?

Eddy current clutches are driven at a constant speed by an AC induction motor. The AC motor interacts with an electromagnetic clutch that controls both the torque and speed that is transferred to the driven load. The clutch itself is installed between the constant speed AC motor and the equipment being driven.

The clutch controller governs the amount of power that the clutch receives (which is separate from the AC motor power). A rotating drum (sometimes called a ring) is coupled directly to the shaft of the motor (the input shaft) and rotates at a constant speed. The drum is made from magnetically permeable steel and the motor shaft provides a support bearing for the drum.

There is a magnetic rotor mounted concentrically within the rotating drum. The drum and rotor are separated from each other by a bearing. There is also

an air gap maintained between the inner diameter of the rotating drum and the outer diameter of the magnetic rotor.

Included as part of the magnetic rotor is a direct-current (DC) excitation coil that is regulated by the clutch controller. The magnetic rotor combined with the DC excitation coil serves as the electromagnetic coupling that varies the output speed and torque of the clutch's output rotor and shaft.

(Video showing how Dynamatic® Eddy Current adjustable speed technology works)

The voltage sent to the clutch coil is controlled by the digital clutch controller, which receives feedback from the clutch in the form of tachometer data from the output shaft. Note that the controller itself doesn't have to be digital -- there are analog controllers available.

What Are the Main Components of an Eddy Current Clutch?

We can break down an eddy current clutch into its major components:

- Input shaft
- Input drum
- Input bearing
- Drum
- Output rotor
- Clutch coil (excitation coil)
- Output shaft
- Output bearing
- Tachometer

Of these parts, the input and output bearings have the shortest useful life and will eventually need to be replaced. The other component that requires the most repairs would be the clutch coil itself. Sometimes the digital clutch controller (not listed because it is external to the eddy current clutch itself)

may need calibration or repair. And, of course, there is the AC induction motor that powers the eddy current clutch.

What Happens When You Send in an Eddy Current Clutch for Repairs?

Perhaps the best way to approach discussing the most common repairs needed on an eddy current clutch would be to describe what usually happens when you send one in for repairs:

1. Disassemble the drive
2. Inspect all critical parts, checking for signs of wear and comparing critical dimensions and parameters to OEM specifications (this includes bearing journals and bores, air gaps, pilots, cores, and seal fits)
3. Replace or rewind coil (as needed)
4. Check the concentricity and squareness of bearing caps and sleeves
5. Check the generator fields and the rotors
6. Install new wear parts, bearings, gaskets, and seals (as needed, except for gaskets and seals which should always be replaced)
7. Reassemble the eddy current drive
8. Perform quality tests on the repaired eddy current drive

In general, most of the repairs performed on eddy current clutches are fairly straightforward for an experienced technician -- another reason why eddy current clutches are sometimes preferred over VFDs.

Vintage Eddy Current Clutches

Because eddy current clutches are known for being so durable and rugged that many vintage models are still in use today and many times the manufacturers still have the original drawings and schematics for them. This can make it a bit easier to find alternate replacement parts when the OEM no longer makes them. They can also be fully refurbished and restored to OEM specifications (or even better).

HECO Knows Eddy Current Clutch Technology

At HECO, eddy current clutches, brakes, and press drives are within our realm of expertise for repairs. Our technicians know how to both **repair and rebuild eddy current variable speed solutions**, and we have the equipment needed to troubleshoot, diagnose, and repair your equipment, even if it is a vintage model that has difficult to find parts. And that includes the AC induction motor that is a part of your drive system. We can also assist you with maintenance plans to minimize downtime, increase reliability, increase efficiency, and extend the useful life of your eddy current clutch equipment.

Eddy current clutches, for one reason or another, cannot always be repaired or rebuilt. In such instances, you might be interested in investing in a new eddy current drive system. At HECO, we carry **Dynamatic variable speed solutions**, including eddy current clutches, eddy current brakes (including air cooled and water cooled), and eddy current controls. Eddy current clutches and drives include AS/FAS, DCD, AT, water/wastewater, and CES press drives.