

Application Considerations: Pneumatic or Electric Brakes & Clutches

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What are the main differences between pneumatic brake and clutch assemblies versus electric brake and clutch assemblies?

Pneumatic clutches and brakes use air cylinders to actuate and provide the normal force to transmit torque. They require 30-80 PSI of a clean compressed air.

[Electromagnetic clutches and brakes](#) use electric coils (normally DC voltages are used, though AC type units are available). The Electromagnetic field created by the magnetic circuit provides the normal force to transmit torque. This makes the electric units more convenient for many machines because most control commands on modern machinery are electric. This is particularly true in remote applications.

Both technologies generally use "friction" to aid in the transmission of torque. Electromagnetic clutches and Brakes can be used in applications with very fast cycling rates. Pneumatic clutches and brakes usually have higher torque capacity than electromagnetic units.

In what situations would you use a pneumatic brake and clutch assembly over an electric brake and clutch assembly, and vice-versa?

Pneumatic clutches and brakes require a clean air supply at 30-80 PSI. Because many machines and equipment do not have this available, a separate air compressor is required. In some cases electricity may also be required to actuate an air valve, and in most cases piping and plumbing is required to bring the compressed air to the actuator.

On the other hand electromagnetic clutches and brakes can operate on any AC rectified or DC voltage, which is normally readily available on any machine or equipment.

What specifications are important to consider when deciding on pneumatic and electric brake and clutch assemblies?

- Air supply vs. voltage
- Diameter and length
- Speed
- Response
- Cycle Rate
- Required torque

What are the differences between non-contact clutches and friction clutches?

Non-contact clutches use hysteresis or eddy current magnetic fields. Because they need to produce fields powerful enough to create non-contact torque, they tend to be much much larger in diameter than friction clutches.

Non-contact clutches are usually used in applications that require continuous variable slip, such as in a tensioning application. The heat generated is lower than friction type clutches and brakes.

Friction clutches and brakes use metal-to-metal or metal-to-friction material contact. The coefficient of friction for steel-to-steel can be as high as 0.62, which aids the transmission of torque.

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