

electromagnetic clutches work electrically

A magnetic clutch is a device that allows connection and disconnection between two coaxial shafts. In normal clutches, there is a diaphragm spring that links up the clutch plate and flywheel. However; in magnetic clutches ([visit here](#)), what works is an electromagnetic field.

The EM clutch is the best suitable clutch type for remote operation, as no linkages are required to control its engagement. It operates smooth and fast. However, there are a few limitations too.

Every time the clutch is engaged, energy dissipates in form of heat in the electromagnetic actuator. Thus, there is always a risk of overheating; and consequently, the maximum operating temperature of the clutch is limited by the temperature rating of the insulation of the electromagnet. This being a major limitation, one more is its higher initial cost. Despite of a few negative points, EM clutches have a number of advantages and applications.

Applications of EM clutches

- Lawnmowers, copy machines, and conveyor drives
- Packaging machinery, printing machinery, food processing machinery, and factory automation
- Automobiles
- AWD systems
- Crankshafts
- Diesel locomotives

In automobiles, there may be a clutch release switch inside the gear lever. The driver often operates the switch by holding the gear lever to change the gear which leads to cutting off current to the electromagnet and disengaging the clutch. If this mechanism is adopted, there is no need to depress the clutch pedal. The switch can be alternatively replaced by a touch sensor or proximity sensor which senses the presence of the hand near the lever and cuts off the current. The main advantage of using EM clutch for automobiles is that no complicated linkages are required to actuate the clutch. Only the driver needs to apply reduced force to operate the clutch. This kind of transmission is semi-automatic.

Looking after EM clutches is important

No matter what material clutch designers choose, the wearing of machines and particularly clutches always forms particulates. Particulates are often problematic when they are present in clean-room and food-handling applications. In such cases, units should be enclosed to prevent particles from contaminating the surroundings.

Clutch or brake systems get contaminated by something in environment. Since oils and grease reduce friction between contact surfaces, they should be kept away from clutches or brakes. Reduced friction may lower the available torque significantly. Dust and some other contaminants that fall between contact surfaces can also reduce torque.

The same is the case with oil mists and airborne lubricant particles that are present in the work area. Rust is no big issue with clutches, as it wears away within a few cycles and leaves no impact on final torque.

Electromagnetic clutches ([official website](#)) are the most commonly used magnetic clutches. They operate electrically but transmit torque mechanically. This is the reason why these clutches were known as electro-mechanical clutches according to their physical operation. However; later these clutches gradually got the name - electromagnetic clutches according to their actuation method. There are innumerable designs and functions in EM clutches but the basic principle is the same.