Direct vs Indirect Solenoid Valves

A solenoid valve is an electromechanically controlled valve, featuring an electrical coil with a ferromagnetic core at its centre. There are a variety of solenoid valves, the main ones being direct operated solenoids and indirect acting solenoid valves. Each valve is designed to operate in a way that will suit their specific industry requirements. Here, MGA Controls looks at direct vs indirect solenoid valves.

What is a direct acting solenoid valve?

Direct operated solenoids have the simplest working principle. In a normally closed valve, the media flows through a small orifice which can be closed off by a plunger with a rubber gasket at the bottom. In a direct acting solenoid valve, the plunger is held down by a small spring made of ferromagnetic material. An electric coil is positioned around the plunger and as soon as the coil is electrically energised, a magnetic field is created which pulls the plunger towards the centre of the coil. The operating principle is the same in a normally open valve, except it works in the opposite way.

The operating pressure and flow rate is directly related to the orifice diameter and the magnetic force of the solenoid valve. Direct operated solenoids don’t require a minimum operating pressure or pressure difference either. So, they can be used up to the maximum allowable pressure.
Indirect solenoid operation

Indirect solenoid valves operate differently to direct operated solenoids and use the differential pressure of the media over the valve ports to open and close. Indirect solenoid valves need a minimum pressure differential of around 0.1 to 0.5 bar depending on the size, and are separated by a rubber membrane, also known as a diaphragm. The membrane in an indirect acting solenoid valve has a small hole which allows the medium to flow to an upper compartment.

The pressure and supporting spring above the membrane ensures that the valve remains closed. Once the solenoid valve is energised, the pressure difference on both sides of the membrane allows media to flow from the inlet port to the outlet port.

The operation of an indirect solenoid means they can only be used in one flow direction and are therefore suited for a high desired flow rate, including irrigation systems.

MGA Controls are leading suppliers of indirect and direct operated solenoids. For more information about our range of products, please contact our technical team today on 01704 898980 or email store@mgacontrols.co.uk.