

Different Types of Solenoid Valves

A wide range of **solenoid valve types** are available depending on your specific application requirements. The various **functions of a solenoid valve** depend on the type of valve you have, and the operation you need the valve to perform. In order to understand the range of functions available to you, [MGA Controls](#) have produced this quick-start guide, telling you everything you need to know regarding the **types of solenoid valves**.

Direct Acting Solenoid Valve

Direct acting is a term generally associated with diaphragm solenoid valves or solenoid poppet valves. It means that by energising the solenoid coil, there is a direct influence on the position of the solenoid valve. For instance, if the valve is closed in its resting position (see 'Normally Closed' below), then energising the solenoid coil in a direct acting solenoid valve will move the diaphragm in to its open position. It is important to note that this doesn't necessarily mean that there is a connection between the core tube of the valve and the diaphragm, but there is a direct control as a result of the electrical state. One of the main functions of a direct acting solenoid is that they can operate fully with no pressure differential. This means that the valve can be fully operational without the need for any pressure in the line.

Indirect Acting (pilot operated) Solenoid Valve

Indirect Acting Solenoid Valves, also known as 'pilot operated solenoid valves,' are generally always of the diaphragm style **solenoid valve type**. The 'pilot operated' term refers to the media acting as a pilot to assist with the operation of the valve. Normally, there is a small orifice in the inlet port of the solenoid valve that allows some of the media to enter into a cavity on top of the diaphragm. In a normally closed valve, the media then applies pressure to the top of the diaphragm, holding it in the closed position. When the solenoid coil is energised, the diaphragm opens and the media is forced out of the top cavity and back into the main pressure line. The main benefit of using an indirect acting **solenoid valve** is the reduction in energy required compared with that of a direct acting valve. As a result, indirect acting solenoid valves are often more cost-effective.

Normally Closed or Normally Open

These terms refer to the resting state of the valve, with no power applied. Although they are fairly self-explanatory, they can also be referred to using different terms. A normally closed solenoid valve can be described as 'energise to open,' and a normally open solenoid valve can be described as 'energise to close.' Normally closed or normally open most commonly refer to diaphragm or poppet **solenoid valves** that employ a spring to return the valve to its resting state once the power has been removed from the coil.

2/2-Way (On-Off)

2/2-Way Solenoid Valves are generally diaphragm or poppet type valves, and can only be used for On/Off duty as there is no exhaust port. They are very versatile and can be deployed in a wide variety of applications in many different industries to simply switch flow on and off. In some instances, it is possible to have a 2/2-Way Proportional Solenoid Valve which is used to regulate flow.

3/2-Way (Sol/Spring)

The term 3/2-Way is most commonly associated with a spool type **solenoid valve**, although it is possible have a poppet type valve in this configuration. The term 3/2 can be extruded to mean '3 port, 2 position.' This same formula can be applied to other valve types with a similar abbreviation. In their resting state, the most basic of 3/2-Way valves uses port 1 as the valve inlet, port 2 as the outlet and port 3 is the exhaust, but is blocked in its resting state. When power is applied via the solenoid, the spool position changes and port 1 becomes blocked, with port 2 flowing to port 3 and therefore



exhausting the system. When power is removed, the spool springs back to its resting position and normal valve function is restored. This is why the operation of this type of 3/2-Way Spool Valve is also known as 'Sol/Spring.' 3/2-Way Spool Valves are most commonly used as a pilot to a Single Acting Pneumatic Actuator or Pneumatic Cylinder.

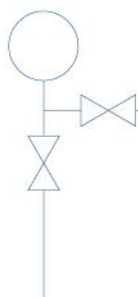
5/2-Way (Sol/Spring or Sol/Sol)

A 5/2-Way valve is also most commonly supplied as a spool **type of solenoid valve**. They operate in much the same way as a 3/2-Way Valve, but there are two extra ports which can be used to pilot double acting pneumatic actuators or pneumatic cylinders. They can be supplied with a single coil allowing spring return (known as Sol/Spring), or with a double solenoid coil (known as Sol/Sol).

5/3-Way (Sol/Sol – APB or Pressure Held)

5/3-Way Solenoid Valves are most commonly supplied with two coils. They are always of the spool valve type, and have 5 ports and 3 positions. Two of the positions perform the same function as those found in a 5/2-Way **solenoid valve type**, and the third position performs an additional operation. The third position is normally engaged by spring and is activated when no power is applied to either solenoid coil. The most common function the third position performs is a Pressure Held function, sometimes referred to as 'all ports blocked.' This holds the valve and the larger actuator/instrument in a steady state until power is applied to one of the solenoid coils.

MGA Controls Ltd works in partnership with many of the leading solenoid valve manufacturers. With 30 years' experience of working with such high quality brands, you can be confident that we can offer you the best prices on the market. Our high stock levels allow us to offer next day delivery in your time of need. To obtain an immediate quote call the MGA Controls technical team on **01704 898980** or email sales@mgacontrols.co.uk.



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