Magnet and Actuator Operation

HSI Sensing
Hermetic Switch Inc.

Magnets and Actuators Application Notes
Magnet and Actuator Operation

With a Reed Switch

With a Magnet

A reed switch is activated by a magnetic field. It’s important to realize that there are numerous possibilities for orientation of a switch within a given magnetic field. The diagrams on the next page show several basic examples of reed switch operation with the use of a moving and stationary magnet.

The length of the magnet and the length of the reed switch both affect the magnetic field coupling.

The physical parameters of a magnet—such as length, width, thickness or diameter—impact the size and shape of the resultant magnetic field. For example, an M-01 (.062 h/w x .50 length Alnico) must be very close to a reed switch to ensure operation, while an M-15 (.250 dia. x 2.25 length, Alnico) will operate a reed switch at a much greater distance.
As explained on the previous page, reed switches are activated by magnetic fields. It's important to realize that there are numerous possibilities for a switch's orientation within a given magnetic field. On this page, you can see several basic examples.

A magnet moved in a front to back motion (perpendicular towards and away) will operate the reed switch.

A reed switch moving through a circular/ring magnet will operate up to 3 times.

A pivoting/swinging magnet will operate the reed switch.

A reed switch can operate with a magnet moving parallel to the reed switch.

Shielding (Indirect Actuation):
If the reed switch and magnet are stationary, the movement of a shield (made of ferro-magnetic material) between the switch and the magnet will open and close the switch's contacts. The shield is used to divert the magnetic field away from the switch.

Rotation: Magnets can be rotated several different ways to operate the reed switch. For more information on the effects of rotary magnetic motions, contact HSI Sensing.
Common Paths of Reed Switch Activation...

A magnet’s path

- The magnet is activating the switch
- The magnet is not activating the switch
- The point of activation, also known as Operate or Pull-In

The Point of de-activation, also known as Release or Drop-Out

A magnet can actuate a reed switch several different ways. The drawing below demonstrates several common paths a magnet travels to operate the switch's contacts. The blue line represents the point at which the switch is activated by the magnet (also called the Release or Drop-Out). As shown in the drawing, a magnet must pass the Operate point (blue line) for the switch to be activated. To de-activate the switch, the magnet must travel outside the Release point (red dotted line).

If you have specific questions about the operation of a reed switch, especially within a certain application, please contact HSI Sensing.
With a Proximity Sensor

For proper alignment, position and location, please refer to the product specification sheet. An example is provided below.

Please note that a shorter magnet or actuator has a shorter field, and a longer magnet or actuator has longer field.