Application Note:
Reed Switch and Reed Sensor Activation

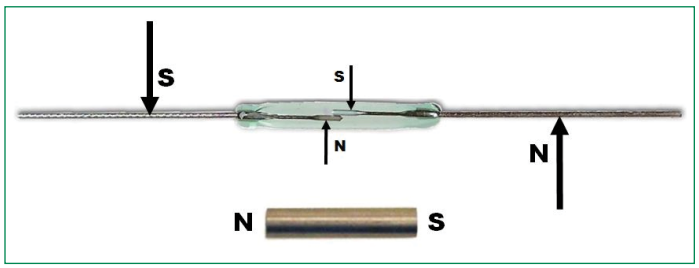
Introduction

Although a reed switch can be activated by placing it inside an electrical coil, many reed switches and reed sensors are used for proximity sensing and are activated by a magnet. As the magnet is brought into the proximity of the reed sensor/switch, the device activates. As the magnet is removed from the proximity of the reed sensor/switch, the device deactivates. However, the magnetic interaction involved in activating the reed switch contacts is not necessarily obvious.

Magnetic Induction and Flux

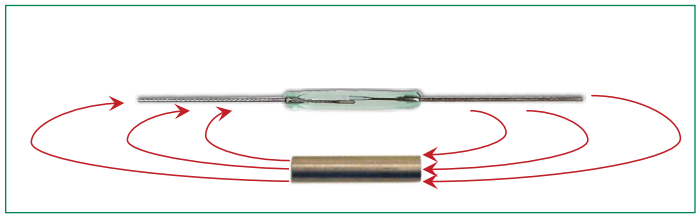
One way of thinking about the interaction is that the magnet induces magnetic poles into the metal parts of the reed switch and the resulting attraction between the electrical contacts causes the reed switch to activate.

Figure 1.
Magnetic Induction



Another equally valid way of thinking about the interaction between a magnet and a reed switch is that the magnet induces magnetic flux through the electrical contacts. When the magnetic flux is high enough, the magnetic attraction between the contacts causes the reed switch to close.

Figure 2.
Magnetic Flux



Reed Switch/Sensor Activation Distances

The following are examples of typical reed switch and reed sensor activation distances.

Figure 3.
Magnet Parallel to Reed Switch

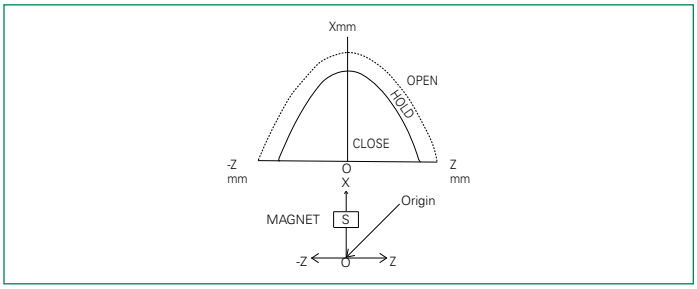


Figure 4.
Magnet Perpendicular to Reed Switch

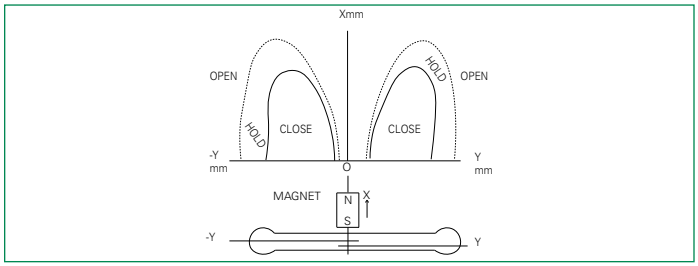
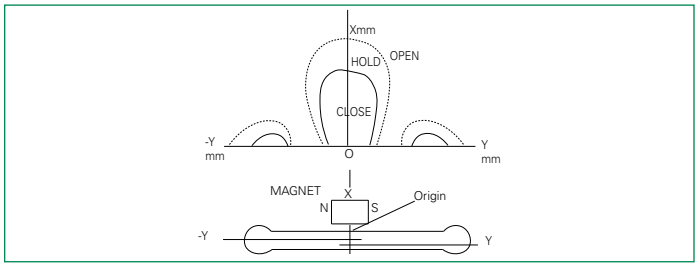


Figure 5.
Magnet Parallel to Reed Switch



As can be seen, the magnetic orientation and location relative to the reed switch play important roles in the activation distances. In addition, the size of the activate regions (lobes) will vary depending on the strength of the magnet and the sensitivity of the reed switch. Proper orientation of the magnet with respect to the reed sensor/switch is an important consideration in meeting the application's requirements across the tolerance range for mechanical systems, magnetic strength and reed sensor or reed switch sensitivity. See also Littelfuse application note AN102 – Ampere*turn versus mT and Gauss for guidance on magnet and switch sensitivity.

Littelfuse, Inc.
8755 West Higgins Road, Suite 500
Chicago, IL 60631 USA
Phone: (773) 628-1000
Littelfuse.com