

# The 5 Sensing Solutions You Should Know



The top sensing solutions for detecting position, proximity, speed, level and flow

## THE USE OF MAGNETIC SENSING SOLUTIONS

A magnetic sensor functions as a non-contact device that allows for an extended life compared to mechanical devices in applications that operate at low voltages and low currents.

### 1. REED SWITCHES

A reed switch has two ferromagnetic blades (reeds) contained within a tubular glass envelope that is hermetically sealed at each end. The contacts on each reed blade have a thin layer of precious metal material deposited on them. Reed switches are activated by a permanent magnet or an electromagnet. The reed switch and magnetic field combination is commonly known as the “magnetic circuit.”

### 2. REED SENSORS

Reed sensors are reed switches that are packaged within an external housing for simplified mounting and additional protection against environmental influences. These sensors are typically mounted in mechanical systems. A bare reed switch can easily be mounted on circuit boards. However, for an application such as a door security sensor, the reed switch should have a protective shell/housing for handling and mounting. These packages offer resistance to mechanical stress by protecting the bare glass of the reed switch.

### 3. REED RELAYS

A reed relay is made by combining a reed switch with a copper coil. Like other relays, this provides galvanic isolation between the coil input and the controlled contact(s). However, because of the small size and magnetic efficiency of the reed switch, the power required to drive the coil is lower than most other types of relays. Other advantages include high insulation resistance, low contact resistance and long contact life. Reed relays are used in many applications, including automotive, test equipment, security, medical and process control equipment.

### 4. HALL EFFECT SENSORS

A Hall effect device is a semiconductor-based integrated circuit with Hall plates that respond to magnetic fields. Additional circuitry is added for power supply and signal conditioning, temperature compensation and EMC/ESD protection. Hall effect devices provide digital or analog output signals that are used for proximity and continuous rotary or linear positioning. Unlike a reed switch, a Hall effect device contains active circuitry, so it draws a small amount of current at all times. Hall effect devices come in two- or three- wire versions. Some devices are programmable.

### 5. MAGNETIC ACTUATORS

For any magnetic sensor system, the actuator is just as important as the sensing device. Actuators are packaged in shapes similar to the relative mating sensors or are offered as bare magnets with various grades of materials available. Magnets come in various grades of materials, including ferrite (ceramic), AlNiCo and neodymium iron boron (NdFeB), and Samarium Cobalt (SmCo) materials.

## LITTELFUSE PRODUCTS

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Our global organization provides:

- Custom sensor designs per customer specifications
- Vertically integrated manufacturing
- In-house magnetic simulation support
- Quick turnaround for custom sensor prototypes

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