Standex Electronics

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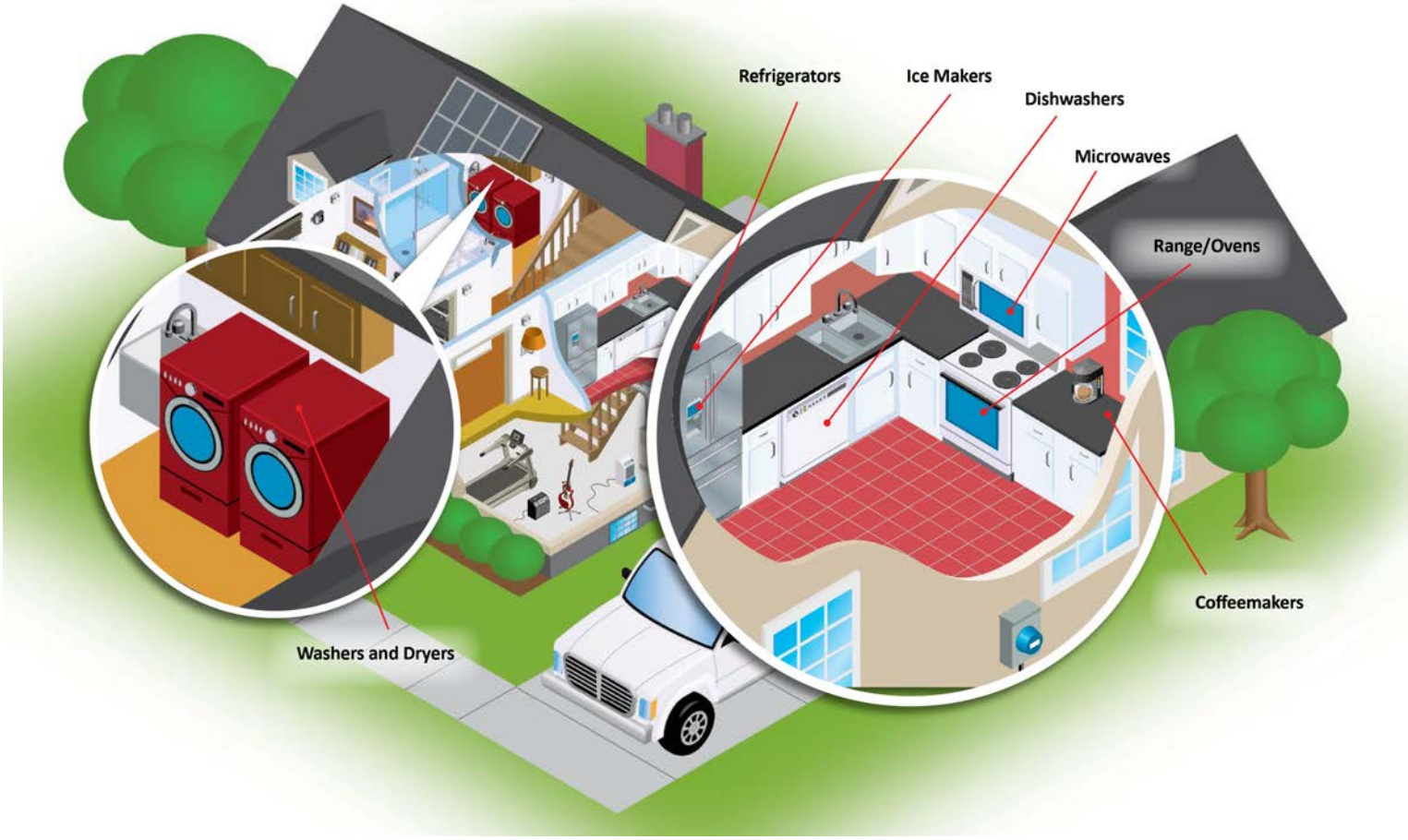
Application Alley

Reed Switch & Sensor Technology for Household & Appliance Applications



Reed Switch Features:

- Ability to switch up to 10,000 Volts
- Ability to switch currents up to 5 Amps
- Ability to switch or carry as low as 10 nano-Volts without signal loss
- Ability to switch or carry as low as 1 femtoAmp without signal loss
- Ability to switch or carry up to 7 GigaHz with minimal signal loss
- Isolation across the contacts up to 10^{15} W
- Contact resistance (on resistance) typical 50 milliOhms (mW)
- In its off state it requires no power or circuitry
- Ability to offer a latching feature
- Operate time in the 100 ms to 300 ms range
- Ability to operate over extreme temperature ranges from −55 °C to +200 °C
- Ability to operate in all types of environments including air, water, vacuum, oil, fuels, and dust-laden atmospheres
- Ability to withstand shocks up to 200 Gs
- Ability to withstand vibration environments of 50 Hz to 2000 Hz at up to 30 g
- Long life. With no wearing parts, load switching under 5 Volts at 10 mA, will operate well into the billions of operations
- No power consumption, ideal for portable and battery-powered devices
- No switching noise

Whenever you use a washer, coffee maker, dishwasher, fryer, refrigerator, oven, microwave, or countless other appliances – chances are Reed Switch technology made it possible.

Over the years, the Reed Switch has shrunk in size from approximately 50 mm (2 inches) to 3.9 mm (0.15 inches). These smaller sizes have opened up many more applications, particularly in RF and fast time domain requirements.

Without question, the Reed Switch's hermeticity lends itself to more switching applications than any other switching device. Its ability to be used as a complete sensing component by itself or the ease of packaging it into special sensing requirements is done without any complicated process or high tooling costs.

There are so many existing and potential applications for Reed Sensors that it would be impossible to discuss them all here. However, we will cover some of the basic household and appliance applications that we hope will give insight and new considerations for your present and future projects.

Utility Meters - Measuring Water Flow Volume Using Reed Sensors Determine If Filter Needs Replacement

Water filters must measure the amount of water passing through them to know when to change the filter.

Reed Sensors sense each full rotation of the filter's paddle wheel and send that information to an electronic counter to accurately measure the amount of water being filtered. The electronics then keep track of the volume that's flowed through the filter.

Usually, a light will notify users when it's time to replace their filter to keep their water clean and safe to drink.

Appliances
- Dishwasher
- Range
- Oven
- Microwave
- Coffeemaker
- Refrigerator
- Ice Maker
- Washers & Dryers

Security
- Door Sensors
- Window Sensors
- Control Panels
- Smoke Alarms

Transportation
- Washer Level Sensor
- Coolant Level Sensor
- Keyless Entry
- Ignition Immobilizer

HVAC & Plumbing
- Furnaces
- Air Conditioning Compressors Air Conditioning Condensers Dehumidifiers
- Humidifiers
- Solar Panels
- Gas Smart Meters
- Electric Smart Meters, Instant Water Heaters, Standard Water Heaters, Water Meters
- Shower Pumps
- Pool and Spa Pumps
- Sprinkler System Controllers

Other
- Designer Lighting
- Automatic Shades
- Tablet Keyboards
- Electric Toothbrushes
- Sound Sensors for Toys
- Guitar Amplifiers
- Microphones
- Organs
- Fitness Equipment
- Garage Door Openers
- Speakers

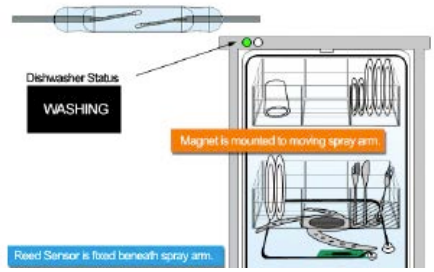


Figure 1. A magnet is mounted to the underside of the dishwasher spray arm and its rotation is sensed when it passes over the reed switch sensor mounted to the bottom of the dishwasher.

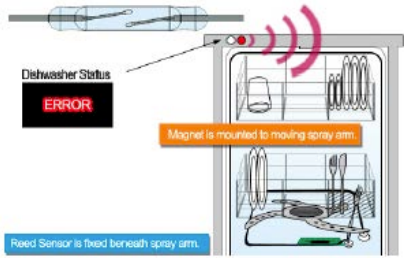
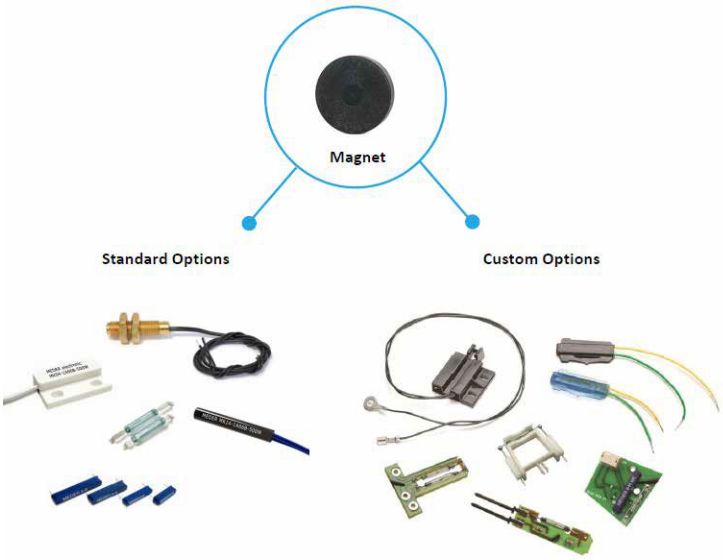


Figure 2. When there is an obstruction to the spray arm, the magnet and arm do not rotate causing the sensor to send a signal to the electronics sounding an alarm and turning off the dishwasher.



Coffee, Espresso & Tea Maker Components

In many newer coffee machines, without permanent water connections for commercial or domestic applications, a low water indicator lamp signals the minimum water level.

The construction of the water tank is usually designed to ensure at least 2 cups of water remain once the minimum water level's reached. The Reed Switch will only open (and thereby turn off the low water light) when the water level has been sufficiently refilled such that the magnetic float is above the minimum water level mark.

Reed Sensors Detect Dishwasher Spray Arm Obstruction

One of the essential actions that take place within the dishwasher is the rotation of the spray arm. If a dish is improperly positioned in the washer blocking the rotation of the spray arm, trouble ensues.

A Reed Sensor is conveniently mounted to the internal chassis such that it will be energized with every rotation of the spray arm. When the spray arm is blocked, the Reed Sensor fails to energize, sending a signal to the electronics that the spray arm is no longer operating. In this case, three things generally happen:

1. a signal is sent to turn off the spray arm motor,
2. a light on the outside panel begins to flash,
3. a beeper begins to alert the user of the jam internally in the dishwasher.

Once the blockage is removed, the dishwasher resets and will resume its normal operation.

Detect and Control Appliance Doors Using A Reed Sensor

Appliances, particularly refrigerators and freezers, must have their doors closed at all times to ensure the freshness of food. Reed Sensors are a simple choice to ensure this.

The Reed Sensor is usually mounted to a PCB on the chassis of the appliance. When the door is closed, the Reed Sensor is activated.

When the door is opened, the contacts open, activating a timer in the electronics. After a specified period, an alarm or beeper will be activated – alerting the user that the door has been left open.

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About Standex Electronics

Standex Electronics is a worldwide market leader in designing, engineering, and manufacturing standard and custom electro-magnetic components, including magnetics products and Reed Switch-based solutions.

Our magnetics offerings include planar, current sense, and conventional low- and high-frequency transformers and inductors. Reed Switch-based solutions include Meder, Kent, and KOFU brand Reed Switches, as well as a complete portfolio of Reed Relays and a comprehensive array of fluid level, proximity, motion, water flow, HVAC condensate, hydraulic pressure differential, capacitive, conductive and inductive sensors.

We offer engineered product solutions for a broad range of product applications in the transportation, automotive, medical, test and measurement, military and aerospace, aviation, HVAC, appliance, security and safety, and general power and industrial markets.

Standex Electronics has a commitment to absolute customer satisfaction through a partner, solve, and deliver approach. With a global organization that offers sales support, engineering capabilities, and technical resources worldwide – we implement customer-driven innovation that puts the customer first.

If your application requires one of our standard sensors from our catalog, that's clearly the best approach and the quickest solution to satisfying your design requirement. However, more than half of our shipped sensors are from special requirements. Since many sensing requirements are unique, working with customers on their special applications is expected.

Because at Standex, **"custom is standard."**

For more information on Standex Electronics, visit us at standexelectronics.com.

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