Standex DETECT Electronics

APPLICATION ALLEY

Reed Switch & Sensor Technology for Automotive & EV Applications



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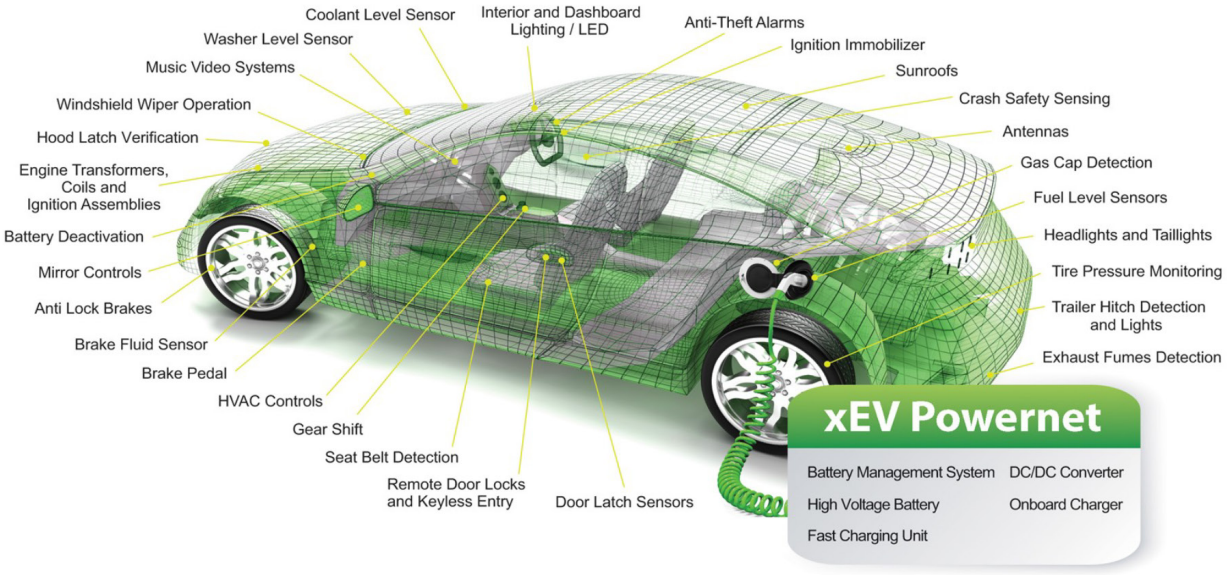

Reed Switch Features:

- 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-Volls 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 woll
- into the billions of operations
- No power consumption, ideal for portable and battery-powered devices
- No switching noise

From read-outs on the dashboard to measurement of coolant, brake, windshield, water in fuel, tire presure, and emissions – our components perform vital processes within automobiles, heavy-duty trucks, recr ational vehicles, airplanes, trains, motorcycles, E-Cars, E-Bikes, boats, and more.

This ultimately allows end-users the ability to seamlessly open a door, flip a switch, measure fluid levels, track an object, adjust a car thermostat, drive home, or do thousands of other activities.

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 automotive and EV applications that we hope will give insight and new considerations for your present and future projects.

Automotive/EV

- Headlights
- Dashboard Lights
- Glovebox Lighting
- Catalytic Converters
- Brake Pedals
- Convertible Roofs
- Key In Ignition Detection
- Lights On Detection
- Battery Management Systems
- Battery Isolation Systems
- Power Inverters
- Battery Conditioning
- Power Door
- Power Locks
- Truck Gear Shifts
- Sensing and Controlling Fume Exhaust
- Battery Deactivation
- Alarmed Vehicle Hoods
- Gas Tank Lid Monitoring
- RFID/Antennas

LED Capabilities

Using light-emitting diode (LED) lighting instead of common bulbs has opened new doors for Reed Switches and Sensors. LEDs offer lower warranty costs, longer lifespans, and greater efficiency.
As LEDs use less power than incandescent bulbs, switching via a Reed Switch also becomes simple. They're capable of switching most interior automotive lighting loads directly and can be directly mounted to a printed circuit board or electrical circuit to make instant electrical transfer.

Reed Sensors Control and Minimize The Exhaust Emissions In Catalytic Converters

To reduce gas emissions, auto designers found that sensing the movement of a valve mounted in the catalytic converter that moves relative to the volume of emissions can feed back information to make adjustments.
As the valve shifts its movement, the Reed Sensor will activate, sending a signal back to the onboard computer sensing function. The Reed Sensor is an excellent choice because it can operate reliably from -50˚C to 150˚C and represents an economical way to carry out the sensing function.



Brake Pedal Position Reed Sensor

Practically all motor vehicles have a brake pedal used to slow down or stop, generally located near the floor of the vehicle in one of the dirtiest environments in the cab of the vehicle. Regardless of the harsh environment or space availability, Reed Sensors work very well.

The sensors can also be supplied as a single pole normally open and a single pole normally closed. In the second case, when the brake pedal is depressed, the normally closed contact will open, automatically disengaging the cruise control.

Automatic Convertible Roofs Use Reed Sensors to Control The End Points

Many older convertible cars used mechanical hand operation to collapse convertible roofs and to reclose the roof. Today, a magnet's mounted to the convertible roof and Reed Sensors are mounted at the end positions. When the vehicle operator throws the switch to open the roof, a motor is engaged and the roof begins to open or close.

This operation will continue until the end position is about to be reached. This is when the Reed Sensor engages, sending a signal to the onboard computer, which sends a command to turn off the motor. The roof comes to rest in its proper position.

Reed Sensor Detects Key In Ignition And Auto Lights Left On

Automakers have cleverly designed a magnet into the door handle. Standex Reed Sensors are strategically placed internally in the door to sense motion. When the Reed Sensor is activated, the onboard computer checks to see if the keys are still in the ignition and if the main lights are still on.

If detected, a beeping noise sounds, alerting the driver that something's amiss.

Vehicle Power Door Locks Controlled Using A Reed Sensor

Power door locks are now designed into 75% of all new cars, and 100% on all full feature models. The power door locks can be opened wirelessly or by placing in a code that is compared electronically to the preset code on the onboard computer.

If they match, the locks are disengaged. Engaging the lock can be done remotely or by lifting the handle of the car door handle. The Reed Sensor senses this motion and activates the locking motion.

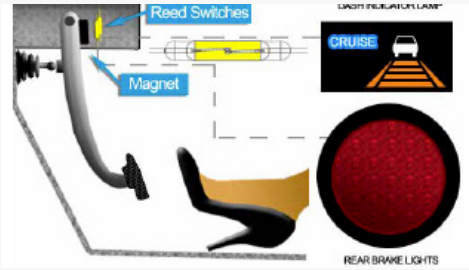

Figure 1. Brake Pedal is up and both Reed Switches are closed, Rear brake lights off and cruise control indicator is lit.

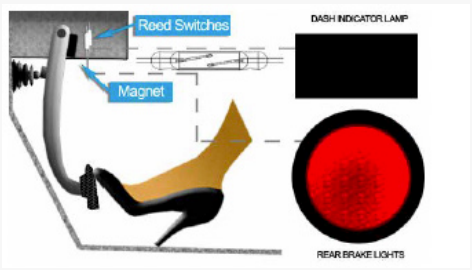

Figure 2. Brake Pedal is depressed, Reed Switches open activating rear brake lights and disengaging the cruise control.

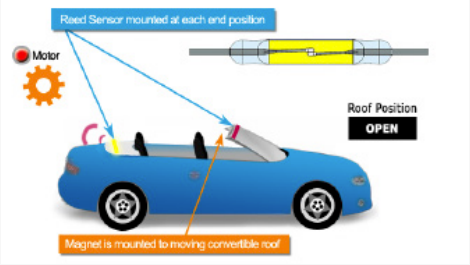

Figure 1. Showing convertible top in open position. Motor turned off and reed switch is activated.

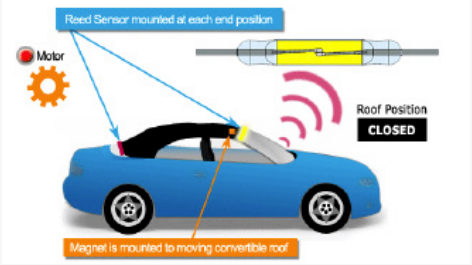

Figure 2. Showing convertible top in closed position. Motor turned off and reed switch is activated.



For When it Matters - The Right Design, at the Right Time, at the Optimal Cost.

At Standex Electronics, we believe in: Collaborative innovation with our customers

- Collaborative innovation with our customers
- Delivering the right design, at the right time, at the optimal cost
- Acting as an extension of your engineering team
- Living our promise: **Innovate | Consult | Engineer | Deliver** — when the stakes are high,

Standex Detect delivers

To learn more about how Standex Detect can support your projects with innovative sensing, switching, and relay technologies, visit standexdetect.com or contact our engineering team to discuss your specific application needs.

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