



# Application Alley

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## **Automotive - Reed Sensor**

**Automatic Convertible Roofs Use Reed Sensors To  
Control The End Points**



Custom  
Engineered  
Solutions for  
Tomorrow

### Introduction

Particularly in warm weather areas convertible automobiles are very popular; however, surprisingly, even in cold weather areas, convertible autos are also very popular in the summer, warm weather months. In these areas, as the evenings cool or sudden weather conditions develop, the convertible roofs may need to be closed in a hurry. Most of the convertibles have gone over to automatic opening and closing. Reed sensors play a key role in accomplishing this.

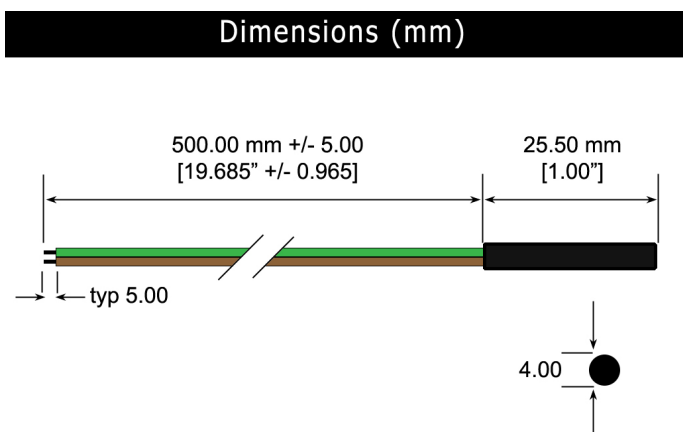


Figure 1. MK14 Sensor physical layout

### Features

- The Reed Sensor never comes in contact with the actual movement of the convertible roof
- The reed switch used in the Reed Sensor is hermetically sealed and is therefore not sensitive to dirty, oily, extreme temperature environments
- Magnet and Reed Sensor are isolated and have no physical contact by typically having the magnet mounted to the convertible roof and the Reed Sensors are mounted and positioned to detect the end limit positions
- The magnet is not affected by its environment
- Capable of operating between  $-50^{\circ}\text{C}$  to

$150^{\circ}\text{C}$

- Millions of reliable operations
- Cylindrical hole and screw fastening mounting
- Contacts dynamically tested
- Large sensing distances possible

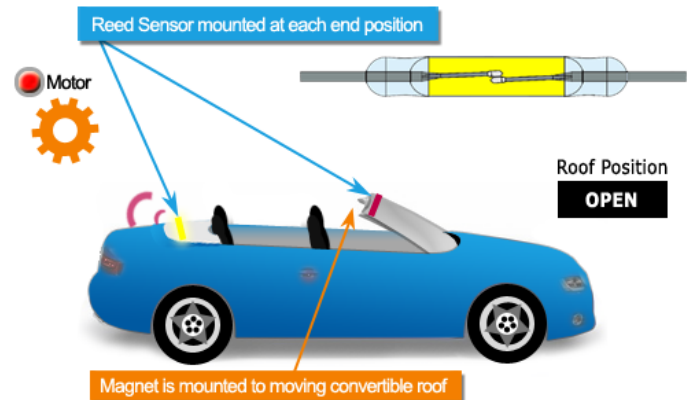


Figure 2. Showing convertible top in open position. Motor turned off and reed switch is activated.

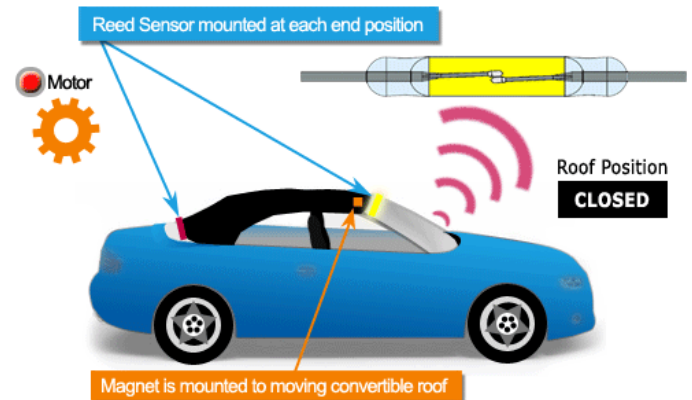


Figure 3. Showing convertible top in closed position. Motor turned off and reed switch is activated.

### Applications

- Reed Sensors are ideal for use in convertible cars for detecting roof end positions
- Anywhere for applications sensing any kind of end position movement even in dirty, extreme temperature environments

### Convertible Roofs And Their End Positions Are Controlled By Reed Sensors

Many of the older convertible cars used mechanical hand operation to collapse convertible roofs and to re-close the roof. This was a difficult task and many times the folds would not sit correctly making it difficult to seal off in the collapsed condition. Then motors were added to collapse (open) and close the roof, but if the motor was not stopped at the exact closed position and driven into its seating position or enclosure, damage could occur. This damage can occur whether the roof is traveling to the open position or traveling to the closed position. Designers finally selected Standex-Meder's reed sensors to solve the problem at the end positions.

#### Specifications (@ 20°C) MK14 Series





	Min	Max	Units
<b>Operate Specifications</b>			
Must close distance	5	25	mm
Must open distance	5	25	mm
Hysteresis	Typical 50%		
<b>Load characteristics</b>			
Switching voltage		200	V
Switching current		0.5	Amps
Carry current		1.5	Amps
Contact rating		10	Watts
Static contact resistance		150	mΩ
Dynamic contact resistance	200		mΩ
Breakdown voltage	320		V
Operate time		0.5	msec
Release time		0.1	msec
Operate temp	-20	85	°C
Storage temp	-20	85	°C

A magnet is mounted to the convertible roof and the 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.

This operation will continue until the end position is about to be reached. This is when reed sensor engages, sending a signal to the on-board computer, which sends a command to

turn off the motor. The roof comes to rest in its fully open, nested position. When the switch is thrown to close the roof, the reverse happens. The motor is engaged and as the roof approaches the end position, the reed sensor closes, sending its signal to the computer, and it executes the turn off control of the motor. The roof now sits in its final closed position. These actions will happen reliably over the life of the vehicle.




#### Cylindrical Panel Mount Sensor Series

Series	Dimensions		Illustration	
	mm	inches		
MK03	D	5.25	0.207	
	L	25.5	1.004	
MK14	D	4	0.157	
	L	25.5	1.004	
MK18	D	5	0.197	
	L	17	0.669	
MK20/1	D	2.72	0.107	
	L	10	0.394	

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. Because Standex-Meder's sensors use hermetically sealed reed switches that are further packaged in strong high strength plastic, they can be subject to rough treatment and environmental concerns such as dirt, grease, and moisture without any loss of reliability.

Standex-Meder has cylinder packages as well as screw fastening packages having lead wires for remote attachment to the electronics. Also, because of the multitude of design requirements, Standex-Meder, in a matter of fact manner, has the capability of developing specialized packaging for both the reed sensor and the magnet to meet the user's specific needs.

**Rectangular Panel Mount Sensor Series**

Series	Dimensions			Illustration
		mm	inches	
MK04	W	13.9	0.547	
	H	5.9	0.232	
	L	23.0	0.906	
MK05	W	19.6	0.772	
	H	6.1	0.240	
	L	23.2	0.913	
MK12	W	14.9	0.587	
	H	6.9	0.272	
	L	32.0	1.260	

\*\*Consult the factory for more options not listed above.

Consider some of the above options in cylindrical and rectangular versions for end position/limit sensors or other similar applications.

Find out more about our ability to propel your business with our products by visiting [www.standexmeder.com](http://www.standexmeder.com) or by giving us a [hello@standexelectronics.com](mailto:hello@standexelectronics.com) today! One of our engineers or solution selling sales leaders will listen to you immediately.

## About Standex-Meder Electronics

Standex-Meder Electronics is a worldwide market leader in the design, development and manufacture of standard and custom electro-magnetic components, including magnetics products and reed switch-based solutions.

Our magnetic offerings include planar, Rogowski, current, and low- and high-frequency transformers and inductors. Our reed switch-based solutions include Meder, Standex and OKI 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 spectrum of product applications in the automotive, medical, test and measurement, military and aerospace, as well as appliance and general industrial markets.

Standex-Meder Electronics has a commitment to absolute customer satisfaction and customer-driven innovation, with a global organization that offers sales support, engineering capabilities, and technical resources worldwide.

Headquartered in Cincinnati, Ohio, USA, Standex-Meder Electronics has eight manufacturing facilities in six countries, located in the United States, Germany, China, Mexico, the United Kingdom, and Canada.

For more information on Standex-Meder Electronics, please visit us on the web at [www.standexmeder.com](http://www.standexmeder.com).

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