Application Alley

Medical Equipment - Reed Sensor

Detect End Limit Position On Hospital Beds And Mobility Equipment Using Reed Sensors

Standex Electronics

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Introduction

There are a large number of applications requiring the detection of end limit position, where electric shock can be a real concern. Hospital beds, for example, need end position limits when adjusting the bed position. Reed Sensors are ideal here because they reliably pass very low level voltages and currents well under any potential power that could cause a shock. Mechanical limit switches have been used successfully in the past, but can fail prematurely because they need a higher level of power to operate properly. Mechanical sensors exposed to the environment will develop films on the contacts. To break through these films higher switching voltages may be necessary. These higher voltages are not ideal in a hospital bed environment. Now designers have turned to the Reed Sensor which uses hermetically sealed reed switches, which are ideal for switching low signal levels reliably.

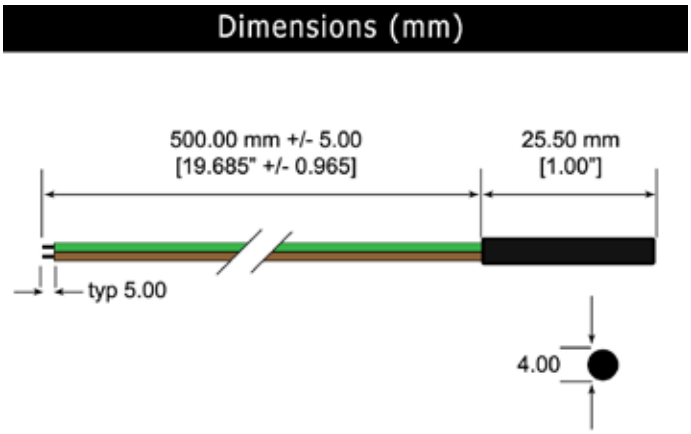

Figure 1. MK14 Sensor physical layout

Features

- The reed switch used in the Reed Sensor is hermetically sealed and is therefore not sensitive to spillage or wet environments
- The hermetically sealed reed switch is ideally suited for switching low signal level voltages and currents
- Magnet and Reed Sensor are isolated and have no physical contact by typically having the magnet mounted to the movement and the Reed Sensor mounted and positioned to pick on the end limit position/s
- The magnet is not affected by its environment
- Millions of reliable operations
- Cylindrical hole and screw fastening mounting
- Contacts dynamically tested
- Large sensing distances possible

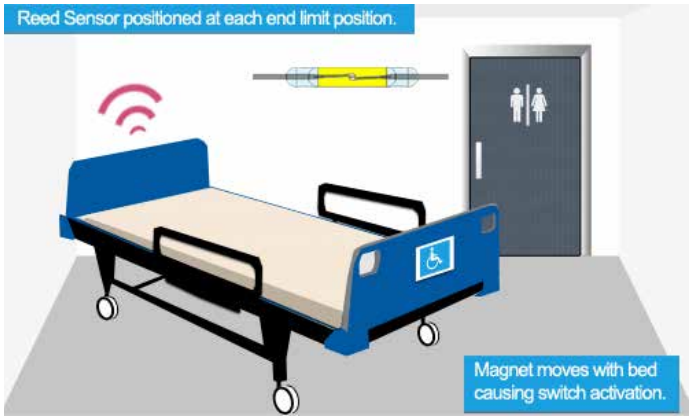

Figure 2. Sensor is mounted to each end position. When the piston reaches its top end limit position, the magnet actuates the sensor and sounds an alarm.

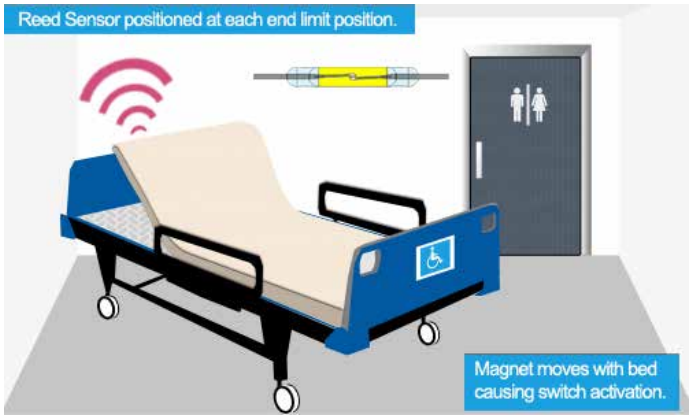

Figure 3. Sensor is mounted to each end position. When the piston reaches its bottom end limit position, the magnet actuates the sensor and sounds an alarm.

Applications

- Ideal for sensing end position(s)
- Medical mobility equipment
- Hospital beds

- Ideal for applications sensing any kind of end movement even in dirty or wet environ ments
- Lift chair position
- Mobility scooter
- Patient lift
- Power wheelchair
- Stair lift position
- Wheelchair ramp position

Reed Sensors Are Ideal for Sensing End Position On Hospital Beds And Other Mobility Equipment

Specifications (@ 20°C) MK14 Series			
	Min	Max	Units
Operate Specifications			
Must close distance	5	25	mm
Must open distance	5	25	mm
Hysteresis	Typical 50%		
Load characteristics			
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

Hospital beds, motorized chairs, special lifts for bath tubs, massage chairs, etc. all require end position detection. Since these are used by the consumer, care needs to be taken to use low power switching devices eliminating the threat of electrical shock to the user. Also, dust, dirt, and moisture may be present with the potential for spillage occurring, all of which, could create faulty operation of switching devices.

Mechanical limit switches have been used in the past, but can fail prematurely, because they require higher switching power to operate properly. Designers have tried to operate them with lower power, have found they are not very reliable. Increasing the power level would result in the threat of electrical shock.

Designers have not turned the Standex Electronics's reed sensors solving both of the above issues. The reed sensor uses hermetically sealed reed switches which are ideal for switch low power signals eliminating the potential for electric shock. And since the reed switches are hermetically sealed and packaged in strong high strength plastic, they are virtually fault free in any environment.

In these requirements the magnet is usually mounted to the movement mechanism and the reed sensor is mounted at the end position detection point. When the mechanism and magnet are moved and approach the reed sensor the reed contacts will close sending a signal to the electronics, which in turn halts the motion. In this way reliable operation is achieved.

It is also easily accomplished to sense several positions in a given motion and not only the end movement. Reed sensors can be strategically placed at all interested sensing points to carry out this operation. Also multiple magnets can be used to accomplish a similar task.

Cylindrical Panel Mount Sensor Series				
	Dimensions	mm	inches	Illustration
Series				
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	

Rectangular Panel Mount Sensor Series

Series	Dimensions	mm	inches	Illustration
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.

If the motion is very complex, combinations of reed sensors and magnets may be used effectively to accomplish the given detection.

Standex Electronics's reed sensors are available in several packages with various connector or lead options allowing the users to meet exact design details. The magnets can also be packaged in an assortment of ways as well. Because of the multitude of design requirements, Standex Electronics, 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.

Consider some of the below options in cylindrical and rectangular versions for end limit sensor or other similar applications.

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

About Standex Electronics

Standex Electronics is a worldwide market leader in the design, engineering, and manufacture of 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.

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

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