



Application Alley

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Industrial - Reed Sensor

**Surveyors Use Reed Sensors to Accurately Measure
Linear Distance**



Custom
Engineered
Solutions for
Tomorrow

Introduction

For many years surveyors' essential piece of equipment was and still is their measuring distance device. Most plots of land are precisely broken up into parcels of land in a very accurate manner, particularly in residential areas where every foot or meter needs to be accounted for. Often squabbles occur between residents with the only way to resolve them is the accurate pacing off of the plot distances by an accurate measuring device and a competent surveyor. Often these measuring devices used a walking device having a wheel that translates circular motion into a linear distance. These devices used a mechanical means to establish the distance. These mechanical devices did not always prove reliable and would often fail at the most inappropriate times. Designers have now chosen Standex-Meder's reed sensors as an inexpensive way to accurately measure the linear distance in a very reliable manner.

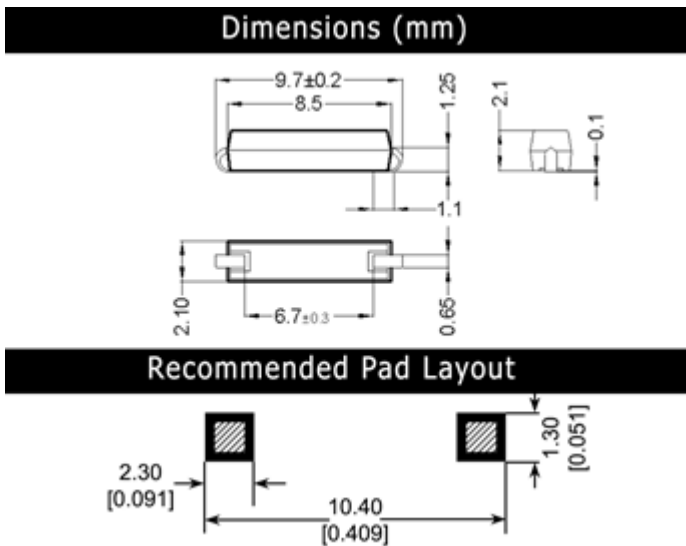


Figure 1. MK17-x-3 Sensor physical layout

Features

- Magnets and Reed Sensors are isolated and have no physical contact by typically having the multiple magnets mounted to the rotating

wheel, and the Reed Sensors are mounted strategically such that the magnetic field of magnets will be sensed by each reed sensor during the rotation.

- The reed switch used in the Reed Sensors is hermetically sealed and is therefore not sensitive to the environment
- The magnet is not affected by its environment
- The combination of magnets and multiple reed sensors allow very accurate measurements as small as fractions of an inch/centimeter
- Tens of millions of reliable operations
- Surface mounting and through hole mounting

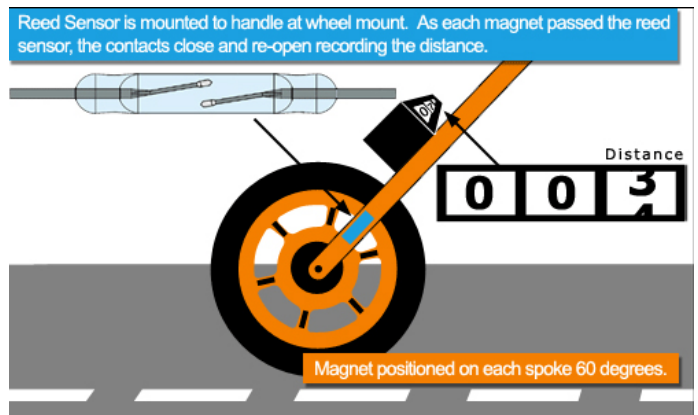


Figure 2. Reed switch contacts are closed until a magnet every 60 degrees passes the reed sensor.

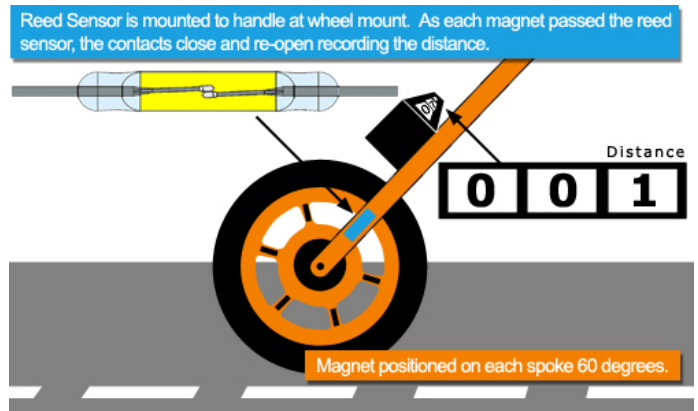


Figure 3. When magnet passes reed sensor, the contacts close generating a pulse the increases the distance measurement.

Applications

- Ideal for sensing the rotation of a surveyor wheel for measuring linear distance
- Ideal for applications sensing rotation in a host of different configurations

Using Multiple Reed Sensors And Magnets Meder Engineers Are Able To Accurately Measure Linear Distance For Surveyors

Surveyors for years have been searching for a measuring device that can accurately measure over long distances to within fractions of an inch/centimeter. There have been devices around to do this but they have failed in show repeatable accuracy and reliability. Many times surveyors would have to redo their jobs multiple times before they could trust their results. Finally surveyor equipment designers have turned to Standex-Meder engineers and have collaboratively come up with their ‘dream machine’. Using multiple reed sensors and magnets they can now meet the requirements of repeatability and accuracy with Standex-Meder’s design.

The object is to measure an assortment of distances accurately, reliably for long periods of time, and be able to trust the results. To accomplish this over variable terrain a rotating wheel is used with strategically placed magnets in the rotating wheel. Reed sensors are also strategically placed on a PCB in such a way that they close only once as a magnet and its corresponding magnetic field energizes the reed sensor. The reed sensor stays on only for 60° of the rotation. Using multiple magnets and reed sensors a pulse is produced every 60° of rotation or 6 times over the course of a full rotation of 360°. In this manner, since the diameter of the wheel is known and using the simple circumference of a circle equation = $2\pi R$, the distance can be determined and converted very accurately to linear distance by simply counting the pulses electron-

ically. In this way the surveyor receives a digital readout of the exact distance he has covered with his surveyor wheel.

The reed sensor is an excellent choice because it can operate reliably over a wide temperature range, and represents an economical way to carry out the sensing function.

Specifications (@ 20°C) MK15 & MK06 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 MK06	-20	85	°C
Storage temp MK06	-20	85	°C
Operate temp MK15	-20	130	°C
Storage temp MK15	-20	130	°C

Dimensions (mm)

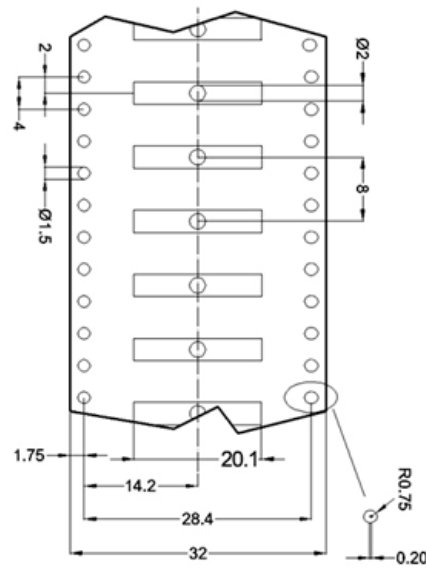














Figure 4. MK15 Tape & Reel

Surface Mount Sensor Series

Series	Dimensions		Illustration	
	mm	inches		
MK15	W	2.5	0.098	
	H	2.5	0.098	
	L	19.50	0.768	
MK16	W	2.3	0.091	
	H	2.3	0.091	
	L	15.60	0.614	
MK17	W	2.1	0.083	
	H	2.1	0.083	
	L	9.61	0.378	
MK22	W	2.7	1.060	
	H	2.3	0.091	
	L	15.60	0.614	
MK23-35	W	2.2	0.087	
	H	1.95	0.077	
	L	15.75	0.620	
MK23-66	W	2.2	0.087	
	H	2.7	1.060	
	L	19.60	0.772	
MK23-87	W	2.0	0.079	
	H	2.1	0.083	
	L	15.60	0.614	
MK23-90	W	2.54	0.100	
	H	3.05	0.120	
	L	24.9	0.980	

Through Hole Sensor Series

Series	Dimensions		Illustration	
	mm	inches		
MK06-4	W	3.3	0.130	
	H	3.3	0.130	
	L	12.06	0.475	
MK06-5	W	2.8	0.110	
	H	3.2	0.126	
	L	14.30	0.563	
MK06-6	W	3.3	0.130	
	H	4.2	0.165	
	L	17.24	0.679	
MK06-7	W	3.3	0.130	
	H	4.2	0.165	
	L	19.78	0.779	

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

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 spillage water, and moisture without any loss of reliability.

Find out more about our ability to propel your business with our products by visiting www.standexmeder.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-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.

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