Application Alley

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Appliance - Reed Sensor

Reed Sensors Detect Dishwasher Spray Arm Obstruction

Standex MEDER ELECTRONICS

Custom Engineered Solutions for Tomorrow

Introduction

Most modern kitchens today have as an essential component - a dishwasher. Actually dishwashers if designed properly can be very power efficient and represent a healthier approach to washing dishes. One of the essential actions that takes place within the dishwasher is rotation of the spray arm. This generally sprays hot water/steam and/or hot air under high pressure to all the dishes. If a dish is improperly positioned in the washer blocking the rotation of the spray arm trouble will ensue. However, reed sensors have solved this commonly occurring problem.

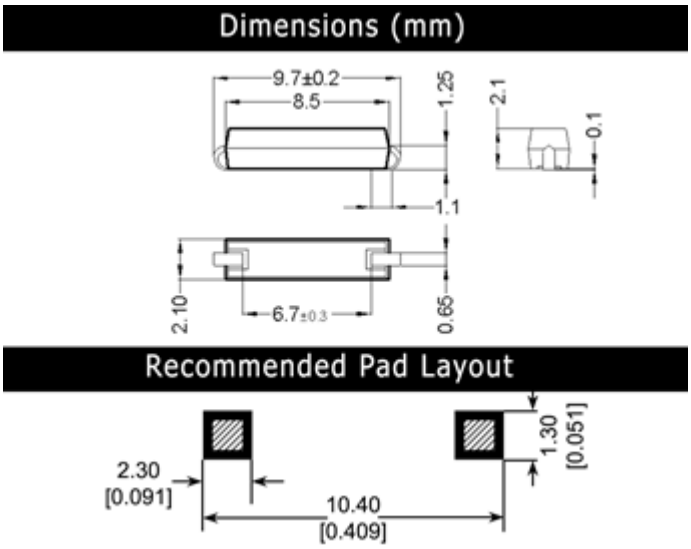


Figure 1. MK17-x-3 Sensor physical layout

Features

- Magnet and Reed Sensor are isolated and have no physical contact by typically having the magnet mounted to the spray arm and the Reed Sensor is mounted on the inner casing of the body such that it will detect the magnetic field of magnet on the spray arm when it rotates by the reed sensor.
- The reed switch used in the Reed Sensor is hermetically sealed and is therefore not sensitive to rough, wet, moist, high temperature environments
- The magnet is not affected by its environment
- Tens of millions of reliable operations
- Surface mount and through hole packages available
- Cylindrical hole and screw fastening mounting
- Contacts dynamically tested

Applications

- Ideal for sensing the rotating dishwasher spray arm
- Ideal for applications sensing any kind of rotation in a host of different configurations

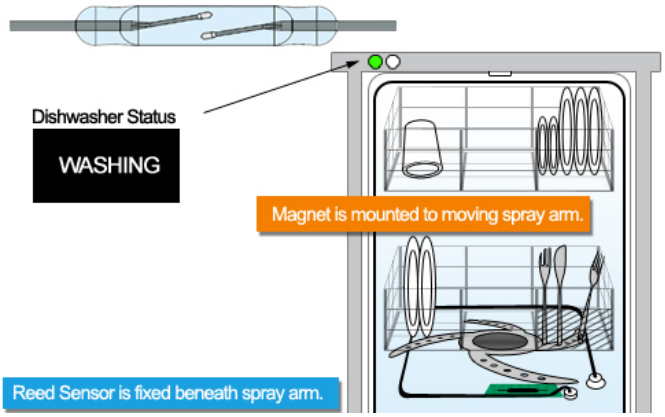


Figure 2. A magnet is mounted to the underside of the dishwasher spray arm and its rotation is sensed when it passes over the reed switch sensor mounted to the bottom of the dishwasher.

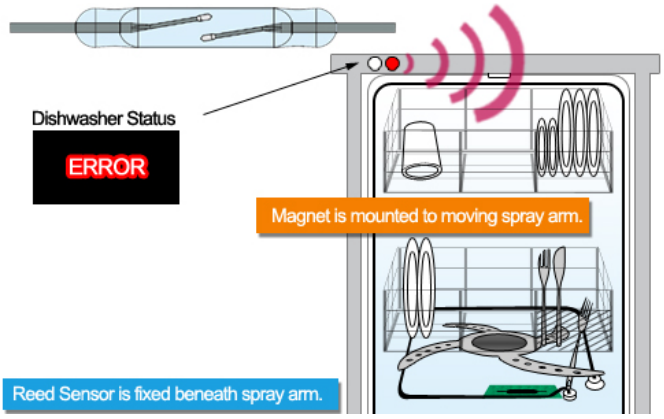


Figure 3. When there is an obstruction to the spray arm, the magnet and arm do not rotate causing the sensor to send a signal to the electronics sounding an alarm and turning off the dishwasher.

Reed Sensors Solve the Spray Arm Blockage Problem

People take their dishwashers for granted assuming they will get the job done. In most cases this is a good assumption. However, many people like to run their washer only when it is completely full and sometimes overloaded. In the overloaded case, a dish or utensil may be inadvertently in the way of the rotating spray arm blocking the rotation. In this case two things happen: first, the spray arm is not longer rotating and is therefore only spraying in one area only; and secondly, when the motor is stopped from rotating (called a locked rotor condition), the motor will automatically increase the current, and therefore increasing power trying to start the motor moving. This heavy draw of power dramatically reduces the efficiency and potentially could burn out the motor. Furthermore, the dishes end up not very clean with the spray only penetrating certain dish areas.

Surface Mount Sensor Series

	Dimenstions	mm	inches	Illustration
Series				
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	

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)

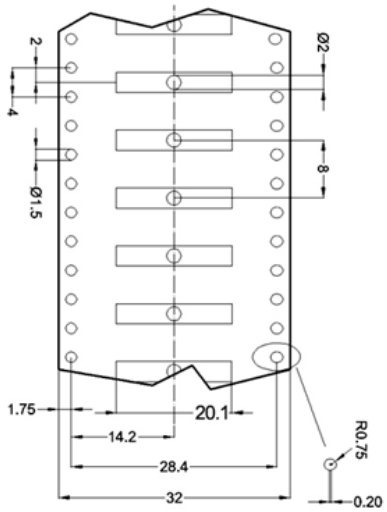


Figure 4. MK15 Tape & Reel

Reed Sensors Detect Dishwasher Spray Arm Obstruction

Dishwasher manufacturers offer models where this problem is solved using reed sensors.

A magnet is generally mounted to the spray arm/s and rotates with the spray arm. 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, which sends a signal to the electronics alerting it that the spray arm is no longer operating. In this case, three things generally happen:

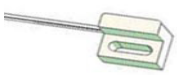
1. a signal is sent to turn off the spray arm motor, 2. a light on the outside panel begins to flash; and 3. a beeper begins to alert the user of the jam internally in the dishwasher. Once the blockage is removed the dishwasher is reset and will resume its normal operation.

In this application, the reed sensor may be in a direct line with the sprays including the high and low temperatures. 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 water sprays, and moisture without any loss of reliability.

Cylindrical Panel Mount Sensor Series

Series	Dimenstions	mm	inches	Illustration
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	Dimenstions	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	

Through Hole Sensor Series

Series	Dimenstions	mm	inches	Illustration
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.

Reed Sensors Detect Dishwasher Spray Arm Obstruction

The reed sensor 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. Standex-Meder ’s sensors are packaged for surface mounting as well as through hole mounting. Also, Standex-Meder has cylinder packages as well as screw fastening packages having lead wires for remote attachment to the electronics.

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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