

# Top Loading Washing Machines Use Reed Sensors to Detect if the Lid is Open or Closed

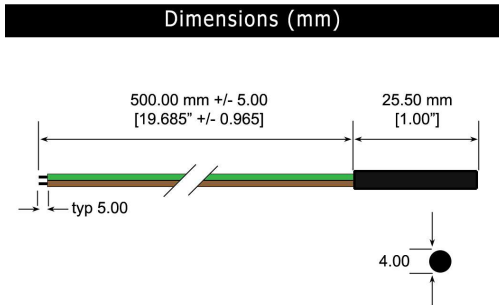


Figure 1. MK14 Sensor physical layout

## Features

- Magnet and Reed Sensor are isolated and have no physical contact by typically having the magnet mounted the top lid of the washing machine, and the Reed Sensor is mounted on the chassis of the washing machine strategically placed such that the magnetic field of magnet will be sensed when the top is opened and closed.
- 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
- Cylindrical hole and screw fastening mounting
- Contacts dynamically tested

## Applications

- Ideal for sensing the top lid opening and closing with top loading washing machines
- Ideal for applications sensing any kind of door or lid opening or closing in a host of different configurations

## Introduction

Some top loading clothes washers have the drum rotating perpendicular to the door and some have the drum rotating in the same plane as the top. In the former of the two rotating directions, opening the top can be very dangerous if the drum continues to rotate. In the case of the latter rotating drum is less dangerous, but trouble may still occur. To avoid laws suits, appliance designers once again have turned to MEDER engineers to help solve the problem.

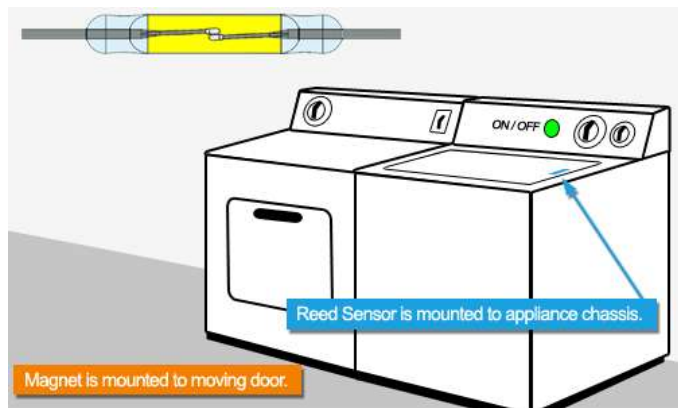


Figure 2. Washing machine lid is closed and magnetic field closes the reed switch activating the washing machine.

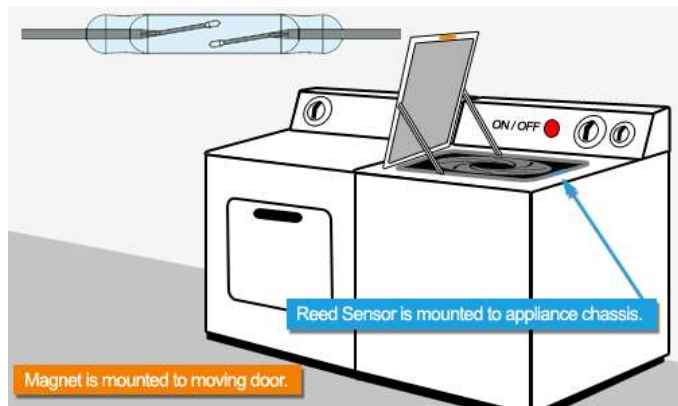


Figure 3. Washing machine lid is open moving the magnetic field of the magnet away from the reed switch causing the contacts to open and the washing machine to turn OFF.

## MEDER's reed sensors sense the position of the top lid of a washing machine

Some top loading clothes washing machines have their drums rotating perpendicular to the top of the washing machine and rotate in the plane of the top of the appliance. Opening the top of the appliance while the drums are rotating can be dangerous particularly when the drum is rotating in the perpendicular direction. Appliance designers working MEDER's engineers have solved the problem by using a reed sensor to sense open and closing of the lid.

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*Products for tomorrow...*

REED RELAYS ■ REED SENSORS ■ REED SWITCHES

## Specifications

Operate specs	Min	Max	Units
Must close distance	5	25	mm
Must open distance	5	25	mm
Hysteresis	Typical 50%		

Load Characteristics	Min	Max	Units
Switching voltage		200	Volts
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		Volts
Operate time		0.5	msec
Release time		0.1	msec
Operate Temp (MK06)	-20	85	°C
Storage Temp (MK06)	-35	85	°C

A magnet is mounted to the top lid. The reed sensor is mounted on the chassis of the washing machine strategically placed such that it will sense each time the top lid is opened or closed. In this position the sensor is directly wired to the washer electronics. Now if the washing machine is in the middle of a cycle with the top closed, the reed sensor is in the closed position. If someone attempts to open the top, the reed sensor opens. This change of state is sensed by the electronics and will immediately turn off the drum eliminating the existing danger of the rotating drum. When the top is re-closed the sensor switch closes giving the 'green light' to the electronics to resume operation.

Because 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.

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. MEDER's cylinder packages as well as screw fastening packages having lead wires for remote attachment to the electronics are ideally suited for this application.

### Cylindrical Panel Mount Series

Series	Dimensions			Illustration
		mm	inches	
MK03	Dia	5.80	0.244	
	L	25.5	1.004	
MK14	Dia	4	0.157	
	L	25.5	1.004	
MK18	Dia	5	0.197	
	L	17	0.669	
MK20/1	Dia	2.72	0.107	
	L	10	0.394	

### Rectangular Screw Flange Mount 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 our factory for your specific design requirements.