Off Hook Switching for Telephone Sets

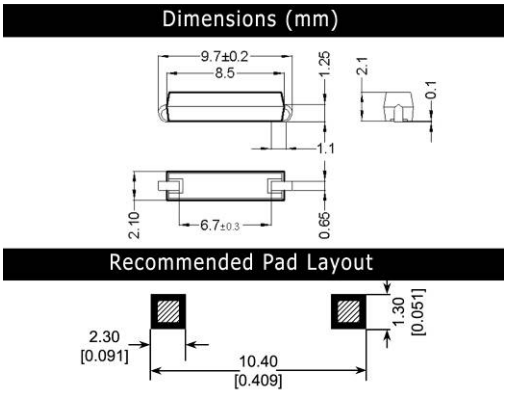

Figure 1. MK17-x-3 Sensor physical layout

Features

- The reed contact can be sealed in the casing of the receiver
- The reed contact never comes in contact with the outside environment
- The reed switch is hermetically sealed
- Magnet and switch are isolated by having the magnet mounted in the hand set and the reed switch mounted in the receiver
- The magnet is not affected by the environment
- Millions of operations reliably out performing the life of the telephone
- Surface mount, through hole and screw fastening mounting
- Contacts dynamically tested
- Not affected by rough treatment
- Large sensing distances possible

Applications

- Off-hook telephone switching
- Ideal for applications sensing the proximity of two separate objects
- Activation approach may be used anywhere when concerned about switching in a dirty environment (dust, dirt, moisture, acidic environment, alkaline environment)

Introduction

In the past, disconnecting a telephone connection required the placement of the handset on the receiver. This placement activated a mechanical switch which created the electrical disconnect. The mechanical switch is subject to any spillage or debris clogging the contacts which will affect the reliability of the electrical on/off connection. MEDER has developed several packages that use hermetically sealed reed switches that completely eliminate this reliability issue.

Figure 2.. Phone closed, Reed Switch activated while in proximity to magnet

Figure 3. Phone open, Reed Switch is deactivated with magnet distance from switch.

Telephone hand sets serve a great many of us with literally billions being used world wide. Their primary reliability issue has been the electrical on/off connection. The faulty operation of the on/off mechanical switch that is not fully sealed from the environment is the chief culprit. To prevent this designers have had to go to fully sealed switches that are much more expensive but still have been subject to some reliability issues. The mechanical switches are still subject to very harsh environments having to deal with chemically active liquids, dust and dirt. These environments, can and will cause the contacts to stick or remain open.

To completely solve this problem designers have finally turned to the best solution - **Reed Sensors.** It solves the reliability problem and represents a low cost solution. The on/off switch must be able to handle the following: 1. Environmental issues; 2. Ability to survive being dropped repeatedly from three or more feet; and 3. Ability to switch on and off reliably for several years.

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Specifications Defining the MK06 & MK15 Series

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	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)

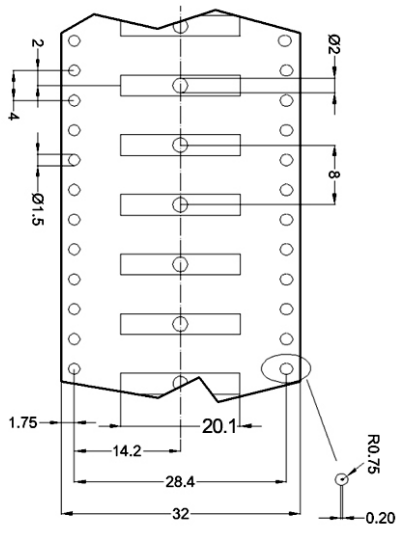

Figure 3. MK15 Tape & Reel

MEDER's packaged hermetically sealed reed switches are ideal and meet all the critical criteria, having the ability to switch for 100s of millions of operation, clearly outliving the usable life of the telephone.

A magnet is conveniently mounted in the hand set. When the hand set is placed on the telephone receiver, the hermetically sealed reed switch senses the magnetic field presence, in turn closing the contacts and then sends an electrical signal to turn off the phone. The hermetically sealed reed switches are conveniently packaged for surface mount placement, PCB through hole mounting, screw hole fastening, etc. When the hand set is lifted the reed switch senses this and the dial tone is then engaged. Designers have also found another way to conveniently activate the reed switch - simply using the existing magnet in the mouth piece speaker. This approach forgoes the need to use a separate magnet.

The sensors can be supplied in a Form A normally open (SPST) or a Form B where the contacts are supplied in the normally closed mode. The sensor can also be supplied as a Form C single pole double throw (SPDT) contact configuration as well.

Consider some of the below options in surface mount, through hole and cylindrical panel mount and rectangular screw flange mount.

Surface Mount Series

Series	Dimensions	mm	inches	Illustration
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	
MK23-80	W	2.0	0.079	
	H	2.1	0.083	
	L	13.00	0.512	
MK23-87	W	2.0	0.079	
	H	2.1	0.083	
	L	15.60	0.614	

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Through Hole Series

Series	Dimensions	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	

Cylindrical Panel Mount Series

Series	Dimensions	mm	inches	Illustration
MK03	Dia	5.25	0.207	
	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	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.