



Reed Switch Protection Methods

Operating Instructions

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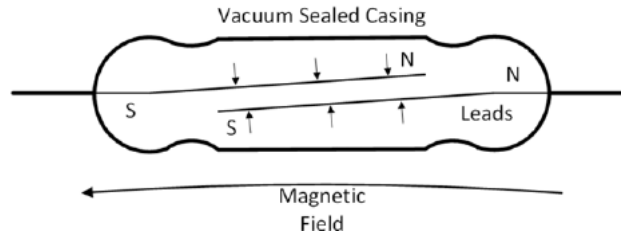
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Introduction

A reed switch is a switching device that opens and closes through the power of magnetism.

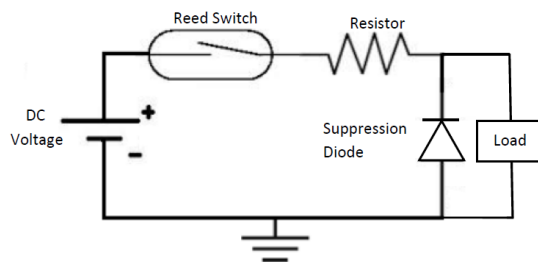


The overall structure is simple for its intended use. Two ferromagnetic blades that are hermetically sealed in a glass envelope tubing. This allows the components to be used in almost any environment. Due to the simple design of the switch in both function and safety it can be used in both DC and AC applications.

Why Protection is needed

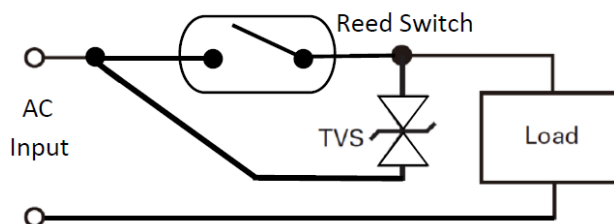
Depending on the application requirement, reed switch contacts require protection to insure a long, dependable life. When current is interrupted, the inductance of the load generates a very high back EMF, which appears across the switch contacts. If this EMF is large enough, it can ruin the reed switch causing the contacts to fuse/weld. The purpose of a protection circuit is to prevent arcing, which is done by shorting this voltage through an alternate path. Similarly, high and instantaneous current discharge from external capacitive sources can damage reed switch contacts by discharging high surge current through it.

Reed Switch with a Suppression Diode (DC)



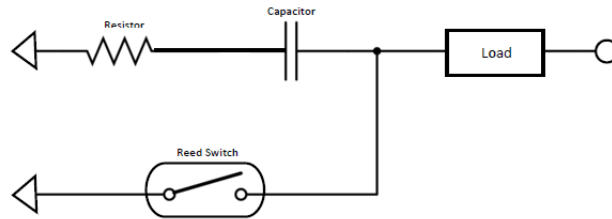
The simplest method of suppressing a DC inductive circuit is with a reverse diode wired across the load (As shown above). With the diode in the circuit, the Back EMF is directed through the diode instead of the reed switch. The diode should be selected with a forward current rating that is at least as high as the steady current of the circuit in question. Using a 1N4004 or 1N4007 diode or anything equivalent to those is best recommended as a suppression diode.

Reed Switch with a Bidirectional TVS Diode (AC)



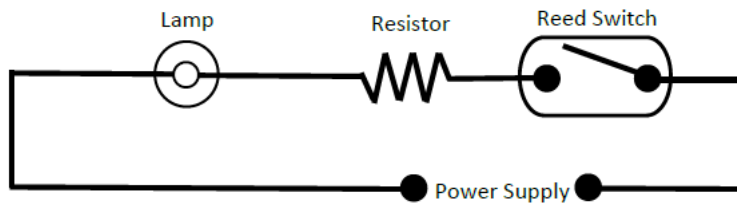
The TVS diode conducts current when a threshold voltage is exceeded. These devices are usually placed across (in parallel with) the reed switch. They are suitable for absorbing and suppressing static electricity or high voltage pulses of short duration thus protecting the reed switch from fusing.

Reed Switch using an RC Connection

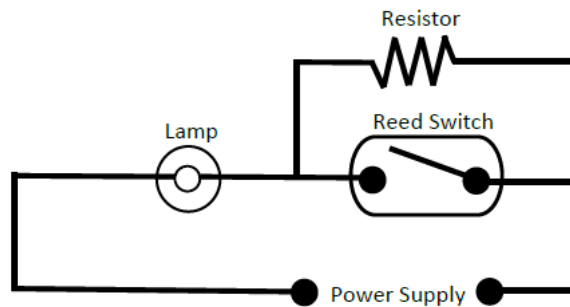


The most common recommended protection for AC Inductive Loads is the Resistor-Capacitor (RC) network. This is done by having the resistor and capacitor in series that is connected in parallel to the reed switch. This will help reduce arcing thereby improving the reed switch life span.

Contact Protection in a Lamp Circuit



(A) Current limiting resistor R should be selected so as to control the current through the circuit to a value under the maximum allowable current published for the reed switch.



(B) Having a resistor in parallel to the reed limits the inrush current by preheating the lamp filament thereby increasing its resistance. The value of R should be approximately 1/3 of the filament resistance value.

The cold filament inrush current in a lamp circuit can reach 5 to 10 times the steady state hot filament current. The nature of the inrush is very similar to a capacitive load that needs reed switch protection. Methods used normally consist of either a series or parallel resistance, to reduce the inrush. A series resistance simply reduces the current in the whole circuit to an acceptable level. Parallel resistance provides a current path around the reed switch, and serves to hold the lamp filament at an elevated temperature (below incandescence), and therefore at a higher resistance than in its cold state.

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