Warnings for an effective protection of the Reed switches

The electric features on the Reed switches, shown in the descriptive tables, are supplied by the manufacturers. For a Reed switch connection, it is recommended to pay special attention to the type of load to which the switch is going to be connected. Inductive, capacitive or lamp loads may produce surges during operation, for their own nature. These surges may damage the Reed switch or drastically reduce its operating life.

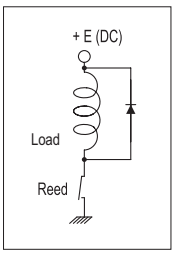
Inductive load

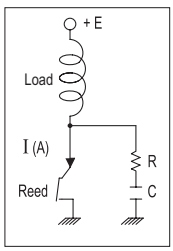
When a Reed switch is used to guide an inductive load such as engines and solenoid valves, the energy stored in the load may cause an inverse voltage when the Reed contact breaks. The voltage depends on the inductance value. The following circuits provide a protection in the cases hereunder mentioned.

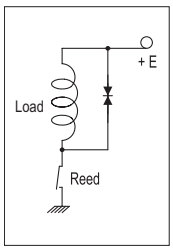
In case of continous voltage, it is enough to introduce a diode in parallel to the load respecting the polarity, to advoid any damage to the Reed switch.

In case of alternating voltage, it is possible to use a resistance and a capacitance in parallel to the Reed switch. The capacitance and resistance values come out from the following formula.

An alternative solution may be to use a varistor in parallel to the load.





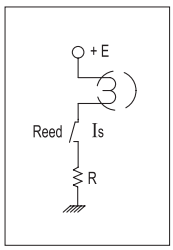


$$C\,[\mu F] = \frac{I^2}{10}$$

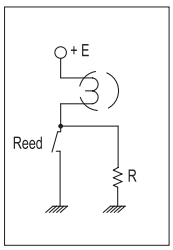
$$R\,[\Omega] = \frac{E}{10 \cdot I\,(1 + \frac{E}{50})}$$

Lamp load

In case of a tungsten filament lamp, the filament resistance is 10 times smaller when the lamp is switched off (cold filament) than in case of the lamp switched on (hot filament). After the Reed contact commutation and after the lamp turning on, for a short time the in-rush current is 10 times higher than the one circulating in steady state. This flow may damage the Reed contact or jeopardise its duration. In this case, the solution is to introduce a resistance in series to the Reed switch, thus cutting the maximum value of the current, or a resistance in parallel to the Reed switch, to keep the filament hot (by increasing the resistance) without causing the lamp to turn on.



R = Protection resistance
It must be properly chosen so that
Is < 0.5 A

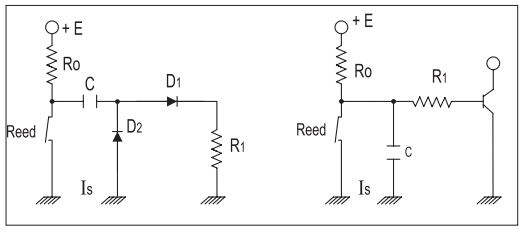


$$R < \frac{\text{Filament resistance}}{3}$$

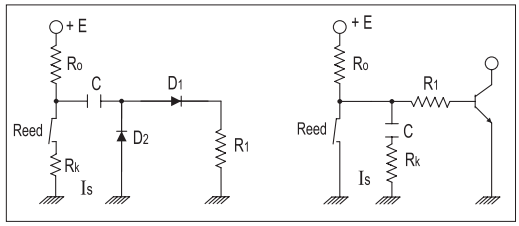
Capacitive load

The in-rush current flowing during charge and discharge of the capacitor will cause deterioration of the Reed contacts in case when a capacitor is connected in series or in parallel with a Reed switch in a closed circuit. In this situation, the easiest and more effective solution is to position a resistance in series to the Reed switch or, in general, a resistance properly set in order to cut the maximum value of the currents of charge and discharge. Here are two examples of a circuit: the energy, stored in the capacitive load "C", generates rush currents discharging through the Reed contact. The use of a properly calibrated resistance reduces the value of these currents and protects the operating life of the Reed contact.

Circuit without protection



Circuit with protection

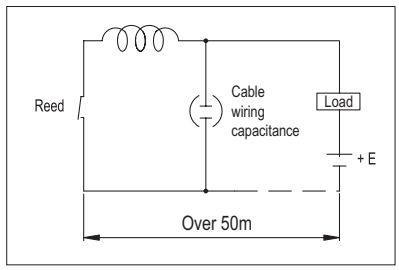


R_k is the resistance limiting the surges.
The R_k resistance value depends on the circuit electric configuration.
As a general rule:

$$Is = \frac{V \text{ stored in the load}}{{}_kR\ [K\Omega]} < 0{,}1\ A$$

Wiring capacitance

In case a Reed switch is connected to a load by a cable, over a long distance, the cable static capacitance will affect the Reed switch. In case the cable length exceeds 50 metres, it is recommended to use a protection for assuring a longer operating life of the Reed switch (although it depends on the type of cable used). In this situation an inductance in series to the Reed switch or a small resistance (current limiting resistance of 10 to 500 ohms) can be inserted.



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