

## Contact Protection Measures with Reed Contacts

### General:

The current, voltage and power values indicated in the technical data sheet for reed contacts apply to purely ohmic loads only.

However, electrical loads usually include inductive or capacitive components, or switching of incandescent lamps is required.

In all of these cases, the reed contacts must be protected against the occurrence of voltage and current peaks.

The following guidelines indicate how reed switches can be connected such that rapid wear and premature failure are avoided.

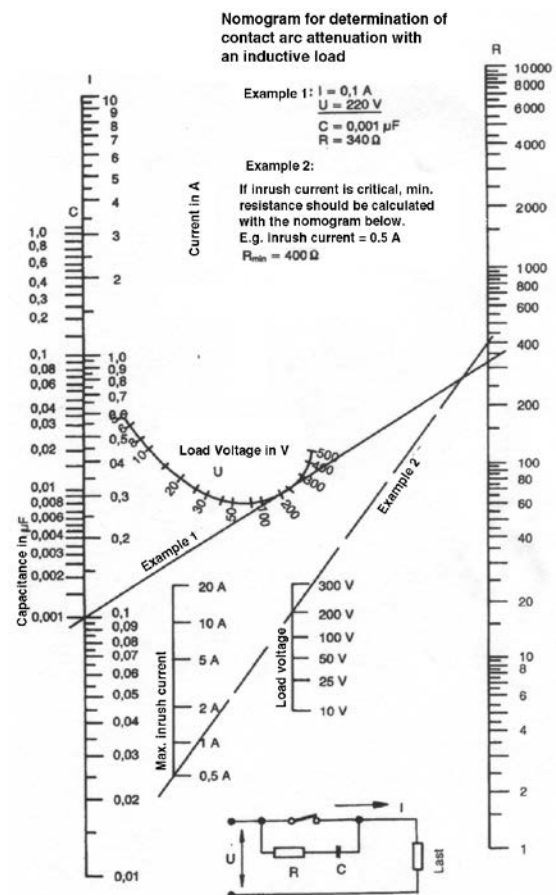
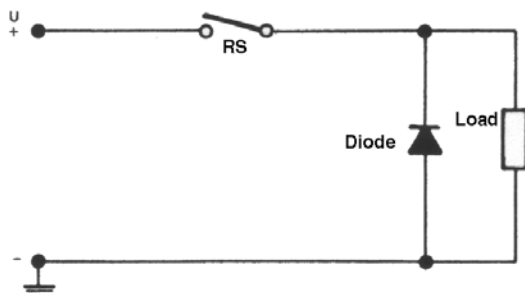
### Inductive Loads

#### Alternating Current:

A snubber circuit must be used for switching alternating current. RC elements are generally used to this end which are connected in parallel to the switch, and thus in series to the load. The required size of the snubber circuit can be determined with the nomogram to the right.

#### Direct Current:

A recovery diode must be connected in parallel to the load for direct current switching. The diode must be poled such that it blocks when normal operating voltage is applied, and such that it short circuits the voltage peak which occurs in the reverse direction when the switch is opened.



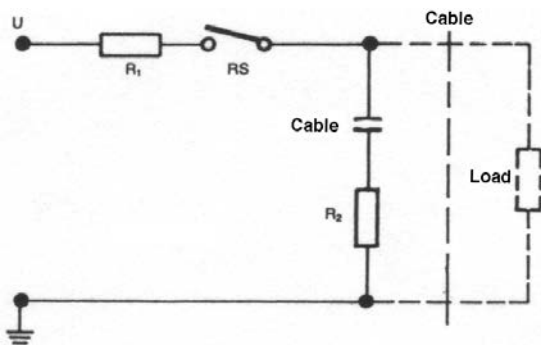
### Capacitive Loads

As opposed to inductive loads, increased inrush current occurs with capacitive loads and incandescent lamp loads, which may lead to interference and even welding of the contacts.

When charged capacitors are switched (i.e. cable capacitance) a sudden discharge occurs, the intensity of which depends upon the capacitance and the length of the cable leading to the switch, which functions as a series resistor.

The discharge peak is reduced to a great extent by connecting a resistor in series to the capacitor. Its size is determined by the respective circuit. It should be as large as possible in order to limit discharge current to an allowable value.

These considerations apply to the charging of capacitors as well.



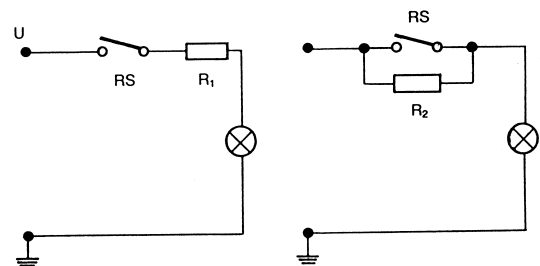
### Protection Against Excessive Discharge Current from Capacitors

$R_1$ ,  $R_2$  or both should be used, depending upon the circuit.

### Incandescent Lamp Loads

Cold lamp filaments (i.e. switched off) demonstrate only one tenth the resistance as is the case when they are switched on. This means that when a lamp is first turned on, ten times more current flows for a brief period of time than is normally the case when the lamp is burning under stable conditions. This 10-fold inrush current can be reduced to an allowable amount with a series connected current limiting resistor.

Connecting a resistor parallel to the switch represents another possibility. In this way the lamp filament is continuously preheated to just below the glow threshold in the off condition. Both of these protective measures result in a loss of power.



Incandescent Lamp Load with Resistor  
Parallel or Series Connected to the Switch