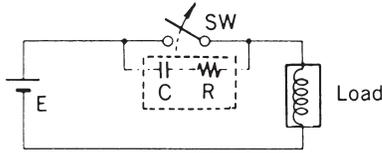


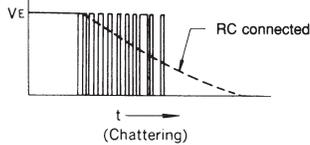
EFFECT OF RC NETWORKS

ARC SUPPRESSION



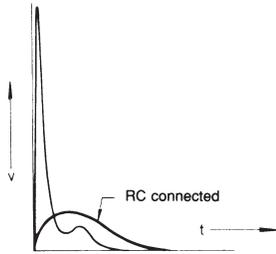
At the moment of switch opening, the RC combination absorbs and suppresses the energy of the arc by letting it bypass the switch.

DAMPING OSCILLATION



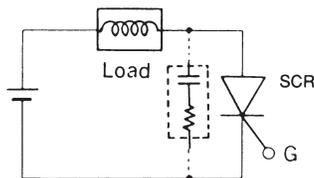
The RC combination absorbs the high frequency oscillations caused by mechanical vibrations such as relay contact chattering. Similarly, the oscillations created by arcing are also averaged and suppressed by the RC combination regardless of their origin.

BACK ELECTROMOTIVE FORCE SUPPRESSION



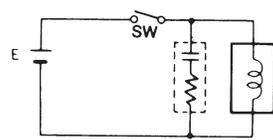
With back electromotive force due to inductance, the surge voltage peak is suppressed by conducting it through the RC circuit on the low impedance side. The peak is absorbed by the capacitance of RC. The waveform is averaged and smoothed by the time constant of the RC; thus generated noise is eliminated or substantially minimized.

DV/DT SUPPRESSION

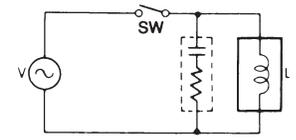


The RC combination allows the dv/dt of the "on" and "off" operation of thyristors or similar devices to decrease; thus surge voltages are suppressed and semiconductor elements are protected. Even in the case of zero crossing circuits, such as AC circuits, protection is necessary since harmonic noise occurs when there is a gap between phases of current and voltage of the load circuit.

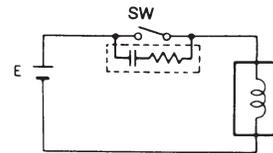
APPLICATION EXAMPLES



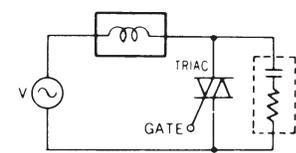
Standard example in DC circuits



Standard example in AC circuits



Standard example in DC circuits



For phase control circuits employing SCR or TRIAC, etc.

DETERMINING RC VALUE

In general, the calculated RC value is difficult to determine using the following formula. This is due to contributing factors such as equipment wiring and component locations which can vary from machine to machine.

$$C = \frac{I^2}{10} \text{ Mfd.}$$

$$R = \frac{E}{10 [3.16 \sqrt{C}] (1 + 50/E)}$$

C = Capacitance in MFD
I = Load Current in Amps
R = Resistance in Ohms
E = Source Voltage

The best way to determine the values needed is to obtain a storage oscilloscope and match combinations of resistors and capacitors while viewing the amount of spike reduction on the oscilloscope. The user should change the combination of R & C until the optimum spike reduction is achieved.

Electrocube has determined that the best overall combination is 0.47-50 Mfd @ 220 . This combination seems to work for 90% of the applications. The voltage should be selected for the normal DC or AC voltages, however, the designer must take into consideration the peak voltages involved.

The resistor wattage depends upon the number of times per minute the circuit is activated. As a general rule of thumb, the following chart should be considered.

CIRCUIT ACTIVATION TIMES/MINUTE	RESISTOR WATTAGE
1-3	1/2
4-5	1
6-9	2
10-15	5
>15	10

The chart and formula are guidelines to give the user a starting point from which to work. The final selection must be evaluated in the application to determine its acceptability.