

INTRODUCTION TO RC NETWORKS

Recent developments in electronic equipment have shown the following trends:

- Increasing demands for numerical control machines, robotics and technically advanced appliances are requiring progressive electronic technologies.
- When employing integrated circuit and microcomputer technology, today's equipment is required to perform multifunctions in limited size.
- The denser the installation of components, the more the components must be miniaturized and of lighter weight.

As a result, the following problems arise:

- Functional limits of magnetic relays and switches have narrowed due to increasing contact amperage.
- Miniaturization of electronic components has reduced their dielectric strength.
- Circuit noise has increased as a result of the coexistence of signal and power lines.
- Safety standards for electronic equipment and components have become increasingly restrictive.

Some key factors affecting circuit performance are:

- Arcing between relay and switch contacts cause pitting and whiskers resulting in premature contact failure.
- Contact arcing results in high frequency noise and abnormal high voltages.
- The generation of back electromotive force (EMF) is due to the inductance of loads present.
- The occurrence of high frequency noise is the result of contact chatter in magnetic relays and switches.

Back EMF, due to inductance, affects Silicon Control Rectifiers (SCRs) and Solid-State Relays (SSRs) and can result in the breakdown of other semiconductor devices. Power line surges must also be carefully considered. Either may be a contributing factor in equipment malfunctions, failures and in extreme cases of fire and/or electrical shock.

To illustrate these factors, consider that relay contact chatter is capable of inducing oscillations of several KHz, contact arcing frequencies of several MHz and amplitudes 10 to 20 times normal circuit voltages. Voltage surges from external sources may approach thousands of volts.

To protect electronic equipment against costly failures or malfunctions, Electrocube has developed advanced components to suppress contact arcing and filter unwanted electrical noise.

GENERAL CONSTRUCTION

RC Networks are easily selectable electronic components designed to prevent or substantially minimize the occurrence of arcing and noise generation in relay and switch contacts.

RC Networks consist of specially designed capacitors and resistors connected in series. Spark discharges and induced noise are absorbed over a wide range by the accumulation characteristic and impedance of the capacitor, while the RC time constant delays and averages surge voltage and oscillations.

RC Networks must have the capacity to store surge voltages and current energy and afford protection against inductively induced potentials. The dielectric material of Electrocube's capacitors, used in RC Networks, affords a very high degree of voltage withstand strength. All resistors are non-inductive types to insure a high degree of protection against pulse potentials. To provide additional protection for equipment and users, especially when these components are used in their applications, all Electrocube RC Networks are packaged in cases which meet or exceed the flammability requirements of UL94VO.

SAFETY STANDARDS

Electrocube's RC Networks are UL and UL_C approved. Self-declaration of CE mark is available upon request.

APPLICATIONS

- Protection for contacts and from noise during switching operations of equipment such as radio, TV, copiers, mixers, coffee grinders, washing machines, dryers, tool machine equipment, packaging machinery, etc.
- Protection of electronic instruments during operation of relays, solenoids, motors, etc.
- Electrical noise protection of semiconductor devices during control of triacs, thyristors, motors, welders, illumination equipment, etc

CUSTOM DESIGNS

Electrocube offers many years of experience in the design and manufacture of standard RC Networks, as well as special units to meet customer requirements. For custom applications, consult the factory direct to assist in the design, production and delivery of your special needs.