



# ABBERFIELD INDUSTRIES

## *SPIKE SUPPRESSION FOR SOLENOID VALVES AND CONTACTORS PLUS MOTORS AND OTHER EQUIPMENT*

Some electrical devices generate very considerable electrical spikes as they switch on and off. These spikes (sometimes called EMF or back EMF) can cause problems with electronic equipment connected on the same electrical supply.

By law devices like solenoid valves and contactors should be fitted with spike suppression devices but in practice they never are. This information sheet explains how the spikes are generated and how they can be suppressed.

Essentially solenoids and contactors are a coil into which slides a metal slug. That constitutes the definition of a generator (i.e. as the slug moves it breaks the magnetic lines of force of the field around the coil and induces a back EMF on to the supply).

The law requires that any electronic equipment does not emit line borne or radiated electrical interference. The same law applies to solenoid valves and electrical contactors and yet no manufacturer of solenoids or contactors that we know of fits any filtering devices. Electronic equipment manufacturers fit filters to stop the spikes, but it is much more effective to fit the filter at the solenoid valve, or contactor, the source of the spike.

Spike suppression devices are many and varied, including capacitors and inductors. However the best general purpose device seem to be a varistor, otherwise called a Voltage Dependant Resistor (VDR). If a varistor is fitted across the supply to the solenoid coil or contactor, as close to the coil as practicable, problems generally cease to exist.

**This varistor should be part of the solenoid or contractor.**

Essentially a varistor is open circuit to the supply voltage but when a spike reaches its strike voltage that spike is shorted out. For a 220 / 240 volt mains a 275 volt varistor is normally used. For low voltage applications a different value varistor is used. Note that fitting a 275 volt version across a low voltage device doesn't cause a problem but it doesn't do anything either. For a 12 volt device an 18 volt varistor is needed. However never fit an 18 volt varistor across a mains solenoid, there will be a big bang.

The polarity of the varistors is not important, just their voltage rating and their physical size. If too small the shorted spike can cause internal haemorrhage, or the device can blow apart.

Perhaps varistors only need to be fitted if problems are experienced.

For more information contact Abberfield Industries technical support team.