



future automation

# **APPLICATION NOTES:**

AC ELECTRIC SHADE  
MOTORS FALSE TRIPPING

ISSUE 001  
08 . 10 . 2019

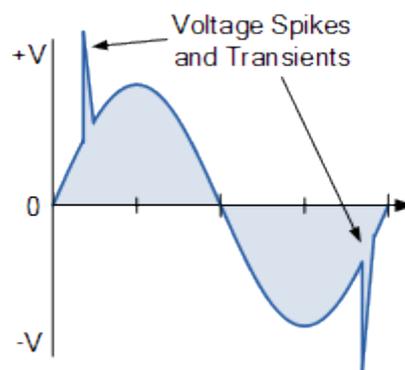
## INTRODUCTION

A common problem with AC blind (shade) motors is false breaker tripping.

This is basically caused by the fact you're switching AC motors which have back EMF (Electromotive Force)

An AC Motor is an inductive load and a voltage that appears in the opposite direction to current flow as a result of the motor's coils moving relative to a magnetic field. It is this voltage that serves as the principle of operation for a generator.

If you were to view the signal across the AC motor with an oscilloscope the back EMF would show as a huge spike this is short in time but can be thousands of volts.



The high voltage spike coming back down the power cable through the blind controller (generally just a relay) reaching back to the Circuit breaker is what causes it to trip.

It's not good practice to just up-rate the circuit breaker and it is likely to not fix it anyway.

Some manufactures blinds are better than others the branded companies must include some in-built suppression, bear this in mind when selecting blinds.

As well as false trips the spike travelling down long runs of cables which act as an RF antenna and can interfere with control signals, TV, FM radio etc.

## SOLUTION

The best way to fix this is to suppress the back EMF spike.

This evolves fitting a component called an “RC Snubber” across the AC motor ideally as near to the motor as possible but it will work at the controller side. its best done between the motor and controller as that will also increase the life of the relays in the controller. The device must be rated for Mains use 240V RMS (650V peak to peak)

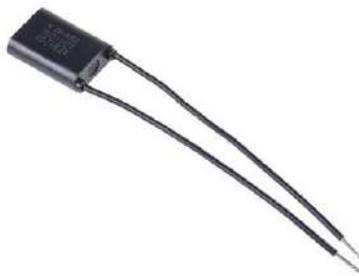
You will need to fit two per motor:

- One from Neutral to Motor UP
- One from Neutral to Motor Down

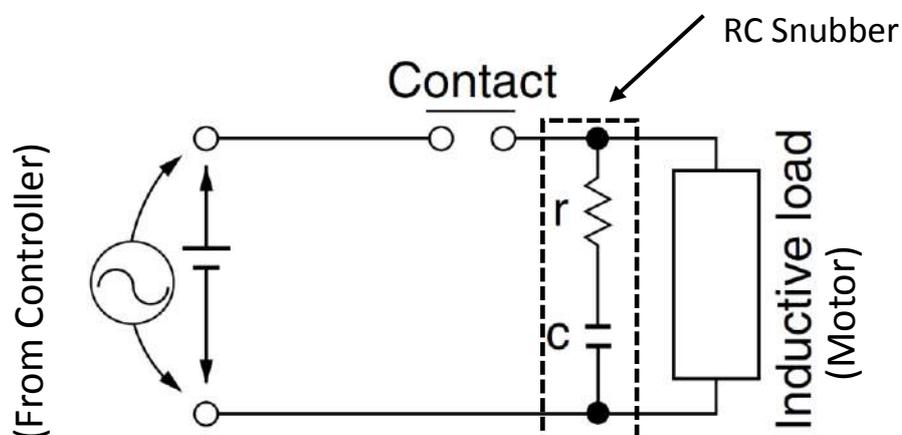
*This needs to be done safely within a junction box ensuring terminals are clamped etc. and everything well-insulated from other connections.*

Typical Snubber device example:

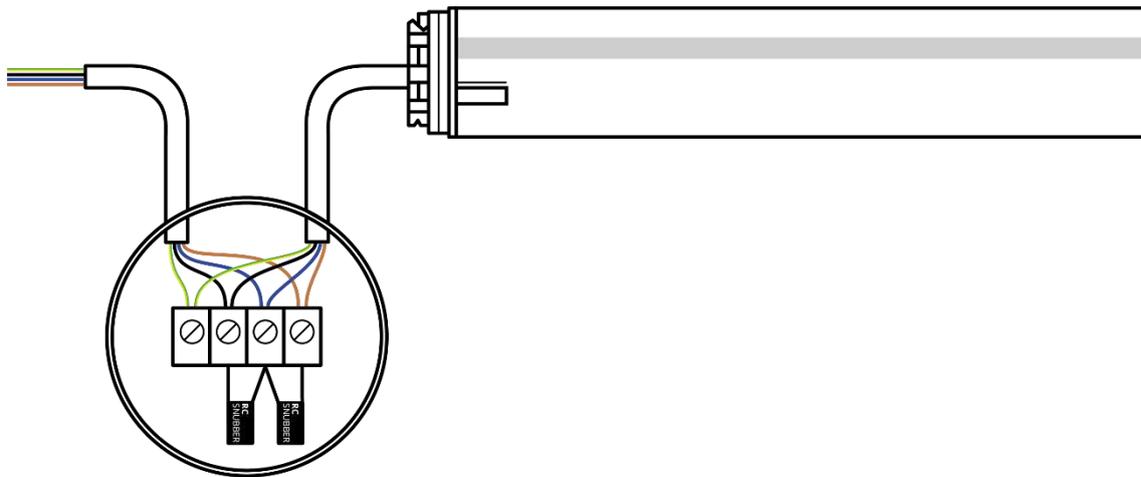
Roxburgh EMC XEB Series Mains Protector RS 672-7035 Farnell 1187659



Below is an example of the circuit which is given by Panasonic who makes the relays supplied in Lutron and some other motor controllers.



Drawing below shows how RC Snubbers could be implemented near the shade motor in a junction box.



Note wiring colours may differ from those shown and some motors may not have an earth connection

Snubbers should be fitted between:

Neutral and Motor up

Neutral and Motor down

*Ensure all wires and exposed legs of the RC Snubbers are insulated.*

*Ensure all relevant local wiring regulations are adhered to.*