



Radio Control Switch Modules - Notes on Suppression

Before pressing any of our Switching Modules into service, please carefully read through the installation drawings, notes and information supplied.

It may well be we are 'trying to tell Grandma how to Suck Eggs' but sometimes as we find, information such as this is priceless knowledge which has been gained over 40 years of Electronic Engineering Design and Construction experience and Servicing.

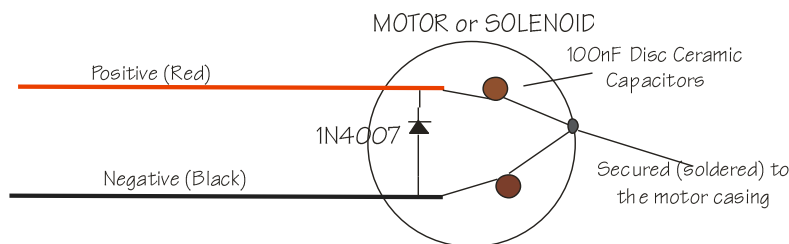
Other than Radio Frequency Interference (RFI) from other equipment or users on an adjacent channel (frequency) which could interfere with your transmission, electrical noise on your own equipment is the biggest cause of servo glitches or 'twitching' or any annoying problems in RC Systems.

Electrical Noise is generated on your power lines from motors, relays, solenoids and switches in your electrics which may create RFI unless you fit Suppression Components.

This best practice design approach has been made in an attempt to aid you in reducing harmful RFI in your project or application.

Simple but effective suppression techniques involve using inexpensive Diodes across the contacts of motors, solenoids and relays which when de-energised release a couple of hundred volts of 'Back Electro Magnetic Force' (EMF) when switched off. This sudden burst of energy cannot go anywhere and consequently it dissipates as electrical noise throughout your system electrics.

Putting a Diode across the terminals of a motor rectifies the back EMF energy to DC which is then lost back in the motor windings.

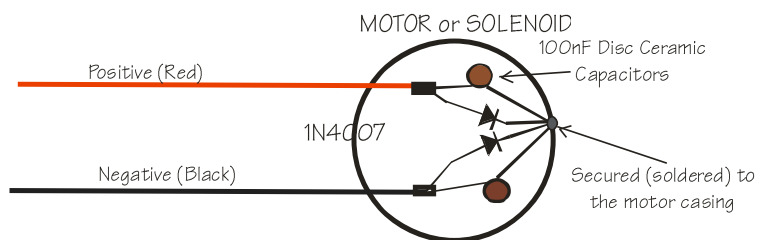


The 100nF (0.1 μ F) ceramic capacitors are there to reduce any electrical noise generated by the Brush Gear arcing on the ¹Commutator.

Please note

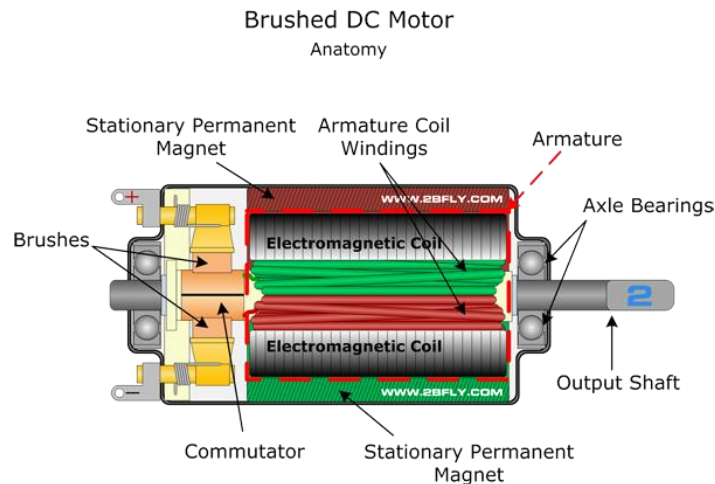
You will not be able to use a diode in the manner explained above if the polarity is reversed to make the motor run in both directions of rotation.

To apply EMF suppression in this instance would require you to use two diodes as explained below.



What is the Commutator ?

Q. "A device that maintains the direction of flow of electrical current in a generator or reverses it in an electric motor"



DC Brushed Motor Break-In

As the old saying goes with I.C. engines: 'Break it in, or will Breakdown!' While it's nothing quite that extreme with electric motors, a properly Broken-In Brushed DC Motor will give many hours of cooler, more efficient and more powerful operation.

Breaking-in a Brushed DC motor refers to "seating" the brushes properly on the commutator. The goal is to gently wear the brushes against the commutator in order to achieve a smooth fit, maximising the contact surface area. This makes for a more efficient transfer of energy, reduces arcing which results in less heat created on the commutator surface as well as less Radio Frequency Interference (RFI). A broken-in motor can produce 10-30% more power than one straight off the shelf and put into full service.

**** Note **** All procedures mentioned are assuming a bare motor, with nothing attached. Break-in procedures are most effective under no load! Also, Break-In the motor in the intended operational direction for most effectiveness.

Finally a few notes on wiring.

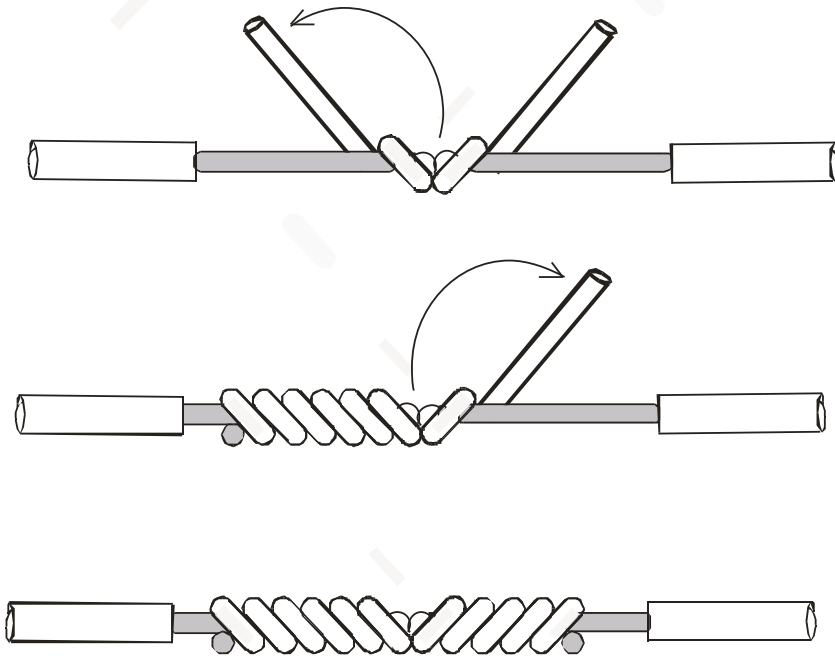
Always try to use conductors that are 'man enough' for the job. For example, if your circuit is going to draw 6 amperes of current you should be looking at cabling which will carry 10 Amperes, especially if the cable run is over 200mm.

If your conductor dimensions are too small for the load you will find that there will be energy loss in the conductor itself. Consequently what started off as 6volts will arrive at the load at only 5.1volts or less resulting in a disappointing performance.

Always try to use solder joint connections when terminating your wiring, as opposed to connectors. There is very little resistance over a solder joint compared to connector, and when you are working with low Direct Current (DC) voltages, 6v to 18v DC etc. always remember, the lower the voltage the higher the circuit current.

DC by its very nature is lazy and does not like to travel far from its source, any area of resistance in a wiring joint or connection will generate heat which in turn will use more current, generate more heat, to the point to where your precious creation could literally go up in smoke.





When making a solder joint in two conductors always try to use the twist wrap method.

When the conductors are wrapped, solder it up. If the joint is liable to be near moisture, i.e. in a model boat, apply a liberal coating of silicone grease before slipping over some heat-shrink insulation. Try to use a heat gun rather a cigarette lighter or a Gas Torch. A lighter or Gas Torch puts far too much heat into the joint which may anneal (soften) the copper conductors, restricting the current flow, and or damage the insulation.

Pay particular attention to the negative side of the circuit. If moisture enters your joints or connections the electron flow will oxidise the tinned copper stranded core and create a resistance to current flow – Which will in turn could generate heat, using precious battery resources.

Lastly, it is essential when dealing with low voltage, high current circuits to put a fuse in the positive line from the battery. An ideal inline fuse carrier can be purchased from our online store at www.mr-rcworld.co.uk

These Fuse Carriers take a standard Automotive Blade style Fuse. You can also purchase our Special Lucas Anti Surge fuses in 1A, 3A, 5A, 8A, 10A 15A, 25A, 30A and 40A rating.



Don't use the old 1/4" Glass Type Fuse Carriers, The Plastic Carrier MELTS !

Fuses, Carriers, Resistors, Diodes, and Suppression Capacitors kits can be purchased On-Line at www.mr-rcworld.co.uk.

Once again, thank you for purchasing one of our products – and taking the time to read this article.