



### Prudent safety measures with electrical devices on a classic car during a lay-up

Following reports that serious fire damage to a small collection of historic vehicles was believed to have been caused by a malfunction of a battery conditioner, prudent protective measures have been reviewed. One protective device is the use of an **RCD** (Residual Current Device), or as they are technically termed a **Residual Current Circuit Breaker** or RCCB. Nic Houslip feels any protection is better than none and the more the better. Here he provides information on how an RCD could be useful and how it works.

#### What are RCDs?

RCDs are relatively simple in concept, although the operation is complex and requires some careful design. What RCDs do is measure the current in the Live and Neutral wires, and if there is any unbalance in the current between Live and Neutral, such as an Earth fault, often with current going to Earth through a human body, the RCD trips out and cuts off the power supply. In the case of the RCD above the “trip leakage current” is low at only **30 milliamperes**.

#### How are electrical devices like conditioners built?

Most small electrical equipment is what is called **Double Insulated** and if you look on the name plate of an Accumate battery conditioner it should have the **international symbol of one square within another – the Double Square symbol**. This means that the device has an **outer case of non-conductive plastic** and an internal construction that will ensure that any internal failure does not cause dangerous voltage to appear on any part the device that could come in contact with a person.



In the case of a battery charger or a more sophisticated conditioner, if an internal failure caused a mains voltage to appear on the 12V output, the car would be effectively “Live” and therefore dangerous to anyone standing beside it! A special case might be

an electric lawn mower or hedge trimmer, as it is built as a “Double Insulated” device, but what happens if you accidentally cut the power lead on the mower? That is why an RCD protected Outlet (a 13amp socket) is a **must-have protection** for garden equipment.

If the device has a metal case it will have an Earth wire that is connected to that metal case and all the metal parts inside it. If there is a fault and contact is made from Live to the metal case, perhaps by a wire coming loose, the “Fault Current” will flow via case and out along the Earth wire (Green/Yellow), then the unbalanced current will trip the RCD. The RCD overcomes the potential danger that would occur if the fault current is insufficient to blow the fuse installed in the plug in the 13amp socket, preventing the part becoming live. Fuses are in fact deliberately slow acting, because many devices (particularly a fan motor or incandescent lamps) have what is called **Inrush Current** for a very short time (perhaps 100 milliseconds) that may be higher than the fuse rating.

#### What type of battery conditioner failure could occur leading to a fire in and around a battery conditioner?

I cannot think of any likely failures in a battery conditioner that could cause a fire, but we should be aware that the wiring on an MGB and derivatives like the MGBGTV8 is known to be borderline and a 12V car battery is more than capable of starting a fire if a short were to occur. The thought occurs to me that if the battery conditioner was connected by crocodile clips to the Fuse Carrier, it could slip down and short the battery. Unlikely, but then even if all imaginable things are foreseen, there is a possibility that an unforeseen one will occur. I have just looked at the cable on my Accumate battery conditioner which I use on my RV8 and also the small conditioner on my Ride-On lawn mower, and see the Accumate has only a 2 core cable to the plug and the Mower one has a plastic Earth pin, so no Earth connection can be made on either conditioner. Both are therefore Double Insulated and the Accumate bears the **Double Square** symbol confirming that.

#### Is using a 3amp fuse worthwhile?

On fusing the matter is complicated but generally speaking the fuse should be rated as low as possible consistent with it working properly and not blowing frequently, although you have a limited choice of 3A, 5A and 13A fuses when a device is connected to a domestic electricity supply. Fitting 3A fuses is good practice if what is connected is a small power consumer. As a rule of thumb, a 3A fuse will protect any device that consumes under about 500 Watts, except certain high wattage lamps or motor driven appliances when the **Inrush Current** when the device is first turned on, may cause it to blow. A 13A fuse will be sufficient to enable a 3KWatt appliance to be used.

In the case of the Accumate battery conditioner it is only a small device so a 3 Amp fuse is adequate, but depending on what kind of fan you use (to help move damp air and moisture from the underside of the car in lay-up), there is a Caveat with a desk top fan.

The **desk top fan** has a switch that controls the speed, and you will probably have noticed that it always has a **High setting** next to the **Off position**. This is to ensure that the motor will actually start, because if the **Low setting** were next to Off, the motor might not get enough current to start turning (at which point the current drawn falls quickly) and overheats. Where you do use a floor mounted table fan connected to a timer in the circuit (so you get say two 20 minute blows under the car a day), **make sure you use the High setting**. If you feed both a battery conditioner and a table fan from a single 13amp socket with an extension lead, a 3A fuse in the extension lead’s plug will probably suffice for both devices.

See [RAC guide](#) to battery conditioners and trickle chargers.