

# Adding a Battery Disconnect Switch

## Why add a Disconnect Switch?

The MGB is rather vulnerable to electrical fires largely because so many circuits run on unfused wires (those with base colors brown, white or blue). There are several such wires under the dash, an area that is a nightmare under which to work, and where accidental fires and burns are all too easy to provoke (see Safety XXX). In addition, if installed in a hidden position, it may fool the opportunist thief who tries to start the vehicle.

## Radio Memory Problems

Although a battery disconnect (sometimes called a master cut-off) switch certainly has its safety advantages, there is a major convenience disadvantage, and that has to do with any clock or some electrical entertainment systems that might be fitted to the vehicle. All but the latest radios and CD players have volatile memory, that is, they lose their station or track-played memory when power is removed. These devices usually have two power wires, one directly connected to the battery on a purple (always hot but fused) wire to preserve memory, and the other green/white or green/pink (ignition/accessory) wire providing amplifier power when the ignition switch is in the 'run' or 'accessory' position. Of course, a battery disconnect switch removes power from the purple wire, possibly causing equipment amnesia.

There is a way around the memory problem, putting a fuse across the switch terminals allows a limited amount of current to continue to be fed to the clock or radio even when the switch is 'Off', yet the vehicle remains protected because, in the event of any attempt to start the car or should a short circuit occur, the fuse will blow. Unfortunately, the MG battery compartment is so inaccessible and, accidental attempts to start the car, or otherwise use several amps, is so easy, the result is a need to constantly change fuses. The solution recommended below in Adding a Radio Memory and Clock Maintainer is to use a PolySwitch<sup>®</sup>; a device that



Figure 9.12

acts like a self repairing fuse.

Some equipment uses "super caps", capacitive devices that store energy for a perhaps 10 minutes so as not to erase memory, but the very latest entertainment equipment uses a "Electrically Erasable" (better known as E<sup>2</sup> or Flash) memory that does not require constant power and so does not "forget" in the event of a power disconnect.

## Switch Selection

The most common MGB parts and accessory catalogs list battery disconnect switches but prices are often formidable. Shop around and some smaller accessory outlets can supply suitable switches as can boat chandlers. Most switch styles are available with the option of a key that may add a level of security and just a little inconvenience.

The switch illustrated in Figure 9.11 is made by the Massachusetts company Pollak but all other switches should be found to have just two connections like that shown here and so the installation method is essentially the same. Note that the switch has two threaded terminals on the back (secured by  $\frac{9}{16}$ " A/F nuts) for connecting the battery wires (either terminal can be considered the 'in' or the 'out'). The switch is placed through a hole in the body metal and retained with a single nut (1" A/F) over a serrated washer. A backing nut allows adjustment of the switch depth. The lever on the front, retained with a single screw, needs to be removed before the switch can be passed through the panel hole.

## Ground Switching

The instructions that come with the switch show how to install it in the hot (+ve on negative ground vehicles) side of the battery circuit. However, the safest method is to put the switch in the vehicles ground circuit. That way, the back of the switch is not 'hot' and so is not vulnerable to short circuit to ground should anything drop on it. It is also easier to install, the ground from the battery being terminated to



Figure 9.11

the vehicle chassis by an eyelet, which can be joined instead to one of the bolt terminals on the switch.

The exact installation will vary depending on the vehicle configuration. Positive or negative ground, 6 or 12 Volt system.

## Schematic

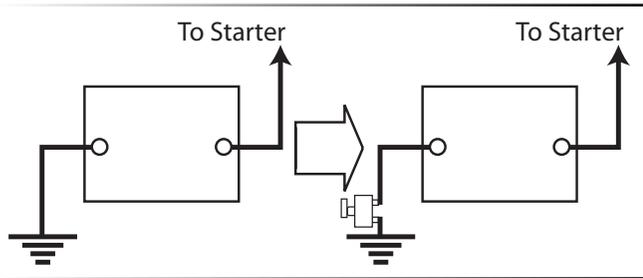


Figure 9.13

The principle is the same whatever the vehicle arrangement; the battery to ground terminal has to be broken by the switch as shown in Figure 9.13

## Ground Strap

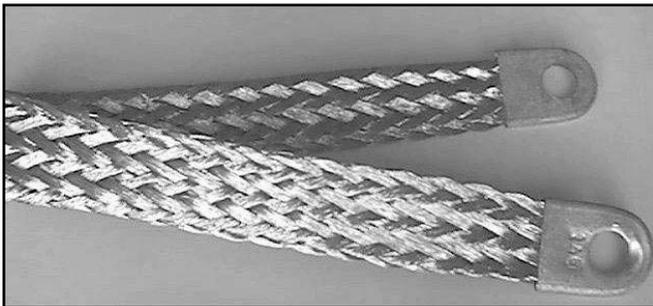


Figure 9.14

As was stated above, the battery ground cable has an eyelet that can be removed from the chassis and instead joined to the switch. For the switch-to-ground termination a battery strap, like the 14" example shown in Figure 9.14 obtained from an auto accessory store, fits the bill very well. It offers (i) very good electrical continuity, (ii) ease of installation due to the 2 eyelets, one for the switch the other for the ground bolt, and (iii) a very flat profile that allows it to route around the edges of the battery box without interfering with the insertion and extraction of the battery itself.

If a braided strap is unavailable, then a regular cable with eyelets at both ends will work just as well, so long as it is not so thick as to restrict the installation of the battery. 4 AWG (25 mm<sup>2</sup>) cables, sold as "Switch to Starter" cables are readily available, but don't buy one over 18" (450 mm) long, the un-required extra length is hard to manage and the added resistance of a long cable could be detrimental to starter performance.

## Installing the Switch

First remove the battery. Always remove the ground connection first, that way, when you remove the hot connection, there will be no fireworks if your wrench inadvertently touches chassis metal.

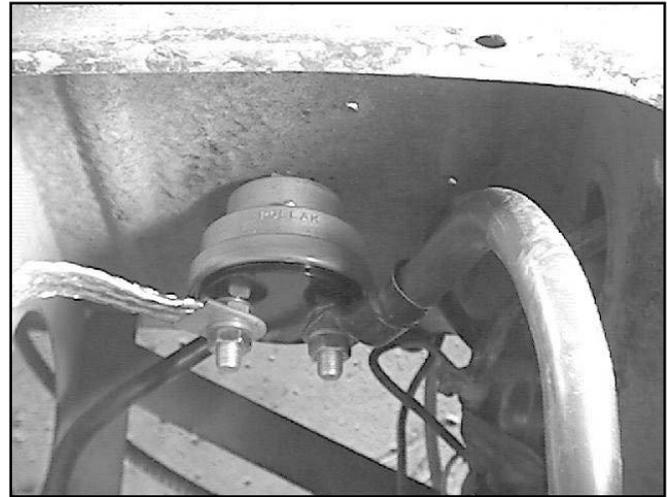


Figure 9.15

The Switch is shown in Figure 9.15 installed in a vehicle converted to have a single 12 V battery in the right hand battery bay. However, the principle remains very similar whatever the battery configuration. The switch has been installed about half way up the vertical panel. This position was chosen because it allows the lever to "peek" out between the battery shelf carpet and that folding up from the floor, making it very accessible. A higher positioned switch would be hidden from potential thieves and would actually allow a slightly easier installation because cables would be closer to the battery terminals. When selecting the horizontal position of the switch, verify that the particular ground strap you are to use will reach from the switch to the current chassis fixing of the grounded battery cable.

The hole needed to penetrate the sheet metal is rather larger than the drill sizes available in most toolboxes so drill as larger hole as possible and file out the hole if necessary.

Pass the switch shaft through the hole from the back, install the face plate, serrated washer and the fixing nut. Hold the back of the switch while tightening the front nut using a 1" A/F wrench or socket. Position the switch lever in place and fix it with the single screw.

## Attaching the Cables

Attach the ground strap to the switch, (shown in Figure 9.13 installed on the left), to the most convenient position that allows it to go directly to the bolt currently attaching the battery ground cable to chassis. Then remove the battery grounding cable and secure the other end of the braided ground strap in its place. If the length of the ground strap or some other logistical reason makes it preferable, you may choose to drill a new hole for the chassis ground. Remember

that every hole that exposes bare metal is a potential corrosion point and always be aware of what is behind the panel into which you are drilling; thus avoiding the fuel tank, fuel pump, fuel and hydraulic pipes and electrical wires.

Bolt the now free end of the battery ground cable to the remaining switch contact. The shake proof washers should go over the strap and cable terminals and under the fixing nuts. Tighten the nuts with a  $\frac{9}{16}$ " A/F wrench, if possible using a second wrench to hold the backing nut; thus putting less strain on the switch itself.

Cover the switch terminals, grounding point and the area surrounding any vacated grounding hole with Vaseline® to prevent corrosion.

Reinstall the battery and attach its cables, taking great care to insert it the right way and with correct cable polarity.

### **Cut-Off Switch Diagnostics**

Should the car not start, the switch is probably in the Off position. If you are unhappy with the orientation of the switch pointer in the On and Off positions, you can remove the switch lever and reinstall it 180° from the original position.

### **Adding a Radio Memory and Clock Maintainer**

In order to provide for equipment that needs a constant voltage supply, some kind of device is required that will bridge the disconnect switch and bleed sufficient current

to keep the radio or clock working and not blow when any door-switched courtesy lamp operates, yet that will open if a dangerously high current flows.

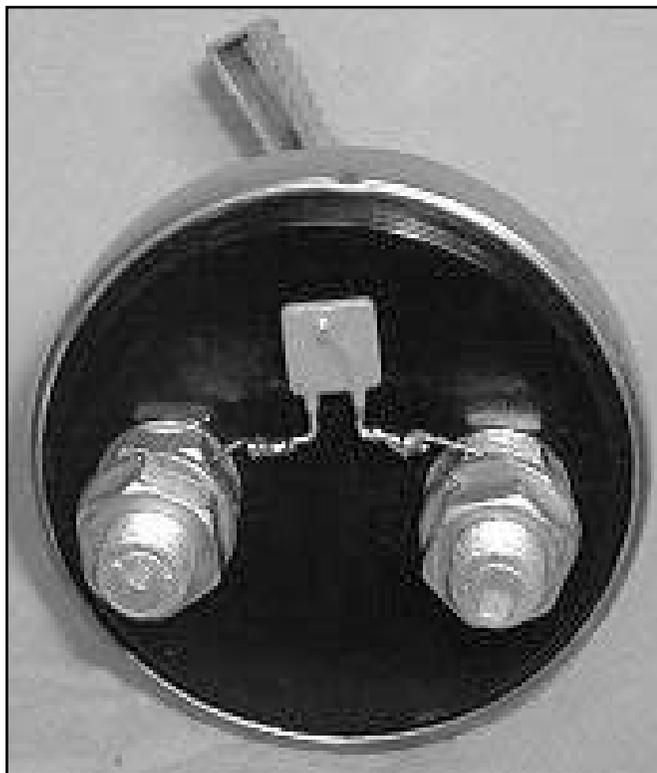
The PolySwitch® PTC device RGEF500 (Figure 9.16) will pass about 5 A but at any current much above that will open and protect even the thinnest wires in the vehicle. A 5 amp fuse would work similarly but the PolySwitch® device, unlike the fuse, will automatically reset and pass current again after the cut-off switch is switched on for a few seconds, thus removing the voltage from the PTC.

The RGEF500 has simply to be attached across the switch terminals as shown. Unfortunately, the standard device is designed for use in printed circuit boards and hence has quite short leads, so some additional wire length has to be attached and made into loops that will pass over the switch terminal screws

You can locate a source for this device by visiting the Where to Buy section of the manufacturer's web site at: [www.circuitprotection.com](http://www.circuitprotection.com).

### **Battery System Fault Finding**

Refer to Battery Maintenance page XXX to check the level of the electrolyte, the battery charge state and the condition of the electrical connections. Other faults are covered in the under Charging System chapter XXX and Starter System chapter XXX.



**Figure 9.16**