

Refusing to Beat the Heat

by Rick Astley

Take a look at the driver's manual for your modern car and you'll see that it probably has some 40 odd fuses. Certainly it's a sophisticated vehicle compared to your British sports car, but it's nevertheless surprising that the older car was designed with perhaps only 2 or 4 fuses. That has always concerned me, especially because some circuits that are always live, and can't be switched off, are not fused at all on my MGBs. These include the headlights, starter solenoid and ignition-switch circuits and are characterized by having brown wires. On my 1970 Bs, these wires terminate at the power stud on the starter solenoid and come upward from there, entering the under-bonnet area at the right-side bulkhead.

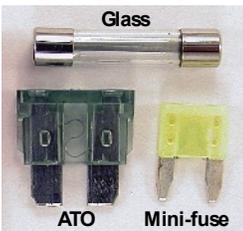
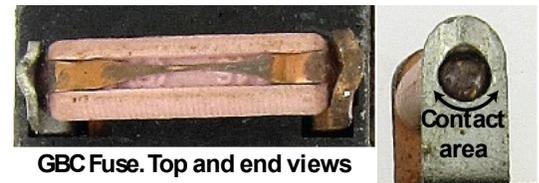
When reassembling my MGB-V8, I decided to do something about this issue; adding a fuse block in the route of these vulnerable wires by opening up and cutting the wiring harness as it emerged from the rear of the engine. Unfortunately, every time you add a component to any system, be it a car or a blender, statically speaking, the reliability goes down. This is the subject of complex failure analysis studies which are a standard part of modern design and manufacture, but in short, the more stuff you add, the more stuff there is to go wrong.

Last summer, club member Marc Weitzman borrowed the car to take to a V8 meet in North Carolina. He picked it up on a hot day and drove back along an even hotter I-696 to his home. Later, when he went to gas the car up for the next day's journey, the car wouldn't start and I got the call to come out and fix it. The problem turned out to be a failure of one of the new fuses — the one that supplies the starter solenoid — and although it took only a moment to diagnose and repair, it wasn't an obvious fault, because the offending glass fuse still looked intact. It hadn't blown, as such, but the current flowing through would have heated it, as did the combined high ambient temperature of that day and that of the under-bonnet area of the V8, especially in the locality of the new fuse block, which in this car is very close to the exhaust manifold. That heat had fatigued the fuse to the point of melting the connection between its end cap and filament. Marc had an uneventful journey but when I got the car back, I attached a thermocouple to a fuse and measured its temperature, which rose to about 50°F above that of the outside air, so on a 90°F day, it could get to about 140°F. In the hope of reducing the temperature and eliminating the problem, I added a reflective heat shield below the fuse block.



It had occurred to me that my heat reflector might work instead as a heat collector, and so make things worse, and that may have been the case because, when I went to leave the Brass Pointe after the June meeting, a different fuse, this one for the lighting, failed in an identical manner. It was dusk and I only live 5 minutes from the restaurant, so rather than fix it there, we made a dash for home before it became any darker.

Nuisance fuse failure wasn't new to me and these incidences reminded me of trouble I had in England in the 1970s with my Ford Cortina. Ford of Dagenham was being forced to standardize more with Ford of Cologne, and one result was that it had to adopt the German GBC fuse. This was a horrible device because it had an open filament and so, should the fuse fail as a result of a real short circuit, when being replaced, it would often immediately blow again, but this time the molten metal filament would be exploding into the thumb of the person inserting it. The other problem was that the torpedo shaped fuse would usually only make contact with its clips over a very small surface area, causing an electrical current bottleneck and hot spot, that caused the fuse to fail, even though there was no fault with the car. If "That's the Power of German Engineering" or "Vorsprung durch Technik," well, you can keep it.



Actually, that last German phrase, used by Audi, means something like, "Progress through technology" and I've chosen to progress through my fuse problems by using the same American technology now used by Audi and indeed all European and Asian car makers, and which was designed for GM by Littelfuse of Chicago in 1976: the ATO fuse. This fuse makes much better electrical and thermal contact with its fuse block and distributes internal heat far more evenly than its predecessors. Its newer cousin, the Mini-fuse is now more common on US vehicles. The fuse block I bought for the ATO fuses is quite tall

and required I add wire pigtailed to terminate it. This allowed me to also move the fuses further from the exhaust and somewhat higher into whatever airstream there is. I've yet to prove that this is the solution. If not, I'll be adding a small blower fed with air ducted from the front of the car, rather like MG used to cool the carburetors on the MGC; but again, that would be adding yet more 'stuff' that could go wrong.

