

## COVVC Article

### Protecting Your Electrical System

VW did a great job with engineering its product line, but there are a few areas that can be improved upon. One of these areas is protection of the base electrical system. Most automotive manufacturers use fuses or fusible links on the main power supply from the battery, but VW opted not to include this. In 99% of the vehicles on the road this is not a problem, however, if you have an electrical short in the power feed circuit you will have major electrical damage to the vehicle and perhaps a fire. As many of our cars are 20+ years old and wiring in some cases may be suspect, circuit protection becomes even more important. There is an easy way to upgrade these circuits to prevent major electrical damage, and that is by installing circuit protection on two circuits- the power feed to the dashboard and the ignition switch output. I'll explain how I installed these fuses when replacing the wiring harness in my '69 Ghia.

On most VW's, the main power feed wire is a 10 gauge red wire that is tapped off of the voltage regulator and feeds the headlight switch via the main harness loom. The headlight switch acts only as a distribution point, feeding the ignition switch and fusebox directly. The best place to install a fuse is in the power feed wire, as close to the power source (battery) as possible. Being that my Ghia had already had the battery relocated under the rear seat, I chose to install my main fuse at this location. There are several types of fuses that can be used to protect this circuit with the most common being an ATO blade style fuse. There are also Mini-, Maxi-, and Megafuses that can be purchased in the correct amperage. To find the correct amperage, I used an oscilloscope and a low current clamp to measure the draw on my main feed wire. With the key on, the current was approximately 8 amps and with the starter engaged maxed out momentarily at approximately 28 amps, so I chose a 40 amp fuse to protect the circuit. I like to go oversize on components, so I chose to use the larger style MaxiFuse and fuseholder both for its physical strength and larger terminals which will not overload at this current level. I mounted it near the battery and it feeds the 10 gauge wire to

my voltage regulator mounted several feet away in the engine compartment. This now protects my main feed as it travels to the voltage regulator, through the main harness loom, and to the dashboard. These directions should apply fairly universally to most Type 1 vehicles, either 6 volt or 12 volt, but on buses this power feed comes directly from the starter so the large fuse will need to be installed there.

The key-on circuit which feeds the ignition coil, idle solenoid, and choke is also unfused. This has been the source of many ignition switch failures from a wire falling off in the engine compartment overloading the ignition switch to the point the contacts fail. You could argue that installing the 40a feed fuse now protects this circuit, but 40 amps is far past the design load of the ignition switch and the 16 gauge wire that feeds the coil. To protect this circuit, I installed a regular ATO fuseholder behind the dash with a 15 amp fuse protecting the ignition coil feed. Being paranoid about wiring, I also put shrink tube on all of the live wires near the headlight switch and fusebox.

During some recent maintenance on Mike Roecker's '66 Beetle, I did some amperage tests to verify the fuse sizes I mentioned above would also be correct for a 6v system. This testing showed both the 40 amp and 15 amp fuses should be fine in a 6 volt car also. In Mike's car the spot that looked good for mounting the fuse would be on the firewall just behind the engine. There's a large red 10 gauge wire coming from the starter that feeds power to the entire car via a double connection on the voltage regulator. Mounting a MaxiFuse holder just behind the engine and running this main feed wire through it would protect almost the entire car from an electrical short. I hope this information helps protect your favorite VW, as I'm sure you all know about the "smoke" that you shouldn't get out of wiring.....

Have fun, good luck, and keep driving those classic VW's!

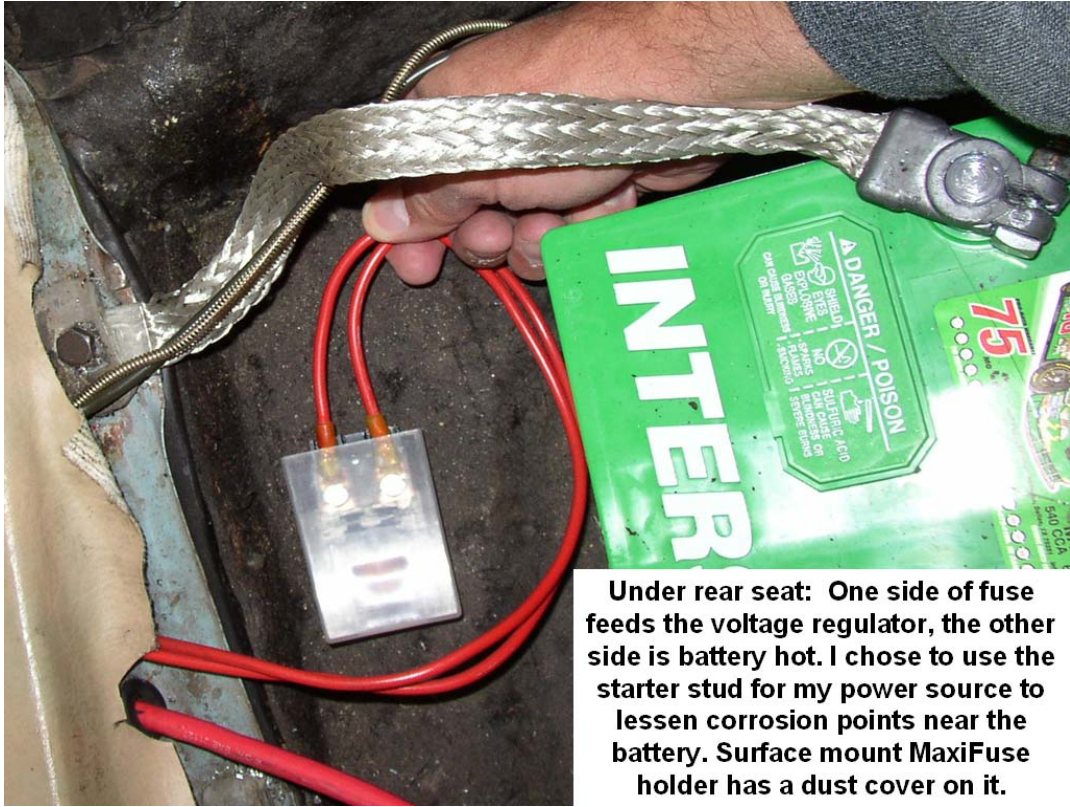
**40 Amp ATO Inline Fuseholder**



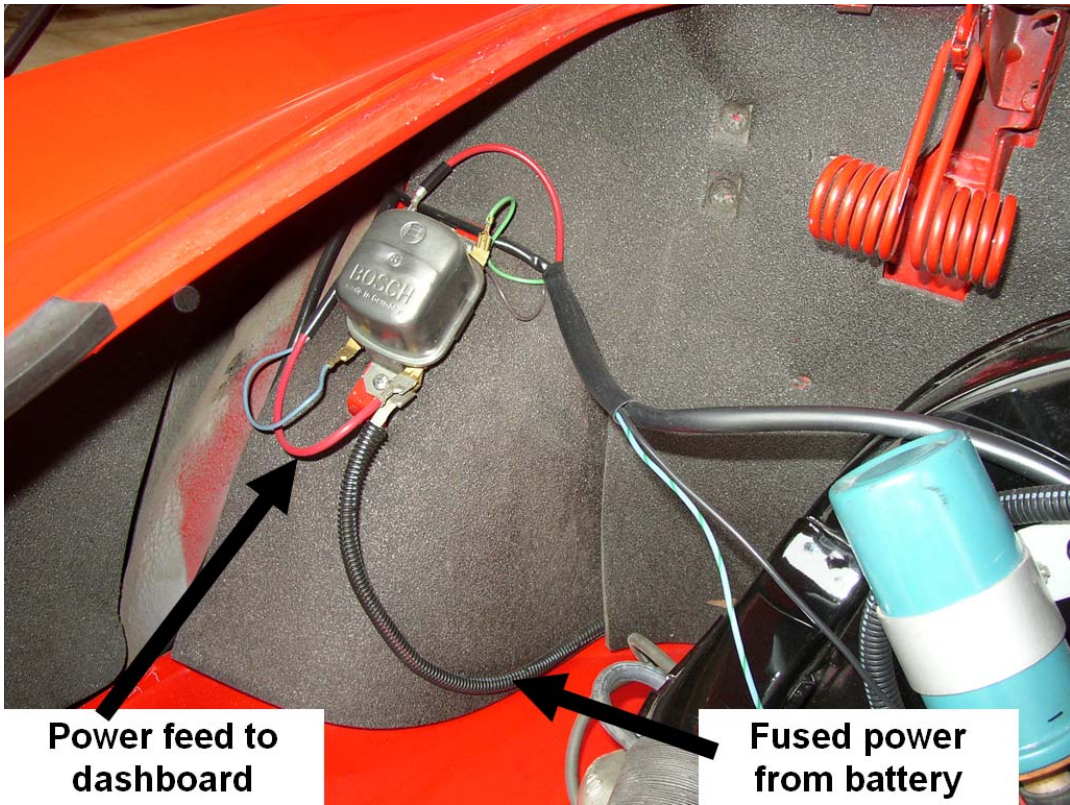
**40 Amp  
Surface Mount  
MaxiFuse**



**40 Amp MaxiFuse Inline Fuseholder**

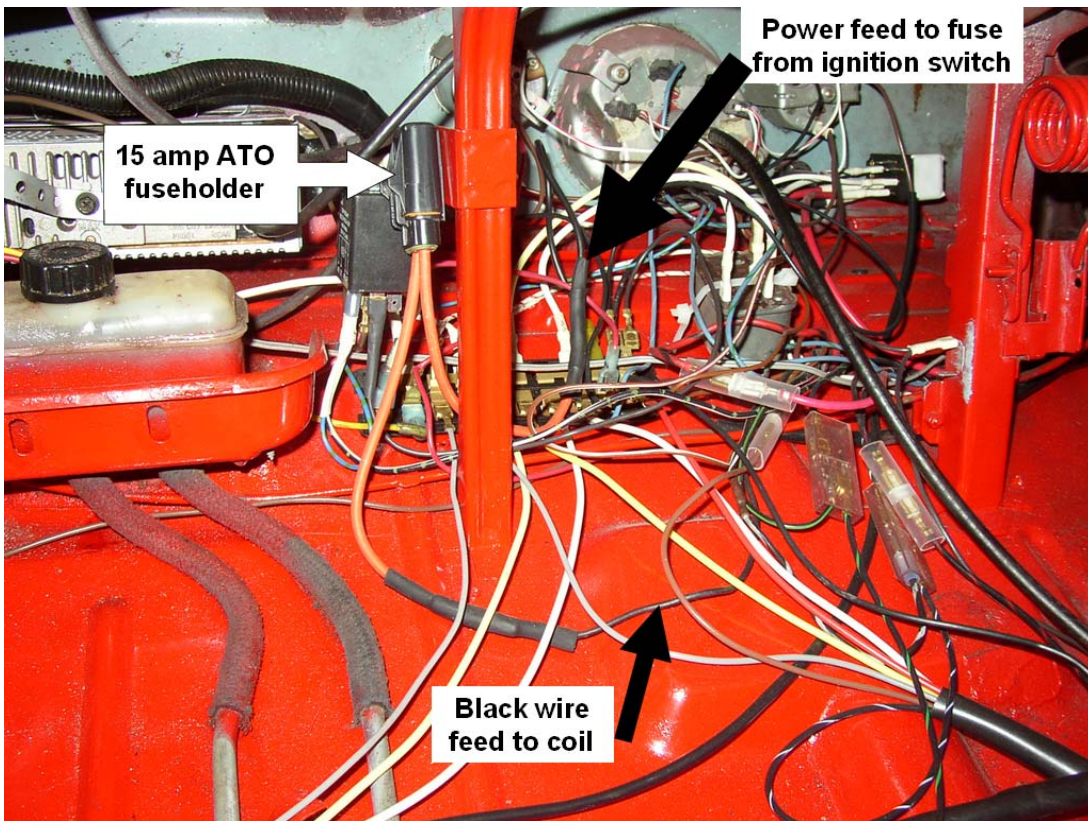


**Under rear seat: One side of fuse feeds the voltage regulator, the other side is battery hot. I chose to use the starter stud for my power source to lessen corrosion points near the battery. Surface mount MaxiFuse holder has a dust cover on it.**



**Power feed to dashboard**

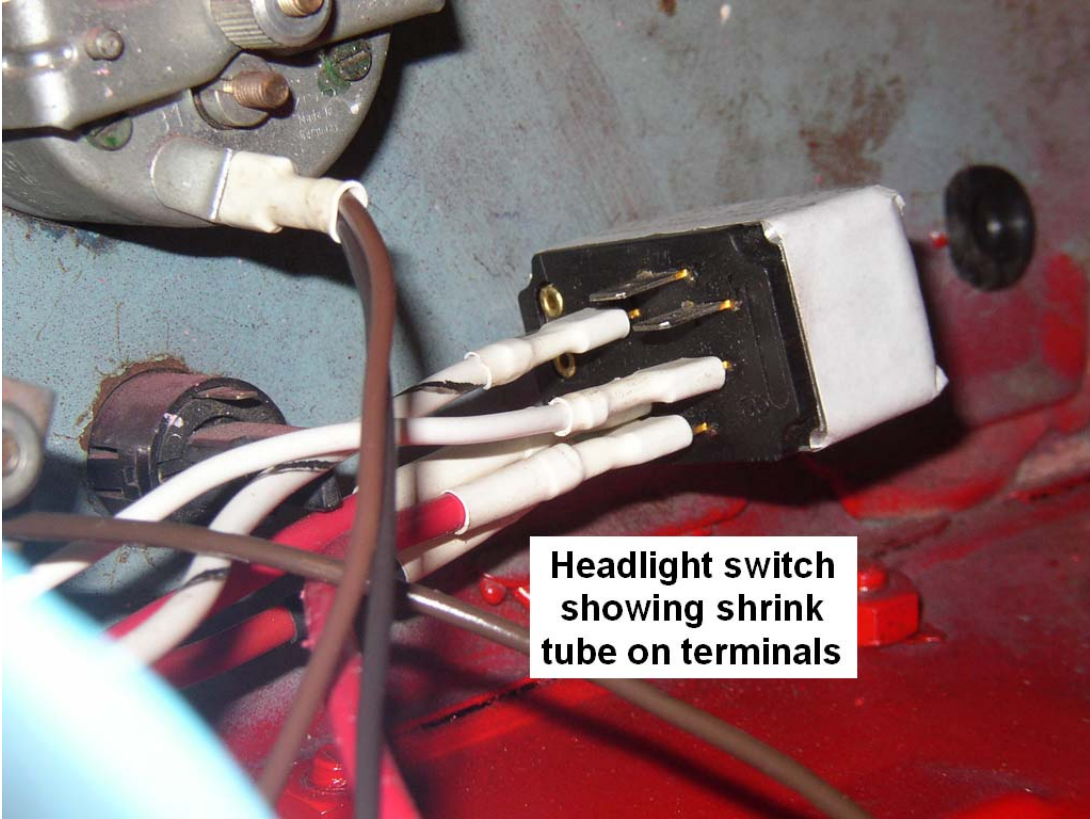
**Fused power from battery**



15 amp ATO  
fuseholder

Power feed to fuse  
from ignition switch

Black wire  
feed to coil



**Headlight switch  
showing shrink  
tube on terminals**