

Relay Race

by Brian Shorey
AONE Director

[On Saturday, April 15, a nice showing of around twenty Alfisti gathered on a very nice day at Brian Shorey's extremely nice garage for the first AONE Tech Session of the season. Brian gave an excellent presentation on the importance of the use of relays to protect the headlight and ignition switches in our older Alfas, with a discussion covering the practical details of how to select and install such relays ourselves.

The day also included a swap meet, with a surprising number of items changing hands. And, of course, there was the usual Alfa banter and camaraderie that makes all of our events such fun!

What follows is an article written by Brian for the benefit of those of you who couldn't attend. But there's nothing like being there in person – next time, join us! – Ed.]



In all of the Alfas I have owned, there are a couple of major weaknesses in the electrical system, namely the headlight switch and the ignition switch. These components operate at or near the limits of their intended loading, and tend to last around 40K – 60K miles, in my experience. With components for older cars becoming harder to source (are GTV6 headlight switches even available anymore?), it is desirable to find a means to extend their life.

The answer is quite simple – relays! In fact, the factory eventually came around and added relays to the later cars; the Milano was subject to a recall for the addition of relays.

What is a relay? Simple – it's a powered switch. There are two basic parts to the relay: the coil and the switch. Operation is straightforward – apply power to the coil and the switch is thrown. The thing to remember is that the coil is designed to draw very little

in the way of current, and the switch is designed to carry a lot of current.

So, how do they help us in our Alfas? Well, we conducted (no pun intended) a little experiment in which we took a headlight, a power supply, and a current meter, and measured the current required to light up the headlight – it was 7.5

amps, which may not seem like much until you consider that the fuse for the single headlamp circuit is 8 amps, and that there are two headlights that need to be powered. So, with a stock headlight you're already operating at more than 90% of the capacity of the system (which you should take into account before even thinking about higher wattage headlights), and the total current through the headlight switch is 15 amps.

Next, we measured the current required to power the relay: 0.25 amps. Not much to say here, except that since the single relay will provide switching for two headlights, we're

talking about a total draw on the switch of 0.25 amps, as opposed to 15 amps to power the headlights directly. If you do the math, when we use the relay we're presenting the switch with 1/60 of the load we asked it to carry when we powered the headlights directly.

OK, so we can see the benefits of relays, but how do we wire them into the system?

Figure 1 shows the basic wiring of a stock headlight system. I've left the ignition switch and starter in as well; we'll get to those later. Note the direct wiring from the headlight and ignition switches to their components.

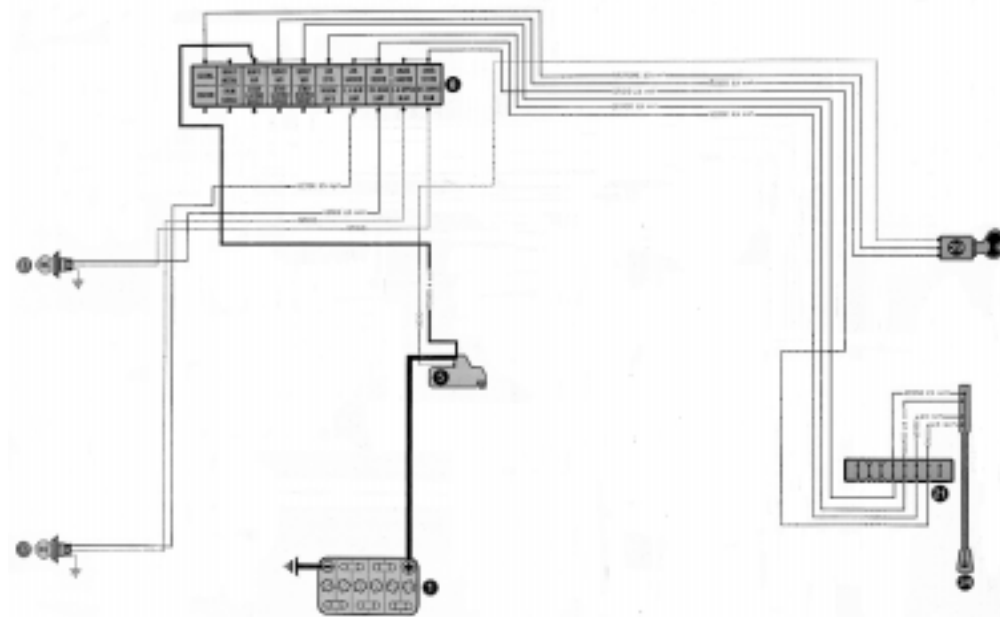


Figure 1 – original GT wiring diagram showing headlight and starter circuits

There are a couple of basic methods for wiring relays into the headlight circuit. First, you can install the relays close to the fuse box and use as much of the stock wiring as possible. To do this you must provide unswitched power to the headlight fuses and insert the relay downstream of them (you put the switch part of the relay in-line between the fuses and the headlights). Then you wire the headlight switch to the coil of the relay. The advantages of this method are that it uses all the stock wiring under the hood, and retains the use of the stock fuses for the headlights. The disadvantages are that it is more complex to wire, and requires mucking around near the fuse box.

The second method involves taking power from something other than the fuse box to supply the switched part of



Brian avoids serious injury while powering up a headlamp through a relay

the relay, and using the existing wiring from the headlight switch (through the stock fuses) to power the coil of the relay. If you're thinking about using higher wattage headlights, you should consider this method, as it is relatively simple to replace the wiring from the relay to the headlights with something of a larger gauge. The advantages of this method are that it is simpler to wire, and facilitates heavier gauge wiring to the headlights. The disadvantage is that the wiring under the hood is non-stock.

Starter relays operate the same way the headlight relays do. You wire them in between the ignition switch and the starter solenoid.

Figure 2 shows the same basic wiring diagram with relays. I've drawn Relay 1 (R1) using method 1 for the high beams, and Relay 2 (R2) using method 2 for the low beams, to give

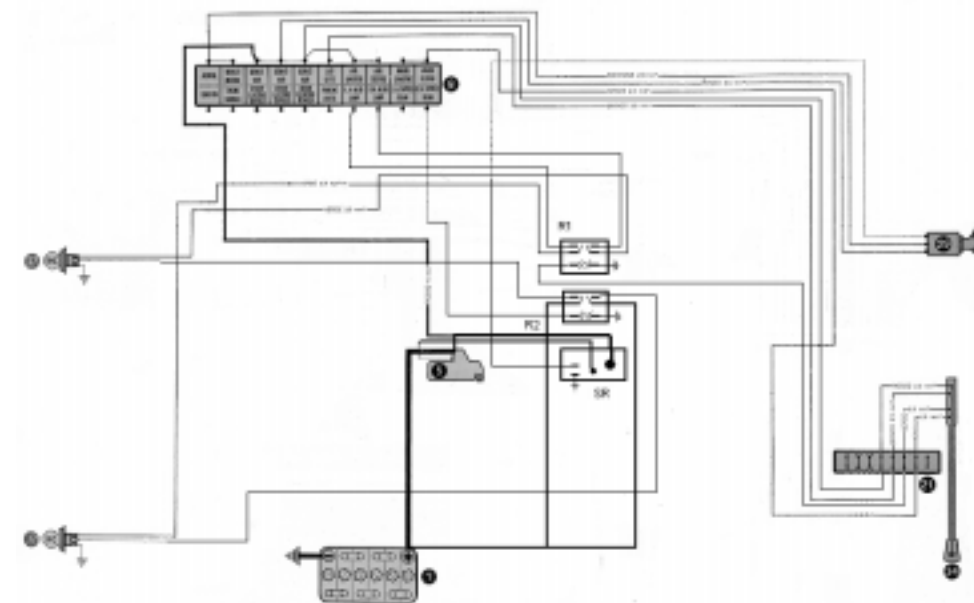


Figure 2 – GT wiring diagram with headlight and starter relays added



Brian's garage, which predates his house, holds several Alfas, and includes a complete shop — even a lift!



Alfisti gather around Kevin Murphy's Spider investigating ways and places to mount the relays

you an idea how both methods work. SR is the starter relay.

Where can you find these relays? I've found off-the-shelf components at Radio Shack; the relay is part number 275-218C (15 amp DPDT plug-in relay), and there is a socket you can get for it which is part number 275-220A (10 amp relay socket). There are also some Milano relays that will work fine, and some GTVs appear to have used a relay for the fog lamps.

For the starter relay, I like the generic starter relay found on early Chrysler products; I found one at NAPA made by Filko, simply called 'SR3'.

An additional note: I have found that, in systems where the headlight or ignition switch is on its way out, sometimes the installation of a relay will prolong the life of the switch, sometimes indefinitely. I can't guarantee that relays will fix any problems you have with marginal switches, but they can't hurt and even if you end up having to replace the switch you'll be left with a system that should last a good long time. With these switches being expensive and getting harder to find, that ain't bad! ☺

[For details on your car's wiring, refer to the electrical diagram in your shop or owner's manual. For close-up views of the diagrams on these pages, visit the online version of this article at www.velocissima.com. – Ed.]