

ADDING FOG AND/OR DRIVING LIGHTS

OPERATIONAL SCHEME

Here's my preferred method for wiring fog and driving lights: Use one relay for the fog lights, and another for the driving lights, both fed from the same fused lead from the battery. Then, use a three position switch (readily available at most any auto parts store for around \$5), wired as follows - with the switch in the up position, the fog lights will be on if and only if the parking lights are on. With the switch in the center position, neither the fog nor the driving lights will be on. With the switch in the down position, the driving lights will be on if and only if the high beams are on.

Reasons for this?

1. You won't have to remember to turn off another switch when you turn off the main lights, as the fog or driving lights will automatically go off.
2. No worry about blinding an oncoming driver, as the driving lights will go off when you dim the main lights.
3. If you really need the driving lights, you also need the high beams.
4. In a very heavy fog, even the low beams may be blinding to you, reflecting off the fog, so you want to be able to have only the parking and the fog lights on.
5. You will never need both the fog and the driving lights on at the same time.
6. One switch will do the function of two, which may make it easier to find a place to mount it.
7. One fused lead will do, as both lights will never be on at the same time.

When you mount your lights, remember the differences in the light pattern from the two types. A fog light has a very sharp cut off, limiting the light to a narrow band just above the pavement. This allows the light to go under the fog, eliminating glare from the light bouncing off the fog. For this reason, the fog lights should be mounted as low as possible.

Driving lights, on the other hand, are intended to have a long, penetrating beam, designed to light up the road as far ahead as possible. For this reason, they should be mounted as high as possible.

At the end of this chapter are schematics for the fog and driving light circuit described above, along with wiring/connection diagrams as well. The wiring/connection diagrams give the physical details for

wiring. Actually, there are six sets of diagrams; one each switching the ground leads to the relays, and one each switching power to the relays, for three different configurations - using both driving and fog lights, using driving lights only, or using fog lights only. Functionally, the power switching and the ground switching circuits are the same for each installation, but one or the other will be easier to install, depending on where you mount the relays.

In general, you should choose the one that limits the length of the "powered" wires to the relay coil. That is, if you have the choice of long powered leads and short ground leads, or short powered leads and long ground leads, choose the location that gives the latter. A short on a ground wire will do no harm, whereas a short on one of the power leads can burn a wire or blow a fuse. It is always good practice to limit the exposure of wires that have power on them.

A double pole, double throw (DPDT) switch is shown for both schemes when using driving and fog lights, although you could get by with a single pole, double throw (SPDT) switch for the grounding circuit. The reason I show it this way is because a DPDT switch is the most likely type of switch you will find in the auto parts stores. If you can find a SPDT switch, and prefer to use it, no problem at all - just ignore one half of the switch in the diagrams.

INSTRUCTIONS AND PROCEDURES

The relays can be mounted any where that is convenient. The only criteria that is of any concern (other than protection from physical damage) is the TOTAL length of wire from the power source to the relays and then from the relay to the lights. This length should be kept short, but as long as you use the proper size wire, it is not really important (assuming you don't intend to mount the relay in the trunk!). The wire from the power source should be connected directly to the battery (solenoid connection) if your car has a voltmeter. If you have an earlier model with an ammeter, connect it to a brown/white wire on the alternator side of the ammeter if you wish to have the ammeter read correctly. See chapter 14, Gauges, for details on this.

The fuse in the lead to the power source **MUST** be placed as close to the connection to the power source as possible. If you do this, the remainder of the wire will be protected, and routing becomes less critical. Rather than connecting

to an existing brown wire, I recommend using a new brown wire, and connecting it as close to the power source as you can. If you do connect to an existing brown wire, make sure it is large enough to handle the existing load as well as the added loads of the lights. HINT: If you detest un-necessary splices as much as I do, you might try this trick. I buy heavy-duty in-line fuse holders from the auto parts store and modify them to suit my purpose. I cut the leads off to about an inch and strip off all the insulation. Next, I remove the fuse contacts, and the wire, from the holder. I place the contacts in a vise and spread the wire strands out in a fan shape. Using a pair of needle nose pliers, I pull the center strand out of the crimp on the contact. After a few of the center strands are removed, the rest come out easily. Once all the wires are removed, I spread the crimp just a little, and insert the end of the wire I wish to use and re-crimp, followed by soldering. This way, I get an in-line fuse holder with the correct color coded wires, and each wire long enough to reach the rest of the circuit without splices.

The wires used from the power source to the relays and from the relays to the lights should be sized to carry the rated current of the lights with a little margin. I would use 12 gauge -- good for 20 amps -- unless you are using very powerful lamps. Remember, only one pair will be on at a time, so the wires should be sized for the most powerful pair.

When you connect to the Red wire, you can use ANY Red wire you find, whichever one is most convenient for you.

Use at least 14-gauge wire for the connections to the Red wire, and you won't need to use a fuse, as the Red wire is already fused.

The physical configuration of the DPDT switch as shown in the connection diagram is not important -- only that it looks like that shown when the wiring is completed. Wired one way, the FOG lights will be on with the switch handle in the up position: wired the other way, the DRIVING lights will be on with the switch handle in the up position.

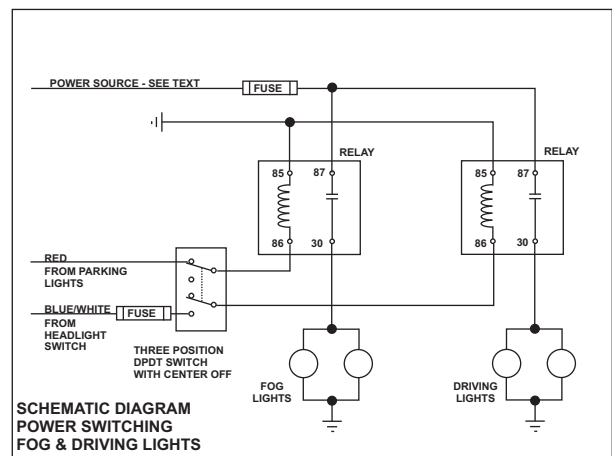
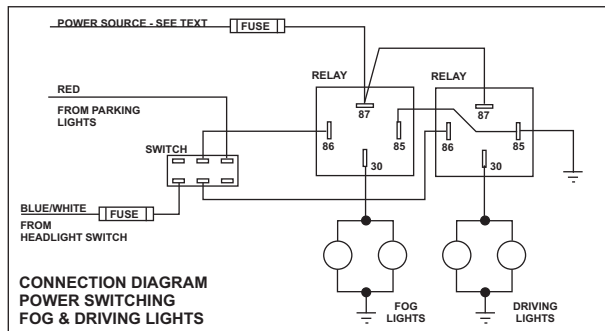
The wires from the switch to the relays in the grounding scheme can be just about any size you want, as they carry only the limited current of the relays. If one of these wires should short to ground, the effect will be exactly that of turning on the switch - no harm done.

The wires from the switch to the relays in power switching scheme must be sized carefully. Although they carry the same load as those in the grounding scheme, because they are hot under certain conditions, a short here will blow a fuse, provided the wires are adequate to match the fuse. If the wires are too small, they may burn before the fuse blows. The red wire is fused at 17 amps, so the wire must be capable of handling 17 amps. Normally, that calls for 12 Ga., but you could get by with 14. The wire from the blue/white wire can be any size you wish, as long as the fuse is rated no larger than the wire can handle.

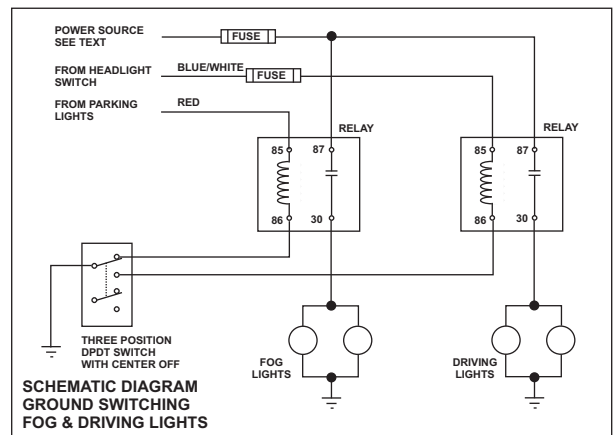
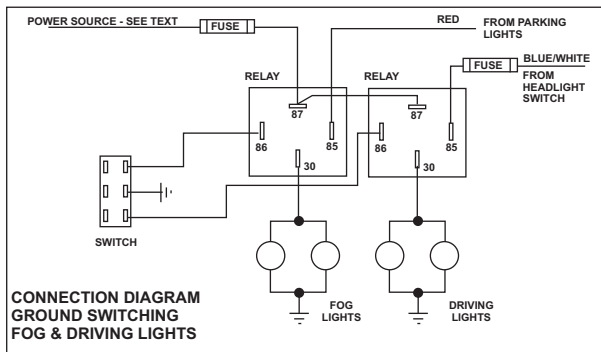
The colors for the wires shown are only for existing wires. Use any color you wish for the new wires.

When sizing the fuses, remember that they are there to protect the wiring, so they MUST NOT be sized larger than the current rating of the wiring they are protecting. Refer to chapter 7, Fuses, for more details on fuse sizing.

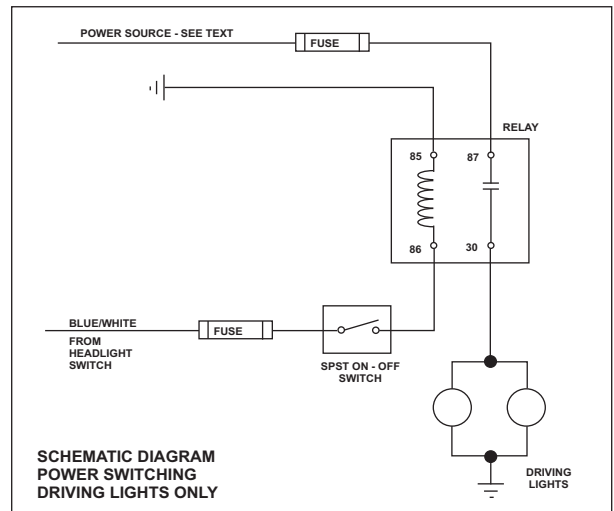
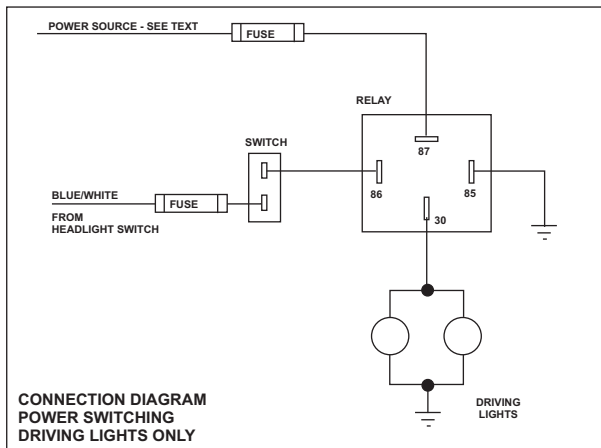
SCHEMATICS AND WIRING/CONNECTION DIAGRAMS



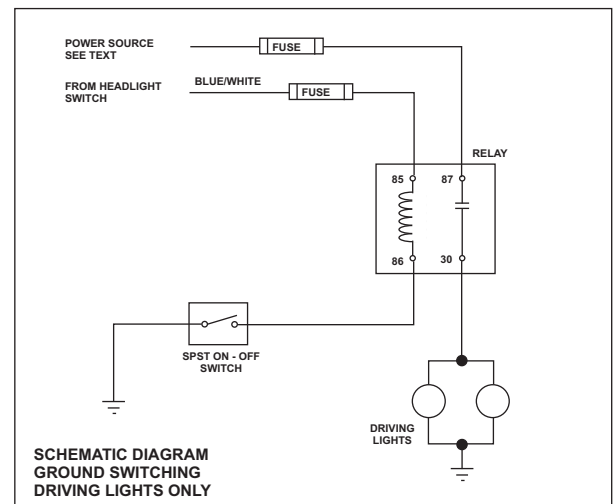
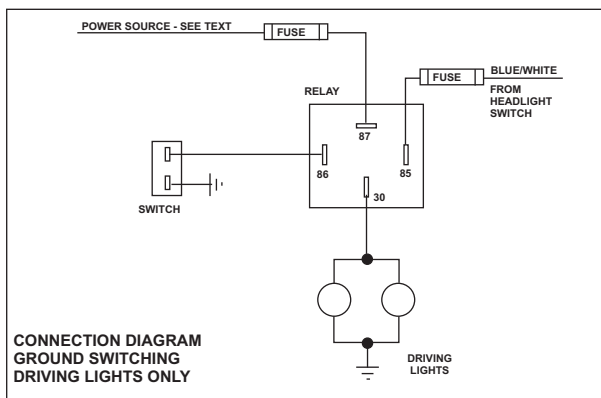
A. Fog and driving lamps, switching the power leads:



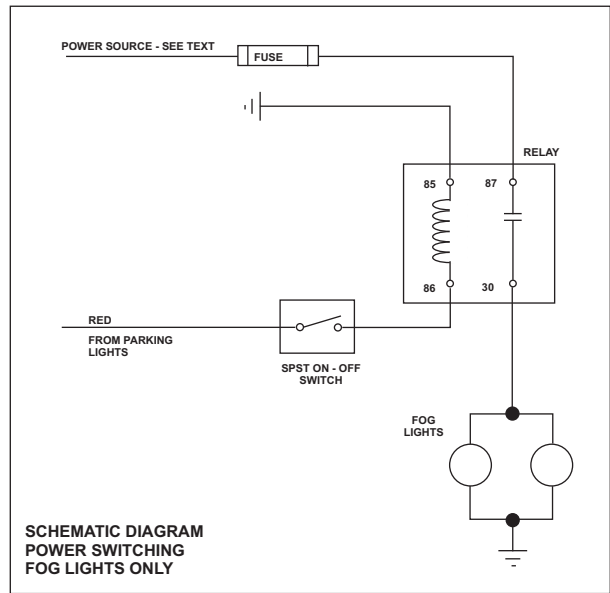
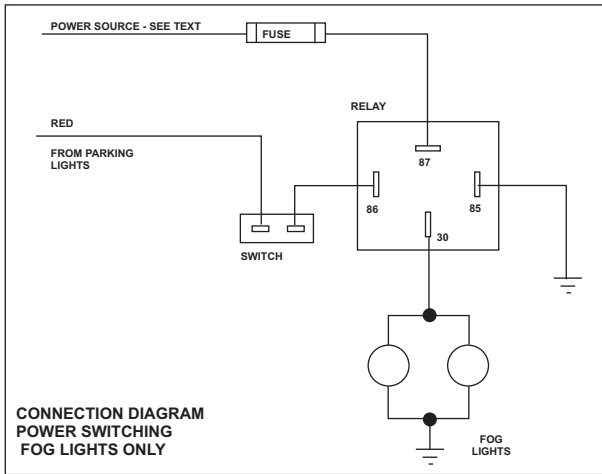
B. Fog and driving, switching ground leads



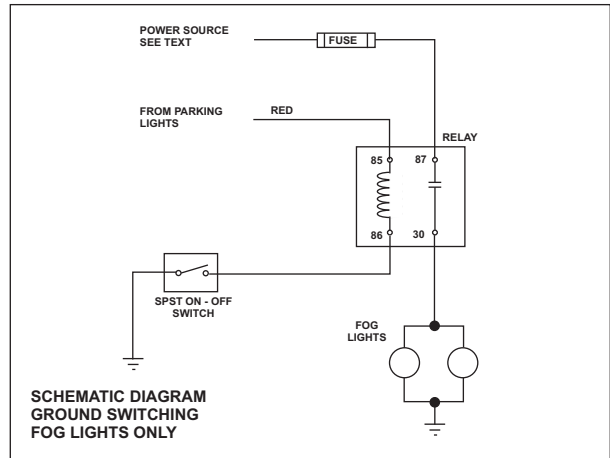
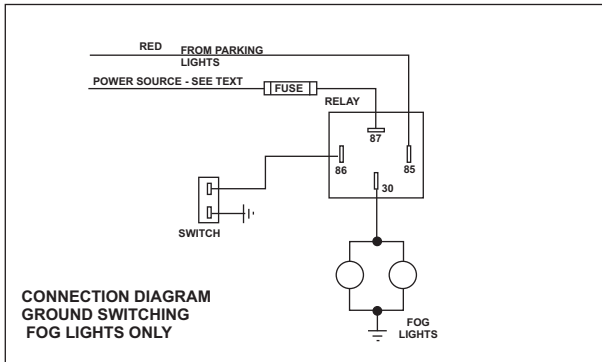
C. Driving lights only, power switching.



D. Driving lights only, ground switching



E. Fog lights only, power switching.



F. Fog lights only, ground switching