

Volkswagen Cabriolet DIY Guide

Relaying the Headlights

Why relay the headlights? Because Volkswagen was too cheap to do it for you! But seriously, there are three reasons to relay your headlights: 1) to increase your stock system's light output, 2) to reduce voltage drop; 3) so your headlight and ignition switches don't burn up; 4) so that you don't overload your electrical system when upgrading the lamps to the higher-powered E-codes, H4's, etc. [Be sure to read this guide in its entirety prior to beginning this project.](#)

Wiring the Relays

This method is 100% reversible and requires no cutting of the OEM wires.

Tools needed:

- Wire cutter, stripper and crimper
- Soldering iron & solder (optional, but recommended)
- 10mm wrench
- Small, thin flat screwdriver or small nail
- Philips screwdriver (removing the air duct at the lower valance may be required in order to run the wires to the passenger side headlight)
- Digital Volt-Ohm Meter (DVOM)
- Camera (optional)



Parts needed*:

- Two Bosch/Tyco relays (part #0332209150)
- Two 5-pin, pre-wired relay sockets for the above relays
- Two 9003/H4 pre-wired headlight sockets (use hi-heat versions if upgrading the lamps)
- Regular male-end disconnects, 14 gauge
- Three different colors of 14 gauge insulated wire (yellow, white and brown will match the OEM wiring)
- Two in-line ATO/ATC fuse holders (10 or 12 gauge)
- Two 20- or 30-amp fuses (some fuse holders come with the fuses)
- Three ring-style terminals, 10-12 gauge
- Heat shrink tubing of varying sizes
- Black plastic wire loom tubing (optional)
- Electrical tape
- Mounting hardware of your choice (in this how-to, an L-shaped bracket is made from sheet metal)
- Small black zip ties

*This parts list is for the minimum amount of parts needed. Relay sockets are not required, but they will give your engine bay a cleaner, more OEM look; if not using sockets, you'll need insulated female-end disconnects. New headlight sockets are not required (unless upgrading your lights), but they are recommended and are used in this guide.

NOTES:

1) Wire lengths are not given in this how-to because the lengths will vary depending on where you locate the relays. Always measure prior to cutting! Wire colors are also not given because color preference varies from person to person; therefore, the pictures of wires in this guide are for reference only.

2) The stock wiring is 16 gauge. If you are using stock sealed-beam lamps, 16 gauge wire will suffice; however, it is advised that you upgrade the wiring to 14 or 12 gauge, especially if you plan to upgrade to higher-powered headlights. Wiring diagrams can be found on pages 7 & 8. **When stripping wire, strip just enough insulation off of the wires for splicing and/or inserting into disconnects and such.**

3) These relays have two variations; know which relays you have before beginning! One relay type uses two 87 terminals; the other relay type uses one 87 terminal and one 87a terminal. Relays with two 87 terminals are convenient because one terminal can be used to power the driver's side headlight and the other to power the passenger side headlight. Look at the bottom of your relays: If one or both of your relays have terminal 87a, that terminal **cannot** be used; instead, the two headlight socket power wires will need to be spliced together into the one regular 87 terminal wire and the end of the 87a terminal wire (if using pre-wired sockets) will need to be capped. **The steps in this guide use relays with two regular 87 terminals.**

4) The steps in this guide's instructions are for single-round Cabriolets and for the outer lights on dual-round Cabriolets. For the inner, hi-beam lights on the dual-round cars, you will simply need to do some additional splicing. Please refer to the diagram on page 8.

Step 1



Before beginning this procedure, it's a good idea to take a voltage reading at the headlights (and photograph their brightness for a before-and-after comparison):

- Pop the hood, turn the engine on and take a voltage reading at the battery.
- Flip the headlight switch on and take another voltage reading at the battery (see voltage drop?).
- Keep the negative DVOM lead connected to the battery's negative post and touch the positive DVOM lead to the lo-beam (yellow/black wire) headlight terminal.

Record the reading (take a picture of the lights, if desired) and turn the lights, engine, and DVOM off.

Step 2



Using your 10mm wrench, disconnect the negative and positive battery cables (remove the nuts from each bolt and set aside).

Step 3



- Remove the original headlight sockets from each headlight.
- Remove the disconnects from the driver's side socket: Insert a small nail or a very small, thin flat-head screwdriver into a socket disconnect, pushing in the raised "lock" while gently pulling on the wire (this step is optional, but recommended if using wiring looms).

Step 4



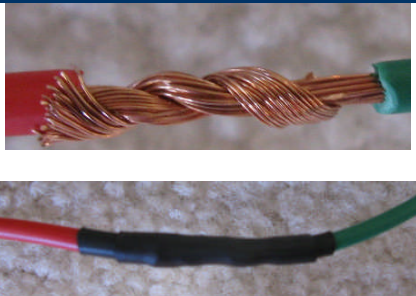
Strip the insulation off of an in-line fuse wire and crimp one ring terminal onto the wire. Repeat with the second fuse holder.

Step 5



- Strip the insulation off of the other in-line fuse holder wire.
- Cut a length of new wire and strip the insulation off of one end.
- Cut an appropriate-sized heat shrink tube a bit longer than the exposed wires and slide it onto one of the wires.

Step 6



Twist one in-line fuse holder wire and one new power wire together tightly. Solder the wires together, if desired. Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 7



Repeat steps 5 and 6 with the other fuse holder.

Step 8

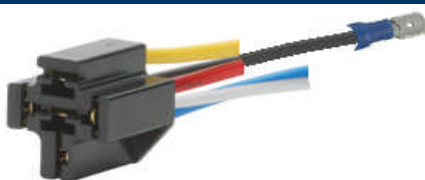
- Strip the insulation off of the other end of one newly spliced in-line fuse holder power wire.
- Strip the insulation off of the relay socket power wire (terminal 30).
- Cut a heat shrink tube a bit longer than the exposed wires and slide it onto one of the wires.
- Twist the wires together tightly. Solder the wires, if desired. Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 9



Repeat process with the other fuse holder and relay power wires.

Step 10



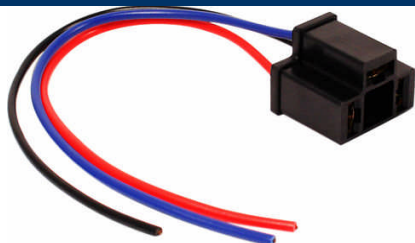
- Decide which relay will be hi-beam and which will be lo-beam and mark them if need be. Plug each relay socket onto each relay, making note of which wire goes to which terminal.
- Strip the insulation off the lo-beam relay socket switch wire (terminal 86) and crimp a male disconnect onto the wire.
- Repeat the above step with terminal 86 on the hi-beam relay socket.

Step 11



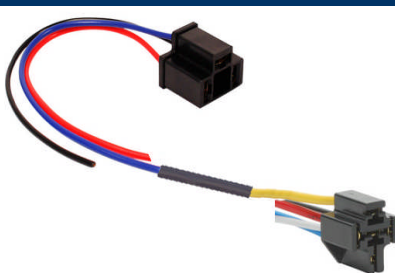
- Strip the insulation off of the lo- and hi-beam relay socket ground wires (terminal 85) and twist together tightly.
- Crimp a male disconnect onto the two newly combined relay socket ground wires.

Step 12



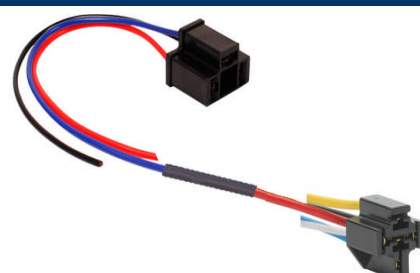
Strip an appropriate length of insulation off all the new headlight socket wires. (See note #3 on page 1 before beginning!)

Step 13



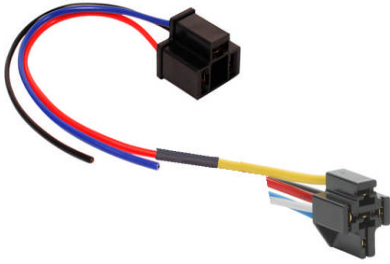
- Cut the **driver's side lo-beam** relay socket headlight power wire (terminal 87) to length, if need be, and strip the insulation off.
- Cut an appropriate-sized heat shrink tube a bit longer than the exposed wires and slide it onto the terminal 87 wire.
- Twist the driver's side lo-beam relay and headlight socket power wires together tightly. Solder the wires together, if desired.
- Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 14



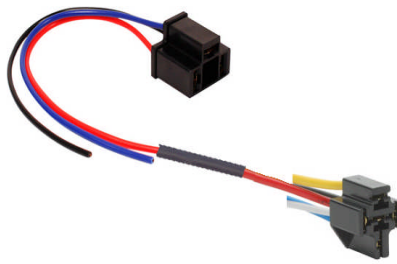
- Cut the **passenger side lo-beam** relay socket headlight power wire (second terminal 87) to length, if need be, and strip the insulation off.
- Cut a length of wire long enough to run from the relay wire over to the passenger side headlight socket wire and strip the insulation off both ends of this wire. Splice (twist and heat shrink) this wire into the passenger side headlight socket lo-beam wire.
- Cut an appropriate-sized heat shrink tube a bit longer than the exposed wires and slide it onto the terminal 87 wire.
- Twist the passenger side lo-beam relay and the newly-extended headlight socket power wires together tightly. Solder the wires together, if desired.
- Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 15



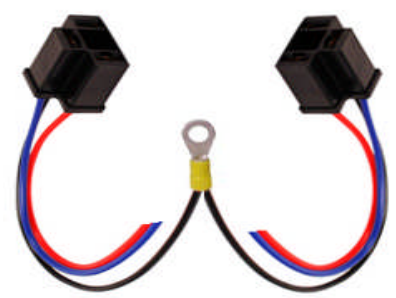
- Cut the **driver's side hi-beam** relay socket headlight power wires (terminal 87) to length, if need be, and strip the insulation off.
- Cut an appropriate-sized heat shrink tube a bit longer than the exposed wires and slide it onto the terminal 87 wire.
- Twist (splice) the driver's side lo-beam relay and headlight socket power wires together tightly. Solder the wires together, if desired.
- Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 16



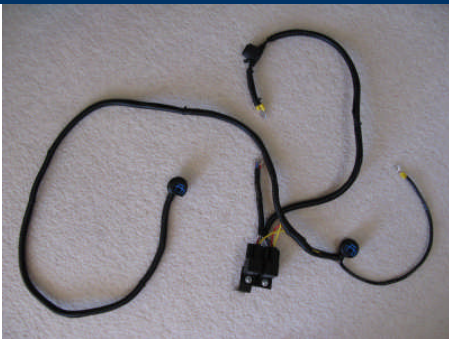
- Cut the **passenger side hi-beam** relay socket headlight power wire (second terminal 87) to length, if need be, and strip the insulation off.
- Cut a length of wire long enough to run from the relay wire over to the passenger side headlight socket wire and strip the insulation off both ends of this wire. Splice (twist and heat shrink) this wire into the passenger side headlight socket lo-beam wire.
- Cut an appropriate-sized heat shrink tube a bit longer than the exposed wires and slide it onto the terminal 87 wire.
- Twist the passenger side lo-beam relay and the newly-extended headlight socket power wires together tightly. Solder the wires together, if desired.
- Slide the heat shrink tube over the wire splice, centering it. Carefully apply heat to the tube to shrink it tightly over the splice.

Step 17



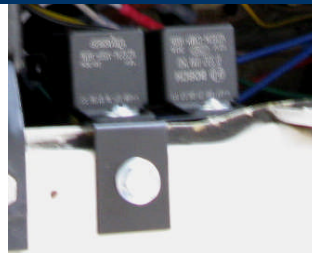
- Cut two lengths of ground wire: One long enough to run from the passenger side headlight socket ground wire to the negative (-) battery terminal; the other long enough to run from the driver's side headlight socket ground wire to the negative (-) battery terminal.
- Strip the insulation off of both ends of both newly cut ground wires.
- Splice (twist and heat shrink) the longer ground wire into the passenger side headlight socket ground wire.
- Splice (twist and heat shrink) the shorter ground wire into the driver's side headlight socket ground wire.
- Twist the other ends of the ground wires together and crimp a ring terminal onto them.

Step 18



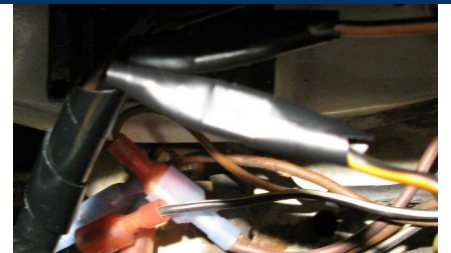
Enclose all wires inside plastic wire looms, if desired.

Step 19



Bolt the relays to your desired location. (Bracket template is on the last page of this guide.)

Step 20



Insert relay terminal 86 wire male disconnects into their respective original driver's side headlight wiring female disconnects (yellow/black = lo-beam, white/black = hi-beam). If you removed the socket in step 3, wrap each pair of disconnects with electrical tape as shown.

Step 21

- Insert relay terminal 85 ground wire disconnects into the original driver's side headlight wiring disconnect (brown). If you removed the socket in step 3, wrap the disconnects with electrical tape.
- Plug the new driver's side headlight socket onto the driver's side headlight.

Step 22

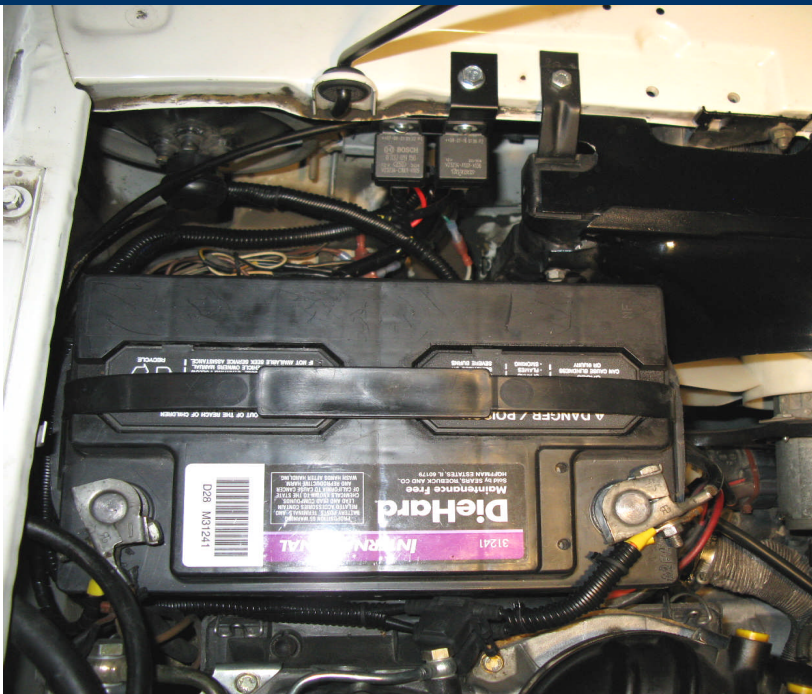
- Drop the passenger side wires down to the ground via the gap next to the battery, following the horn wires. Run the passenger side headlight wires across the lower valance, following the original headlight wiring loom.
- Plug the new passenger side headlight socket onto the passenger side headlight.

Step 23



- Secure the passenger side headlight wiring loom to the original wiring loom with zip-ties, from the right side of the radiator core support over to the left.
- Place a piece of electrical tape over the end of the original passenger side headlight socket.

Step 24



- Insert the in-line fuse holder ring terminals onto the battery positive (+) securing bolt. Locate one of the battery cable securing nuts and reconnect the positive (+) battery cable.
- Insert the headlight ground wire ring terminal onto the battery negative (-) securing bolt. Locate the other battery cable securing nut and reconnect the negative (-) battery cable.

Step 25



Turn the key to the battery-on position (or run the engine) and flip on the headlights. If all was done correctly, you should now be seeing much brighter, whiter headlight beams along with higher voltage at the headlights and little, if any, voltage drop at the battery and on the in-car VDO volt gauge. 🚗



Lo-beams, before
10.68 VDC



Lo-beams, after
13.36 VDC

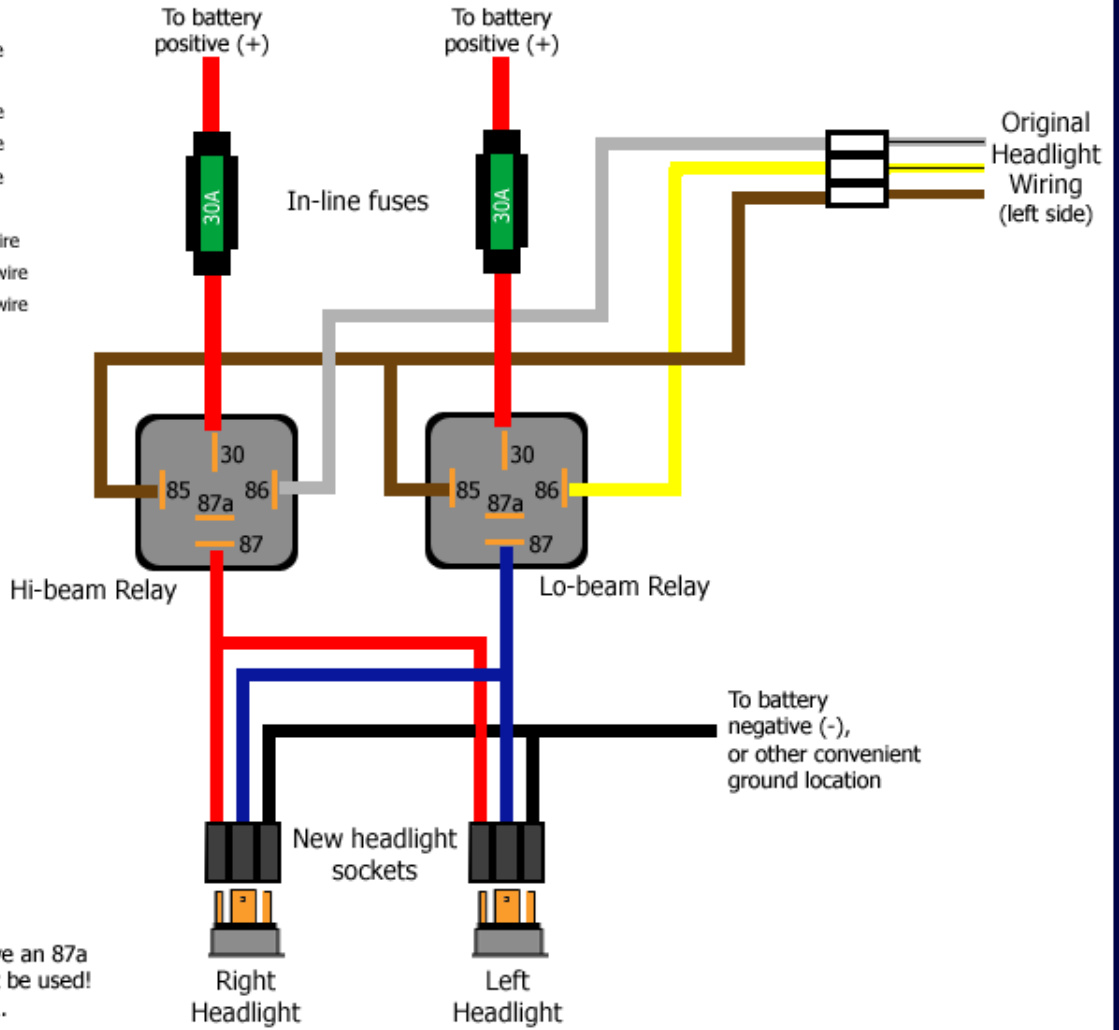
It is highly recommended that you not use crimped butt splices. Splicing the wires using butt splices can create resistance in the new wiring, which negates all of your work. The picture below shows the results of butt splicing: slightly brighter and whiter than stock (11.7 VDC), but not nearly as bright as the soldering/heat-shrinking method:



Headlight Relay Wiring Diagram

Single-round Cabriolets

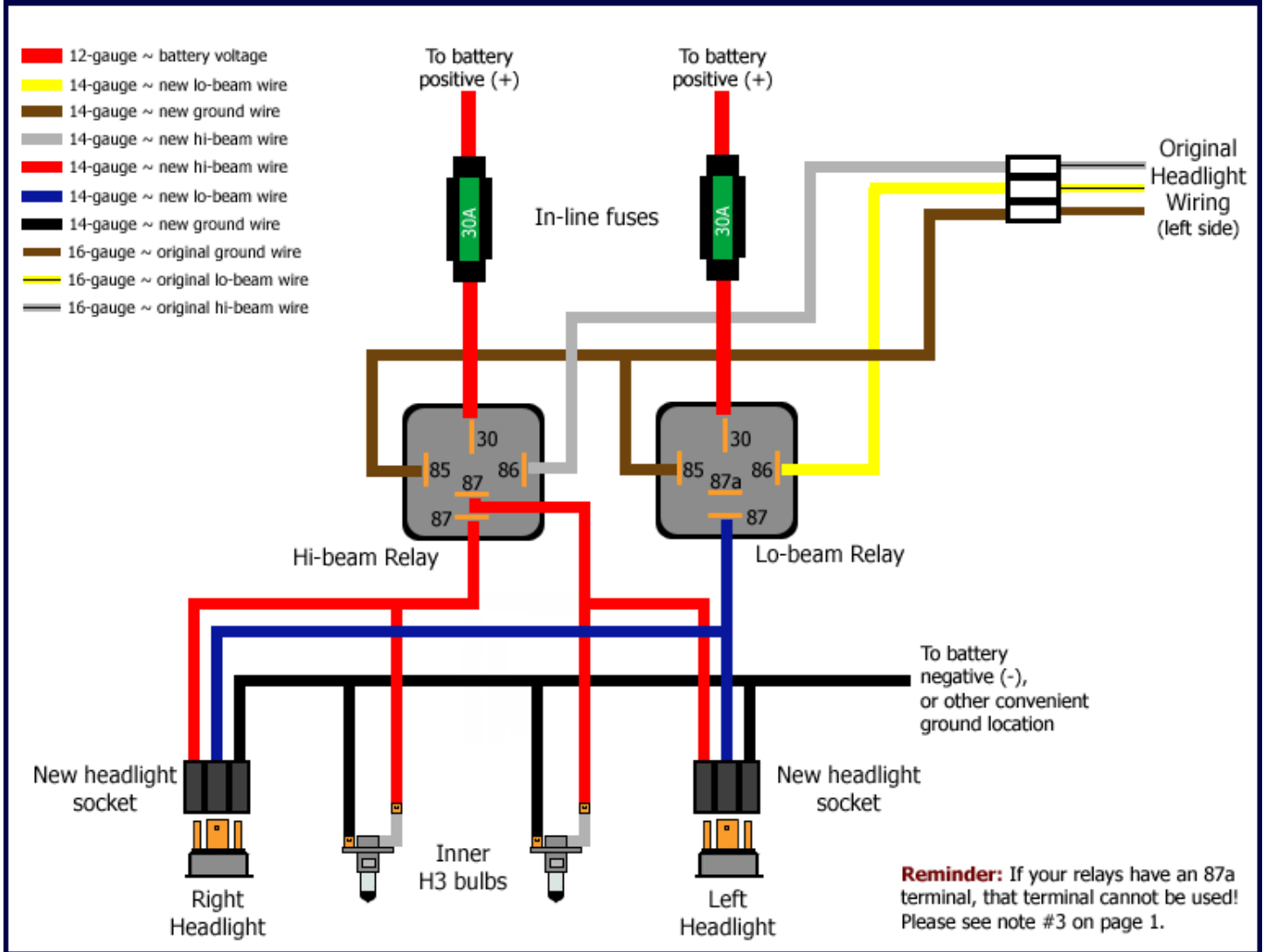
- █ 12-gauge ~ battery voltage
- █ 14-gauge ~ new lo-beam wire
- █ 14-gauge ~ new ground wire
- █ 14-gauge ~ new hi-beam wire
- █ 14-gauge ~ new hi-beam wire
- █ 14-gauge ~ new lo-beam wire
- █ 14-gauge ~ new ground wire
- █ 16-gauge ~ original ground wire
- █ 16-gauge ~ original lo-beam wire
- █ 16-gauge ~ original hi-beam wire



Reminder: If your relays have an 87a terminal, that terminal cannot be used! Please see note #3 on page 1.

Headlight Relay Wiring Diagram

Dual-round Cabriolets



Where to Find the Parts

Relays and relay sockets:

- www.partsexpress.com (relays supplied are Tyco* and have an 87a terminal)

Relays:

- www.germanautoparts.com (relays are Bosch and have two 87 terminals)

Wires, in-line fuse holders, fuses, disconnects, ring terminals, headlight sockets, heat shrink tubing, wire looms, electrical tape, zip ties:

- your local auto parts store

Sheet metal, bolts, nuts, washers:

- your local hardware store

*Tyco now manufactures Bosch relays.

Making a Relay Bracket

The following is for making the OEM-looking relay bracket used in this how-to that can be mounted to the hood slam panel (aka radiator support).

Tools needed:

- Tin snips
- Dremel (cut-off wheel, drilling bit and sander)
- Eye protection (whenever using the Dremel, wear protective glasses!!)

Parts needed:

- Sheet metal (sold at Home Depot and elsewhere)
- M6x18 metric bolt
- Two small bolts with 2 matching nuts and 4 matching washers (2 per bolt)

Using tin snips (or a Dremel), cut out the relay bracket from the sheet metal using the dimensions in the template below.

Using the template below as a guide, mark the holes on the bracket and drill out the holes to the appropriate sizes.

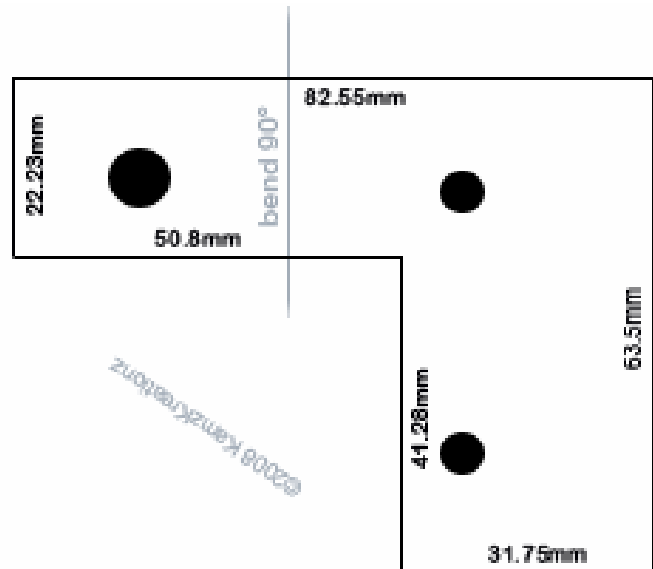
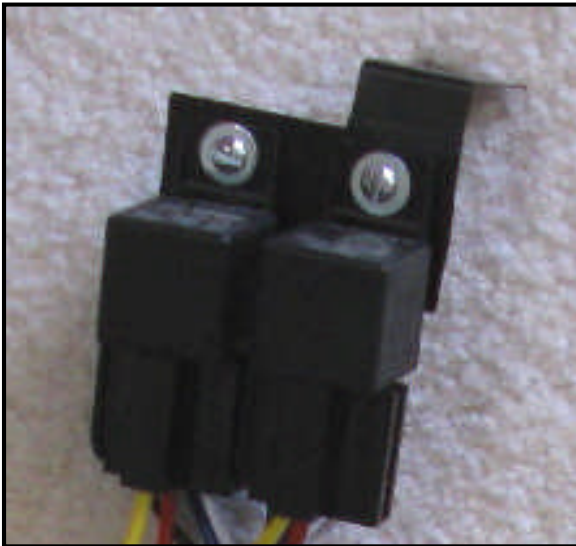
Using the Dremel's sander attachment, round off the corners of the bracket and smooth the edges of the holes.

Using the template below as a guide, place the bracket on the edge of a counter at the 90° bend line and bend the bracket into a 90° angle.

Finish the bracket to your desired preference: Paint, vinyl wrap, polish, wide pin striping, etc.

Attach the relays to the bracket using one bolt, two washers (one between the bolt head and relay, the other between the securing nut and bracket), and one nut per relay.

Mount the bracket to the hood slam panel using an M6x18 metric bolt. In this how-to, the bracket is mounted to the hole located to the right (as you're facing the engine) of the radiator bracket.



**** Remember, *you* are responsible for working on *your* car; Cabby-Info.com, KamzKreationz, VAG, VWoA, or anyone else are not responsible if *anything* goes wrong while *you* are working on, in and under *your* car!
Use this information at your own risk!***