

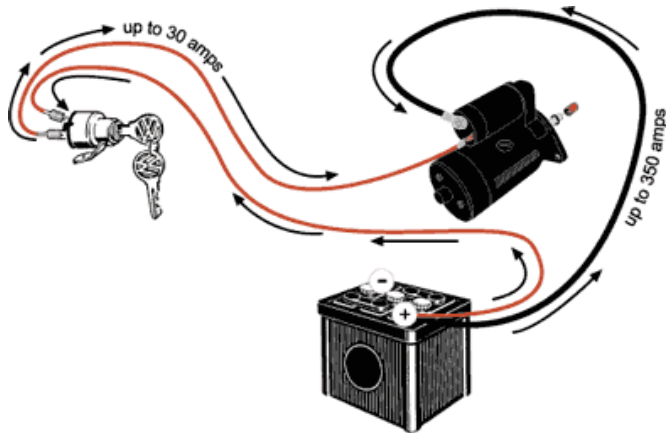
# Volkswagen Cabriolet DIY Guide

## Installing a Hard-start Relay

(Removing the starter in an auto transmission Cabriolet begins on page 5.)

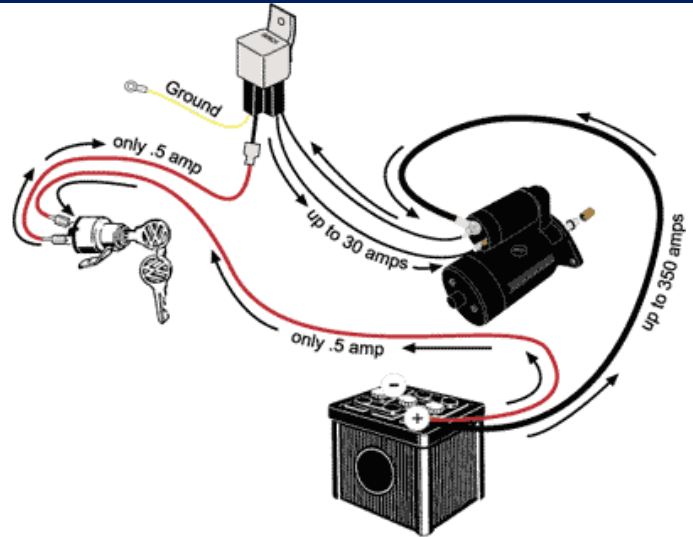
### Why install a starter relay?

Ignition circuit without relay



Current from the battery, which ranges from 15 to 30 amps, is routed to the starter solenoid via the ignition switch. In other words, the ignition switch is absorbing that ignition amperage. It is also a long run for the electrons.

Ignition circuit with relay



Current from the battery, which is now reduced to 1 amp at most, is routed to the starter solenoid via the relay. In other words, the ignition switch is now being used as a trigger for the relay, which is now absorbing the 15 to 30 ignition amps. The electron run is now shortened.

*Images from WolfsburgWest.com*

"Bosch starters use an electromagnetic solenoid for activating the starter mechanism. Like any electromagnet when it gets hot, the electromagnetic force is substantially reduced, often to the point that the solenoid can't pull hard enough to activate the starter. **All** Bosch starters suffer from this problem, particularly when old and always when installed on an automatic transmission, which is right under the exhaust manifold (a brilliant piece of engineering)." ~ Oran Sands

There are a few ways to go about installing a hard-start relay: 1) Install a Ford-based relay; 2) install the official Bosch WR1 relay kit (available via Amazon and other retailers); 3) install an improved version of the Bosch kit. Read through the guide and decide which is best for you. One thing to note: The WR1 kit uses a 20 amp relay and a 15 amp fuse. This is considered by most to be insufficient; a 30-40 amp relay and 20 amp fuse is a better combination for this job. However, the WR1-equivalent was installed by Volkswagen dealers to comply with Technical Service Bulletins and, thus, is adequate if you prefer a complete plug-and-play option.

## Installing the F496 Hard-start Relay

This guide was originally posted on VWvortex.com by "Moljinar": <http://forums.vwvortex.com/showthread.php?2593146> .

### Parts needed:

- Duralast F496 relay/solenoid
- Weatherproof fuse (optional, but recommended\*)
- Wire (for best results: 12 or 10 gauge)
- Male disconnect terminals
- Ring terminals
- Self-tapping screws and washers (use a drill, if desired), or other mounting hardware

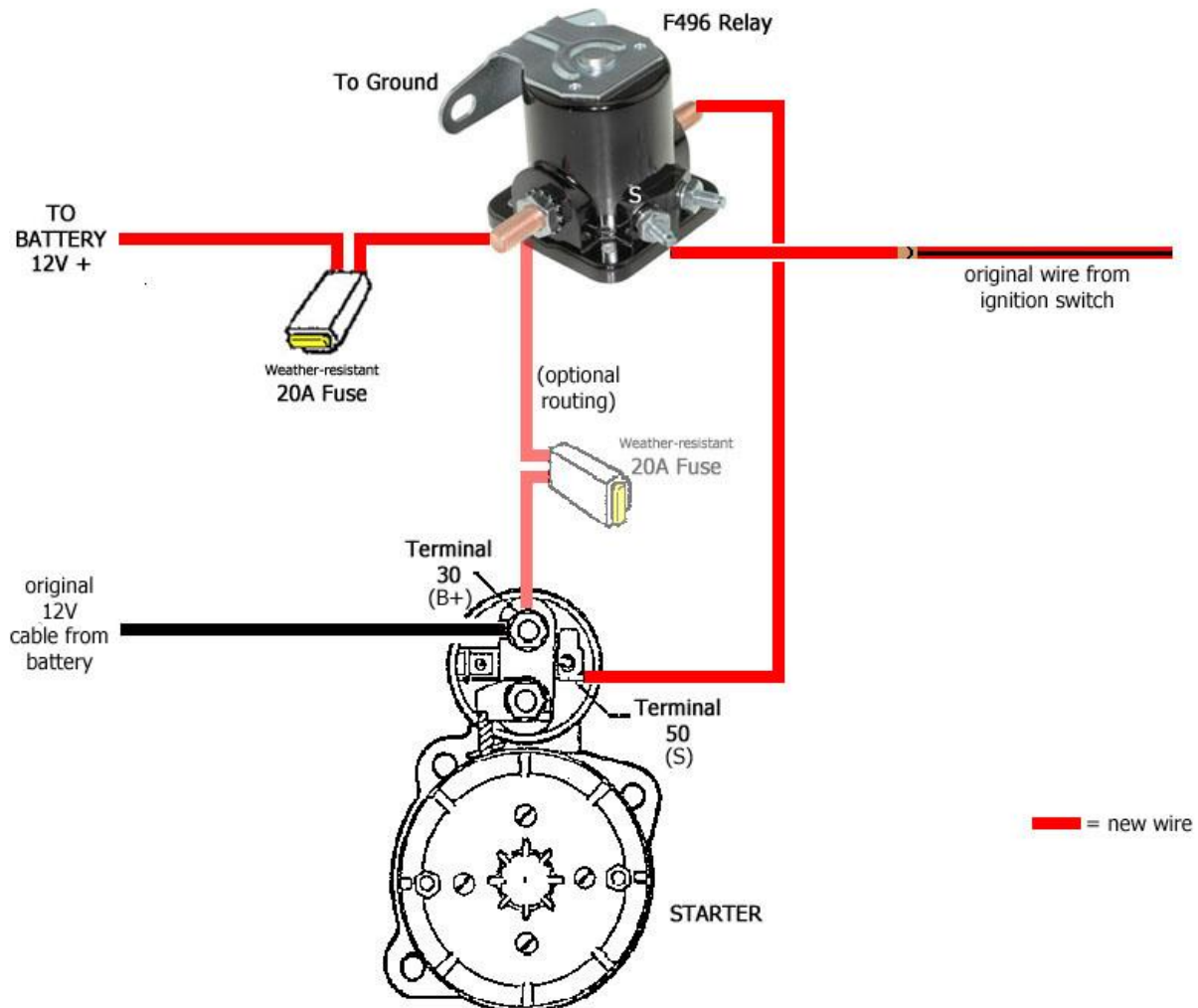
### Instructions:

**Disconnect the battery before beginning!!**

You'll need to make a short [jumper] wire from the key switch wire (red/black) to the relay post (S); another longer wire from the battery terminal\*\* to the big post (either one); and another to go from the other big relay post to the solenoid terminal (50). All of the connectors are available at Wal-Mart, AutoZone, etc. I always install such relays close to the starter so the current path is short, but realistically you could mount it on the firewall or fender and be okay.

\* If the car doesn't start, check this fuse. If the fuse blows continuously, the starter is pulling too many amps, which indicates that the starter is having issues.

\*\* You can also connect it to terminal 30 on the starter solenoid.



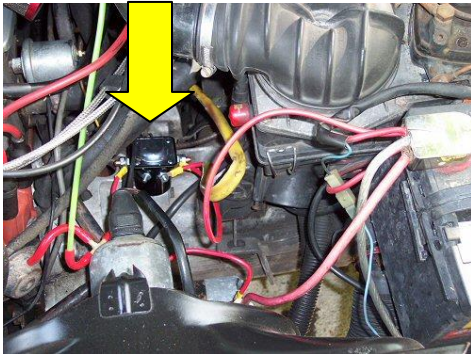
**Here's the relay:**



**Here's how the wires attach to it.**



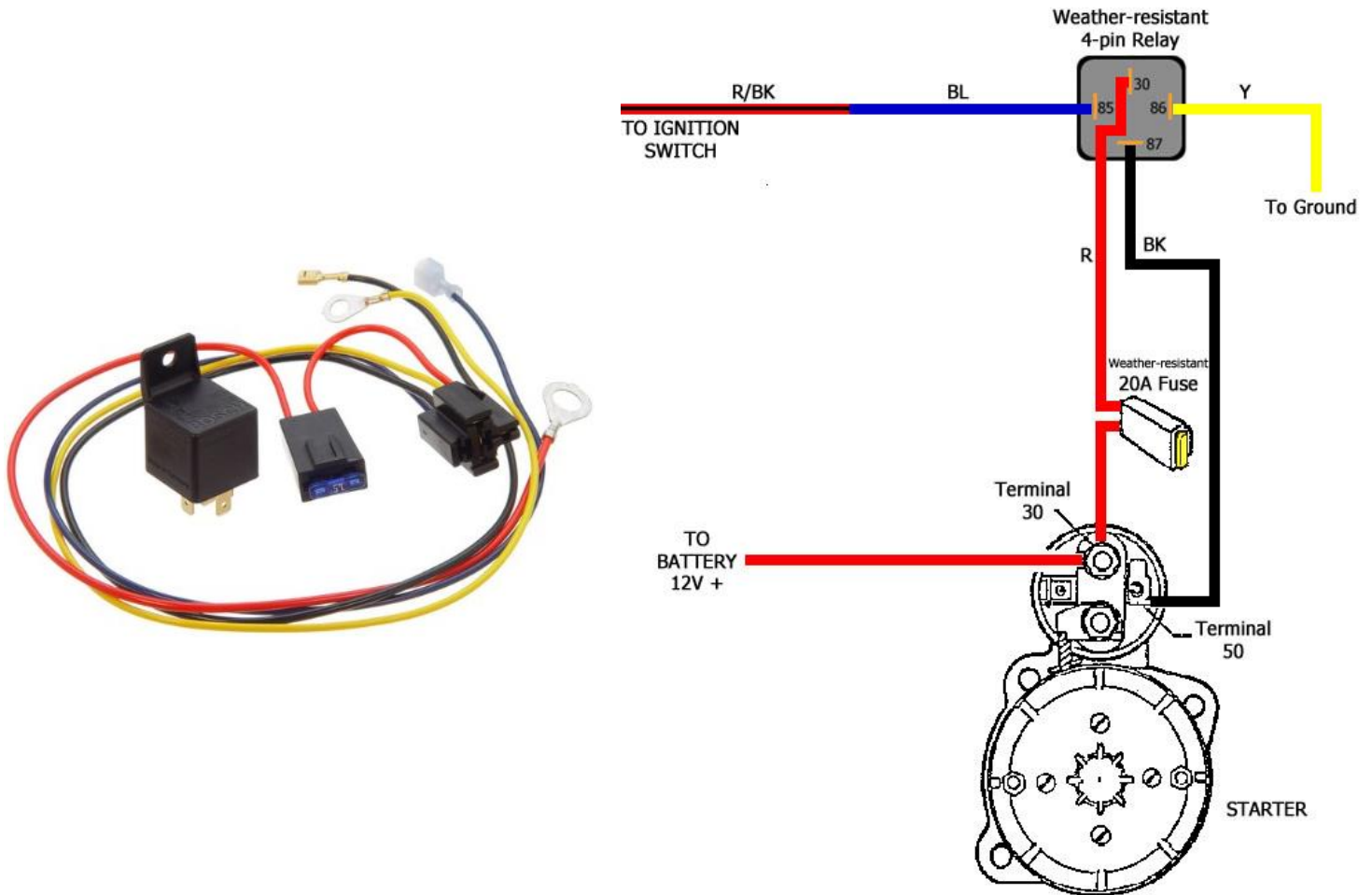
**I installed it to a tab on the (manual) transmission housing since the bracket is the ground of the circuit for this relay:**



**Here's a close-up of how it's nestled in there:**



## Installing the Bosch WR1 Hard-start (aka Low Voltage) Relay Kit



### Bosch instructions (reprinted here; reference diagram above):

1. Disconnect the negative cable from the battery.
2. Select a location close to the starter to mount the relay. The relay should be mounted in an area with the terminals facing downward to prevent the entry of water or dirt into the relay. Drill a 1/8" hole where the relay is to be installed, and mount the relay with a sheet metal screw.
3. Disconnect the ignition/starter switch wire (red with black stripe) from the starter solenoid (terminal 50) and attach it to the blue wire of the relay (terminal 85).
4. Attach the black wire of the relay (terminal 87) to the starter solenoid (terminal 50).
5. Disconnect the battery cable(s) from the starter (terminal 30). Attach the large red wire from the relay (terminal 30) to the starter (terminal 30). Reconnect the battery cable(s) to the starter (terminal 30).
6. Attach the yellow wire from the relay (terminal 86) to a solid non-corroded ground connection.
7. Tape all exposed connections. Use wire ties to secure the relay wires and route them away from potential damage areas such as exhaust manifolds, sharp corners, or moving parts.
8. Reconnect the negative cable to battery.
9. Installation is now complete.

Note from VW shop techs: The Bosch kit comes with a 15 amp fuse. This may need to be bumped up a 20 amp fuse if the 15 amp keeps blowing. If the 20 amp fuse blows, there may be an issue with the starter solenoid.



## Removing the Starter (auto trans only)

The following is courtesy of *briano1234* and *mtemal* of *VWvortex.com*.

### Tools needed:

- Short 6pt socket
- Wobble extension
- 3- and 6-inch extensions
- 13mm & 10mm socket wrenches
- Jack & jack stands
- PB Blaster

### Step 1



### Disconnect the battery!

**\*\*Failure to do so will have SHOCKING RESULTS!\*\***

### Step 2



Jack the car and support it with jack stands or ramps.

### Step 3



Remove the 2 starter brackets. Soak the nuts on the heat shield with PB-Blaster... three 10mm nuts, one 10mm bolt and a 13mm on the block. Two nuts on the starter, one on the upper heat shield and one bolt to the left of the heat shield bottom.

### Step 4



Remove the wires from the starter; there is one 13 mm nut and a spade connector - take them off before you remove the starter from the car.

### Step 5



To remove the starter it takes a 13mm. You will need a short 6pt socket and a wobble extension to remove the middle starter bolt as it is holding the heat shield.

You will need two or three 6-inch extensions to remove the upper bolt. The very top one is hidden.

### Step 6



Installation is the reverse of removal. Catch the lower bolt, then put the heat shield on and tighten that bolt.

Removing the passenger side tire and using about 3 feet of extensions help to get the top bolt.

**\* \* Remember, *you* are responsible for working on *your* car; Cabby-Info.com, "Moljinar", "briano1234", "mtemal", VWvortex.com, 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! \* \***