Install a starter Relay to cure the Le Sharo's non starting condition

Inspired by Moljinar from VW Vortex Forum

Adapted by Jacques Pagé from Yahoo LESHARO OWNERS Group

Most starters use an electromagnetic solenoid to activate the starter mechanism. Like any electromagnet, when the temperature goes up, the electromagnetic force is substantially reduced. Sometimes, it gets so hot that the solenoid can't pull hard enough to activate the starter. A lot of starters suffer from this heat related problem, particularly when old. The Le Sharo's engine bay being VERY hot, this condition should be frequent in them.

Symptom: You turn the key and nothing happens. Nothing. Not even a click. The voltmeter however, does show a current drain.

You can wait for the starter to cool off (about an hour usually) or you can get more current to the solenoid so it can finally develop enough force to run the starter. Even though the original wiring is fine, it's not heavy enough to supply the current (Volts and Amperes) required by the solenoid to trip when hot. Also, your ignition switch might not be as good at relaying current as when it was new. Anyway, the result is the same: you get no action when you turn the key to the start position.

Solution #1: get a long screwdriver and short from the main starter terminal to the solenoid terminal. Works great. Makes lots of sparks. Destroys screwdrivers. Sometimes cars.

Solution #2: Buy and install a new solenoid/starter. Expensive, labour intensive and doesn't always solve the problem.

Solution # 3: Wire in a relay that's triggered by the key switch and gets it's current directly from the battery via a heavy wire.

Bosch (and maybe other companies) makes a relay kit just for this. Seems it's been a problem since VW Beetles roamed the earth. It's called the WR1. In many peoples opinion it's not heavy enough for the job. Solenoids will sometimes need up to 30 amps of current to work. This transforms a small relay into a part ready to melt, short out and possibly engage the starter and not let it release. Not good. We need a better relay.

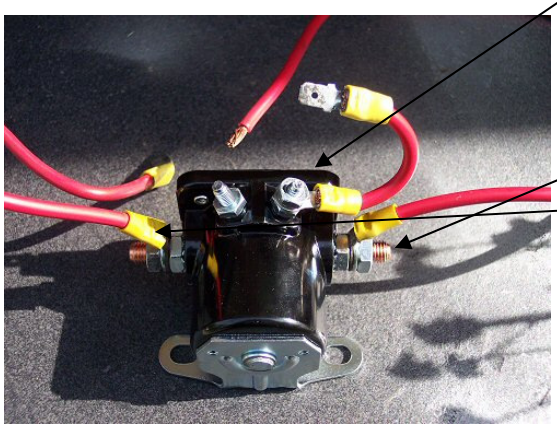
Here's what you can do. Go to an Auto Parts Store (AutoZone for example) and get what is known around the world as a Ford starter relay. This design dates back to the 30's when they were used to actually pass the current to the starter. So it's kind of heavy duty. The part number is Duralast F496. It costs about $10.

You'll need to unplug the small wire from the blade terminal on the starter. This wire comes either directly from the keys witch (manual transmission) or from the transmission safety switch (automatic). After unplugging it from the starter, you will probably have to lengthen it to reach the new relay's small terminal (S) and crimping a round type terminal that can connect to it. Another -longer wire- goes from the battery positive terminal to the relay's big post (either one) and yet another goes from the other big relay post to the solenoid terminal. All of

the connectors are available at good auto parts store (Wal Mart, Auto Zone, etc.). Try to install the relay as close as possible to the starter so the current path is short. But realistically you could mount it on the firewall or fender and it would be OK.

Picture of the Relay

Here's how the wires attach to it.

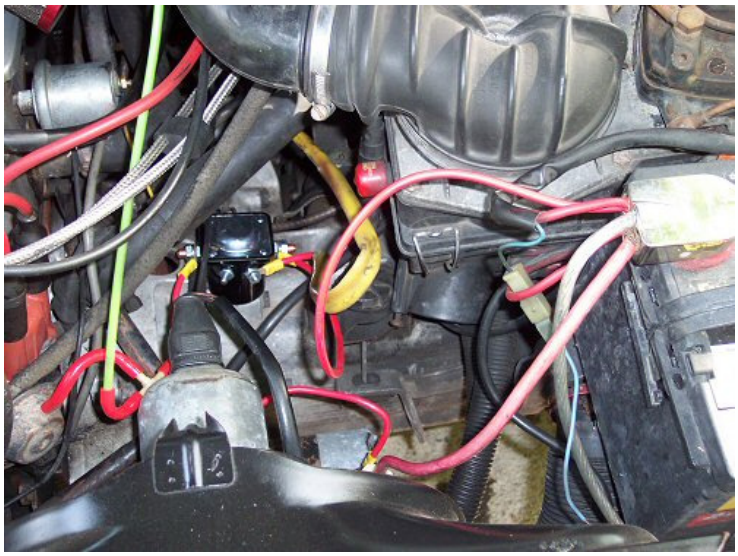


Small terminal:
Receives the wire from the ignition switch or transmission safety switch

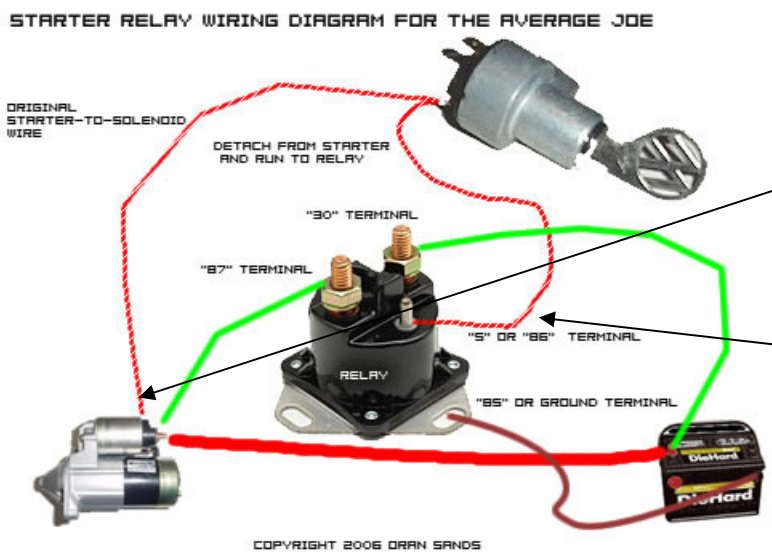
Big terminals:
One receives the wire from the battery's positive post.

One receives the wire from the starter's solenoid

You can install the relay on any suitable metal surface, either on the engine/transmission unit or on the firewall. The relay's bracket is the ground of the circuit for this relay.



Here’s a close up picture of how it’s installed on the transmission of a VW Golf.



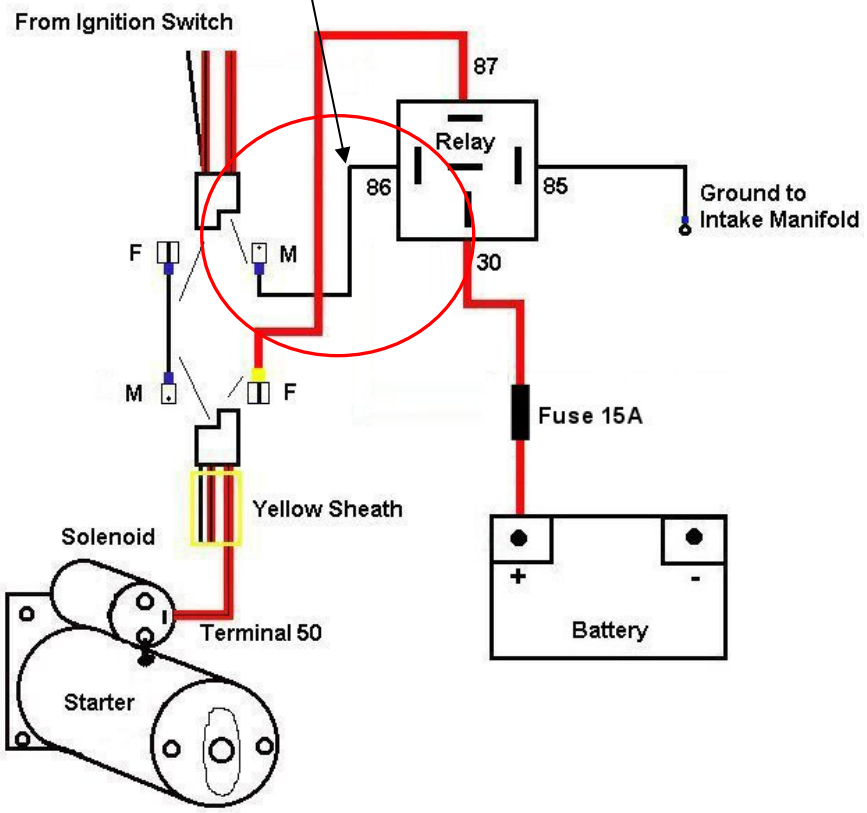
Remember:
In the case of the automatic transmission, the small wire connected to the starter comes from the transmission safety switch and NOT directly from the ignition switch. It MUST ALWAYS come from the transmission and connect to the relay

Here's a typical wiring diagram found in another forum and nicely made. Note the diagram shows a 15A fuse but that may be too small. Start with 15A and work your way up to a 30A.

You should install an inline fuse holder (not shown in this diagram) with an appropriate sized fuse to protect your relay from any electrical surcharge

REMEMBER THAT IN THE CASE OF THE AUTOMATIC TRANSMISSION, THE WIRE THAT CONNECTS TO TERMINAL 86 OF THE NEW RELAY DOES NOT COME DIRECTLY FROM THE IGNITION SWITCH BUT FROM THE TRANSMISSION SAFETY SWITCH. IF YOU USE THE ORIGINAL WIRE, JUST LENGHTENING IT AND FITTING A ROUND TERMINAL TO FIT THE NEW RELAY, YOU WILL THUS MAKE SURE THAT YOUR INSTALLATION KEEPS THE TRANSMISSION INTERLOCK AND IS SAFE.

Starter Relay retro-fit Automatic Transmission



Wire size for connection 87 and 30 is 12ga.
Wire size for 85, 86 and jumper is 16-14ga.
Male and Female crimp connectors are .250 copper or tinned copper.
Lug terminal goes to the intake manifold 10mm bolt at the throttle cable bracket.
Relay is a standard Bosch 30 or 40 amp with no internal diode or resistor.
Load Reduction Relay should be upgraded to a 70 amp ECG brand RLY8782 (Jetta only).