

## HOW-TO: Pimp your glowplug wiring

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```
var gaJsHost = (("https:" == document.location.protocol) ? "https://ssl." : "http://www.");  
document.write(unescape("%3Cscript src=" + gaJsHost + "google-analytics.com/ga.js'  
type='text/javascript'%3E%3C/script%3E"));
```

```
try {  
var pageTracker = _gat._getTracker("UA-356307-2");  
pageTracker._trackPageview();  
} catch(err) {}
```

This HOW-TO describes one way to dramatically improve your glow-plug wiring.

This is also one way to add glowplug wiring if you are converting a gasser chassis over to a diesel engine and want to do without the official glowplug relay and associated harness.

As always, this is just one way to do things... not necessarily the "right" way, and like most instructions I recommend reading them all they way thru before starting out.

### DISCLAIMER:

- Use these instructions at your own risk
- Read them through from beginning to end before starting
- This is how I do things&hellip; it is not necessarily the right way nor the best way !
- Using equipment,tools, and supplies incorrectly could result in serious injury to you or your property or even death

Please note: You can click on any thumbnail below to see a larger version of the image. After viewing the large image, you can click on "close" to return to your spot in the text

## Overview:

IMHO there are several weaknesses in the original VW IDI glowplug harness, including:

- the full amperage of the circuit (50 amps or so) passes thru the firewall and thru the connectors in the fuseblock
- the copper buss bar makes removing the glow plugs a pain since you have to completely remove the 8mm nuts
- the copper buss bar makes troubleshooting a pain since all plugs are connected in parallel
- the 50A fuse is prone to hairline fractures that takes out all your glowplugs
- the glowplug relay itself is \*extremely\* expensive
- the length and gauge of the factory wiring results in a reasonably significant voltage drop to the glow plugs... I've measured below 9V at the plugs when the battery was delivering 12.5V

Ergo, this design has the following features:

- el-cheapo garden tractor relay carries all the current and protects the contacts of the expensive glow plug relay
- all the heavy duty current travels via short wires in the engine compartment to minimize voltage drops
- all the heavy duty current travels via over-designed wire gauges to minimize voltage drops
- separate fuses provide individual protection and prevent all plugs from being disabled at once
- separate and easy-to-remove fuses make it quick to continuity or current-test each glow plug individually
- color-coded wires make it easy to trace which glow plug is which

- modified connectors at the glowplug allow removal without removing the 8mm glow plug terminal nut

Materials needed:

- generic starter solenoid: I used NAPA #SME 701670 since it had the smallest form factor of anything NAPA carries \*and\* was the cheapest, but any generic starter solenoid that can handle 30 seconds of 50A duty will do
- generic fuse block: mine came from Canadian Tire, but most automotive shops have them. I picked the long-glass style of fuse because IMHO it's easier to see when the fuse is blown
- a length of 4 gauge wire: I found it cheapest to buy a low-budget set of booster cables
- four lengths of 10 gauge wire.. each length a different colour
- two lengths of 16 gauge wire.. each length a different colour
- four 20A glass fuses
- three 4 gauge copper lug connectors
- four 10 gauge female spade connectors
- four 10 gauge lug connectors
- two 16 gauge lug connectors
- 4 sheet metal screws to mount the solenoid and fuse block
- solder
- (optional) a bit of heat-shrink tubing if you like to dress the ends of your cables
- (optional) 1/2" plastic loom for bundling the glow plug wires
- (oprional) a bottle of liquid electrical tape if you like to minimize the number of bare live wires in your engine compartment

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#### Construction:

1) Start by soldering the fuse block to a short length of the 4 ga wire, terminated with a 4 gauge lug as per the above picture. I solder all crimped connections \*and\* insulate with red heat-shrink to reduce resistance and keep out the elements.

2) Mount the new relay and fuse block in a convenient location in the engine compartment. The idea of this system is troubleshooting convenience, so pick a spot where you can get to the individual fuses easily. Also remember that these are live wires and terminals, so it's a good idea to locate them off to the side where they won't come in contact with wrenches and screwdrivers during routine engine maintenance. On my A3 the driver-side shock tower is perfect:

3) wire up the solenoid ground (green wire and lug in the above picture), the energize wire (orange wire and lug in the above picture which leads to the original wire that supplied the glow plug buss) and a longer length of 4 ga wire, terminated with soldered and crimped 4 ga lug connectors, which runs between the relay and the battery. I prefer to go all the way to the 13mm stud on the engine's starter solenoid as the battery feed... I find connections at the battery tend to corrode quickly, get in the way when servicing the battery, and don't easily adapt to a big 4 gauge connector.

If you're doing this wiring because you're installing a diesel engine into a gasser chassis and don't want to mess with the original glow plug relay and harness you simply run the energize wire (orange in the above picture) thru the firewall to a pushbutton switch on the dash. The other terminal on the pushbutton goes to a source of power that's hot when the key is in the "on" position. Push the button for 5-30 seconds (depending on engine temperature) to activate the glowplugs.

4) prepare the 4 different-coloured lengths of 10 gauge wire with lug connectors on the end:

As you can see I've taken a lug connector and cut off one side. When installed correctly this circular shape will stay in one piece as the glow plug nut is tightened, but will allow the wire to be removed without having to fully remove the glow plug's nut. Why is this important ??!! Well, those 8mm nuts are not only an enormous pain to thread on and off in cramped quarters but also have a life of their own... they love to leap off and drop down into the most inconvenient hidy-holes, requiring you to spend hours with a magnet fishing them out and cursing the day you were born.

5) Attach the glowplug wires to each glowplug, orrenting the connector so that the opening wants to close as you tighten the glow plug nut:

6) Route the glowplug wires neatly thru the engine compartment (I'm a big fan of plastic loom) and terminate them on the fuse block with soldered-and-crimped female spade connectors:

You'll notice I've cleverly arranged the wires in order... number 1 glow plug at the top, etc. I've also added the fuses in this picture, and a layer of liquid electrical tape (the black gooey stuff) to the buss side to help prevent an electrical short

You're done !! It might end up looking something like this:

You'll notice a few extra wires in this picture... the wiring at the top of the picture is a feed to a 30A breaker for



accessories including a fog light relay (the blue and yellow wires at the top).

Not shown is a wire from the fuse side of the new relay which to an LED on the dash... a HIGHLY recommended addition:

This yellow LED shows me that the glowplug relay is actually engaging the glowplugs (unlike the glowplug light in the cluster). The one drawback of this LED is that it won't tell you if a fuse is blown... you'd need to run 4 LEDs to do that, since there are four separate feeds. However, unlike the stock system where a blown fuse takes out all your glowplugs, if a fuse does go you will still be able to start pretty easily on the three remaining glowplugs. Someday I'll design a fancy monitoring circuit that traps blown fuses... I used to be an electrical engineer after all.

Questions / comments / suggestions for improvement welcome !!

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