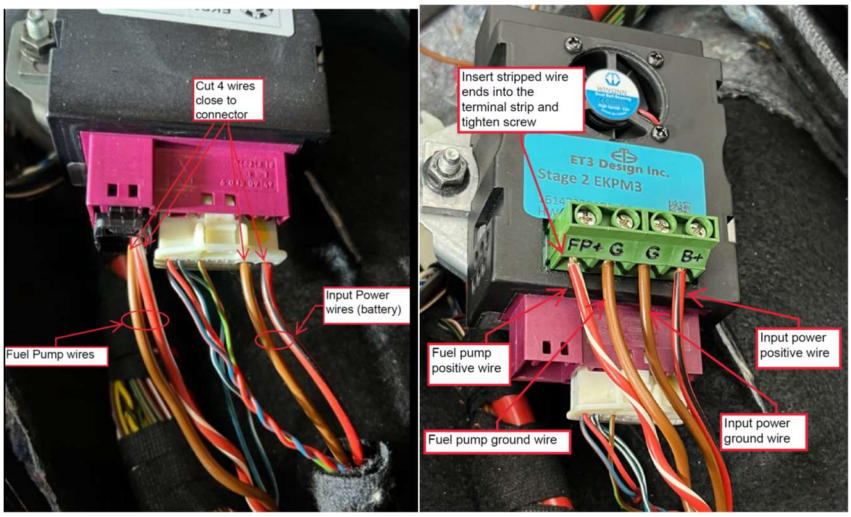
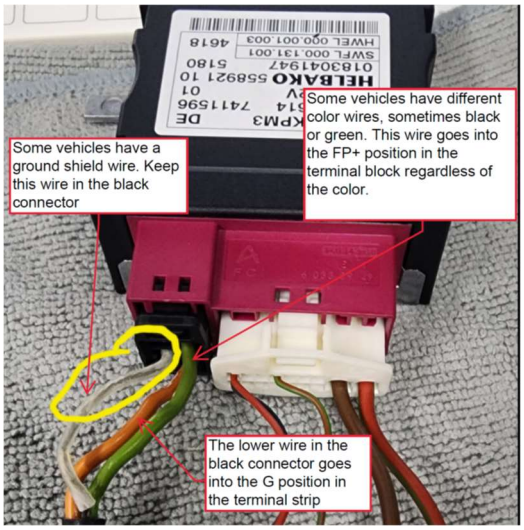
ET3 Design Inc.

Stage 2 EKPM3 Module Installation Instructions (V2.6)

1) **Disconnect battery by removing negative battery terminal (IMPORTANT!)**
2) Disconnect both connectors from your existing EKPM3.
3) Remove the 2 nuts securing the factory EKPM3 module and remove the module from the bracket.
4) Mount your new EKPM3 module reusing the two nuts.
5) Unwrap cable restraining cloth (wrap) enough to gain a few inches of wire slack if needed.
6) Cut the brown wire and the red/white from the black fuel pump connector (close to the connector)
7) Cut the brown wire and the red/black wire from the white connector (close to the connector)
8) Insert the white 16 pin connector into your new EKPM3 module.
9) Strip 0.3” insulation from each of the 4 wires that were removed from the connectors.
10) Insert the 4 wires exactly as shown in the photo below and tighten the terminal block screws.
11) Try to ensure that the EKPM3 has some airflow around it and can get fresh air from the surrounding area. This may require some modifications to the plastic and cloth coverings. Only a small amount of air exchange is needed.
12) Reconnect the negative battery terminal to the battery.
13) Your installation is completed.



On some vehicles there is ground shield wire (clear heat shrink).The shield wire remains in the black connector:



Testing: The diagnostic LED illuminates when the output of the EKPM3 duty cycle is >90%. Start your car and monitor the LED. With the engine cold, the diagnostic LED should turn on initially and then turn off after the engine warms up. The LED **usually** turns on at high engine RPM's (>3K RPM) with hard acceleration under load (wide open throttle). Sometimes the LED will not illuminate at all if your ECM sees that your fuel pressure is OK with less than 90% fuel pump power. If the diagnostic LED does not turn off after your engine warms up, the EKPM3 module needs to be coded to your vehicles ECM. Use an appropriate scanning tool to code the EKPM3. There are many YouTube videos showing how to code the EKPM3 if you don't know how.

Measurements: The best way to measure the output of the EKPM is by using an oscilloscope. The oscilloscope will allow you to observe the pulse width modulated fuel pump drive voltage. The duty cycle increases as the engine load and RPM increases. If you try to measure the output using a voltmeter or monitor the scanning tool live data, you will be measuring the **average** voltage driving the fuel pump. This DC voltage usually is low, around 9V at idle and increases up to around 13V under full load, high RPM.

Troubleshooting:

1) If you have coded your EKPM3 module and the diagnostic LED is not operating as described above, check your O2 sensors. Faulty O2 sensors can cause your MCU to tell the EKPM3 to stay at 100% duty cycle (LED on).
2) Check your fuses, if blown, find and fix the root cause, check your wiring.
3) Check that your fuel pump is working- you can try applying 12VDC directly to the fuel pump. You should use a fused line with the jumper wires in case the fuel pump is shorted. Note, the input power wires shown in the photo have 12VDC even with the ignition off. The battery needs to be connected of course.
4) Your stage 2 fuel pump might be a little taller than the OEM pump. This can cause the fuel line to kink and restrict the fuel flow. This is the opposite of what you are trying to accomplish so make sure none of the fuel lines are kinked in your fuel tank. It is possible for a kinked fuel line to burst due to the high pressure caused by the restriction.

Notes:

1) If you keep blowing the 20A factory fuse and there is not a wiring problem or a short in the fuel pump, you may want to upgrade the input power and fuel pump wires going to and from the EKPM3. Do not just increase the factory fuse to a higher value, this could cause a fire as you may exceed the current capability of the factory wire harness. If you're running your stage 2 fuel pump near its upper limit around 500whp then we suggest you just upgrade the wires. The larger gauge wires will also provide a higher voltage to your fuel pump and increase the fuel flow and pressure capabilities a little. Our testing on a 2009 E90 shows that the factory wires will drop the voltage at the pump by about 2VDC at 26A when using the Stage 2 EKPM3. So, if your battery voltage is 13.8V, you will have 11.8V at the fuel pump. Increasing the wire gauge will reduce the voltage drop and increase your fuel pumps output. The terminal strip on this module can accommodate up to 10AWG wire. We suggest using a 30A in line fuse if you do upgrade to 10AWG wires. The 2009 E90 has the fuse panel located in the glove box so

there is a long wire run from the battery to the fuse and back to the EKPM. This contributes to the 2V drop in voltage. Cars with fuse panels located in the trunk would not benefit much by replacing the wires.

2) If you use a scanning tool to look at live data of the current level of your fuel pump, it will read ½ the actual value with your stage 2 control module. This effectively doubles the current level required to trip a high current fault to 40A. Your OEM module will fault at 20A.
3) **Notes:** It's also highly recommended that the connector on your fuel tank bulkhead be replaced with a bulkhead studs like the ones available at [Electrical Bulkhead Stud Kit, 6 Pack (radiumauto.com)] as the OEM connector may not be able to handle the additional current needed to support the increased horsepower of your vehicle.

4) Spare connector terminals are included in case you want to revert to your OEM EMPK3.

Contact bill@et3design.com if you have any questions or problems.