

PAINLESS[®]

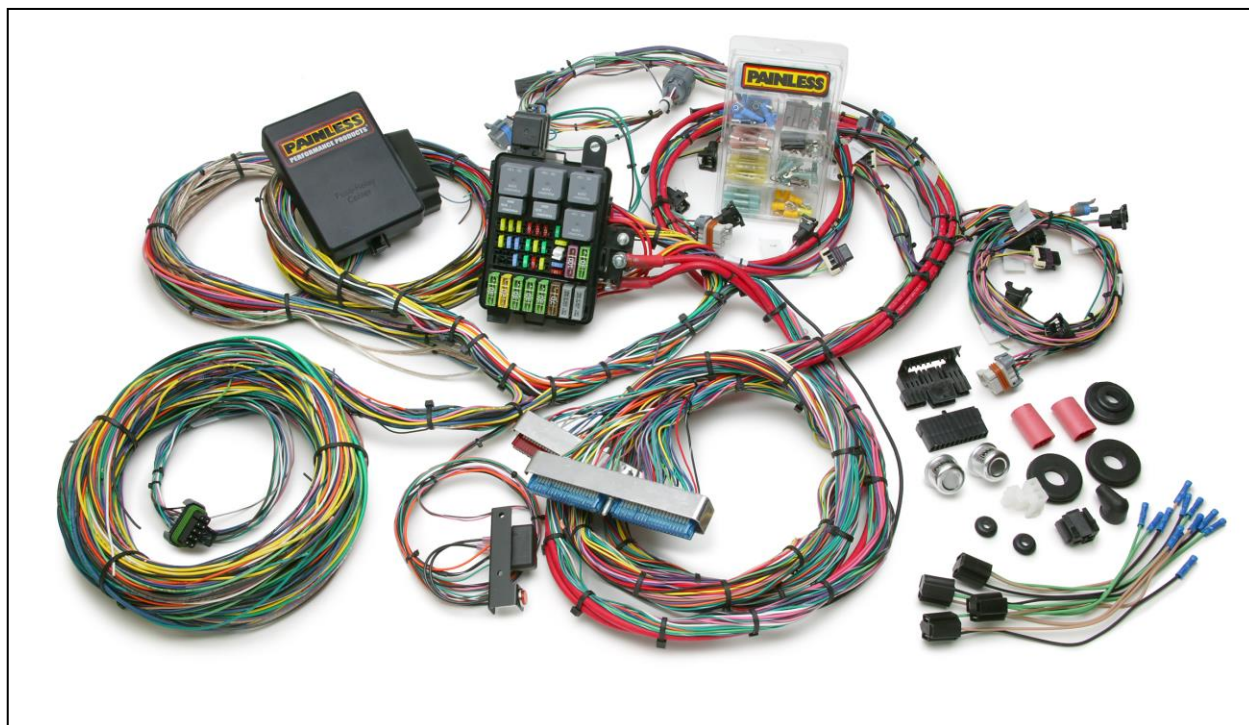
PERFORMANCE PRODUCTS

Wire Harness Installation Manual #90572

For Installing:

Part # 60617

**26 Circuit/7 Relay
4.8L-6.0 L w/4L60E, 4L80E/85E Integrated Harness**



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If you have any questions concerning the installation of this harness, feel free to call Painless Performance Products' Tech Line at 1-800-423-9696. The Tech Line can be reached from 8 A.M. to 5 P.M. central time, Monday through Thursday, and 8 A.M. to 4:30 P.M. on Fridays.

We have attempted to provide you with as accurate of instructions as possible and are always concerned about corrections or improvements that can be made. If you have found any issues or omissions, or simply have comments or suggestions concerning these instructions, please write us at the above address, send us a fax at (817) 244-4024, or email us at painless@painlessperformance.com. We sincerely appreciate your business.

Painless Performance Products, LLC shall in no event be liable in contract or tort (including negligence) for special, indirect, incidental, or consequential damages, such as but not limited to, loss of property damage, or any other damages, costs or expenses which might be claimed as the result of the use or failure of the goods sold hereby, except only the cost of repair or replacement.

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CAUTION: *BEFORE THE REMOVAL OF YOUR ORIGINAL HARNESS AND/OR THE INSTALL OF YOUR NEW PAINLESS HARNESS, DISCONNECT THE POWER FROM YOUR VEHICLE BY REMOVING THE NEGATIVE AND POSITIVE BATTERY CABLES FROM THE BATTERY. THE BATTERY IS NOT TO BE CONNECTED UNTILL THE PAINLESS HARNESS HAS BEEN INSTALLED AND TESTED.*

- **A full color copy of these instructions can be found at <http://www.painlessperformance.com/InfoSearch/manuals.php>**
- **Painless Performance Products recommends you, the installer, read this installation manual from front to back before installing this harness. Due to the variables involved with your particular installation, reading this manual will give you considerable insight on the proper installation of this harness.**

- In the event that there are unused or unconnected wires, the ends of all unused wires will need to be terminated with an insulated terminal or taped. Doing so will prevent the wires from shorting and causing harness failure or fire.

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Introduction:

This integrated chassis/fuel injection harness can be used to wire any vehicle with a 4.8L, 5.3L or 6.0L engine, 4L60E, or 4L80E/85E transmission and a chassis that utilizes switches, lighting and other circuits that are 12Volt and negative grounded. Fuel injection wires are also GM color. Chassis wires are color coded as any 1970s to 1980s General Motors vehicle would be. With this harness fitting such a wide range of vehicles, these instructions should be considered general installation procedures. Referring to a factory chassis wiring schematic of your vehicle will aid in connecting to factory switches, lighting and accessory equipment. Most manuals sold at auto parts chain stores provide a basic wire diagram. Please do not attempt to modify this Painless harness to function as your factory harness did. We have developed this harness to function as this manual instructs you to connect it.

We suggest you make identification labels and apply them as you remove the old harness from your vehicle. Marking the sections, connectors and single wire connections during the removal gives you a great backup resource to use if you forget which wire goes where while installing this Painless harness.

Be sure to retain any wiring pertaining to the following accessories as this Painless harness only provides fused power circuits for these:

- A/C-Heater selector switch, blower motor resistor and blower motor
- Power window motors, switches and relays
- Power door locks, switches and relays

Contents of this Painless wire harness kit:

Refer to the contents figure on the front page to take inventory. See that you have everything you're intended to have in this kit. If you find that anything is missing or damaged, please contact the dealer where you obtained the kit or Painless Performance at (800) 423-9696.

This Painless Wire Harness Kit should contain the following:

- Wire harness
- 2 large parts bags containing heat shrink, 4 inch zip ties, 7 inch zip ties, umbrella zip ties, rubber alternator wire boot, rubber grommets GM turn signal switch connectors, GM ignition switch connectors, GM headlight switch and dimmer switch connectors and four H4 headlight connectors.
- 1 bag labeled, PP-720, this is a pigtail for the input speed sensor found on 4L80e/85e transmissions.
- 1 clear plastic, bubble pack, parts box containing miscellaneous ring terminals, spade terminals and several types of Packard terminals.

Things to know about the Delphi Powertrain Control Module (PCM) utilized with this Painless harness:

- If the PCM is flashed for a 1999-2002 truck engine, the electric fan circuits must be turned ON in the ECM for these circuits to work in this harness. These circuits are not part of the factory flash, but do exist in the programming.

- This harness requires the PCM to be flashed as a 1999-2002 Camaro if factory cruise control is being utilized
- The GM service #12200411 PCM was factory installed in many different makes and models of General Motors vehicles. Both V6 and V8 engines can be operated by this controller. When procuring a PCM for use with this harness be sure to specify it be from a 1999-2002 Camaro Z28 or Trans Am.
- The factory Camaro Z28 and Trans Am calibration incorporates a Vehicle Anti-theft System (VATS). VATS must be turned off or otherwise the engine will continuously start for two seconds and then die, when cranked.
- Factory installed emission devices include: fuel tank pressure sensor, tank vent solenoid, tank purge solenoid, air pump, air pump solenoid, and exhaust gas recirculation solenoid. The calibration installed at the GM factory onto your PCM tells it to look for all of these emissions components. This Painless harness does not include any supporting wiring or connectors for these.
- The final drive ratio utilized in 1999-2002 Camaro Z-28 and Trans Am cars was 3.23:1. The rear tire on these vehicles had an overall diameter of 25 inches. Transmission shift schedule calibrations are based around this rear end gear ratio and tire diameter. Most likely your rear end gear ratio and tire diameter is different than this. If so, without a calibration change to the transmission shift schedules your vehicle may up shift late/soon and down shift late/soon. You may also experience improper torque converter lock up operation.
- This Painless harness utilizes two cooling fan relays built into the fuse block. Both relays are controlled by the PCM. Fan 1 relay factory calibrations are 226°F on and 219°F off. Fan 2 relay factory calibrations are 234°F on and 227°F off. GEN III engines were factory installed with a coolant thermostat that opens at 195°F. Aftermarket thermostats are available with a lower opening temperature. If you plan to use an aftermarket thermostat you must have both fan relay on/off temperature calibrations changed. We suggest an on temperature of 215°F and off at 200°F for fan 1 and 2.

Non-electrical parts and other things you should consider when transplanting a Gen III engine and 4L60E transmission include:

- If your engine has not ran for several months or more you will probably experience the joy of clogged injectors when you go to fire it up for the first time. Do yourself a favor and have the injectors cleaned, or purchase new fuel injectors. If you do not, your engine will probably not start due to clogged fuel injectors.

Gen III engines all came equipped with Delphi Multec injectors. Different part numbers have different lb/hr rated injectors.

- Fuel system requirements include a high pressure, 56-60 PSI, fuel pump. The fuel feed line to fuel rail must be at least -6AN or 3/8" in size for stock engine, 350-450HP, setups. If your engine's output is more than 450HP you should use -8AN or 1/2" fuel rail feed line. Walbro manufactures a wide variety of high pressure fuel pumps and installation kits.

If your vehicle's fuel tank is one with the early small 1 & 13/16" hole sending unit you have several options of how to upgrade it. One option is to modify the sending unit yourself by adding a fuel return line. Another option is to replace the sending unit with an aftermarket one from a company such as www.robbsmcperformance.com. They offer drop in units with a variety of tube sizes and adapter fittings. The other option is to have a company such as www.rockvalleyantiqueautoparts.com cut out the old flange and weld in a large flange from a later model 1984 & up GM vehicle. The larger flange will allow for an in tank mounted fuel pump.

Gen III engines have return style fuel rails. External fuel pressure regulators are not required since the fuel rails have a built in one. You can plug the return line from the fuel pressure regulator on the fuel rail and mount an external vacuum biased regulator on the firewall. Make sure to adjust the fuel pressure to 56-60 PSI.

- Gen III engine cooling systems have some specific requirements. First, the lower radiator hose connects to the water neck with the thermostat behind it. If looking at the front of the engine it is the water neck to the lower left of the water pump. The upper radiator hose connects to the water neck at the top of the water pump. Second, the factory coolant thermostat only starts to open at 195°F and is fully open at 210°F. Aftermarket thermostats are available that will open at a lower temperature. Third, these engines incorporate steam tubes that are plumbed into both the front and rear of each head. They are all tied together and then plumbed through the bottom of the throttle body and then to the radiator. Most people remove the throttle body from this coolant loop by connecting the steam tube outlet, which is located just the lower right of the throttle body and protruding forward from under the intake manifold, directly to the upper radiator hose or to an open coolant bung in the radiator. Do not plug off this steam tube, it must be connected to either the upper radiator hose or to the upper third of the radiator in order to bleed off any steam that accumulates in the engine heads.

Companies such as Afco www.afabcorp.com manufacture direct bolt in radiators that are specifically designed for Gen III engine transplants. These are ideal especially since the coolant inlet and outlet are both on the passenger side of the radiator. By moving the upper radiator inlet to the passenger side the driver side is opened up to allow a fresh air intake elbow to be routed there.

- Coolant temperature and oil pressure gauge senders can easily be connected to any Gen III engine. In both engine heads are threaded coolant ports with Metric 12 x 1.5 threads. The coolant port on the driver side head is utilized by the coolant temperature sensor needed for the PCM. The port on the passenger head usually has a plug in it that can be removed and a temperature sender for a gauge can be inserted. Most aftermarket gauge manufacturers offer adapters to adapt their gauge sender so you can thread it into this coolant port.

There are two places that oil pressure senders may be connected to these engines. Behind the intake manifold is a threaded port, Metric 16 x 1.5 threads. Depending on what vehicle your engine was donated from, this port might already have a 0-5 Volt oil pressure sensor in it. This Painless harness does not have connections for this sensor so you may remove it and with an adapter screw in your oil pressure gauge sender. Another spot that is common for oil pressure senders is just above the oil filter. Here you will find an aluminum cap with two hex head, 8mm bolts holding it to the oil pan. You can remove this cap, tap it to the threads that match your oil pressure sender and then reinstall it. Just keep in mind that if you plan to use headers this location for a sender may not be ideal. Heat can kill a sender quick.

- 4L60E, 4L80E, & 4L85E transmissions require external fluid coolers. The ports on the side of the transmission usually have quick-connect fittings installed. Most local auto parts suppliers will offer fittings that adapt these ports to pipe flare fittings. If you plan to bend your own hard lines this is your best bet. Or, you can also screw in 3/8" NPT fittings into these ports. Make sure to use Teflon tape on the threads for a good seal. Fittings are available from many online retailers or your local hydraulic hose shop that are male 3/8" NPT to male -6AN or whatever your application may need.

Shifter detents are another thing to consider when transplanting a 4L60E into a vehicle that was originally manufactured with a 2 or 3 speed transmission. Companies such as Shiftworks www.shiftworks.com manufacture shifter conversion kits to upgrade your factory shifter to operate your late model transmission. Another option is to completely replace the shifter with an aftermarket one such as Lokar www.lokar.com part # FMS64L60EEM.

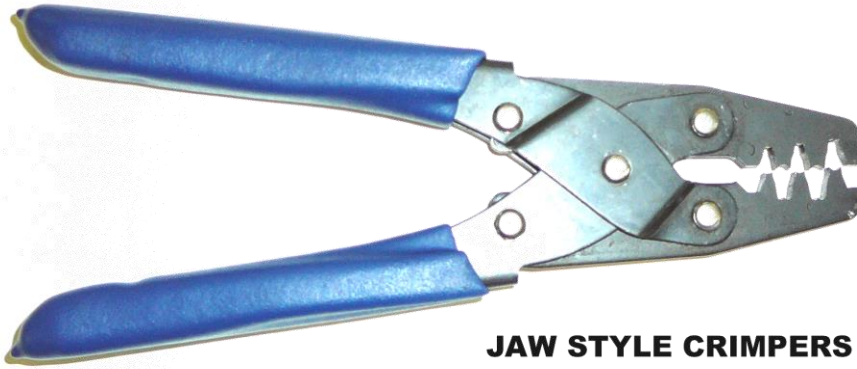
- Throttle cables originally installed to your transplant vehicle may or may not be long enough to reach the throttle body. If it is not long enough or just doesn't seem to work properly because it is worn out/frayed then check out Lokar and their universal LS series throttle cables. These are cut to fit and easy to install.
- Engine accessory and frame clearance always seems to be an issue that comes up when transplanting a Gen III engine into any early model vehicle. Usually the alternator and power steering pumps do not have any clearance issues associated with them. The factory A/C compressor mounts to the passenger lower side of the engine. In this location, it will not clear most GM frames. You will either have to notch the frame to create clearance or move the A/C compressor. Companies such as KWIK Performance www.kwikperf.com offer relocation brackets that move the compressor to the upper passenger side of the engine. Moving the compressor to this location works well with most transplants. These kits utilize a Sanden style compressor.
- Drive shaft length will have to be modified if you are upgrading to a 4L60E from most 2 & 3 speed automatics or manuals. You should also consider having the entire tube upgraded to a thicker wall material since you are likely to exceed the handling capabilities of the original tube.

Tools Needed:

In addition to regular hand tools such as ratchets, sockets, extensions, screw drivers, flash light or drop light, you will need the following tools:

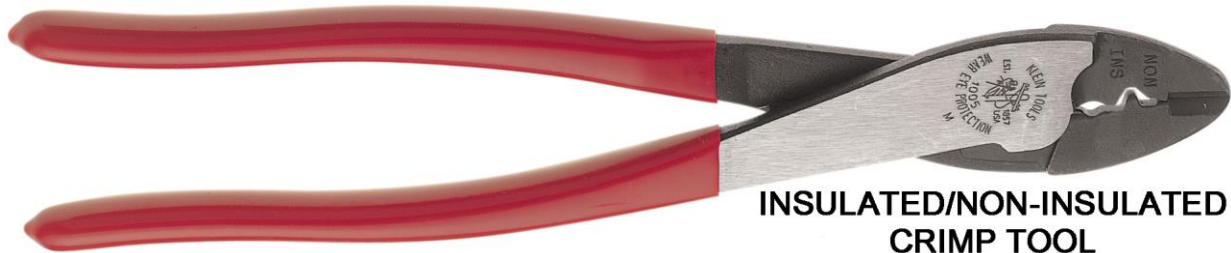
Wire Crimping and Stripping Tools:

Two types of crimping tools are needed to install this harness. The jaw style of crimp tool shown below can be purchased from www.dellcity.net under part number **990170**. You will need this style of crimper to crimp the terminals used with GM turn signal, ignition, headlight and dimmer switches.



JAW STYLE CRIMPERS

The second style of hand crimper shown below can be purchased from just about any local electrical supply shop, home improvement store or can also be purchased online. You will need this style of crimper to crimp the heat shrinkable, insulated terminals included in the small parts bubble pack.



**INSULATED/NON-INSULATED
CRIMP TOOL**

A good set of wire strippers are required to strip wire properly. Shown below are a pair of strippers manufactured by Klein tools and that are available from just about any local electrical supply shop, home improvement store or can be purchase online. This style of wire stripper is ideal for this harness install because of its ability to properly strip wire gauges 10awg to 20awg.



Volt/Ohm Meter:

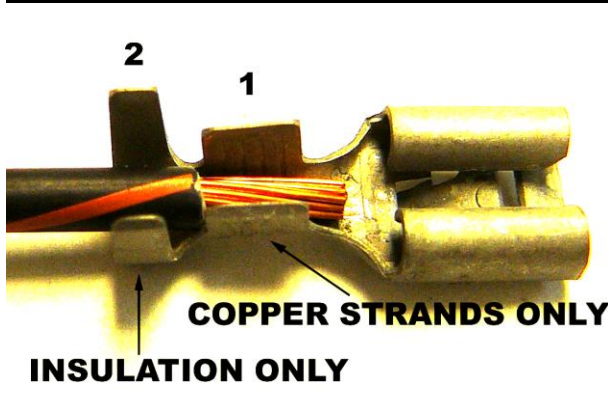
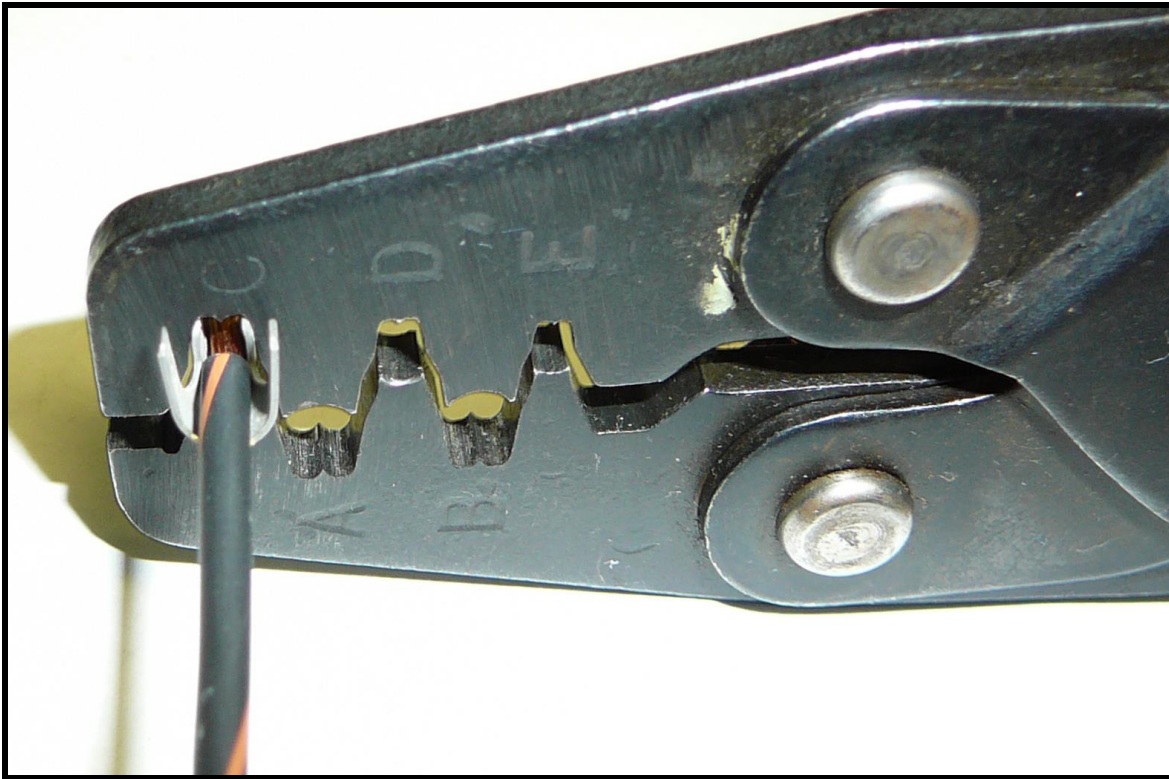
A Volt/Ohm meter is always a good tool to have on hand when installing any type of electrical components into any vehicle. Most basic units provide the two functions required to diagnose most electrical issues seen during a harness install. These two functions are the ability to read DC Voltage and electrical continuity or Ohms. They can be purchased from any home improvement store, local hardware store and electrical supply shop and online.



Battery Charger:

A battery charger is a very useful tool to have when initially connecting power up to a newly installed wire harness. Battery chargers are available from any auto parts, sporting, home improvement or local electrical supply store. Be sure the charger you purchase has a low (5-10 Amps) setting.

How to use jaw style crimpers:



Parts required for installation of this harness:

The Gen III engine and 4L60E transmission section of the wire harness requires the following parts for proper installation and operation. Factory installed engine sensors, injectors and coils should be perfect matches for this harness. Do not purchase the parts listed below unless you are missing it or need to replace a faulty one.

Part Description	Part Number
Engine	1999-2006 Gen III (Mechanical Throttle)
Transmission	1997 & UP 4L60E, *4L80E, *4I85E
PCM (Powertrain Control Module)	GM Service #12200411
Fuel Injectors	Delphi Multec
Ignition Coils	Delco D580
Throttle Position Sensor	Delco 213-912
Idle Air Control	Delco 217-1806
Engine Coolant Temperature Sensor	Delco 213-953
Mass Air Flow/IAT Sensor	GM Service #25318411
Cam Position Sensor	Delco 213-363
Crank Position Sensor	Delco 213-354
Knock Sensor	Delco 213-3521
Oxygen Sensor	Delco AFS106
PRNDL Switch	GM #29540479
Vehicle Speed Sensor	Delco 213-328
Cruise Control Module	GM #25315091
Cruise Control Cable	GM #15040802
Manifold Absolute Pressure Sensor	Delco 213-331

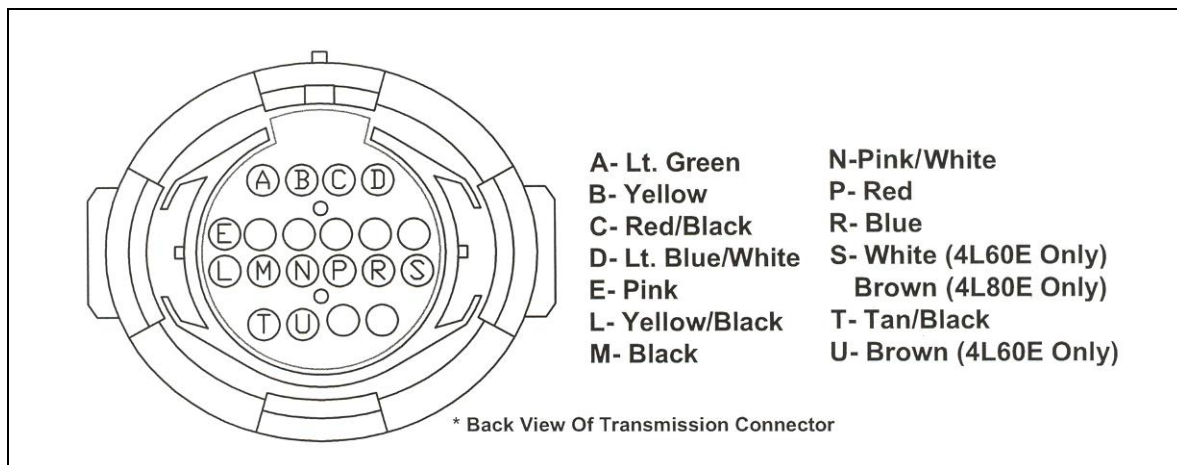
***NOTE:** The PP-720 pigtail supplied with this kit must be added to the harness in order to utilize a 4L80e/85e transmission. Additionally, the transmission connector must also have two wires re-pinned and **the ECM must be flashed for the correct transmission.** Instructions for these modifications can be found on the next page. These modifications are easier to make before the harness has been installed.

4L80e/85e Transmission

***Note: A custom ECM tune will be needed in order to run ECM flashed with a LS1 operating system as these engines were never factory equipped with a 4L80e/85e transmission. An ECM with a factory truck tune must be flashed for a vehicle with a 4L80e if a 4L80e/85e is being used.** The 60617 harness has the transmission connector pre terminated to allow use of a 4L60E transmission. In applications where a 4L80/85e is to be used, follow this procedure to change your transmission connector to ensure all functions of the transmission work properly. See the diagram below for repinning the transmission connector. The supplied input speed sensor pigtail, labeled PP-720, will also need to be added to the ECM/ harness.

Transmission connector Re-Pin

1. With the terminal end of the connector and the arrow on top pointing towards you, carefully remove the white retaining lock located in the center of the connector.
2. Locate the white wire located in terminal location S. Using a paper clip or small screwdriver, gently lift the locking tab inside the connector and pull the wire from its location. The white wire has no function with the 4L80E transmission; it needs to be taped up and stowed in the harness in case a 4L60E is ever to be used.
3. Now locate the brown wire located in terminal location U. Using the same method, remove the brown wire from it's location
4. Gently insert the brown wire into terminal location S.

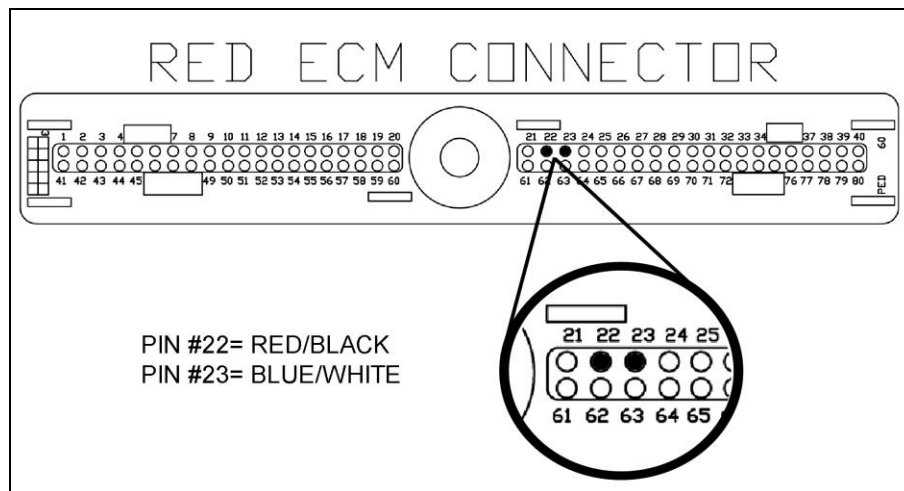


Transmission Connector Pin Out

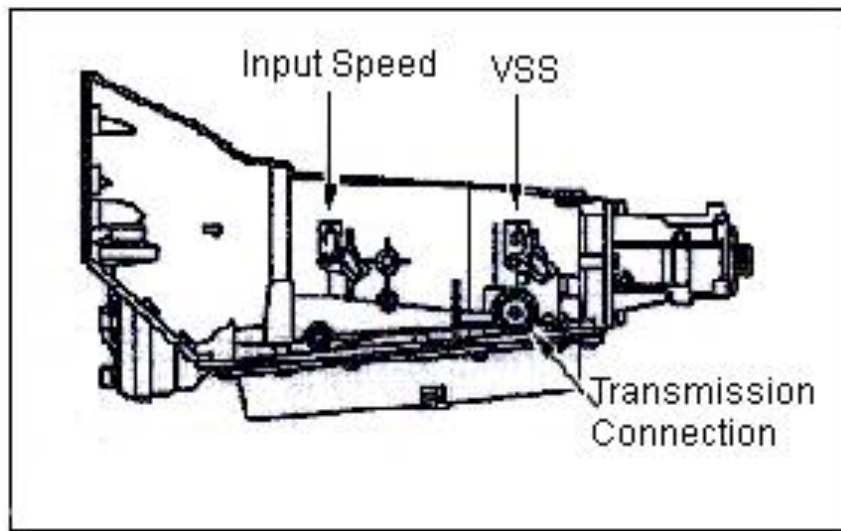
Adding the Input Speed Sensor Connection, PP-720

Wires from the pigtail have been pre-terminated and have had the appropriate connector pre-installed. You, the installer, must simply install the 2 terminals into the ECM connector and route the connector to the transmission section of this harness. It needs to match the length of the VSS connector from the harness. Extra length has been supplied to fit those with extra-long Painless EFI harnesses as this pigtail is also used in other Painless harnesses. In most situations this pigtail will have excess length that will need to be coiled up or cut off. Extra ECM terminals have been supplied in the event the installer wants to cut the pigtail to length. Rollover crimpers, like Painless part **#70900** will be needed to crimp these terminals.

1. Locate the RED ECM connector. Looking at the wire insertion side of the connector, identify pin locations #22 and #23. These locations will be empty.
2. Using a small screw driver, press the locking tang on one side of the terminal lock and pull the lock away from the connector. Once one side is done, do the other side as well to completely remove the lock from the connector. You only need to remove the lock from side of the connector with pins 22 and 23.
3. Locate the Input Speed Sensor pigtail supplied with this kit. This pigtail will have a RED/BLACK and BLUE/WHITE wires. Plug the RED/BLACK wire into pin #22 and the BLUE/WHITE wire into pin #23. Re-install the RED terminal lock.
4. Route the pigtail with the other transmission wires to the transmission and connect it to the Input speed sensor, located towards the front of the transmission. Please be aware that this connector is also the same connector that plug into the VSS sensor, do not mistakenly plug the Input Speed sensor into the VSS on the rear of the transmission and or the VSS connector into the Input Speed Sensor.



Input Speed Sensor Connection to ECM

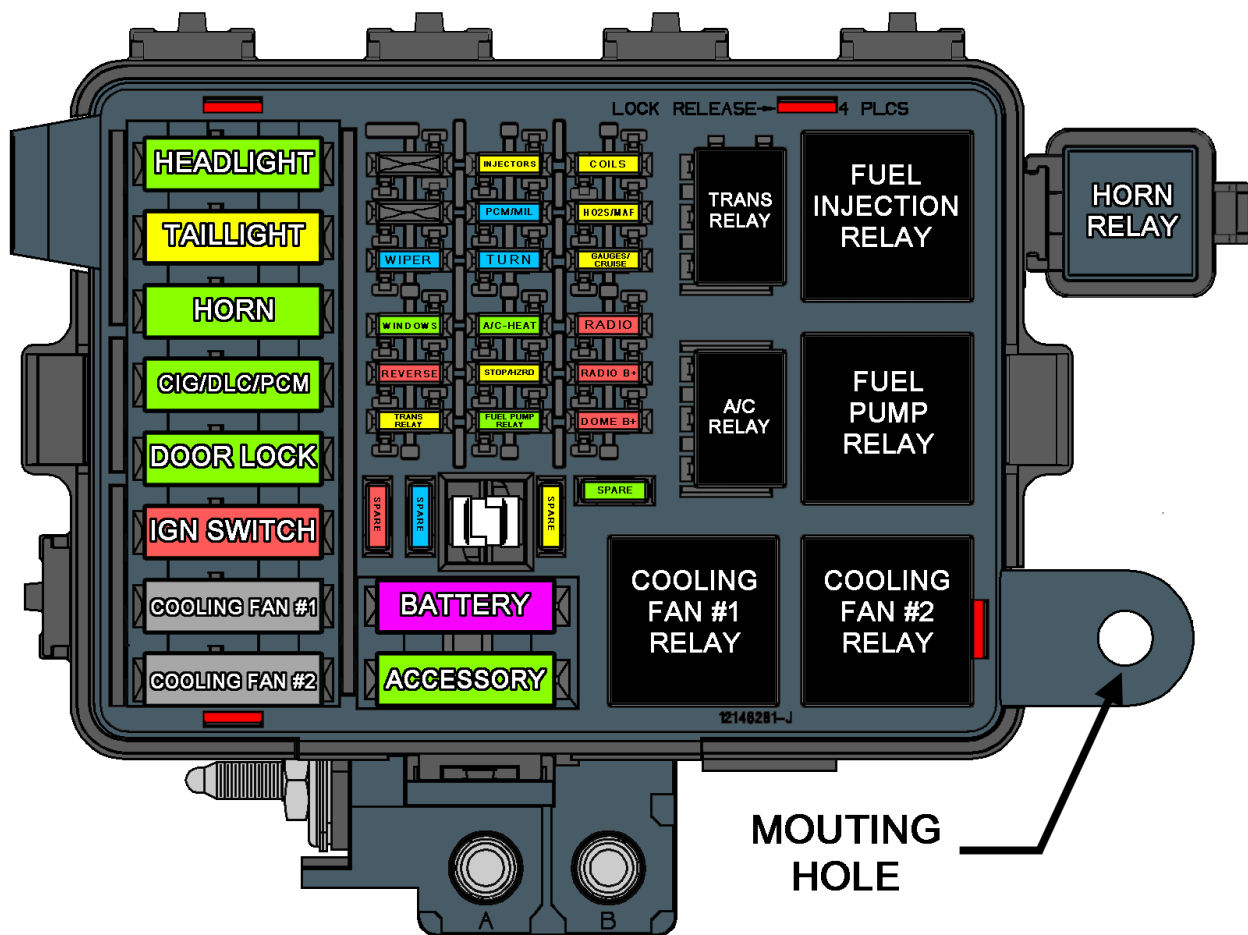


4L80e/85e Transmission

Mounting the fuse block:

The 26 fuse 7 relay fuse block is the center point of this integrated harness. All power is routed through this fuse block. The first step to installing this integrated harness is to mount the fuse block. Remove the front cover from the fuse block.

- If looking at the front of the fuse block you will see a mounting hole on the lower right side. Use a bolt and this hole to secure this fuse block if possible.
- Another option for mounting this fuse block will require you to remove the rear cover from it. Insert a small, flat screw driver into the red slots as labeled in the picture below. Push the screw driver about ½" into the slot, gently pry on the screw driver handle towards the center of the fuse block while at the same time pulling the rear cover away from the fuse block. Do this for all four release slots. Once the rear cover is released from the main body of the fuse block you may notice the need to cut the tie wraps around the wires protruding from it in order to completely remove it. If so, cut the tie wraps and completely remove the rear cover from the fuse block. The front cover and rear cover will click together without the fuse block in between them. Just line them up and push them together until you hear the two locks click. You now have an accurate mock up of the fuse block to aid you when figuring out where to mount it. You can now make a custom bracket or just run some self tapping screws through it to hold this rear cover in its mounting place. Be sure any mounting solution you use does not distort the rear cover or introduce any sharp metal objects that could short out wires when you reassemble the fuse block.



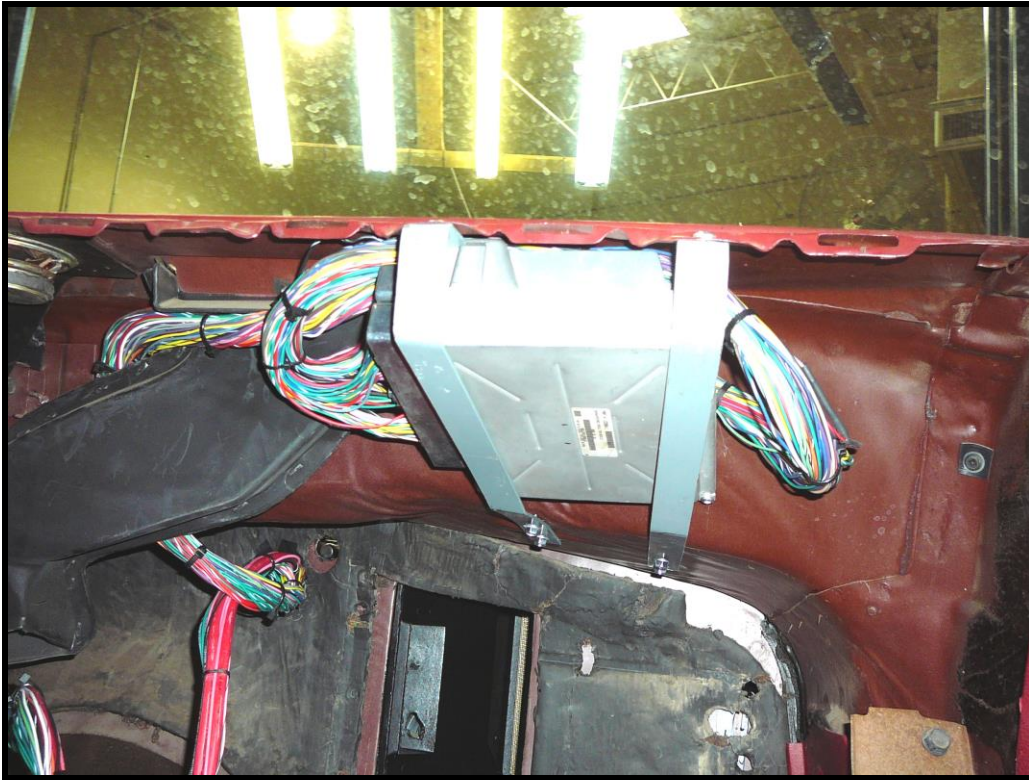
— RELEASE TABS

Mounting the Powertrain Control Module:

The Delphi PCM utilized with this harness must be securely mounted away from excessive heat, water or oil and road debris. We provide 5 feet (1.5 meters) of harness between the main harness body and the PCM connectors. The harness also provides 3 feet (1 meter) of harness between the PCM harness breakout and the fuse block. So, finding a spot to mount the PCM should not be a problem. Custom mounting brackets will be required.

- Behind the dash board is always a good place to mount the PCM. Depending on your dash board and whether or not your a/c evaporator box will allow for it, you most likely can mount the PCM here.
- Under the passenger seat is another good place to mount the PCM. The 5ft of harness should allow you to mount the PCM here. Just be sure the seat has enough clearance below it to not crush, scrape or damage the PCM or harness.
- On some vehicles, behind the passenger kick panel, there is a cubby hole large enough to mount the PCM. If your vehicle has this cubby hole feel free to mount the PCM there.
- Engine compartments usually have ample room that can be used for PCM mount places. For instance, many vehicles have large cubby holes between the inner fender, out fender and firewall. Sometimes this area is used for a/c evaporators

and blower motor mounting; so make sure the space does not already have a planned occupation.



Harness routing and attachment:

Now that the fuse block and PCM are mounted you can move on to routing the harness sections to their respective automobile locales. Take your time, leave enough slack in the harness to accommodate body/engine/chassis movement and keep the harness away from moving and/or hot parts. This complete wiring system, as well as this instruction manual, has been designed with five major groups incorporated into it. These groups are as follows.

Engine section:

This sections wires are to be routed out the center of the firewall, into the engine compartment, and then to their respective component.

Includes wires and/or connectors that connect to the following: injectors, coils, engine coolant temperature sensor, alternator, throttle position sensor, idle air control, cam position sensor, manifold absolute pressure sensor, knock sensors, intake air temperature sensor, mass air flow sensor, crank position sensor, vehicle speed sensor, transmission solenoid pack, transmission mounted PRNDL switch, driver and passenger pre-catalytic converter oxygen sensors, starter, a/c compressor, oil pressure gauge sending unit, coolant temperature gauge sender and two engine grounds.

Dash section:

Includes fuse block, turn and hazard flashers, a horn relay, an interior ground connection, and the appropriate wires to connect the following: a/c-heater switch, wiper switch, ignition switch, headlight switch, turn signal switch, dimmer switch, cruise control switch, radio, gauge cluster, cigar lighter, courtesy lights, OBD-2 diagnostic port w/check engine light, driver and passenger power window/lock.

PCM section:

This section is to be routed to the powertrain control module.

Includes blue and red, 80 pin connectors for the powertrain control module.

Headlight section:

This section is to be routed out the driver side of the firewall, into the engine compartment, and then to their respective components.

Includes wires and/or connectors that connect to the following: high and low beam headlights, turn lights, park lights, grounds, brake switch, cooling fan 1 & 2, wiper motor, cruise control module and horn.

Tail section:

This section is to be routed to the rear of the vehicle. You can either route this section out into the engine compartment and then to the rear of the vehicle or route it under the door sill plate and then to the rear of the vehicle.

Includes wires that connect to the following: fuel sending unit, electric fuel pump power wire, reverse lights, left turn/brake/tails, license plate light, right turn/brake/tail lights, grounds, amplifier activation wire and electric antenna activation wire.

Engine section:

To route the fuel injection engine section of this harness out into the engine compartment you will be required to drill a 1 5/8" (41mm) hole in the firewall. Be sure to de-burr the hole with a round file and to fold some duct or electricians' tape around the metal edge of the hole so as to not chafe the harness while inserting it. The harness allows 4 feet (1.2 meters) of length between the fuse block and first major fuel injection engine section break out. Make sure you measure where the hole should go according to the harness break out.

When pushing a fuel injection harness through the firewall always start with the largest connector. In this case the largest connector is the transmission solenoid connector. After this connector is through the hole in the fire wall proceed to push all the other connectors through. This process is always easier said than done and we suggest you have a second person present to assist you with this. See photo below.



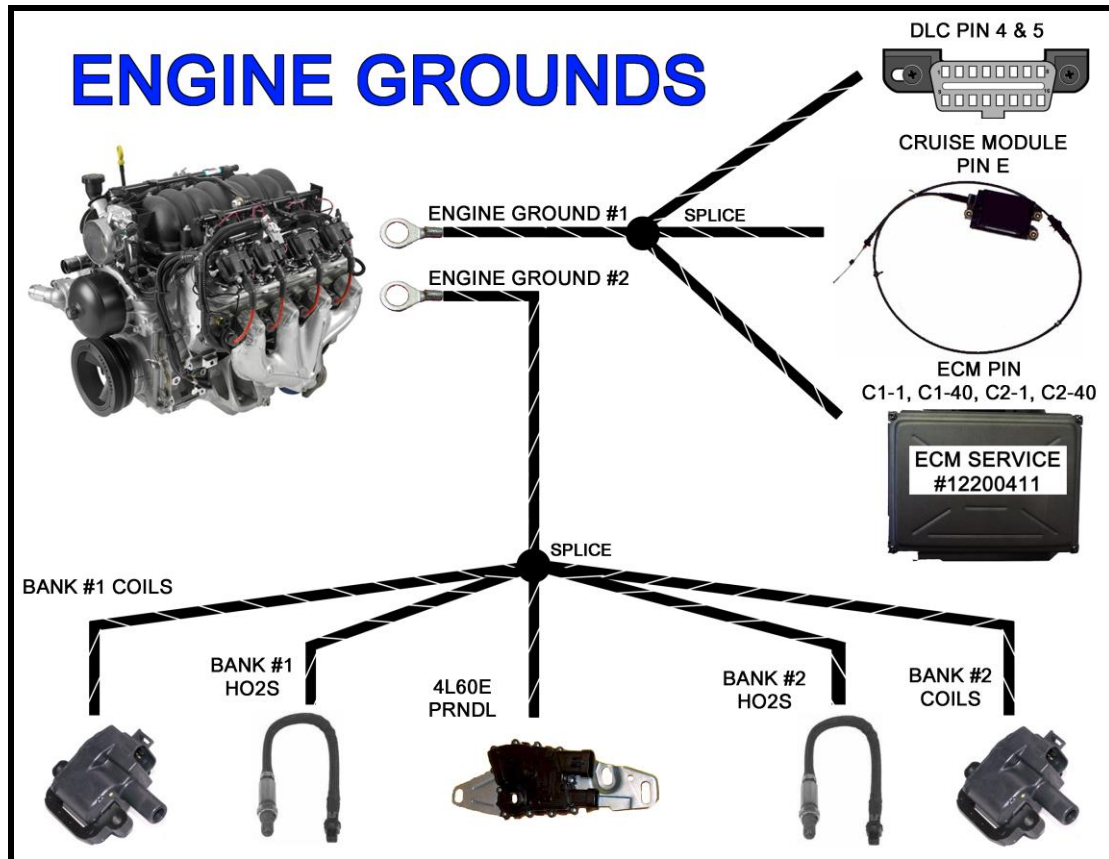
Once you have the entire fuel injection engine section through the fire wall hole begin to sort and route the harness to it respective component. Notice that the harness is broke out into several sections. Read each printed tag on the fuel injection section of the harness and connect them to their respective component. All connectors are designed with a key slot or pin configuration which requires directional insertion into its mating component. Do not force the connector insertion as this will break it, its mating component or bend the pins inside of either one. Route and connect the connectors to their mating components as shown in the next few pages.

Lay the fuel injection harness out onto the engine and decide how to secure it before making any connections:

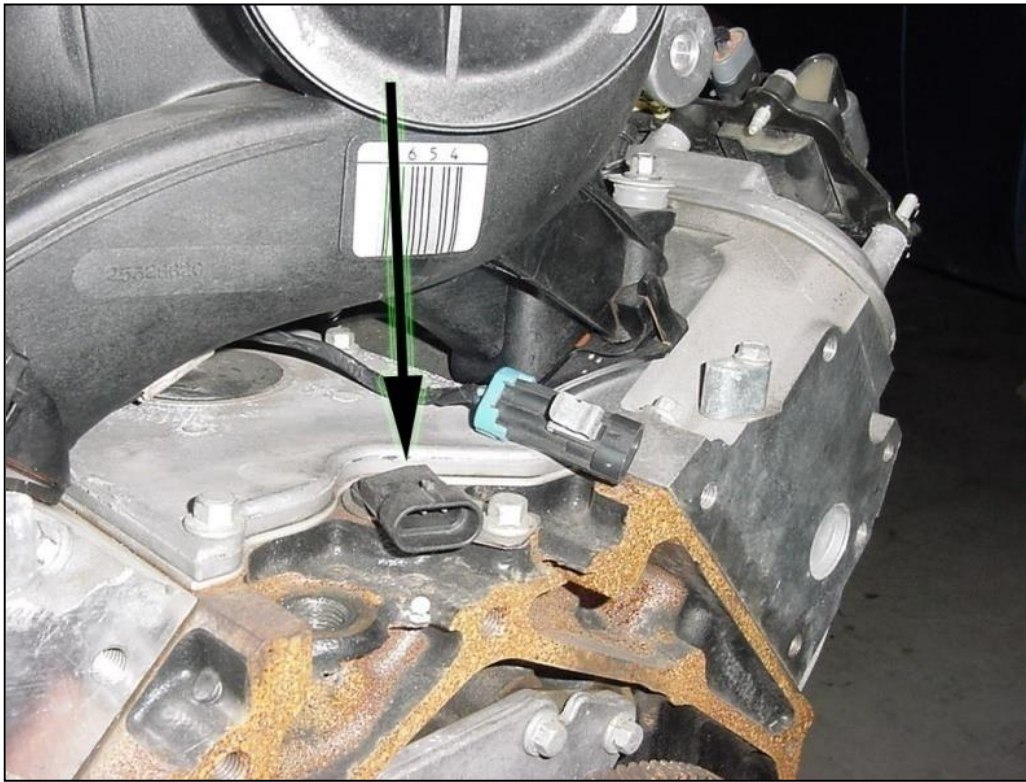
1. Lay the driver side injector/coil break out onto the driver side fuel rail.
2. Lay the passenger side injector/coil break out onto the passenger fuel rail.
3. Feed the crank position sensor (CKP) connector and starter wires down to the starter.
4. Feed the passenger oxygen sensor connector down to where its sensor will be located.
5. Feed the transmission solenoid, vehicle speed sensor and park/neutral switch connectors down towards the transmission.
6. Feed the driver oxygen sensor connector down to where its sensor will be located.
7. Lay the intake air temp (IAT) and the mass air flow (MAF) connectors out to the where the sensors will be mounted. Use some of the included tie wraps to secure these wires to which ever injector bank you route it with.

Attach or connect the connectors and open ended wires for the engine and transmission to their mating components.

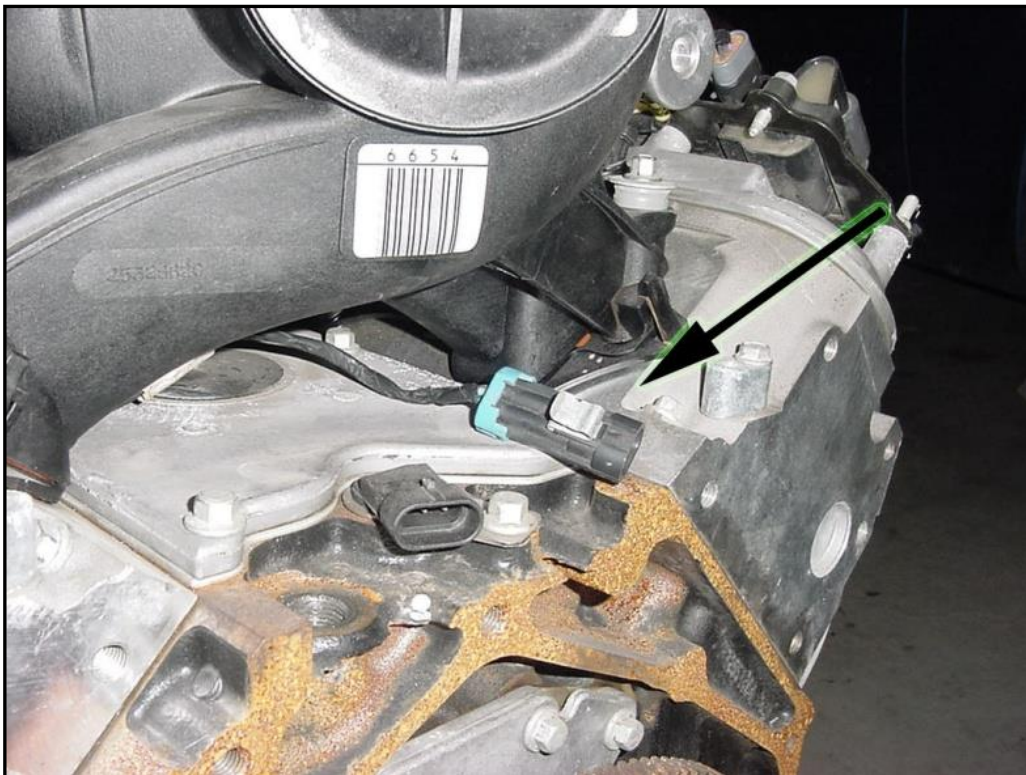
1. Locate the two black/white engine ground wires (labeled **Ground #1** and **Ground #2**) which protrude from the main engine harness breakout near the back of the intake manifold. These two ground wires need to be terminated using two of the large yellow ring terminals from the parts bubble pack. **You must separate these grounds; bolt one to each engine head.** See the diagram below for more information on what these grounds are used for.



2. Plug the black, three pin, cam position sensor connector (labeled **CMP**) into the cam position sensor located in the engine block at the back of the intake manifold.



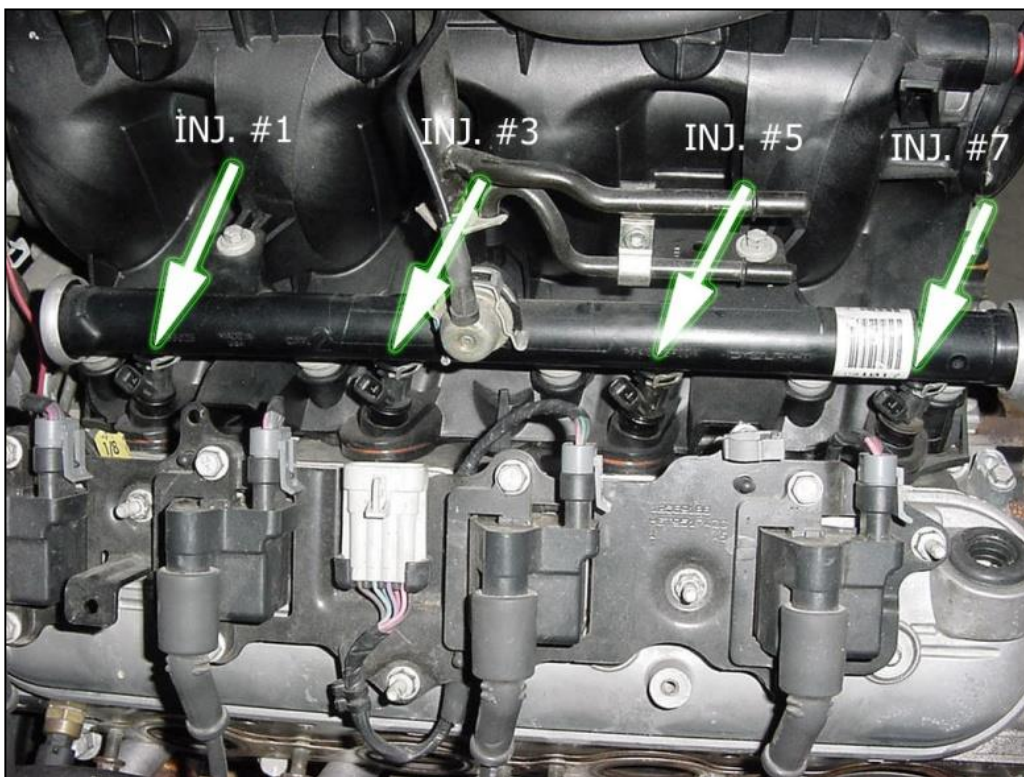
3. Plug the black, two pin, knock sensor connector (labeled **KNOCK**) into the knock sensor pigtail which protrudes from underneath the rear of the intake manifold.



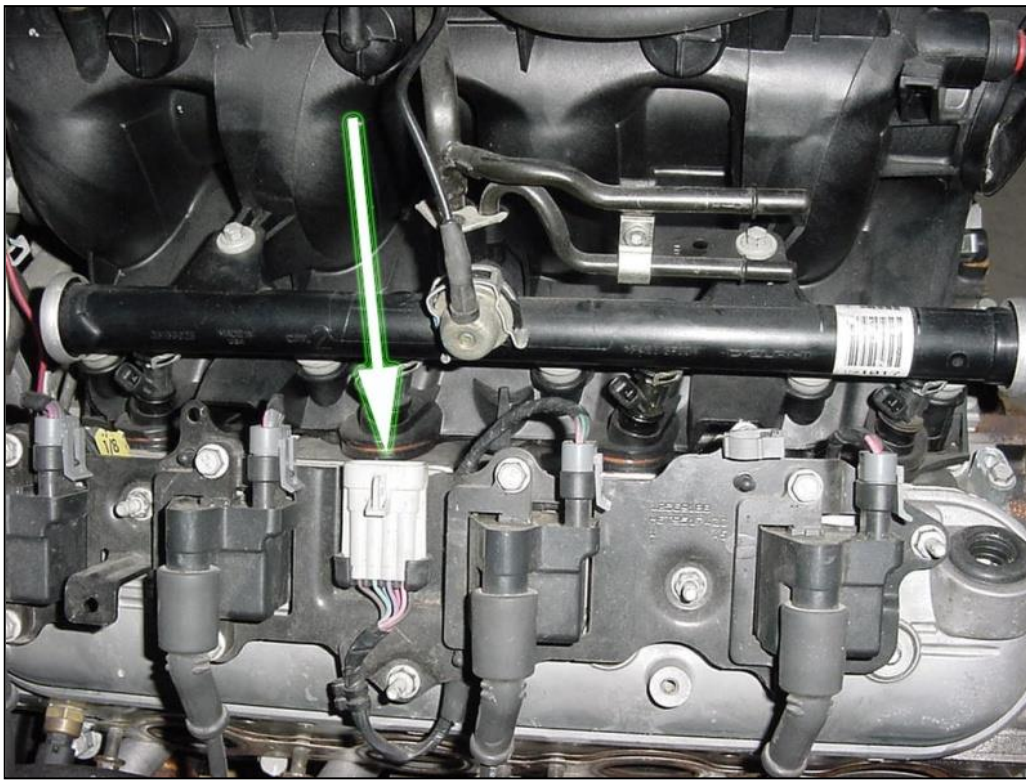
4. Plug the grey, three pin, manifold absolute pressure sensor connector (labeled **MAP**) into the MAP sensor located at the center rear of the intake manifold.



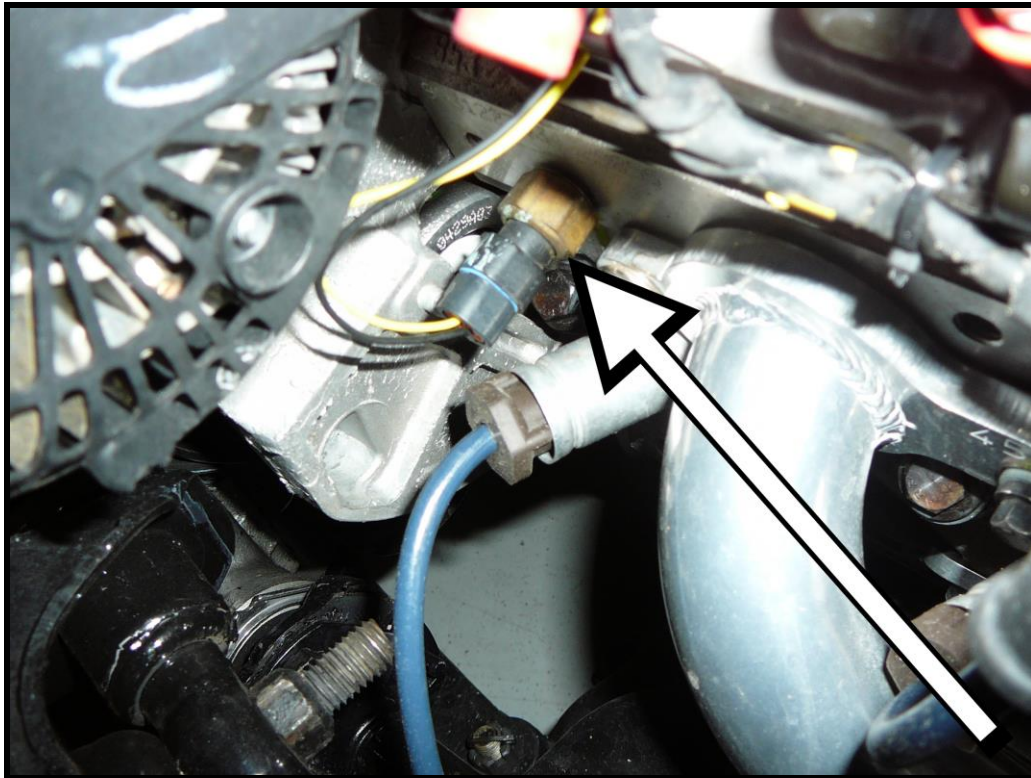
5. Plug the 4, black, two pin, driver side, injector connectors into their mating injector. #1 cylinder is at the front driver side of the engine.



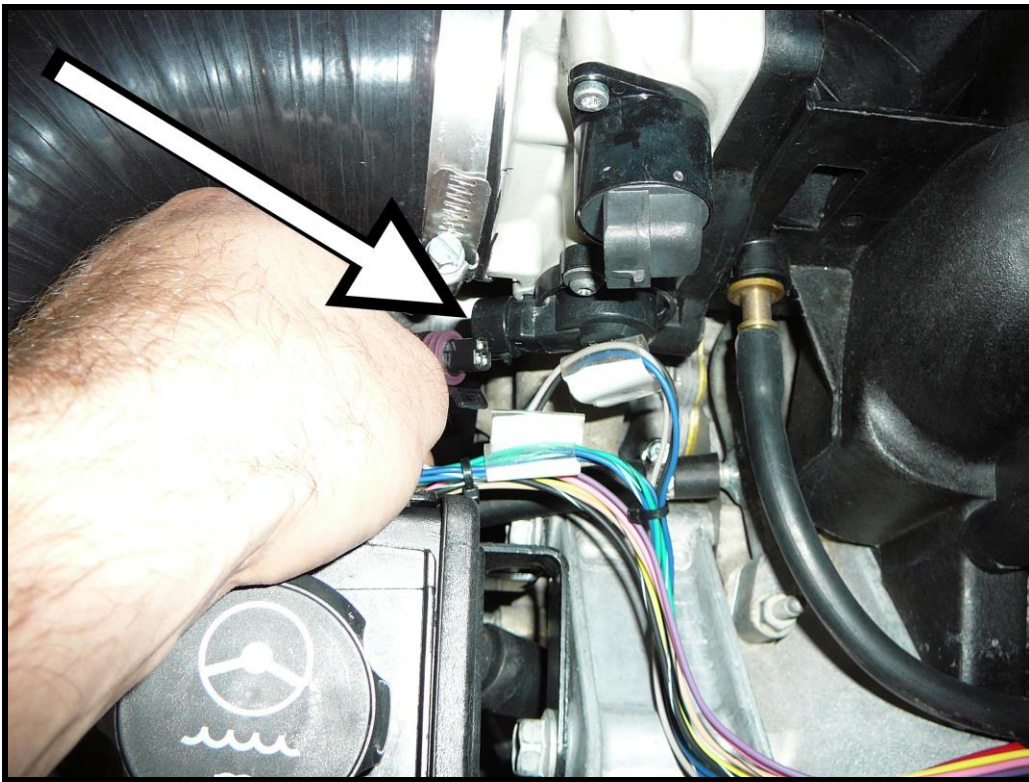
6. Plug the white, seven pin, driver side coil connector (labeled **DRVR COILS**) into the mating coil harness located on the driver side valve cover.



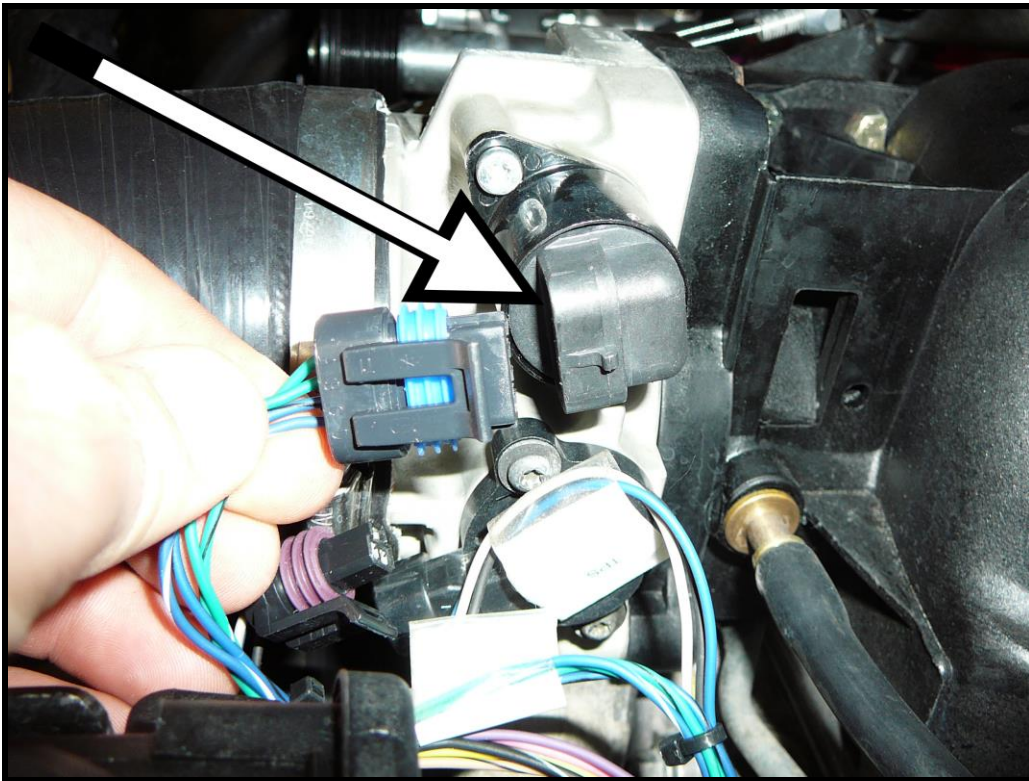
7. Plug the black, two pin, engine coolant temperature sensor connector (labeled **ECT**) into the coolant temp sensor located just in front of the #1 cylinder exhaust port on the driver side head.



8. Plug the black, three pin, throttle position sensor connector (labeled **TPS**) into the throttle position sensor located on the side of the throttle body.

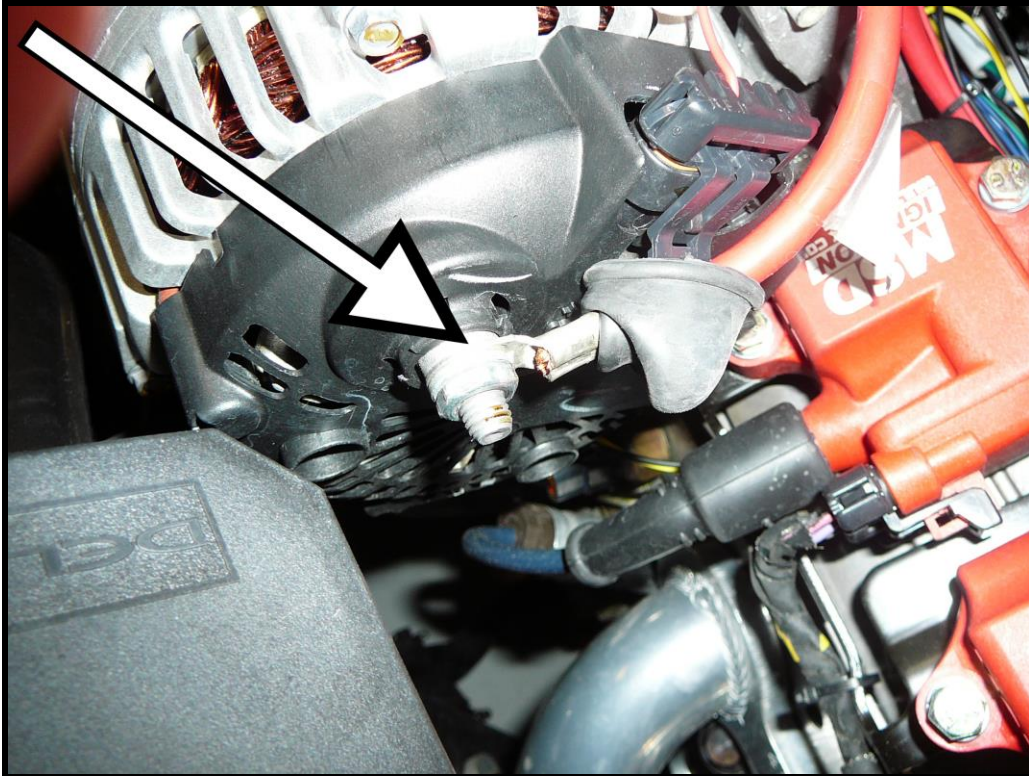


9. Plug the black, four pin, idle air control connector (labeled **IAC**) into the idle air control stepper motor located on the side of the throttle body.

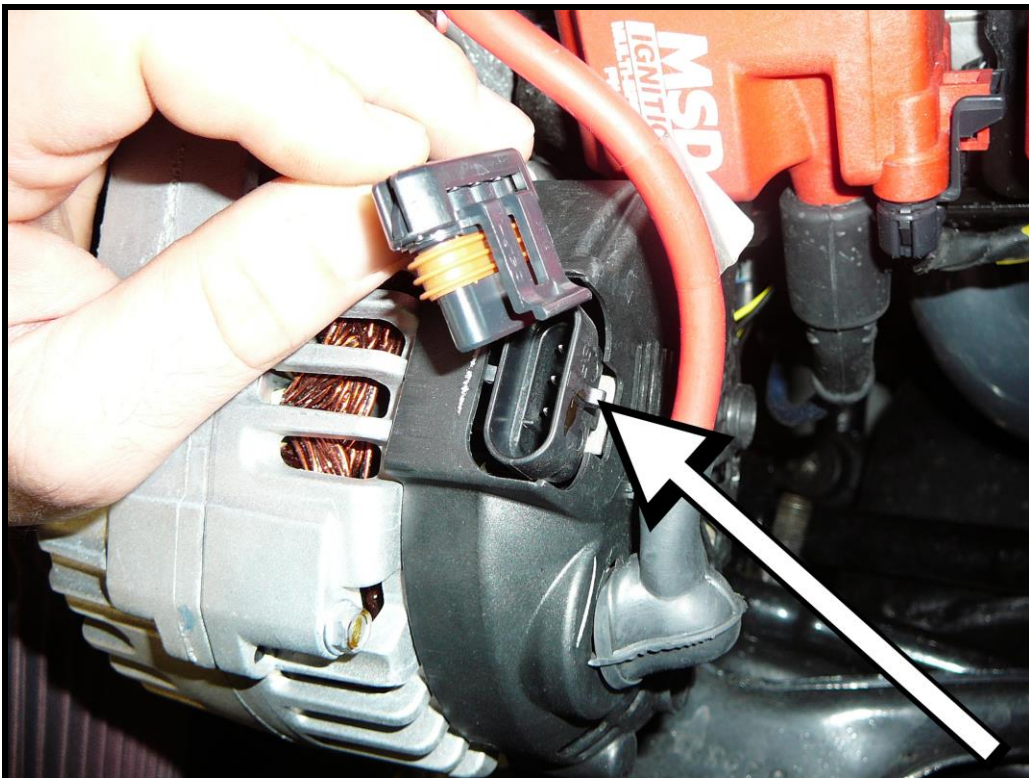


10. Route the red 6 gauge wire (labeled **ALTERNATOR**) to the charge lug on the alternator. Cut it to length, insert it into the alternator boot provided in the parts

kit and then terminate it with the appropriate terminal from the parts kit and connect it.

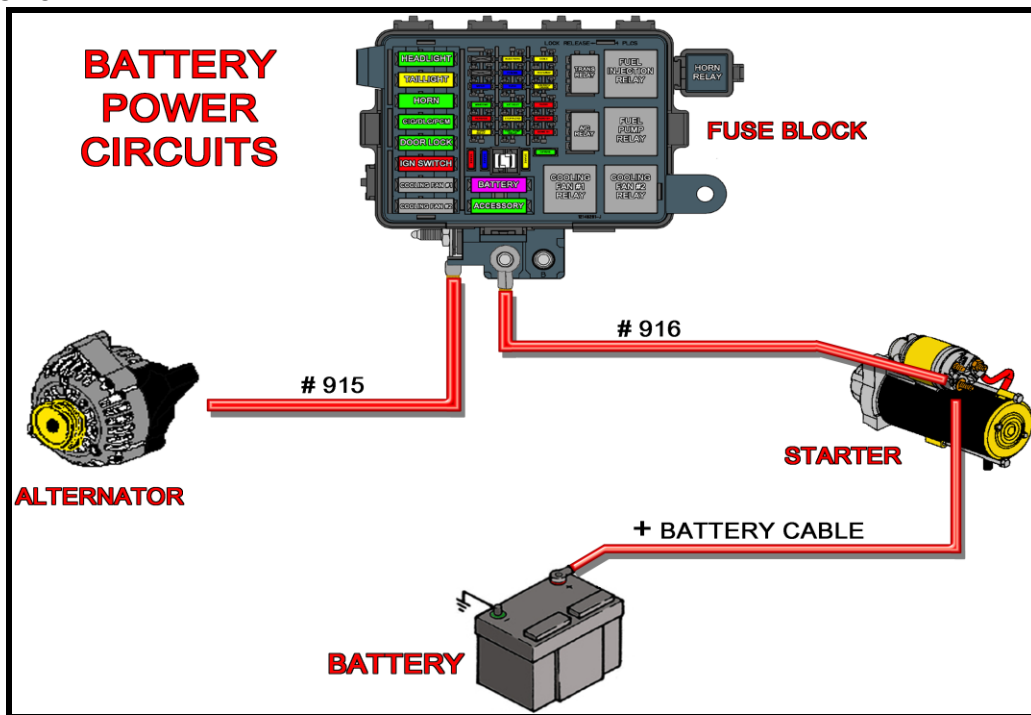


11. Plug the black, four pin, alternator regulator connector (labeled **ALTERNATOR**) into the alternator.

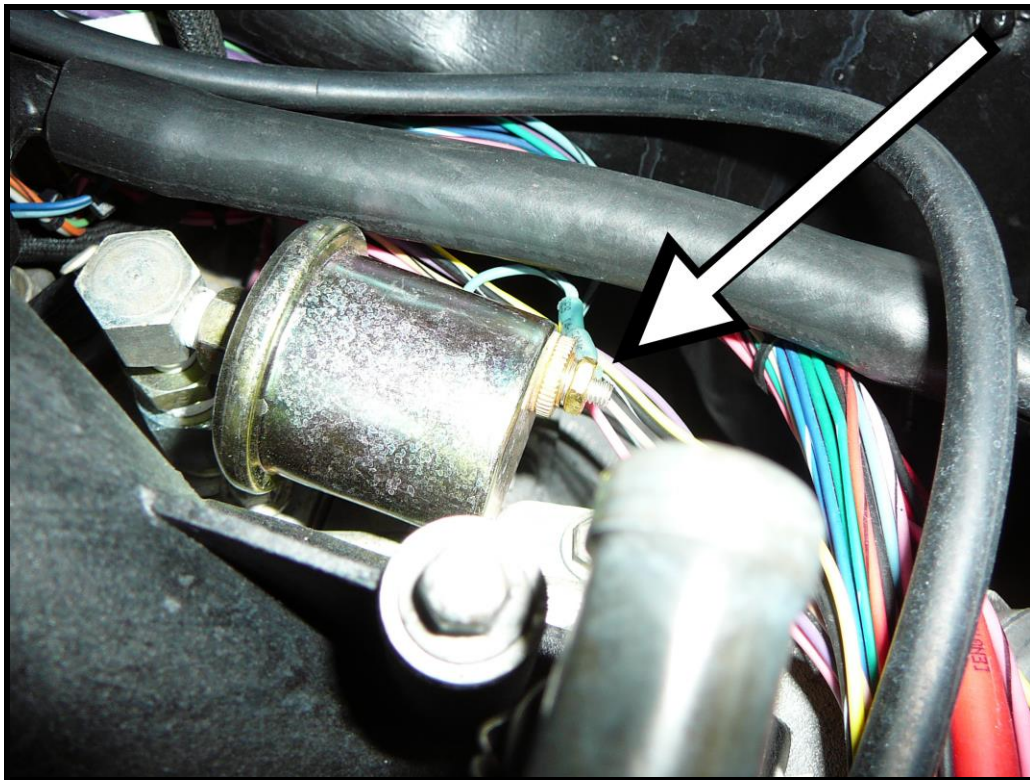


The battery B+ circuits of this harness are drawn out in the diagram below. The #915 and #916 wires are connected internally within the fuse block. Battery

cables such as the one in the picture below are not included in this kit. We suggest that you install new battery cables and that they are at least 1 gauge in size.



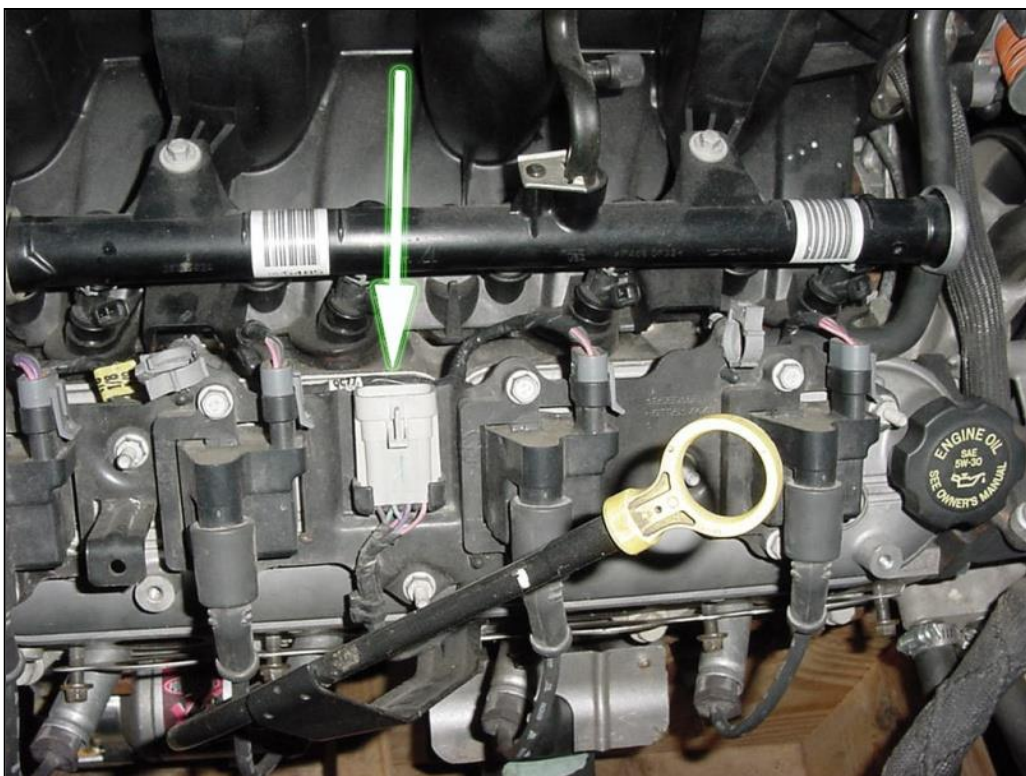
12. Route the light blue/black wire (labeled **#922**) to the engine oil pressure gauge sender. This wire protrudes from the main fuel injection breakout at the back of the intake manifold. Terminate it with the appropriate terminal from the parts kit and connect it to the sender.



13. Plug the 4 black two pin passenger side injector connectors into their mating injector. #2 cylinder is at the front passenger side of the engine.

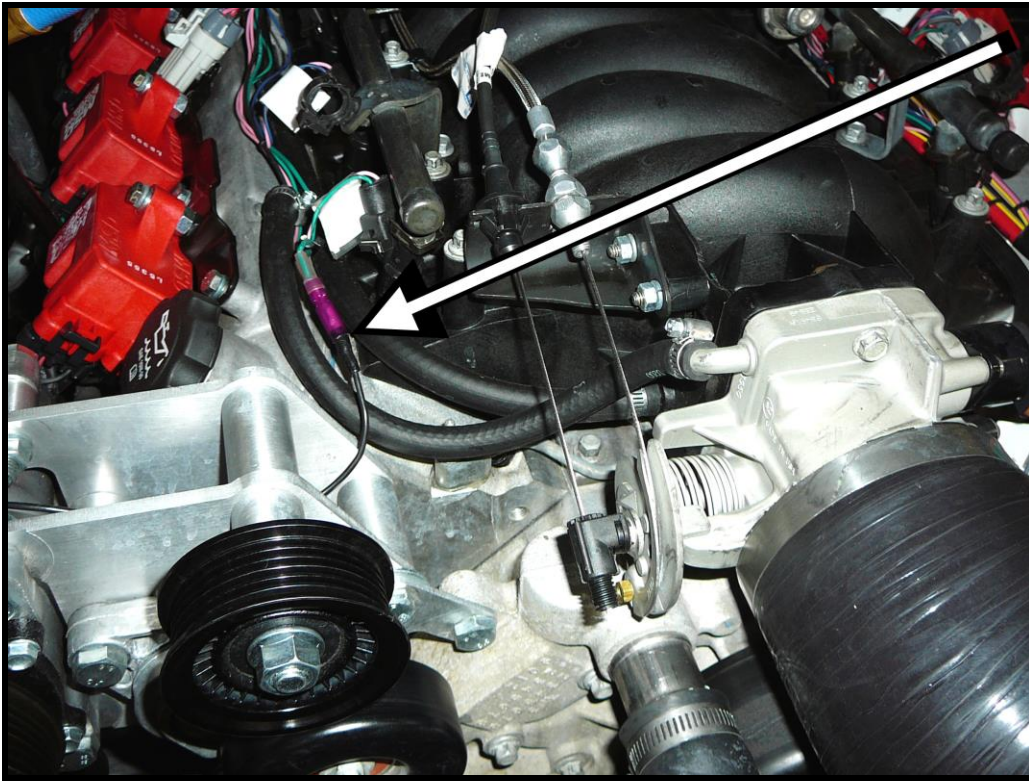


14. Plug the wire seven pin passenger side coil connector (labeled **PASS COILS**) into the mating coil harness located on the passenger side valve cover.



15. Route the green wire (labeled **#902**) and the black wire (labeled **#992**) to the A/C compressor. The #902 wire is the PCM controlled A/C compressor clutch activation wire. Use the appropriate terminal from the parts kit to connect this

wire to the A/C compressor clutch activation wire located on the A/C compressor. If your compressor clutch requires an external ground connect the #992 to it. The #922 wire is a constant battery ground wire; if you don't need it just tape it back in the harness.



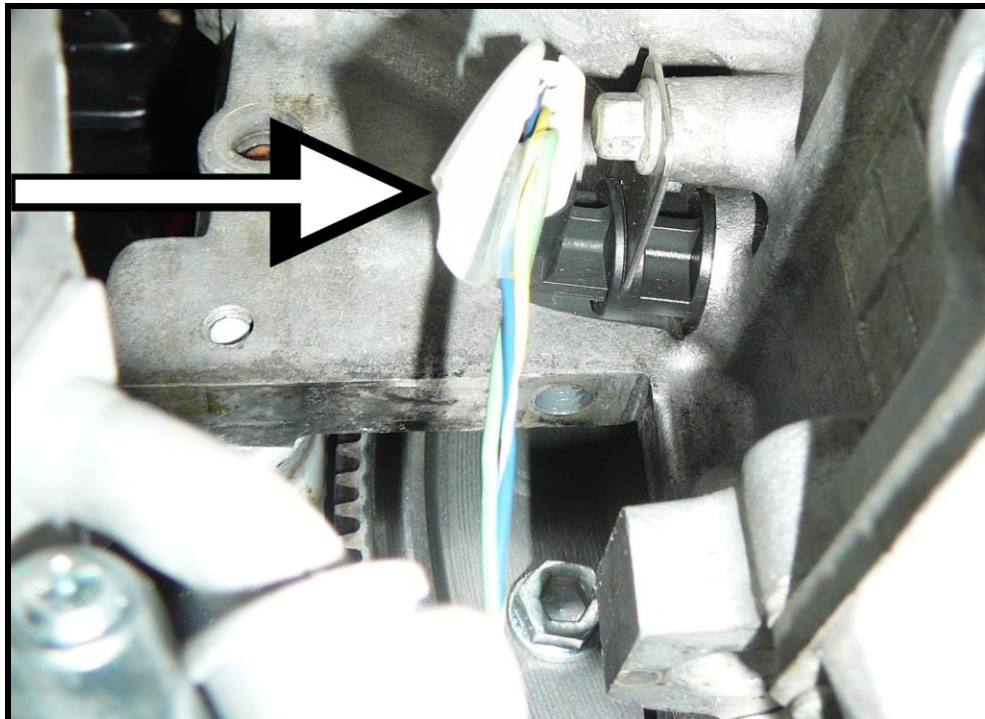
16. Route the light green wire (labeled **#921**) to the engine temperature gauge sender. This wire protrudes from the same harness breakout as the #8 injector connector. Terminate it with the appropriate terminal from the parts kit and connect it to the sender.



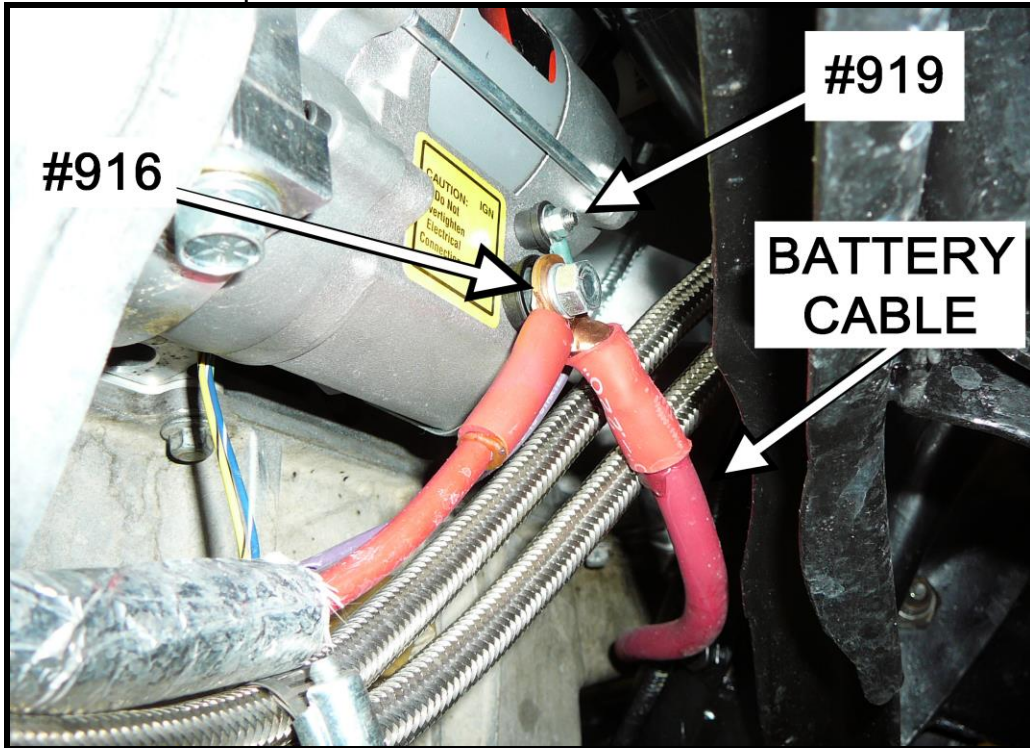
17. Plug the black five pin mass air flow/intake air temp sensor connector (labeled **MAF/IAT**) into the mass air flow sensor.



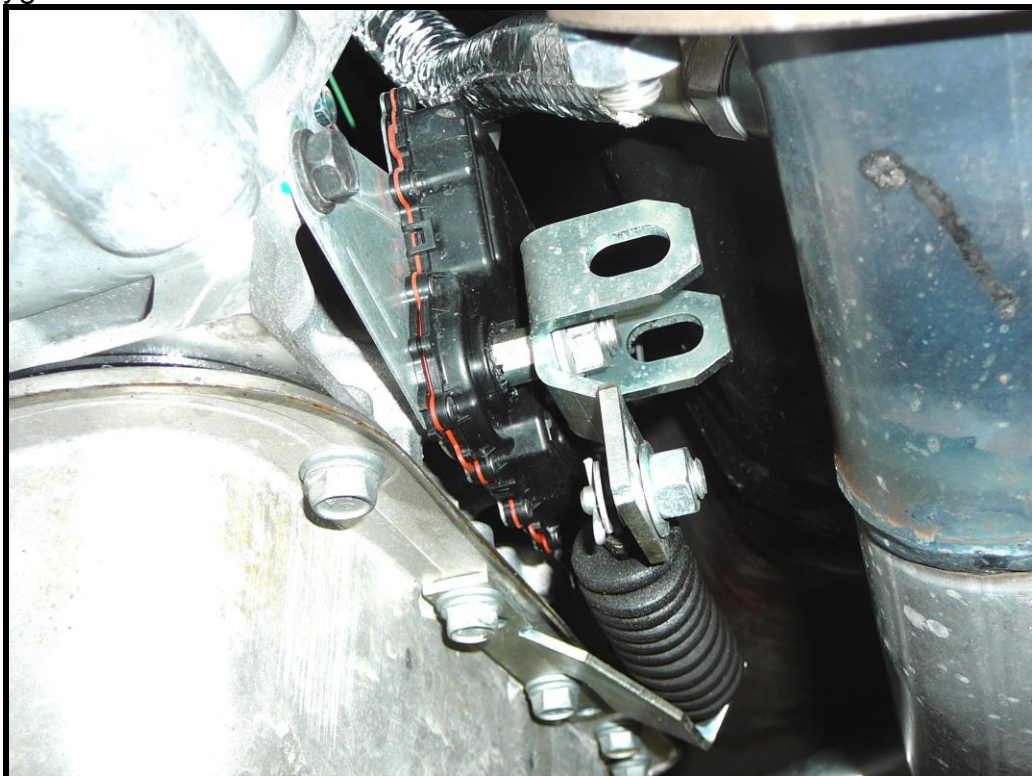
18. Plug the black three pin crankshaft position sensor connector (labeled **CKP**) into the crankshaft position sensor located on the passenger side of the engine just above and behind the starter. It may be necessary to remove the starter from the engine in order to gain access to this sensor.



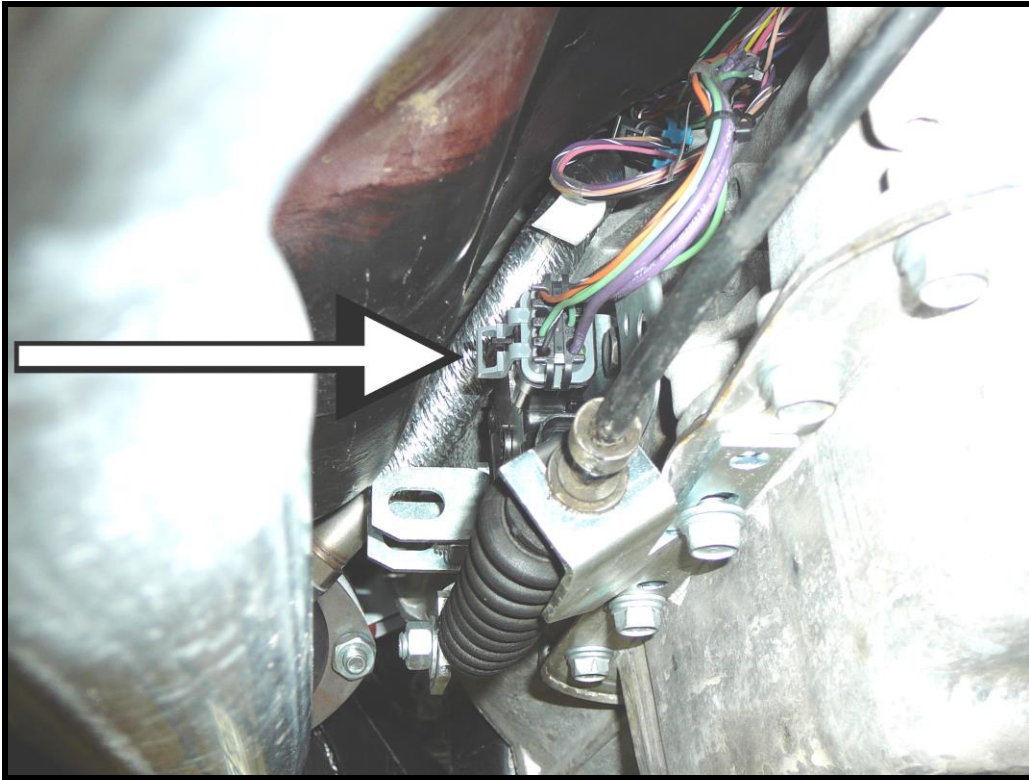
19. Route the purple wire (labeled **#919**) to the **S** post on the starter. Cut it to length and terminate with the appropriate terminal from the parts kit. Attach to the starter. Route the red wire (labeled **#916**) to the battery post on the starter. Cut it to length, slide one piece of the heat shrink and terminate with the appropriate terminal from the parts kit. Attach to the starter.



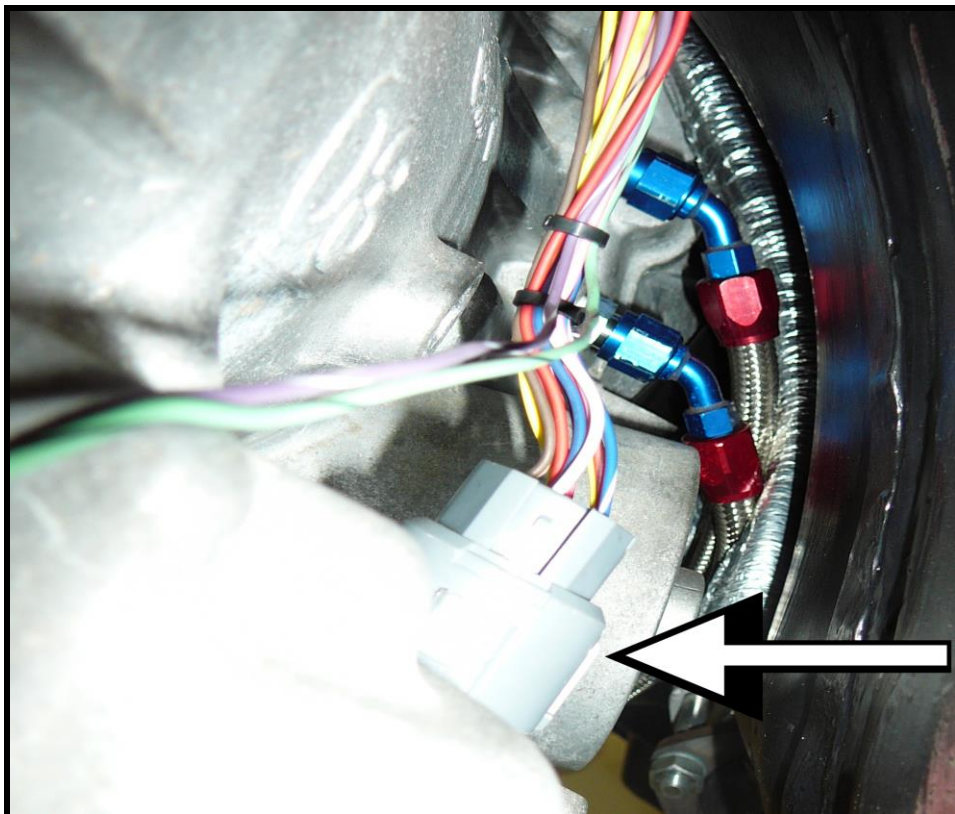
20. Plug the black four pin passenger side oxygen sensor connector (labeled **PASS SIDE OXY**) into the passenger side oxygen sensor. Plug the black four pin driver side oxygen sensor connector (labeled **DRVR SIDE OXY**) into the driver side oxygen sensor.



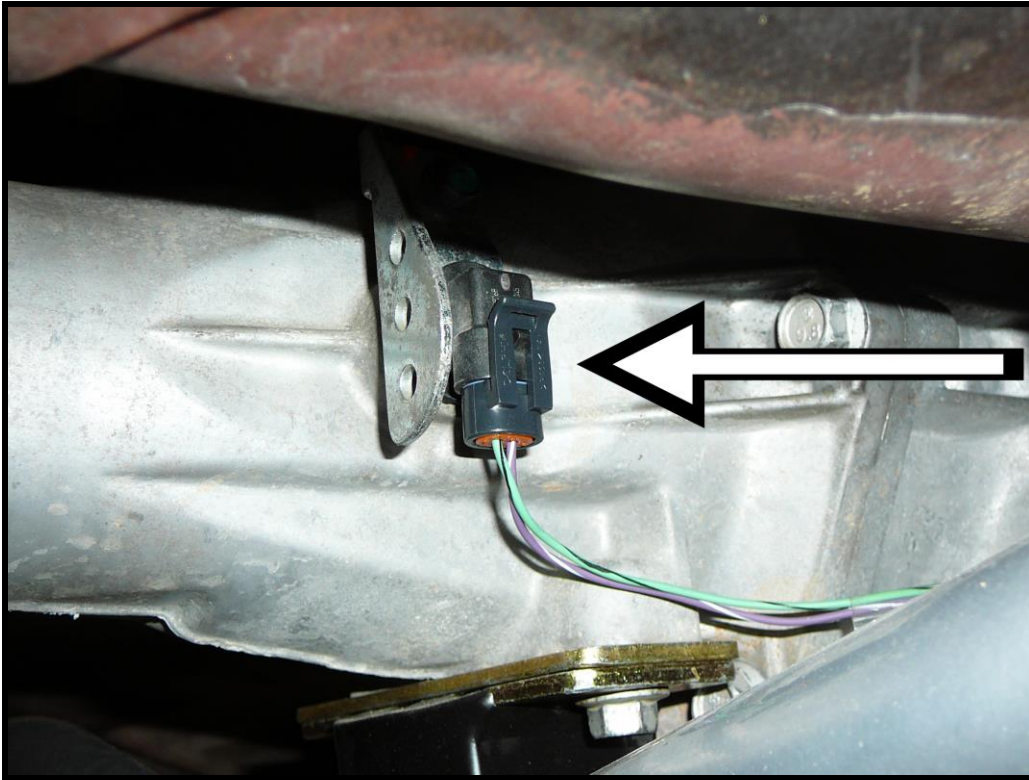
21. Plug the black seven pin park/neutral connector (labeled **PRNDL**) into the PRNDL switch located on the driver side of the transmission.



22. Plug the grey 13 pin 4L60E transmission solenoid connector (labeled **TRANSMISSION**) into the mating connector port located on the passenger side of the transmission just behind the lube level indicator tube.



23. Plug the black two pin vehicle speed sensor connector (labeled VSS) into the vehicle speed sensor located on the passenger side of the tail shaft housing of the transmission.



Wiring the front of your vehicle:

This section of this harness includes wires for the front lighting circuits, horn, wiper/washer, cruise control module and electric cooling fans. This section should be routed over to the driver's side of the steering column and then out to the engine compartment through the firewall. A grommet of the appropriate size is included in the parts kit. Locate where in the firewall you would like the headlight section wires to protrude through and drill a 1 1/4" hole. De-burr the hole, wrap the bare metal edge with electrical tape and then feed the headlight section wires through it and out into the engine compartment. Included in the parts kit and bubble pack are headlight connectors, terminals, park/turn light sockets and several types of zip ties. Use these parts where they are applicable to your harness installation. Route the headlight section wires to the front of the vehicle. Separate the driver's side and passenger's side wires into their own break outs. Loosely zip tie the harness to the driver's side inner fender or route it between the inner and outer fenders.

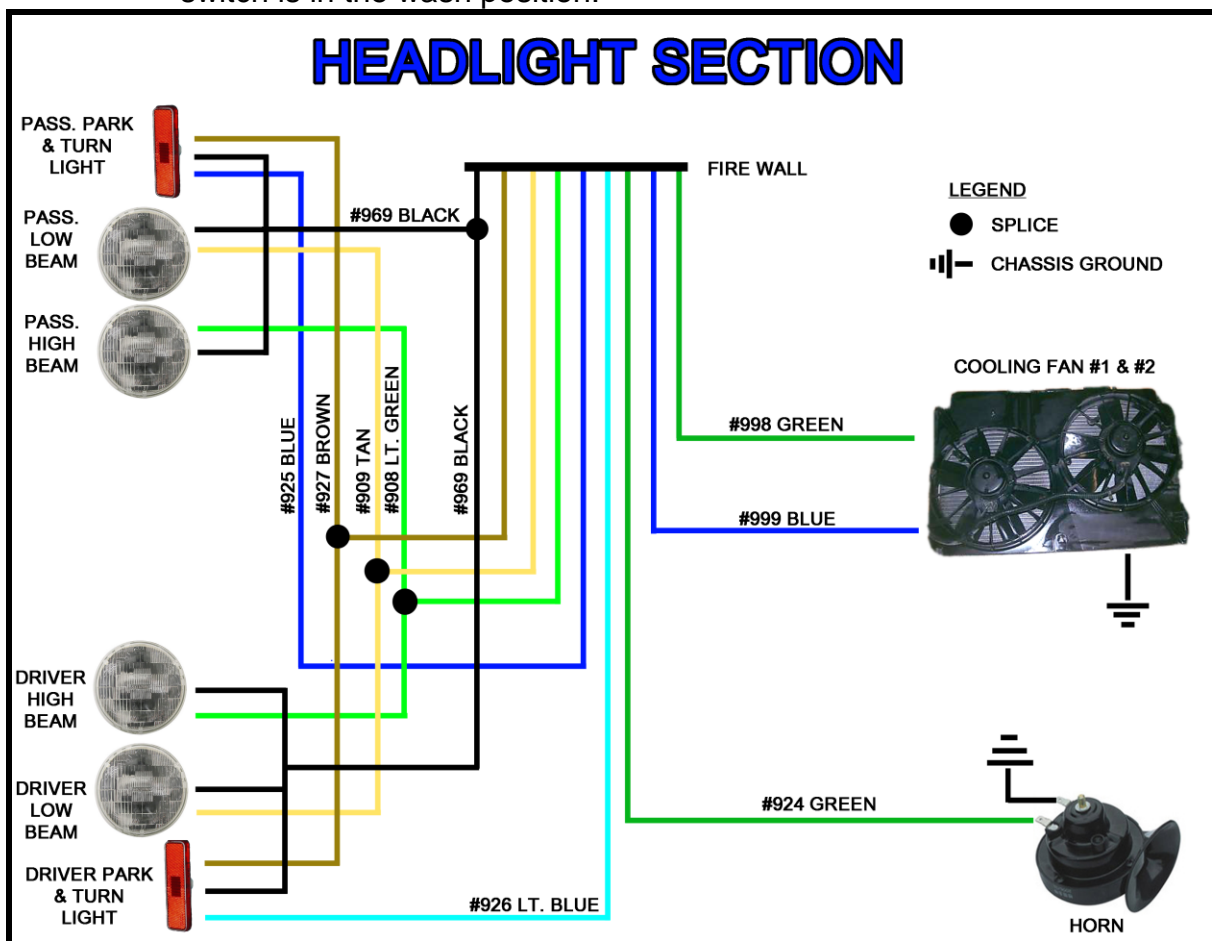
1. Cruise Control Module

The cruise control module connector may need to be routed out through the same grommet used for the Headlight Section wires. If so, do this now and route this connector over to the cruise control module and plug it in.

2. Wiper Motor

The wiper motor wires **#905**, **#978**, **#979** and **#976** may need to be routed out through the same grommet used for the Headlight Section wires. If so, do this now and route the wires up to the wiper motor and window washer motor. If your wiper and washer motors require the use a different fire wall hole and grommet please locate it or drill it now. Several grommets are provided in the parts kit. Find one the right size to fit your hole. Connect the wiper and washer motor wires as follows. You will find connectors and terminals in the bubble pack that will fit most wiper motors. If these don't fit your specific application please use some of the heat-shrinkable spade terminals that are also in the bubble pack.

- #905** is the power wire for your wiper and washer motors. This wire will need to be jumped between the wiper and washer motors in some applications.
- #978** is the low speed wire that grounds the low speed circuit of the wiper motor when the wiper switch is in the low speed position.
- #979** is the high speed wire that grounds the high speed circuit of the wiper motor when the wiper switch is in the high speed position.
- #976** is the wash wire that grounds the washer motor when the wiper switch is in the wash position.



- Route the driver's side wires **#969**, **#909**, **#908**, **#926** and **#927** to the driver's side headlights and front park/turn lights. Cut them to length, strip and terminate then connect to their mating components.

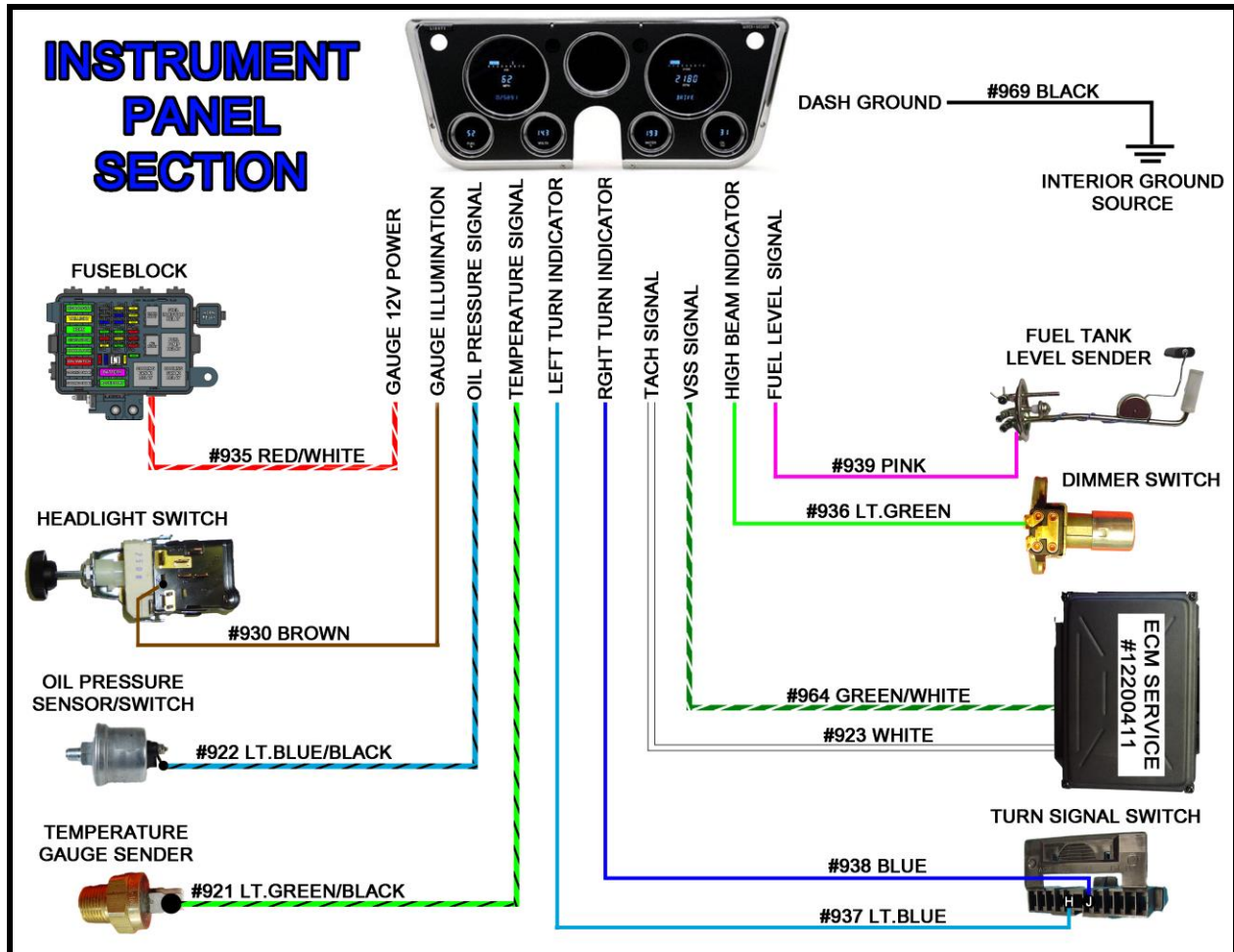
- a. **#969** is a ground wire that requires you to splice it between all of the driver's side lighting components. This wire is spliced to the interior ground wire that will be attached under the dash.
 - b. **#909** is spliced to reach both driver and passenger side low beam headlights. This wire provides 12 Volts to the low beam headlights when the dimmer switch is in the low beam position.
 - c. **#908** is spliced to reach both driver and passenger side high beam headlights. This wire provides 12 volts to the high beam headlights when the dimmer switch is in the high beam position.
 - d. **#926** is the driver side turn signal wire that provides 12 Volts when the turn signal lever is in the left hand turn position.
 - e. **#927** is spliced to reach both driver and passenger side park lights. This wire provides 12 Volts to the park lights when the headlight switch is in the park light position (usually the first click when pulled out).
5. Route the wire **#924** to the horn. Cut it to length, strip and terminate it with the proper terminal from the bubble pack and connect it. If you have dual horns jumper what you cut off as excess between the two horns. This wire provides the relayed 12 Volts that operates the horn with the horn button depressed. Make sure where the horn is mounted it is also receiving a clean ground or if your horn has two terminals on it ground the second terminal.
6. Route the passenger side wires **#969**, **#909**, **#908**, **#925** and **#927** to the passenger side headlights and front park/turn lights. Cut them to length, strip and terminate then connect to their mating components.
 - f. **#969** is a ground wire that requires you to splice it between all of the driver's side lighting components. This wire is spliced to the interior ground wire that will be attached under the dash.
 - g. **#909** is spliced to reach both driver and passenger side low beam headlights. This wire provides 12 Volts to the low beam headlights when the dimmer switch is in the low beam position.
 - h. **#908** is spliced to reach both driver and passenger side high beam headlights. This wire provides 12 volts to the high beam headlights when the dimmer switch is in the high beam position.
 - i. **#925** is the passenger side turn signal wire that provides 12 Volts when the turn signal lever is in the right hand turn position.
 - j. **#927** is spliced to reach both driver and passenger side park lights. This wire provides 12 Volts to the park lights when the headlight switch is in the park light position (usually the first click when pulled out).
7. Route the **#998** and **#999** wires to your radiator electric cooling fans. These wires provide relayed 12 volts to your cooling fans when the PCM requests them on. They both have their own 40 Amp, type 1, circuit breaker in the fuse block. If your vehicle only requires one of these wires, please use **#998**. Ground the fans to the radiator support or directly to the battery negative post.

Wiring the Interior of your Vehicle:

This section of your wiring project requires some special attention to routing and attachment of the harness. Separate out the harness breakouts for each switch or component. Group the breakouts together that will be routed to the same section of your dash board. For instance, if your headlight switch, wiper switch and instrument cluster are all mounted in the same section of your dash board then you should route these wires as one group and then separate them out to their mating components.

1. Instrument Panel Section:

Connect the wires for your instrument panel as the diagram shown below indicates. If you require a pin out diagram for your instrument cluster because it is a printed circuit board please feel free to contact our tech support @ 1-800-423-9696.

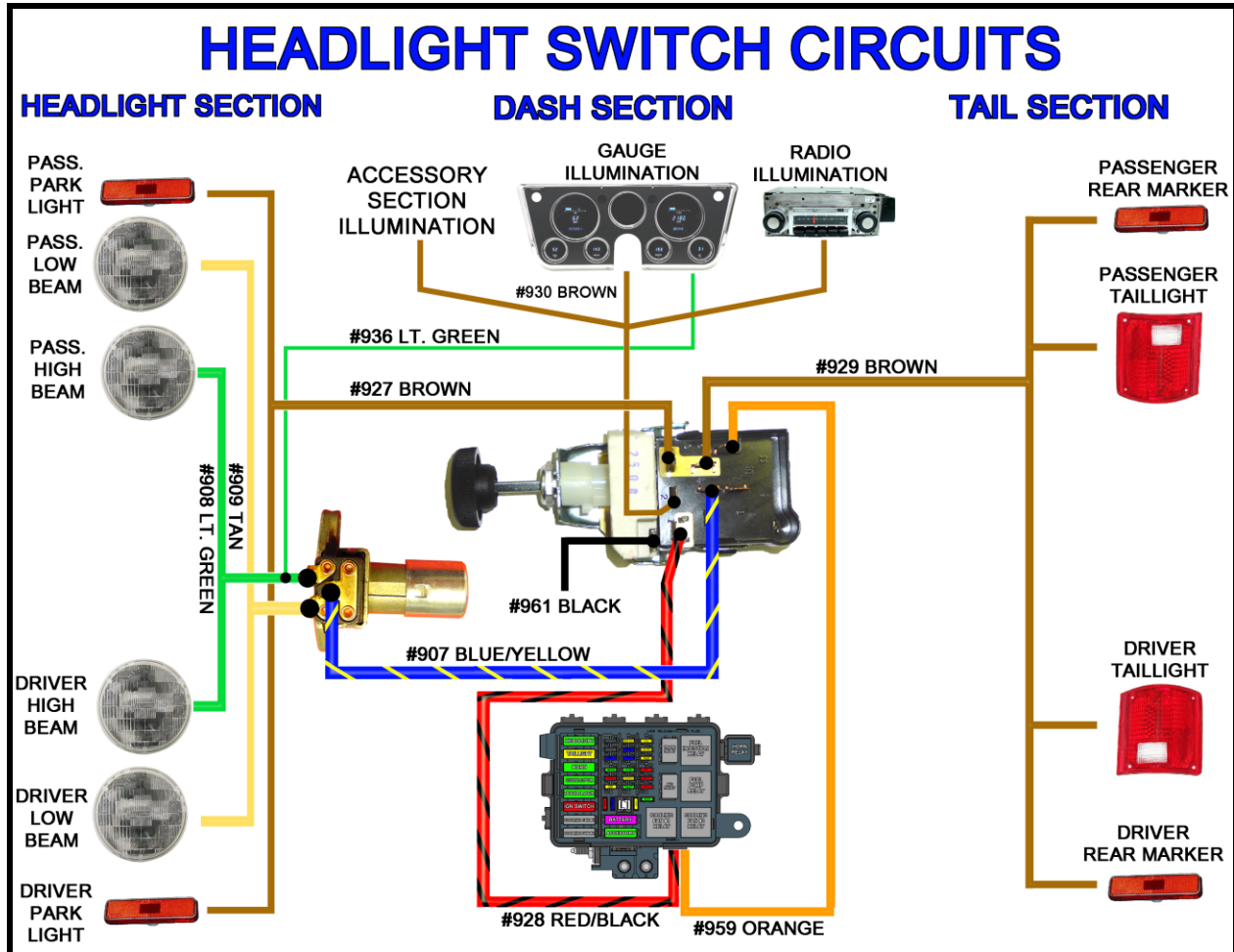


- #935** is ignition hot 12 Volts to power your gauges. You need to jumper this wire to each gauge's power terminal.
- #930** is the illumination wire that provides 12 Volts when the headlight switch is in the on position. If you have a dimmable headlight switch this wire will vary in voltage depending on where the dimmer is set. You need to jumper this wire to each gauge's illumination power terminal.
- #922** is the sender wire for your oil pressure gauge. This wire is simply a straight through wire that connects the oil pressure gauge to the oil pressure sender.

- d. **#921** is the sender wire for your engine coolant temperature gauge. This wire is simply a straight through wire that connects the engine coolant temperature gauge to the engine coolant temperature sender.
- e. **#969** is the ground wire for your gauges. You need to jumper this wire to each gauge's ground terminal and to each indicator light ground wire.
- f. **#939** is the sender wire for your fuel tank level gauge. This wire is simply a straight through wire that connects the fuel level gauge to the fuel level sender in the fuel tank.
- g. **#936** is the high beam indicator light activation wire. This wire provides 12 Volts to the high beam indicator light when the headlight switch is on and the dimmer switch is in the high beam headlight position.
- h. **#964** is the vehicle speed sensor signal wire for your speedometer. Connect this wire to your digital speedometer signal terminal.
- i. **#923** is the tachometer signal wire. Connect this wire to your tachometer signal terminal.
- j. **#938** is the right turn indicator light activation wire. This wire provides 12 Volts to the right turn indicator light when the turn signal lever is in the right hand turn position.
- k. **#937** is the left turn indicator light activation wire. This wire provides 12 Volts to the left turn indicator light when the turn signal lever is in the left hand turn position.

2. Headlight Switch Section:

Connect the wires to your headlight switch as the diagram indicates. Included the parts kit and bubble pack are terminals and a connector that mate to this type of headlight switch. Use the jaw style crimpers to crimp these terminals onto the wires. Hold the connector up to the headlight switch as it would connect and insert the wires as shown in the diagram. If your headlight switch is different than the one shown in the diagram then look at the wire descriptions and match them to your headlight switch's pin out.



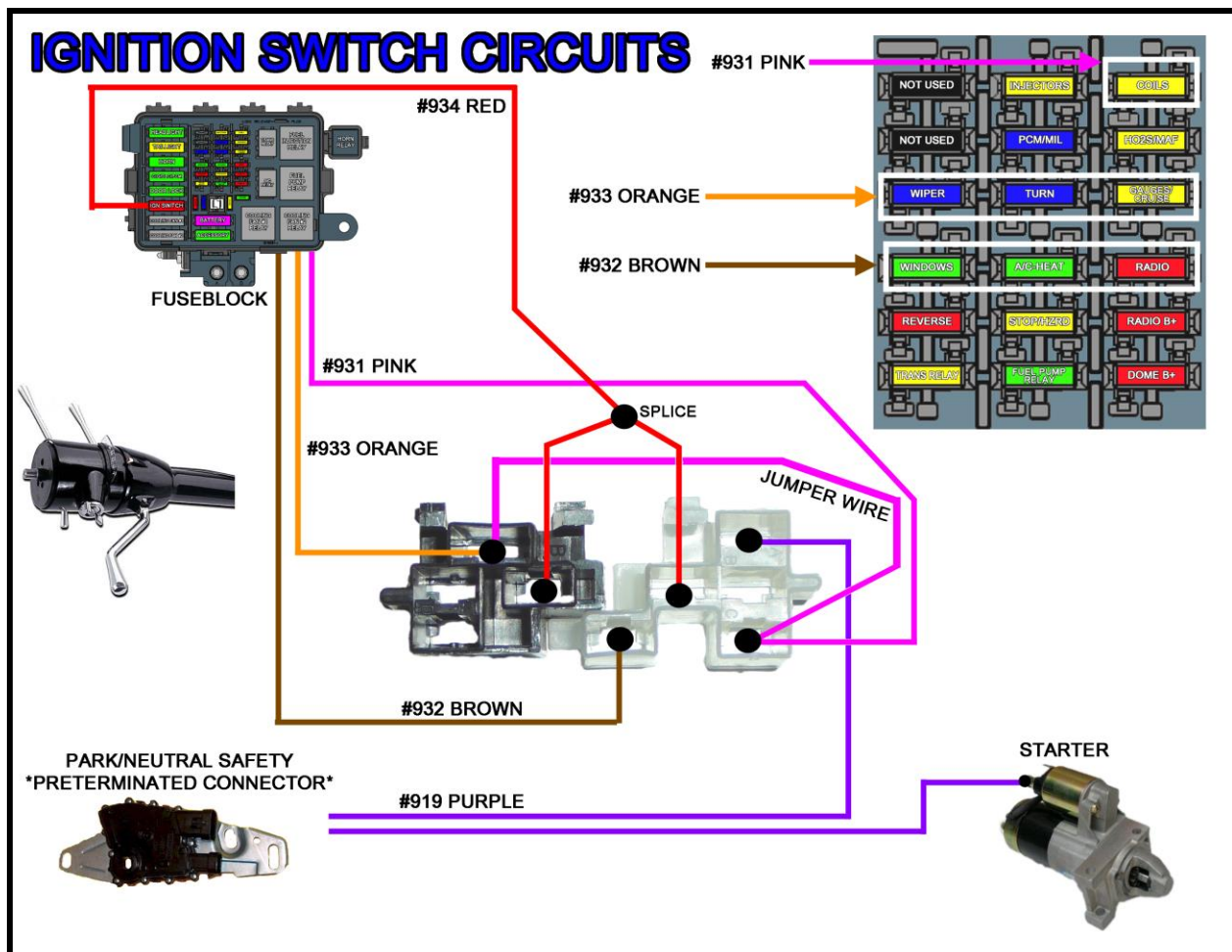
- #927** is the front park lights power wire.
- #929** is the rear tail lights and marker lights power wire.
- #930** is the illumination wire that splices to the gauge section, radio section and accessory section of wires.
- #961** is the dome light activation wire. This wire is grounded by the headlight switch when the knob is turned all the way counter clockwise.
- #907** is the headlight dimmer switch power wire. This wire provides 12 volts to the dimmer switch when the headlight switch is in the second pulled out position.
- #928** is the high amperage headlight switch power wire. This wire is connected internally within the headlight switch to the **#907** wire when the headlight switch is the second pulled out position.

- 36

- d. **#951** is the hazard flasher input wire for the hazard switch. This wire is a constant 12 Volt wire.
- e. **#952** is the turn flasher input wire for the turn signal switch. This wire is a switched 12 Volt wire.
- f. **#949** is the right rear turn/brake signal wire. If your vehicle has integrated turn/brake lights in the rear this wire is used to indicate both with one bulb. If your vehicle has separate turn/brake lights in the rear this wire is used to indicate turn only.
- g. **#949** is the left rear turn/brake signal wire. If your vehicle has integrated turn/brake lights in the rear this wire is used to indicate both with one bulb. If your vehicle has separate turn/brake lights in the rear this wire is used to indicate turn only.
- h. **#918** is the brake switch input into the turn signal switch. If your vehicle has integrated turn/brake lights then you must connect this wire to the turn switch as indicated in the diagram. If your vehicle has separate turn/brake lights then do not connect this wire at the turn signal switch. Insulate the end with some tape and zip tie it up out of the way.

5. Column Mounted Ignition Switch Section:

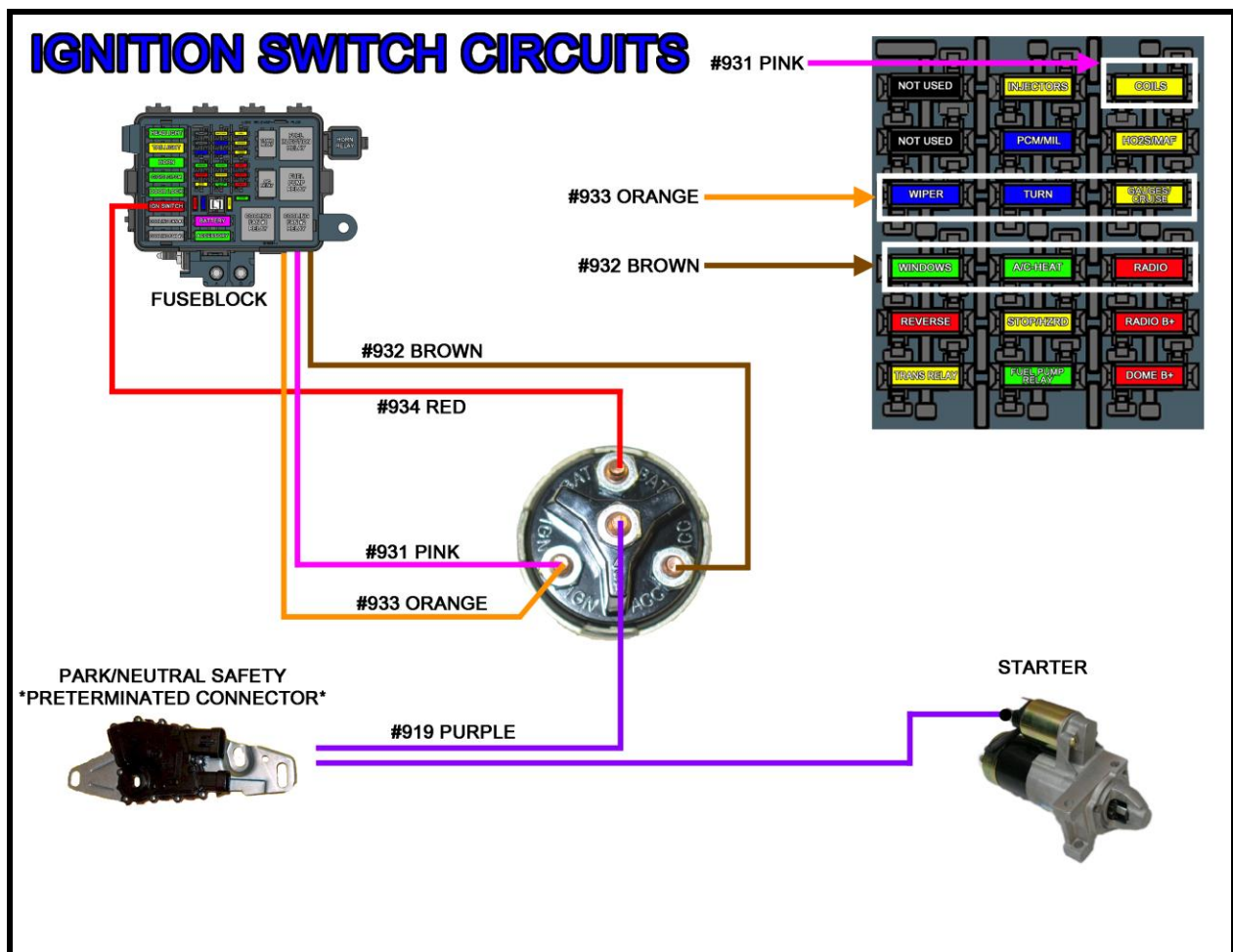
Connect the wires for your column mounted ignition switch as the diagram indicates. Included in the parts kit and bubble pack are terminals and a connector that mate to the steering column mounted ignition switch. Use the jaw style crimpers to crimp these terminals onto the wires.



- a. **#934** provides battery 12 Volts to the ignition switch. In order for this type of ignition switch to function properly you are required to splice this wire and connect it to both terminals as indicated in the diagram. Use one of the butt connectors from the bubble pack to do this splice.
- b. **#931** is the coil power wire. In order for this type of ignition switch to function properly with this harness you are required to install a jumper wire to go between the **#931** and **#933** wires. This jumper wire provides the **#933** wire 12 Volts from the **#931** wire while cranking the engine.
- c. **#933** provides 12 Volts to the wiper, turn and gauge/cruise fuses. This wire also activates the fuel injection relay.
- d. **#932** provides 12 Volts to the window, a/c-heat and radio fuses.
- e. **#919** is the engine crank signal wire that connects to the park/neutral switch and then to the starter if in park or neutral.

6. Dash Mounted Ignition Switch Section:

Connect the wires for your column mounted ignition switch as the diagram indicates. Included in the bubble pack are terminals that mate to most dash mounted ignition switch.



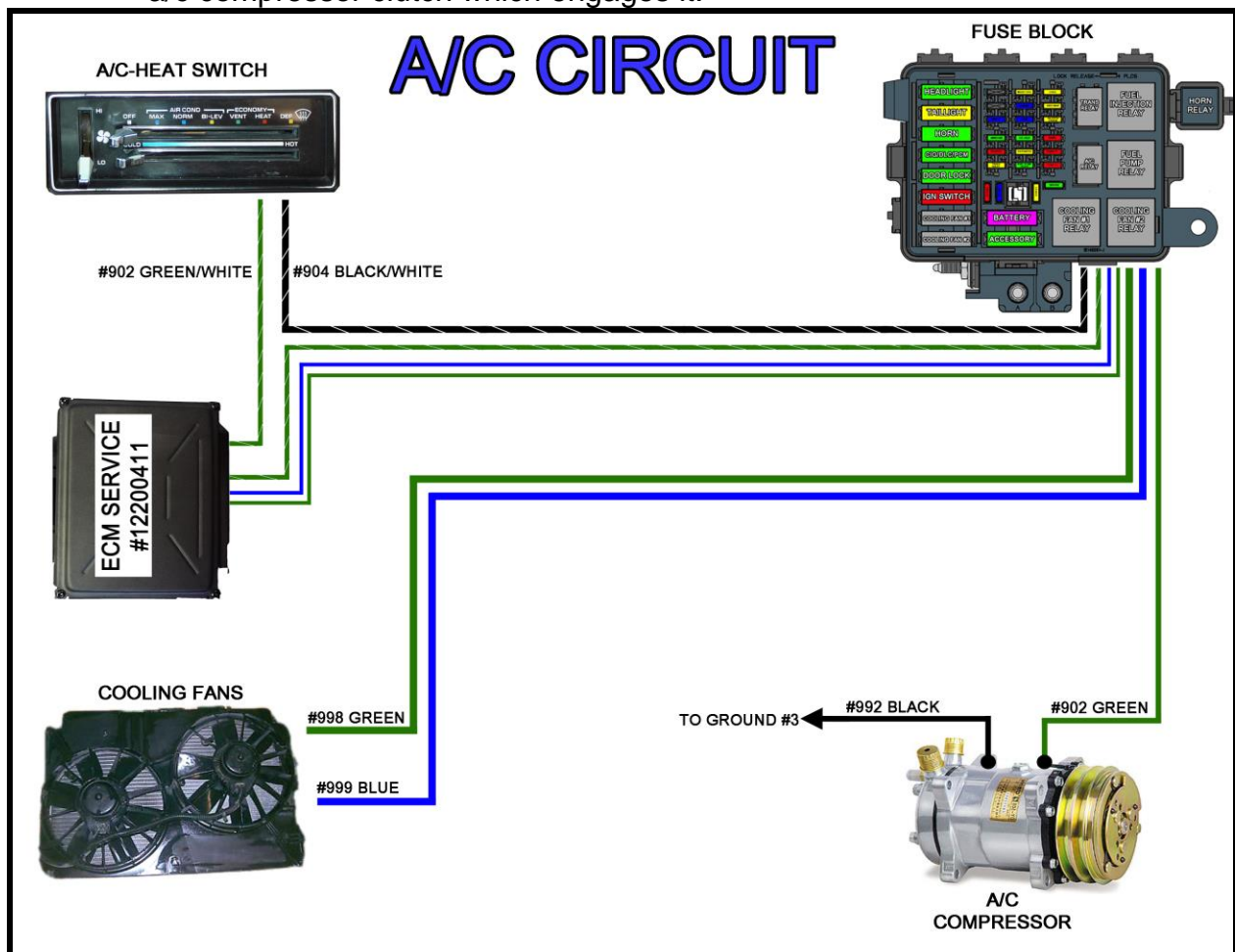
- a. **#934** provides battery 12 Volts to the ignition switch. Connect this wire to the battery terminal of your ignition switch.

- b. **#931 & #933** wires are must be connected this to the ignition terminal of your ignition switch. **#931** provides power to the coil fuse. **#933** provides power to the wiper, turn and gauge/cruise fuses.
- c. **#932** wire must be connected to the accessory post of your ignition switch. This wire provides 12 Volts to the window, a/c-heat and radio fuses.
- d. **#919** wire must be connected to the starter/crank post of your ignition switch. This wire is the engine crank signal wire that connects to the park/neutral switch and then to the starter if in park or neutral.

7. Accessory Switch Section:

The accessory switch section of this harness provides wires for a cigarette lighter, a/c-heater switch, wiper switch, illumination power and ground. Connect the wires as listed. If your vehicle has an illuminated a/c-heat switch, wiper switch and cigarette lighter use the **#969 & #930** wires to power the lighted sockets.

- a. Connect the wires for your a/c-heater switch as the diagram indicates. **#904** wire is fused by the a/c-heat 30 Amp fuse. It provides ignition switched power for your a/c-heater switch. **#902** wire is to be connected to your a/c request wire from your a/c-heat switch. If using the OEM switch it is the wire that originally went out to the a/c compressor clutch. When you turn your a/c switch to a/c or defrost this wire tells the PCM that you are requesting the a/c compressor to turn on. If the PCM sees this request as acceptable it then activates the a/c relay on the fuse block. This relay switches 12 Volts to the a/c compressor clutch which engages it.



Note: Using the PCM to control your a/c compressor brings with it several benefits. The first is the PCM has a built in rpm window that it allows the a/c compressor to operate within. Anything above 4300 rpm the PCM shuts off the a/c compressor. Once the engine rpm returns to below 3900 rpm the a/c compressor is reengaged. Second, the PCM shuts off the a/c compressor if it registers wide open throttle. Once the throttle returns back to 0% the a/c compressor is reengaged. The fans are shut off when the vehicle is travelling above 40mph. Finally, the PCM automatically activates the engine cooling fans when it activates the a/c compressor.

- b. Connect the cigarette lighter power wire **#903** to your cigarette lighter or power port. Most of the time this connection will utilize one of the heat shrinkable bullet connectors from the bubble pack. If you are mounting the cigarette lighter into a non-metallic (non conducting material) be sure to add a ground wire to the bezel. The **#903** wire is battery hot 12 Volts.
- c. Connect the **#978, #979 & #976** wires to your wiper switch. Most wiper switches are self grounding into whatever they mount in. If your wiper switch is not self grounding you are required to add another wire to ground the switch. **#978** wire is for the low speed of your wiper motor. **#979** wire is for the high speed of your wiper motor. **#976** wire is for the washer motor. If you find that your wiper system is completely different or you are having issues figuring out how your switch connects, please call our tech line @ 1-800-423-9696.

8. Radio Section:

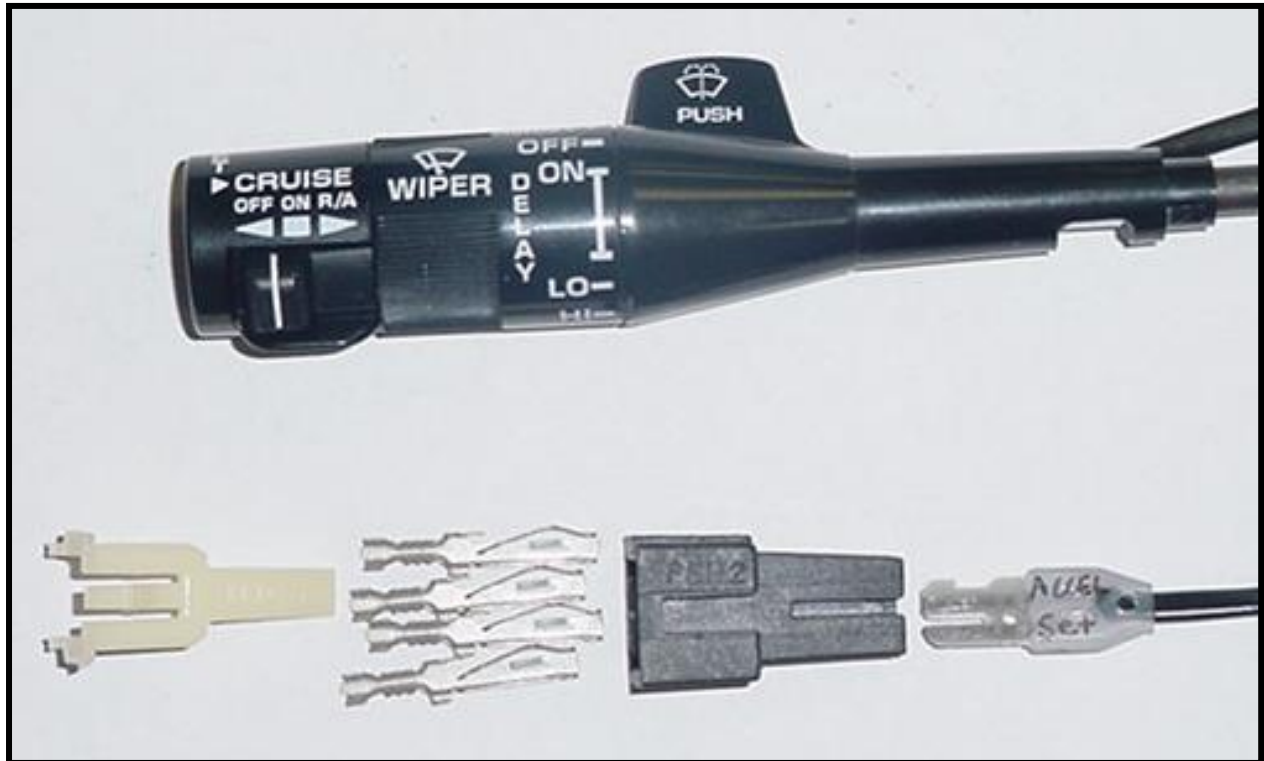
The radio section of this harness provides power, ground, amp on, and power antenna on. Connect these wires as follows.

- a. **#941** wire provides ignition 12 Volts for your radio to turn on when the ignition key is in the on or accessory position.
- b. **#940** wire provides battery 12 Volts for your radio to retain its radio and equalizer presets.
- c. **#954** wire is for an amplifier activation. If you have an external amplifier connect this wire to the "AMP ON" wire coming from the radio. If you don't have an external amplifier then cap and zip tie this wire up out of the way because you won't use it.
- d. **#942** wire is for activation of a power antenna. If you have a power antenna connect this wire to the "ANT ON" wire coming from the radio. If you don't have a power antenna then cap and zip tie this wire up and out of the way because you won't use it.
- e. **#930** wire is to activate the dimming function of your radio's display. Some radios have this feature and some do not. If yours does then connect this to "ILLUMINATION" wire coming from the radio. If your radio does not have this feature then tape up the wire end and zip tie it out of the way.
- f. **#969** wire is a ground wire for your radio. Connect this wire to the "GROUND" wire coming from the radio.

9. Cruise Switch Section:

The cruise switch section of this harness provides power, cruise on/off, resume/accelerate and set/coast wires. Connect these wires as follows. Most late model GM steering columns years 1983-1993 already have or can be retrofitted with a cruise control switch. See figure below for the proper connection of these wires to a factory GM cruise control switch part number 25111262. This harness kit does not include the connector needed because it has been discontinued by Delphi.

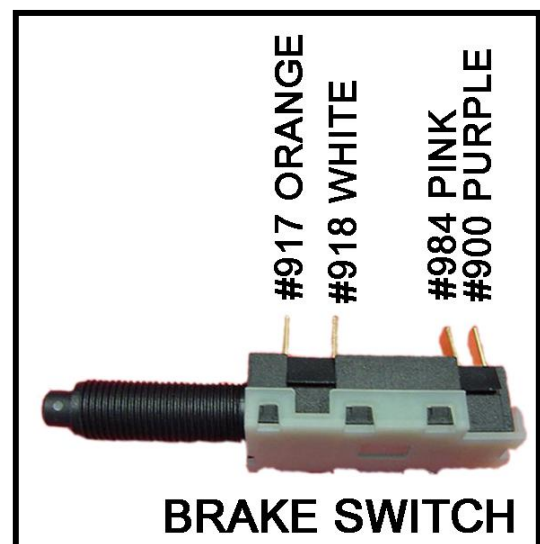
- The pink wire **#957** is power (connector pin A).
- The grey wire **#973** is the cruise control on/off switch signal (connector pin B).
- The blue wire **#974** is the cruise control set/coast switch signal (connector pin D).
- The grey/black wire **#975** is the cruise control resume/accelerate switch signal (connector pin C).



10. Brake Switch Section:

Provided with the parts kit is a four pin brake switch. Connect the brake switch wires according to the diagram to the right. Use some of the heat shrinkable spade connectors provided in the bubble pack.

This switch must be mounted so that the plunger is pushed into the switch when the brake pedal is at rest.



11. Driver Door Section:

Route these wires over to the driver's door. Connect as follows.

- #910** wire is battery 12 Volts to power an electric lock switch.
- #913** wire is accessory and ignition hot 12 Volts to power an electric window switch.
- #961** wire is spliced with the rest of the dome light ground circuits. This wire needs to be connected to a grounding door jamb switch.

12. Passenger Door Section:

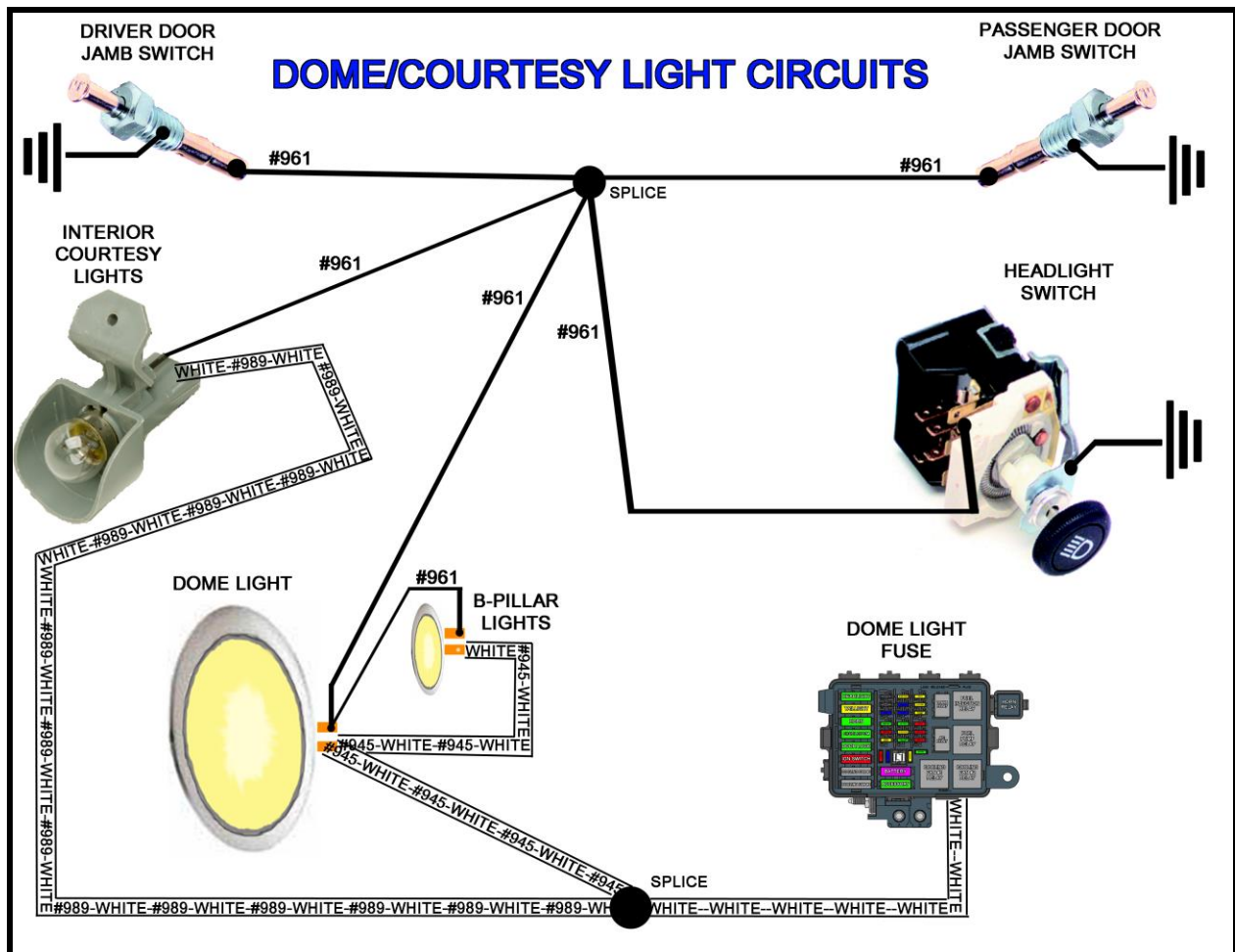
Route these wires over to the driver's door. Connect as follows.

- #912** wire is battery 12 Volts to power an electric lock switch.
- #911** wire is accessory and ignition hot 12 Volts to power an electric window switch.
- #961** wire is spliced with the rest of the dome light ground circuits. This wire needs to be connected to a grounding door jamb switch.

13. Courtesy Lights Section:

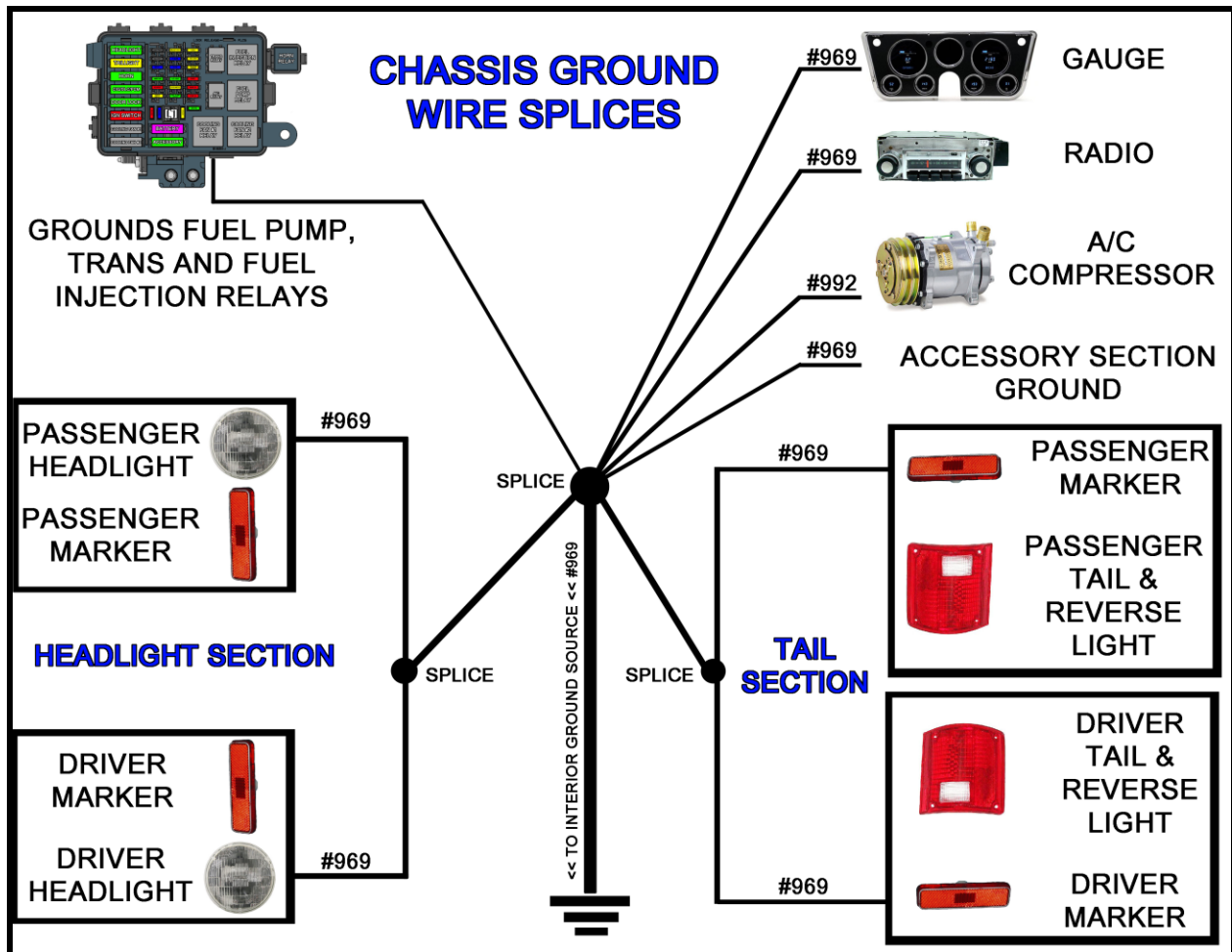
Connect these two wires to all of the interior courtesy lights. See the diagram below for more information.

- #961** wire is spliced with the rest of the dome light ground circuits. Connect this to the ground side of your courtesy lights.
- #989** wire is battery 12 Volts to power all of the interior and courtesy lights. It is spliced with the dome light power wire **#945**.



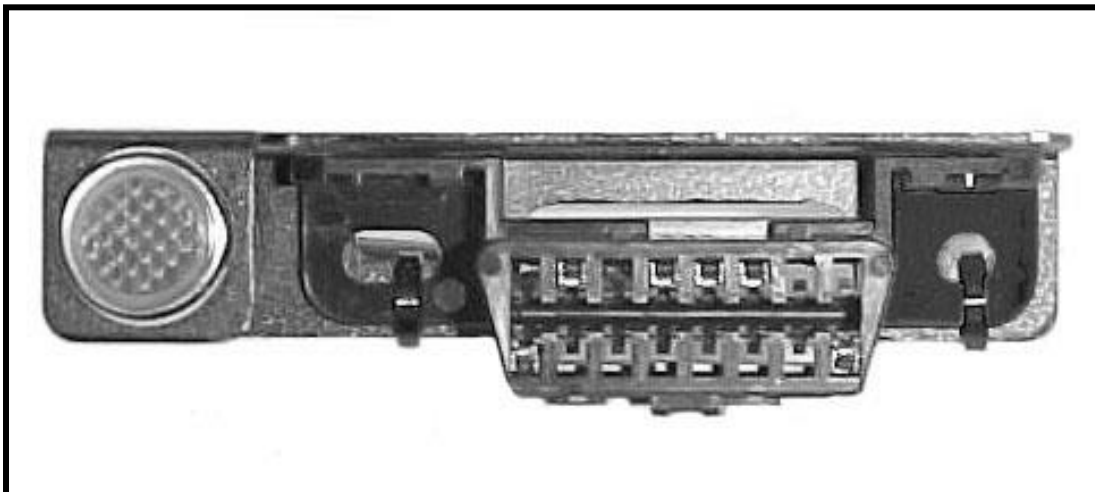
14. Ground #3:

Connect this **#969** wire to a clean ground source under the dash. Use the appropriate heat shrinkable ring terminal from the bubble pack to make this connection. This wire splices to the grounds shown in the diagram below.



15. DLC:

This harness includes a diagnostic link connector, service engine soon light and mounting bracket for both. Find a suitable place to mount this connector and mount it. Make sure it is accessible for future use.

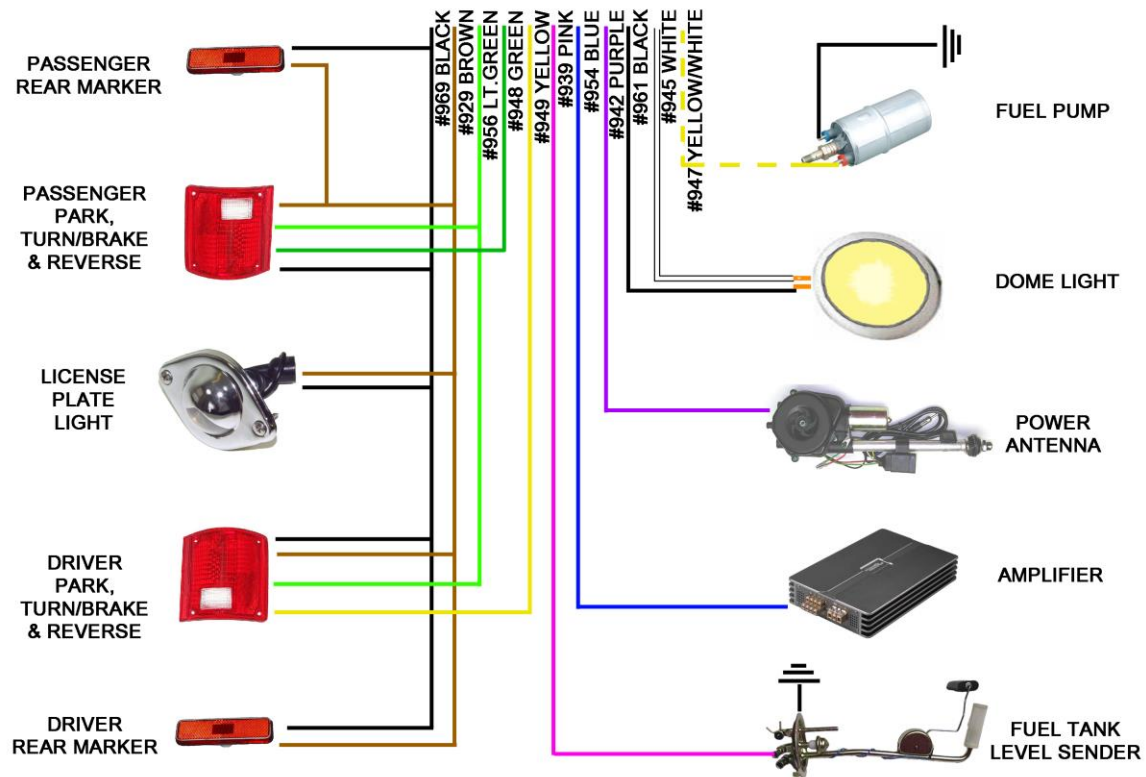


Wiring the rear of your vehicle:

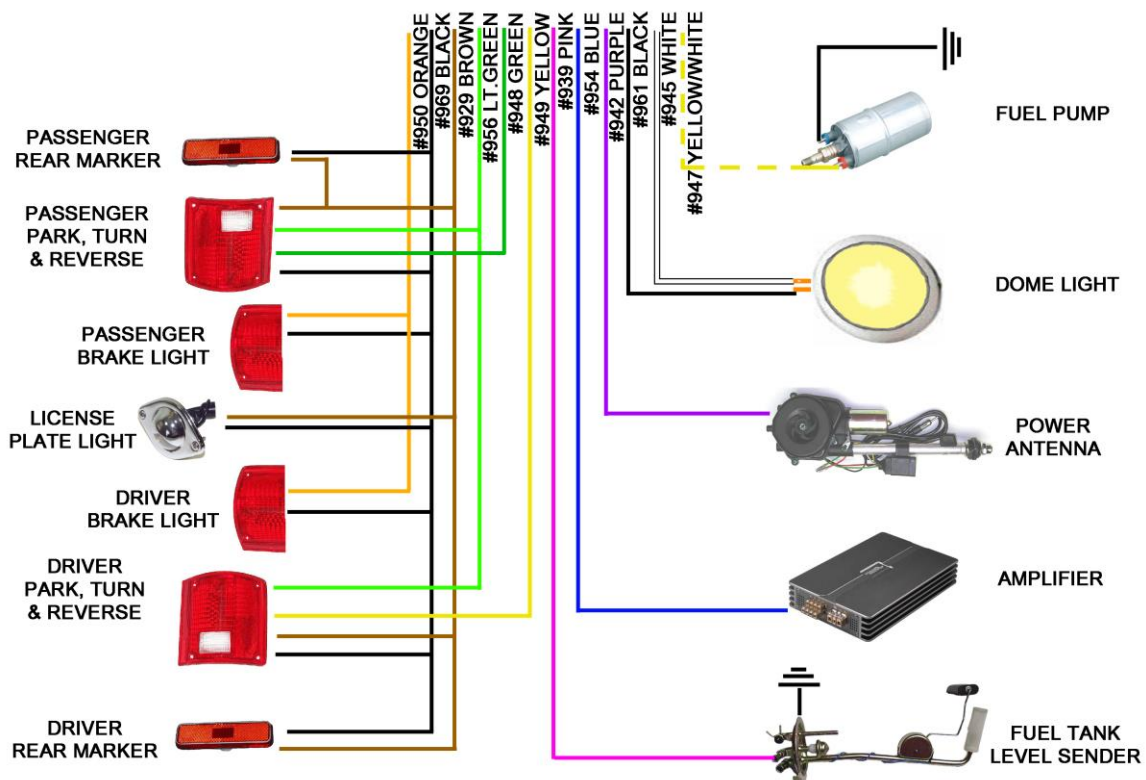
This section of this harness includes wires for the rear lighting circuits, fuel tank sending unit, electric fuel pump, dome light, power antenna and amplifier. The diagrams below indicate both ways to connect the tail section of this harness. If your vehicle's turn/brake lights are integrated you will follow the first diagram. If your vehicle's turn/brake lights are separate you will follow the second diagram. Both are on the next page. Use the heat shrinkable butt splices to make these connections.

- a. **#969** wire is for grounding the rear lighting section. This wire is spliced to two wires. Use one for the driver side and the other for the passenger side. Jumper the wire to all of the ground terminals of your tail section lighting. If you don't have ground terminals on your bulb sockets because they are self grounding we suggest that you connect this ground wire to somewhere near the tail light housings.
- b. **#929** wire is to power the tail lights, marker lights and license plate light. This wire is spliced to two wires. Use one for the driver side and the other for the passenger side. Jumper the wire to all of the power terminals of your tail, marker and license plate lights.
- c. **#956** wire is to power your reverse lights. Jumper this wire to the power terminals of your reverse lights.
- d. **#948** wire is to power your passenger rear turn/brake light if you have integrated lights. If your lights are separate only connect this wire to your turn signal light power terminal.
- e. **#949** wire is to power your driver rear turn/brake light if you have integrated lights. If your lights are separate only connect this wire to your turn signal light power terminal.
- f. **#950** wire is to power your separate brake lights or for a third brake light. Only connect this wire to your brake lights if they are a separate bulb filament from anything else.
- g. **#939** wire must be connected to your fuel sender signal terminal. Make sure the fuel sender has a ground wire that is grounded to the vehicle's chassis or body.
- h. **#954** wire is for activation of an external radio amplifier. The amplifier should have a terminal labeled "REMOTE" or "AMP ON." If you don't have an external radio amplifier cap and zip tie this wire up and out of the way.
- i. **#942** wire is for activation of a powered antenna. This wire signals the antenna to extend. You will need to run your own power and ground wires here. If you don't have a powered antenna cap and zip tie this wire up and out of the way.
- j. **#961** wire is to ground your dome light and any other light you want to turn on when the door is open or the headlight switch is commanding it on.
- k. **#945** wire is to power your dome light and any other light you want to turn on when the door is open or the headlight switch is commanding it on.
- l. **#947** wire is to power your electric fuel pump. Make sure to add a ground wire of the same gauge and to a clean ground source.

INTEGRATED TAIL LIGHT SECTION

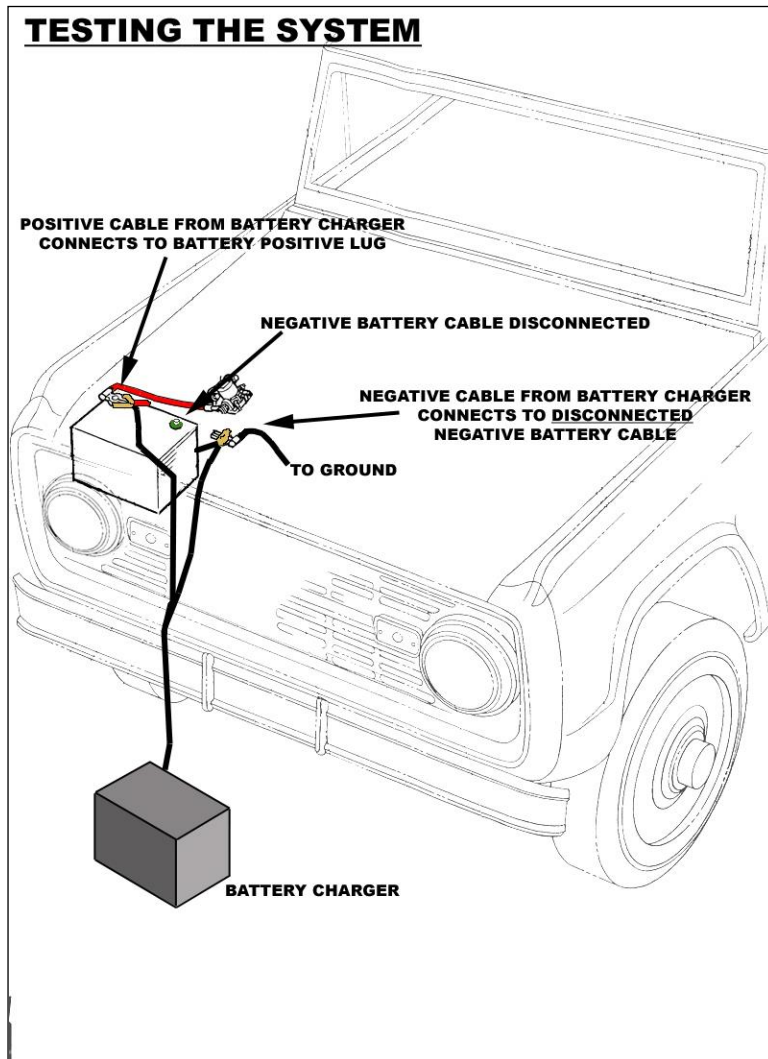


SEPARATE TAIL LIGHT SECTION



TESTING THE SYSTEM

Use a small (10 amp or less) battery charger to power up the vehicle for the first time to test the circuits. If there is a problem anywhere, the battery charger's low amperage and internal circuit breaker will provide circuit protection.



- a. Make sure the Negative Battery cable is connected to the frame or engine, and make sure there is a ground between the engine and frame. The Negative Battery cable should still be disconnected from the Battery.
- b. Connect the Battery Positive cable to the Positive side of the Battery and also make sure this cable is connected to the B+ side of the Starter Solenoid and is connected.
- c. Connect the Battery Charger's NEGATIVE cable to the automobile chassis, engine block or to the disconnected

Negative Battery cable. Do NOT connect the Battery Charger's NEGATIVE cable to the Battery.

- d. Connect the Battery Charger's POSITIVE cable to the automobile's positive battery terminal lug.
- e. INDIVIDUALLY turn on each light, ignition, wiper circuit, etc. and check for proper operation.

Note: The turn signals will not flash properly if you do not have both the front and rear bulbs installed and connected.

- f. After all circuits have been checked, disconnect the battery charger and attach the vehicles battery cables to the battery.

WIRE INDEX:

HEADLIGHT SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
GREEN	12	#998	FAN #1 RELAY POWER TO COOLING FAN #1	FUSE BLOCK
BLUE	12	#999	FAN #2 RELAY POWER TO COOLING FAN #2	FUSE BLOCK
BLACK	14	#969	DRIVER SIDE LIGHTING GROUND WIRE	INTERIOR GROUND
BLACK	14	#969	PASSENGER SIDE LIGHTING GROUND WIRE	INTERIOR GROUND
BROWN	18	#927	DRIVER SIDE PARK LIGHT POWER	HEADLIGHT SWITCH
BROWN	18	#927	PASSENGER SIDE PARK LIGHT POWER	HEADLIGHT SWITCH
TAN	16	#909	DRIVER SIDE LOW BEAM HEADLIGHT POWER	DIMMER SWITCH
TAN	16	#909	PASSENGER SIDE LOW BEAM HEADLIGHT POWER	DIMMER SWITCH
LT.GREEN	16	#908	DRIVER SIDE HIGH BEAM HEADLIGHT POWER	DIMMER SWITCH
LT.GREEN	16	#908	PASSENGER SIDE HIGH BEAM HEADLIGHT POWER	DIMMER SWITCH
LT.BLUE	18	#926	DRIVER SIDE (LF) TURN SIGNAL POWER	TURN SWITCH
BLUE	18	#925	PASSENGER (RF) TURN SIGNAL POWER	TURN SWITCH
GREEN	14	#924	HORN POWER	FUSE BLOCK

WIPER MOTOR SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
YELLOW	16	#905	WIPER MOTOR POWER	FUSEBLOCK
LT.BLUE	16	#978	WIPER MOTOR LOW SPEED	WIPER SWITCH
BLUE	16	#979	WIPER MOTOR HIGH SPEED	WIPER SWITCH
BLACK	18	#976	WASHER MOTOR WASH	WIPER SWITCH

INSTRUMENT PANEL SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
RED/WHITE	18	#935	GAUGE POWER	FUSE BLOCK
BLACK	18	#969	GAUGE/INDICATOR GROUND	INTERIOR GROUND
BROWN	18	#930	GAUGE ILLUMINATION	HEADLIGHT SWITCH
BLUE	20	#938	RIGHT TURN INDICATOR POWER	TURN SWITCH
PINK	18	#939	FUEL GAUGE SENDER WIRE	FUEL TANK SENDER
LT.GRN/BLK	18	#921	TEMPERATURE GAUGE SENDER WIRE	TEMP SENDER
GRN/WHITE	20	#964	SPEEDOMETER GAUGE SENDER WIRE	PCM
LT.BLUE	20	#937	LEFT TURN INDICATOR POWER	TURN SWITCH
LT.GREEN	20	#936	HIGH BEAM INDICATOR POWER	DIMMER SWITCH
WHITE	18	#923	TACHOMETER GAUGE SENDER WIRE	PCM
LT.BLU/BLK	18	#922	OIL PRESSURE GAUGE SENDER WIRE	OIL PRESSURE SENDER

HEADLIGHT SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
RED/BLACK	14	#928	HEADLIGHT SWITCH POWER	FUSE BLOCK
ORANGE	14	#959	HEADLIGHT SWITCH POWER	FUSE BLOCK
BROWN	16	#927	FRONT PARK LIGHT POWER	HEADLIGHT SWITCH
BROWN	16	#929	TAIL LIGHT POWER	HEADLIGHT SWITCH
BROWN	16	#930	DASH PANEL ILLUMINATION POWER	HEADLIGHT SWITCH
BLUE/YELLOW	14	#907	DIMMER SWITCH POWER	HEADLIGHT SWITCH
BLACK	18	#961	DOMED/COURTESY LIGHT GROUND	HEADLIGHT SWITCH

IGNITION SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
BROWN	12	#932	ACCESSORY POWER	FUSEBLOCK
RED	10	#934	BATTERY POWER TO IGNITION SWITCH	FUSEBLOCK
PINK	14	#931	COIL POWER	FUSEBLOCK
ORANGE	12	#933	IGNITION POWER	FUSEBLOCK
PURPLE	12	#919	START SIGNAL TO PRNDL SWITCH	IGNITION SWITCH

TURN SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
LT.BLUE	18	#926	DRIVER (LF) TURN SIGNAL POWER	TURN SWITCH
BLUE	18	#925	PASSENGER (RF) TURN SIGNAL POWER	TURN SWITCH
WHITE	16	#918	BRAKE LIGHT POWER INTO SWITCH	BRAKE SWITCH
GREEN	16	#948	PASSENGER (RR) TURN SIGNAL POWER	TURN SWITCH
YELLOW	16	#949	DRIVER (LR) TURN SIGNAL POWER	TURN SWITCH
BROWN	16	#951	EMERGENCY FLASHER POWER TO SWITCH	EMERGENCY FLASHER
PURPLE	16	#952	TURN FLASHER POWER TO SWITCH	TURN FLASHER
BLACK	18	#963	HORN RELAY ACTIVATION	HORN RELAY

CRUISE SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
PINK	20	#957	CRUISE CONTROL SWITCH POWER	FUSEBLOCK
GREY	20	#973	CRUISE CONTROL SWITCH ON/OFF COMMAND	CRUISE MODULE
BLUE	20	#974	CRUISE CONTROL SWITCH SET/COAST COMMAND	CRUISE MODULE
GREY/BLACK	20	#975	CRUISE CONTROL SWITCH RESUME/ACCEL COMMAND	CRUISE MODULE

DIMMER SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
BLUE/YELLOW	14	#907	DIMMER SWITCH POWER	HEADLIGHT SWITCH
TAN	16	#909	LOW BEAM HEADLIGHT POWER	DIMMER SWITCH
LT. GREEN	16	#908	HIGH BEAM HEADLIGHT POWER	DIMMER SWITCH

TURN SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
BLACK/WHITE	14	#904	A/C-HEATER SWITCH POWER	FUSEBLOCK
TAN	14	#903	CIGARETTE LIGHT POWER	FUSEBLOCK
GREEN/WHITE	20	#902	A/C COMPRESSOR REQUEST	PCM
LT.BLUE	16	#978	WIPER MOTOR LOW SPEED GROUND WIRE	WIPER SWITCH
BLACK	18	#976	WASHER MOTOR GROUND WIRE	WIPER SWITCH
BLUE	16	#979	WIPER MOTOR HIGH SPEED GROUND WIRE	WIPER SWITCH
BROWN	18	#930	ACCESSORY SECTION SWITCH ILLUMINATION POWER	HEADLIGHT SWITCH
BLACK	18	#969	ACCESSORY SECTION SWITCH ILLUMINATION GROUND	INTERIOR GROUND

RADIO SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
RED	18	#941	RADIO IGNITION POWER	FUSEBLOCK
YELLOW	18	#940	RADIO BATTERY POWER	FUSEBLOCK
BLUE	20	#954	AMPLIFIER REMOTE WIRE	RADIO
PURPLE	20	#942	POWER ANTENNA REMOTE WIRE	RADIO
BROWN	18	#930	RADIO ILLUMINATION WIRE	HEADLIGHT SWITCH
BLACK	18	#969	RADIO GROUND	INTERIOR GROUND

BRAKE SWITCH SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
PINK	18	#984	CRUISE RELEASE SWITCH POWER	FUSEBLOCK
ORANGE	16	#917	BRAKE SWITCH POWER	FUSEBLOCK
WHITE	16	#918	BRAKE SWITCH TO BRAKE LIGHTS	BRAKE SWITCH
PURPLE	18	#900	CRUISE RELEASE SWITCH TO CRUISE MODULE	BRAKE SWITCH

DRIVER DOOR SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
YELLOW/BLACK	14	#910	ELECTRIC DOOR LOCK SWITCH POWER	FUSEBLOCK
YELLOW	14	#913	ELECTRIC WINDOW SWITCH POWER	FUSEBLOCK
BLACK	18	#961	DOME/COURTESY LIGHT GROUND	HEADLIGHT SWITCH

PASSENGER DOOR SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
YELLOW/BLACK	14	#912	ELECTRIC DOOR LOCK SWITCH POWER	FUSEBLOCK
YELLOW	14	#911	ELECTRIC WINDOW SWITCH POWER	FUSEBLOCK
BLACK	18	#961	DOME/COURTESY LIGHT GROUND	HEADLIGHT SWITCH

COURTESY LIGHT SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
BLACK	18	#961	DOME/COURTESY LIGHT GROUND	HEADLIGHT SWITCH
WHITE	18	#989	DOME/COURTESY LIGHT POWER	FUSEBLOCK

TAIL SECTION

COLOR	GAUGE	CIRCUIT	FUNCTION	ORIGIN
YELLOW/WHITE	14	#947	FUEL PUMP POWER	FUSEBLOCK
WHITE	18	#945	DOME/COURTESY LIGHT POWER	FUSEBLOCK
BLACK	16	#969	DRIVER SIDE LIGHTING GROUND	INTERIOR GROUND
BLACK	16	#969	PASSENGER SIDE LIGHTING GROUND	INTERIOR GROUND
BROWN	18	#929	DRIVER SIDE TAIL LIGHT POWER	HEADLIGHT SWITCH
BROWN	18	#929	PASSENGER SIDE TAIL LIGHT POWER	HEADLIGHT SWITCH
ORANGE	18	#950	THIRD BRAKE LIGHT POWER	BRAKE SWITCH
LT.GREEN	18	#956	REVERSE LIGHT POWER	PRNDL SWITCH
GREEN	16	#948	PASSENGER (RR) TURN/BRAKE POWER	TURN SWITCH
YELLOW	16	#949	DRIVER (LR) TURN/BRAKE POWER	TURN SWITCH
PURPLE	20	#942	POWER ANTENNA REMOTE WIRE	RADIO
BLUE	20	#954	EXTERNAL AMPLIFIER REMOTE WIRE	RADIO
PINK	18	#939	FUEL SENDER SIGNAL WIRE	FUEL SENDER

DTC C0266	ADS Controller Malfunction
DTC C0550	ECU Malfunction
DTC C0896	Device Voltage Range/Performance
DTC C0901	Device #2 Voltage Low
DTC P0101	Mass Air Flow (MAF) Sensor Performance
DTC P0102	Mass Air Flow (MAF) Sensor Circuit Low Frequency
DTC P0103	Mass Air Flow (MAF) Sensor Circuit High Frequency
DTC P0106	Manifold Absolute Pressure (MAP) Sensor Performance
DTC P0107	Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage
DTC P0108	Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage
DTC P0112	Intake Air Temperature (IAT) Sensor Circuit Low Voltage
DTC P0113	Intake Air Temperature (IAT) Sensor Circuit High Voltage
DTC P0117	Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage
DTC P0118	Engine Coolant Temperature (ECT) Sensor Circuit High Voltage
DTC P0121	TP Sensor Circuit Insufficient Activity
DTC P0122	Throttle Position (TP) Sensor Circuit Low Voltage
DTC P0123	Throttle Position (TP) Sensor Circuit High Voltage
DTC P0125	Engine Coolant Temperature (ECT) Insufficient for Closed Loop Fuel Control
DTC P0128	Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature
DTC P0130	HO2S Circuit Closed Loop (CL) Performance Sensor 1
DTC P0131	HO2S Circuit Low Voltage Bank 1 Sensor 1
DTC P0131 or P0151	HO2S Circuit Low Voltage
DTC P0132	HO2S Circuit High Voltage Bank 1 Sensor 1
DTC P0132 or P0152	HO2S Circuit High Voltage
DTC P0133	HO2S Slow Response Bank 1 Sensor 1
DTC P0133 or P0153	HO2S Slow Response
DTC P0134	HO2S Circuit Insufficient Activity Bank 1 Sensor 1
DTC P0134 or P0154	HO2S Circuit Insufficient Activity
DTC P0135	HO2S Heater Performance Bank 1 Sensor 1
DTC P0135, P0141, P0155, or P0161	HO2S Heater Performance
DTC P0137	HO2S Circuit Low Voltage Bank 1 Sensor 2
DTC P0137 or P0157	HO2S Circuit Low Voltage
DTC P0138	HO2S Circuit High Voltage Bank 1 Sensor 2
DTC P0138 or P0158	HO2S Circuit High Voltage
DTC P0140	HO2S Circuit Insufficient Activity Bank 1 Sensor 2
DTC P0140 or P0160	HO2S Circuit Insufficient Activity
DTC P0141	HO2S Heater Performance Bank 1 Sensor 2
DTC P0150	HO2S Circuit Closed Loop (CL) Performance Bank 2 Sensor 1
DTC P0151	HO2S Circuit Low Voltage Bank 2 Sensor 1
DTC P0152	HO2S Circuit High Voltage Bank 2 Sensor 1
DTC P0153	HO2S Slow Response Bank 2 Sensor 1
DTC P0154	HO2S Circuit Insufficient Activity Bank 2 Sensor 1
DTC P0155	HO2S Heater Performance Bank 2 Sensor 1
DTC P0171 or P0174	Fuel Trim System Lean
DTC P0172 or P0175	Fuel Trim System Rich
DTC P0200	Injector Control Circuit
DTC P0201-P0206	Injector Control Circuit
DTC P0218	Transmission Fluid Overtemperature
DTC P0230	Fuel Pump Relay Control Circuit
DTC P0300	Engine Misfire Detected
DTC P0325	Knock Sensor (KS) Circuit
DTC P0327 or P0332	Knock Sensor Circuit
DTC P0335	Crankshaft Position (CKP) Sensor Circuit
DTC P0336	Crankshaft Position (CKP) Sensor Circuit
DTC P0341	Camshaft Position (CMP) Sensor Performance
DTC P0342	Camshaft Position (CMP) Sensor Circuit Low Voltage
DTC P0343	Camshaft Position (CMP) Sensor Circuit High Voltage
DTC P0351-P0358	Ignition Coil Control Circuit
DTC P0401	Exhaust Gas Recirculation (EGR) Flow Insufficient
DTC P0403	Exhaust Gas Recirculation (EGR) Solenoid Control Circuit
DTC P0404	Exhaust Gas Recirculation (EGR) Open Position Performance
DTC P0405	Exhaust Gas Recirculation (EGR) Position Sensor Circuit Low Voltage
DTC P0410	Secondary Air Injection (AIR) System
DTC P0418	Secondary Air Injection (AIR) Pump Relay Control Circuit
DTC P0420	Catalyst System Low Efficiency
DTC P0420 or P0430	Catalyst System Low Efficiency
DTC P0440	Evaporative Emission (EVAP) System
DTC P0442	Evaporative Emission (EVAP) System Small Leak Detected
DTC P0443	Evaporative Emission (EVAP) Purge Solenoid Control Circuit
DTC P0446	Evaporative Emission (EVAP) Vent System Performance
DTC P0449	Evaporative Emission (EVAP) Vent Solenoid Control Circuit
DTC P0452	Fuel Tank Pressure Sensor Circuit Low Voltage
DTC P0453	Fuel Tank Pressure Sensor Circuit High Voltage
DTC P0461	Fuel Level Sensor Performance
DTC P0462	Fuel Level Sensor Circuit Low Voltage
DTC P0463	Fuel Level Sensor Circuit High Voltage
DTC P0480	Cooling Fan Relay 1 Control Circuit
DTC P0481	Cooling Fan Relay 2 and 3 Control Circuit
DTC P0500	Vehicle Speed Sensor (VSS) Circuit
DTC P0502	Vehicle Speed Sensor (VSS) Circuit Low Input
DTC P0503	Vehicle Speed Sensor (VSS) Circuit Intermittent
DTC P0506	Idle Speed Low

DTC P1111	Intake Air Temperature (IAT) Sensor Circuit Intermittent High Voltage
DTC P1112	Intake Air Temperature (IAT) Sensor Circuit Intermittent Low Voltage
DTC P1114	Engine Coolant Temperature (ECT) Sensor Circuit Intermittent Low Voltage
DTC P1115	Engine Coolant Temperature (ECT) Sensor Circuit Intermittent High Voltage
DTC P1120	Throttle Position (TP) Sensor 1 Circuit
DTC P1121	Throttle Position (TP) Sensor Circuit Intermittent High Voltage
DTC P1122	Throttle Position (TP) Sensor Circuit Intermittent Low Voltage
DTC P1125	Accelerator Pedal Position (APP) System
DTC P1133	HO2S Insufficient Switching Bank 1 Sensor 1
DTC P1133 or P1153	HO2S Insufficient Switching
DTC P1134	HO2S Transition Time Ratio Bank 1 Sensor 1
DTC P1134 or P1154	HO2S Transition Time Ratio
DTC P1153	HO2S Insufficient Switching Bank 2 Sensor 1
DTC P1154	HO2S Transition Time Ratio Bank 2 Sensor 1
DTC P1220	Throttle Position (TP) Sensor 2 Circuit
DTC P1221	Throttle Position (TP) Sensor 1-2 Correlation
DTC P1258	Engine Coolant Overtemperature - Protection Mode Active
DTC P1271	Accelerator Pedal Position (APP) Sensor 1-2 Correlation
DTC P1272	Accelerator Pedal Position (APP) Sensor 2-3 Correlation
DTC P1273	Accelerator Pedal Position (APP) Sensor 1-3 Correlation
DTC P1275	Accelerator Pedal Position (APP) Sensor 1 Circuit
DTC P1276	Accelerator Pedal Position (APP) Sensor 1 Performance
DTC P1280	Accelerator Pedal Position (APP) Sensor 2 Circuit
DTC P1281	Accelerator Pedal Position (APP) Sensor 2 Performance
DTC P1285	Accelerator Pedal Position (APP) Sensor 3 Circuit
DTC P1286	Accelerator Pedal Position (APP) Sensor 3 Performance
DTC P1336	Crankshaft Position (CKP) System Variation Not Learned
DTC P1351	Ignition Coil Control Circuit High Voltage
DTC P1352	Ignition Bypass Circuit High Voltage
DTC P1361	Ignition Control (IC) Circuit Low Voltage
DTC P1362	Ignition Bypass Circuit Low Voltage
DTC P1374	Crankshaft Position (CKP) High to Low Resolution Frequency Correlation
DTC P1380	Misfire Detected - Rough Road Data Not Available
DTC P1381	Misfire Detected - No Communication with Brake Control Module
DTC P1404	Exhaust Gas Recirculation (EGR) Closed Position Performance
DTC P1415 or P1416	Secondary Air Injection (AIR) System
DTC P1441	Evaporative Emission (EVAP) System Flow During Non-Purge
DTC P1514	Throttle Body Performance
DTC P1515	Control Module Throttle Actuator Position Performance
DTC P1516	Throttle Actuator Control (TAC) Module Throttle Actuator Position Performance
DTC P0507	Idle Speed High
DTC P0530	Air Conditioning (A/C) Refrigerant Pressure Sensor Circuit
DTC P0560	System Voltage
DTC P0562	System Voltage Low
DTC P0563	System Voltage High
DTC P0567	Cruise Control Resume Switch Circuit
DTC P0568	Cruise Control Set Switch Circuit
DTC P0571	Cruise Control Brake Switch Circuit
DTC P0601	Control Module Read Only Memory (ROM)
DTC P0601-P0607, P1600, P1621, P1627, P1680, P1681, or P1683	ECU Malfunction
DTC P0602	Control Module Not Programmed
DTC P0604	Control Module Random Access Memory (RAM)
DTC P0606	Control Module Internal Performance
DTC P0608	Vehicle Speed Output Circuit
DTC P0615	Starter Relay Control Circuit
DTC P0620	Generator Performance
DTC P0645	Air Conditioning (A/C) Clutch Relay Control Circuit
DTC P0650	Malfunction Indicator Lamp (MIL) Control Circuit
DTC P0704	Clutch Switch Circuit
DTC P0711	TFT Sensor Circuit Range/Performance
DTC P0712	Transmission Fluid Temperature (TFT) Sensor Circuit Low Input
DTC P0713	Transmission Fluid Temperature (TFT) Sensor Circuit High Input
DTC P0719	Brake Switch Circuit Low Input
DTC P0724	Brake Switch Circuit High Input
DTC P0740	TCC Enable Solenoid Circuit Electrical
DTC P0742	TCC System Stuck On
DTC P0748	Pressure Control Solenoid Circuit Electrical
DTC P0751	1-2 Shift Solenoid Valve Performance
DTC P0752	1-2 Shift Solenoid Valve Performance - No Second or Third Gear
DTC P0753	1-2 Shift Solenoid Circuit Electrical
DTC P0756	2-3 Shift Solenoid Valve Performance
DTC P0757	2-3 Shift Solenoid Valve Performance - No Third or Fourth Gear
DTC P0758	2-3 Shift Solenoid Circuit Electrical
DTC P0785	3-2 Shift Solenoid Circuit Electrical
DTC P0801	Reverse Inhibit Solenoid Control Circuit
DTC P0803	Skip Shift Solenoid Control Circuit
DTC P0804	Skip Shift Lamp Control Circuit
DTC P1106	Manifold Absolute Pressure (MAP) Sensor Circuit Intermittent High Voltage
DTC P1107	Manifold Absolute Pressure (MAP) Sensor Circuit Intermittent Low Voltage

DTC P1517	Throttle Actuator Control (TAC) Module Performance
DTC P1518	Throttle Actuator Control (TAC) Module Serial Data Circuit
DTC P1519	Throttle Actuator Control (TAC) Module Internal Circuit
DTC P1523	Throttle Closed Position Performance
DTC P1539	Air Conditioning (A/C) Clutch Feedback Circuit High Voltage
DTC P1546	Air Conditioning (A/C) Clutch Feedback Circuit Low Voltage
DTC P1554	Cruise Control Feedback Circuit
DTC P1574	Stoplamp Switch Circuit
DTC P1585	Cruise Control Inhibit Output Circuit
DTC P1586	Cruise Control Brake Switch 2 Circuit
DTC P1626	Theft Deterrent Fuel Enable Signal Lost
DTC P1629	Theft Deterrent Fuel Enable Signal Not Received
DTC P1635	5 Volt Reference 1 Circuit
DTC P1637	Generator L-Terminal Circuit
DTC P1639	5 Volt Reference 2 Circuit
DTC P1810	TFP Valve Position Switch Circuit
DTC P1860	TCC PWM Solenoid Circuit Electrical
DTC P1870	Transmission Component Slipping
DTC U1000 and U1255	Class 2 Communication Malfunction
DTC U1001-U1254	Lost Communications With XXX
DTC U1300	Class 2 Data Link Low
DTC U1301	Class 2 Data Link High

Painless Performance Products, LLC

Limited Warranty and Return Policy

Chassis harnesses, fuel injection harnesses, and Trail Rocker units are covered under a lifetime warranty.

All other products manufactured and/or sold by Painless Performance are warranted to the original purchaser to be free from defects in material and workmanship under normal use. Painless Performance will repair or replace defective products without charge during the first 12 months from the purchase date. No products will be considered for warranty without a copy of the purchase receipt showing the sellers name, address, and date of purchase. You must return the product to the dealer you purchased it from to initiate warranty procedures.