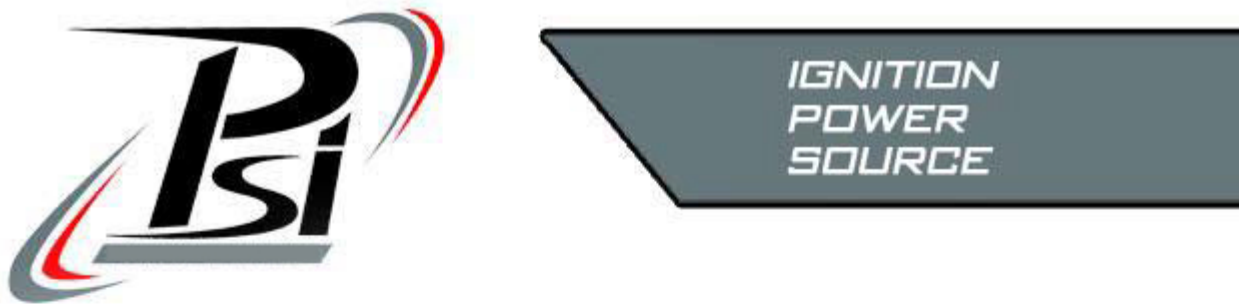


GENERAL INSTALLATION TROUBLESHOOTING

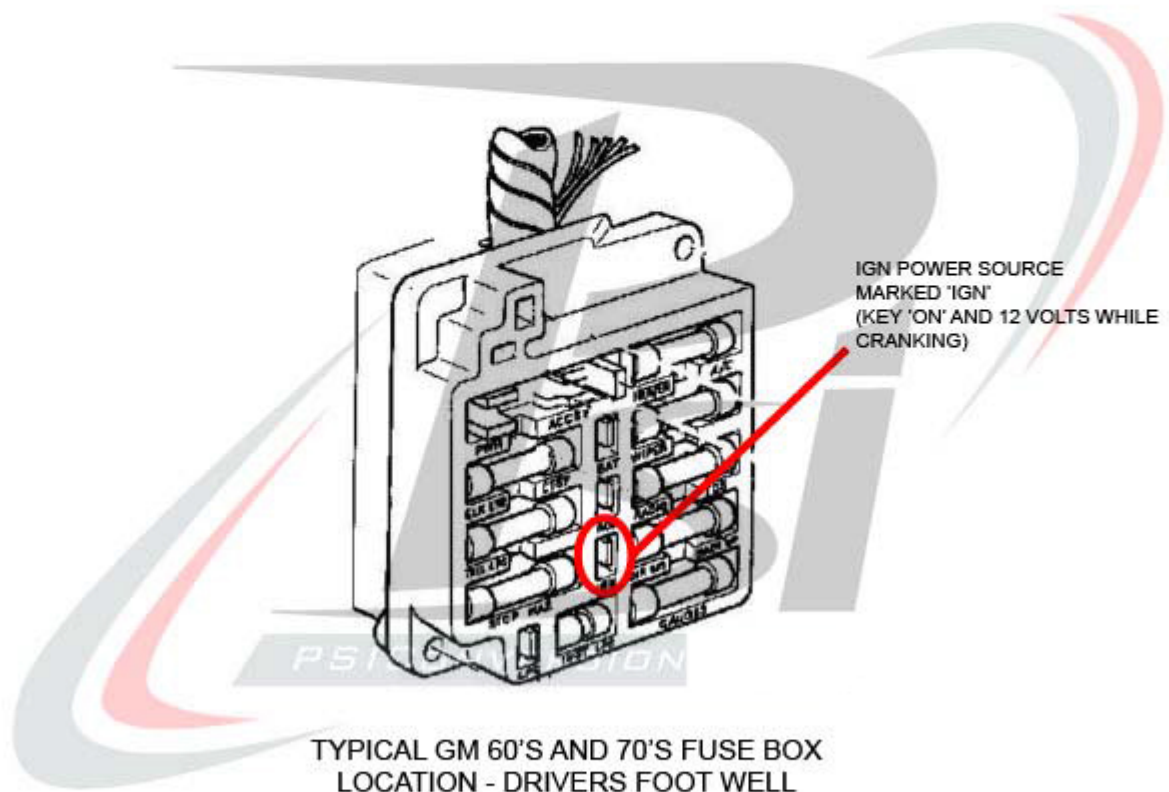
Below is a comprehensive list of the frequently asked questions we receive via our email contact form.

WHERE DOES THE SINGLE RED WIRE COMING FROM RELAY BLOCK GO?

- The red wire provides switched power signal for the PCM. Connect to a 12 volt source that has power with the key 'ON' AND WHEN 'CRANKING'. Note that in older GM Vehicles, the ignition wire in the engine compartment (White cloth covered) is not a 12-volt source. The most common spot to find this type of power is in the factory chassis fuse box. It is typically marked as 'IGN' power NOT 'ACC' power.



CONNECTING THE SINGLE RED WIRE COMING FROM THE PSI RELAY BLOCK



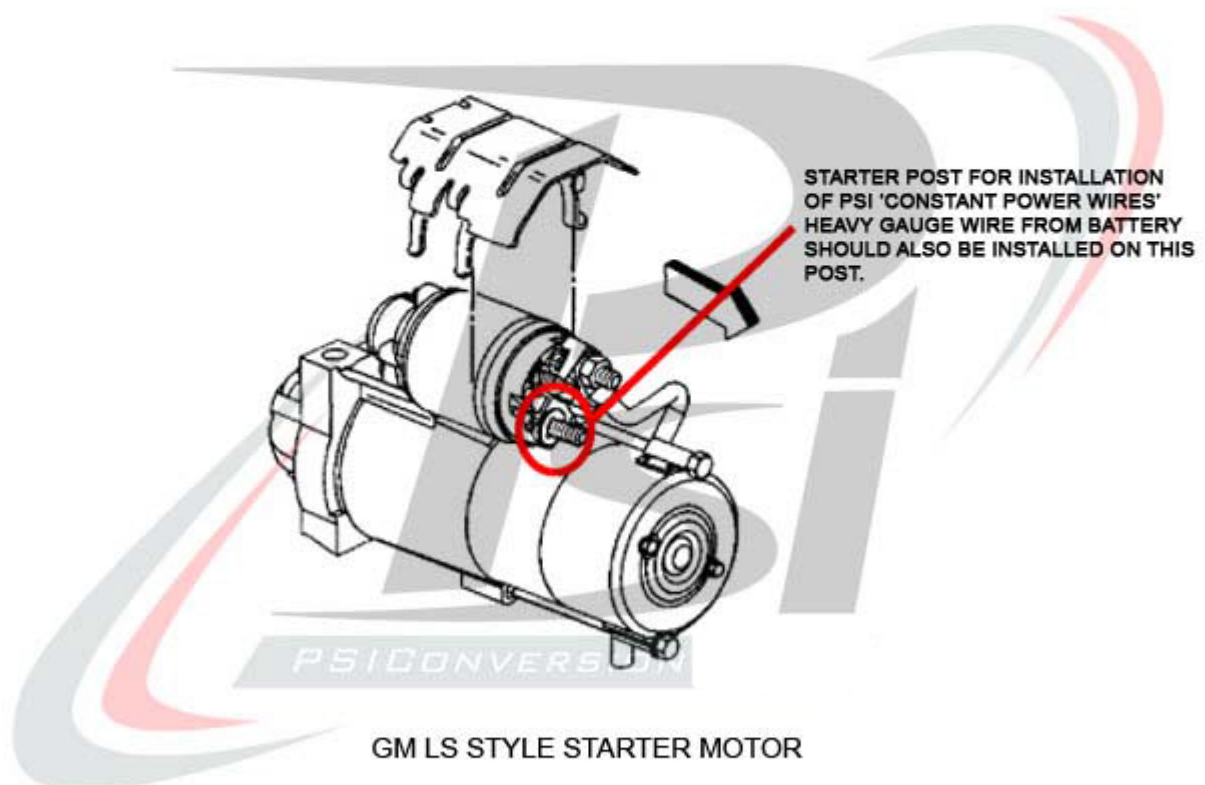
WHERE DO THE TWO RING TERMINALS AT THE STARTER GET CONNECTED TO?

- The 2 black wires with the large ring terminals provide all the power to the harness. They get connected to the large stud on the starter, which should have battery power.



CONSTANT POWER LOCATION

CONNECTING THE TWO RING TERMINALS AT THE STARTER



WHY DON'T MY OXYGEN SENSORS PLUG IN?

- PSI harnesses are designed to use the most popular Oxygen sensor applications. For peak engine performance, PSI recommends the oxygen sensors be replaced, especially if vehicle/engine history is unknown. New Delphi Oxygen sensors can be purchased from PSI, or Table 2 of your harness instructions will provide GM part numbers for the correct sensor.

WHERE SHOULD I INSTALL MY OXYGEN SENSORS IF I HAVE LONG TUBE HEADERS?

- O2 sensors should always be installed as close to the engine as possible in order to allow for proper sensor heating and function. The further from the engine the sensors are installed the more time the sensors will take to heat up and put the engine in closed loop.

HOW DO I HOOK UP MY AC REQUEST WIRE?

- The AC Request Wire must be hooked up to a 12-volt source when the ac compressor clutch is engaged.

WHERE DO I PLUG IN THE PURPLE AND YELLOW WIRES.

- This varies depending on your specific Harness. Please check your wiring harness instruction manual - [Instructions](#)

WHAT DO I DO WITH ORANGE WIRE?

- Run to ground (IN PARK AND NEUTRAL). It is not a neutral safety wire and will not prevent the engine from starting. Hooking this wire up is 'Optional'.

DO I NEED TO HOOK UP MY OIL PRESSURE CONNECTOR?

- Oil pressure wiring only needs to be hooked up if you are using Variable Valve Timing (VVT). This function is only present on Gen IV (58X) engine applications. For all other applications the engine oil pressure wiring is not required to make the engine function properly. When using an aftermarket oil pressure gage, you must use the sender that came with the gage and wire it directly.

WHERE CAN I INSTALL MY COOLANT TEMPERATURE GAUGE SENDER?

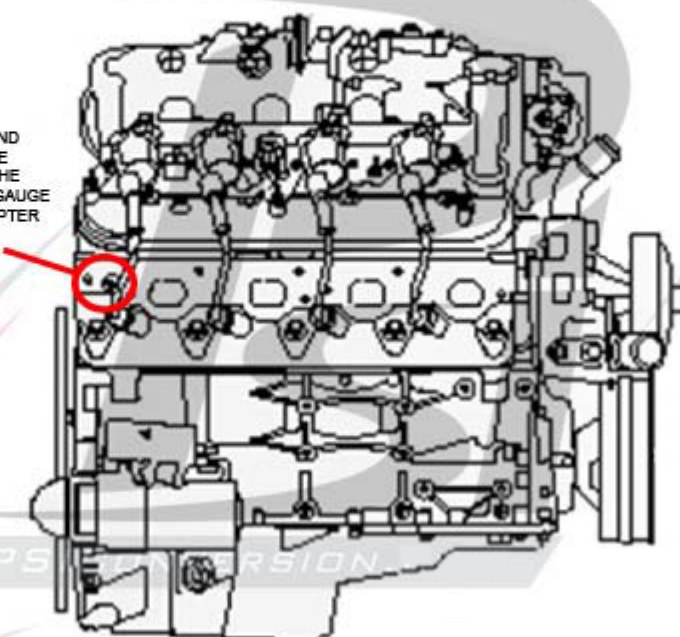
- When using an aftermarket water temperature gage, the sender that came with the gage must be used and wired directly to the gauge. Most aftermarket gauges use senders with standard US threads. However, LS engines have metric threads, therefore a fitting must be used to adapt the threads. The port on the rear of the passenger cylinder head is most commonly used for this function. These adapters are available through PSI.



ENGINE COOLANT TEMPERATURE GAUGE SENDER

LOCATION FOR AFTERMARKET COOLANT TEMPERATURE GAUGE SENDER IN PASSENGER CYLINDER HEAD

REMOVE BOLT FROM CYLINDER HEAD AND
INSERT COOLANT TEMPERATURE GAUGE
SENDER. NOTE THAT THE THREADS IN THE
CYLINDER HEAD ARE METRIC. IF YOUR GAUGE
SENDER IS STANDARD THREAD, AN ADAPTER
(AVAILABLE THRU PSI) IS REQUIRED.



HOW DO I WIRE UP MY FUEL PUMP?

- Using Figure 2 and specific connections indicated in Table 4, connect the wiring as directed. All connections in table 4 are required unless otherwise noted.

HOW DO I WIRE UP MY SPEEDOMETER?

- Connect our black "under dash" wire to speedometer. NOTE: Do not tap into VSS wiring in the harness as this can result in the transmission NOT shifting due to a split VSS signal. Following installation, ensure proper calibration of the speedometer per the manufacturer's instructions.

HOW DO I GET MY AUTO-METER TACHOMETER TO WORK?

- Connect our white "under dash" wire to their green wire of your tachometer. Note that most aftermarket tachometers work with a 12-volt signal. However, LS controllers use a 5-volt signal which is not directly

compatible with most aftermarket tachometers. In these cases a resistor must be wired into the tachometer signal wire. This wiring diagram is located in the PSI instructions which came with your harness.

NO SIGNAL TO THE TACH AND SPEEDO GAUGE(S)?

- Most aftermarket tachometers work with a 12-volt signal. However, LS controllers use a 5-volt signal which is not directly compatible with most aftermarket tachometers. In these cases a resistor must be wired into the tachometer signal wire. This wiring diagram is located in the PSI instructions which came with your harness.

VEHICLE RUNS PERFECT BUT NO 5V SIGNAL AT TACH WIRE (GAUGES)?

- Check that gauge is installed correctly.
- Contact PSI Tech Support to determine if PCM 'Tach Resolution' is set correctly.

I HAVE A TH350/MANUAL TRANS. DO I NEED TO PLUG IN THE VSS?

- The VSS is not required, however, it is recommended. In some instances, if the VSS is not hooked up, the PCM will not know how fast the vehicle is going and therefore under hard stopping conditions could abruptly hunt for idle or stall. This condition can be alleviated by installing a VSS or through a local tuner once the swap is completed.

CAN I EXTEND MY MAF CONNECTOR WIRING?

- Yes you can extend the MAF connector using a properly made extension harness. These are available through PSI in varying lengths to fit many different configurations.

CAN I EXTEND MY OXYGEN SENSOR WIRING?

- Yes you can extend the oxygen sensor connector using a properly made extension harness. These are available through PSI in varying lengths to fit many different configurations.

CAN I TAP INTO THE VEHICLE SPEED SENSOR (VSS) WIRING PROVIDED WITH MY HARNESS SO MY SPEEDOMETER WILL WORK?

- No, at no time should you tap into any of the engine sensor wiring supplied with your PSI harness. Your speedometer should be wired per the manufacturer's instructions. This typically requires that you connect the speedometer to the output wire supplied with the PSI wiring harness 'under dash wiring' section.

CAN I TAP INTO THE COOLANT TEMPERATURE SENSOR WIRING PROVIDED WITH MY HARNESS SO MY COOLANT TEMPERATURE GAUGE WILL WORK?

- No, at no time should you tap into any of the engine sensor wiring supplied with your PSI harness. Your temperature gauge should be wired per the manufacturer's instructions. This typically requires the sender that came with the gauge to be used.

HOW DO I ENSURE THAT MY COIL SUB-ASSEMBLY WIRING HARNESS IS ON THE CORRECT SIDE?

- When using PSI coil sub-harnesses it is critical that they are oriented correctly. An easy way to check orientation is to confirm the wire color in position 'C' of each coil connector. The colors and corresponding cylinders are as follows:



COIL SUB-HARNESS ORIENTATION

WIRE COLOR IN POSITION 'C' OF EACH
COIL CONNECTOR

DRIVERS SIDE

#1 PURPLE
#3 LIGHT BLUE
#5 DARK GREEN
#7 RED

PASSENGER SIDE

#2 RED
#4 DARK GREEN
#6 LIGHT BLUE
#8 PURPLE

HOW DO I MOUNT MY EXTERNAL FUEL PUMP TO MY VEHICLE?

- The external fuel pumps require insulated mounting brackets to ensure proper, long lasting performance. Most customers will fabricate mounts based on their application or use rubber insulated clamps to secure the pump.
- If using a Walbro external fuel pump, a mounting kit is available through PSI.

NO-START TROUBLESHOOTING

Below is a comprehensive list of the frequently asked questions we receive via our email contact form.

MY ENGINE WON'T START, WHAT DO I DO?

- Make sure ALL connections for the harness and swap have been made. This includes, Oxygen Sensors and MAF Sensor. Additionally, ensure the exhaust and intake duct work are installed properly. If any of these items are not installed correctly a no start condition can result.
- If you are having trouble with your engine running poorly or not running at all, first perform basic trouble shooting (ensure that you are using the correct parts, see Table 2), check for faulty connections, blown fuses, disabling of VATS in PCM, spark, timing, fuel pressure, etc., then see if the PCM has stored a trouble code in its memory.
- Contact PSI Tech Support.

NO INJECTOR IMPULSE?

- With an OBDII scanner, check that the engine RPM during 'Cranking' is above 150-rpm. If the RPM is reading below 150-rpm, charge the battery. If the RPM is not reading at all, a faulty crank sensor or crank sensor wiring could be the issue. Contact PSI Tech Support for further instruction.
- If the RPM is reading over 150-rpm, insert a Noid Light (available at your local auto parts store) in each injector connector. If the light flashes, the injectors are clogged. Remove the injectors and fuel rail from the intake manifold. Once removed insert a pan under the injectors (to catch fuel). Have someone crank the engine while watching for fuel spraying evenly out of the injectors. If no fuel sprays, or dribbles out, remove the injectors and have them professionally cleaned (soaking the injectors is not an acceptable means of cleaning) or replaced.
- Contact PSI Tech Support to determine if Vehicle Anti-Theft (VATs) is still active in your PCM.

DRIVEABILITY TROUBLESHOOTING

Below is a comprehensive list of the frequently asked questions we receive via our email contact form.

NO MAF READING (0V) AND THE VEHICLE RUNS GOOD WITH MAF PLUGGED IN AND UNPLUGGED?

- Check MAF fuse. If fuse is good, check that the MAF you are using is wired correctly for the harness you ordered.

DTC P0102 (LOW FREQUENCY MAF) VEHICLE RUNS BAD WITH MAF PLUGGED IN BUT RUNS GOOD WITH MAF UNPLUGGED?

- Check that MAF you are using is wired correctly for the harness you ordered.

NO THROTTLE RESPONSE WITH DBW VEHICLE?

- GM drive by wire (DBW) systems require that components integral to the system (Pedal, Throttle Body, Throttle Actuator Control Module (Gen III applications only)) are matched to work together. This includes the tune which must have the correct programming to match your throttle components as well. If these steps are not followed a lack of throttle response may ensue.
- Check brake switch wiring.

FUEL PUMP RELAY WON'T RESPOND/CONSTANTLY CLICKING?

- This relay is grounded in by the PCM wiring harness grounding lugs. Check that the lugs are tightened the rear of the driver's cylinder head and that the surface on the engine is clean. Also ensure that the battery, engine and vehicle are grounded properly. Reference the PSI Engine Ground Diagram.
- If Grounding checks out, contact PSI to ensure that the tune is set for 'Constant' fuel pump signal and not 'PWM' signal.

TRANSMISSION TROUBLESHOOTING

Below is a comprehensive list of the frequently asked questions we receive via our email contact form.

TRANSMISSION STARTS OFF IN SECOND GEAR, WON'T SHIFT ON ITS OWN, BUT YOU CAN SHIFT IT MANUALLY (4L60E/80E)?

- Ensure that your transmission plug is inserted fully and in the correct orientation into the transmission. Check the transmission for bent or broken pins in the connector.
- Contact PSI Tech Support to ensure that the tune in your PCM is correct for your application.

TRANSMISSION STARTS IN FIRST AND THEN SHIFTS INTO NEUTRAL (4L60E/80E)?

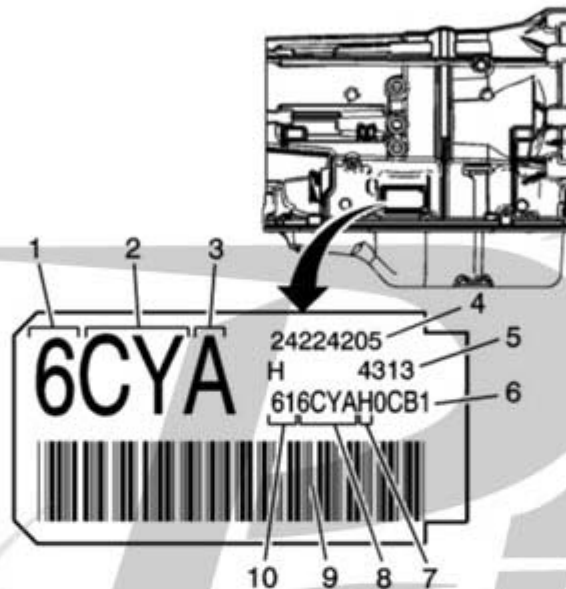
- Ensure that your transmission plug is inserted fully and in the correct orientation into the transmission. Check the transmission for bent or broken pins in the connector.
- Ensure that your transmission is filled to the correct fluid level.
- Contact PSI Tech Support to ensure that the tune in your PCM is correct for your application.

WHAT YEAR IS MY 6L80E TRANSMISSION?

- There is an ID tag on the side of the transmission which can be decoded with the identifier below.



6L80E / 6L90E MODEL YEAR DECODER



1. Model Year
2. Model Code
3. Transmission Family
4. Transmission Assembly Number
5. Julian Date
6. Sequential Serial Number
7. Source Code
8. Broadcast Code
9. Bar Code
10. Transmission I.D.

WHAT ARE THE DIFFERENCES BETWEEN THE VARIOUS 4L60E/4L65E/4L70E TRANSMISSIONS?

- GM started making the 4L60E automatic overdrive transmission in the early 1990's in various configurations. Mechanically there are various differences which will affect strength and longevity, while electrically there are slight differences. For the purposes of using with the LS PCM there are some compatibility issues you must be aware of. For Gen III (24X) engine applications the transmission must be newer than 1996. This can be identified by counting the metal pins sticking up from the round electrical connector on the transmission. There should be 13 pins in the electrical connector. If you are using a Gen IV (58x) engine, the preferred transmission would be from a 2005 or newer application. This can be identified by counting the metal pins sticking up from the round electrical connector on the transmission. There should be 15 or 17 pins in the electrical connector. An earlier transmission (13 Pin) can be used as well, but requires changes made to the ECM/TCM tune.