



2006 – Current
GEN IV LSX/Vortec 4.8, 5.3, 6.0, 6.2, 7.0 Drive by Wire (58X)
Electronic Fuel Injection Wiring Harness w/4L60E or 4L80E Automatic
Transmission

HAR-10 ___ (See Below)

(P/N HAR- 1036, 1038, 1040, 1042, 1044, 1046,
1048, 1064, 1066, 1068)

PERFORMANCE SYSTEMS INTEGRATION

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Thank you for choosing Performance Systems Integration (PSI). We offer a full line of LSX/LT1 and GM Overdrive Transmission parts for your conversion needs. We have attempted to provide you with as accurate instructions as possible, and are always concerned about corrections or improvements that can be made. If you have found any errors or omissions, or if you simply have comments or suggestions concerning these instructions, please write us at the address on the cover and let us know about them. Or, better yet, send us an e-mail at INFO@PSIConversion.com. Once again, thank you for choosing PSI!

PERFORMANCE SYSTEMS INTEGRATION LIMITED WARRANTY AND RETURN POLICY

All products manufactured and/or sold by ***Performance Systems Integration (PSI)*** are warranted to the original purchaser to be free from defects in material and workmanship under normal use. **PSI** 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. The buyer is responsible for returning the product to **PSI** to initiate the warranty procedures. If defects occurred under what **PSI** deems to be normal use, product will be returned free of charge.

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1.0 INTRODUCTION

Thank you for purchasing what PSI has designed as the most up-to-date and easiest-to install automotive fuel injection harness on the market. This harness is designed to be a complete wiring harness for the fuel injection system on General Motors 2006 and newer LSX and Vortec fuel injected engines using a 58X crank sensor and the 4L60E/4L80E transmission with factory installed Drive By Wire throttle Body.

NOTE: PSI typically customizes the 58X harnesses to customer specifications prior to shipment. This includes variations in Accelerator Pedal, Alternator, Variable Valve Timing (VVT) Camshaft, Intake Manifold and Mass Airflow Sensor (MAF). If the incorrect items are used, the engine and transmission will not work correctly. Please ensure you are using the correct components prior to installation.

This harness is constructed with GM Delphi Connectors and Terminals with GXL (600 volt polyethylene cross-linked) wire which is professionally assembled and 100% quality inspected prior to shipping. This harness includes all wiring that is needed by the ECM/TCM to run and control the fuel injection system and transmission.

List of Terms			
Item	Description	Term	Purpose
1	Engine Control Module	ECM	This is the computer which controls engine function.
2	Throttle Position Sensor	TPS	ECM Input for engine throttle position.
3	Drive by Wire	DBW	Throttle Body operation by ECM
4	Exhaust Gas Recirculation	EGR	ECM Output to control engine emissions.
5	Engine Coolant Temperature	ECT	ECM Input to determine engine temperature.
6	Inlet Air Temperature	IAT	ECM Input to determine air temperature.
7	Manifold Absolute Pressure	MAP	ECM Input to determine engine load.
8	Mass Air Flow	MAF	ECM Input to determine airflow into engine.
9	Oxygen Sensor	O2	ECM Input to determine air/fuel ratio of engine.
10	Vehicle Anti-Theft	VAT's	ECM Input to prevent engine from starting.
11	Charcoal Canister Purge	CCP	ECM Output to control engine emissions.
12	Transmission Control Module	TCM	The computer which controls transmission function.
13	Vehicle Speed Sensor	VSS	ECM/TCM Input to determine vehicle speed.
14	Input Speed Sensor	ISS	TCM Input to determine trans input speed (4L80E)
15	Malfunction Indicator Light	MIL	ECM Output to alert of EFI Malfunction.
16	Data Link Connector	DLC	ECM Input for retrieving trouble codes.
17	Torque Converter Clutch	TCC	TCM Output for locking torque converter.
18	Accelerator Pedal Position	APP	ECM Input to determine pedal position

Table 1 - List of Terms



PERFORMANCE SYSTEMS INTEGRATION

2.0 PRECAUTIONS

Below are a few precautions that should be taken prior to and after installing this wiring harness:

1. Never disconnect the battery or the ECM/TCM Connectors while the ignition is turned 'On'.
2. Never short any wires in this harness to ground (with the exception of the 'Ground' wires) or damage to the ECM/TCM will result.
3. Never use a 'Test Light' to determine the condition of any circuits. A digital Volt/Ohm Meter with a minimum of 10-Mohm resistance is required to test any circuits. Do not back probe wires as this can lead to permanent wire damage.

3.0 PRE-INSTALLATION REQUIREMENTS

The following information details some of the hardware and software requirements when installing this harness:

1. All LSX/Vortec Engines will require the VAT's System to be removed from the ECM. If the VAT's is not removed from the ECM the engine will NOT start. Contact PSI for removal of this function.
2. Factory Stock LSX/Vortec engines utilized four (4) O2 Sensors; two (2) Sensors on each side of the engine, one before and one after the catalytic converter. The rear O2 Sensors (after the catalytic converters) are **not** used with the PSI Harness. Provisions are provided for two oxygen sensors in the harness.
3. **LSX/Vortec engines utilized Evaporative and CCP features for emissions control. This harness does not include these provisions. Evaporative and CCP are not necessary for engine operation. ECM reprogramming may be necessary to avoid storing a Diagnostic Trouble Code (DTC) for absence of emissions equipment.**
4. If any sensors are missing or damaged, PSI recommends replacements listed in Table 2. Note that the ECM listed in Table 2 must be used.
5. The Oil Pressure Sensor is **NOT** required for normal operation of the engine. If you wish to use an oil pressure gauge, you will need an oil pressure sensor from a 2008 Silverado LY6. See the table below for the OEM part numbers compatible with our harness.
6. If using an aftermarket gauge, you **MUST** use the sender that is included with the gauge.
7. When using a 4L60E or 4L80E transmission you **MUST** have a brake switch. These are necessary to allow proper function of the TCC. The brake switch should be closed (electrically connected) when the brakes **ARE** being applied and open (not electrically connected) when the brakes **ARE NOT** being applied.

CAUTION: FAILURE TO WIRE THE TCC SWITCH CORRECTLY WILL RESULT IN A DANGEROUS SITUATION IN THE VEHICLE WHERE THE TORQUE CONVERTER MAY NOT UNLOCK. ADDITIONALLY AN INOPERABLE THROTTLE BODY MAY RESULT!



TABLE 2. COMPATIBLE PARTS	
Item Description	Part Number
Engine Computer (ECM)	GM Service# 12597121, 12612384, or 12625455
Transmission Computer (TCM)	GM Service# 24234503
Knock Sensor	GM# 12570125 / Delco# 213-1576
Ignition Coil	GM# 12558948 / Delco# D-580
Oxygen (O2) Sensor	GM# 12581966 / Delco# 213-1694
Mass Air Flow (MAF) Sensor *CAUTION: SENSOR WIRING AND PCM TUNE MUST MATCH SENSOR USED	GM# 25168491 / Delco# 213-364 (LS2) GM# 15865791 / Delco# 213-4222 (LS3/LS7 Cartridge Style) GM# 15900023 / Delco# 213-3827 (LSX/Vortec 07-08 Tube Style) GM# 10393948 / Delco# 213-4343 (Vortec 09+)
Cam Position Sensor	GM# 12561211 / Delco# 213-363 (non-VVT) GM# 12568983 / Delco# 213-3826 (VVT)
Crankshaft Position Sensor	GM# 12585546 / Delco# 213-3520
Manifold Absolute Pressure (MAP) Sensor	GM# 12591290 / Delco# 213-3842 "Bosch Map Style" (LS3 Vortec 09+ Intake Manifold) GM# 12614973 / Delco# 213-796 "Delphi Map Style" (LS2/Vortec 07-08 Truck Manifold)
Accelerator Pedal Position (APP) Sensor	GM# 25835421 (Corvette), GM# 20972082 (Vortec Truck)
Oil Pressure Sensor (Not Required for normal engine operation)	GM# 12616646 (2008 and Older) GM# 12621234 / Delco# 2134411 (2009- Up)

Table 2 - Compatible Parts

4.0 TOOLS

Non-Standard Tools Required for Installation:

1. Terminal Crimping Tool
2. Wire Strippers
3. Electric Drill
4. 2" Hole saw (for the rubber grommet in the firewall)

5.0 ROUGH INSTALLATION/ROUTING

This harness was designed with the intent of ECM/TCM mounting in the passenger compartment (e.g. glove box, or under dash). This fuel injection harness has two sections, the Engine Compartment Section, and the Dash Section, reference Figure 1 below. Note that the Engine Compartment Section is on one side of the Grommet Seal and the Dash Section is on the other side.

- **ENGINE COMPARTMENT SECTION:** Includes wiring for the fuel injectors, coils, sensors, and transmission.
- **DASH SECTION:** Includes ignition feed wires, DLC Connector, Underdash Wires, Accelerator Pedal Position Sensor, ECM Connectors, TCM Connector, and Fuse/Relay Center.



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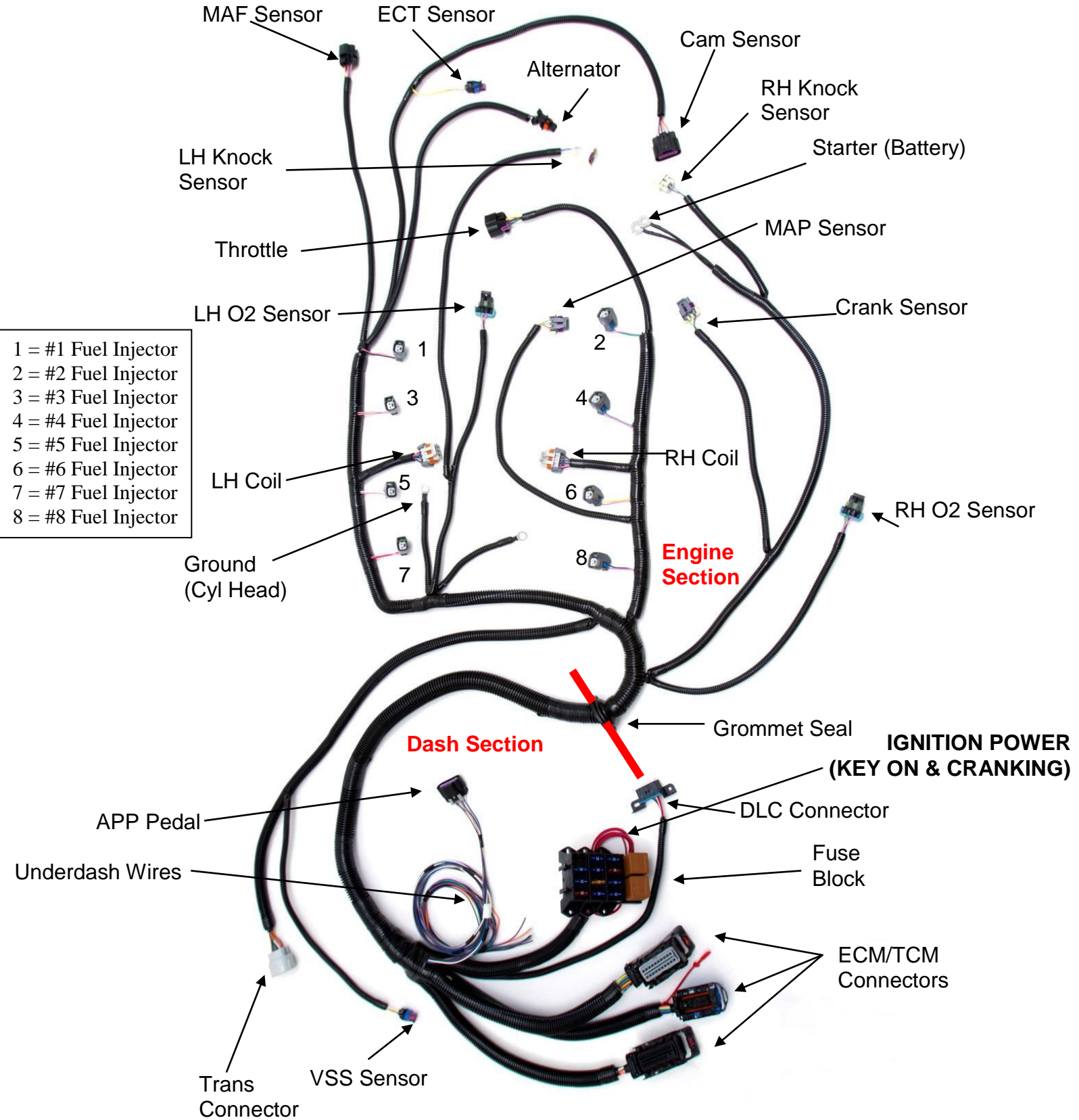


Figure 1



PERFORMANCE SYSTEMS INTEGRATION

NOTE: Routing your harness depends a great deal upon the particular make of the automobile and to what extent you want to secure and conceal the harness.

- 5.1 Decide where and how the ECM/TCM and Fuse/Relay Center will be mounted. PSI wiring harnesses are designed to mount either under the dash or in the kick panel on the right side. They must be no further apart than the wiring will allow.
- 5.2 A good exercise is to lay out the wire harness on the floor beside your vehicle and identify all the connectors and wires.
- 5.3 You will want to route the harness through and around open areas. Inside edges provide extra protection from hazards and also provide places for tie wraps, clips and other support.
- 5.4 Route the harness away from sharp edges, exhaust pipes, and the hood, trunk and door hinges.
- 5.5 Allow enough slack in the harness at places where movement could possibly occur (body to frame, frame to engine, etc.).
- 5.6 Familiarize yourself with the harness by locating each of the harness sections and by looking at the connectors on the wire ends, reference Figure 1.

As with all automotive wiring, the grounding circuit is critical for proper operation. Ensure that there is secure grounding of the following, battery to engine, battery to chassis, engine to chassis, and harness to engine.

NOTE: This harness is equipped with Ground Wiring on the rear portion of the driver side cylinder head.

- 5.7 Connect a ground strap or cable (minimum of a 4 Ga. wire) from the negative battery terminal to the chassis (frame).
- 5.8 Connect a ground strap (minimum of a 4 Ga. wire) from the engine to the chassis (frame). **DO NOT RELY UPON THE MOTOR MOUNTS TO MAKE THIS CONNECTION.**
- 5.9 Connect a ground strap from the engine to the body.

6.0 HARNESS INSTALLATION

CAUTION: BEFORE BEGINNING INSTALLATION, DISCONNECT THE POWER FROM YOUR VEHICLE BY REMOVING THE NEGATIVE BATTERY CABLE FROM THE BATTERY.

Connecting the Wiring Harness is a simple process and is detailed in the following steps.

- 6.1 Mark the position where the wiring harness will come through the firewall with a metal punch. (Typically near the passenger side cylinder head) Using a 2" hole saw, drill a hole in the firewall. Make sure to debur the hole with a file.
- 6.2 From **inside** the vehicle, feed the Engine Section of the wiring harness through the 2" hole. Push the grommet (already installed on the harness) into the hole until it is seated.

NOTE: Make no wire connections or permanent mounting of any kind at this time. Remember to route harness away from sharp edges, exhaust pipes, hinges and moving parts.



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- 6.3 Route the engine compartment section to the top of the engine. The engine section is designed to be separated into left side (driver) and right side (passenger) sections, in much the same way as factory wiring. Each side is wire loomed separately, BUT IS NOT LABELED. The driver side of the engine section is longer, and has the connectors for the CAM, MAF, and ECT Sensor, reference Figure 1.
- 6.4 Route the driver side section behind the intake manifold and then between the driver side rocker cover and fuel rail.
- 6.5 Route the passenger side section between the passenger side rocker cover and fuel rail.
- 6.6 If applicable, route the transmission connector, ISS connector (4L80E only) and VSS connector over the transmission case to the rear of the transmission.

CAUTION: WHEN ROUTING THE WIRES FOR THE VEHICLE SPEED SENSOR MAKE CERTAIN THAT THEY ARE AT LEAST 12 INCHES AWAY FROM ANY IGNITION WIRING (SPARK PLUG WIRES, ETC.).

- 6.7 Route the Battery Positive (**2 LARGE RING TERMINALS COVERED IN BLACK HEAT SHRINK**) and Crank sensor connectors behind the passenger head and under the exhaust manifold (header) to their respective locations.
- 6.8 Route the Fuse Block/Relay Center and ECM/TCM connectors to their preferred mounting locations. Position the ECM/TCM in its intended location (e.g. under the dash).

CAUTION: IT IS IMPORTANT TO AVOID ECM/TCM CONTACT WITH MOISTURE OR DAMAGE MAY OCCUR.

- 6.9 Route the underdash wires, Figure 1, to the driver side of the dash.

7.0 ENGINE COMPARTMENT SECTION CONNECTIONS

- 7.1 Locate the black wires in the driver side group that end in two, large ring terminals and ground them to the engine, Figure 1. (Commonly to the rear of the driver side cylinder head).
- 7.2 Using Figure 1 and specific connections indicated in Table 3 connect the wiring as directed.
- 7.3 Route the transmission connector to the passenger side of the transmission and attach it.
- 7.4 Route the connector for the Vehicle Speed Sensor (VSS) and connect it to the Vehicle Speed Sensor on the tailshaft of the transmission.

NOTE: If using a 4L80E transmission, a separate Input Speed Sensor (ISS) connection will be present in the harness. This is plugged into the sensor towards the front of the transmission.



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Connector	Connected To	Wire Colors	Check Completed
1	#1 Fuel Injector	Pink, Black	
2	#2 Fuel Injector	Pink, Dk Green	
3	#3 Fuel Injector	Pink, Tan	
4	#4 Fuel Injector	Pink, Lt Blue	
5	#5 Fuel Injector	Pink, White	
6	#6 Fuel Injector	Pink, Yellow	
7	#7 Fuel Injector	Pink, Red	
8	#8 Fuel Injector	Pink, Dk Blue	
9	Alternator	Brown, Gray, Red (Optional)	
10	ECT Sensor	Tan, Yellow	
11	Cam Sensor	Orange, Pink, Brown, Purple (VVT Only), Tan (VVT Only)	
12	LH Coil	Black, Red, Dk Green, Brown, Lt Blue, Purple, Pink	
13	LH O2 Sensor	Tan, Purple, Pink, Gray	
14	Crank Sensor	Dk Blue, Yellow, Lt Green	
15	LH Knock Sensor	Dk Blue, Gray	
16	RH Knock Sensor	Lt Blue, Gray	
17	MAF Sensor	Yellow, Black, Pink, Purple, Tan	
18	Throttle Body	Brown, Yellow, Tan, Green, Blue, Purple	
19	MAP Sensor	Orange, Lt Green, Gray	
20	RH Coil	Black, Orange, Dk Green, Brown, Lt Blue, Purple, Pink	
21	RH O2 Sensor	Tan, Purple, Green, Pink	
22	Transmission	Lt Green, Yellow, Orange, Lt Blue, Pink, Orange, Yellow, Tan, Pink, Dk Green, Dk Blue, White, Tan, Brown, Lt Blue	
23	VSS Sensor	Yellow, Purple	
24	Starter (Battery Positive) 2 RING TERMINALS	Large Ring Terminals (Black)	
25	Ground	Small Ring Terminal (Black)	
26	ISS Sensor (4L80E Only)	Tan, Orange	

Table 3 – Engine Compartment Connection Checklist (Reference Figure 1)

8.0 DASH SECTION CONNECTIONS

The wires in this section consist of the DLC, Ignition Feed, MIL indicator, Speedometer/Cruise Control Signal, Tachometer, Accelerator Pedal Position Sensor, ECM/TCM Connectors, Primary Cooling Fan, Secondary Cooling Fan, Park/Neutral Signal, and Brake Signal wires.

CAUTION: DO NOT MAKE ANY CONNECTIONS WHILE THE ECM/TCM IS PLUGGED INTO THE HARNESS.

8.1 Using Figure 1 and specific connections indicated in Table 4, connect the wiring as directed. All connections in Table 4 are required unless otherwise noted.



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NOTE: A fuel pump relay is provided with the signal side of the relay being pre-wired from PSI. However, in order to provide a clean installation, the feed and output sides of the relay are not wired. PSI has provided you with two blade terminals to complete this circuit. Ensure that properly sized and fused wiring is used, depending on the capacity of your fuel pump. Measure the length of wire needed to reach the fuel pump, strip the wire and crimp the supplied blade terminal onto the wire. Insert the terminal into the relay holder per Figure 2. Perform the same operation for wiring the power supply side of the relay ensuring that the wire is run from an appropriate power source.

CAUTION: BE SURE TO PROPERLY GROUND AND FUSE YOUR FUEL PUMP OR ENGINE DAMAGE MAY OCCUR.

- 8.2 Connect the 2 ECM connectors to the ECM and single connector to the TCM, **BEING CAREFUL NOT TO BEND ANY PINS**. Connectors are color coded to prevent incorrect installation.
- 8.3 All wires not being used should be individually taped and secured to prevent electrical shorting.
- 8.4 Permanently mount your ECM, TCM, Accelerator Pedal, and Fuse/Relay Center.
- 8.5 After all connections have been made throughout the harness, reconnect the battery.

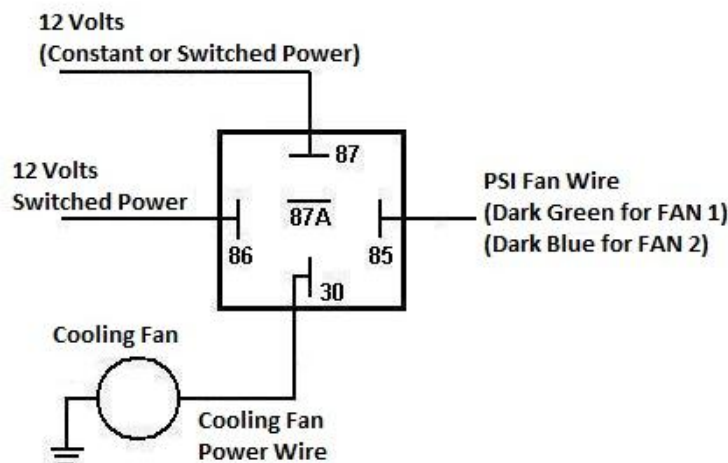
CAUTION: BE SURE THE IGNITION IS OFF WHEN YOU RECONNECT THE BATTERY OR DAMAGE TO THE ECM/TCM WILL OCCUR.

NOTE: In **STOCK CONFIGURATION** Fan #1 will come ON at 226F and go OFF at 221F Fan #2 will come ON at 235F and go OFF at 230F. If PSI programmed your PCM, your fans will be set to come on at 182 and 192, respectively.

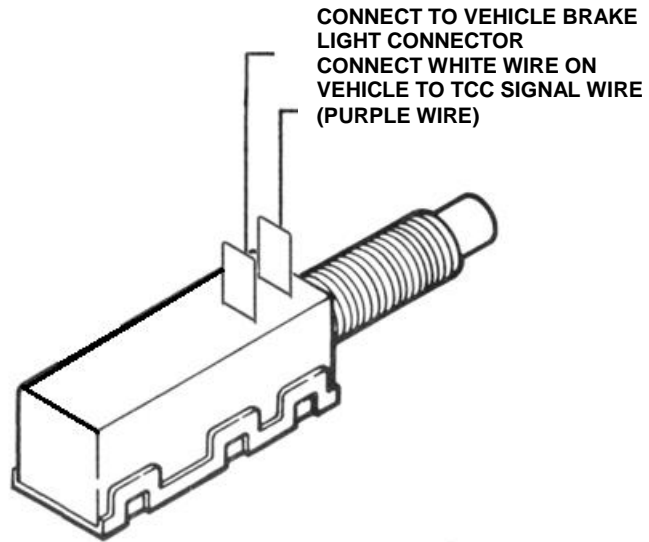


UNDERDASH WIRES (BUNDLED TOGETHER)			
WIRE COLOR	CONNECTED FROM	CONNECTED TO	CHECK IF COMPLETE
Brown	MIL Lamp Ground	Through Automotive Light to 12V	
Black	Speedometer (Optional)	Speedometer Module	
White	Tachometer (Optional)	Electronic Tachometer	
Dk Green	Fan 1 Ground (Optional)	Ground Side of Customer Supplied Fan 1 Relay	
Dk Blue	Fan 2 Ground (Optional)	Ground Side of Customer Supplied Fan 2 Relay	
Orange	Park Neutral Signal (Optional) *NOT NEUTRAL SAFETY*	To Ground (In Park and Neutral)	
Purple (2 Wires)	Brake Signal / TCC Ground	To 12V (Brakes Applied)	
UNDERDASH WIRES			
N/A	Fuel Pump (Line)	To 12V Battery Power	
N/A	Fuel Pump (Load)	To Fuel Pump	
Red	Ignition Feed (Relay Center)	12V Fused Switched Power (KEY ON and CRANKING)	
Multiple	ECM Connectors	ECM	
Multiple	TCM Connector	TCM	
Multiple	Accelerator Pedal Position Sensor	Accelerator Pedal	

Table 4 - Dash Connections Checklist



Cooling Fan Relay Diagram

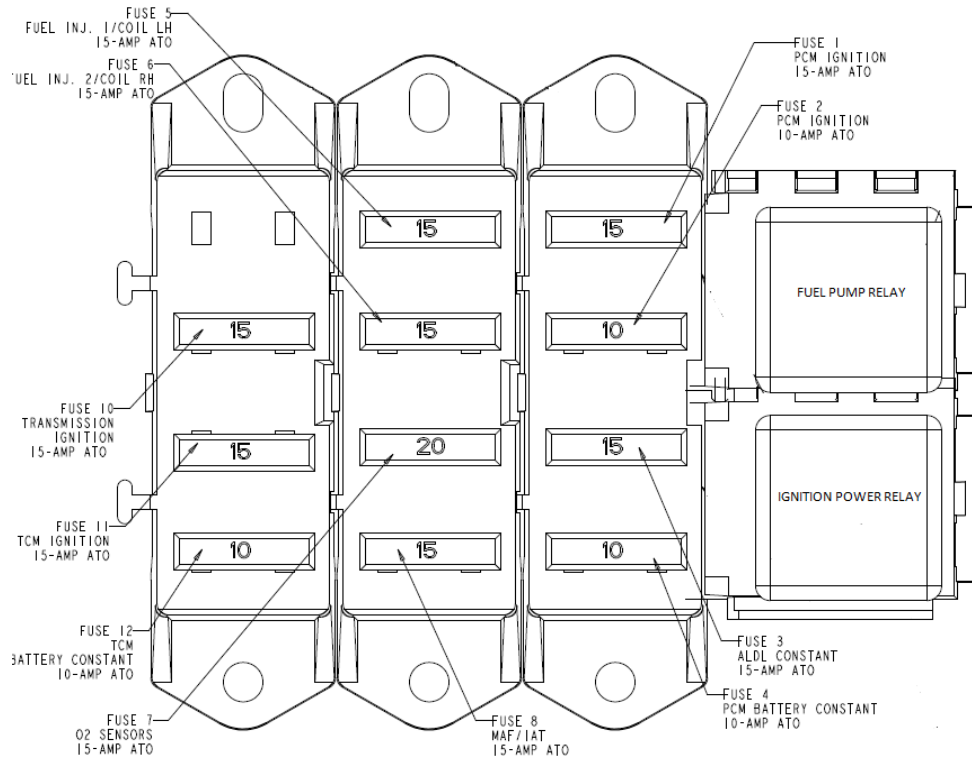


TCC Brake Switch Diagram

CONGRATULATIONS! Your PSI LS3/VORTEC 4L60E/4L80E Fuel Injection Harness installation is complete.



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FRONT VIEW

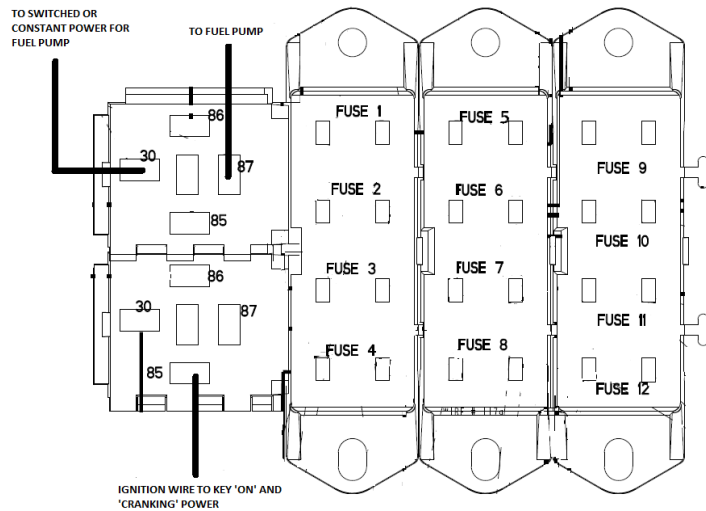
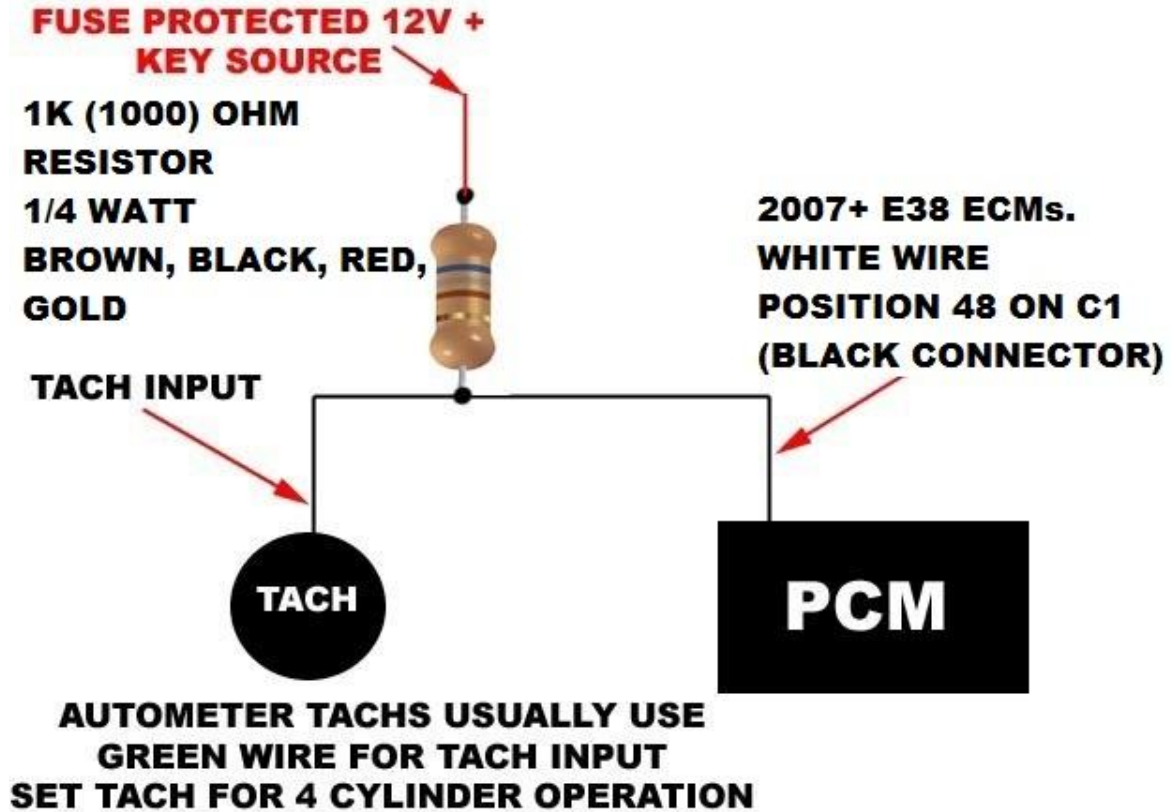


Figure 2 - Fuse/Relay Center (Front and Back View)



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If your Tachometer gauge is giving sporadic or incorrect readings, you will need to put a 1k Ohm resistor into the Tach circuit as shown below.





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9.0 TROUBLE SHOOTING INSTRUCTIONS

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.

Check the following items prior to contacting PSI.

NO-START

1. Red Ignition Wire (From back of Fuse/Relay Center) has 12-volts with the Key in the **ON** position and **CRANKING** positions. This cannot be stressed enough, most NO-START conditions can be traced to this wiring issue.
2. Check Fuel Pressure for correct value (Approximately 58-psi).
3. Check that Fuel Injectors are firing. In many cases, engines which have been sitting for a few months have old fuel which has turned to varnish and clogged the injectors. A simple way to check if the injectors are clogged is to place a NOID LIGHT (Available at most autoparts stores) in the injector plug while cranking the engine. If the plug lights up, then the injectors are being commanded to fire. If the spark plugs are firing, the fuel pressure is correct, then the injectors are clogged and must be cleaned.

THROTTLE PEDAL DIES

1. Purple brake switch wires are not connected properly.
2. Incorrect tune in ECM/TCM for throttle body, MAF and MAP sensors being used.
3. Incorrect APP Pedal used.
4. Trouble Codes exist.

COOLING FANS STAY RUNNING

5. Check Engine Light is connected properly.
6. Trouble Codes exist.

9.1 “CHECK ENGINE” LIGHT

Normally, the “Check Engine” or “MIL” indicator light should come on when the ignition is turned on, then go out a few moments after the engine starts running. If it reappears, or stays on while the engine is running, the PCM has detected a problem and a trouble code has been set.

9.2 RETRIEVING TROUBLE CODES FROM THE PCM

- 9.2.1 In order to retrieve the trouble codes stored in the PCM, a scanner must be connected to the DLC connector. Follow the instructions provided with the scanner to read the codes set in the PCM. (Normally with the ignition in the “ON” position, but with the engine NOT running).
- 9.2.2 After you have read any codes, document them for reference. Remove the connector from the DLC connector.

NOTE: A code indicates a problem in a specific circuit, **NOT THAT A PARTICULAR PART IS DEFECTIVE.**



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- 9.2.4 Before taking more extensive correction actions for any trouble codes, make sure that all connections on the indicated circuit, **INCLUDING THE PCM**, are clean and tight. Inspect the wiring in the circuit for any broken, shorted, or exposed wires. Finally, insure all ground wires are clean and secure.

10.0 TECHNICAL SUPPORT

PSI harnesses are built with the highest regard to quality control, and all products are 100% quality inspected. Before contacting us, please double check all connections and perform normal basic trouble shooting (fuel pressure, timing, ignition system, etc.).

If you have any questions concerning the installation of this harness, feel free to call **Performance Systems Integration** 732-444-3277. Email questions to TECHSUPPORT@PSICONVERSION.COM