



Wire Harness Installation Instructions

Part #60501 & 60504
LT-1 Wiring Harness for 92-93



Manual #90509



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P/N 90509 Painless Wiring Manual

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1.0 INTRODUCTION

You have purchased what we at Painless Performance believe to be the most up-to-date and easiest-to-install automotive fuel injection harness on the market. It is designed for easy installation, even if you have no electrical experience.

This harness is designed to be a complete wiring system for the fuel injection system on General Motors LT-1 injection engines. This kit includes all wiring that is needed by the computer to run and control the injection system. It is designed to use the parts listed in **Table 4.1**. Using any other computer could cause problems and cause the system to function improperly.

This system will work on LT-1 engines up to and including 1997 models if a '92 - '93 computer is used. When using this harness on a '96 or '97 engine you must replace the coil, coil output wire and knock sensor with the parts from a '92 - '95 engine. This harness will not work with a 4L60E/4L80E electronic transmission. This harness will work with 200, 700R4, 350 Turbo, 400 Turbo, 4L60 (non-electronic) and manual transmissions.

You must also replace the factory computer chip with one that has had the (VATS) vehicle anti-theft system programming removed (Painless part number 64050) or use an add on VATS by-pass module (Painless part number 64024), otherwise the engine will not start.

NOTE: This harness does not have the wiring for the emission devices in it.

Usually, the computer and sensor board group can easily be mounted under the dash. Most of the wiring in the harness has been pre-terminated to the proper connector and all wire has been color-coded. All wiring is 600 volt, 125°C, TXL. Standard automotive wire is GPT, 300 volt, 80°C, with PVC insulation.

The harness is divided into three major groups:

ENGINE GROUP	Includes wiring for the fuel injectors, distributor and sensors.
DASH GROUP	Includes ignition feed wires, assembly line diagnostic link (ALDL) connector, check engine light, computer wiring and connectors, brake switch wiring, gear shift indicator wiring and tachometer wiring.
TAIL GROUP	Includes (VSS) vehicle speed sensor wiring, transmission wiring (if applicable) and power wire for fuel pump.

2.0 ABOUT THESE INSTRUCTIONS

These instructions provide information for the installation of the 60501 or 60504 LT-1 (92 & 93) Fuel Injection Harness Kit. The contents of these instructions are divided into major **Sections**, as follows:

- 1.0 INTRODUCTION
- 2.0 ABOUT THESE INSTRUCTIONS
- 3.0 TOOLS NEEDED
- 4.0 PRE-INSTALLATION AND HARNESS ROUTING GUIDELINES
- 5.0 GENERAL INSTALLATION INSTRUCTIONS
- 6.0 60501 OR 60504 LT-1 (92 & 92) FUEL INJECTION HARNESS KIT
- 7.0 TROUBLE-SHOOTING INSTRUCTIONS AND TROUBLE CODES

Sections are further divided into **Paragraphs** and **Steps**. Throughout, the **Figure** numbers refer to illustrations and the **Table** numbers refer to information in table form. These are located in or near the sections or paragraphs to which they correspond. Please pay special attention to any notes or any text labeled **CAUTION**.

3.0 TOOLS NEEDED

In addition to your regular tools, you will need, at least the following:

Crimping Tool	NOTE: Use a quality tool to avoid over-crimping.
Wire Stripper	
Continuity Tester	CAUTION: Do not use a test light to test computer or sensor wiring or you will damage the computer.
Electric Drill	
1-1/2" Hole Saw	NOTE: For the rubber grommet in the firewall.

4.0 PRE-INSTALLATION AND HARNESS ROUTING GUIDELINES

The installation of your harness kit will consist of two (2) steps:

- The physical routing, positioning and securing of the harness, wire groups and individual wires and connectors.
- The proper electrical connection of the individual circuits.

We cannot tell you how to route the harness in your automobile. That depends a great deal upon the particular make of the automobile and what extent you want to secure and conceal the harness. We do offer some general guidelines and routing practices starting in **Paragraph 5.3**, general installation instructions in **Section 5.0** and precise instructions concerning the electrical connections you will have to make beginning in **Section 6.0**. To help you begin thinking through the installation of your wire harness, read the following sections.

4.1 TRANSMISSION LOCKUP FUNCTION

You should decide at this time whether or not you will use the lockup function on your transmission. If you are **not** using the lockup function, read **Paragraph 4.1.1**, then skip to **Paragraph 4.1.3**. If you **are** going to use the lockup function, then skip **Paragraph 4.1.1** and start at **Paragraph 4.1.2**. This harness is designed to plug into a 4L60 Transmission with a 5-pin connector, if you are using an older 700R4 Transmissions with a 4-pin connector, cut off the connector on the harness and splice on your original 4-pin connector as shown in **Figure 4.2**.

- 4.1.1** If you DO NOT wish to use the lockup function, tape off and store the Pnk and Lt.Blu/Blk wire labeled Brake Switch in the dash group and the 5-position, round connector in the tail section.
- 4.1.2** If you ARE going to use the lockup circuit then you MUST use a (VSS) vehicle speed sensor, and the correct brake switch. These are necessary to make the lockup function work properly. The brake switch should be closed (electrically connected) when the brakes ARE NOT being applied and open (not electrically connected) when the brakes ARE being applied. This is the opposite of a standard brake light switch. If you are using a pressure brake switch, a (SPDT) single pole double throw relay MUST be installed to unlock the converter when the brakes are applied (see **Figure 6.4**). The (VSS) vehicle speed sensor lets the computer know how fast the wheels are turning.
- 4.1.3** Regardless of whether you use the lockup function, the (VSS) vehicle speed sensor must be used and is needed by the computer so that it can command the (EGR) exhaust gas recirculation solenoid on the engine.

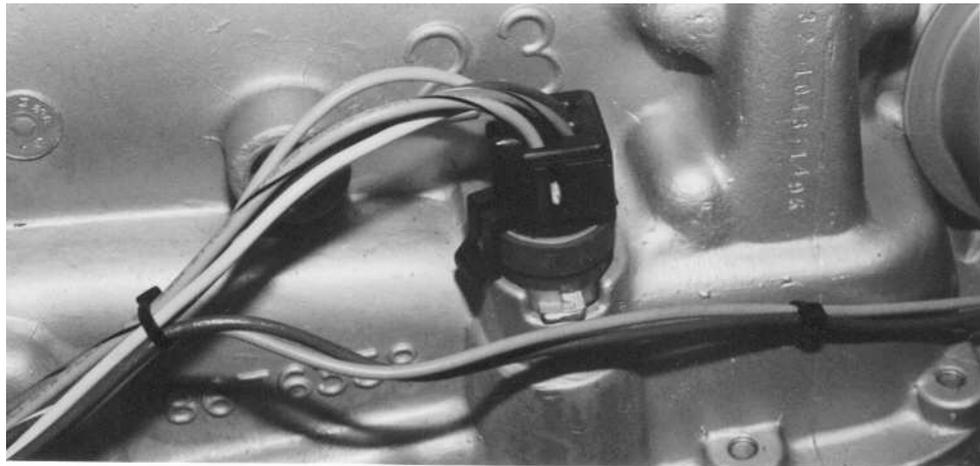


Figure 4.1 Transmission Lockup Connector

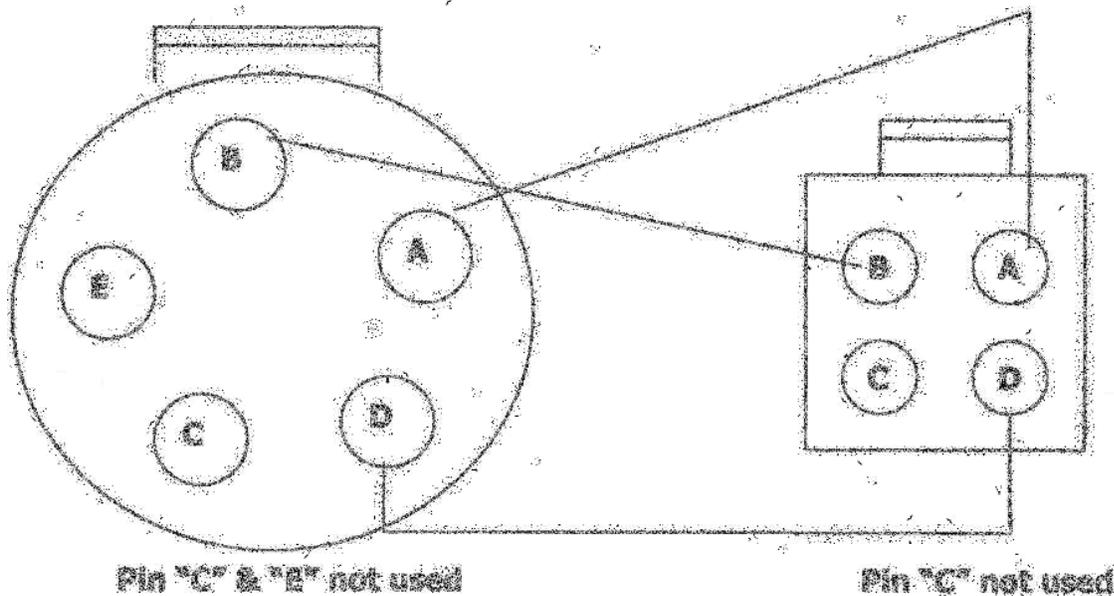
5-Pin 4L60 Connector to 4-Pin 700R4 Connector

5-Pin

"A" Lt.Blue/Black
"B" Lt.Blue
"C" Green/White
"D" Tan/Black
"E" White

4-Pin

"A"
"B"
Not Used
"D"
Not Used



Connectors are shown from terminal view.
Pin locations are cast into outside of connectors. Unused wires can be removed or tied back in the harness.

Figure 4.2 5-Pin (4L60) Connector to 4-Pin (700R4) Connector

4.2 YOU SHOULD GET TO KNOW THE PARTICULAR ENGINE YOU ARE USING

- 4.2.1 The 92 & 93 LT-1 engine has two (2) oxygen sensors, one on the right side and one on the left side of the engine. This system has four (4) square connectors at the computer. You must use GM part number 16159278 computer with this kit.
- 4.2.2 Painless Performance recommends the use of the following parts. See **Table 4.1**. These will meet all requirements and are compatible with this Painless Performance harness. The following numbers listed in **Table 4.1** are GM part numbers except for the vehicle speed sensor (VSS) and the mem-cal chip, which are Painless Performance numbers. The main computer part number is **required** for use with our harness.
- 4.2.3 Familiarize yourself with the harness by locating each of the harness groups and by looking at the connectors on the wire ends.
- 4.2.4 Decide where and how the computer and sensors will be mounted. Painless Performance wire harness kits are designed to mount both under the dash or in the kick panel on the right side. They must be no further apart than the wiring will allow (approx. 10 inches).
- 4.2.5 A good exercise is to lay out the wire harness on the floor beside your vehicle and identify all the connectors and wires.
- 4.2.6 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.
- 4.2.7 Route the harness away from sharp edges, exhaust pipes, and the hood, trunk and door hinges.
- 4.2.8 Plan where harness supports will be located. Use a support approximately every 6 inches unless the harness routes under the floor carpet.
- 4.2.9 Allow enough slack in the harness at places where movement could possibly occur (body to frame, frame to engine, etc.).
- 4.2.10 The wires should be bundled into harness groups. Use tape, nylon ties or poly split loom.

LT-1 Fuel Injection Harness (92 & 93) Part # 60501 or 60504

Main Computer.....	16159278	EGR Solenoid.....	19197223
Mem-Cal chip (non-vats).....	64050	Neutral Safety.....	15679680
Brake Switch.....	25524845	MAP Sensor.....	16137039
Intake Air Temperature.....	12110319	Fuel Pump Relay.....	14089936
Ignition Module.....	D-1986-A	Coolant Temperature Sensor.....	25036979
Idle Air Control.....	17113099 ¹	Knock Sensors.....	10456126
Coil.....	D-573	Oxygen Sensor.....	AFS 21
Vehicle Speed Sensor (VSS).....	60116		

NOTE: Other parts may plug into the harness, but the part numbers **must** match the ones on this list for proper operation. You must use a mem-cal chip that has the Vehicle Anti-Theft System (VATS) removed or use an add on VATS by-pass module (Painless part number 64024), otherwise the engine will NOT start.

1. An adapter (Painless part # 60120) is included to adapt the 4-pin square IAC connector to the 94-96 flat 4-pin IAC connector.

Table 4.1 Compatible Parts

5.0 GENERAL INSTALLATION INSTRUCTIONS

CAUTION:

- **DO NOT DISCONNECT THE BATTERY OR THE COMPUTER CONNECTORS WHILE THE IGNITION IS ON.**
- **DO NOT SHORT ANY WIRES IN THIS HARNESS TO GROUND (WITH THE EXCEPTION OF LABELED GROUND WIRES) OR DAMAGE TO THE COMPUTER WILL RESULT.**
- **GIVING OR RECEIVING A "JUMP START" MAY DAMAGE THE COMPUTER.**
- **DO NOT USE A TEST LIGHT WHEN TESTING COMPUTER SENSORS OR COMPUTER CIRCUITS. DAMAGE TO THE COMPUTER WILL RESULT!**
- **WHEN ROUTING THE WIRES FOR THE VEHICLE SPEED SENSOR (VSS), IF USED, MAKE CERTAIN THAT THEY ARE AT LEAST 12 INCHES AWAY FROM ANY IGNITION WIRING (SPARK PLUG WIRES, ETC.).**

Notes:

- ♦ **There is a normal, small circuit drain on these fuel injected systems.**
- ♦ **Each connector in this harness is different and will not fit in the wrong place. Never force any connector.**
- ♦ **When connecting the plugs to the computer use extreme care to make sure none of the pins in the computer are or become bent.**
- ♦ **The fuel pump you are using must be rated at a minimum of 45 PSI (lbs. per square inch). Place the fuel filter on the pressure side of the pump for best possible operation.**

5.1 GROUNDING THE VEHICLE

A perfectly and beautifully wired automobile will nevertheless have problems if everything is not properly grounded. Do not go the effort of installing a quality wire harness only to neglect proper grounding.

Note: The installer of this harness is responsible for all ground wires not provided with this kit.

5.1.1 Connect a ground strap or cable (minimum of a 4 ga. wire) from the negative battery terminal to the chassis (frame).

5.1.2 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.**

5.1.3 Connect a ground strap from the engine to the body.

5.2 ROUGH INSTALLATION

CAUTION: DISCONNECT THE POWER FROM VEHICLE BY REMOVING THE NEGATIVE BATTERY CABLE FROM THE BATTERY.

Note: Make no wire connections or permanent mounting of any kind at this time.

5.2.1 Position the computer and sensors in their intended locations.

5.2.2 Drill a 1-1/2" hole for the firewall grommet near the computer for the engine group and tail section to pass through.

5.2.3 Route the engine group and tail section through the hole. Push the grommet (already installed on the harness) into the hole until it is seated.

5.2.4 Route the dash group over to the driver's side of the vehicle.

5.2.5 Route the sensor group to the place the sensors will be mounted.

5.3 HARNESS ATTACHMENT

Note: **Harness routing and shaping will be a time-consuming task. Taking your time will enhance the beauty of your vehicle. Please take your time and be patient.**

5.3.1 Permanently mount your computer. You should mount the parts (sensors, relays, etc.) that will be used for your engine at this time. These parts will vary by application. Also, mount the fuse holder(s) that are already on the harness.

5.3.2 Mold harness groups to the contour of the dash, engine, frame, etc. Remember to route harness away from sharp edges, exhaust pipes, hinges and moving parts.

5.3.3 Attach harness groups to your automobile with clips or ties starting at the computer and working your way outward.

Note: **Do not tighten tie wraps or mounting devices at this time. Make all harness attachments LOOSELY.**

5.3.4 When used every 1-1/2" or so on the visible areas of the harness, colored plastic wire ties make a very attractive assembly. Otherwise, a tie installed in other areas every 6" or so will hold the wires in place securely. **Remember to take your time.**

5.4 TERMINAL INSTALLATION INSTRUCTIONS

Note: **In the following steps you will be making the circuit connections. Before you start, you should carefully read SECTION 6.0 and continually refer to the wire charts, double-checking your length calculations before cutting any wire or making any connections. These directions are for the wires, which do not have a connector already, installed on them.**

5.4.1 Have all tools and connectors handy.

5.4.2 Select the correct terminal for the wire and application.

5.4.3 Determine the correct wire length and cut the wire. Remember to allow enough slack in the harness and wires at places where movement could occur. **Double-check your calculations.**

5.4.4 Strip insulation away from wire. Strip only enough length necessary for the type of terminal lug you are using.

Note: **In the following step, make sure that the terminal is crimped with proper die in the crimping tool. An improper crimp will not make a good connection. DO NOT OVER CRIMP.**

5.4.5 Crimp the terminal onto the wire.

5.4.6 Connecting the wires and connectors throughout the harness is a repeating process. Make sure that each wire is properly routed and then attached. **Do not attach then route afterward.**

5.4.7 When all the wires are attached, tighten the mounts and ties to secure the harness permanently.

5.4.8 Attach the connectors to the computer. **Being very careful not to bend any pins.**

5.4.9 After all connections have been made throughout the harness, connect the battery to the vehicle.

CAUTION: BE SURE THE IGNITION IS OFF WHEN YOU RECONNECT THE BATTERY OR YOU WILL DAMAGE THE COMPUTER.

6.0 GM 92 & 93 LT-1 SYSTEM WIRE HARNESS INSTALLATION INSTRUCTIONS

6.1 CONTENTS OF THE 60501 OR 60504 WIRE HARNESS KIT

Take inventory to see that you have everything you are supposed to have in this kit. If anything is missing, go to the dealer where you purchased the kit or contact Painless Performance at 800-423-9696. The kit should contain the following items:

- The main wire harness with the connectors already on the ends of most of the wires.
- Fuel Injection Installation Instructions, part number 90509 (this booklet).

6.2 SPECIFIC CIRCUIT CONNECTIONS

Note: If you have not already done so, read **SECTIONS 4.0 and 5.0** of these instructions and think through the installation of the harness before securing or cutting any wires.

6.2.1 DASH SECTION INSTALLATION

The wires in this group consist of the assembly line diagnostic link (ALDL) connector (see **FIGURE 6.1**), the check engine light (pre-mounted into a mounting bracket) and four (4) other wires.

Note: You may need to connect the check engine light wires to their mates in the wire harness.

CAUTION: DO NOT MAKE ANY CONNECTIONS WHILE THE COMPUTER IS PLUGGED INTO THE HARNESS.

Note: Wire color (i.e.: Blk/Wht) is one wire with a stripe. The second color (the stripe) may not be bold. Observe all two-color wires closely.

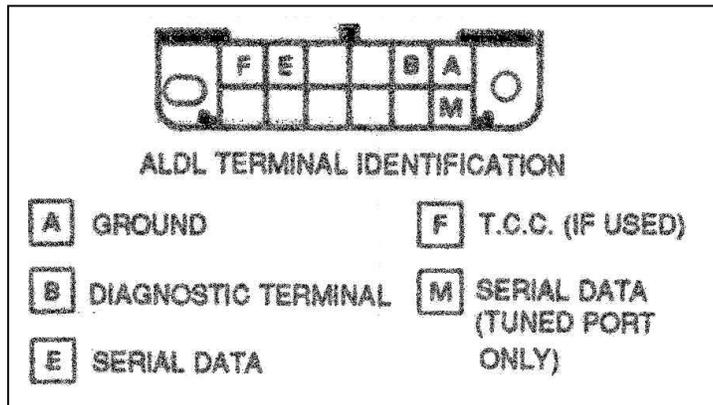


FIGURE 6.1 Assembly Line Diagnostic Link (ALDL) Connector

- Find a suitable location to mount the ALDL connector (using the bracket that the light is mounted in) that will allow access to the front of the connector and still allow you to see the light while driving.
- Mount the ALDL connector using the bracket containing the check engine light in the place selected.
- Locate the pink power wire (16 ga.) labeled Ignition B+ Coil and the two pink wires (14 ga.) labeled Ignition B+ Fuse Block and attach them to the chassis B+ panel or some other suitable location where there is power **when the key is in the start and run position** (the 16 ga. Ignition B+ Coil wire needs to be connected to a fused power source or a fuse needs to be added to the circuit). These are the power wires for the fuel injection harness. If the pink wire is connected correctly the check engine light will come on with the key turned to "ON" or "START".
- The wire labeled VATS (Lt.Grn) is only used if you are using an electronic module to bypass the vehicle anti-theft system programmed into the original factory computer chip. This wire comes from the computer and would connect to the VATS module output wire. If you are using a chip with the VATS (vehicle anti-theft) programming removed, you will tape and store this wire.

- E. Locate the Orn/Blk and Blk/Wht wires in the dash group. These two wires are for the Park/Neutral **Indicator** Switch, **not the Neutral Safety Switch**. If you have a GM column then you can use the combination switch P/N 15679680 and wire it as described in **Paragraph 2 or 3** below. The Orn/Blk wire needs to be grounded in "Park" and ungrounded in "Drive". This can also be done with a toggle switch, or a switch on the parking brake.

CAUTION: DO NOT CONNECT THE ORN/BLK AND BLK/WHT WIRES USING DIRECTIONS FROM DIFFERENT PARAGRAPHS. YOU MAY DAMAGE THE COMPUTER.

1. If you are **NOT** using a vehicle speed sensor (VSS) or Park/Neutral Indicator Switch then you will need to connect the Orn/Blk and Blk/Wht wires together. We recommend that you **DO** use a speed sensor.

Note: If you connect the Orn/Blk and Blk/Wht wires together the computer will stop controlling the exhaust gas re-circulation (EGR) solenoid. This will prevent the system from being street-legal.

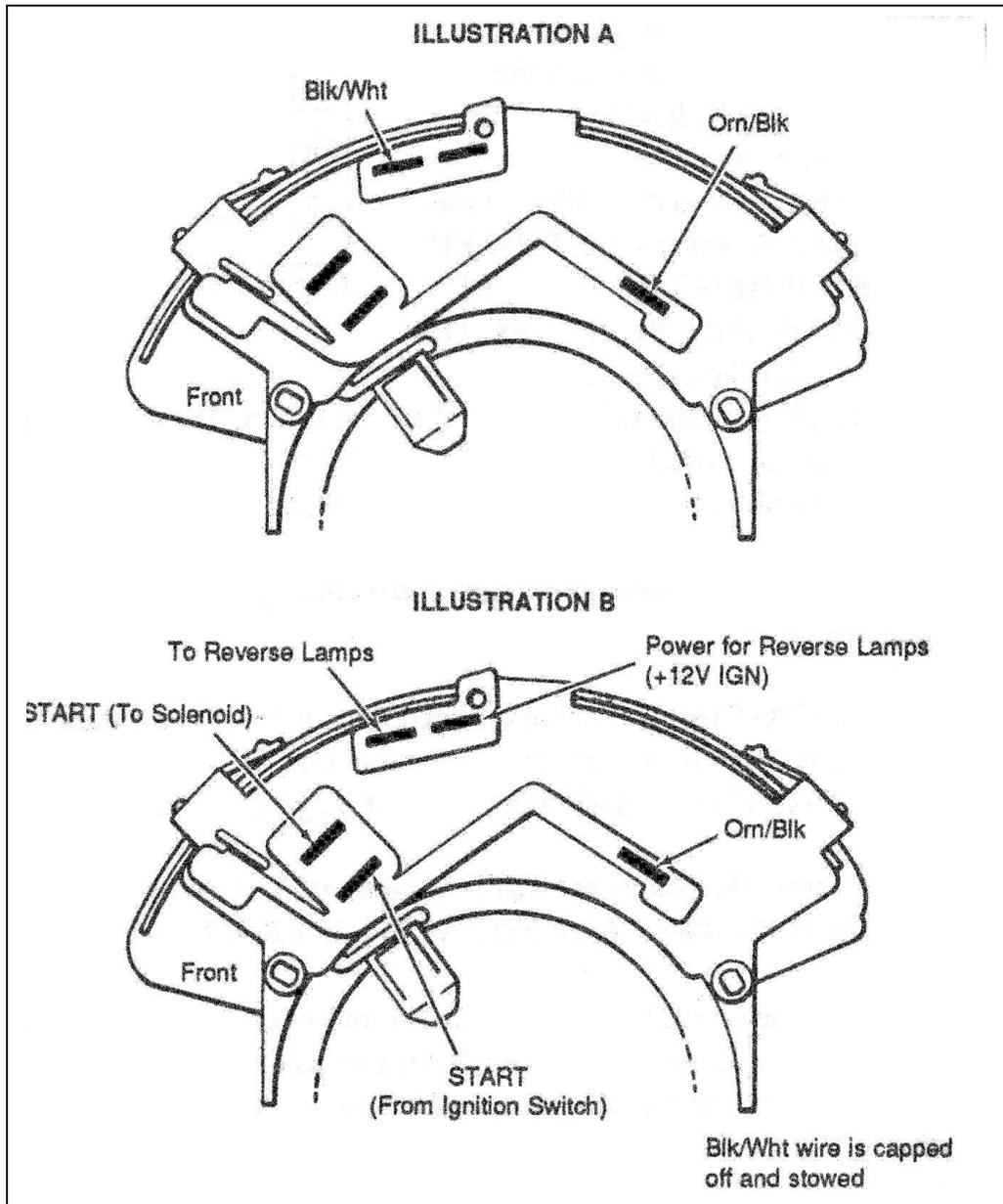


Figure 6.2 Neutral Safety Switch

2. If you are going to use the recommended switch for the computers benefit **only**, then you will wire it as shown in **Figure 6.2, Illustration A**.
 3. The recommended switch is a combination reverse light **and** neutral safety switch. You may use it for these purposes **and** the computer signal **if** you wire it **exactly** as shown in **Figure 6.2, Illustration B**.
 4. You may want to install your own switch. This switch must connect the Orn/Blk wire to ground only when the car is in **PARK**. You may or may not want to use the Blk/Wht wire. The other end of the Blk/Wht wire is already grounded throughout the harness.
- F. The Pnk and Lt.Blu/Blk wire labeled Brake Switch are the wires that powers up the torque converter lockup function on the transmission. If you **ARE NOT** using the lockup then you will tape off and store these wires. If you **ARE** using the transmission lockup function then you will have to install an electrical switch as described in **Paragraph 4.1.2**.

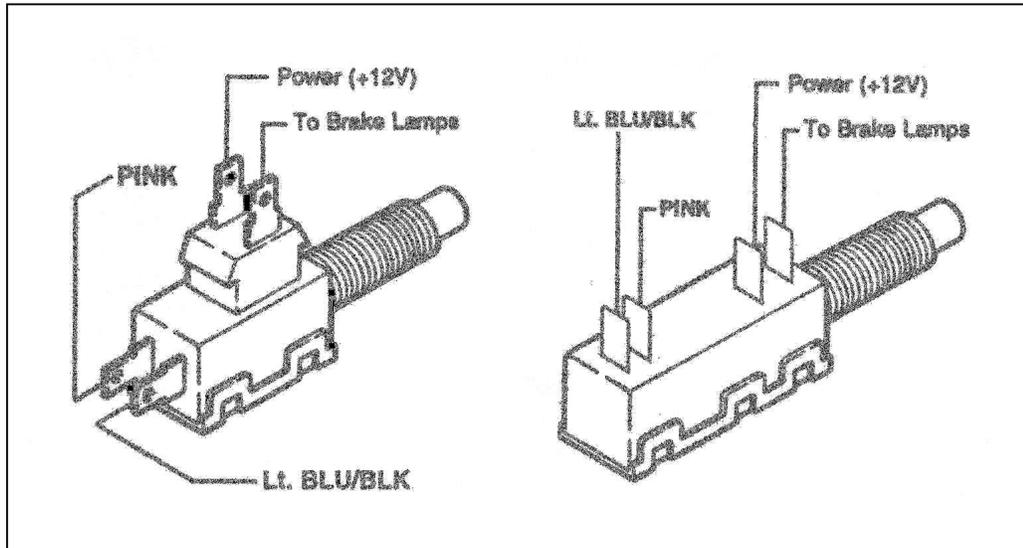


Figure 6.3 Brake Switches

- G. If you are using the recommended brake switch then you will wire it according to **Figure 6.3**. The Pnk wire will connect to one terminal and the Lt.Blu/Blk wire will connect to the other.

CAUTION: FAILURE TO WIRE THIS SWITCH CORRECTLY WILL RESULT IN A DANGEROUS SITUATION ON THE VEHICLE. THE TORQUE CONVERTER MIGHT NOT UNLOCK.

- H. If the vehicle you are installing this harness into has a hydraulic brake switch you will need to connect the Pnk, Lt.Blu/Blk, jumper and ground wires using a relay as shown in **Figure 6.4**.

CAUTION: THE RELAY MUST BE A SPDT RELAY, NOT A SPST RELAY. FAILURE TO USE THE CORRECT RELAY OR WIRE THE RELAY CORRECTLY WILL RESULT IN A DANGEROUS SITUATION ON THE VEHICLE. THE TORQUE CONVERTER MIGHT NOT UNLOCK.

Note: The fuel pump relay connector has a small gray wire at the bottom of it that terminates in a female connector. This wire is a test point for the fuel pump. After the vehicle has been wired and tested okay, tape off this wire and store it in the harness.

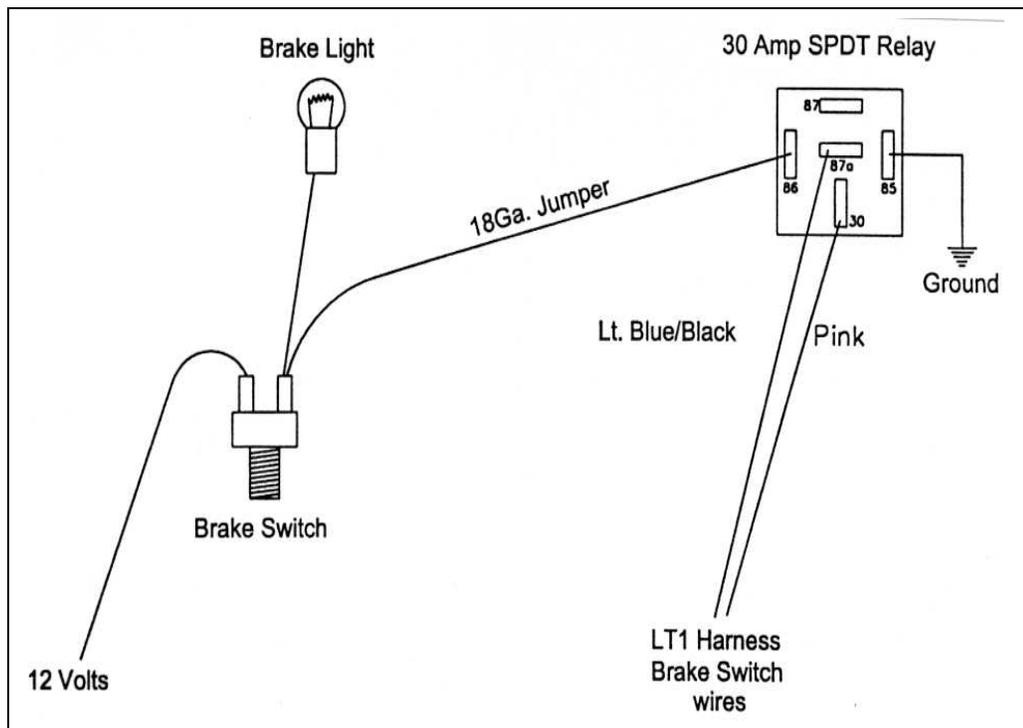


Figure 6.4 SPDT Relay

6.3 ENGINE GROUP INSTALLATION

The engine group is designed to be separated into left side (driver) and right side (passenger) sections. Each side is tie-wrapped separately, **but not labeled**. The right side of the engine has the connectors for the idle air control, throttle position sensor, distributor and map sensor, all of which **are** labeled. When you begin routing, **first** separate the engine group into left and right sections and place them accordingly.

- 6.3.1** Before you connect any wires, separate the tail section from the engine group and place it out of the way.
- 6.3.2** Locate the two Blk/Wht wires in the harness that end in a single, large ring terminal and ground them to the engine.
- 6.3.3** Using **Figure 6.6** thru **6.16** and the specific connections indicated in **Table 6.1**, connect the wiring as directed.
- 6.3.4** Check to make sure that the 60501 or 60504 wire harness has the correct distributor connector (shown in **Figure 6.16**) on it for your particular engine. There are two different distributor connectors used with the LT-1 engine. The 92 & 93 used the short connector (1") and the 94 & up used the long connector (2"). See **Figure 6.5**, Part #60113. The 60501 and 60504 harnesses have the short connector on them, but if you have the original factory distributor pigtail that came with your engine you can unplug the one on the 60501 or 60504 harness and plug yours on. If you need the distributor pigtail with the long connector call Painless Performance at 800-423-9696 or e-mail: tech@painlessperformance.com.

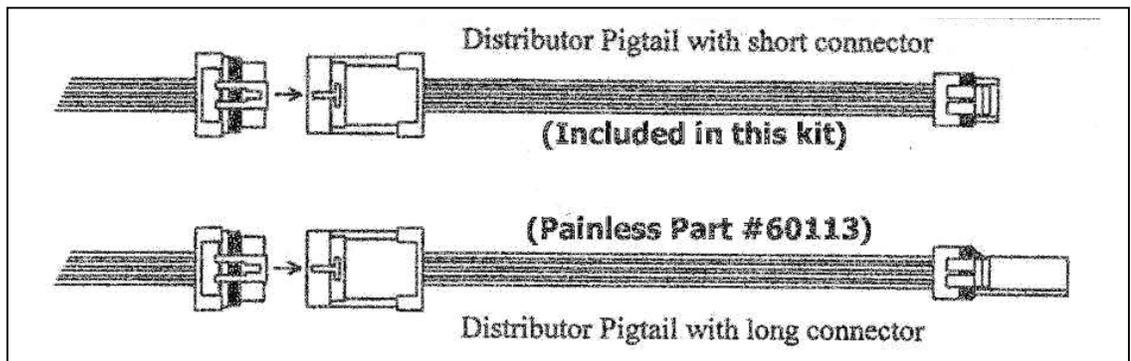


Figure 6.5 Distributor Pigtail

6.4 TAIL SECTION INSTALLATION

- 6.4.1** Locate the tail section that you earlier separated from the engine group. Begin routing it towards the rear of the vehicle. Be sure to avoid all sharp edges, moving or hot parts, or anything else that may damage the harness.
- 6.4.2** If you **are** using the lockup function, route the 5-position connector to the transmission and attach it to the solenoid (**Figure 4.1**).
- 6.4.3** If you **are not** using the lockup function, tape up the connector and store it in the harness.
- 6.4.4** Take the gray wire and route it to the fuel pump. This is the power wire for the fuel pump.
- 6.4.5** If using the 700R4 or 4L60 transmission that came with the engine, connect the connector for the vehicle speed sensor (VSS) to the Vehicle Speed Sensor. See **Figure 6.7**. If you are not using the factory sensor, you must add a 4-pulse speed sensor. The vehicle you are installing the engine into may already have one. You can also use a speedo-cable driven speed sensor from Painless Performance, part number 60116.

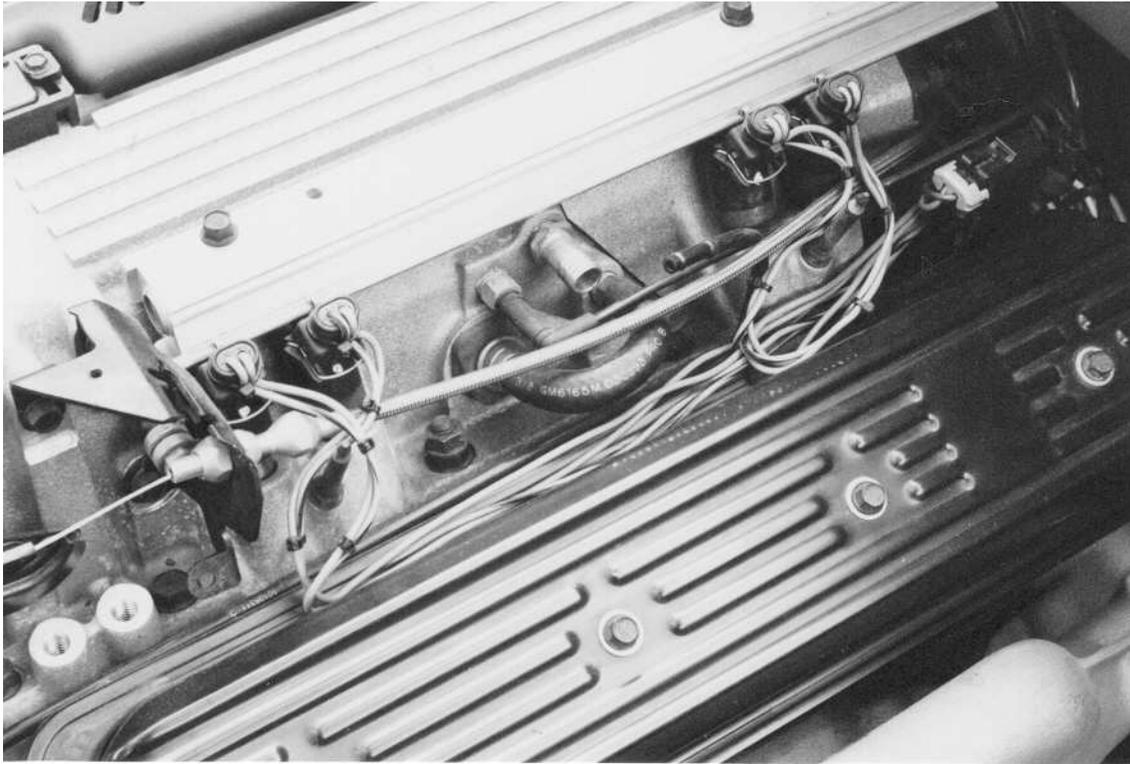


Figure 6.6 Engine Compartment Overview

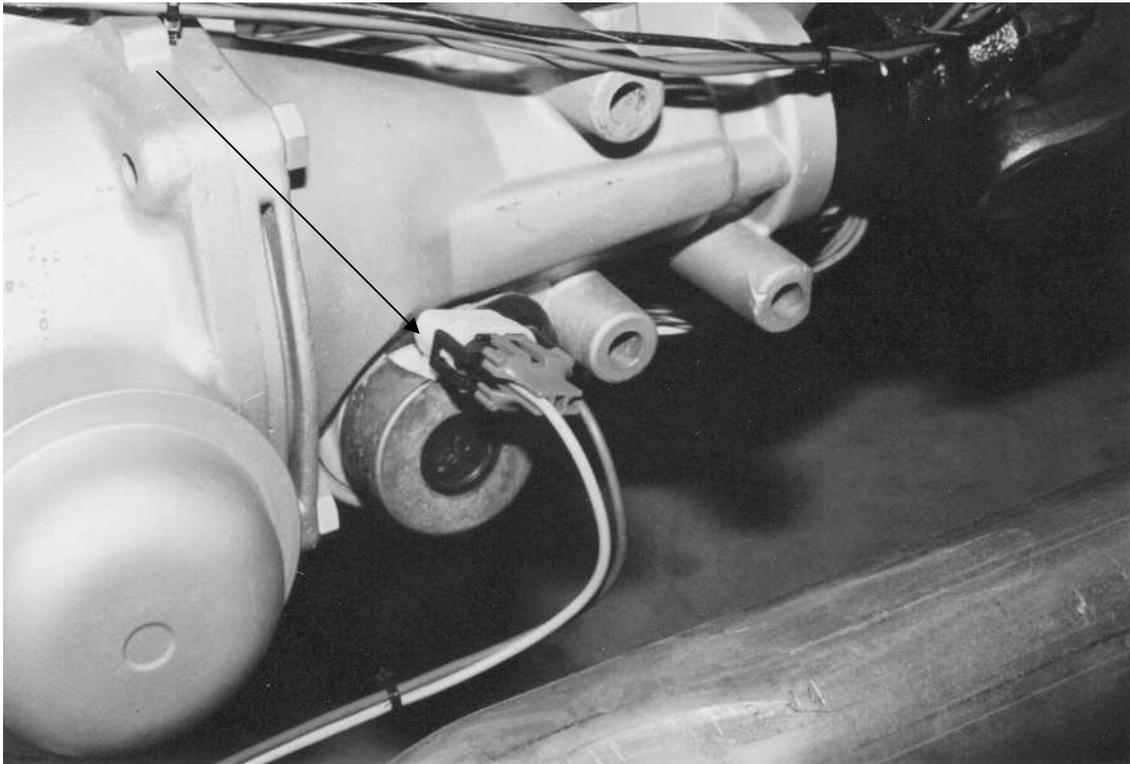


Figure 6.7 Vehicle Speed Sensor (700R4 or 4L60)

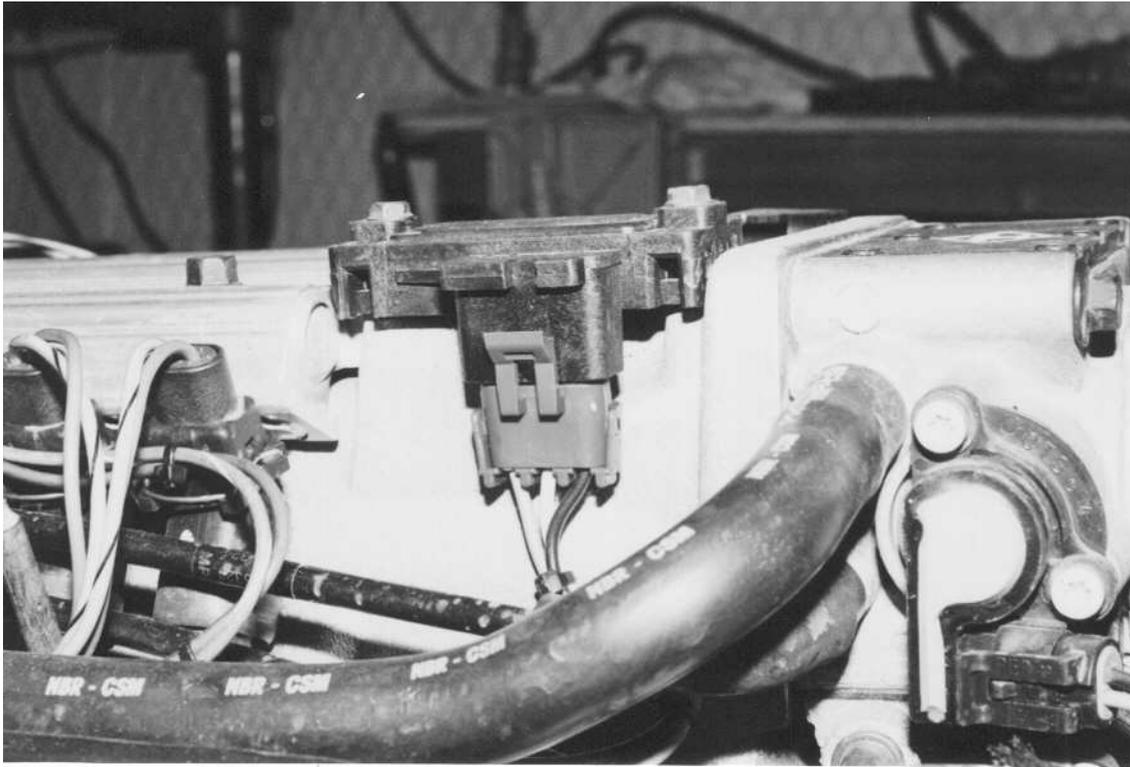


Figure 6.8 Manifold Absolute Pressure Sensor (MAP)

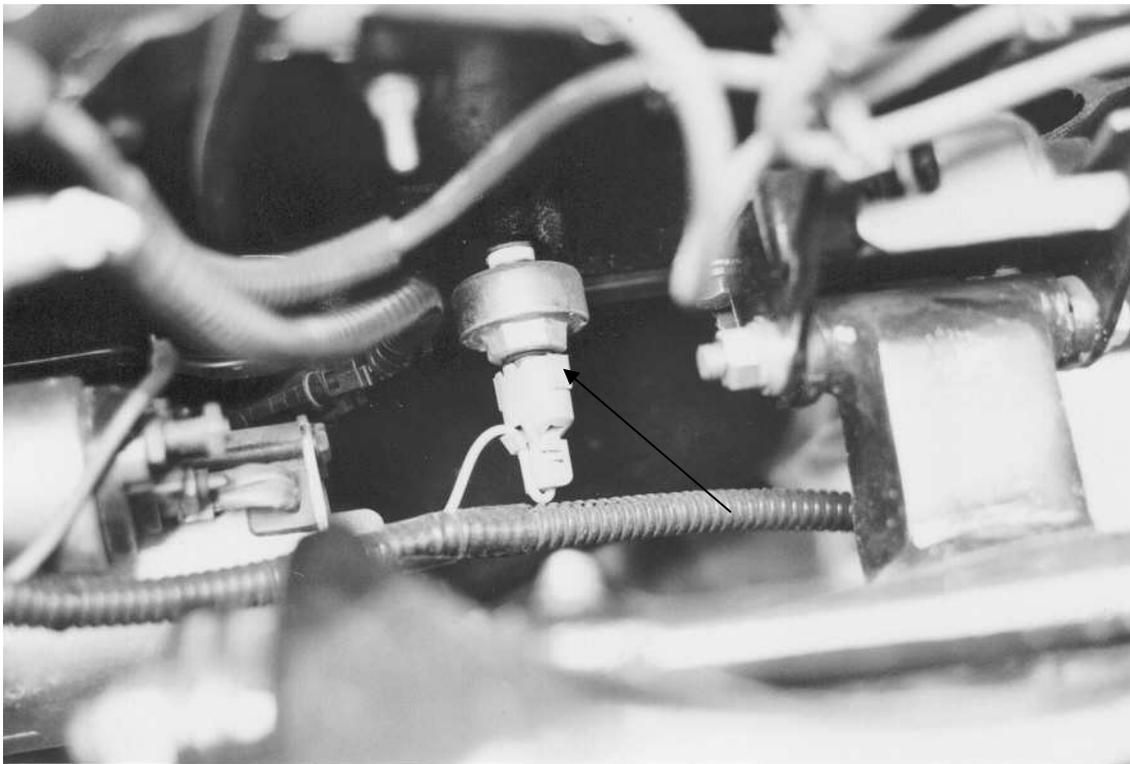


Figure 6.9 Knock Sensor

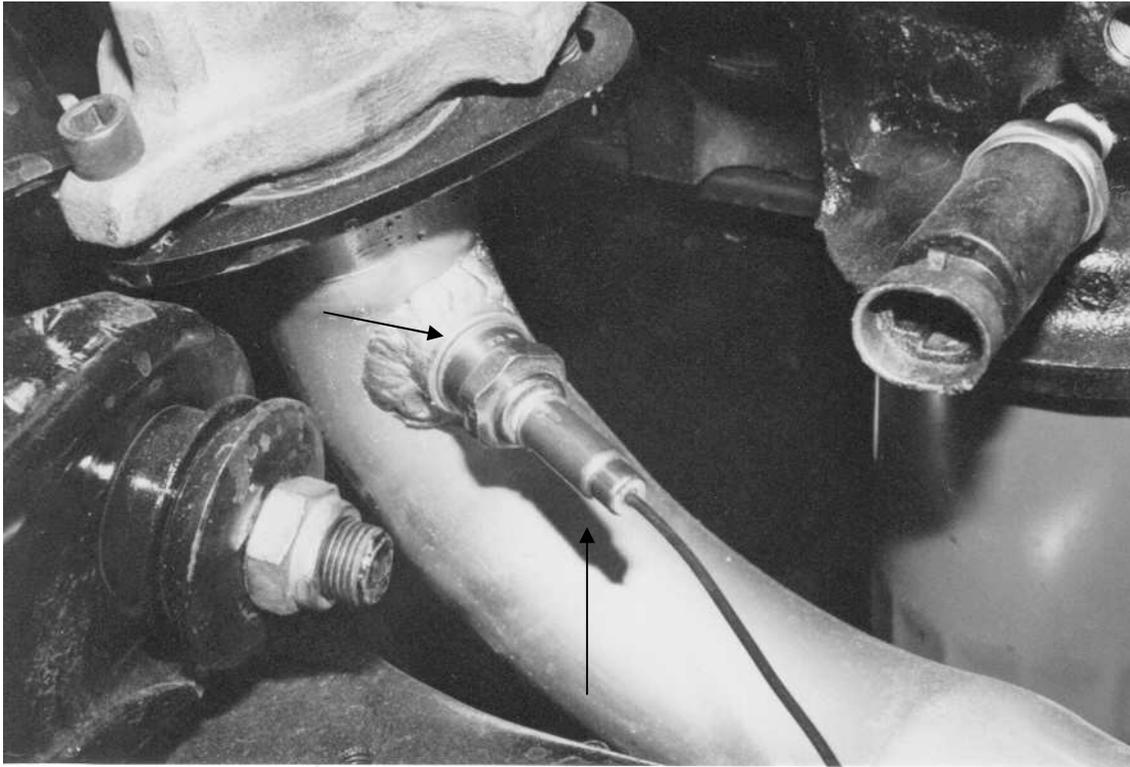


Figure 6.10 Oxygen Sensor

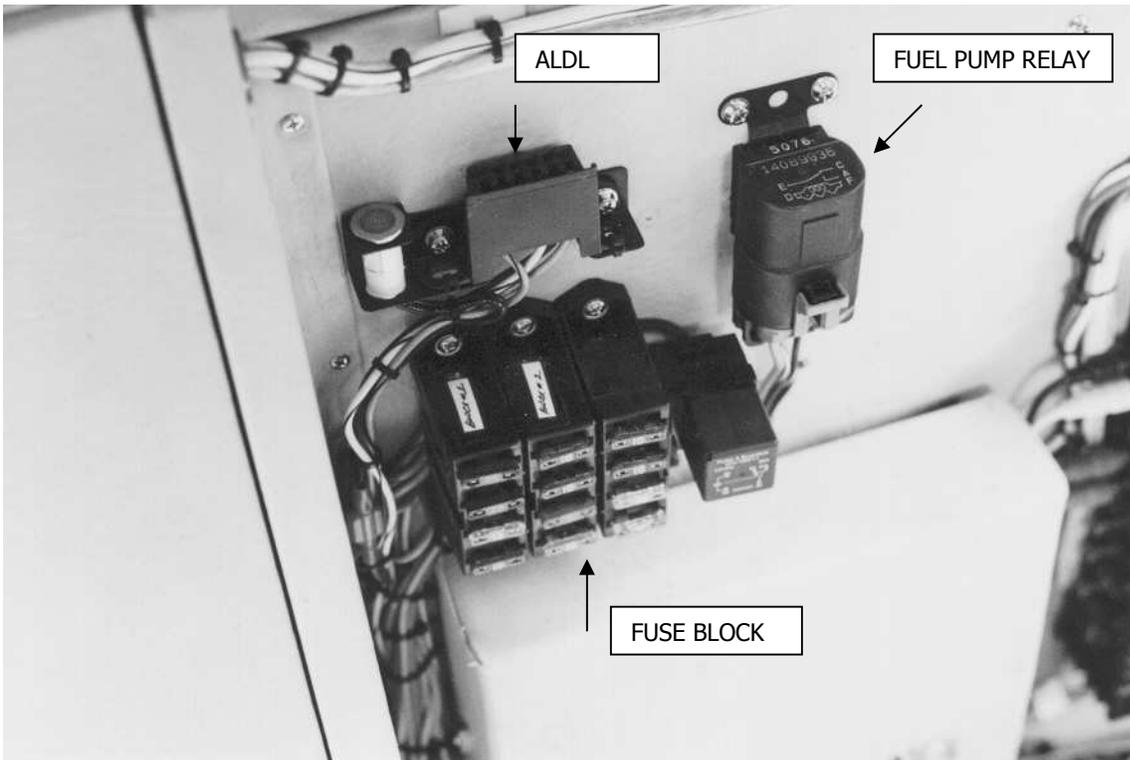


Figure 6.11 Fuse Block/ALDL Connector and Fuel Pump Relay

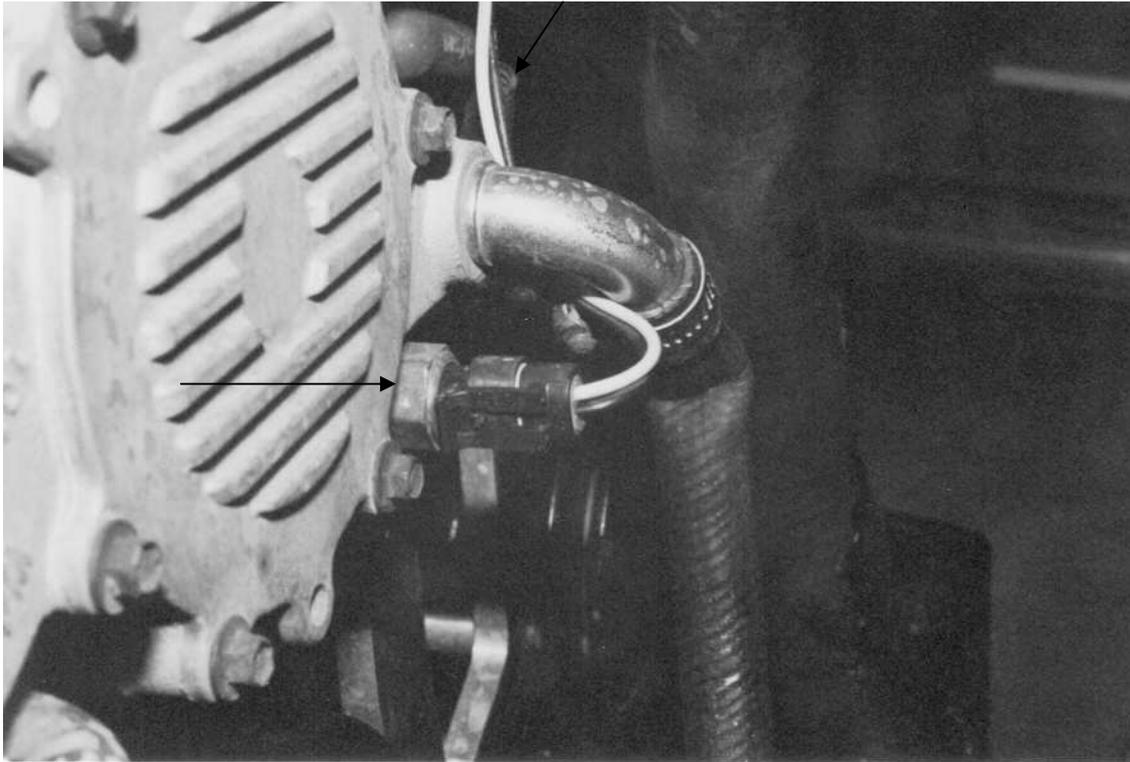


Figure 6.12 Coolant Temp Sensor (CTS)

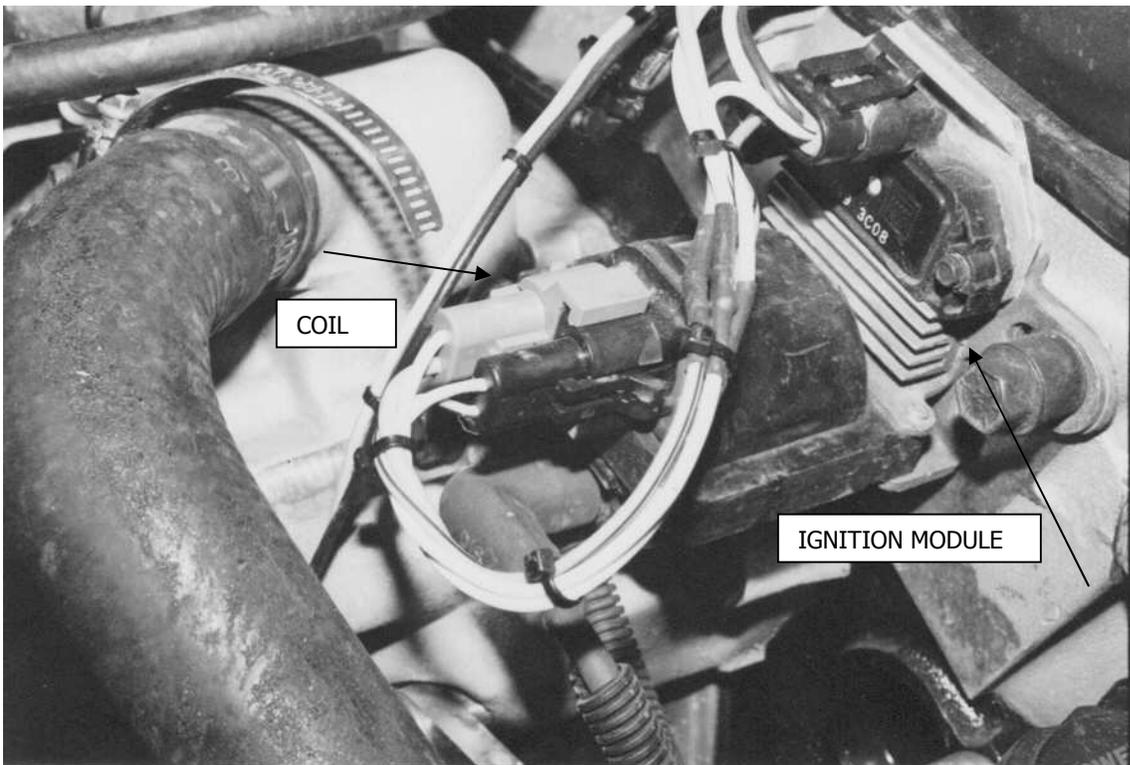


Figure 6.13 Ignition Coil and Ignition Module

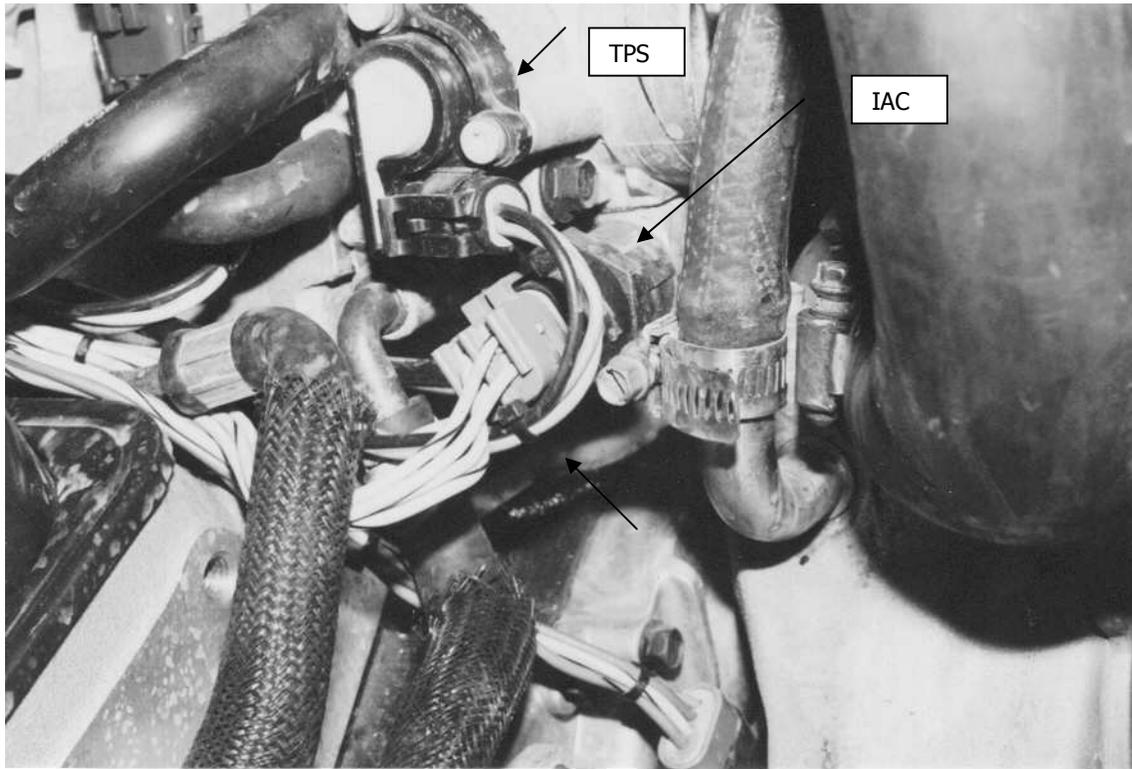


Figure 6.14 Throttle Position Sensor (TPS) and Idle Air Control Module (IAC)

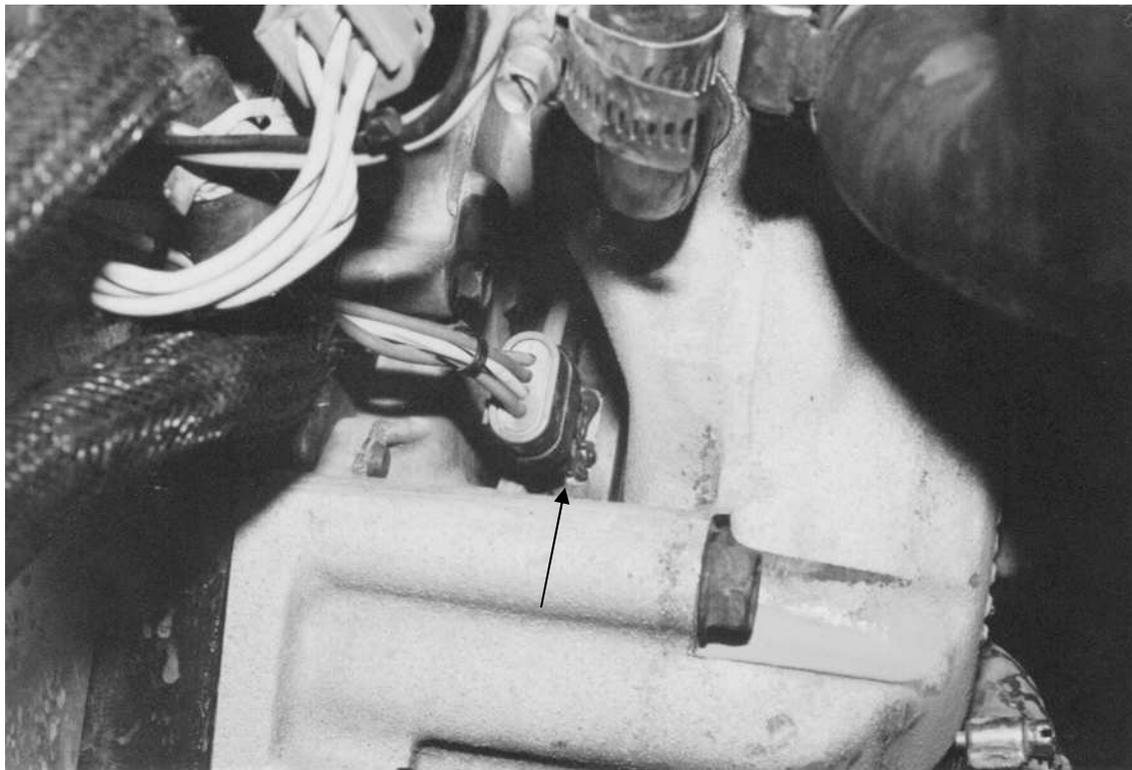


Figure 6.15 Distributor Connection

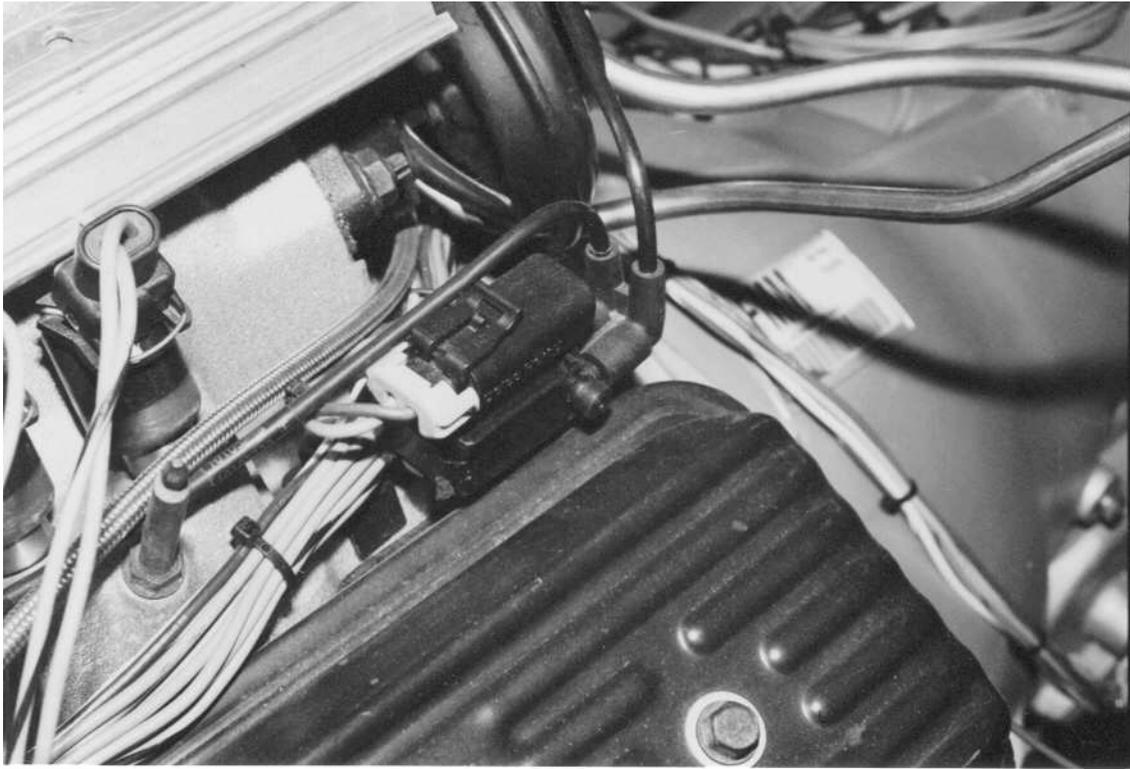


Figure 6.16 EGR Solenoid

WIRE COLORS	# OF POSITIONS IN CONNECTOR	LABELED	CONNECT TO
Tan, Grn/Wht, Pnk, Blk/Wht	4	Fuel Relay	Fuel Pump Relay
Grn/Wht	-	VSS Output	Speedometer
Wht	-	Tach	Tachometer
Orn/Blk, Blk/Wht	-	P/N Switch	Park/Neutral Switch
Pnk, Lt.Blu/Blk	-	Brake Switch	Brake Switch
Pnk (16 ga.)	-	Ign. B+ Coil	Power for Coil
Pnk, Pnk (both 14 ga.)	-	Ign. B+ Fuse Blk	Ignition Switch (hot in run & start)
Lt.Grn	-	VATS	Vehicle Anti-Theft Module (if used)
Brn, Gry	2	EGR	EGR Solenoid
Gry	-	Fuel Pump	Fuel Pump
Blu	2	KNC	Knock Sensor
Wht, Grn/Wht, Lt.Blu, Lt.Blu/Blk, Tan/Blk	5	TRANS	Lockup Converter
Ylw, Pur	2	VSS	Vehicle Speed Sensor
Pur/Wht	1	L. Oxy	Left Oxygen Sensor
Pur	1	R. Oxy	Right Oxygen Sensor
Pnk/Blk, Blu	2 (4 connectors)	INJ	Drivers Side Injectors
Pnk/Blk, Grn	2 (4 connectors)	INJ	Passenger Side Injectors
Red	Ring Terminal	Starter	Starter Solenoid (lg. post)
Blk/Wht, Blk/Wht	Ring Terminal	Ground	Engine Ground
Gry, Lt.Gr, Blk	3	MAP	Map Sensor
Pnk, Wht	2 (2 connectors)	Coil	Coil
Ylw, Blk	2	CTS	CTS Sensor
Blu, Gry, Blk	3	TPS	TPS Sensor
Lt.Gr/Blk, Lt.Gr/Wht, Lt.Blu/Blk, Lt.Blu/Wht	4	IAC	IAC Motor
Red/Blk, Lt.Blu/Blk, Red, Pnk/Blk	4	Dist. Diag.	Distributor
Tan/Blk	2	IAT	IAT Sensor
Pnk/Blk, Wht, Blk, Wht/Blk	4	Ign. Module	Ignition Module

Table 6.1 LT-1 Harness Connections Overview

7.0 TROUBLE SHOOTING INSTRUCTIONS

7.1 THE "CHECK ENGINE" LIGHT

Normally, the "check engine" 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 computer has detected a problem and a trouble code has been set.

7.1.1 The computer identifies particular trouble codes by flashing the "check engine" light in a certain way. The codes are read by counting the flashes:

- A.** The first digit (the "tens" digit) of the code is flashed quickly, followed by a brief pause, then the second digit (or "ones" digit) is flashed, followed by a longer pause. For example, three (3) quick flashes followed by a brief pause followed by two (2) flashes indicates code 32.
- B.** The code will repeat itself three (3) times. The next code will be displayed in the same manner.

Note: **When you access the codes from the computer a code 12 (one flash followed by two flashes) will first be displayed. This does not indicate a problem. Code 12 will flash 3 times, followed by the particular trouble codes, if any. If the computer merely flashes code 12 there are no trouble codes stored.**

7.2 RETRIEVING TROUBLE CODES FROM THE COMPUTER

7.2.1 In order to retrieve the trouble codes stored in the computer, locate the Assembly Diagnostic Link (ALDL) connector (installed and connected in **Paragraph 6.2.1**). Turn the ignition on, **BUT DO NOT START THE ENGINE**. Connect a jumper from ALDL terminal "A" to terminal "B" (see **Figure 6.1**) and observe the "check engine" light.

7.2.2 After you have read any codes (remember the normal code 12), write them down for reference. Remove the jumper from the ALDL connector.

7.2.3 Take the codes one at a time and match them to the codes in **Table 7.1**. This will tell you in which circuit the computer has detected a problem.

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

7.2.4 Before taking more extensive corrective actions for any trouble codes, make sure that all connections on the indicated circuit, **INCLUDING THE COMPUTER**, 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.

If a trouble code (other than 12) is detected and the problem has been fixed, clear the codes by first making sure the ignition is off then disconnecting the NEGATIVE battery cable for at least 3 minutes.

CODE #	CIRCUIT AFFECTED	CODE #	CIRCUIT AFFECTED
13	Oxygen Sensor	36	Distributor Ignition System
14	Coolant Temp (High)	41	Ignition Control Circuit
15	Coolant Temp (Low)	43	Knock Sensor
21	Throttle Position Sensor	44	Left Oxygen Sensor (Lean)
23	Intake Air Temp (Low)	45	Left Oxygen Sensor (Rich)
24	Vehicle Speed Sensor	46	Personal Automotive System
25	Intake Air Temp (High)	51	Prom Error
32	Exhaust Gas Re-circulation Sensor	53	System Voltage
33	Manifold Absolute Pres. Sensor	55	Fuel Lean Monitor
34	Manifold Absolute Pres. Sensor	64	Right Oxygen Sensor (Lean)
35	Idle Air Control Circuit	65	Right Oxygen Sensor (Rich)

Table 7.1 Diagnostic Trouble Codes

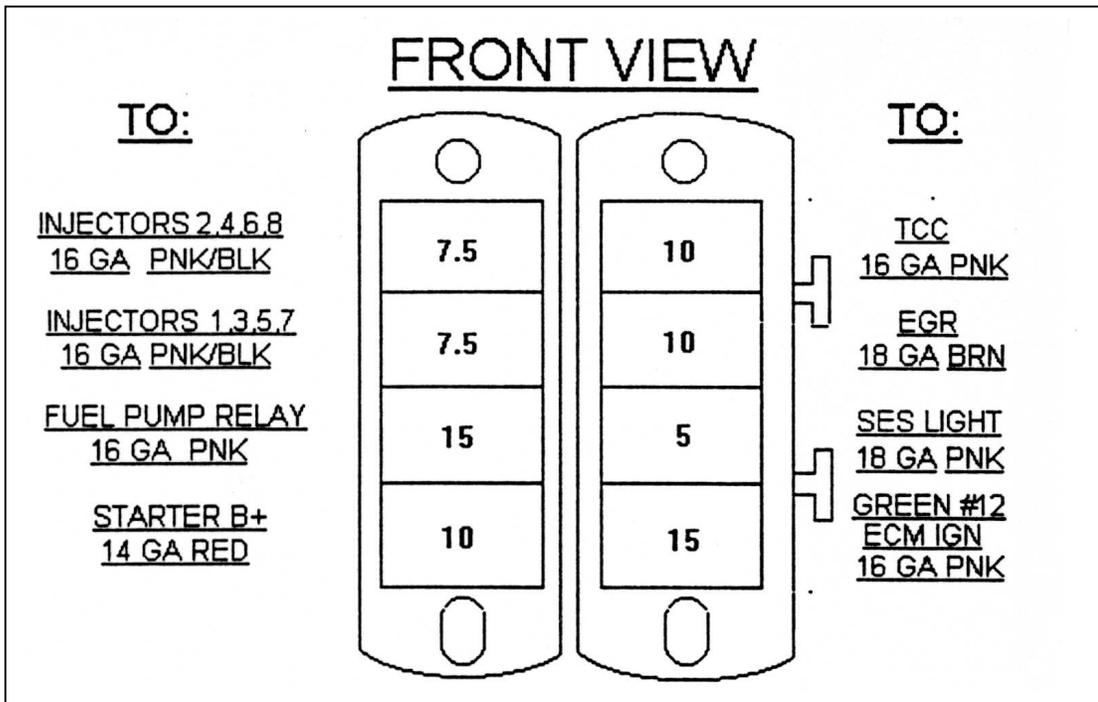


Figure 7.1 92 & 93 LT-1 Fuse Block

7.3 WHEN TO CALL PAINLESS PERFORMANCE PRODUCTS "TECH LINE"

- 7.3.1** These harness kits have been built with the highest regard to quality control. Before calling us please double check all connections and perform normal basic trouble-shooting (fuel pressure, timing, ignition system, etc.).
- 7.3.2** If you have any questions concerning the installation of this harness or have trouble in general, feel free to call the Painless Performance tech line at 800-423-9696. Calls are answered from 8am to 5pm central time, Monday thru Friday, except holidays.

We have attempted to provide you with the most accurate instructions 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 or call the Painless Performance tech line at 800-423-9696 and let us know about them. Or, better yet, send us a fax at 817-244-4024. We sincerely appreciate your business.

Painless Performance Limited Warranty and Return Policy

Chassis harnesses and fuel injection harnesses 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.