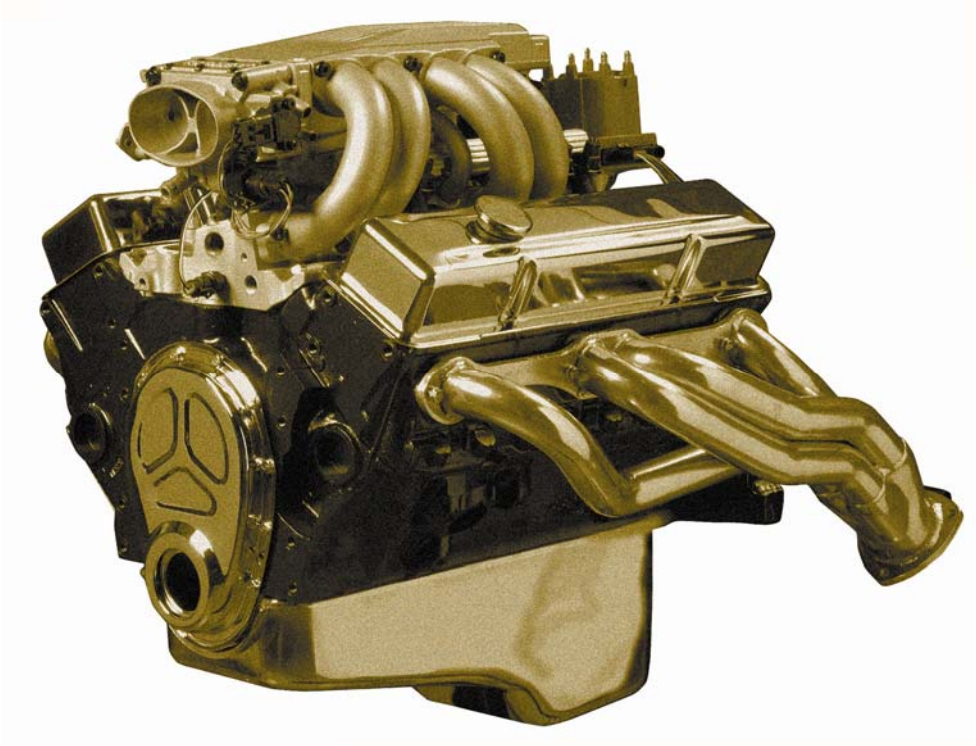
PERFECT
ENGINE MANAGEMENT SYSTEM®

Wire Harness Installation Instructions

For Installing:

Part # 65104 – Into 1985-1992 (5.0 & 5.7L) TPI Engines



Manual # 90536

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1.0 Introduction

Please read all instructions prior to install. You have purchased what we at Painless Performance Products, Inc. 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 system for fuel injection on all General Motors stock tuned port injection engines. This includes all wiring that is needed by the computer to run and control the fuel injection system. Please note that the PERFECT computer will not have the capability to control a 700 R4 trans. lock up functions. You will need to purchase Painless Performance part number 60109 for that function.

Usually, the Computer, MAP Sensor, ALDL and Check Engine Light can easily mount under the dash. Most of the wiring in the harness has been pre-terminated to the proper connector and all wire is rated at 275˚F and has been GM color-coded.

This harness has been broken down into three major groups:

Engine Group	Includes wiring for the fuel injectors, distributor, sensors and fuel pump.
Dash Group	Includes ignition feed wire, ALDL and check engine light.
Sensor and Relay Group	Includes wiring for the manifold absolute pressure (MAP) sensor, fuse block, fuel pump relay, a/c relay, ignition relay and cooling fan relay ground. The MAP sensor wires are long enough to route out and mount the sensor in the engine compartment.

2.0 About These instructions

These instructions provide information for the installation of the 65104 Tuned Port Injection Wire Harness Kit (for MAP TPI). 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
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 the table form these are located in or near the sections or paragraphs to which they correspond. Always pay careful attention to any ***Notes*** or any text labeled **CAUTION**.

3.0 TOOLS NEEDED

You will need at least, the following:

Crimping Tool	**Note: Use a quality tool to avoid over-crimping**.
Wire Striper	
Continuity Tester	**Caution: Do <u>not</u> use a test light to test the computer or sensor wiring or you will damage the computer.**
Electric Drill	
1 5/8” Hole Saw	(for the rubber grommet in the firewall)
Digital Volt meter	
Timing Light	

4.0 PRE-INSTALLATION AND HARNESS ROUTING GUIDELINES

The installation of your harness kit consists mainly of two parts:

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

These two major tasks are not separate steps, but are integrated together. That is you, will route some wires and make some connections, route some more wires and make some more connections.

We cannot tell you how to physically route the harness in your automobile. That depends a great deal upon the particular make of automobile and what extent you want to secure and conceal the harness. We do offer some general guidelines and routing practices starting in **Paragraph 4.2**, GENERAL installation instructions concerning the electrical connections you will have to make beginning in **Section 6.0**. To help you begin thinking though the installation of your wire harness, read the following sections:

4.1 You should get to know the particular engine that you are operating:

THIS SYSTEM WILL CONVERT THE EARLY MAF SYSTEM OR OPERRATE THE LATE VERSION TUNED PORT INJECTION (TPI) SYSTEM <u>WITHOUT</u> A MASS AIRFLOW (MAF) SENSOR, DESIGNED TO

USE A MANIFOLD ABSOLUTE PRESURRE (MAP) SENSOR, BUT DOES NOT REQUIRE AN ELECTRONIC SPARK CONTROL (ESC) MODULE: The 65104 harness is designed for and will support this system.

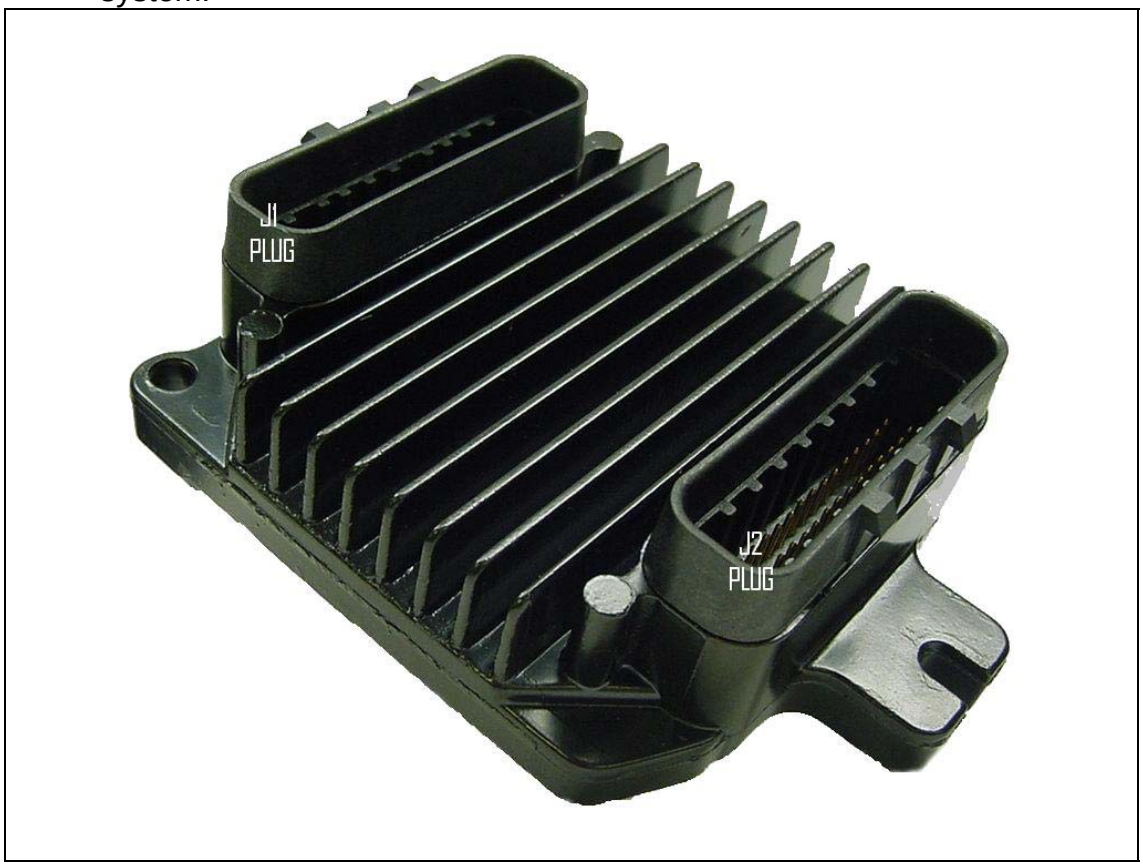


Figure 4.1 Fuel Injection Computer

4.1.1 PAINLESS PERFORMANCE recommends the use of the following parts. See **Table 4.1 on p.8**. These will meet all requirements and are compatible with the Painless Performance harness. The following numbers given are GM and AC Delco part numbers. ***Note: Distributor to Coil and the Coil Power/Tach Pigtail are used only if you have a "separate coil" distributor.***

4.1.2 If you are using a separate coil type distributor, then you will use the distributor adapter included in the kit. You will need to obtain the distributor to coil and coil power/tach pigtails either from Painless Performance part #'s 60124 & 60125, a wrecking yard or from your original harness. The wiring for the separate coil system is shown in **Figure 4.2 on p.7**.

4.2 Familiarize yourself with the harness by locating each of the harness groups and by looking at the connectors on the wire ends.

4.3 Decide where and how the computer and sensors will be mounted. Painless Performance wire harness kits are designed to mount either under the dash or on the lower kick panel. They must be no further apart than the wiring will allow (approx. 10 inches).

4.4 A good exercise is to lay out the wire harness on the floor beside your vehicle and identify all the connectors and wires. **The harness must be routed from the inside of the vehicle out to the engine compartment.**

4.5 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.

4.6 Route the harness away from sharp edges, exhaust pipes, the hood and door hinges.

4.7 Plan where harness supports will be located. Use a support approximately every 6 inches unless the harness routes under the floor carpet.

4.8 Allow enough slack in the harness at places where movement could possibly occur (body to frame, frame to engine, ect.).

4.9 The harness should be bundled into harness groups. Use tape, nylon ties or poly-split loom.

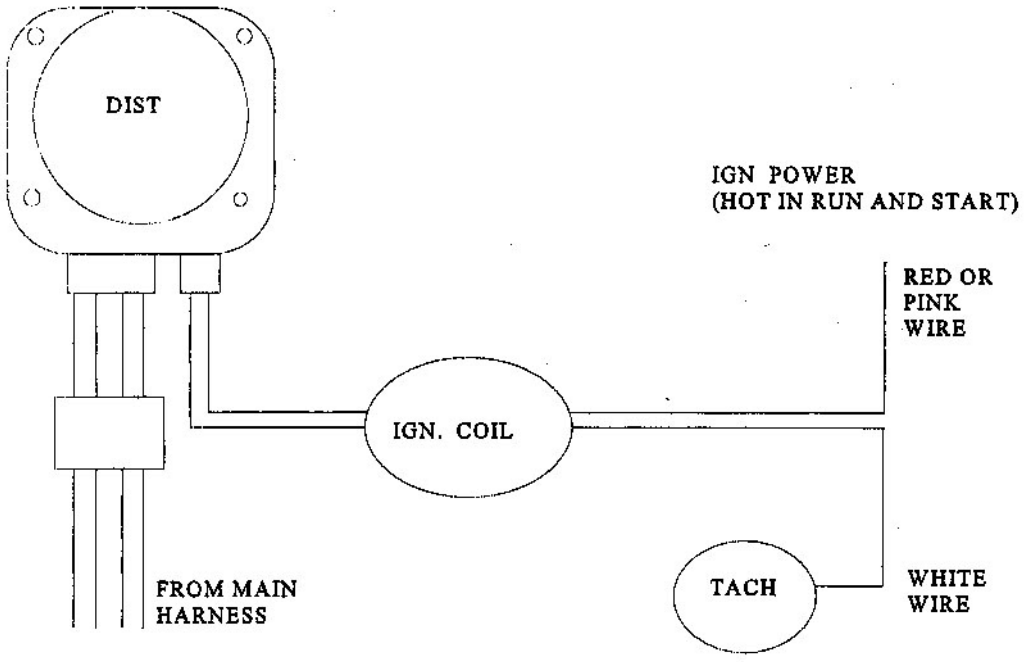


Figure 4.2 External Coil Distributor Hookup

65104 (MAP) Tuned Port Injection

Manifold Absolute Pressure Sensor……..GM Service # 16137039
Manifold Air Temp Sensor……..GM Service # 25036979
Coolant Temperature Sensor……GM Service # 25036979
Knock Sensor……GM Service # 10456126
Oxygen Sensor……AC Delco # AFS-105
Oil Pressure Switch……..GM Service # 25036553
or AC Delco # D1818
Distributor to Coil Wiring……....Painless part # 60124
Coil Power/Tach Pigtail……Painless Part # 60125
Micro Relays……..AC Delco # D1703-A

Table 4.1 Compatible Parts List

5.0 GENERAL INSTALLATION INSTRUCTIONS

Caution:

Do not disconnect the battery or computer connector(s) while the ignition is on.

Do not short any wire 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!

Notes:

All of the adaptors listed in the manual, are included in the wiring kit. You should use or remove them depending on your particular application.

If you are switching an engine from the early TPI (MASS AIR FLOW) then you must use the new **KNOCK SENSOR** in **Table 4.1**.

An oil pressure SWITCH must be used with this harness. **DO NOT BYPASS THE OIL PRESSURE SWITCH WIRES.**

If you are using an oil pressure switch that has two or three small pins surrounded by a plastic collar for an electrical connection, an adaptor is in the kit.

There is a normal, small current drain on these fuel injection 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 have become bent.

IF YOU HAVE A GM SEPARATE COIL IGNITION SYSTEM ON YOUR ENGINE: use the adaptor in the kit.

FOR YOUR DISTIBUTOR: The power wire used on the previous distributor should work fine as long as there is no ignition resistor in the circuit. It **must be a fused** power wire (14 ga. minimum) that is HOT (12V) when the ignition switch is in the **START AND RUN** positions. Connect it to the terminal on the distributor cap labeled BAT or to the PINK wire on the separate COIL IGNITION System. This wire provides power to the ignition coil. YOUR ENGINE WILL NOT START OR RUN WITHOUT IT.

The fuel pump you are using MUST be rated at a minimum of **45 PSI.**

If you have headers you may have to relocate the knock sensor for proper clearance other than the stock location as shown in **Figure 6.8 on p. 18.**

Note: The oil pressure switch wires are designed to be connected to an oil pressure switch, not the oil pressure sending unit. An oil pressure sending unit is for a gauge or an indicator light and will only have one terminal on the top. The stock oil pressure switch is cigar shaped and has three terminals. If you wish to use the stock oil pressure switch then you will use the oil pressure switch adaptor included in this kit. On the oil pressure switch adaptor there are two wires that match the wire colors from our harness and there is also an extra wire.

The extra wire is for the factory oil pressure on indicator light, depending on what the switch was originally designed for. You may also obtain a smaller oil pressure switch if you have clearance problems with the original pressure switch. This type of switch has two male connectors that will plug directly into the harness.

5.1 GROUNDING THE VEHICLE

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

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

5.1.2 Connect a ground strap 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 your 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 5/8" hole in the firewall near the computer for the engine group section to pass though.
5.2.3 Route the engine group section though the hole. Push the grommet (already installed on the harness) into the hole until it is seated.
5.2.4 Route the dash group to the driver's side of the car.
5.2.5 Route the sensor group to the area where 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 installation. Please be patient and take your time.***

5.3.1 Permanently mount computer. You should mount the parts (sensors, relays, etc.) that will be used for your engine at this time.
5.3.2 Mold harness groups to the connectors of the engine, frame and etc. Remember to route the 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 ½" or so on the visible areas of the harness, 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 for the fuel pump, A/C compressor, Ignition and Electric Fan Relay ground. Before you start, you should carefully read Sections 6.0 through 7.0, as applicable, and continually refer to the wire connection 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 needed 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 possibly occur. DOUBLE-CHECK YOUR CALCULATIONS.
5.4.4 Strip insulation away from wire. Strip only enough length necessary for the type of terminal you are installing.

Note: ***In the following step, make sure that the terminal is crimped with the 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 first properly routed and then attach. DO NOT ATTACH AND THEN ROUTE AFTERWARD.
5.4.7 When all wires are attached, tighten the mounts and ties to secure harness permanently.
5.4.8 Attach the connectors to the computer BEGING CAREFUL NOT TO BEND ANY PINS.
5.4.9 Only 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 TUNED PORT SYSTEM WIRING HARNESS INSTALLATION INSTRUCTIONS

6.1 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 other wires.

Caution: ***Do not make any connections while the harness is plugged into the computer.***

Note: ***Wire color (example: BLK/WHT) is one wire with a stripe. The second color (the stripe) may not be bold. Observe all two-color wires closely.***

A. Find a suitable location to mount the ALDL connector that will allow access to the front of the connector and still allow you to see the check engine light while driving.

B. Mount the ALDL connector.

C. Locate the PNK/BLK wire and attach it to the fuse block or the coil power wire. **POWER IS REQUIRED WHEN THE KEY IS IN THE RUN AND START POSITION.** This is the ignition power wire for the computer.

Figure 6.1 Assembly Line Diagnostic Link Connector (ALDL)

Caution: ***Do not connect these wires using directions from different instructions. You may damage the computer.***

6.2 SENSOR AND RELAY GROUP INSTALLATION

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 Sensor and Relay Installation

Note: The single RED wire with the female terminal that comes out of the fuel pump relay base is a test lead only. It is not connected to anything. . See note in Section 7.1 on p. 20.

A. Take the wiring to the sensors and connect.

B. When installing a tuned port manifold absolute pressure (MAP) sensor: the MAP sensor has been moved inside to clean up the engine compartment, but additional wire length has been added for optional engine compartment mounting. If mounting inside you can usually use a regular vacuum line for this. If you are having trouble getting full manifold vacuum line inside to the sensor or the vacuum line collapses you can run hard plastic or metal vacuum line inside for the sensor.

Important: The MAP sensor needs to be mounted with the hose nipple pointed down.

Figure 6.2 Manifold Absolute Pressure Sensor (MAP)

The three relays that have been supplied for you in the kit are for the following:

Fuel Pump Relay	This relay will supply the 12 V ignition hot power to your fuel pump when the key is on and in start.
AC Signal Relay	This relay will supply a ground for the computer to increase engine RPM when the AC compressor has been turned on.
Ignition Relay	This relay will supply 12 V ignition hot power to the O2 sensor, check engine light and computer when the key has been turned to the on or start position.

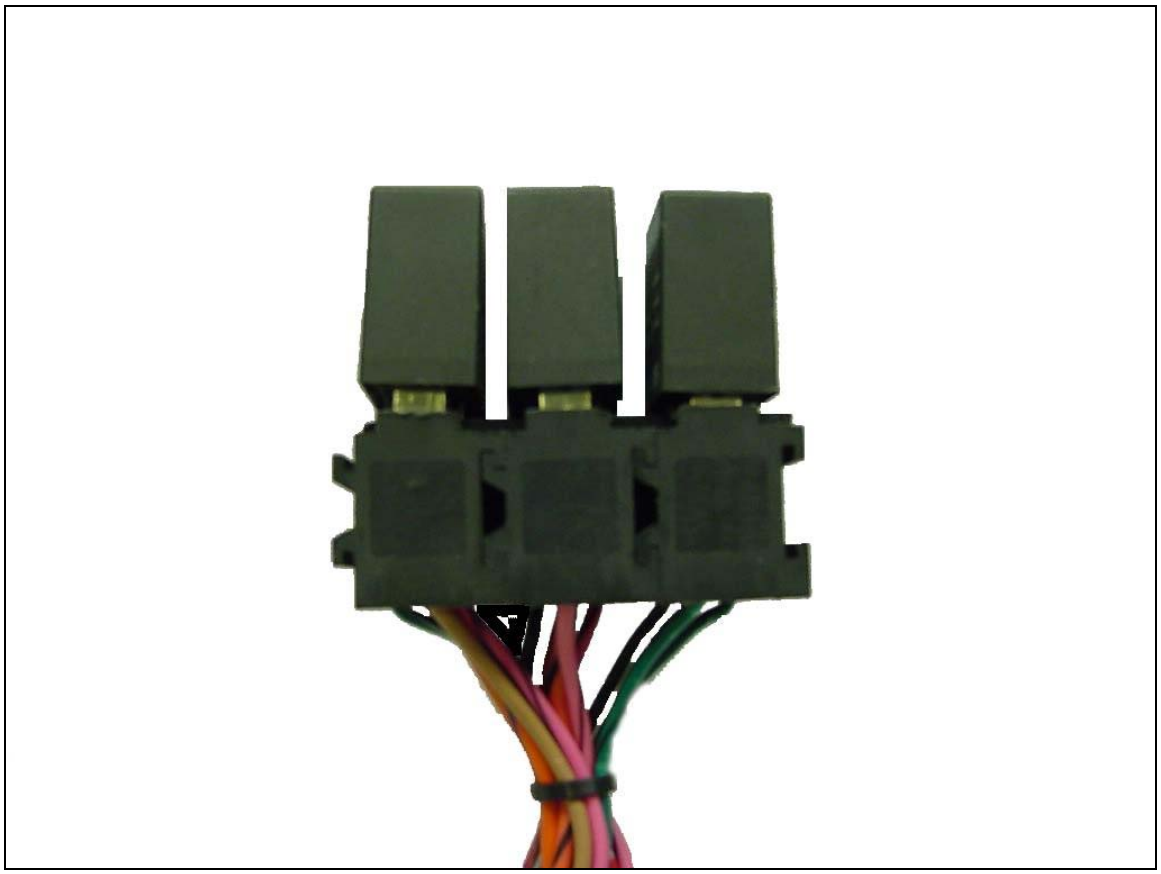


Figure 6.3 65104 Relays and Relays bases

Note: ***You will have to install the relays in their housing after mounting the relays bases. All three relays are identical.***

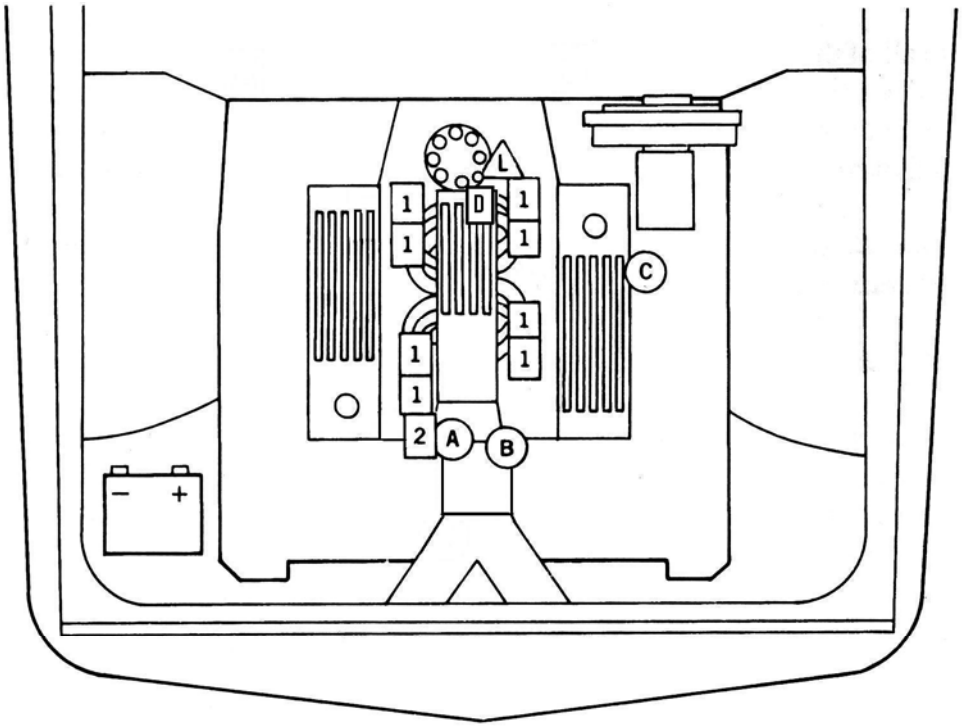
6.3 ENGINE GROUP INSTALLATION

The engine group is designed to be separated into the 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 IAC, TPS, CTS all of which ARE labeled. First separate the engine group into left and right side sections and place them accordingly.

6.3.1 *Before you connect any wires, separate the fuel pump wire from the engine group and place it out of the way.*

6.3.2 Locate the two separate BLK/WHT wires in the harness that each end in a ring terminal and ground them to the engine.

6.3.3 Using **Figure 6.4 on p.15** and **Table 6.1 on p.16** connect the wiring as directed.



CONTROLLED DEVICES

1 Fuel Injector
2 Idle Air Control Motor

INFORMATION SENSORS

A Throttle Position
B Coolant Temperature
C Knock
D Manifold Air Temperature

NOT ECM CONNECTED

L Oil Pressure Switch

Figure 6.4 Engine Compartment Overview

Wire Colors	***# of Positions*** in Connector	***Labeled***	***Connects to:***
Tan/Blk, Blk/Red, Wht., Pur/Wht	4	DISTR.	Distributor
Blk/Wht, Pnk/Blk, Pur., Blk	4	OYX	O2 Sensor
Blu, Pnk/Blk or Grn, Pnk/Blk	8	INJ #	Injectors ***** (**see note below)**
Orn, Tan		OIL	Oil Pressure
Dark Blue	1	KNOCK	Knock Sensor
Tan, Black	2	MAT	Manifold Air Temp. Sensor
Blk, Dk. Blue, Gray	3	TPS	Throttle Pos. Sensor
Lt.Blu/Wht, Lt Blu/Blk, Lt. Grn/Wht, Lt Grn. /Blk	4	IAC	Idle Air Control
Ylw, Blk	2	CTS	Coolant Temp Sensor
Red		STARTER	Battery B+
Lt. Grn, Gry, Blk	3	MAP	MAP sensor
Drk. Grn.		AC POWER	AC Compres.
Blk/Wht		GROUND 1 & 2	Engine Grounds
Gray		FUEL	Fuel Pump
Pnk/Blk		IGN	Ignition B+

Table 6.1 *GM Tuned Port Injection Engine Group Connections*

Note: ***When installing the 65104 we recommend that you start from the back of the engine and work your way forward.***

Note: ***This system has been designed to run on the batch fire system. See note on page 23 for information.***

6.3.3 Green wire tagged A/C POWER attaches to the A/C compressor power wire at the compressor if the vehicle is so equipped. This will increase the engine idle RPM when the A/C is turned on.

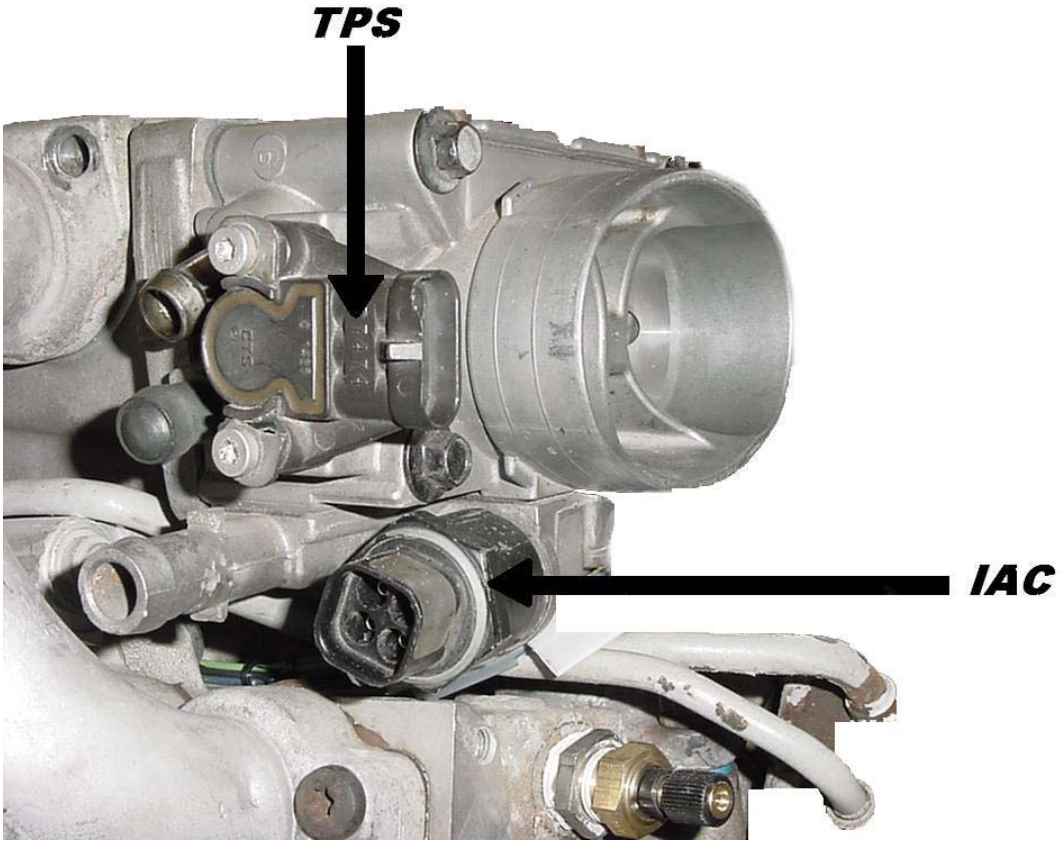


Figure 6.5 Throttle Position Sensor and Idle Air Control Valve

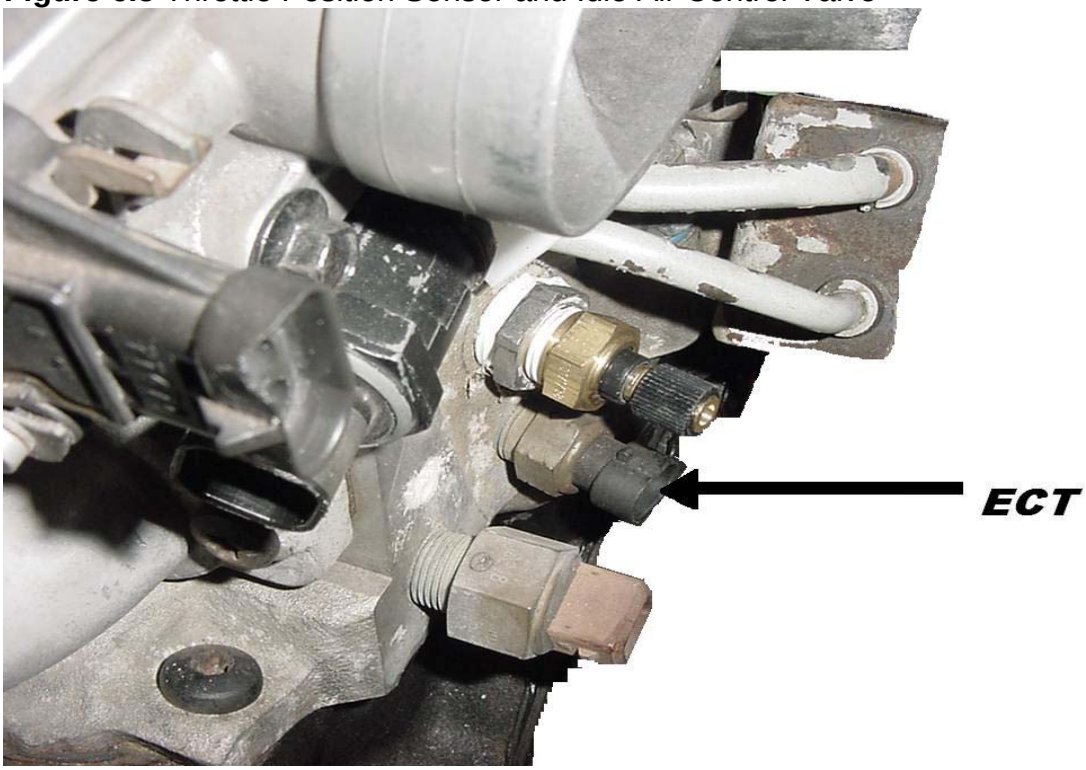


Figure 6.6 Engine Coolant Temp. Sensor

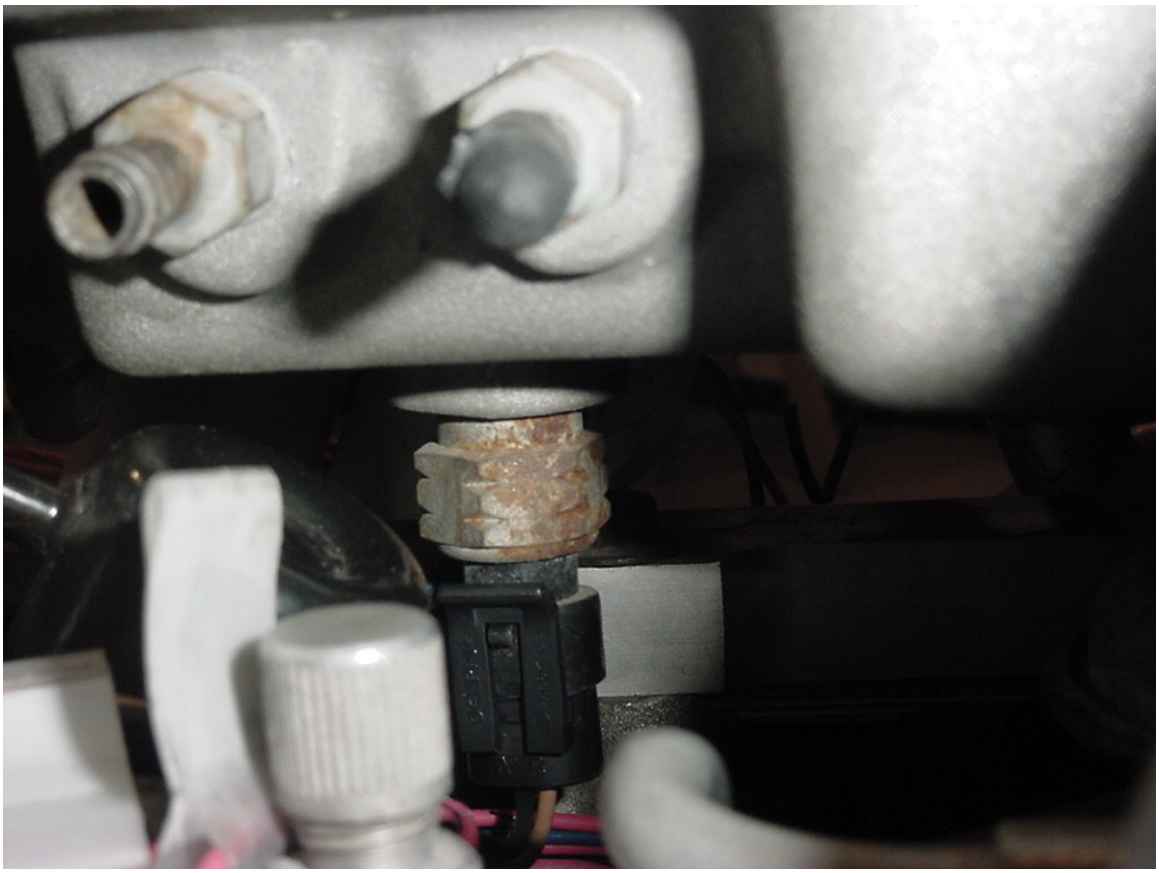


Figure 6.7 Manifold Air Temp. Sensor

Figure 6.8 Knock Sensor

Figure 6.9 Heated Oxygen Sensor

6.4 PRE-ADJUSTMENTS BEFORE STARTING ENGINE

6.4.1 Throttle Position Sensor Adjustment

A. Turn on ignition but do not start engine.
B. Check to insure throttle is not depressed
C. At the throttle position sensor, place a digital voltmeter's probes into the blue and black wires in the back of the sensors connector, which is plugged into the sensor.
D. Loosen the sensor mounting screws and adjust the sensor until the meter reads .5 volts (1/2 of one volt).
E. Tighten the mounting screws and recheck the meter reading.

6.4.2 Base Engine Idle Adjustment

A. Turn on ignition but do not start engine
B. Jumper A & B of the ALDL as if you were checking for codes.
C. Wait 30 seconds and then remove the plug from the IAC motor.
D. Remove the jumper from ALDL
E. Start engine and adjust idle speed with adjusting screw at throttle lever (there may be a cap covering the adjustment screw that will need to be removed and discarded).
F. Shut off engine and disconnect battery for one minute.

G. Plug the IAC connector back in and then reconnect the battery.
H. Start engine and check for proper base idle speed.

6.5 ADJUSTMENTS AFTER STARTING ENGINE

6.5.1 Base Idle

A. Make sure that harmonic balancer line is properly marked and visible when checking for timing.
B. Hook up timing light
C. Start engine
D. Place jumper wire in terminals A and B of ALDL **See Figure 6.1 on p.12.**
E. Take timing light and set timing at 10˚ for the 5.7L and 8˚ for the 5.0L.
F. Check balancer with timing light for proper timing.
G. If timing is off take a 9/16" wrench and loosen distributor hold down bolt.
H. Turn distributor clockwise or counter clockwise until timing light shows 10˚ on balancer. Retighten hold down bolt.
I. Turn off engine and remove jumper wire and timing light.

6.5.2 IAC Adjustment

A. Start Engine and run it until the engine is completely warm **(185˚F)**.
B. When engine is warm turn off engine and disconnect the IAC
C. Restart engine and set idle speed to 1,000 RPM.
D. Once you have set the idle turn off the engine and plug IAC back in
F. Cycle your Ignition Switch to the "ON" and "OFF" positions a couple of times, but make sure that you **Do not start the engine.**
G. Restart your engine and make sure that engine is running around 700 RPM, also recheck your TPS voltage to .5V.

Note: ***You are not resetting your base idle by doing this* step. You are setting your IAC to a certain count for every time you start your engine when cold.**

7.0 TROUBLE SHOOTING INSTRUCTIONS

Note: Only scanners with marine cartridges and marine cable plugs will communicate with the PERFECT computer.

If you are having trouble with your engine running badly or not running at all, first perform basic trouble shooting (checking for faulty connections, spark, timing, fuel pressure, etc.) then see if the computer has stored any trouble codes in its memory.

7.1 THE FUEL PUMP RELAY TEST WIRE

The small RED wire that is coming out of the relay is a TEST lead wire. If you do not hear your fuel pump prime when you turn on the ignition take a jumper wire and connect it from a 12 V power source to the RED wire coming out of the FUEL PUMP RELAY. By supplying 12 V to that wire you are bypassing the relay completely. You should hear the pump run. If you do not hear anything make sure that all connections are good and the pump has a good ground.

7.2 THE CHECK ENGINE LIGHT

Normally, the “check engine” light should come on when the ignition is initially turned on, and then go out few moments after the engine starts running. If the computer has detected a problem and a trouble has been set the light will come back on.

7.2.1 The computer identifies particular trouble codes by flashing the “check engine” light in a certain way. The codes are read by counting 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 a two (2) flashes indicates code 32.

B: The code will repeat itself two (2) times. The next code, if any, 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 be flashed 2 times, followed by the

particular trouble codes, if any. If the computer merely flashes code 12 there are no trouble codes stored. Code 12 mean the engine is not running.

7.3 RETRIEVING TROUBLE CODES FROM THE COMPUTER

7.3.1 In order to retrieve the trouble codes stored on the computer, locate the ALDL plug installed in **Section 6.2 on p.12**. Turn the ignition on, BUT DO NOT START THE VEHICLE. Connect a jumper wire from the ALDL terminal "A" to terminal "B" see **Figure 6.1 on p.12** and observe the check engine light.

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

7.3.3 Take the codes one at a time and match them to the codes in **Table 7.1 on p.22**. This will tell you in which circuit the computer has detected a problem.

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

7.3.4 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 grounds wires are clean and secure.

7.3.5 If you are getting a code from your computer and need to clear the code, other than code 12, after you have replaced apart, readjusted a part, etc. You can do this by making the following steps:

A: Install a jumper wire from terminal A to terminal B.
B: Ignition ON engine OFF
C: Move throttle from 0% (idle) to 100% (WOT) and back to 0%.
D: Remove the jumper wire.
E: Turn ignition OFF for at least 20 seconds.
F: Ignition ON engine OFF
G: Recheck for codes

Code #	*Circuit affected*
13	Oxygen Sensor Inactive
14	Coolant Sensor High Voltage (COLD)
15	Coolant Sensor Low Voltage (HOT)
21	Throttle Position Sensor (high voltage)
22	Throttle Position Sensor (low voltage)
23	Manifold Air Temp (low temp. indicated)
25	Manifold Air Temp (high temp. indicated)
33	MAP Sensor Circuit (high voltage)
34	MAP Sensor Circuit (low voltage)
41	EST Fault
42	EST/BYPASS Fault (IC grounded or open)
44	Knock Sensor circuit inactive
51	Calibration Checksum Failure
54	Oxygen Sensor Low voltage (lean reading indicated)
55	Oxygen Sensor High Voltage (rich reading indicated)
81	Throttle Position Sensor (out of range)

Table 7.1 Diagnostic Trouble Codes Chart

7.4 WHEN TO CALL PERFECT PERFORMANCE PRODUCTS TECH LINE

7.4.1 These harness kits have been built with the highest regard to strict quality control and tested before shipment. Before calling us please double-check all connections and perform
normal basic trouble shooting (fuel pressure, timing, ignition system, etc.).

7.4.2 If you have any questions concerning the installation of this harness or are having trouble in general; feel free to call Painless Performance tech line at (800) 423-9696. Calls are answered from 8 AM to 5 PM CST, Monday-Friday, except holidays. Please leave a message if you are unable to reach us and we will return your call as soon as possible.

Note: Helpful information on the PERFECT ECM Calibration

The PERFECT ECM has been specifically calibrated for your particular engine. This computer will not work with any other type of engine, nor will it work with a modified motor (i.e. aftermarket parts). The computer has been programmed to control your electric fan. Your fan should come on at 200˚and off at 185˚. We have also created a rev. limit RPM @5,000. If your computer was to detect an engine malfunction it will first set a check engine light and then proceeds to place itself into a “safe mode”. This “safe mode” will still allow you to drive your car, but it will not allow you to drive your car over 1,300 RPM. The computer will not take itself out of “safe mode” until the malfunction has been corrected. The computer will place itself into “safe mode” even if your car starts to over heat. Once the engine cools down the computer will place itself out of the mode and return back to normal functions. Engine over heat temp. has been set at 250˚.

E-MAIL: tech@painlessperformance.com
WEB: www.painlessperformance.com

MOST COMMONLY ASKED QUESTIONS ABOUT GM ELECTRONIC FUEL INJECTION

Q WHAT IS DIFFRENCE BETWEEN THE EARLY AND LATE TPI UNITS?

A
1. THE EARLY TPI UNITS, 1985 THRU 1989, HAVE A MASS AIR FLOW SENSOR TO MEASURE THE AMOUNT OF AIR ENTERING SO THE COMPUTER WILL KNOW HOW MUCH FUEL TO INJECT.
2. MOST EARLY TPI'S HAVE A 9TH INJECTOR TO INJECT FUEL, DURING STARTING, TO RICHEN THE MIXTURE LIKE A CHOKE.
3. THE LATE TPI, 1990 THRU 1992 USES A MAP SENSOR RUN BY VACUUM, TO CALCULATE THE AMOUNT OF FUEL TO INJECT.
4. THE LATE TPI UNITS DO NOT HAVE A 9TH INJECTOR: INSTEAD THEY INJECT EXTRA FUEL FROM ALL 8 INJECTORS DURING COLD STARTING.

Q CAN I CHANGE MY EARLY TPI OVER TO THE LATE STYLE?

A YES. YOU CAN MAKE AN EARLY UNIT A LATE STYLE BUT, YOU CANNOT MAKE A LATE STYLE AN EARLY BECAUSE OF THE 9TH INJECTOR.

Q WHAT ALL DO I HAVE TO CHANGE TO MAKE MY EARLY UNIT OPERATE LIKE A LATE UNIT?

A
1. YOU MUST USE THE PAINLESS PART NUMBER 65104.
2. REMOVE THE MAF SENSOR AND AS A MAP SENSOR.
3. CHANGE THE KNOCK SENSOR TO THE 1990-1992 STYLE.
4. ELIMINATE THE ELECTRONIC SPARK CONTROL MODULE.

Q WHAT IS THE MOST COMMON PROBLEM WITH FUEL INJECTION SYSTEM?

A LACK OF PROPER FUEL PRESSURE WHICH CAUSES LOW POWER, STUMBLE, BACKFIRE, NO THROTTLE RESPONSE AND THE LIST GOES ON AND ON.

Q MUST I HAVE MY FUEL PUMP IN THE TANK?

A NO. INSIDE THE TANK IS THE BEST BECAUSE THE FUEL COOLS THE PUMP. IF YOU ARE USING AN EXTERNAL PUMP, MOUNT IT CLOSE TO

THE TANK AS POSSIALBE AND BE SURE TO USE A BYPASS FUEL REGULATOR SO EXCESS PRESSURE CAN BE BLED OFF TO THE TANK.

Q WHEN INSTALLING A TPI UNIT AND REMOVING A CARBURATOR WHAT MODIFICATIONS TO THE ENGINE MUST I DO?

A
1. FUEL PUMP REPLACEMENT ALONG WITH A RETURN FUEL LINE.
2. AN OXYGEN SENSOR ADAPTOR WILL BE NEEDED IN THE EXHAUST SYSTEM.
3. THE BRAKETS FOR THE ALTERNATOR AND A/C COMPRESSOR WILL NEED TO BE MODIFIED OR REPLACED.
4. DIFFERENT SYTLE OF AIR CLEANER WILL BE REQUIRED.
5. DIFFERENT IGNITION DISTRIBUTOR WILL BE REQUIRED.
6. THROTTLE LINKAGE, WIRING AND OTHER SMALL PARTS WILL NEED TO BE REPLACED OR REWORKED.

Q WHAT MODIFICATIONS TO MY EXISTING WIRING IS NEEDED TO INSTALL FUEL INJECTION?

A FACTORY STYLE ELECTRONIC FUEL INJECTION (EFI) SYSTEMS ARE STAND ALONE UNITS WHICH MEANS THAT THEY DO NOT REQUIRE A CERTAIN STYLE OF CHASSIS WIRING SYSTEM TO OPERATE.

Q WHAT WIRES NEED TO BE HOOKED UP IN EFI SYSTEMS OTHER THAN THE SENSORS, ETC.?

A USUALLY THERE ARE ONLY 4 WIRES TO BE HOOKED UP:
1. MAIN POWER INPUT FROM THE BATTERY SUPPLY.
2. IGNITION POWER WHEN THE KEY IS ON.
3. A GOOD GROUND.
4. STARTER ACTIVATION INPUT, THIS TELLS THE COMPUTER THAT THE ENGINE IS BEING TURNED OVER AND TO INJECT FUEL SO THAT IT WILL START.

Q IS THE LARGE, HEI STYLE, DISTRIBUTOR BETTER OR WORSE THAN THE SMALLER EXTERNAL COIL TYLE?

A THEY BOTH OPERATE ON THE SAME PRINCIPAL AND HAVE ABOUT THE SAME OUTPUT, BUT THE LARGER HEI STYLE IS EASIER TO HOOK UP.

Painless Performance Limited Warranty and Return Policy

Chassis, fuel injection harnesses, and Striker ColdShot 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.