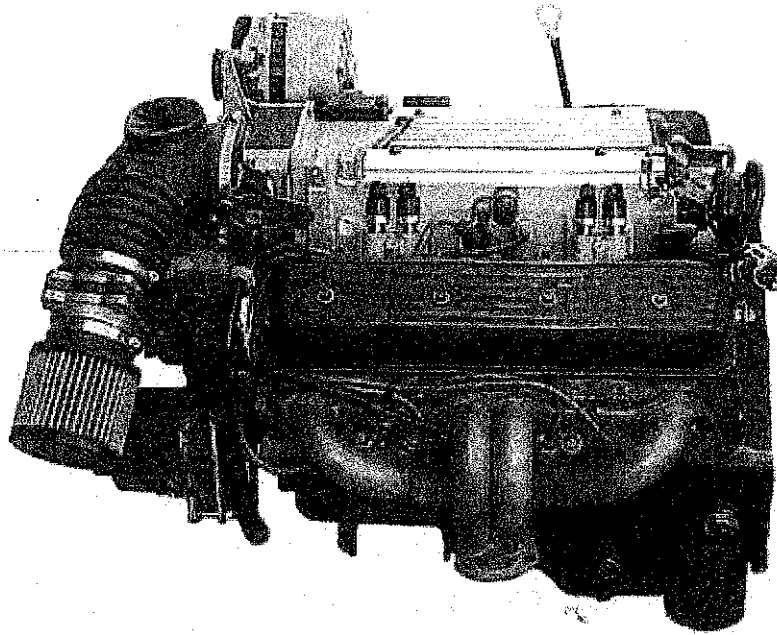




**1994/1997 GM LT1 FUEL
INJECTION
WIRE HARNESS INSTALLATION
INSTRUCTIONS**

This harness is designed to be a complete wiring system for the fuel injection system on General Motors 1994 and newer LT1 injected engines and to control the 4L60E transmission. This includes all wiring that is needed by the computer to run and control the injection system and transmission.

NOTE: The use of a 40 pulse Vehicle Speed Sensor, such as the one that comes standard in the 4L60E transmission, is required when using an electronic transmission like the 4L60E. The use of a 4L60E will also require the use of an electronic speedometer because of the absence of a cable drive in the transmission.

Usually, the computer, relays and fuse block 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 GM color-coded. All wiring is GXL, 600 volt, and 125 degree centigrade with cross-link insulation.

This fuel injection system harness has been 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 (DLC) connector, check engine light, computer wiring and connectors, brake switch wiring, gear shift indicator wiring, tachometer wiring and fuse block. **TAIL GROUP** Include VSS wiring, transmission wiring (if applicable) and power wire for fuel pump.

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 THE COMPUTER OR SENSOR WIRING OR YOU WILL DAMAGE THE COMPUTER.**

The installation of your harness kit will consist of two parts:

- ~ 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. If you **ARE** going to use a 4L60E transmission then you **MUST** have a two-position vehicle speed sensor (VSS), and the correct brake switch. These are necessary to make the transmission work correctly. 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** relay must be installed to unlock the converter when the brakes are applied. You can run without the brake switch however the torque converter lock up will not be active. The vehicle speed sensor lets the ecm (computer) know how fast the wheels are turning and the ecm will shift the transmission accordingly.

The 94 & 95 LT1 engine has two oxygen sensors, one on the right side and one on the left side of the engine.

This system has four rectangular connectors at the computer. A 16188051 computer is required for proper operation on 94 and 95 engines OBD1 and the later model ecm (16214399) for OBD2 engines.

The numbers given are GM and AC Delco part numbers.

You must use the computer listed on table Familiarize yourself with the harness by locating each of the harness groups and by looking at the connectors on the wire ends.

Decide where and how the computer, fuse block and relays will be mounted. Our wire harness kits 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 (approx. 16 inches). A good exercise is to lay out the wire harness on the floor beside your vehicle and identify all the connectors and wires.

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.

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

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

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

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

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 (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 current 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 (pounds per square inch).

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 to 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 part.

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

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.**

Connect a ground strap from the engine to the body.

LT1 Fuel Injection Harness (94 & 95)

Main Computer.....Service#16188051 for 94-95 use

Brake Switch.....GM# 25524845

Gear Indicator Switch.....GM# 15705308 or

Intake Air Temperature.....GM# 12110319

Delco #D2286A

Ignition Module.....Delco# D-1986-A

MAP SensorGM# 16137039

Idle Air ControlGM# 17113099

Coolant Temperature SensorGM# 25036979

Knock SensorDelco# 213-96

Coil.....Delco# D-573

Oxygen Sensors...GM# 25312184 or Delco# AFS 75

TPS Sensor.....GM# 17106680

MAF Sensor.....Delco# 213-252

NOTE: Components with part numbers other than the ones listed may plug into the harness, but the part numbers **MUST** match the ones on this list for proper operation.

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.

Position the computer and sensors in their intend locations.

Route the dash group over to the driver's side of the car.
Route the fuse block and relays to the place they will be mounted.

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.

Permanently mount your computer. You should mount the fuse block and relays at this time.

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.

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**.

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.**

TERMINAL INSTALLATION INSTRUCTION

Note: In the following steps you will be making the circuit connections. Before you start, you should carefully read 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.

Have all tools and connectors handy.

Select the correct terminal for the wire and application.

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.

Strip insulation away from wire. Only strip as much insulation off as 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.**

Crimp the terminal onto the wire.

Connecting the wires and connectors throughout the harness is a simple process. Make sure that each wire is properly routed and then attached. **DO NOT ATTACH THEN ROUTE AFTERWARD.**

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

Attach the connectors to the computer. **BEING VERY CAREFUL NOT TO BEND ANY PINS.**

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.

DASH SECTION INSTALLATION

The wires in this group consist of the diagnostic link connector (DLC)

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

Locate the pink ignition hot activation wire, labeled "fuse block ignition B+ (14 Ga.) for the fuseblock and attach it a 12V fused power source where there is power

This is the power wire for the fuel injection harness. If the pink wire is connected correctly, the check engine light will come on when the ignition is "ON or START".

Locate the Orn/Blk wire in the dash group. This wire is 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 Neutral" and ungrounded in "Drive". This can also be done with a toggle switch or a switch on the parking brake.

If you are **NOT** using a vehicle speed sensor (VSS) or Park/Neutral Indicator Switch then you will need to connect the Park/Neutral wire to ground.

You may want to install your own P/N switch. This switch must connect the Orn/Blk wire to ground only when the car is in **PARK OR NEUTRAL**.

The single purple wire is the wire that lets the computer know when the brake is applied. If you ARE NOT using a 4L60E then you will tape off and store this wire. If you ARE using the 4L60E transmission then you will have to install an electrical switch that allows ignition on power to the purple wire for the TCC lock up. The fuel pump connector has a small gray wire at the bottom of it that terminates in a female connector.

Fan #1 relay wire (green) and fan #2 relay wire (blue) are relay ground wires activated by the computer.

Note: Fan #1 will come ON at 226°F and go OFF at 221°F.

Fan #2 will come ON at 235°F and go OFF at 230°F.

The wire labeled TACH (white) is the signal wire for a tachometer is used.

The VSS output wire sends out a signal to operate the electronic cruise control or speedometer if so equipped.

Dash Section Connections

WIRE COLOR # OF POSITIONS LABELED CONNECT TO: IN CONNECTOR

Gray, Green/White, Black/White, Pink 4 Fuel Relay Fuel Pump Relay

Green/White VSS Output Speedometer/Cruise

White Tach Tachometer

Orange/Black P/N switch Park/Neutral Switch

Purple Brake Switch

Dash Section Connections

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. Before you connect any wires, separate the tail section from the engine group and place it out of the way.

Locate the 3 Blk/Wht wire bundles in the harness that end in a single, large ring terminal and ground them to the engine.

The pink wire labeled coil power needs to be connected to the wire that powered the coil on the original engine. This is already done for you with the 2 piece coil wire set.

RETRIEVING TROUBLE CODES FROM THE COMPUTER

The chart below shows the type of ALDL test connector each vehicle came with from the factory. If you are using a computer with '94 Camaro/Firebird, '94-'95 Caprice or '95 Impala programming you must obtain a OBD 1 connector. We have provided this connector

In order to retrieve the trouble codes stored in the computer, a scanner must be connected to the Assembly Diagnostic Link (DLC) connector.

Follow the instructions provided with the scanner to read the codes set in the computer.

After you have read any codes, write them down for reference. Remove the connector from the DLC connector.

Take the codes one at a time and match them to the codes in owners manual 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.

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 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.

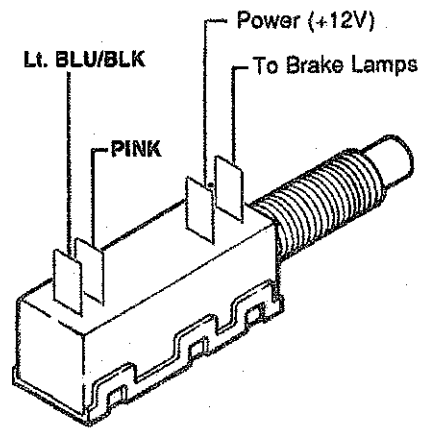
These harness kits have been built with the highest regard to quality control. Before calling us please double check all connections and perform normal basic trouble-shooting (fuel pressure, timing, ignition system, etc.).

If you have any questions concerning the installation of this harness or having trouble in general, feel free to call 303.641.6400 Calls are answered from 8am to 5pm central time, Monday thru Friday, except holidays. Email questions to fuelinjectionconnection@gmail.com

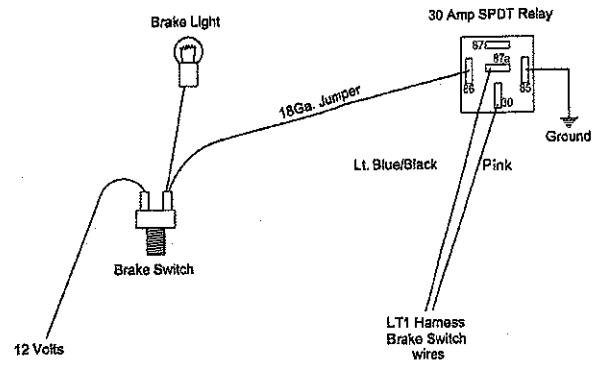
Chassis harnesses and fuel injection harnesses are covered under a lifetime warranty.

All other products manufactured and/or sold by us are warranted to the original purchaser to be free from defects in material and workmanship under normal use.

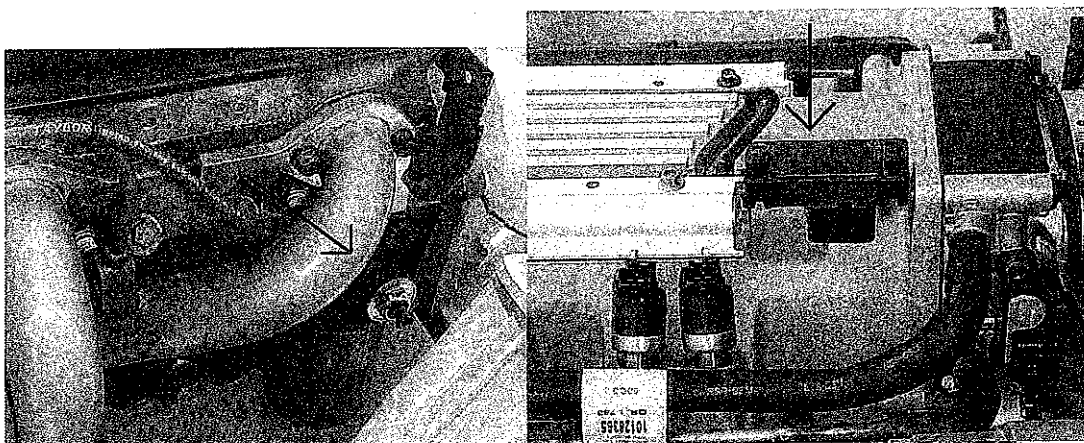
We will repair or replace defective products without charge during the first 12 months from the purchase date. No products will be considered for warranty without a copy of the purchase receipt showing the sellers name, address and date of purchase. You must return the product to the dealer you purchased it from to initiate warranty procedures.



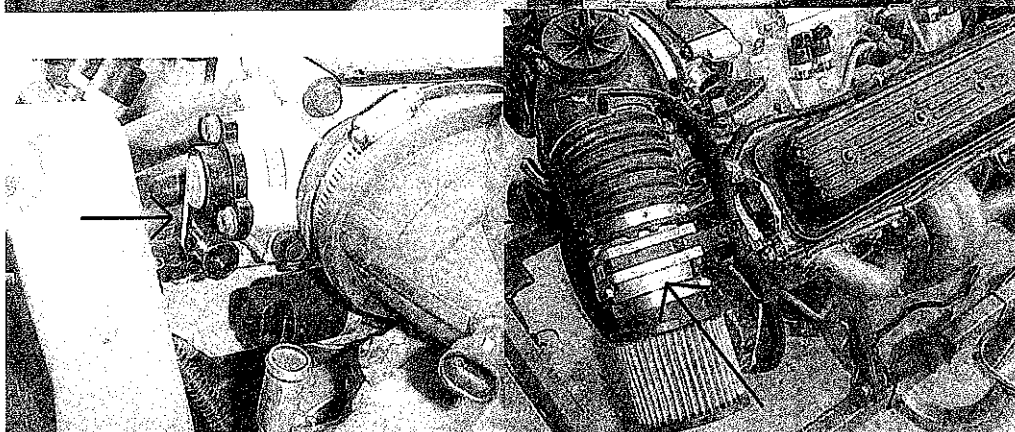
Brake Switch



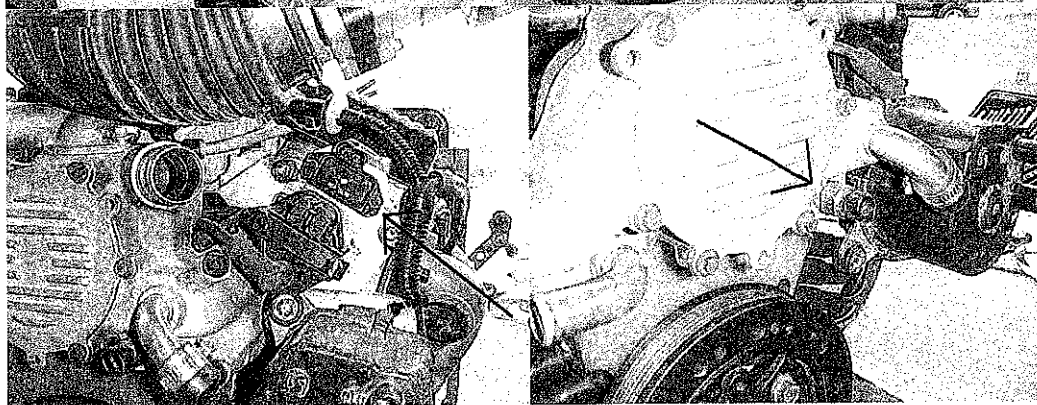
elocated
nrock sensor
eft)
IAP (right)



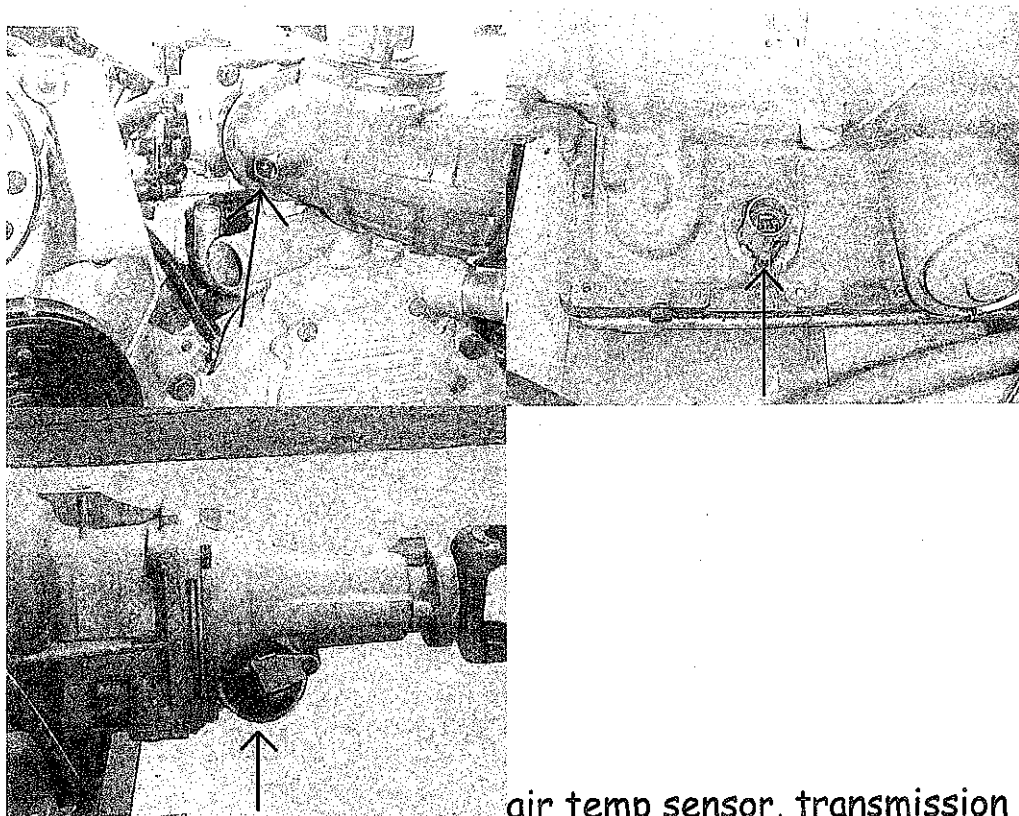
Throttle
Position
Sensor



MAF
sensor



Ignition
timing
module
(left)
Coolant
sensor
(right)



air temp sensor, transmission
connector and speed sensor

How Many Knock Sensors

THE HARNESS IS EQUIPPED WITH TWO KNOCK SENSOR LEADS, DEPENDING ON WHICH KNOCK SENSOR MODULE IS IN THE COMPUTER. DETERMINE HOW MANY KNOCK SENSORS YOU NEED. CHECK THE LIST BELOW FOR WHICH SENSOR IS USED. IF ONLY ONE SENSOR IS NEEDED TIE EXTRA SENSOR LEAD BACK.

PART NUMBER OF SENSOR MODULE:

16188309

16188709

16177690

ALL USE 2 KNOCK SENSORS

16177700

USES 1 KNOCK SENSOR

ACCESS COVER ON BOTTOM OF COMPUTER KNOCK SENSOR MODULE

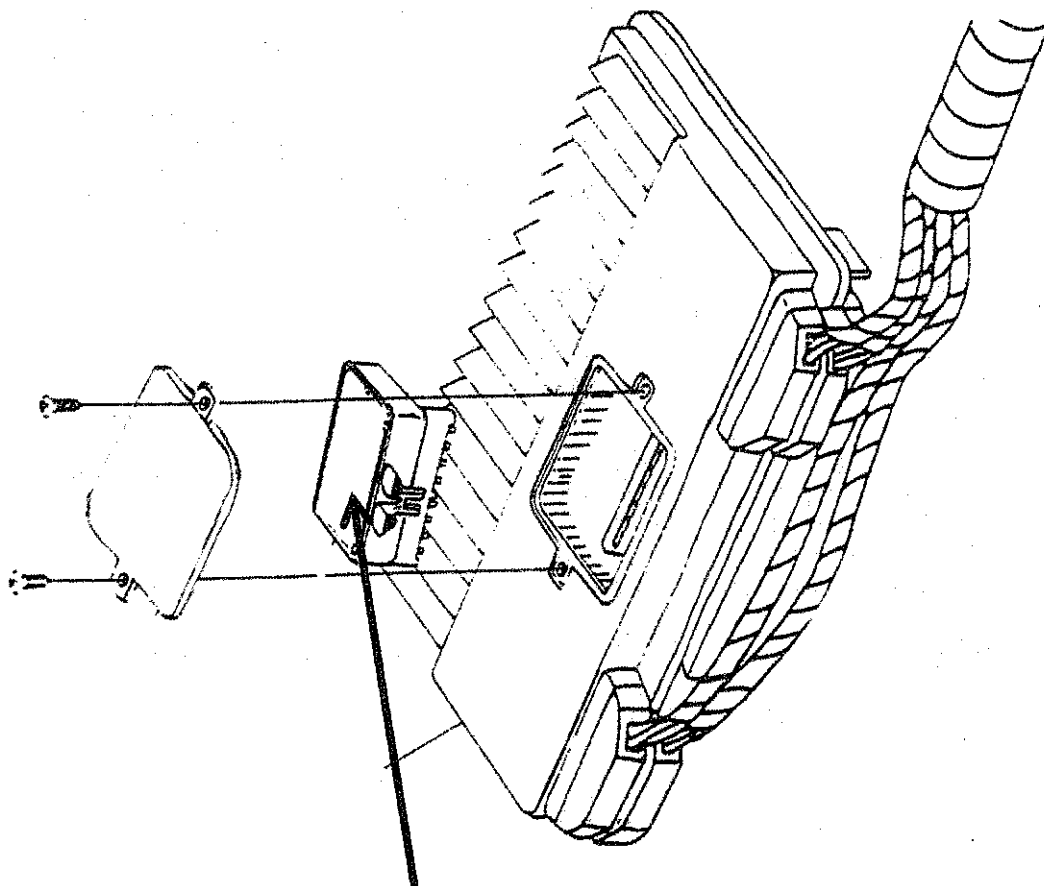
PCM

94 Computer #16188051

95 Computer #16188051

Corvette's, cast iron headed SS, Cadillac and Buick used two knock sensors. IROC/TA used one knock sensor. Check the knock module in your computer with the chart above to insure that you have the proper module for your engine.

We can reprogram your computer to provide improved drivability, remove emissions and reconfigure your gear ratio and tire rollout for better performance. Computers can be programmed on exchange basis.



ECM Battery Positive 15	ECM Ignition ON 10	O2 Sensor heaters 20
Fuel Pump 20	Trans MAF TAC 15	Fuel Injectors 15
Fan #1 B+ 30	Coil 20	Fuel Injectors 15
Fan #2 B+ 30	CCP/EGR 20	Fan Relay 15

LT1 Panel Fuse Location with Fans

On 96-97 wiring, the CCP/EGR fuse location is for the spark timing module near coil or it may be combined with coil fuse location.