" We Put The Quality In Conversions "

Dual Curve

For Alternate Fuels

Installation Instructions

GM OBD II INTEGRATED PROCESSOR™
PN 5924

OVERVIEW

The **GM OBD II Integrated Processor** PN 5924 is designed to support dedicated and bi-fuel conversions to LPG, CNG, or LNG on 1996 Chevrolet or GMC pickups equipped with the 4.3L, 5.0L, 5.7L, or 7.4L Vortec® engines. Use PN 5925 for bi fuel CNG for low fuel - Auto/ Switch.

OPERATION

The GM OBD II Integrated Processor, like the entire Integrated Processor™ line, provides conversion support in four critical areas:

1. OEM Computer Interface, preventing false “check engine” lights and code storage when operating on alternate fuel while preserving the OEM diagnostic function.
2. Load-sensitive timing advance, allowing the vehicle to take full advantage of the higher octane rating of the alternate fuel.
3. Precise closed-loop fuel control for lowest possible exhaust emissions.
4. Fuel injector control, turning the OEM fuel injectors off for alternate fuel operation and allowing normal function during gasoline operation.

In addition, the GM OBD II Integrated Processor offers Dual Curve’s new, patent pending **Electronic Idle Control™**. This revolutionary new system provides for complete electronic control of air/fuel mixtures under all operating conditions. Total adaptive electronic control means that you can be assured of the lowest possible emissions, best driveability, and top fuel economy along with tamper-proof security.

WARNING: The idle control solenoid feature CANNOT be used with the IMPCO® PEV or ANY OTHER positive pressure fuel system. Omit Section I, ICS mounting (other functions of the PN 5924 will perform normally).

NOTE: Only experienced and licensed alternate fuels technicians perform these conversions. A thorough knowledge of automotive and alternate fuels systems is required. This will avoid poorly installed systems, resulting in poor vehicle performance, and/or personal injury or property damage. When installing the **GM OBD II Integrated Processor P/N 5924**, these instructions must be carefully followed to ensure a quality conversion.

PARTS INCLUDED IN THIS KIT:

- 1 - GM OBD II Integrated Processor PN 5924
- 1 - Wiring Harness
- 1 - Three Port Solenoid PN 4048
- 1 - Two Port High Flow Solenoid PN 4051
- 1 - Foam Air Filter
- 1 - Calibrated orifice elbow PN 4049
- 2 - Elbow without orifice PN 4049-2
- 1 - Brass Hex Nipple 1/8"NPT
- 4 - Cable Ties
- 4 - Sheet Metal Screws
- 4 - Heat shrink caps
- 4 - Female Wire Lugs
- 1 - Molded Plastic Extension tab
- 1 - 10-32x Bolt
- 1 - 10-32 Nut
- 2 - Lock Washers

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SECTION I
HARDWARE INSTALLATON

MOUNTING THE UNIT

Use the four (4) sheet metal screws in the parts bag to mount the unit in a location that will permit the wiring harness to reach. Do not mount the unit on the engine or near the exhaust manifold. Extreme heat can damage the unit. The P/N 5924 is moisture resistant, however do not mount it such that water will collect in its housing. Suggestion: Mount the unit underneath the PCM.

FUEL CONTROL VALVE (FCV)

Remove one of the screws which hold the regulator cover. Use this screw to secure one end of the mounting tab provided in the parts bag to the regulator cover. Also in the parts bag is a small bolt, lockwasher and nut. Use these to attach the FCV to the mounting tab. It is important that this mounting tab be installed since its purpose is to avoid the heat transfer from the regulator to the FCV. This extreme heat can inhibit proper function of this solenoid.

VACUUM ELBOW

Remove the atmospheric vent cover screen from the regulator cover. Thread the plastic orificed elbow into the regulator cover. If possible position the orifice so that it points downward, allowing any moisture to drain.

NOTE: CNG APPLICATIONS ONLY. Plug the orifice in this elbow. See warning regarding Electronic Idle Control Option.

NOTE: On some applications a bog or flat spot from idle to drive may be noticed. This may be due to vacuum being trapped on the regulator diaphram, restricting it's movement. To prevent this condition, an IMPCO® RCV Valve installed on the regulator cover will allow the trapped vacuum to be vented and the diaphram to move freely for good throttle response.

VACUUM LINE ROUTING

Using 3/16" vacuum line, connect the Orificed Elbow to the FCV plastic port that is 90 degrees with respect to the metal port (as shown in figure 1). With another piece of vacuum line connect the remaining FCV plastic port to the **Air Valve Vacuum** port on the mixer. The metal port must have the foam air filter placed on it (Adhesive or a tie strap may be used to secure this foam filter in place).

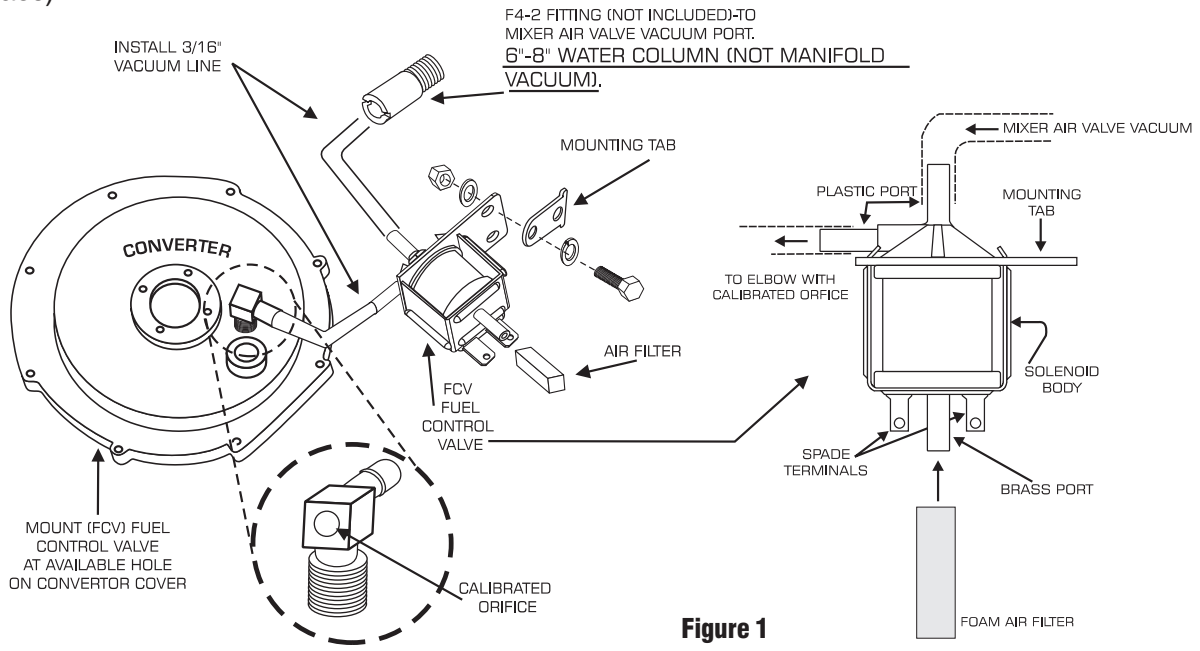


Figure 1

IMPORTANT: Air Valve Vacuum is defined as the vacuum located between the mixer and the throttle plates. This vacuum is typically 6-8" of water column. **Do not** use ported vacuum or worse yet, manifold vacuum.

IDLE CONTROL SOLENOID (ICS) MOUNTING

Take the metal or plastic fitting that adapts the vapor hose and the mixer together. This may be a straight or 90 degree pipe nipple. Tap it to fit the 1/8" NPT Hex brass fitting included in the 5924 parts bag. Install the metal fitting into the vapor hose adapter. The ICS valve has two ports, one is labeled "IN". Thread the ICS valve "OUT" port into the other end of the 1/8" NPT Hex brass fitting (See Figure 2).

Attach an elbow to the "IN" port of the ICS. Using a minimum size of 7/32" hose, connect this elbow to a filtered air source. This can be accomplished a number of ways. Two possibilities are;

a) If using a balance line in the conversion, a Tee fitting can be inserted into this balance line to provide filtered fresh air.
b) Drill and mount a fitting into the vehicle's air filter assembly and connect it to the ICS valve. Make sure that this configuration delivers filtered air.

SECTON II

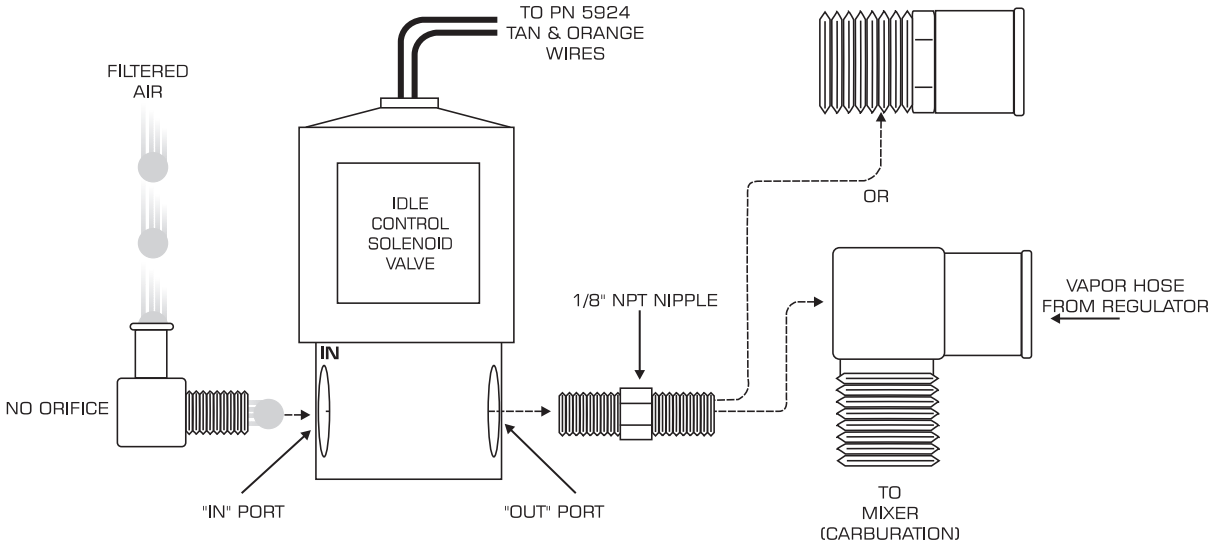


Figure 2

HARDWARE WIRING

STEP 1

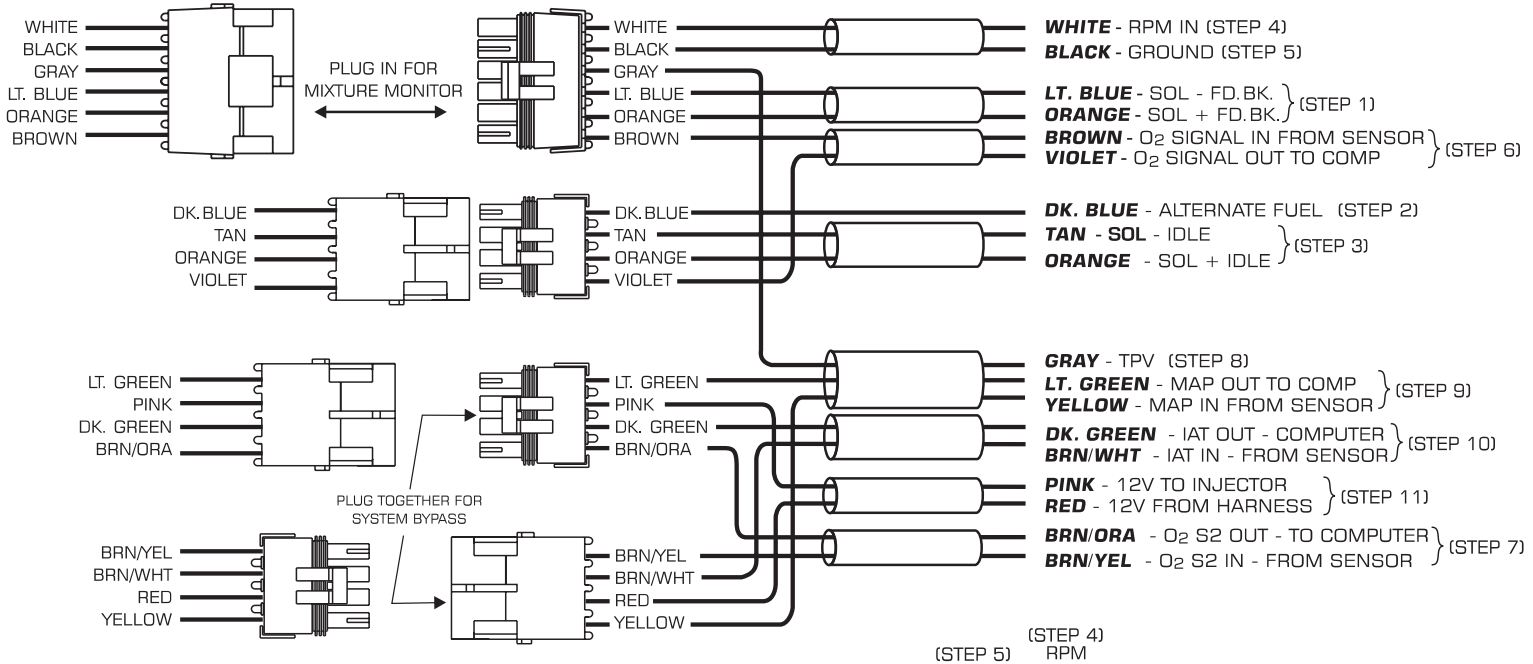
FUEL CONTROL VALVE - LT. BLUE & ORANGE

These two wires connect to the spade terminals of the FCV. There is no set polarity on the valve. Under no circumstances are these two wires to be shorted together! This will destroy the Fuel Control Circuit and the unit will have to be replaced.

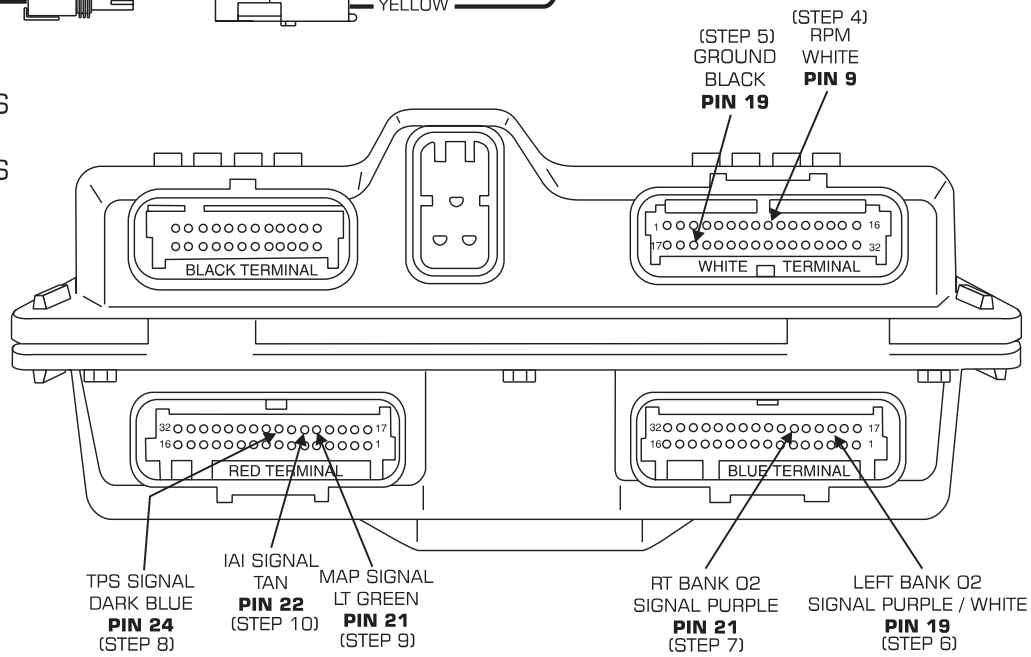
STEP 2: FUEL SELECTOR SIGNAL - SINGLE DARK BLUE

The DK. BLUE wire connects to the wire that is suppling the Electric Fuel Lock Off solenoid with +12 Volts during the alternative fuels mode. The Electric Fuel Lock Off solenoid is powered on alternate fuels by a wire from the Fuel Selector Switch. The 5924 DK. BLUE wire connects to this wire to sense +12 Volts during the alternate fuel mode and 0 Volts during the gasoline mode.

NOTE: Dedicated applications need to connect this wire to +12 Volts ignition source.



WIRE LOOPS:
FOR 6 CYLINDER VEHICLES
CUT ONE WIRE LOOP.
FOR 4 CYLINDER VEHICLES
CUT TWO WIRE LOOPS.



PCM
Factory computer located on drivers fender.

Figure 3

STEP 3 : IDLE CONTROL SOLENOID - TAN & ORANGE

Take these two wires and connect them to the two wires of the Idle Control Solenoid (ICS) that controls filtered air into the fuel delivery vapor line. There is no polarity for the solenoid and under no circumstances are these two wires to be shorted together! If not using the ICS cut & seal these two wires.

PCM WIRING

NOTE: Step 4 & 5 call out connections in the White connector, but some applications may actually have a Gray or Clear connector called out. This is typical on *some* 3/4 & 1 ton vehicles. The color of the connector is not critical and the pins called out in the instructions remain the same.

NOTE: To facilitate the PCM wiring we suggest working on one connector at a time. Disconnect each one to facilitate wire and pin identification. After making all connections on one connector, reconnect it to the PCM by making sure the keys line up correctlly. Do not force the connector (See Figure 3).

STEP 4: RPM SIGNAL - WHITE WIRE

Locate the OEM white wire on Pin #9 in the white PCM connector. Splice the 5924 white wire to it.

STEP 5: GROUND CONNECTION - BLACK WIRE

Locate the OEM black wire on Pin #19 in the white PCM connector. Splice the 5924 black wire to it. This will connect the 5924 ground circuit to the PCM signal return line.

STEP 6: LEFT OXYGEN SENSOR - BROWN & VIOLET WIRES

Find the OEM Purple/White wire at Pin #19 at the PCM blue connector and cut it. Solder the 5924 Brown wire to the sensor side of the cut Purple/White. Solder the 5924 Violet wire to the PCM side. This connection to Pin #19 delivers the left side O2 sensor signal to the 5924 via the Brown wire. A simulated signal is generated on the Violet wire and sent to the PCM. A scan tool will display this simulated signal leading one to believe the fuel control is ideal. The real O2 sensor is located on the Brown wire. Use a P/N 4041 or Digital Mulitimeter to monitor.

STEP 7: RIGHT OXYGEN SENSOR - BROWN/ORANGE & BROWN/YELLLOW

Locate the OEM purple wire at Pin #21 in the Blue PCM connector and cut it. Solder the Brown/Orange to the PCM side of the cut OEM wire. Solder the Brown/Yellow to the sensor side of the cut OEM wire. This connection to Pin #21 delivers the right side O2 sensor signal to the 5924 via the Brown/Yellow.

STEP 8: THROTTLE POSITION SENSOR - GRAY WIRE.

Locate the OEM Dk. Blue wire at Pin #24 in PCM Red connector and splice the 5924 Gray wire to it. This 5924 Gray wire is located in a sleeve with a Lt. Green and a Yellow wire.

STEP 9: MAP SENSOR SIGNAL - LT. GREEN & YELLOW

Locate the light green wire at Pin #21 in the Red PCM connector and cut it. Solder the 5924 Lt. Green wire to the PCM side of this cut wire and the 5924 Yellow wire to the sensor side. These two wires are in the same sleeve with the 5924 Gray throttle position sensor wire.

STEP 10: INTAKE AIR TEMP SENSOR - DK. GREEN & BROWN/WHITE

Locate the OEM Tan wire at Pin #22 in the Red PCM connector and cut it. Solder the 5924 DK. Green wire to the PCM side of this cut OEM wire. The 5924 Brown /White connects to the sensor side.

STEP 11

FUEL INJECTORS CONTROL - RED & PINK WIRES

4.3L V-6, & 5.0L, 5.7L V-8 VORTEC

Locate the fuel injector connector behind the throttle body with eight OEM pink wires entering it (4.3L V6 has 6 OEM PINK WIRES). Cut all Pink wires a couple inches from the connector. Tie all ends on the injector side together with the 5924 Pink wire. Tie all the computer side ends together with the 5924 Red wire.

The Red wire will power the 5924 any time the ignition key is ON, no matter what fuel is being used. The Pink wire will have +12V to power the injectors only in the gasoline mode of operation. This is all determined by the status of the Dk. Blue fuel selector wire. Dedicated applications must also follow these procedures for proper OBD II operation.

4.3L, 5.0L & 5.7L INJECTOR WIRING

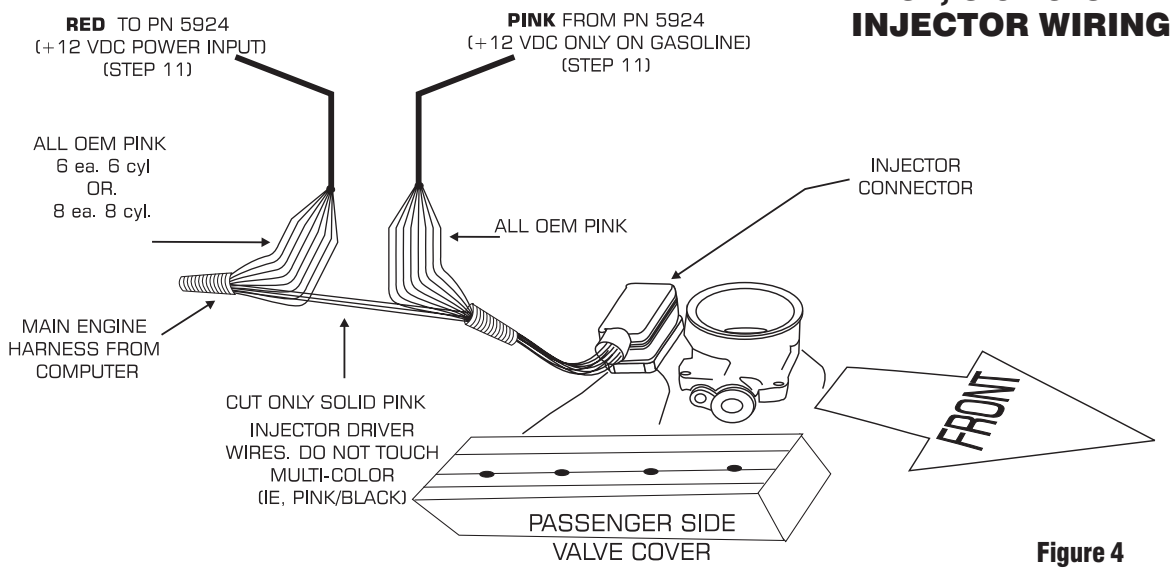


Figure 4

7.4L VORTEC

The injector wires can be found in a 10-pin connector at the back of the engine on the drivers side. In this connector you will find two (2) OEM Pink wires. Cut these two wires. Solder the two power side of these OEM wires to the 5924 RED wire. The RED wire provides +12 Volts to the 5924 and will always have power when the ignition key is ON.

Solder the two injector side of these OEM wires to the 5924 PINK wire. This Pink wire will be powered only during the gasoline operation. Dedicated applications must also follow these procedures for proper OBDII operation.

SECTION III

CALIBRATING THE UNIT

As recieved the unit is calabrated for 8 cylinder applications. For 6 cylinder applications, cut one wire loop. For 4 cylinder applications, cut two wire loops. We suggest cutting loops unevenly and placing a heat shrink cap over each cut loop (See Figure 5).

The Mixture Monitor™ PN 4041 is used to verify proper installation of the GM OBD II Integrated Processor and the correct operation of the fuel system. It offers two indicators of exhaust gas control. The nine LED lights display the actual O2 sensor voltages, which we call the LEAN/RICH indicator. The % analog meter is an indicator of the control required to maintain “ideal mixture” of air and fuel for lowest possible exhaust emissions.

To use Monitor, install it in line with the Processor’s six pin connector which holds the ORANGE and LIGHT BLUE wires going to the control solenoid (See Figure 5).

The GM OBD II Integrated Processor will pulse the control solenoid ON and OFF many times per second. The average voltage of this “pulsing valve” is considered its dwell. The control solenoid’s dwell is an indication of the amount of control the solenoid is exerting over the air/fuel mixture. When reading the dwell of the control solenoid (as indicated in volts by the analog meter of the PN 4041) you are looking for a reading in the OPERATING RANGE. If the reading is close to or at 0V, the solenoid is completely OFF, trying to richen a lean condition. The first step is to re-check all your wiring connections, paying special attention to the oxygen sensor connection. Re-check also the hardware installation instructions for the Integrated Processor. There are some additional areas to check for the solution of this problem. (1) Make sure that the mixer is installed so that there are no air leaks. (2) Check to see that the regulator is receiving an adequate supply of engine coolant and is not "icing up". (3) Make sure that all lines, valves, filters, and solenoids in the gaseous fuel system are completely open and free of restrictions.

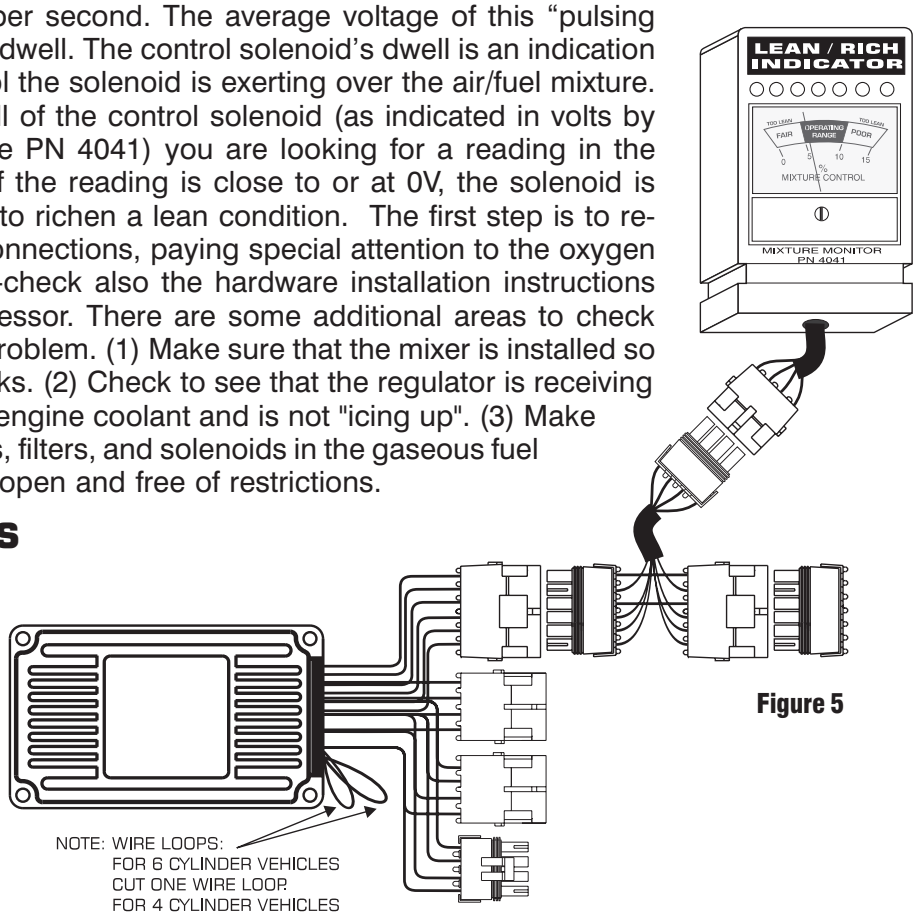


Figure 5

SET-UP PROCEDURES

The **Mixture Monitor P/N 4041** is used to verify proper instal-lation of the **GM OBD II Integrated Pro-cessor P/N 5924** and the correct operation of the fuel system. It offers two indicators of the fuel manage-ment control. The nine LED lights display the actual O2 sensor voltages and the *results* of the fuel management system, these are the RICH/ LEAN indicators. The analog meter indicates the *capability* of the fuel management system to maintain "ideal mixture" of the air/fuel ratio for the best possible emissions. The units are in volts.

To use the **Mixture Monitor P/N 4041**, install it in line with the Processor’s six pin connector which holds the ORANGE & LT. BLUE wires going to the FCV.

A. Start & warm up the engine to its normal operating temperature.

B. Observe the 4041 Mixture Monitor LED lights and meter movement. Meter has the units in volts with a blue "OPERATING RANGE" in the middle and two red zones on either side. Proper fuel management will always have a meter movement in the blue zone, (4-11V) with very short periods of time spent in either of the red zones. These red zones are:

1- Full scale Meter reading indicates a system adjusted too rich and our processor trying to the lean mixture.

2- Zero reading on the meter indicates a system adjusted too lean and our processor trying to richen the mixture.

C. At Idle:

RICH: If the voltage indicates MAXIMUM (15V, 100% Duty Cycle) and the LEDs are all RED, adjust the idle mixture screw on the mixer to a leaner setting. This will cause the meter movement to descend into the blue "OPERATING RANGE" and the YELLOW LEDs to begin flashing more frequently than the RED.

LEAN: If the voltage indicates ZERO (0V, system adjusted too lean) and the LEDs are all staying GREEN, adjust the idle mixture screw on the mixer to a richer setting. This will cause the meter movement to increase into the blue "OPERATING RANGE" and the YELLOW LEDs to beginning flashing more often than the GREEN.

Set the voltage toward low end of the "OPERATING RANGE" for correct adjustment (3-5v). The optional electronic Idle Control Solenoid (ICS) function will automatically make any corrections for future deviations of the mixture at idle.

D. At higher engine speed and under load (test drive or dynamometer) adjust the load screw on the mixer (if equipped) such that the voltage is in the "OPERATING RANGE" under most driving conditions. It is acceptable for the meter to stray into the zone indicating either the system is adjusted too lean or too rich, but this should be ONLY a momentary situation.

NOTE: Items C & D are assuming that (1) the O2 signal from the sensor is correct, (2) an RPM signal is present, (3) +12V and (4) a ground is reaching our processor.

NOTE: A meter display that does not move is a good indication that one of the four items listed is not reaching our processor. Please verify all connections.

IDLE CONTROL - RESET

If you are using the optional Electronic Idle Control feature and if you want to remove the P/N 5924 from its original vehicle and re-install it on another, the fuel trim map which it has learned for the first vehicle may not be appropriate for the second. To clear the P/N 5924 fuel trim memory and return the Electronic Idle Control solenoid to its original 40% duty cycle, follow these instruction:

(1) Without starting the engine, cycle the ignition key "ON" and "OFF" four times.

(2) Fully depress the accelerator and cycle the ignition key "ON" and "OFF" one more time. The duty cycle has now been reset back to its factory start-up duty cycle of 40%.

Limited Warranty

Autotronic Controls Corporation warrants this product to be free from defects in material and workmanship under normal use and if properly installed for a period of one year from date of purchase. If found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of date of purchase. This shall constitute the sole remedy of the purchaser and the sole liability of Autotronic Controls Corporation. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Autotronic Controls Corporation be liable for special or consequential damages.