

INSTALLATION INSTRUCTIONS

Super Fix 1

Part Number 8789-6

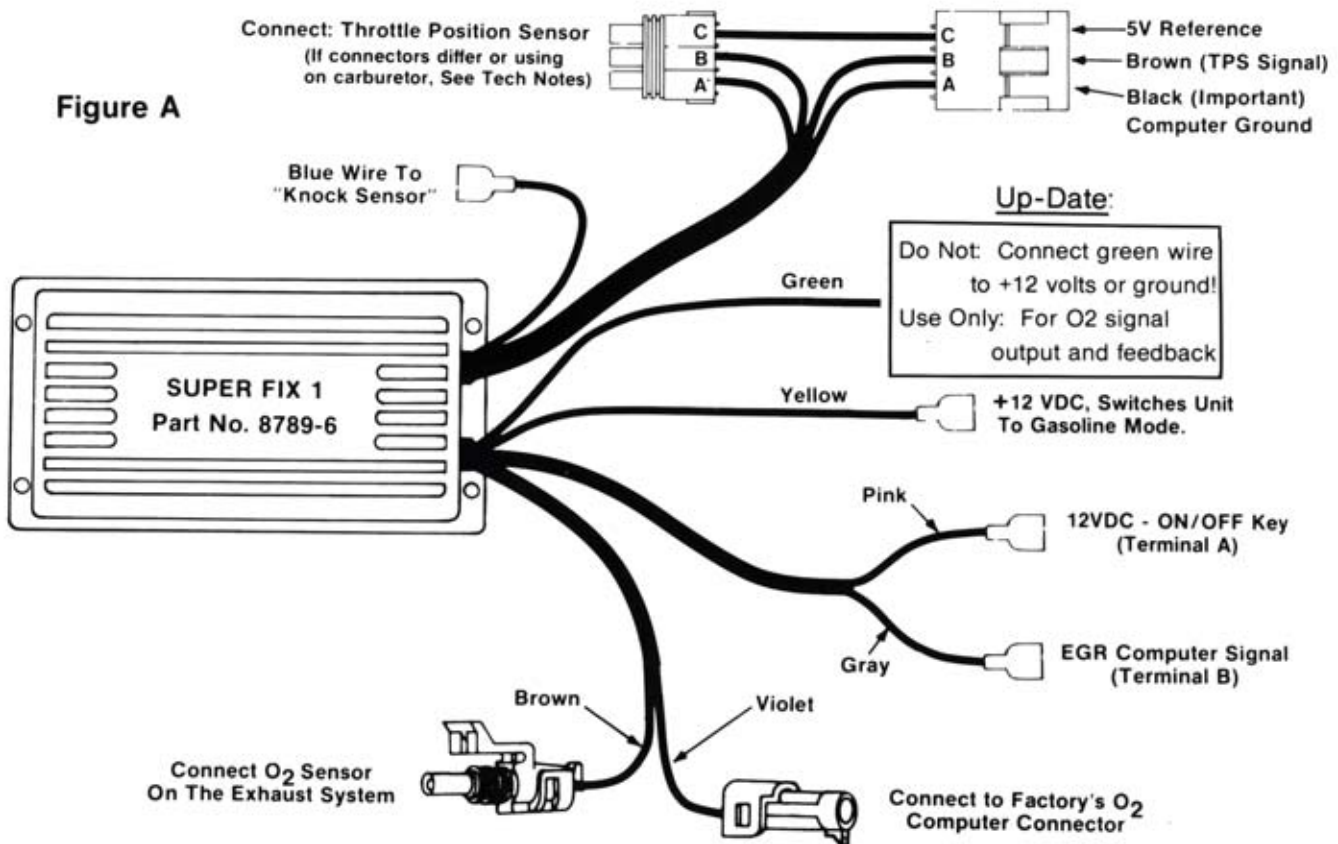
Parts Included In This Kit

- | | |
|---------------------------|-------------------------------------|
| 1 - Super Fix 1 PN 8789-6 | 1 - Installation Instructions |
| 5 - Wire Tap Devices | 4 - Wire Ties |
| 5 - Faston Receptacles | 4 - No. 4 x 3/4" Sheet Metal Screws |

The Super Fix 1 is designed to inform the ECM (Electronic Control Module), "Computer" and sensors when on ALTERNATE FUELS that 3 basic computer functions are working properly!

1. Supplies a Rich/Lean O₂ Feedback signal to the ECM.
Prevents: False oxygen sensor malfunction codes (13, 44, 45).
2. Monitors ECM signals related to exhaust gas recirculation (EGR) and the fuel system, then it responds with the correct signals.
Prevents: False "EGR" performs warning code (32).
3. Monitors ECM signals related to the knock sensor, then it responds with the correct sensor signals.
Prevents: False "knock sensor" warning code (43) and computer "limp-mode" spark timing retard on alternate fuels, which leads to poor driving characteristics, low mileage and high exhaust temperatures.

The Super Fix 1 may be wired using any one function or any combination of functions which the vehicle may require. Codes 13, 32, 43, 44 and 45 are directly related to the problems that the Super Fix 1 can solve.



SECTION I: MOUNTING THE SUPER FIX 1

Mount the unit in a location where the cables will reach the exhaust O₂ sensor, EGR Control Solenoid, the Knock Sensor and the Throttle Position Sensor. Do not mount on the engine or near the exhaust manifold. Extreme temperatures at these locations could cause damage to the unit. Use the sheet metal screws provided in the parts kit.

SECTION II: ELECTRICAL WIRE HOOK-UP

Locate the EGR solenoid (see Figure B) or locate the EGR valve and trace the vacuum line to the EGR control solenoid. Observe the 4-pin or 2-pin electrical connector.

Terminal Connector:

- A. Pink with Black tracer -- +12 VDC supply. For Super Fix 1 power via the Pink wire.
Note: For better +12 -- try coil (+) "pink wire."
- B. Gray wire -- EGR computer signal. Input to Super Fix 1 via the Gray wire.
Note: Keep gray wire away from ignition spark plug wires! If a Code 44 (lean) appears, try disconnecting gray wire and retest!
- C. Purple with White, Red with White or sometimes no wire -- This wire is not used.
- D. Black with White tracer -- Negative Ground. This wire is not used.

Figure B - Diagram of Typical EGR Control Solenoid

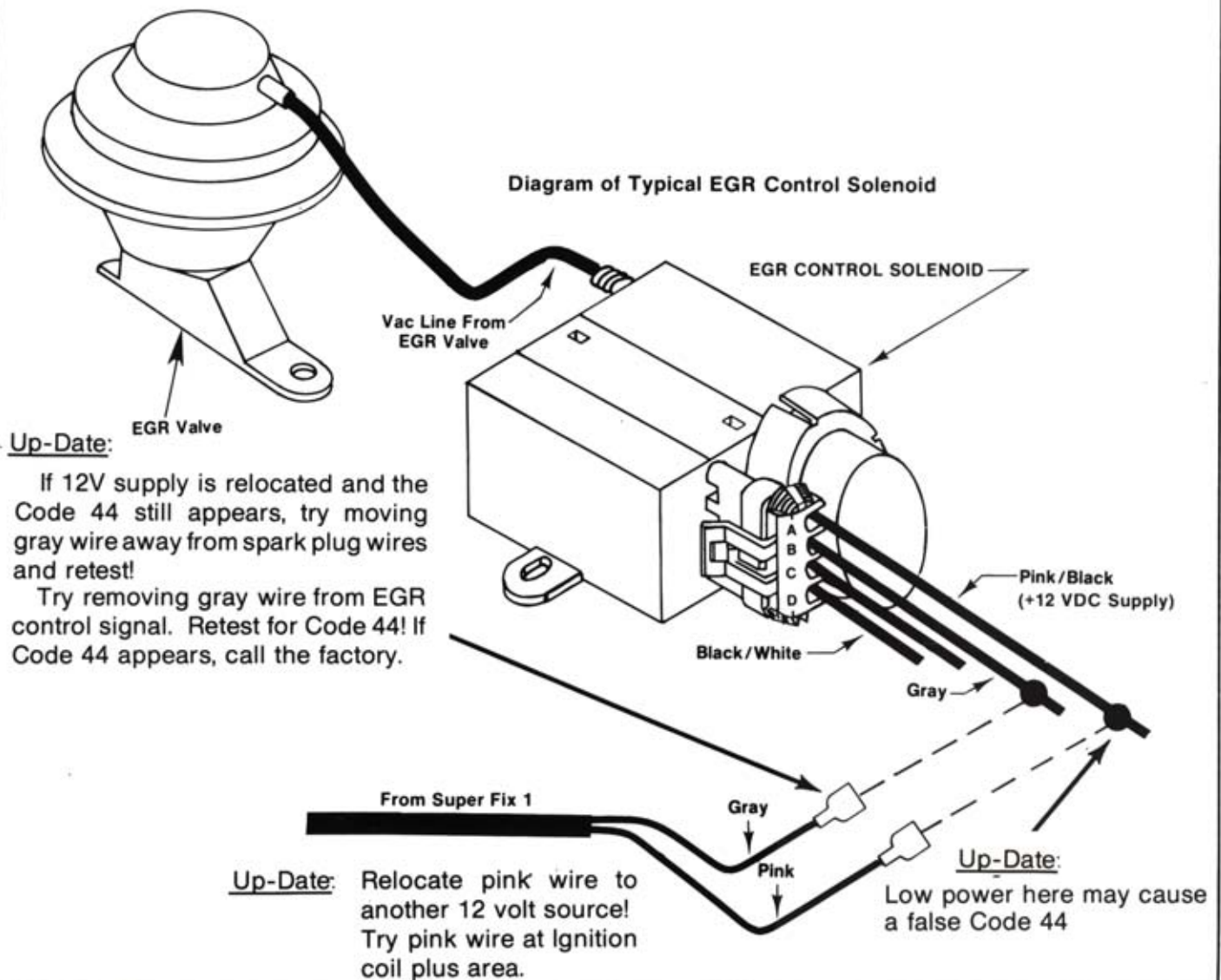
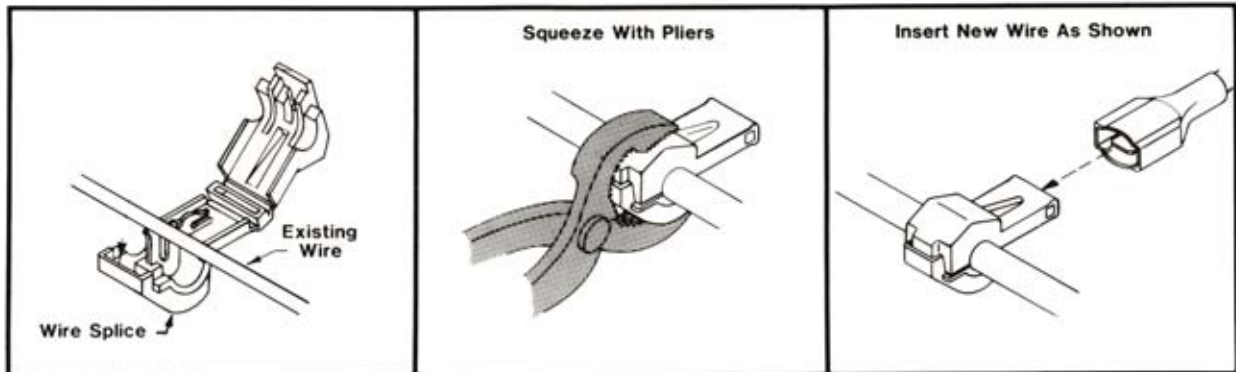


Figure C - Wire Tap Splice



For weather protection use silicone grease or white grease on inside metal connection or use silicone glue on the outside completed connectors.

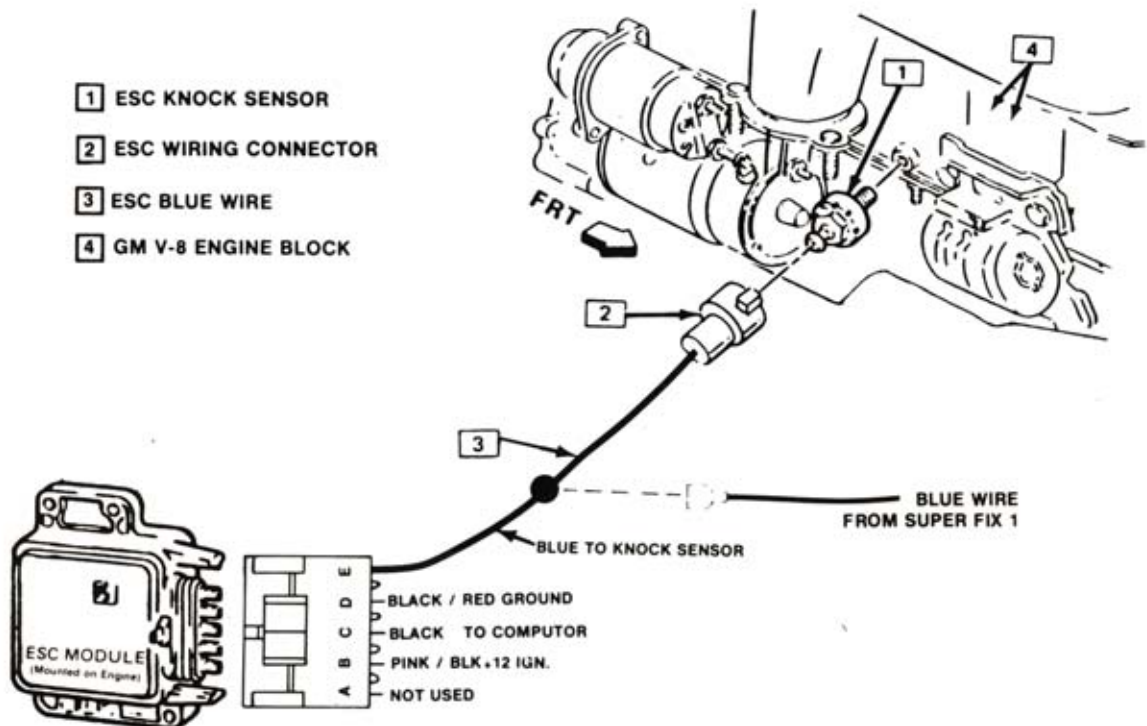
SECTION II: ELECTRICAL WIRE HOOK-UP (CONT'D)

Pink Wire: Requires +12 VDC to power the Super Fix 1's electronic's. The best (on/off key) source is the EGR control solenoid -- Terminal A-the Pink/Black wire. Using the Tap Splice device (see Figure C), connect as shown in Figure B.

Gray wire: This wire monitors the EGR computer signals to the EGR solenoid, thus it eliminates false EGR Code 32. Connect as shown in Figure B with the Tap Splice.

Blue Wire: Locate the Blue wire ESC "Knock Sensor" and use the wire tap connector supplied. (See Figure C). The Knock Sensor is located near the engine starter, threaded into the engine block. Or you can locate the "ESC Module" control unit (Figure D) and tap into the Blue wire that leads to the Knock Sensor.

Figure D - 1987-88 Chevy Pickup ESC Knock Sensor Wire Location



Yellow Wire: Connect the Yellow wire to the gasoline solenoid or the fuel injector (on/off) control wire. The Yellow wire only senses or monitors +12 VDC. If the Yellow wire senses 12 volts, the unit will operate in the gasoline mode. No 12 volts will indicate alternate fuel mode.

Green Wire (Option): This output signal is the true, continuous oxygen sensor signal. It is designed for vehicles using an alternate fuel "closed loop" feedback system. The "feedback" system should connect its O₂ sensor wire to our output, so that the Super Fix 1 and the feedback system work together to eliminate a false EGR malfunction code.

Note: Vehicles without a "feedback" may use this wire connected to a voltmeter to set idle and power A/F mixtures (See Technical Notes).

O₂ Sensor Connectors: To connect the oxygen sensor (input/output) signal control wirings, locate the oxygen sensor mounted in the exhaust system, disconnect the factory connector and plug in the matching Super Fix 1 connectors. If the connector differs, splice the brown wire (input) to the oxygen sensor and splice the Violet wire (output) into the factory computer wire (See Technical Notes).

Note: This connection is a low voltage, sensitive current signal, affected by salt and water. Use weather protection.

Throttle Position Connector: The two 3-pin connectors will provide a rain-tight TPV signal and a good electrical ground for the Super Fix 1. Just plug-in the matching connectors on the throttle.

Note: If the connectors differ or you are using on carburetor vehicles, please see the section on Technical Notes.

SECTION III: INSTALLATION RECOMMENDATIONS

The Super Fix 1 may be wired using any one function or any combination of functions which the vehicle may require. Most 1987-88 GM vehicles will require all three basic computer fix functions. Some 454cu large trucks do not use the Knock Sensor & ESC Module, therefore the Blue wire will not be used.

We recommend connecting all the wires possible to the proper sensors now, because some codes will appear later as mileage increases. Also the computer "learning ability" will receive the proper information while on the alternate fuel. If the vehicle is switched to gasoline while driving - the proper gasoline function will be there.

ADDITIONAL NOTES:

1. The Pink +12 VDC and the Black computer ground wire must be connected for any special wiring hookups.
2. If you receive a Code 21 or 22, check the connector metal pins and the proper volts on our 3 pin connectors (See TPS Tech Notes). Remember, a carburetor throttle position sensor has reversed A & C wires.
3. If you receive a Code 32, check the Gray wire connector.
4. If you receive a Code 43, check the Blue wire connector.

SECTION IV: TECHNICAL NOTES

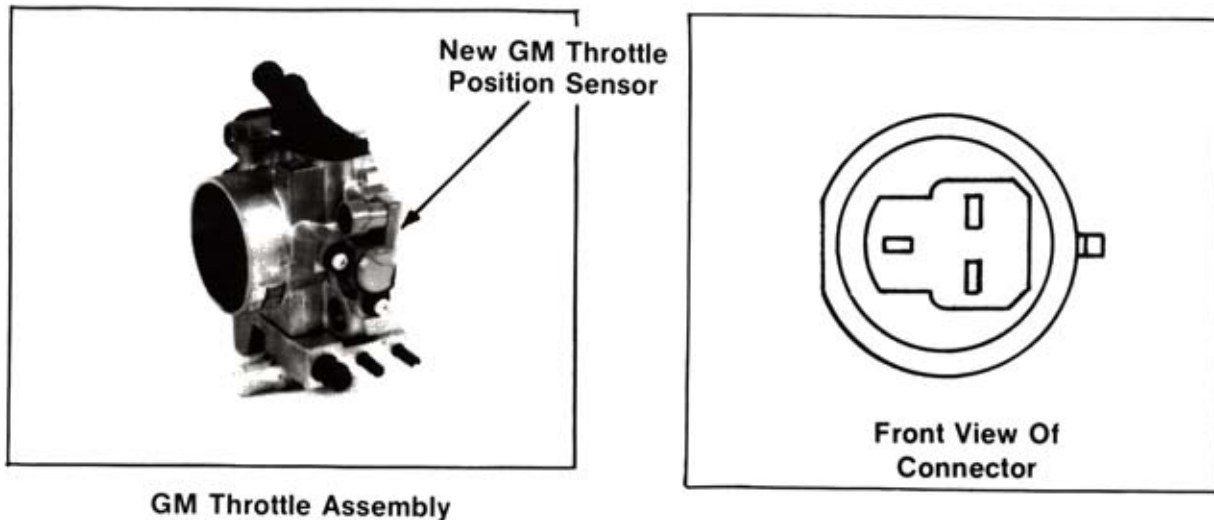
Tech Notes - Throttle Position Sensor (TPS)

On 1987-88 carburetor type vehicles or if the style of TPS connector is different you must modify our wires. The carburetor TPS sensor has reverse signal wiring ie. the A and C terminals are reversed.

The easiest modification for both types is to cut 1 each Brown and Black wire from our Super Fix 1 connectors for the TPS. The Super Fix only monitors the TPS signal, therefore only one of the Brown and Black wires are required to tap into the factory TPS wiring harness.

Note: Our Black ground wire must be connected to a secure computer reference ground. NOT JUST AN ENGINE GROUND. Use your tap splice to secure our wires to the factory TPS wiring harness. Protect the "Not Used" wires from shorting.

Figure E - New GM Throttle Position Sensor Connector

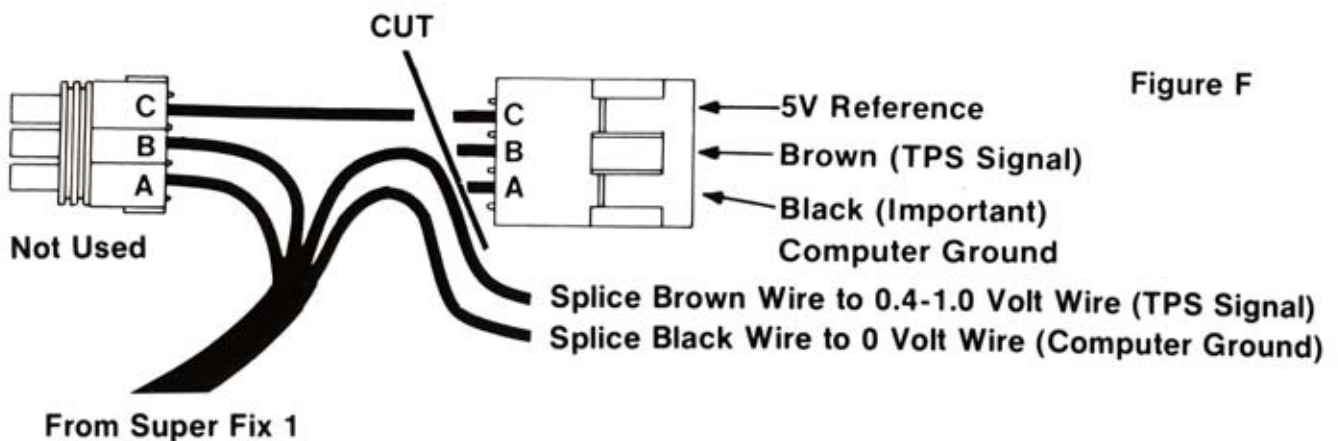


Testing: With the Ignition key ON and TPS at Normal Factory / Idle, use a voltmeter and a thumb tack to pierce all three TPS wires to determine their voltages.

Wire #1: 4-6 Volt measurement --Not Used.

Wire #2: 0.4-1.0 Volt measurement --Connect Brown wire to TPS signal.
(This voltage will increase when the throttle is opened).

Wire #3: 0 Volt measurement -- Connect Black wire to this good computer ground.



Tech Notes - Optional Green Wire

When not using a aftermarket "feedback" system you may use this output to set IDLE and POWER fuel mixtures on the alternate fuel. Use either a RICH/LEAN "Light" INDICATOR or a sensitive (high impedance) voltmeter to determine when you are on the rich or lean side of stoichiometry (14.7:1 Air/Fuel Ratio).

When the engine is fast idled for about 3 or 4 minutes the "hot" O₂ sensor will provide proper voltage reads for about 5 to 8 minutes. The positive (+) meter lead connects to the Green wire and the negative (-) lead to the "Computer Ground" Black wire.

The 0.2-0.4 Volts indicates Leaner than 14.7:1.

The 0.7-0.9 Volts indicates Richer than 14.7:1.

The 0.4-0.5 Volts indicates Stoichiometry (14.7:1).

The Varying Volts indicate On or Near 14.7: 1.

At Idle, 0.5-0.7 volts (average reading) is the best mixture.

At Power, one "Click" passed 0.5-0.7 volts is the best mixture.

At Cruise, varying volts to a leaner adjustment is best.

Tech Notes -Oxygen Sensors

In cases where our single wire connectors do not match your O₂ sensor connectors, then cut our connectors. Use a secure, weatherproof connection to the factory wires, observing the proper input/output signals.

All O₂ sensor signals are the same in voltage output, switching characteristics, and are sensitive to "signal loading" when monitoring the output signal. This HIGH impedance signal should be protected from all weather conditions.

SINGLE WIRE - Oxygen Sensor Signal (0.2-0.9 Volt reading)

DOUBLE WIRE - O₂ Signal and Ground to Computer.

TRIPLE WIRE - O₂ Signal, +12 VDC for Fast Warm Up Heater and Ground to Computer.

To determine the O₂ sensor wire, fast idle the engine (on either fuel) for about 3 or 4 minutes, then let the engine idle. Use a voltmeter and a thumb tack to pierce all the wires to determine their volt readings. Any varying or steady voltage in the 0.2 to 0.9 volt range will indicate the proper O₂ signal wire.

Note: The Super Fix 1 Violet wire (output) signal to the computer will be an ON/OFF 0.0-1.0 volt signal! However, your meter will only sense the average voltage varying between 0.3-0.7 volts. Without +12 VDC on the Yellow wire, the varying 0.3-0.7 volts on the Purple wire will indicate that the O₂ sensor part of the Super Fix is working.

SECTION V: TROUBLE SHOOTING ECM CODES

Entering On-Board Diagnostics

The ECM uses sensors to look at many engine operating conditions. It has a memory, and knows what certain sensor readings should be under certain conditions. If the sensor reading is not compatible with ECM programming, the ECM will turn on the "check engine" or "service engine soon" light on the instrument panel. A trouble code will then be stored in the memory. The assembly line communication link (ALCL), is used to get trouble codes out of the ECM.

NOTE: When the term "check engine" light is used in this text it will also include the "service engine soon" light used on later model vehicles.

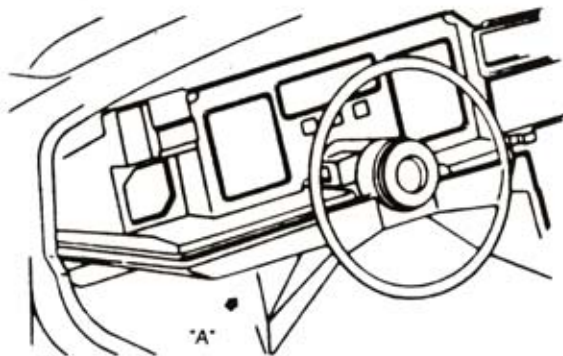
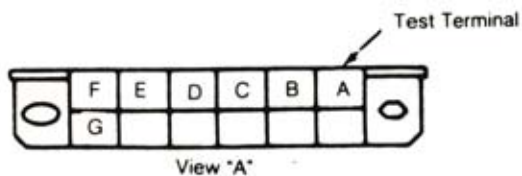


Figure G: ALCL Connector

The following procedure is designed to retrieve trouble codes stored in the memory of the ECM.

1. Turn ignition switch to the "ON" position, but do not start engine, "check engine" light should glow. Locate ALCL connector attached to ECM wiring harness under instrument panel. Insert spade lug terminal between terminals "A" and "B" or connect wire from terminal "A" to "B" (See Figure G).
2. The "check engine" light should flash code "12" indicated by a "flash", pause, "flash", "flash" followed by a longer pause. Trouble code "12" indicates the system is working and will repeat 2 more times, then if any trouble codes are stored in the ECM memory they will be displayed in the same manner.
3. Trouble codes are read by counting flashes of the "check engine" light. A "flash", "flash", pause, "flash", longer pause, would identify code "21". Trouble codes are displayed from the lowest to the highest numbered codes 3 times each. They are repeated as long as the jumper wire is connected to the ALCL terminals "A" and "B" as in Figure G.

Trouble Code Identification

The "Service Engine Soon" light will only be "ON" if the malfunction exists under the conditions listed below. If the malfunction clears, the light will go out and a trouble code will be set in the ECM. Code 12 does not store in memory. Any codes stored will be erased if no problem is detected within 50 engine starts. A specific engine may not use all available codes. The codes listed are TBI and Carburetor combined:

- | | |
|---|---|
| <p>CODE 12 No distributor "RPM" signal to the ECM. This code is not stored in memory and will only flash while the fault is present. This is a normal code with ignition "ON," engine not running.</p> | <p>CODE 22 Throttle Position Sensor (TPS) circuit voltage low (grounded circuit or misadjusted TPS). Check connector or see Tech Notes.</p> |
| <p>CODE 13 Oxygen Sensor Circuit - The engine must run up to four minutes at part throttle, under road load, before this code will set.</p> | <p>CODE 23 Carburetor only - Check mixture control solenoid wires. TBI only - Air Temperature Sensor</p> |
| <p>CODE 14 Shorted coolant sensor circuit - The engine must run two minutes before this code will set.</p> | <p>CODE 24 Vehicle speed sensor (VSS) circuit - The vehicle must operate up to two minutes, at road speed, before this code will set.</p> |
| <p>CODE 15 Open coolant sensor circuit - The engine must run five minutes before this code will set.</p> | <p>CODE 25 TBI only - Manifold air temperature sensor. (High temperature).</p> |
| <p>CODE 21 Throttle Position Sensor (TPS) circuit voltage high (open circuit or misadjusted TPS). With the Super Fix - Check TPS connector plug-in.</p> | <p>CODE 32 TBI only - Exhaust Gas Recirculation (EGR) valve vacuum sensor has seen improper EGR control vacuum. Carburetor only - Bard sensor voltage low.</p> |
| | <p>CODE 33 TBI - (High) Mass Flow indicated.</p> |

CODE 34 Carburetor only - Vacuum sensor or Manifold Absolute Pressure (MAP) circuit or vacuum hose loose. TBI only - (Low) Mass Flow indicated.

CODE 35 Idle speed control (ISC) switch circuit shorted. (Up to 70% TPS for over 5 seconds).

CODE 41 No distributor reference signal to the ECM at specified engine vacuum.

CODE 42 Electronic spark timing (EST) bypass circuit or EST circuit grounded or open. Check timing plug connector or distributor connectors.

CODE 43 Electronic Spark Control (ESC) Module Retard Unit. Functional performance check by computer. If no knock, save engine by timing retard. Fuel octane too high.

CODE 44 Lean exhaust indication - Sensor circuit open or cold O2 Sensor. O2 wire shorted to ground. Super Fix wire needs computer ground or check O2 connectors.

CODE 45 Rich exhaust indication - Check fuel mixture, fuel leaks in throttle. Check TPS connectors. Super Fix 1 needs computer ground or Check O2 connectors.

CODE 51 Faulty or improperly installed calibration unit (PROM). It takes up to 30 seconds before this code will set.

CODE 53 SYSTEM OVER VOLTAGE - Volts greater than 17.1 VDC.

CODE 54 FUEL PUMP CIRCUIT - (Low Voltage). Check fuel pump relay.

Only five of these codes 13, 32, 43, 44 and 45 are directly related to the problems that the Super Fix 1 can solve. If the Super Fix 1 is installed and the "Service Engine Soon" light still illuminates, then clear all recorded trouble codes.

SECTION VI: CLEARING TROUBLE CODES

When the ECM sets a trouble code, the "Service Engine Soon" light will come "ON" and a trouble code will be stored in memory. If the problem is intermittent, the light will go out after 10 seconds, when the fault goes away. However, the trouble code will stay in the ECM memory until the battery voltage to the ECM is removed. Removing battery voltage for 30 seconds will clear all stored trouble codes.

NOTE: To prevent ECM damage, the key must be "OFF" when disconnecting or reconnecting power to ECM (for example battery cable, ECM pigtail, ECM fuse, jumper cables, etc.).

ECM Learning Ability

The ECM has a "learning" ability which allows it to make corrections for minor variations in the fuel system to improve driveability. If the battery is disconnected to clear diagnostic codes, or for repair, the "learning" process has to begin all over again. A change may be noted in the vehicle's performance. To "teach" the vehicle, make sure the engine is at operating temperature, and drive at part throttle, with moderate acceleration and idle conditions, until normal performance returns.

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.

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