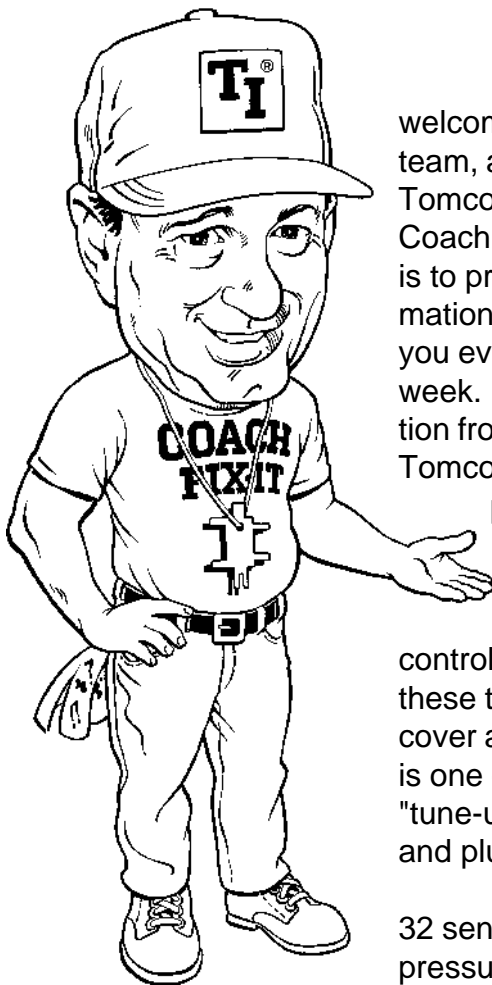


Tomco Techtips

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ISSUE 1

Introducing Tomco Tech Tips



It's a pleasure to welcome you to the TOMCO team, and the first issue of Tomco Tech Tips. I'm Coach Fix-It, and my mission is to provide you with information that will be useful to you every day of your work week. I'll be pulling information from the players at Tomco. We will be sticking pretty close to our own area of expertise, fuel system products and engine performance controls. But, as you know, these two lines of products cover a lot of territory - which is one of the reasons why "tune-ups aren't just points and plugs anymore."

There are as many as 32 sensors and heat or pressure-activated valves or switches used on today's engines. For this issue, we have picked out one sensor and one valve that are very critical for good engine

performance: the exhaust gas recirculation (EGR) valve and the oxygen sensor (sometimes called the O2 sensor.)

Today's engine control systems may at first seem complex, but once you have a basic understanding of them you will be able to diagnose problems and make repairs with the same confidence you have had with standard carburetors. Some resist change. We at TOMCO welcome it with open arms, just as many of you do. The people in our Research and Development Department are dedicated to yesterday's, today's, and tomorrow's engine control systems and - every bit as important - to keeping them in top operating condition. You'll see this dedication reflected in every page of TOMCO TECH TIPS.

Rough idling? Detonation (Pinging)? Overheating? Power loss? Check out the EGR valve!

There are several reasons why an engine might idle rough, and have problems with detonation, overheating and power loss. In today's engines, make sure you check out the exhaust gas recirculation valve (EGR) especially if you have reason to believe nobody else has checked it out during the last 12,000 to 15,000 miles.

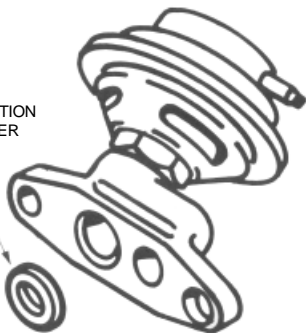
What is the EGR valve's job? Just what its name implies: its used to recirculate exhaust gases through the intake manifold - which reduces the amount of certain types of pollutants that escape into the atmosphere. Recirculation of the gases also helps control combustion chamber temperatures - which explains why engine ping or knock is one of the signs that an EGR valve needs to be looked at.

Warn customers against tampering!

Chances are most of your customers won't touch an EGR valve, even if they know what it looks like; but you never know. So if you suspect this has happened, warn your customer that it's against the law to tamper with any part of an engine's performance control system that's intended to reduce emissions.

NOTE: Many replacement EGR valves use calibration washers in the exhaust gas inlet. Follow instructions with valve.

CALIBRATION WASHER

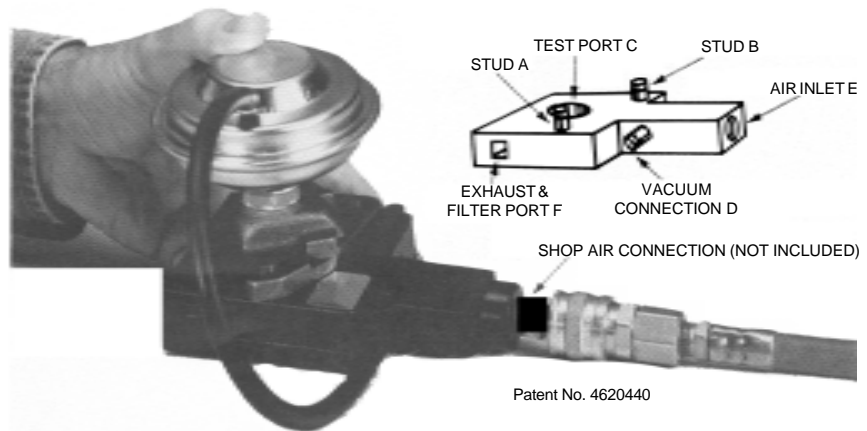


How to check out an EGR valve

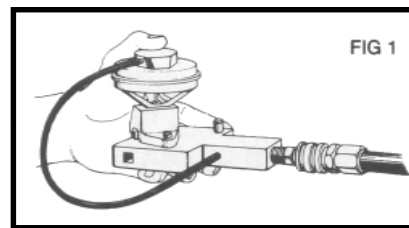
Many late-model valves have a designed-in, calibrated vacuum "leak" in the diaphragm chamber. As you might suspect, this rules out use of a conventional mighty-vac-type vacuum tester. You guessed it; a new Tomco EGR valve tester™-our #13701. Pressure or vacuum activate the valve to make it open or close. When it no longer reacts to pressure or vacuum, the valve causes rough

idling, detonation, overheating and power loss.

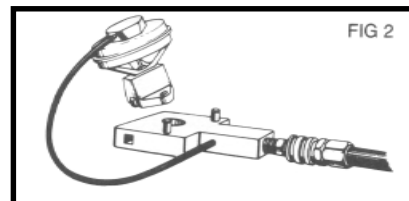
Tomco's new EGR valve tester uses your own compressed air supply to provide both the vacuum and pressure needed to actuate the valve and tester, and check whether the valve is operating properly. As you'll find out in the valve's operation just by watching the diaphragm while you're testing it.



Using the Tomco valve tester™

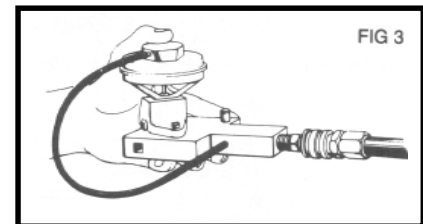


It's quick and easy to check out an EGR valve with our new tester. As shown in Figure 1, the tester, which is only about the size of the palm of your hand, is fitted with your shop air connection, exhaust ports, a test port, a vacuum connection, and two aligning studs. Use the following procedures to check out positive back-pressure type valve:



Diaphragm function check:

Connect the vacuum hose to the valve and tester, as shown in Figure 2. (Do not yet place valve on tester.) Attach your air hose and supply a minimum of 60 psi pressure at tester's air inlet. On positive back pressure-style valves, the diaphragm should not move. If it doesn't; it's faulty.



Back pressure check: As shown in Figure 3, with the vacuum hose still connected, place the EGR valve on the tester, over one of the studs labelled "A" or "B", with the exhaust gas inlet directly above test port "C". The filter should be in place in exhaust port "F", as shown in upper drawing. Apply a minimum of 60 psi

pressure at the tester's inlet. The diaphragm should now move up on positive valves and remain closed on negative valves unless there's a problem. If no diaphragm movement is detected, replace the valve.

NOTE: Negative back pressure and ported-type valves are tested with a slightly different procedure. See the instruction sheet packed with the tester for complete identification and test information.

'Clocking' feature simplifies installation of EGR valve

TURN CLOCKWISE
TO ALIGN
VACUUM CONNECTION

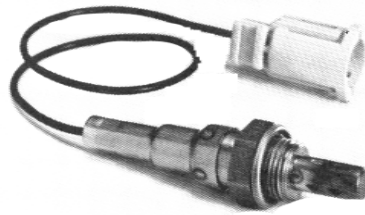


To simplify installation, some Tomco EGR valves are supplied with a diaphragm housing that can be rotated to place the vacuum outlet in the same position as the one on the valve you are replacing.

All Tomco valves with this "clocking" feature have a hex nut in the location shown in the illustration. Please note that this hex nut should not be turned to rotate the diaphragm housing. Instead, clamp the base of the valve in a vise to grip it securely, then turn it by hand or bolt it to the manifold before you turn it.

SPECIAL NOTE: *Special design features have made it possible for 75 Tomco EGR valves to replace more than 1,200 different original equipment valves. This makes it possible for your supplier to stock in deeper quantities to make sure he's "got you covered". no matter what what kind of valve you need.*

Tomco's Oxygen Sensors help cars pass the "sniff test"



When hydrocarbon emissions from a customer's car are too high, there's a good chance the problem is being caused by an oxygen sensor, or "O-2" sensor, that isn't doing its job.

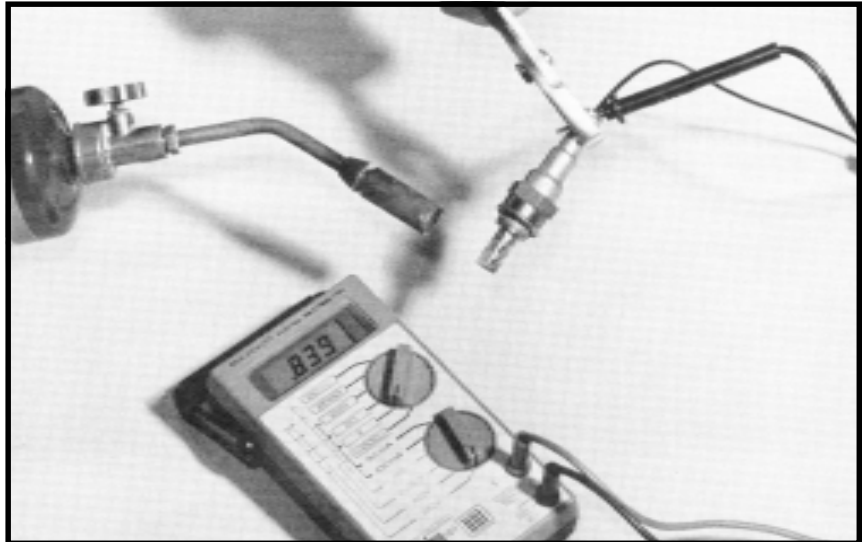
Symptoms that signal a need for service are: as already mentioned, high emissions; the "check-engine" light may be on or the service flag displayed; or engine may be poor. In

extreme cases—for example, when the oxygen sensor has stopped functioning completely—the catalytic converter may overheat and stop working.

What is the purpose of the oxygen sensor in today's engines? It has a single job: it measures the amount of "unburned" oxygen in the exhaust, and signals the car's onboard computer whether the mixture is too lean or too rich. The computer, in turn, then sends a signal to the carburetor or injector to correct the fuel/air mixture.

Oxygen sensors are very delicate and easily contaminated by impurities. Lead fouling and carbon deposits are the two most common causes of failure.

How to bench test an oxygen sensor



All you need to test an oxygen sensor is a propane torch, vise grips, and a 10 Meg ohm input impedance meter capable of measuring low voltages (1 volt and less). If you going to buy one, ask for a high-impedance (10,000 ohms) digital type.

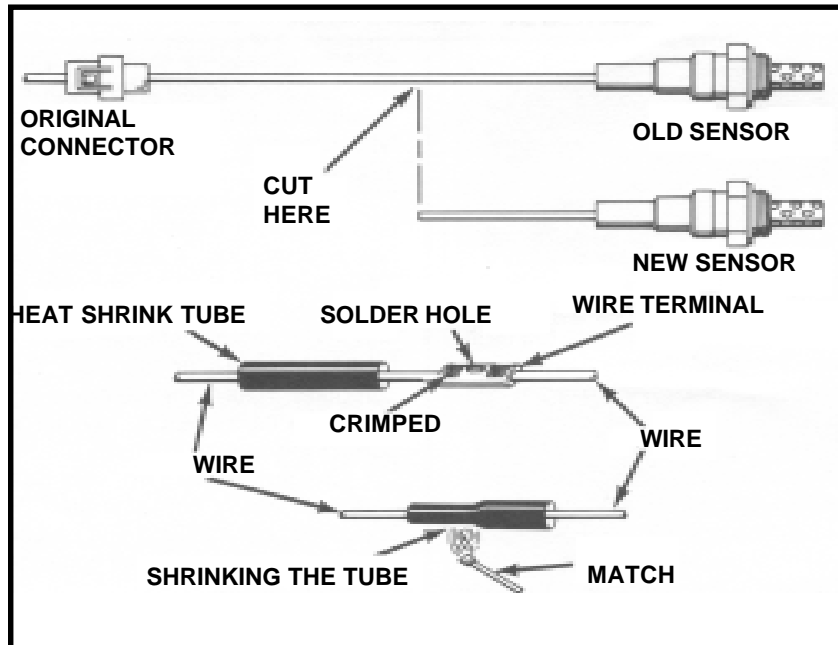
Connect the voltmeter, as shown in the photo. Then heat the tip of the sensor, holding the tip completely in the flame. Move the torch flame over the sensor tip. The tip

should be hot enough to turn cherry red, and the flame must enter the opening into the sensor tip.

Meanwhile, keep an eye on your meter. If you get a reading above 600 millivolts, and the reading quickly changes with the movement of the flame over the tip, the sensor.

NOTE: Testing a sensor with a meter other than the above specified type will destroy the oxygen sensor and any related computer circuits, if connected.

How to install a new oxygen sensor



No matter where they're made, at home or overseas, oxygen sensors are all similar, from the installer's point of view. For example, all output voltages are within the same range when heated, sensing areas are similar in appearance, and you can be pretty sure threads will be 18mm. Just coat the threads with Loctite 77164 or another high-temperature, anti-seize material, and install it.

So far, so good. So what can go wrong? There often is one difference in sensors: electrical connections. Wire leads may not be the right length and connectors may not be identical.

And that can stop you in your tracks unless you can invent some way to bypass the problem...or unless you're using a Tomco sensor.

To solve this problem, Tomco supplies a crimp-type connector and heat-shrink, weather-tight tubing (see photo and diagrams) that make installation a snap (they're included with the sensor, in each package). Here's how to handle installation:

Remove the old sensor (a special socket wrench may be required).

Cut off the old lead and new one, as shown in diagram (make sure overall length will be the same, or a little longer).

Strip off 3/16-inch of insulation from both leads.

Slip the heat-shrinkable tube over either one of the leads before you do anything else.

Slip the two wires into the terminal, crimp, and apply a drop of solder, if you wish. (See diagram).

Slip the tubing over the terminal and apply heat with a match or lighter. That's all there is to it.

NOTE: The above procedure applies to single-wire domestic and import sensors. We will discuss early G.M. 2-wire, electrically heated unit. The above procedure does not apply to this type of sensor.

VIDEO TRAINING TAPES

HOW TO TEST SENSORS AND CONTROLS

This 41 minute tape explains the function and testing of the sensors and controls used on port, TBI fuel injection and computer controlled carburetor systems. Where possible, inexpensive volt ohmmeters are used for both on and off the car checks.

COUNTERMAN'S TRAINING TAPE

This 25 minute tape is designed to aid your new, and retrain your current countermen. It covers fuel injection and emission control parts necessary for system repairs. "The Counterman" will provide your parts people with the necessary information to get your customers the parts they need.

One "Emission Certification Workbook" accompanies each tape. Additional workbooks can be ordered. *Video available in Spanish.*

Call TOMCO for ordering information.

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