

# Tomco Techtips

TM

ISSUE 9

## Two Exhaust Gas Recirculation (EGR) Valve Cases Solved

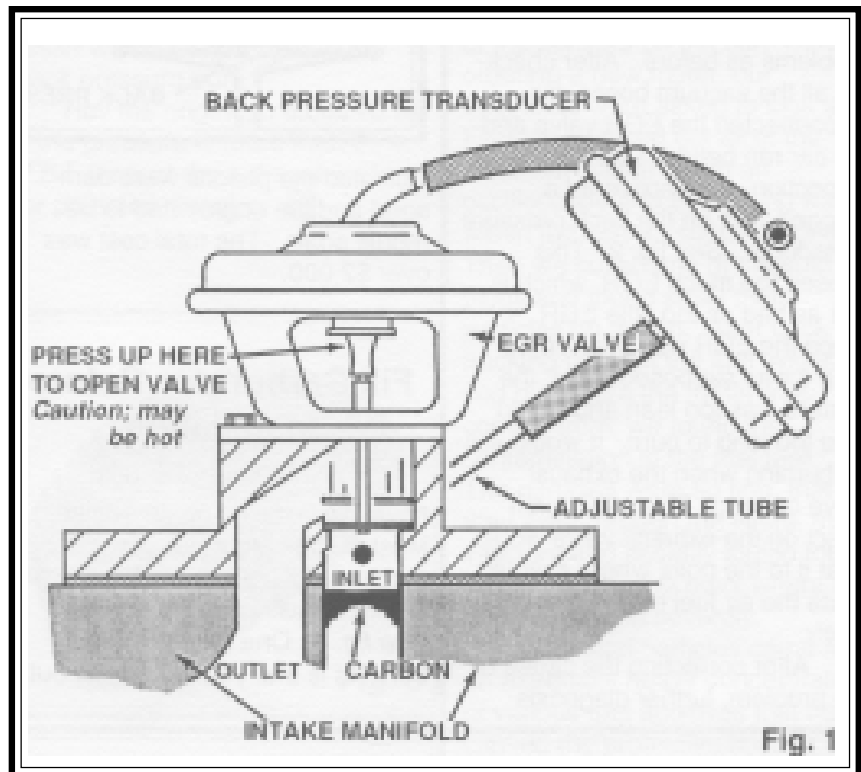
### Case #1 The "Pinging" Toyota

An '81 Toyota 4 cylinder Celica equipped with a back pressure type EGR had a severe problem of pinging (detonation or preignition). It was brought to Tomco's Research and Development Department for diagnosis.

A number of checks were made. A new EGR valve did not correct the detonation. Further examination indicated a plugged passage for the exhaust gas through the intake manifold. It was clogged with an accumulation of carbon. This would not let the valve open and close as it should. The exhaust gases could not circulate, since there was no back pressure to actuate the back pressure transducer. See Fig. 1. Such a condition, if not corrected, can cause serious engine damage.

This condition is likely to happen on high mileage engines which use oil. The problem was further aggravated by carbon buildup in the combustion chamber, which decreased the size of the chamber and increased the compression ratio. The plugged passage has also been found on GM 2.5L, Ford V8 and other engines.

The solution is to clean the passage by scraping out the accumulation of carbon. Use caution to keep the carbon from falling into the manifold and be careful not to damage gasket surfaces.



A quick check to determine if this passage is open can be made as follows: With the engine idling, push the EGR valve diaphragm open (using a screwdriver if the engine is hot). See Fig. 1

A noticeable change in idle speed or engine stalling is an indication the EGR passage is open.

Replacement of the EGR valve should be considered at this point. This same carbon accumulation can plug the valve's small back pressure passages preventing proper operation.

**CAUTION:** EGR valves can get very hot, even when this passage is plugged.

### Case #2 The "\$2,000+ Vacuum Plug

When replacing an EGR valve, it is important to follow the directions for correct hookup. A mistake can be an expensive one.

We experienced an '86 Nissan Stanza 2.0L with a severe detonation and driveability problems. This continued unsolved for about six months. In that time the computer, vane air flow sensor and the O2 sensor were replaced in an attempt to solve this problem.

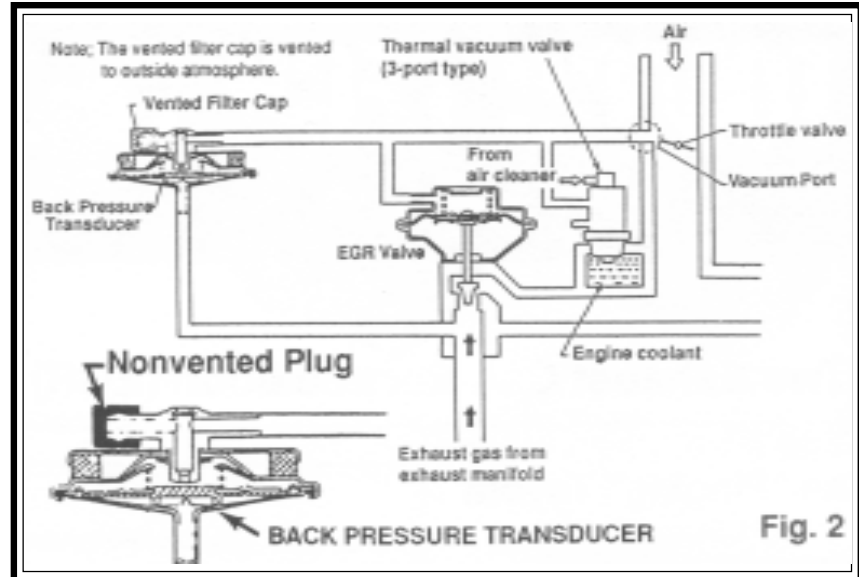
## "\$2000 +"

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About \$800 worth of parts were used. Eventually serious engine damage occurred. Our inspection revealed over 60% cylinder leakage in cylinders 2 and 3.

Upon disassembly by a speciality repair shop, the following was discovered. Some of the valves were burned and the ring lands were broken on some of the pistons. When the car returned from the shop, it experienced some of the same driveability problems as before. After checking all the vacuum hoses, we disconnected the EGR valve and the car ran better. Upon further inspection, we discovered a plugged vent on the back pressure transducer. See fig. 2. This caused too much EGR, which is just as bad as too little EGR. Since the EGR was open more than it was supposed to be, the mixture was too lean and would take too long to burn. It would still be burning when the exhaust valve opened. This blow torch effect on the exhaust valve would heat it to the point where it would ignite the air fuel mixture prematurely.

After correcting the cause of the problem, further diagnosis



indicated the pistons were damaged and the engine had to be rebuilt again. The total cost was over \$2,000.

### Fill Carburetor Before Installation

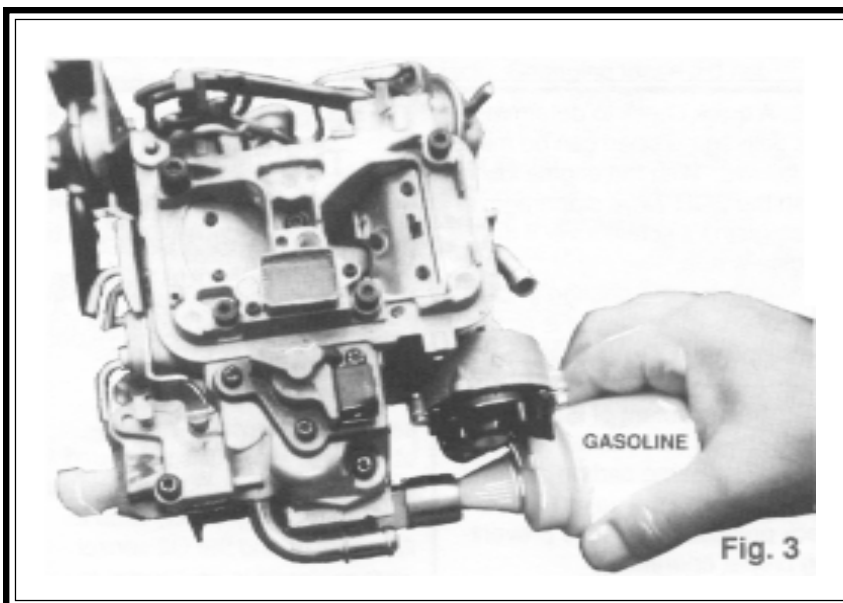
A dry carburetor should never be installed on an engine. Most of the carburetor service manuals advise you to fill the bowl before installing on the engine. See fig. 3. One of the main benefits is that you can check out the float and

accelerating pump circuits before installation. This helps guarantee the success of the installation of a Tomco carb kit.

Dirt, rust, particles of rubber hose and other foreign material may collect in low areas of the fuel line or on the diaphragm of the fuel pump.

During normal operation of the engine, a relatively small amount of fuel flows. When a dry carburetor is being primed, the high volume rush of fuel can pick up this foreign material and dump it into the empty carburetor bowl.

These deposits can clog the small internal passages in the carburetor. If the dirt particles stop between the inlet valve and its seat, flooding or a hard starting rich condition will result.



## The Problem Air Flow Sensor

An '86 Delta 88 Oldsmobile had an air flow sensor fail on a drive from St. Louis to Memphis and back to St. Louis. When the trouble occurred, the driver disconnected the sensor to get the car to run and continued at a top speed of 35 miles per hour.

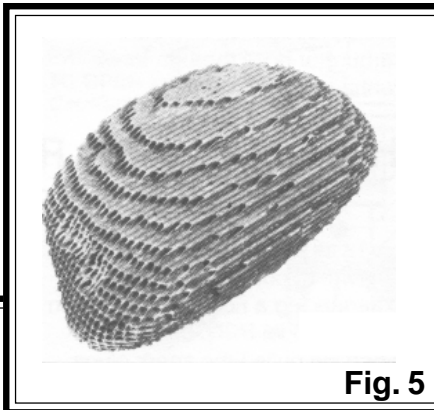
The car was brought into our shop and the back pressure on the exhaust system checked. The back pressure was almost 15 P.S.I., which is far too high. The catalytic converter was removed and sectionalized. *See Fig. 4.* A third of the substrate in the front had eroded away. This was due to the high temperatures from the rich mixtures. There was a "chunk" left (about the size of a goose egg) that rolled around in the rear of the catalyst and intermittently plugged the opening which caused the high back pressure. *See fig 5.*

When a new converter was installed along with the replaced air flow sensor, the problem was solved. A failed mass air flow

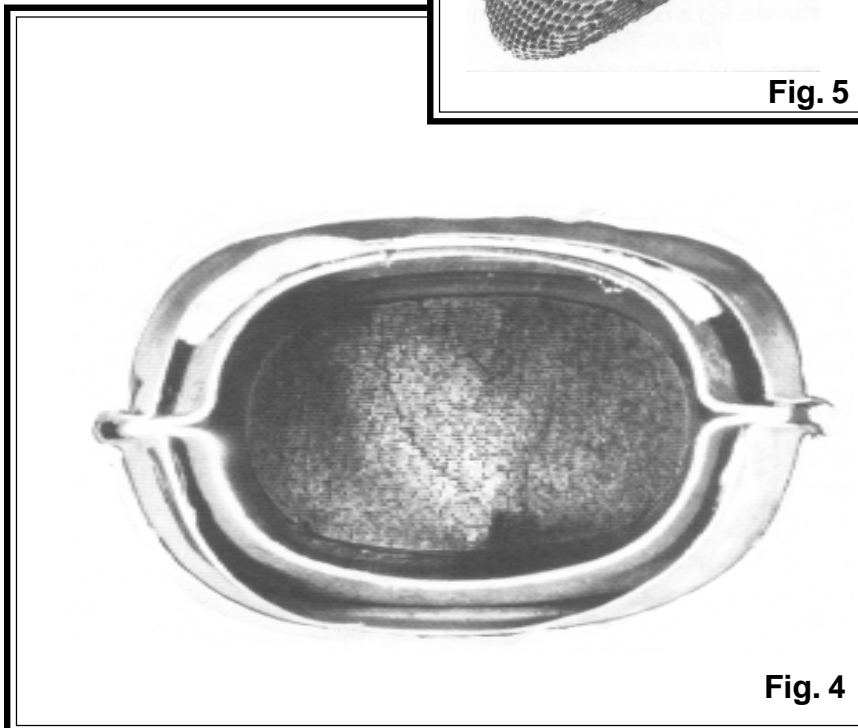
sensor is almost certain to cause a rich mixture and converter overheating if the car runs any distance with the sensor disconnected.

On vehicles equipped with the remote transducer, you can easily check exhaust system pressure. Simply remove the back pressure transducer from the EGR valve and connect a 0-15 P.S.I. pressure gauge (a fuel pump tester works fine for this) to the back pressure port.

Rev the engine to 3,000 RPM. If the pressure is more than 3 P.S.I. inspect the exhaust system for potential plugging.



**Fig. 5**



**Fig. 4**

## The "Souped Up" Cadillac

A 1990 Cadillac Fleetwood Brougham had been back to the dealer so many times, the owner was given another car to use while attempts were made to diagnose the problem. This went on for four months.

The dealer replaced almost everything on top of the engine, including the computer and most of the sensors on the car. Before ordering a new motor, our engineers were asked to look at it. First we checked out all of the electrical systems with an oscilloscope and everything was within the correct specifications. Then we pulled one of the spark plugs and found small metal particles on the tip. After back tracking through the fuel system to find out where the metal was coming from, we found the contamination in the fuel tank. The particles were so fine, that they went through the filters, the injectors and actually fouled the spark plugs to the point where the engine misfired severely.

The metal particles came from an extremely heavy concentration of various fuel additives that had caused the protective coating of the fuel tank to break up and pass through the system. The solution was to clean the fuel tank and all other related fuel system parts. The filters and spark plugs were replaced. The "Souped Up" Cadillac was made well.

The owner was advised not to use gas additives in more than the recommended concentration or combinations.

**Upper left:** a chunk about the size of a goose egg rolled around in the back of the catalyst.

**Left:** a third of the substrate in the front of the converter had eroded away.

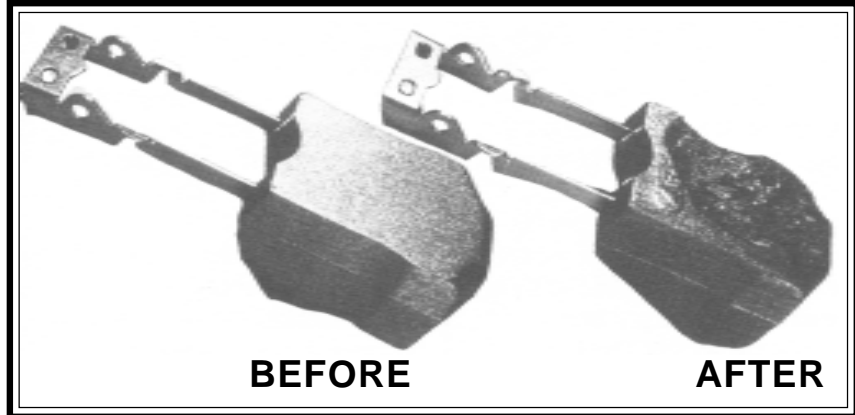
## New Emission Control Training Course (VHS)

Counter men will receive a personalized certificate after completing this 20 minute video program. Accompanying the tape is a detailed workbook designed to help new and current counter men understand today's parts. It goes over each part by: what it does, where it is located, recommended maintenance and failure symptoms. This program provides both parts and service people with the necessary information to sell their customers the parts they need. Each videotape comes with one workbook. Additional workbooks can be purchased separately. Call on Tomco for ordering information.

## How to Test Sensor and Controls (VHS)

This 41 minute tape explains the function and testing of the sensor and controls used on PFI, TBI and computer controlled carburetor systems. Where possible, inexpensive volt ohmmeters are used for both on and off the car checks. Call on Tomco for ordering information.

## Backfire Damaged Carb Floats



**Above:** An example of a normal nitrofil float (left) and a float damaged by backfiring (right).

A customer recently asked us to check some burned GM Quadra Jet - Dual Jet type floats.

Examination indicated these floats were partially burned by a backfire condition in the carburetor bores. This condition causes flame propagation into the carburetor bowl through bowl vents.

Replacing the float is

necessary, but will not correct this condition. Crossfire in the ignition system, extremely lean fuel mixture or a defect in the intake valve system should be suspect when this condition is experienced.

## How a Non - Fuel Related System Can Affect Fuel Ratio

One of our engineers was experiencing a rich fuel mixture on his late model PFI Chrysler. When we pulled the spark plugs and the O<sub>2</sub> sensor, they were black. Changing these did not correct the problem.

We then discovered a leaky water pump. It only leaked under high pressure. This was discovered when we put it up on blocks and got the car running at a high idle. It would not leak sitting in the parking lot but only under high pressure as in highway driving.

The car would run only slightly hotter than normal (200° - 250° F). When the coolant level is low and the engine is hot, the computer enriches the mixture & advances ignition timing in attempt to cool down the engine. This is a "normal" strategy for most PFI systems.

After the water pump was repaired, the rich condition was no longer evident. Failure to correct this symptom could have ruined the catalytic converter.