

Tomco Techtips

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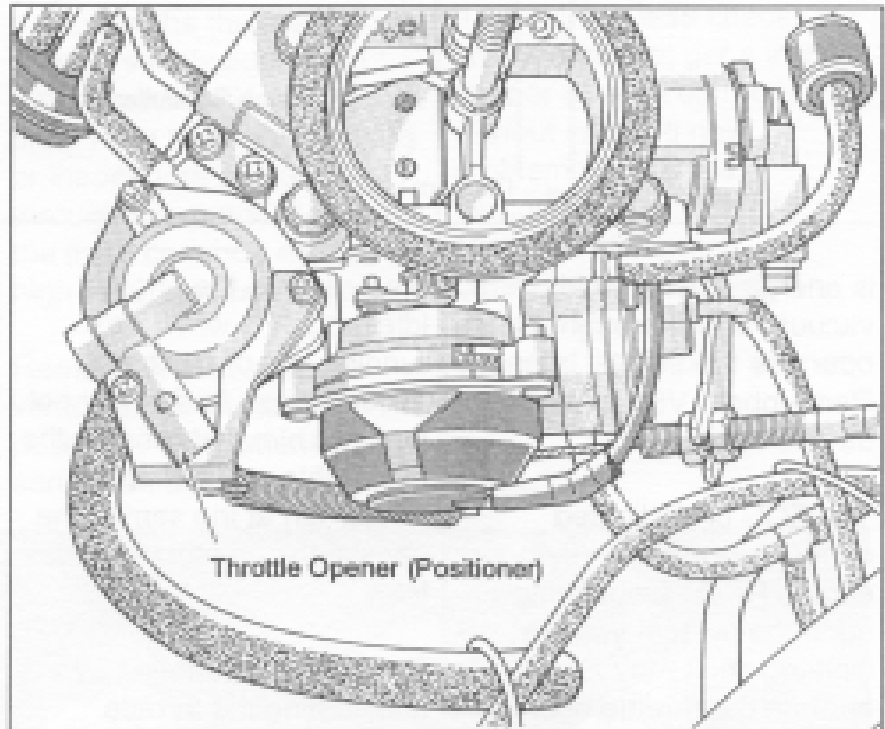
ISSUE 12

Troubleshooting Throttle Positioners (Idle Speed Controls)

On a Japanese carburetor, such as the Mikuni Solex, throttle positioner symptoms are often misdiagnosed simply because they mimic so many other driveability problems. But once you know what to look for, a throttle positioner problem won't fool you a second time. Here, we'll focus on the throttle positioners used on popular Mazda, Mitsu-bishi and Chrysler captive import engines.

A throttle positioner, which is also known as a throttle opener, idle speed control, or idle-up diaphragm, is a vacuum diaphragm and a link. The link is connected to the throttle lever or carburetor linkage. A throttle opener may perform one or both of the following tasks:

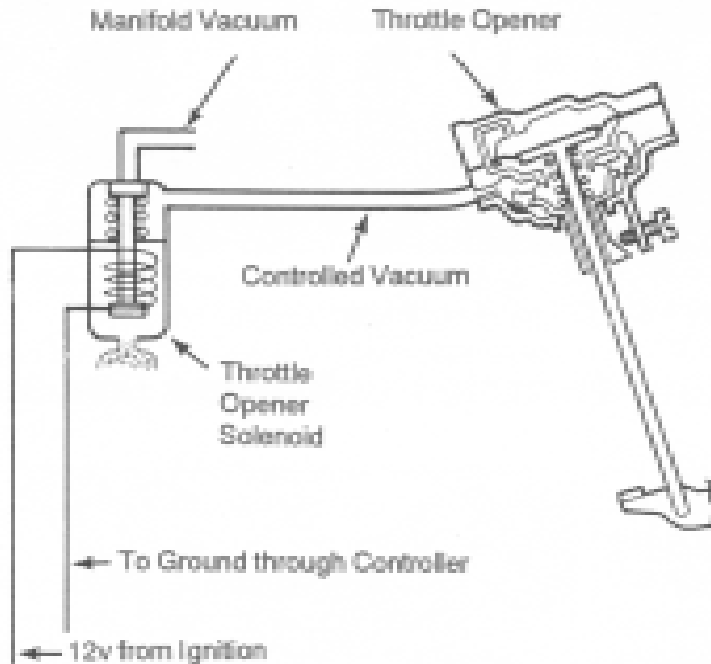
- * Maintain idle speed during air conditioner operation or during periods of heavy electrical load. Remember that the greater the electrical load on the alternator, the greater the load the alternator places on the engine.



- * Reduce deceleration emissions by opening the throttle blade wider during coast down. This lets extra air into the engine and leans out the coast-down mixture. During deceleration, the throttle opener often supplements idle solenoid operation.

Vacuum switching valve

An electric vacuum switching valve (VSV) controls the throttle opener. One side of the VSV has battery power whenever the ignition switch is on. Either the engine's electronic control unit (ECU) or a dedicated control box energizes the VSV by grounding it. When the VSV



is energized, manifold vacuum flows through it and operates the throttle opener. Remember: VSV on, throttle opener on.

The ECU or dedicated control box always monitors engine RPM. Depending upon the system you are working on, it may also operate the throttle opener according to inputs from a throttle switch or idle switch and an air conditioning switch.

When the throttle opener fails, the driver will complain that the engine idles rough or stalls out easily when he turns on the air conditioner or when the electrical load is high. Question the customer carefully, because he may not remember that the only

time the engine idles rough is when he's running lots of electrical accessories. And it may not occur to him that running the headlights, wipers, and heater fan at the same time constitutes an electrical load.

Begin troubleshooting by leak testing the throttle opener diaphragm with a hand-held vacuum pump. Replace the diaphragm if it doesn't hold vacuum. If the diaphragm is okay, check for manifold vacuum at the VSV inlet. If you have manifold vacuum at the VSV inlet, test the VSV itself.

Be sure you have battery voltage at the hot side of the VSV with the ignition switch on. No power? Then trace

the circuit back toward the ignition switch and locate the problem.

If you have power to the VSV, turn the ignition off, disconnect the VSV ground wire, and ground the VSV with a jumper wire. Now the VSV should click when you cycle the ignition switch on and off. Or, run the engine and ground the jumper wire. Every time you ground the jumper wire, the VSV should energize and the throttle opener should raise the idle speed. If you can operate the VSV with a jumper wire, check for an open circuit between the VSV and the ECU or control box. A bad ECU or control box is the last possibility, but experience indicates that this is a relatively rare cause of throttle opener failure.

Idle speed problems

On some engines, a grossly misadjusted throttle opener will make the idle RPM hunt or surge up and down every time the throttle opener operates. When this happens, disconnect the vacuum hose from the throttle opener and plug it or pinch it closed. If the idle speed stabilizes, adjust the throttle opener exactly the way the shop manual tells you to. Skip a step here and you will probably have to repeat the procedure!

Often, a misadjusted throttle opener is the handiwork of an amateur repairman who mistook its adjustment screw for the idle speed screw. On some vehicles, the

adjustment screw is on the throttle opener diaphragm housing. On others it's on the throttle linkage.

High A/C Pressure

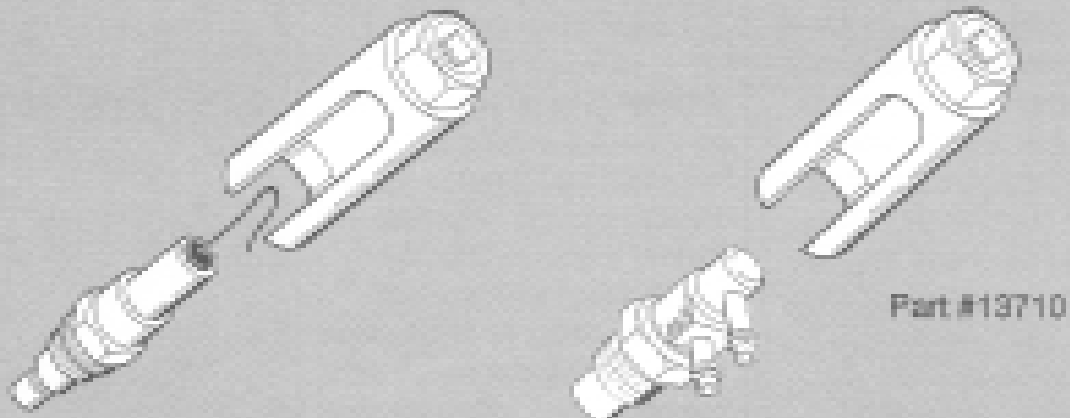
Watch out for high discharge pressure on air-conditioned vehicles. High discharge pressure puts an extra load on the compressor and the engine. Therefore, you may never get the throttle opener to work satisfactorily until you repair the air conditioner first. Note that overcharging or inadequate air flow through the condenser are the most common causes of high discharge pressure.

Remember that on some vehicles, the throttle positioner adjustment is so sensitive that if you set it a

little too high, strange symptoms occur. For example, the idle speed may hunt up and down. The engine in an automatic transmission vehicle may surge during slow city driving. Or during deceleration, engine RPM may hang at fast idle for a moment before settling down to normal idle speed.

If everything else checks out and you cannot get a throttle opener to work correctly without creating new problems, see if the carburetor has a throttle switch or idle switch. A defective or misadjusted switch may be the root cause of the throttle opener trouble.

OXYGEN SENSOR / VACUUM SWITCH INSTALLATION TOOL



A tool to ease removal and replacement of oxygen sensors and ported vacuum switches found on Ford, GM, Chrysler and most imported vehicles is available. This socket can be used with a 3/8-inch square ratchet drive or 7/8-inch open end or box wrench. Order Tomco Part # 13710.

Bad Grounds Ruin Throttle Cables

Ordinarily, a throttle cable or transmission shift cable lasts the life of the vehicle. Whenever you replace a sticking or frozen cable, do you ever wonder why the part failed? Some technicians who fail to ask themselves that question end up replacing the part a second time—free of charge.

If the engine or body ground is bad, the throttle or transmission cable may be the best remaining ground path for the starter or for body-mounted electrical components. The current flowing through the cable literally welds the cable to its protective jacket.

Question the customer carefully, because the vehicle probably has some strange electrical symptoms in addition to the bad cable. For example, does it crank slowly or erratically sometimes? Do lights flicker or become dimmer than normal? Do electrical accessories work erratically or sluggishly? During periods of heavy electrical load, do some components stop working altogether? Does the charging system work correctly?

Check for corroded, frayed, broken, or missing engine ground cables and body ground straps or wires. Some body grounds are routed from the firewall to the engine, others go from the inner fender panel to the negative battery terminal.

When in doubt, use your digital voltmeter to check the engine ground first, body ground second. Disable the ignition so the engine won't start. Connect the voltmeter between a clean spot on the engine and the negative battery terminal and crank the engine for about 10 seconds. If the reading exceeds 0.50 volt, repair or replace the engine ground.

For additional information on ground checks see "Bad Grounds Can Make a Good Oxygen Sensor Look Bad" in Tomco Tech tips #7.

If the engine ground is okay, connect the voltmeter between a clean spot on the firewall and the negative battery terminal. Put the headlights on high beam and turn on all or most of the electrical accessories inside the car. If the voltmeter shows more than 0.50 volt, repair or renew the body ground(s).

Vacuum Hose Identification

On many Japanese emission control systems, vacuum hoses and vacuum ports are color-coded. The color of the stripe on the hose matches the color of a paint spot at the vacuum port the hose is connected to.

So before you reach for a vacuum hose schematic, see if the hose stripes match the paint dots. If you have to clean things up in order to see the colors, avoid using powerful carburetor spray cleaners because they can remove the factory paint spots. Many technicians report that in this situation, a household spray cleaner such as Fantastik, Formula 409, etc., cleans well without removing paint spots or damaging plastic parts.