

Foreign Service



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Reader response to Dan's multipart series on Toyota evap systems has been high. This important postscript answers several inquiries and corrects a small oversight.

Yes, it's true: MOTOR is holding over the Toyota evap emissions series one more month. Don't worry, there's no extra charge, nothing to sign and no operator will call! Drive home with this information today!

In the November issue, we said this 11-part series was completed. But we've received so many worthwhile evap-related questions since that issue went to press that I want to address them here. All of your inquiries were about the resistor box technique described in the August and October columns. This homemade box enables you to substitute the correct hot and cold resistance values for the ECT and IAT sensors. To recap that approach, connect the resistor box in place of these sensors. Be

sure the switch on the resistor box is in the COLD position. Start the engine, then flip the switch to the HOT position within 15 to 30 seconds after start-up. Accelerate to 45 to 55 mph and maintain that speed for three to five minutes until the evap monitor runs. Then check for evap-related DTCs or pending DTCs.

Richard Escalambre is Professor of Automotive Technology at Skyline College in San Bruno, CA, a satellite training center for Toyota. He said that this single, steady and fairly short "cruise" usually runs the monitor promptly on Toyotas equipped with the intrusive and LEV-II evap systems. (I covered LEV-II systems last month and the intrusive type in the June and July 2006 columns.)

The nonintrusive evap setup, which ap-
continued on page 14

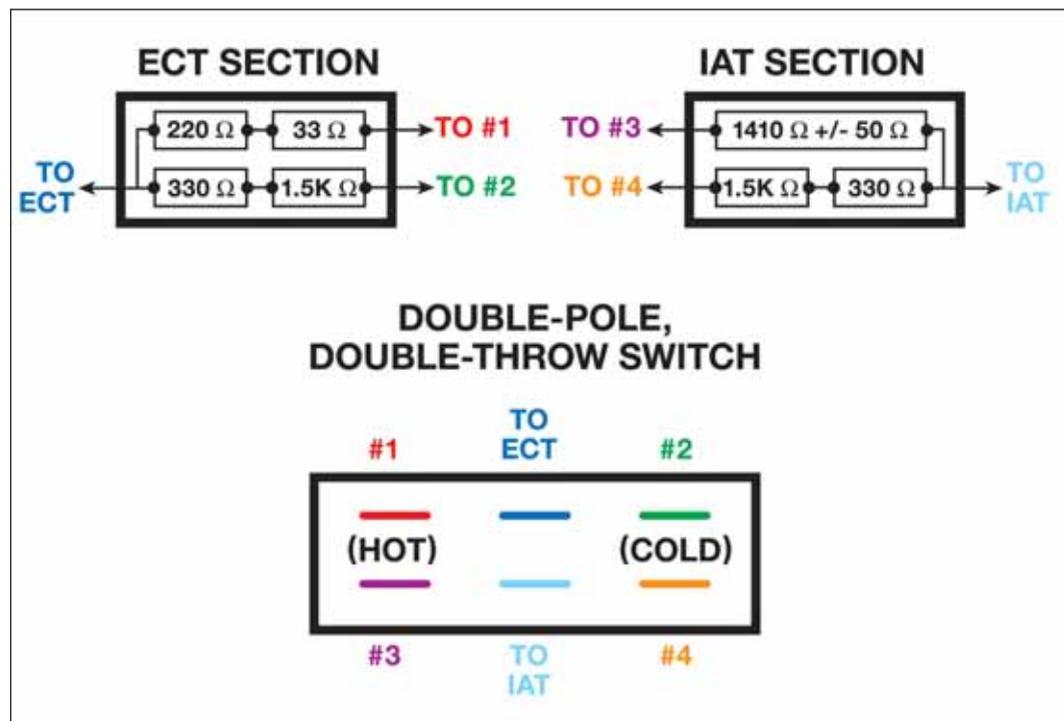


Illustration: Dan Marinucci

peared in the January through March 2006 columns, could take more work. Escalambre explained that running the nonintrusive evap monitor may require the following drive pattern after you switch the resistor box to the HOT position: Accelerate to 45 to 55 mph and maintain that speed for three to five minutes. Next, idle the engine in Drive for three minutes, then repeat the 45- to 55-mph cruise for another three to five minutes.

Escalambre gave me the resistor box idea. After years of teaching about and working on Toyotas, he's already intimately familiar with Toyota monitors and related drive patterns. He has refined the resistor box technique as well as these drive patterns and used them in his classes for years. By now he has probably run *hundreds* of Toyota evap monitors on classroom dynamometers or on lifts using the techniques described earlier.

According to Escalambre, the technique is not 100% foolproof. But years of experience confirm that it's extremely reliable if you follow the procedure correctly. Remember the old adage: Shortcutting a shortcut doesn't work!

Okay, let's get back to your inquiries. One reader noted that the simplified drive procedure for running the evap monitor, which I cited earlier, is very different from those in the service manuals. Escalambre's format may appear different simply because he has prioritized and/or streamlined Toyota's enabling criteria. Once again, this approach is backed by years of live testing. The critical enabling criteria here are road speed, fuel level, coolant temperature and intake air temperature. The quickest way to run any monitor is to control these criteria as carefully as possible. The resistor box cited in the August and October issues controls the temperature inputs very effectively by supplying accurate substitute values for the ECT and IAT sensors.

Meanwhile, a careful technician can control the fuel level by making

sure the gas gauge is between one-quarter and three-quarters full. He can control road speed simply by "driving" the vehicle carefully on the dynamometer or on a lift. Equally important, running the vehicle on the dyno or a lift eliminates the risk of normal fuel slosh inside the gas tank upsetting the monitor! Escalambre cautioned that we can't underestimate the impact of fuel slosh on an evap monitor.

One reader tried to run the monitor with the resistor box in place and


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about one-quarter of a tank of fuel. The monitor didn't run. First of all, having "about" one-quarter of a tank isn't as reliable as *definitely* having one-quarter to three-quarters of a tank! Plus, road-testing the car puts the variable of fuel slosh right back into the equation.

When the evap monitor didn't run fairly quickly, this unlucky tech finally abandoned the road test because the engine was beginning to overheat. This is another potential downside to a road test because the resistor box is providing the ECT sensor input (vital for proper cooling fan operation) instead of the actual, coolant temperature-based signal.

Anyway, suppose you're road-testing without a resistor box and the cooling fans turn on. At this point, Escalambre explained, the vehicle is too hot to run the monitor anyway and/or it has a cooling system problem.

Traditionally, our instincts tell us that road-testing is always best. But when you're trying to run a Toyota evap monitor quickly, road-testing actually *decreases* instead of increases your control of the enabling criteria variables. If you do choose to road-test, always follow the procedures outlined here very closely for running the evap monitor on nonintrusive, intrusive and LEV-II systems.

Another reader asked if the engine had to be cold when you attempt to run an evap monitor with the resistor box. The temperature should not matter because the resistor box is providing the preferred cold and hot values as well as a warm-up "transition," for lack of a better description. However, starting out with a cooler engine allows you to complete the monitor long before the engine would need those cooling fans running.

Last but not least, I need to update the resistance value in the illustration on page 14 of the October 2006 issue of *MOTOR*. The preferred resistance value for the hot IAT on a Toyota is 1410 \pm 50 ohms. I told you 1410 ohms in the August Foreign Service. Unfortunately, I included the hot IAT value of 780 ohms from the original Honda-style resistor box! The corrected illustration on page 12 shows 1410 \pm 50 ohms.

Forgive me for this oversight. But if you already built a resistor box with the 780-ohm hot IAT value, it's perfectly suited for running Honda evap monitors, and there are countless Hondas on the highways. However, that 780 value for hot IAT won't work consistently and reliably on Toyotas, especially those equipped with mass airflow (MAF) sensors. You see, 780 ohms indicates an intake air temperature that's much warmer than normal on a Toyota. M