

80 ELECTRONIC THROTTLE CONTROL SYSTEM

FREQUENTLY ASKED QUESTION

What is the "Spring Test"?

The spring test is a self-test performed by the PCM whenever the engine is started. The PCM operates the throttle to check if it can react to the command and return to the default (home) position. This self-test is used by the PCM to determine that the spring and motor are working correctly and may be noticed by some vehicle owners by the following factors:

- A slight delay in the operation of the starter motor. The PCM performs this test when the ignition switch is turned to the "on" position. While it takes just a short time to perform the test, it can be sensed by the driver that there could be a fault in the ignition switch or starter motor circuits.
- A slight "clicking" sound may also be heard coming from under the hood when the ignition is turned on. This is normal and is related to the self-test on the throttle as it opens and closes.

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Why Not Use a Stepper Motor for ETC?

A stepper motor is a type of motor that has multiple windings and is pulsed by a computer to rotate a certain number of degrees when pulsed. The disadvantage is that a stepper motor is too slow to react compared with a conventional DC electric motor and is the reason a stepper motor is not used in electronic throttle control systems.

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Figure 80-4 The default position for the throttle plate is in slightly open position. The servomotor then is used to close it for idle and open it during acceleration.

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Figure 80-5 (a) An H-bridge circuit is used to control the direction of the DC electric motor of the electronic throttle control unit.

DC MOTOR H-BRIDGE CIRCUIT

(a)

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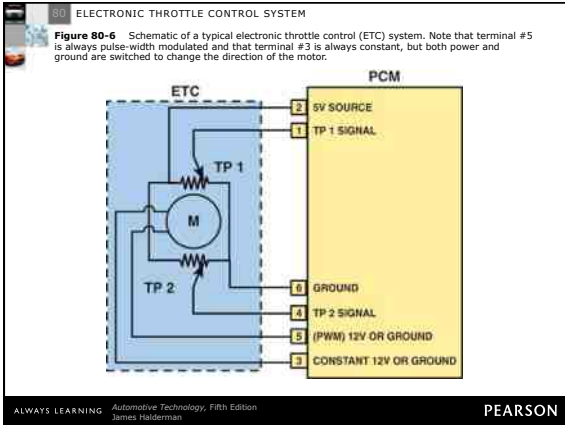
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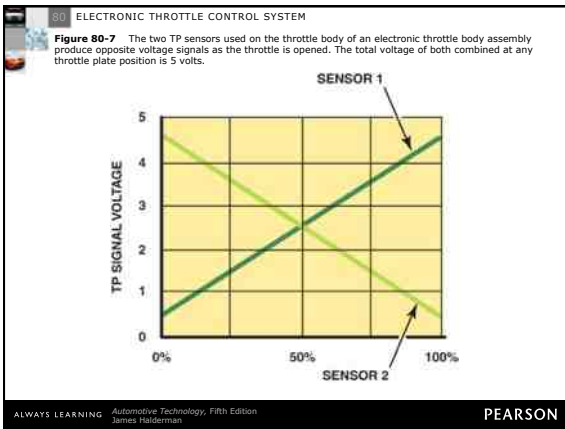
Figure 80-5 (b) To reverse the direction of operation, the polarity of the current through the motor is reversed.

DC MOTOR H-BRIDGE CIRCUIT

(b)

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How Do You Calibrate a New APP Sensor?

Whenever an accelerator pedal position (APP) sensor is replaced, it should be calibrated before it will work correctly. Always check service information for the exact procedure to follow after APP sensor replacement. Here is a typical example of the procedure:

STEP 1 Make sure accelerator pedal is fully released.

STEP 2 Turn the ignition switch on (engine off) and wait at least 2 seconds.

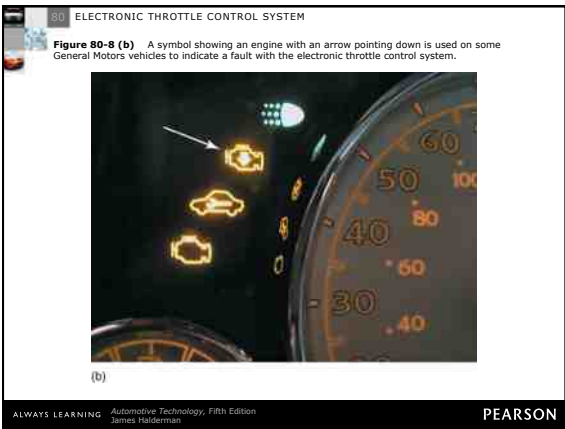
STEP 3 Turn the ignition switch off and wait at least 10 seconds.

STEP 4 Turn the ignition switch on (engine on) and wait at least 2 seconds.

STEP 5 Turn the ignition switch off and wait at least 10 seconds.

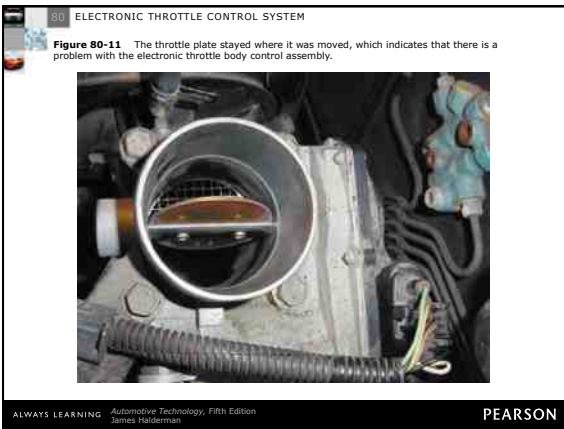
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REAL WORLD FIX

The High Idle Toyota
 The owner of a Toyota Camry complained that the engine would idle at over 1200 RPM compared with a normal 400 to 700 RPM. The vehicle would also not accelerate. Using a scan tool, a check for diagnostic trouble codes showed one code: P0101—“IAC motor circuit low.”

Checking service information led to the inspection of the electronic throttle control throttle body assembly. With the ignition key out of the ignition and the vent air duct off the throttle body, the technician used a screwdriver to push gently to see if the throttle plate worked.

Normal operation—The throttle plate should move and then spring back quickly to the default position.

Abnormal operation—If the throttle plate stays where it is moved or does not return to the default position, there is a fault with the throttle body assembly.

● SEE FIGURE 80-11.

Solution: The technician replaced the throttle body assembly with an updated version and proper engine operation was restored. The technician disassembled the old throttle body and found it was corroded inside due to moisture entering the unit through the vent hose.

● SEE FIGURE 80-12.

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Figure 80-13 Notice the small motor gear on the left drives a larger plastic gear (black), which then drives the small gear in mesh with the section of a gear attached to the throttle plate. This results in a huge torque increase from the small motor and helps explain why it could be dangerous to insert a finger into the throttle body assembly.



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WARNING

The electric motor that operates the throttle plate is strong enough to cut off a finger. ● SEE FIGURE 80-13.

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