

Automotive Technology 5th Edition

Chapter 73 THROTTLE POSITION (TP) SENSORS

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class provides complete coverage of the components, operation, design, and troubleshooting. It correlates material to task lists specified by ASE and NATEF and emphasizes a problem-solving approach. Chapter features include Tech Tips, Frequently Asked Questions, Real World Fixes, Videos, Animations, and NATEF Task Sheet references.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain learning objectives to students as listed BELOW: <ol style="list-style-type: none"> 1. Discuss how throttle position sensors work. 2. Describe how the operation of the TP sensor affects vehicle operation. 3. Describe how to test the TP sensor and interpret the TP sensor diagnostic trouble codes.
Establish the Mood or Climate	Provide a <i>WELCOME</i> , Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

NOTE: This lesson plan is based on the 5th Edition Chapter Images found on Jim's web site @ www.jameshalderman.com

LINK CHP 73: [ATE5 Chapter Images](#)

ICONS



Chapter 73 Throttle Position Sensors

1. SLIDE 1 Chapter 73 Throttle Position Sensors

Check for ADDITIONAL VIDEOS & ANIMATIONS @
<http://www.jameshalderman.com/>
WEB SITE IS CONSTANTLY UPDATED

Videos

2. SLIDE 2 EXPLAIN Figure 73-1 A typical TP sensor mounted on the throttle plate of this port-injected engine.

DISCUSSION: Provide the students with a **wiring diagram of a TP circuit** to study and discuss. What is the function of each wire connected to sensor?

HANDS-ON TASK: Have students locate and visually inspect a **TP SENSOR** for proper connection, attachment, and condition.

Some TP sensors have 4 wires. The fourth wire is commonly a switch circuit used to provide a signal that vehicle is at idle. Some TP sensors go bad in only one spot—vehicles that are driven at constant speeds tend to wear the TP in one spot.

[Potentiometer \(View\) \(Download\)](#)

[Throttle Position Sensor \(View\) \(Download\)](#)

[Throttle Position Volt Check Ref Signal \(View\) \(Download\)](#)

[Throttle Position Ground Check \(View\) \(Download\)](#)

3. SLIDE 3 EXPLAIN Figure 73-2 The signal voltage from a throttle position increases as the throttle is opened because the wiper arm is closer to the 5-volt reference. At idle, the resistance of the sensor winding effectively reduces the signal voltage output to the computer.

DISCUSSION: Have students discuss **how TP sensors affect automatic transmission function**. How could various TP malfunctions

ICONS



Chapter 73 Throttle Position Sensors

cause abnormal automatic transmission operation?

If you find that TP sensor is missing its Vref signal, check other sensors that operate on same Vref signal. If other sensors are also missing their Vref signal, the problem may be inside the computer.

4. **SLIDE 4 EXPLAIN Figure 73-3** A meter lead connected to a T-pin that was gently pushed along the signal wire of the TP sensor until the point of the pin touched the metal terminal inside the plastic connector.
5. **SLIDE 5 EXPLAIN Figure 73-4** typical waveform of a TP sensor signal as recorded on a DSO when the accelerator pedal was depressed with the ignition switch on (engine off). Clean transitions and the lack of any glitches in this waveform indicate a good sensor
6. **SLIDE 6 EXPLAIN FIGURE 73-5** Checking the 5-volt reference from the computer being applied to the TP sensor with the ignition switch on (engine off).
7. **SLIDE 7 EXPLAIN FIGURE 73-6** Checking the voltage drop between the TP sensor ground and a good engine ground with the ignition on (engine off).

DEMONSTRATION: Show the students how to use a **DIGITAL voltmeter** to test TP sensor for proper operation. Be sure to demonstrate proper techniques that should be used to prevent wire, terminal, and connector damage during testing.

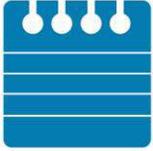
FIGURE 73-5

When using a digital voltmeter, be sure meter is not autoranging; otherwise, when the meter switches ranges, it can easily be mistaken as a glitch in sensor.

DEMONSTRATION: Show proper method for adjusting a TP sensor using a voltmeter, DSO, or scan tool

Only early model TP sensors are adjustable. Current TP sensors are NOT adjustable

ICONS



Chapter 73 Throttle Position Sensors

On some older vehicles, base ignition timing cannot be set unless computer sees an idle signal from the TP sensor. It may be necessary to adjust TP sensor and/or throttle cable in order to set timing.

HANDS-ON TASK: Have students test a TP sensor for proper operation using a scan tool.

ON-VEHICLE NATEF TASK: Inspect and test THROTTLE POSITION Sensor using a GMM)/(DSO); perform necessary action.[Page 239](#)

ON-VEHICLE NATEF TASK: Inspect & test PCM/ECM, ACTUATORS, & circuits using GMM/DSO; perform necessary action [Page 237](#)

[Crossword Puzzle \(Microsoft Word\) \(PDF\)](#)
[Word Search Puzzle \(Microsoft Word\) \(PDF\)](#)