

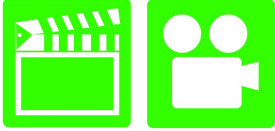
Automotive Maintenance and Light Repair, 1ST Edition

Chapter 46 Tire Pressure Monitoring System

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers Automotive Maintenance and Light Repair . It correlates material to task lists specified by ASE and NATEF.
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 the chapter learning objectives to the students. <ul style="list-style-type: none">⤵ Explain why a tire-pressure monitoring system is used.⤵ Discuss the TREAD Act.⤵ List the two types of TPMS sensors.⤵ Describe how to program or relearn TPMS sensors.⤵ List the tools needed to service a tire-pressure monitoring system.
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.

ICONS



Ch46 Tire Pressure Monitoring System

1. SLIDE 1 CH46 Tire Pressure Monitoring System

2. SLIDES 2-3 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
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4. SLIDES 4-5 EXPLAIN BACKGROUND

6. SLIDES 6-7 EXPLAIN Low Tire Pressure Effects

8. **SLIDE 8 EXPLAIN Figure 46-1** tire pressure placard (sticker) on the driver's side door or door jamb indicates the specified tire pressure.

9. SLIDE 9 EXPLAIN CHART 46-1

10. SLIDES 10-11 EXPLAIN PURPOSE & FUNCTION

DISCUSSION: ASK THE STUDENTS TO DISCUSS POSSIBLE EFFECTS IF TIRES ARE CONSISTENTLY UNDERINFLATED

12. **SLIDE 12 EXPLAIN FIGURE 46-2** A tire with low inflation will have a shorter distance (radius) between the center of the wheel and the road and will therefore rotate faster than a tire that is properly inflated

13. **SLIDE 13 EXPLAIN FIGURE 46-3** The speeds of the diagonally opposed wheels are added together and then compared to the other two wheels to check if one tire is rotating faster.

14. SLIDES 14 EXPLAIN Indirect TPMS ADVANTAGES











15. SLIDES 15-16 EXPLAIN Indirect TPMS DIADVANTAGES









17. SLIDES 17-18 EXPLAIN Diagnosis of Indirect TPMS

19. **SLIDE 19 EXPLAIN Figure 46-4** indirect tire-pressure monitoring system has a reset switch that should be depressed after rotating or replacing tires.

DISCUSSION: HAVE THE STUDENTS DISCUSS WHY INDIRECT TPMS IS APPEALING TO OEMS

DEMONSTRATION: DEMONSTRATE WHEEL SPEED SENSOR SIGNALS USING A SCAN TOOL.

ICONS	Ch46 Tire Pressure Monitoring System
	<p>HANDS-ON TASK: HAVE THE STUDENTS CHECK WHEEL SPEED SENSOR SIGNALS USING A SCAN TOOL. HAVE STUDENTS SCAN WHEEL SPEED SENSORS. HAVE STUDENTS SPIN THE TIRES BY HAND TO SEE SENSOR VALUES CHANGE.</p>
	<p>DEMONSTRATION: SHOW HOW TO DETERMINE PROPER TIRE PRESSURE BY USING THE INFORMATION ON DOOR PLACARDS.</p>
  <p>QUESTION</p>	<p>DISCUSSION: ASK THE STUDENTS WHY A PRESSURE DROP OF LESS THAN 25% SHOULD BE CORRECTED.</p>
	<p>HANDS-ON TASK: HAVE THE STUDENTS INFLATE TIRES ON A VEHICLE TO 75% OF RECOMMENDED PRESSURE</p>
	<p>HANDS-ON TASK: HAVE THE STUDENTS COMPARE TIRE PRESSURE RECOMMENDATIONS OF SEVERAL AUTOMOBILES BY USING INFORMATION ON DOOR PLACARDS.</p>
  <p>QUESTION</p>	<p>DISCUSSION: ASK THE STUDENTS TO DISCUSS WHY IT IS IMPORTANT TO KNOW HOW TO IDENTIFY A VEHICLE WITH TPMS.</p>
	<p>20. SLIDES 20-21 EXPLAIN TREAD ACT 22 SLIDE 22 EXPLAIN CHART 46-2 23. SLIDE 23 EXPLAIN Warning Lamp</p>
	<p>24. SLIDE 24 EXPLAIN Figure 46-5 A clear plastic valve-stem tire-pressure monitoring sensor, showing the round battery on the right and the electronic sensor and transistor circuits on the left.</p> <p>25. SLIDE 25 EXPLAIN Rubber Tire Valve Stems</p> <p>26. SLIDE 26 EXPLAIN Figure 46-6 A conventional valve stem is on the right compared with a rubber TPMS sensor stem on the left. Notice the tapered and larger brass stem. The rubber TPMS sensor also uses a longer cap that makes it easy for a technician to spot that this is not a conventional rubber valve stem.</p>
	<p>DEMONSTRATION: SHOW CONVENTIONAL RUBBER VALVE STEMS AND RUBBER TPMS VALVE STEMS. <u>FIGURE 46-6</u></p>

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	<p>27. SLIDE 27 EXPLAIN Aluminum Tire Valve Stems</p> <p>28. SLIDES 28-29 EXPLAIN TPMS Pressure Sensors: Types</p>
	<p>30. SLIDE 30 EXPLAIN Figure 46-7 three styles of TPMS sensors most commonly found include two stem-mounted (rubber and aluminum, left and top), & banded style (right)</p>
	<p>31. SLIDE 31 EXPLAIN Modes Of Operation</p> <p>32. SLIDES 32-33 EXPLAIN TPMS Sensor Operation</p>
	<p>34. SLIDE 34 EXPLAIN FIGURE 46-8 A typical tire-pressure monitoring system tester. The unit should be held near the tire and opposite the valve stem if equipped with a wheel-mounted sensor, and near the valve stem if equipped with a valve-stem-type sensor</p> <p>35. SLIDE 35 EXPLAIN Figure 46-9 Some vehicles display the actual measured tire pressure for each tire on a driver information display.</p>
	<p>HANDS-ON TASK: HAVE STUDENTS LOCATE A TPMS RECEIVER ON A VEHICLE EQUIPPED WITH DIRECT TPMS.</p>
	<p>36. SLIDES 36-37 EXPLAIN WARNING LAMP ON</p> <p>38. SLIDE 38 EXPLAIN Figure 46-10 A tire-pressure warning light can vary depending on the vehicle, but includes a tire symbol</p>
	<p>39. SLIDE 39 EXPLAIN WARNING LAMP FLASHING</p> <p>40. SLIDE 40 EXPLAIN Installing a New Pressure Sensor</p>
 <p>QUESTION</p>	<p>DISCUSSION: ASK THE STUDENTS WHY AN OVERINFLATED TIRE IS A SAFETY HAZARD?</p>
	<p>HANDS-ON TASK: HAVE THE STUDENTS INSTALL A PRESSURE SENSOR.</p>
	<p>41. SLIDES 41-42 EXPLAIN SCAN Tools</p> <p>43. SLIDE 43 EXPLAIN Figure 46-11 The parts of a typical stem-mounted TPMS sensor. Notice the small hole used to monitor the inflation pressure. The use of stop-leak can easily clog this small hole</p>
	<p>44. SLIDE 44 EXPLAIN Figure 46-12 When replacing TPMS sensor, record sensor ID because this needs to be</p>

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entered into system through the use of a tester/scan tool

45. SLIDES 45-46 EXPLAIN TPMS Sensor Activation

47. SLIDE 47 EXPLAIN Figure 46-13 A magnet is placed around the valve stem to reprogram some stem-mounted tire-pressure sensors.

48. SLIDE 48 EXPLAIN ITEMS NEEDED

49. SLIDE 49 EXPLAIN Figure 46-14 Always use an accurate, known-good tire pressure gauge. Digital gauges are usually more accurate than mechanical gauges.



DEMONSTRATION: SHOW THE STUDENTS HOW TO USE THE TPMS SCAN TOOL TO VIEW THE TRANSMITTER ID, PERFORM INITIALIZATION, AND MONITOR SENSOR VALUES.



HANDS-ON TASK: HAVE THE STUDENTS USE THE TPMS SCAN TOOL TO VIEW THE TRANSMITTER ID, PERFORM INITIALIZATION, & MONITOR SENSOR VALUES



DISCUSSION: DISCUSS WHY THE DELTA PRESSURE METHOD MAY NOT BE PRACTICAL FOR A SERVICE TECHNICIAN TO USE.



DEMONSTRATION: SHOW HOW TO DO A TPMS RELEARN USING MAGNETIC TOOL.



HANDS-ON TASK: HAVE THE STUDENTS PERFORM THE RELEARN PROCEDURES ON AN INDIRECT TPMS.









HANDS-ON TASK: HAVE STUDENTS HOW TO DO A TPMS RELEARN USING MAGNETIC TOOL



ON-VEHICLE NATEF TASK INSPECT, DIAGNOSE AND CALIBRATE TIRE PRESSURE MONITORING SYSTEM



IF HORN DOES NOT "CHIRP," TRY HONKING HORN USING HORN BUTTON. IT WOULD BE WASTE OF TIME TRYING TO TROUBLESHOOT TPMS FOR BAD HORN

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	<p>50. SLIDE 50 EXPLAIN Figure 46-15 A clicker-type valve core tool ensures that the valve core is tightened to factory specifications</p>
	<p>51. SLIDE 51 EXPLAIN Figure 46-16 An assortment of service parts that include all of the parts needed to service a stem-mounted TPMS sensor being installed after removal for a tire replacement or repair</p>
	<p>DISCUSSION: ASK THE STUDENTS TO DISCUSS WHY IT IS SO IMPORTANT TO TIGHTEN THE VALVE CORE TO THE CORRECT TORQUE.</p>
	<p>HANDS-ON TASK: HAVE THE STUDENTS REMOVE AND REPLACE A VALVE CORE ON A TPMS SENSOR.</p>
	<p>SEARCH INTERNET: HAVE STUDENTS SEARCH INTERNET FOR THE TREAD ACT IS MORE THAN TIRE PRESSURE MONITORING. HAVE THE STUDENTS SEARCH THE INTERNET TO FIND OTHER STANDARDS SET BY THE TREAD ACT.</p>
	<p>NATEF MLR TASK A4F10 IDENTIFY AND TEST TIRE PRESSURE MONITORING SYSTEM (INDIRECT AND DIRECT) FOR OPERATION; VERIFY OPERATION OF INSTRUMENT PANEL LAMPS.</p>