ATE5 Chapter 110 Tire Pressure Monitoring Systems

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: 1. Explain why a tire-pressure monitoring system (TPMS) is used. 2. Explain indirect TPMS. 3. Discuss the TREAD act. 4. List the two types of TPMS pressure sensors. 5. Explain direct TPMS diagnosis and TPMS diagnostic tools. 6. Describe how to relearn TPMS sensors and the tools needed to service a TPMS.
Establish the Mood or Climate	Provide a ***WELCOME,*** 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 110: ATE5 Chapter Images

ICONS	Chapter 110 TPMS
	1. SLIDE 1 CH110 TIRE PRESSURE MONITORING SYSTEMS
	Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED
	**Videos**
	2. SLIDE 2 EXPLAIN **Figure 110-1** tire pressure placard (sticker) on driver's side door or door jamb indicates the specified tire pressure.
	**DISCUSSION: Ask the students to discuss possible effects if tires are consistently underinflated**
	3. SLIDE 3 EXPLAIN **FIGURE 110-2** A tire with low inflation will have a shorter distance (radius) between the center of wheel and the road and will therefore rotate faster than a tire that is properly inflated. 4. SLIDE 4 EXPLAIN **FIGURE 110-3** 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. 5. SLIDE 5 EXPLAIN **Figure 110-4** 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.**
	**HANDS-ON TASK: check wheel speed sensor signals with scan tool. Have students spin the tires by hand to see sensor values change.**

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	**DEMONSTRATION: Show how to determine proper tire pressure by using the information on door placards.**
	**DISCUSSION: Ask the students why a pressure drop of less than 25% should be corrected.**
	**HANDS-ON TASK: Have the students inflate tires on a vehicle to 75% of recommended pressure**
	**HANDS-ON TASK: Have the students compare tire pressure recommendations of several automobiles by using information on door placards.**
	**DISCUSSION: Ask the students to discuss why it is important to know how to identify a vehicle with TPMS.**
	6. **SLIDE 6 EXPLAIN Figure 110-5** 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. 7. **SLIDE 7 EXPLAIN Figure 110-6** 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.
	**DEMONSTRATION: Show conventional rubber valve stems and rubber TPMS valve stems.**
	**FIGURE 110-6** 8. **SLIDE 8 EXPLAIN Figure 110-7** The three styles of TPMS sensors most commonly found include the two stem-mounted (rubber and aluminum, left and top), and the banded style (right) 9. **SLIDE 9 EXPLAIN FIGURE 110-8** A typical tire-pressure monitoring system tester. 10. **SLIDE 10 EXPLAIN Figure 110-9** Some vehicles display the actual measured tire pressure for each tire on a driver information display.

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	**HANDS-ON TASK: Have students locate a TPMS receiver on a vehicle equipped with direct TPMS.**
	11. **SLIDE 11 EXPLAIN Figure 110-10** A tire-pressure warning light can vary depending on the vehicle, but includes a tire symbol
	**DISCUSSION: Ask the students why an overinflated tire is a safety hazard?**
	**HANDS-ON TASK: Have the students install a pressure sensor.**
	12. **SLIDE 12 EXPLAIN Figure 110-11** 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. 13. **SLIDE 13 EXPLAIN Figure 110-12** When replacing a TPMS sensor, be sure to record the sensor ID because this needs to be entered into the system through the use of a tester or scan tool. 14. **SLIDE 14 EXPLAIN Figure 110-13** A magnet is placed around the valve stem to reprogram some stem-mounted tire-pressure sensors.
	**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: Ask the students to 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.**

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	**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. Page 332**
	**If the horn does not "chirp," try honking horn using the horn button. It would be a waste of time trying to troubleshoot a TPMS problem only to find a bad horn.**
	15. **SLIDE 15 EXPLAIN Figure 110-14** Always use an accurate, known-good tire pressure gauge. Digital gauges are usually more accurate than mechanical gauges. 16. **SLIDE 16 EXPLAIN Figure 110-15** A clicker-type valve core tool ensures that the valve core is tightened to factory specifications. 17. **SLIDE 17 EXPLAIN Figure 110-16** 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
	**DISCUSSION: Ask the students to discuss why it is so important to tighten the valve core to the correct torque.**
	Tire Pressure Monitor System, TPMS-Failed Sensor (View) (Download) Tire Pressure Monitor System, TPMS (Normal) (View) (Download) Tire Pressure Monitor System, TPMS (With Tire Leak) (View) (Download)
	**HANDS-ON TASK: Have the students remove and replace a valve core on a TPMS sensor.**
	**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. Have students share their findings in a class discussion.**

ICONS	Chapter 110 TPMS
	Crossword Puzzle (Microsoft Word) (PDF) Word Search Puzzle (Microsoft Word) (PDF)