ATE5 Chapter 107 ABS DIAGNOSIS & REPAIR

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 the ABS diagnostic procedure and the brake warning lamp operation. 2. Explain how to retrieve ABS trouble codes in Kelsey-Hayes, Bosch 2, Teves Mark IV, and Delphi ABS-VI. 3. Explain the diagnosis of the wheel speed sensor. 4. Explain how to diagnose the OBD-II ABS system.
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 107: ATE5 Chapter Images

ICONS	Chapter 107 ABS SERVICE
	1. SLIDE 1 CH107 ABS DIAGNOSIS & REPAIR
	Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED
	**Videos**
	2. SLIDE 2 EXPLAIN Figure 107-1 On most vehicles equipped with ABS, the amber ABS and red BRAKE warning lamp should come on as a bulb check when the ignition is first switched on.
	**DISCUSSION: Ask students to discuss procedure for diagnosing a fault in an antilock braking system (ABS). Ask students to talk about what red brake warning lamp (RBWL) indicates when it is illuminated. What ABS problems does it signal? Ask students to discuss operation of amber ABS warning lamp.**
	**DEMONSTRATION: Show students how ABS DIAGNOSTICS works on the trainer**
	25. SLIDE 25 EXPLAIN Figure 107-2 A thorough visual inspection should include carefully inspecting around the electrohydraulic unit for signs of obvious problems or the installation of aftermarket devices such as alarm systems.
	**DEMONSTRATION: Show students how to do a visual inspection looking for telltale clues of how the vehicle has been driven and maintained.**
	**DISCUSSION: Have students talk about the importance of doing a complete visual inspection of the entire vehicle before making a diagnosis**
	**HANDS-ON TASK: Have students perform a complete visual inspection of the antilock braking system.**

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	**DISCUSSION: Ask students to talk about the importance of a test drive in diagnosing an ABS fault. What symptoms should technicians look for in such a test?**
	**DEMONSTRATION: SHOW HOW to retrieve ABS-related diagnostic codes by using a scan tool. Ask them to explain the results.**
	**DISCUSSION: Ask students to discuss the procedures for clearing the diagnostic trouble codes for the vehicles on which they are working.**
	40. **SLIDE 40 EXPLAIN Figure 107-3** GM diagnostic connector on a pre- 1996 vehicle. Flash codes are available by using a jumper wire to ground (terminal A) to terminal H.
	5. **SLIDE 5 EXPLAIN Figure 107-4** Connecting a jumper wire from the diagnostic connector to ground. The exact location of this diagnostic connector varies with the exact vehicle model and year.
	6. **SLIDE 6 EXPLAIN Figure 107-5** Chrysler diagnostic connector location varies with model & year.
	**DISCUSSION: discuss antilock braking systems covered in this chapter. What are the advantages and disadvantages of each technology? On what types of vehicles do you typically find each system?**
	7. **SLIDE 7 EXPLAIN Figure 107-6** A scan tool is the recommended method to use to access General Motors Teves Mark IV systems.
	**DEMONSTRATION: DEMO wheel sensor operation**
	8. **SLIDE 8 EXPLAIN Figure 107-8** breakout box is being used to diagnose an ABS problem. The controller (computer) is located in the trunk of this vehicle, and a digital multimeter is being used to measure resistance and voltage at various points in the system, following the service manual procedure.

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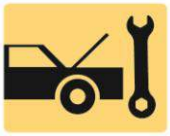
	**DEMONSTRATION: Show students how to inspect the connections involved in the wheel speed sensor circuit for defects and corrosion.**
	Wheel Speed Sensor, AC Voltage (View) (Download) Wheel Speed Sensor, Bias Voltage (View) (Download) Wheel Speed Sensor, Resistance (View) (Download) Wheel Speed Sensor, Short to Ground (View) (Download)
 	**DISCUSSION: Ask students to talk about the problems caused by damaged or contaminated wheel speed sensors (WSS). What are the possible causes of low voltage readings?**
	**HANDS-ON TASK: Have students perform steps in the Quick and Easy Wheel Speed Sensor Diagnosis to test for a fault in wheel speed sensor.**
	10. **SLIDE 10 EXPLAIN Figure 107-9** Typical wheel speed sensor. When a tooth on the sensor ring is close to the sensor, the strength of the magnetic field is stronger because the metal of the tooth conducts magnetic lines of force better than air. When the tooth moves away, the magnetic field strength is reduced. It is this changing magnetic field strength that produces the changing voltage. Frequency of the signal is determined by the speed of the rotating sensor. 11. **SLIDE 11 EXPLAIN Figure 107-10** Measuring the resistance of a wheel speed sensor. 12. **SLIDE 12 EXPLAIN Figure 107-11** A scope can be used to check for proper operation of a wheel speed sensor. 13. **SLIDE 13 EXPLAIN Figure 107-12** A broken tooth on a wheel speed sensor tone ring shows on the scope trace as a missing wave.
	**DEMONSTRATION: show students how to test a WSS by using a scope.**
	**HANDS-ON TASK: Have students test a WSS by using a scope on a lab vehicle**

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	**14. SLIDE 14 EXPLAIN Figure 107-13** Use a nonmagnetic brass or plastic feeler gauge to check wheel speed sensor gap. A steel gauge would be attracted by the magnet in the sensor and would produce a drag on the gauge as it is moved between the sensor and the tone ring. This drag could be interpreted as a correct clearance reading.
	**DISCUSSION: Ask students to discuss the procedures for adjusting wheel speed sensors. What is the significance of the paper or plastic protective covering on the tip end of a WSS?**
	**15. SLIDE 15 EXPLAIN Figure 107-14 (a)** Always use a nonferrous (brass or plastic) feeler (thickness) gauge when measuring the gap between the toothed ring and the wheel speed sensor.
	16. SLIDE 16 EXPLAIN Figure 107-14 (b) Sometimes a sensor is equipped with a paper spacer that is the exact thickness of the spacing required between the toothed ring and the sensor. If equipped, the sensor is simply installed with the paper touching the toothed wheel. A typical gap ranges from 0.020 to 0.050 in. (0.5-1.3 mm).
	**DEMONSTRATION: Show students how to use a nonmagnetic feeler gauge to check the wheel speed sensor gap.**
	**HANDS-ON TASK: Have students use a nonmagnetic feeler gauge to check the wheel speed sensor gap on a Lab Vehicle**
	**ON-VEHICLE NATEF TASK: Test, diagnose, and service ABS wheel speed sensors. Page 328**
	**HANDS-ON TASK: Have students use a scan tool to test a WSS and explain the results.**
	**DEMONSTRATION: Show students how to make certain that the ABS system is not pressurized before you open a bleeder screw or loosen a hydraulic line.**

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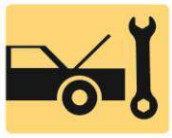
	ON-VEHICLE NATEF TASK: Identify and inspect electronic brake control system components; determine necessary action. Page 323
	ON-VEHICLE NATEF TASK: Diagnose electronic brake system faults; determine necessary action. Page 324
	ON-VEHICLE NATEF TASK: Bleed electronic brake control system hydraulic circuits. Page 326
	ON-VEHICLE NATEF TASK: Remove and install electronic brake control system electrical/electronic and hydraulic components. Page 327
	ON-VEHICLE NATEF TASK: Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.). Page 329
	SEARCH INTERNET: Have students use Internet to research three vehicle antilock braking systems. Ask them to write a brief description of the ABS technology used for each vehicle and the additional cost of this option.
	Crossword Puzzle (Microsoft Word) (PDF) Word Search Puzzle (Microsoft Word) (PDF)