

Light Vehicle Diesel Engines

Chapter 14 Hydraulically Actuated Electronic Unit Injector (HEUI) Systems

Opening Your Class


KEY ELEMENT	EXAMPLES
Introduce Content	This Light Vehicle Diesel Engines 1st text provides complete coverage of light duty diesel engine components, operation, and diagnosis. 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, and Real World Fixes: www.jameshalderman.com contains Videos, Animations, and Task Sheets for use in the lab and classroom.
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.
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 as listed: <ol style="list-style-type: none"> 1. Prepare for the Light Vehicle Diesel Engine (A9) ASE certification fuel system diagnosis and repair area "F" (Fuel System Diagnosis and Repair). 2. Identify the components of a HEUI injection system. 3. Discuss the operation of a HEUI injector. 4. Explain the advantage of a HEUI injection system over a mechanical system. 5. Determine the need for service and repair of HEUI injection systems.
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 1st Edition Chapter Images found on Jim's web site @ www.jameshalderman.com











LINK CHP 14 Chapter Images USE BELOW LINK

http://www.jameshalderman.com/books_a9.html

NOTE: You can use Chapter Images or Power Point files: Though out Power Point Presentations, you will find questions and answers on slides that can be used for discussion..

ICONS	CH14 HEUI FUEL SYSTEM
	<p>1. SLIDE 1 CH14 HEUI FUEL SYSTEM</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p><u>Light Diesel (111 Links)</u></p> <p>http://www.jameshalderman.com/books_a9.html Crossword Puzzle (Microsoft Word) (PDF) Word Search Puzzle (Microsoft Word) (PDF)</p> <p><u>SAFETY</u> Always be very careful when working on a Diesel engine that is running with air intake removed. Because most diesel ENGINES DO NOT USE a throttle plate, objects can very easily be sucked into engine, causing serious engine damage. MOST OEMs offer intake covers.</p> <p>2. SLIDE 2 EXPLAIN FIGURE 14–1 HEUI injection system uses high-pressure engine oil to pressurize the injector.</p> <p>DISCUSS FREQUENTLY ASKED QUESTION: Is the HEUI Injector Used Anywhere Else?</p> <p>3. SLIDE 3 EXPLAIN FIGURE 14–2 typical HEUI injector with oil and fuel pressure.</p> <p>EXPLAIN TECH TIP Component Interchangeability Issues <u>DISCUSSION: ADVANTAGES & DISADVANTAGES OF HEUI SYSTEMS</u></p>

ICONS	CH14 HEUI FUEL SYSTEM
	4. SLIDE 4 EXPLAIN FIGURE 14-3 high-pressure oil pump provides the pressure needed for injector operation..
	5. SLIDE 5 EXPLAIN FIGURE 14-4 Common HEUI injectors.
	<u>DEMONSTRATION:</u> SHOW 3 generations of HEUI FUEL INJECTORS AND EXPLAIN HOW TO TELL THE DIFFERENCE
	<u>DISCUSSION:</u> DISCUSS CHART 14-1: Comparison of 3 HEUI injectors used by Ford.
	6. SLIDE 6 EXPLAIN FIGURE 14-5 Line drawings of HEUI-A filling and injecting fuel.
	7. SLIDE 7 EXPLAIN FIGURE 14-6 plunger and barrel of a HEUI-B injector.
	8. SLIDE 8 EXPLAIN FIGURE 14-7 injector module is located on the fender near the brake booster.
	INTERNATIONAL/NAVISTAR & CATERPILLAR CALLED IT THE INJECTOR CONTROL MODULE <u>IDM (INJECTOR DRIVER MODULE) FIGURE 14-7 AS TEXT DOES. FORD CALLED THIS COMPONENT FICM (Fuel Injector Control Module) as did GM on DURAMAX. This device acts like an ignition coil and boosts voltage to 115 volts outside PCM</u>
	<u>HANDS-ON TASK:</u> ;STUDENTS DOWNLOAD HEUI wiring diagram & TRACE CONTROL CIRCUIT WITH HIGHLIGHTER.
	DISCUSS REAL WORLD FIX Engine Runs Rough after Oil Pan Is Resealed (1 of 2)

ICONS	CH14 HEUI FUEL SYSTEM
 	<p>DISCUSS REAL WORLD FIX Engine Runs Rough after Oil Pan Is Resealed (2 of 2)</p>
 	<p>DISCUSS REAL WORLD FIX Multiple Injector Driver Module Replacements (1 of 2)</p>
 	<p>DISCUSS REAL WORLD FIX Multiple Injector Driver Module Replacements (2 of 2)</p>
	<p>DISCUSSION: DISCUSS CHART 14-2 scan tool data that indicates high-pressure oil desired as "Injection Control Pressure (ICP) and high-pressure pump control is shown as "Injection Control Duty Cycle</p>
	<p>9. SLIDE 9 EXPLAIN FIGURE 14-8 pressure gauge is installed for testing high-pressure oil pump.</p>
	<p>DEMONSTRATION: SHOW STUDENTS HOW TO CHECK HIGH-PRESSURE OIL PUMP</p>
	<p>HANDS-ON TASK: CHECK HIGH-PRESSURE OIL PUMP</p>