








# Automotive Heating and Air Conditioning, 7e

## Chapter 13 Hybrid and Electric Vehicle HVAC Systems

### Opening Your Class

KEY ELEMENT	EXAMPLES
<b>Introduce Content</b>	This course or class covers operation and service of <b>Automotive Heating and Air Conditioning, 7e</b> . It correlates material to task lists specified by ASE and NATEF.
<b>Motivate Learners</b>	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.
<b>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.</b>	<p>Explain the chapter learning objectives to the students.</p> <ol style="list-style-type: none"> <li>1. Prepare for the ASE Heating and Air Conditioning (A7) certification test content area "A" (A/C System Service, Diagnosis and Repair).</li> <li>2. Explain the basic operation of the air-conditioning system used in hybrid electric vehicles.</li> <li>3. Discuss the types of compressors used in a hybrid electric vehicle.</li> <li>4. Explain the components and modes of operation of a coolant heat storage system.</li> </ol>
<b>Establish the Mood or Climate</b>	Provide a <i>WELCOME</i> , Avoid put downs and bad jokes.
<b>Complete Essentials</b>	Restrooms, breaks, registration, tests, etc.
<b>Clarify and Establish Knowledge Base</b>	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	Ch13 Hybrid & Electric Vehicle HVAC Systems
      	<p>1. SLIDE 1 HYBRID &amp; ELECTRIC VEHICLE HVAC SYSTEMS</p> <p>2. SLIDES 2-3 EXPLAIN OBJECTIVES</p> <p>Check for <b>ADDITIONAL VIDEOS &amp; ANIMATIONS</b> @ <a href="http://www.jameshalderman.com/">http://www.jameshalderman.com/</a>  <b>WEB SITE IS CONSTANTLY UPDATED</b></p> <p>4. <b>SLIDE 4 EXPLAIN</b> Basic Operation of the Air-conditioning System Used in Hybrid Electric Vehicles</p> <p><b><u>SAFETY HAVE STUDENTS TALK ABOUT NEED FOR SAFETY PRECAUTIONS WHEN WORKING AROUND &amp; WITH HYBRID ELECTRIC VEHICLES. BOTH HYBRID ELECTRIC VEHICLES &amp; ALL-ELECTRIC VEHICLES USE HIGH-VOLTAGE CIRCUITS THAT CANNOT BE TOUCHED WITHOUT PROTECTION.</u></b></p> <p>5. <b>SLIDE 5 EXPLAIN</b> Types of Compressors Used in a Hybrid Electric Vehicle</p> <p>6. <b>SLIDE 6 EXPLAIN Figure 13–1</b> The A/C compressor clutch allows the compressor to engage and disengage as necessary while the ICE continues to run.</p> <p>7. <b>SLIDE 7 EXPLAIN</b> Types of Compressors Used in a Hybrid Electric Vehicle</p> <p><u>HYBRID AC COMPRESSOR</u></p> <p>8. <b>SLIDES 8-11 EXPLAIN</b> Components and Modes of Operation of a Coolant Heat Storage System</p> <p>12. <b>SLIDE 12 EXPLAIN Figure 13–9</b> Toyota’s coolant heat storage system. Note that the electric storage tank pump is located behind the coolant storage tank</p> <p>13. <b>SLIDE 13 EXPLAIN Figure 13–10</b> A vacuum exists between the inner and outer casing of the coolant heat storage tank. The outlet temperature sensor and the drain plug are located in the manifold at the bottom of the tank</p>

