

Hybrids & Alternative Fuel Vehicles

Chapter 13 Honda Hybrid Vehicles

Opening Your Class








KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Hybrid and Alternative Fueled Vehicles . 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. 1. Identify Honda hybrid electric vehicles. 2. Describe how the Honda Integrated Motor Assist (IMA) system works. 3. Explain the precautions necessary when working on Honda hybrid electric vehicles. 4. Describe the features and the operational characteristics of Honda hybrid electric vehicles. 5. Explain the service procedures for Honda hybrid electric vehicles
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.

NOTE: This lesson plan is based on Hybrids 4th Edition

Chapter Images found on Jim's web site @

www.jameshalderman.com

LINK CHP 13: [Chapter Images](#)

ICONS	Ch13 Honda Hybrid Vehicles
      	<p data-bbox="586 296 1114 331"><u>Ch13 Honda Hybrid Vehicles</u></p> <p data-bbox="626 350 1211 386">1. SLIDE 1 Honda Hybrid Vehicles</p> <p data-bbox="626 489 1390 562">Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/</p> <p data-bbox="626 575 1216 611">WEB SITE IS CONSTANTLY UPDATED</p> <p data-bbox="586 623 1406 772">At the beginning of this class, you can download the crossword puzzle & Word Search from the links below to familiarize your class with the terms in this chapter & then discuss them</p> <p data-bbox="626 789 1336 856">2. SLIDE 2 EXPLAIN FIGURE 13-1 First generation Honda Insight.</p> <p data-bbox="626 871 1398 1014">3. SLIDE 3 EXPLAIN FIGURE 13-2 i-VTEC on this Honda ICE is used to keep the valves closed on three of the cylinders to increase the amount of energy that can be recovered during deceleration.</p> <p data-bbox="626 1026 1395 1129">4. SLIDE 4 EXPLAIN FIGURE 13-3 Honda Civic hybrid engine showing the ignition and fuel system components, as well as the valve train and related components.</p> <p data-bbox="626 1142 1060 1178">EXPLAIN NOTE & TECH TIP</p> <p data-bbox="626 1299 1336 1367">5. SLIDE 5 EXPLAIN FIGURE 13-4 three modes of operation of the Civic VTEC system.</p> <p data-bbox="626 1381 1390 1524">6. SLIDE 6 EXPLAIN FIGURE 13-5 primary motor/generator is used to propel the vehicle and the secondary motor/generator is used to start the engine and charge the high-voltage battery</p> <p data-bbox="626 1537 1406 1640">7. SLIDE 7 EXPLAIN FIGURE 13-6 cutaway view of the two motor/generators used in the two-motor Honda hybrid electric vehicle.</p> <p data-bbox="626 1654 1362 1722">8. SLIDE 8 EXPLAIN FIGURE 13-7 dash display on a Honda Civic hybrid.</p> <p data-bbox="626 1734 927 1770">EXPLAIN TECH TIP</p>

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9. **SLIDE 9 EXPLAIN FIGURE 13-8** modes of operation of the Honda Civic hybrid and the assist and charging symbols displayed on the dash.

DISCUSS REAL WORLD FIX






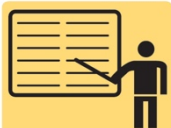



10. **SLIDE 10 EXPLAIN FIGURE 13-9** Major components of the Honda IMA system.
11. **SLIDE 11 EXPLAIN FIGURE 13-10** Under most conditions, the IMA motor is used to start the ICE.
12. **SLIDE 12 EXPLAIN FIGURE 13-11** During acceleration, the battery module provides electrical energy to the IMA motor to help accelerate the vehicle.
13. **SLIDE 13 EXPLAIN FIGURE 13-12** During deceleration, the IMA converts kinetic energy into electrical energy for recharging HV battery pack.


DISCUSS FREQUENTLY ASKED QUESTION







14. **SLIDE 14 EXPLAIN FIGURE 13-13** Instrument display on a Civic hybrid, which shows auto stop light.

EXPLAIN NOTE

15. **SLIDE 15 EXPLAIN FIGURE 13-14A** Honda Civic CVT uses a metal drive chain that operates between 2 cones called a variator. These 2 cones have a very smooth surface and can be damaged if dirt gets into one of 2 units.
16. **SLIDE 16 EXPLAIN FIGURE 13-14B** Honda Civic hybrid CVT transaxle uses a start clutch rather than torque converter. Because the torque converter, which normally drives a pump to supply hydraulic fluid to component is not used, Honda Civic CVT unit uses a chain-driven pump driven by input shaft.

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	<p>17. SLIDE 17 EXPLAIN FIGURE 13-15 upstream oxygen sensor is a lean air–fuel ratio (LAF) sensor on this Honda Accord V-6, whereas the downstream is a conventional Zirconia four-wire heated oxygen sensor.</p>
	<p>EXPLAIN TECH TIP</p>
	<p>EXPLAIN NOTE & CAUTION</p>
	<p>18. SLIDE 18 EXPLAIN FIGURE 13-16 view of the battery pack and the electronic assemblies after removing the rear seat and the steel panel.</p>
	<p>19. SLIDE 19 EXPLAIN FIGURE 13-17 One six-cell segment of the battery module. The protective plastic covering has been removed. The thin strip taped alongside the batteries is a temperature sensor used by the battery condition monitor to help determine charging and discharging rate based on the temperature of the batteries. While this sensor cannot detect a failure in any one battery, it is capable of detecting a fault in a single strip of batteries.</p>
	<p>20. SLIDE 20 EXPLAIN FIGURE 13-18 battery, as well as the electronics, are cooled through this vent on a Honda Civic hybrid. Blocking the airflow through this vent could cause serious damage to the hybrid system and would likely cause setting of a diagnostic trouble code.</p>
	<p>21. SLIDE 21 EXPLAIN FIGURE 13-19 Cooling airflow through intelligent power unit (IPU) of Honda Civic</p>
	<p>EXPLAIN TECH TIP</p>
	<p>22. SLIDE 22 EXPLAIN FIGURE 13-20 heat sink can be seen through the opening where cabin air is drawn through the unit by a fan.</p> <p>23. SLIDE 23 EXPLAIN FIGURE 13-21 entire Honda Insight hybrid IPU assembly is shown removed and</p>

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	<p>placed on the floor.</p> <p>24. SLIDE 24 EXPLAIN FIGURE 13-22 Honda Civic hybrid IMA assembly.</p> <p>25. SLIDE 25 EXPLAIN FIGURE 13-23 conventional 12-volt battery is located under hood on Honda vehicles.</p> <p>26. SLIDE 26 EXPLAIN FIGURE 13-24 cutaway of a Honda electric power steering assembly.</p> <p>DISCUSS FREQUENTLY ASKED QUESTION</p> <p>27. SLIDE 27 EXPLAIN FIGURE 13-25 spark plugs used in Honda Insight are indexed & labeled with letter on top</p> <p>DISCUSS FREQUENTLY ASKED QUESTION</p> <p>EXPLAIN TECH TIP</p> <p>DISCUSS 3 REAL WORLD FIXES</p> <p>28. SLIDE 28 EXPLAIN FIGURE 13-26A After removing the back seat, remove the access panel to reach the shut-off switch for the high-voltage system.</p> <p>29. SLIDE 29 EXPLAIN FIGURE 13-26B Remove the red retainer and flip the switch to the off position. Reinstall the red retainer to prevent the switch from accidentally being moved to the on position.</p> <p>EXPLAIN SAFETY TIP EXPLAIN TECH TIP</p> <p>30. SLIDE 30 EXPLAIN FIGURE 13-27 (a) For best results when diagnosing a Honda hybrid electric vehicle, use the factory scan tool.</p> <p>31. SLIDE 31 EXPLAIN FIGURE 13-27 (b) A screen shot of Honda scan data as displayed on a laptop computer.</p>

ICONS	Ch13 Honda Hybrid Vehicles
	EXPLAIN TECH TIP
	DISCUSS REAL WORLD FIX
	EXPLAIN 2 TECH TIPS
	<p>32. SLIDE 32 EXPLAIN FIGURE 13-28 dipstick from Honda hybrid CVT transaxle. Always clean around the dipstick before removing to prevent the possibility of dirt getting into and contaminating the fluid and causing serious transaxle damage.</p>
	DISCUSS REAL WORLD FIX
	EXPLAIN TECH TIP