









Automotive Heating and Air Conditioning, 7e

Chapter 8 Air Management System

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of Automotive Heating and Air Conditioning, 7e . 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. <ol style="list-style-type: none">1. Prepare for the ASE Heating and Air Conditioning (A7) certification test content area "A" (A/C System Service, Diagnosis and Repair).2. Discuss the different components of an air management system.3. Explain airflow control and air temperature control in an A/C system.4. Discuss plenum and control doors.5. Explain nonelectrical and electronic HVAC controls.
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.

ICONS	Ch08 Air Management System
       	<p>1. SLIDE 1 AIR MANAGEMENT SYSTEM</p> <p>2. SLIDES 2-3 EXPLAIN OBJECTIVES</p> <p>Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/ WEB SITE IS CONSTANTLY UPDATED</p> <p>4. SLIDE 4 EXPLAIN Different Components of an Air Management System</p> <p>5. SLIDE 5 EXPLAIN Figure 8–10 A typical HVAC housing that often has to be removed from the vehicle as an assembly to get access to the heater core and evaporator.</p> <p>6. SLIDE 6 EXPLAIN Different Components of an Air Management System</p> <p><u>HVAC FUNCTIONS</u> <u>HVAC MODES, AIR INLET & DISCHARGE</u> <u>HVAC SYSTEM</u></p> <p>7. SLIDE 7 EXPLAIN Airflow Control and Air Temperature Control in an A/C System</p> <p>8. SLIDE 8 EXPLAIN Figure 8–6 Many air control doors swing on their upper and lower pivots, in red.</p> <p>9. SLIDE 9 EXPLAIN Airflow Control and Air Temperature Control in an A/C System</p> <p>10. SLIDE 10 EXPLAIN Figure 8–8 blower motor forces air to flow through the A/C evaporator to remove moisture from the air before it is sent through the heater core where the air is heated before being directed to the defrost and floor vents.</p> <p>11. SLIDES 11-16 EXPLAIN Plenum and Control Doors</p> <p><u>BLOWER CONTROL, MANUAL</u> <u>BLOWER CONTROL, PWM</u> <u>BLOWER</u></p> <p>17. SLIDE 17 EXPLAIN Figure 8–12 (a) The temperature and mode doors swing to direct all of the cool air past the heater core, (b) through the core to become hot, (c) or to blend hot and cool air.</p>

ICONS

Ch08 Air Management System



HVAC MODES, TEMPERATURE CHANGE COOL
HVAC MODES, TEMPERATURE CHANGE HEAT



18. SLIDE 18 EXPLAIN Figure 8–14 Ducts are placed in the center console or on the floor under the front seats to provide heated and cooled air to the rear seat passengers

19. SLIDE 19 EXPLAIN Nonelectrical and Electronic HVAC Controls



20. SLIDE 20 EXPLAIN Figure 8–16 Many older vehicles used vacuum actuators to move HVAC doors. When vacuum actuators operate, they alter air–fuel mixture in engine. Because vacuum controls affect engine operation and therefore emissions, recent vehicles use electric control systems.



21. SLIDES 21-25 EXPLAIN Nonelectrical and Electronic HVAC Controls



26. SLIDE 26 EXPLAIN Figure 8–18 two-wire HVAC electronic actuator where the direction of rotation is controlled by the HVAC control head or module, which changes direction of rotation by changing polarity of power and ground connection at motor.

27. SLIDE 27 EXPLAIN Figure 8–19 Three-wire actuators include a logic chip inside the motor assembly. The HVAC control module then sends a 0 volt to 5 volt signal to the motor assembly to control the direction of rotation.






28. SLIDE 28 EXPLAIN Figure 8–20 typical five-wire HVAC actuator showing the two wires used to power the motor and the three wires used for the motor position potentiometer.



NATEF MAST TASK A7D1: INSPECT AND TEST A/C-HEATER BLOWER MOTORS, RESISTORS, SWITCHES, RELAYS, WIRING, AND PROTECTION DEVICES; PERFORM NECESSARY ACTION. P1



NATEF MAST TASK A7D3: DIAGNOSE MALFUNCTIONS IN THE VACUUM, MECHANICAL, AND ELECTRICAL COMPONENTS AND CONTROLS OF THE HEATING, VENTILATION, AND A/C (HVAC) SYSTEM; DETERMINE NECESSARY ACTION. P2

ICONS	Ch08 Air Management System
	<p><u>NATEF MAST TASK A7D4:</u> INSPECT AND TEST A/C-HEATER CONTROL PANEL ASSEMBLY; DETERMINE NECESSARY ACTION. P3</p>
	<p><u>NATEF MAST TASK A7D5:</u>INSPECT AND TEST A/C-HEATER CONTROL CABLES, MOTORS, AND LINKAGES; PERFORM NECESSARY ACTION. P3</p>
	<p><u>NATEF MAST TASK A7D6:</u> INSPECT A/C-HEATER DUCTS, DOORS, HOSES, CABIN FILTERS, AND OUTLETS; PERFORM NECESSARY ACTION. P1</p>
	<p><u>NATEF MAST TASK A7D7:</u> IDENTIFY THE SOURCE OF A/C SYSTEM ODORS. P2</p>
	<p>29. SLIDE 29 EXPLAIN Summary</p>