

Automotive Technology 6th Edition
Chapter 66
Heating and Air-Conditioning System Diagnosis
Lesson Plan

CHAPTER SUMMARY:



1. HVAC diagnostic procedure and heater diagnosis
 2. Checking A/C system performance
 3. Temperature and pressure measurements
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OBJECTIVES:



1. List the steps to diagnose HVAC problems.
 2. Explain how to diagnose a heating system problem.
 3. Describe how to check the performance of the A/C system.
 4. Explain the procedures to measure temperature and pressure in A/C systems.
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RESOURCES: (All resources may be found at <http://www.jameshalderman.com>)



1. Task Sheet ASE (A7-A-2) P-1: Air Conditioning Work Order
 2. Task Sheet ASE (A7-A-3) P-1: Air-Conditioning System Performance Test
 3. Task Sheet ASE (A7-A-4) P-1: Air Conditioning Noise Diagnosis
 4. Task Sheet ASE (A7-A-5) P-1: Refrigerant Identification/Read Pressures
 5. Task Sheet ASE (A7-A-6) P-1: Leak Test the Air Conditioning System
 6. Task Sheet ASE (A7-A-7) P-2, (A7-A-8) P-1: Refrigerant Oil
 7. Task Sheet ASE (A7-B-5) P-3: Determine Need for Refrigerant Filter
 8. Task Sheet ASE (A7-C-2) P-2, (A7-C-3) P-2: Heating System Performance Check
 9. Task Sheet ASE (A7-C-1) P-1, (A7-C-2) P-2: Cooling System Inspection
 10. Task Sheet ASE (A7-D-7) P-1: Thermostat Replacement
 11. Task Sheet ASE (A1-D-8) P-1: Cooling Fan and Related Inspections
 12. Task Sheet ASE (A7-C-4) P-2: Heater System Service
 13. Task Sheet ASE (A7-D-1) P-1: Blower Motor Diagnosis
 14. Task Sheet ASE (A7-B-2) P-2: A/C Compressor Clutch Control Diagnosis
 15. Task Sheet ASE (A7-D-4) P-3, (A7-D-5) P-3: Air Conditioning Control System Diagnosis
 16. Task Sheet ASE (A7-A-1) P-1, (A7-C-3) P-2, (A7-D-7) P-2: Identify Heating and A/C Concerns
 17. Chapter PowerPoint
 18. Chapter Crossword Puzzle and Word Search
 19. Animations: Heater Operation, Leak Detector Maintenance, and Pressure Checks - Excess Pressure
 20. Animations: Pressure Checks, Low Pressure and Refrigerant Leak Detector
 21. Animations: Remove and Replace Service Valve and Remove and Replace Service Valve Core
 22. Animations: Test Compressor Clutch Circuit with Clamp Meter
 23. Animations: Test Compressor Clutch Circuit with Test Light
 24. Animations: Test Compressor Clutch Circuit with Volt Meter
 25. Videos: See list at the end of the lesson plan.
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DEMO

ACTIVITIES:

1. **Task Sheet ASE (A7-A-2) P-1:** Have students complete Air Conditioning Work Order Task Sheet.
2. **Task Sheet ASE (A7-A-3) P-1:** Have students complete Air-Conditioning System Performance Test Task Sheet.
3. **Task Sheet ASE (A7-A-4) P-1:** Have students complete Air Conditioning Noise Diagnosis Task Sheet.
4. **Task Sheet ASE (A7-A-5) P-1:** Have students complete Refrigerant Identification/Read Pressures Task Sheet.
5. **Task Sheet ASE (A7-A-6) P-1:** Have students complete Leak Test the Air Conditioning System Task Sheet.
6. **Task Sheet ASE (A7-A-7) P-2, (A7-A-8) P-1:** Have students complete Refrigerant Oil Task Sheet.
7. **Task Sheet ASE (A7-B-5) P-3:** Have students complete Determine Need for Refrigerant Filter Task Sheet.
8. **Task Sheet ASE (A7-C-2) P-2, (A7-C-3) P-2:** Have students complete Heating System Performance Check Task Sheet.
9. **Task Sheet ASE (A7-C-1) P-1, (A7-C-2) P-2:** Have students complete Cooling System Inspection Task Sheet.
10. **Task Sheet ASE (A7-D-7) P-1:** Have students complete Thermostat Replacement Task Sheet.
11. **Task Sheet ASE (A1-D-8) P-1:** Have students complete Cooling Fan and Related Inspections Task Sheet.
12. **Task Sheet ASE (A7-C-4) P-2:** Have students complete Heater System Service Task Sheet.
13. **Task Sheet ASE (A7-D-1) P-1:** Have students complete Blower Motor Diagnosis Task Sheet.
14. **Task Sheet ASE (A7-B-2) P-2:** Have students complete A/C Compressor Clutch Control Diagnosis Task Sheet.
15. **Task Sheet ASE (A7-D-4) P-3, (A7-D-5) P-3:** Have students complete Air Conditioning Control System Diagnosis Task Sheet.
16. **Task Sheet ASE (A7-A-1) P-1, (A7-C-3) P-2, (A7-D-7) P-2:** Have students complete Identify Heating and A/C Concerns Task Sheet.

ASSIGNMENTS:

1. Chapter crossword and word search puzzles.
2. Complete end of chapter 10 question quiz.

CLASS DISCUSSION:

1. Review and group discussion chapter [Frequently Asked Questions](#) and [Tech Tips](#) sections.
2. Review and group discussion of the five (5) chapter [Review Questions](#).

NOTES AND EVALUATION:

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Videos: (at <http://www.jameshalderman.com>)

A/C leak detection (time 1:27)
Low pressure sensor testing (time 2:50)
High pressure sensor testing (time 2:32)
A/C diagnosis (time 9:16)
Leak detection (time 2:48)
Leak detection (time 1:01)
Pressure testing (time 5:25)
A/C troubleshooting part 1 (time 9:11)
A/C troubleshooting part 2 (time 6:59)
A/C diagnosis (time 10:31)
A/C leak detection (time 2:16)
A/C temperature testing (time 6:30)
HVAC Scan Tool Data (time 1:08)
No heat (time 4:52)