

Automotive Technology 6th Edition

Chapter 67 – Heating and Air-Conditioning System Service

Lesson Plan



CHAPTER SUMMARY:

1. Blower motor service, cooling system service, and refrigerant recovery procedures
 2. Evacuation procedures, noncondensable gases and refrigerant recycling
 3. Recharging a system and retrofitting a CFC-12 system to an HFC-124A system
 4. Compressor service, condenser service, and evaporator service
 5. Receiver/drier or accumulator/drier service and orifice tube/expansion valve service
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OBJECTIVES:

1. Discuss blower motor service, cooling system service, and refrigerant recovery procedures.
 2. Describe evacuation procedures and how to identify noncondensable gas in refrigerant.
 3. Explain how to recycle refrigerants, recharge a system, and retrofit a CFC-12 system to an HFC-134A system.
 4. Describe how to service the compressor, condenser, evaporator, receiver/drier or accumulator/drier, and orifice tube/expansion valve.
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RESOURCES: (All resources may be found at <http://www.jameshalderman.com>)

1. Task Sheet ASE (A7-B-1) P-1, (A7-B-2) P-2, (A7-B-3) P2: Air Conditioning Compressor Service
 2. Task Sheet ASE (A7-B-7) P-1: Inspect the Air Conditioning Condenser
 3. Task Sheet ASE (A7-B-8) P-2: Receiver/Drier Accumulator Drier
 4. Task Sheet ASE (A7-B-9) P-1: Replace Expansion Valve/Orifice Tube
 5. Task Sheet ASE (A7-B-6) P-2: A/C Hoses and Lines
 6. Task Sheet ASE (A7-B-10) P-1: Evaporator Housing Drain
 7. Task Sheet ASE (A7-B-12) P-2, (A7-C-4) P-2: Evaporator Replacement
 8. Task Sheet ASE (A7-B-13) P-2: Condenser Replacement
 9. Task Sheet ASE (A7-C-1) P-1: Inspect Belts and Hoses
 10. Task Sheet ASE (A7-E-1) P-1: Refrigerant Handling Equipment
 11. Task Sheet ASE (A7-E-2) P-1: Identify and Recover Refrigerant
 12. Task Sheet ASE (A7-E-3) P-1: Recycle Refrigerant
 13. Task Sheet ASE (A7-E-1) P-1: Evacuate and Charge A/C System
 14. Chapter PowerPoint
 15. Chapter Crossword Puzzle and Word Search
 16. Animations: See list at the end of the lesson plan.
 17. Videos: System evacuate (time 0:42), System evacuation (time 8:58), and A/C recharge (time 1:09)
 18. Videos: Evacuating the system (time 0:43), and Refrigerant recycling (time 9:12)
 19. Videos: Refrigerant recovery (time 9:08)
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ACTIVITIES:

1. **Task Sheet ASE (A7-B-1) P-1, (A7-B-2) P-2, (A7-B-3) P2:** Have students complete Air Conditioning Compressor Service Task Sheet.
 2. **Task Sheet ASE (A7-B-7) P-1:** Have students complete Inspect the Air Conditioning Condenser Task Sheet.
 3. **Task Sheet ASE (A7-B-8) P-2:** Have students complete Receiver/Drier Accumulator Drier Task Sheet.
 4. **Task Sheet ASE (A7-B-9) P-1:** Have students complete Replace Expansion Valve/Orifice Tube Task Sheet.
 5. **Task Sheet ASE (A7-B-6) P-2:** Have students complete A/C Hoses and Lines Task Sheet.
 6. **Task Sheet ASE (A7-B-10) P-1:** Have students complete Evaporator Housing Drain Task Sheet. Task Sheet.
 7. **Task Sheet ASE (A7-B-12) P-2, (A7-C-4) P-2:** Have students complete Evaporator Replacement Task Sheet.
 8. **Task Sheet ASE (A7-B-13) P-2:** Have students complete Condenser Replacement Task Sheet.
 9. **Task Sheet ASE (A7-C-1) P-1:** Have students complete Inspect Belts and Hoses Task Sheet.
 10. **Task Sheet ASE (A7-E-1) P-1:** Have students complete Refrigerant Handling Equipment Task Sheet.
 11. **Task Sheet ASE (A7-E-2) P-1:** Have students complete Identify and Recover Refrigerant Task Sheet.
 12. **Task Sheet ASE (A7-E-3) P-1:** Have students complete Recycle Refrigerant Task Sheet.
 13. **Task Sheet ASE (A7-E-1) P-1:** Have students complete Evacuate and Charge A/C System Task Sheet.
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ASSIGNMENTS:

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

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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.
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NOTES AND EVALUATION:



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

See next page:

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

A/C Performance Test	Refrigerant Service, Evacuation
A/C Proper Charge Level	Refrigerant Service, Recovery
Accumulator Remove and Replace	Remove and Replace Cabin Air Filter
Compressor Remove and Replace	Remove and Replace Drive Belt
Condenser Remove and Replace	Remove and Replace Clutch Plate, Set Air Gap
Heater Core Remove and Replace	Remove and Replace Service Valve Core
Identify Refrigerant, Professional	Remove Orifice with Special Tool
Identify Refrigerant, Economy	Service Fitting and Quick-Connect Coupler
Inline Filter Install	Test Blower Motor with Clamp Meter
Inline Orifice Tube Install	Test Blower Motor with Test Light
Leak Detector Maintenance	Test Compressor Clutch Circuit with Test Light
Orifice Tube Remove and Replace	Test Compressor Clutch Circuit with Volt Meter
Refrigerant Leak Detector Operation	Vacuum Pump Maintenance
Refrigerant Service, Charge	