



Air Conditioning Systems: Automotive A/C Theory, Diagnosis, Service, and Recovery

This five-day course introduces the principles of automotive air conditioning theory and system applications. Topics include the diagnosis, service, and recovery of the air conditioning system.

I. Air Conditioning Systems Overview

II. Electrical Circuits

- A. Blower Circuits
- B. Compressor Clutch Circuits - Typical
- C. Coolant Fan Circuits - Typical

III. Theory of Operation

- A. Heat Transfer
- B. Change of State
- C. Latent Heat
- D. Boiling Temperature/Pressure Relationship
- E. Introducing R-12
- F. R-12 Temperature/Pressure Relationship
- G. R-12 Boiling Point/Pressure Relationship
- H. Basic Air Conditioning System

IV. Component Operation

- A. Expansion Valve Operation
- B. Orifice Tubes
- C. Receivers/Dryers and Accumulators
- D. Compressors
- E. Regulating Evaporator Pressure
- F. Compressor Control Valve
- G. Personal Safety

V. Diagnostic Procedures

- A. System Function Tests
- B. Gauge Hook-Up
- C. System Service Valves
- D. System Performance Test

VI. System Servicing

- A. Service Tools
- B. Refrigerant Recovery: Draining the System
- C. Evacuating the System
- D. Leak Testing
- E. Oil Level

- F. Gauge Diagnosis
- G. Low Refrigerant Charge
- H. Moisture in the System
- I. Bad or Misadjusted Cycling Clutch Switch
- J. Clogged Expansion Valve
- K. Expansion Valve Flooding or Stuck Open
- L. High-Side Restriction
- M. Compressor Problem: EPR, POA, or STV Sticks Open or Closed
- N. Condenser Problem: System Overcharged, Engine Overheating, or Engine Cooling Fan Not Working Properly

VII. Repair Procedures

- A. O-Rings and Gaskets
- B. Orifice Tube Replacement
- C. Orifice Tube Repair Kit
- D. Accumulator Replacement
- E. Receiver/Dryer Replacement
- F. Rubber Hose Repairs
- G. Filter Installation
- H. VIR Desiccant Bag Replacement
- I. Expansion Valve Replacement
- J. Evaporator Pressure Regulator Valve Replacement
- K. Compressor Clutch Replacement
- L. Compressor Replacement

VIII. Environmental Regulations

- A. Refrigerant Recovery
- B. HFC-134a
- C. Chrysler/AMC Service Bulletins
- D. Ford Service Bulletins
- E. General Motors Service Bulletins
- F. European Import Service Bulletins
- G. Miscellaneous Japanese Service Bulletins

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