

Automotive Heating and Air Conditioning, 7e

Chapter 12 Automatic Temperature Control Systems

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.	<p>Explain the chapter learning objectives to the students.</p> <ol style="list-style-type: none"> 1. Discuss the purpose and function of automatic temperature control (ATC) systems. 2. Discuss the sensors used in ATC systems. 3. State the need for airflow control. 4. Discuss the purpose of automatic HVAC controls. 5. Discuss how to diagnose the electrical ATC system faults. 6. Explain the climatic control diagnostic procedure. 7. Explain the types of actuators in ATC systems.
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

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1. SLIDE 1 AUTOMATIC TEMPERATURE CONTROL SYSTEMS

2. SLIDES 2-3 EXPLAIN OBJECTIVES

Check for **ADDITIONAL VIDEOS & ANIMATIONS**
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4. SLIDES 4-5 EXPLAIN Purpose and Function of Automatic Temperature Control (ATC) Systems

DEMONSTRATION: SHOW STUDENTS AN EXAMPLE OF A SENSOR FROM AN AUTOMATIC A/C SYSTEM AND DESCRIBE ITS FUNCTION.

6. SLIDES 6-13 EXPLAIN Sensors Used in ATC Systems

[Automatic Temperature Control, ATC Sun Load](#)
[Automatic Temperature Control, ATC Temperature, Heat](#)
[Automatic Temperature Control, ATC Air Quality](#)
[Automatic Temperature Control, ATC Temp. Cool, Adjust](#)
[Automatic Temperature Control, ATC Temp. Cool](#)
[Automatic Temperature Control, ATC Temp. Humidity](#)

DISCUSSION: BREAK CLASS INTO 2 GROUPS. HAVE HALF CLASS TEST THE OTHER ON THE TYPICAL SETTINGS FOR HEATING AND AIR CONDITIONING; THEN REVERSE GROUPS TO TEST SETTINGS FOR VENTILATION & DEFOGGING OR DEFROSTING THE INSIDE FRONT WINDSHIELD.

DISCUSSION: ASK STUDENTS TO TALK ABOUT THE FUNCTIONS OF ALL THE SENSORS RELATING TO AUTOMATIC A/C SYSTEMS. ASK STUDENTS TO IDENTIFY WHERE EACH SENSOR IS LOCATED AND WHAT ITS FUNCTION IS.

HANDS-ON TASK: ASK STUDENTS TO GO TO A LAB VEHICLE EQUIPPED WITH AUTO A/C & IDENTIFY WHERE EACH SENSOR IS LOCATED AND LABEL IT WITH MASKING TAPE OR STICKY NOTE.

ICONS

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14. **SLIDE 14 EXPLAIN** Figure 12–2 The outside air temperature sensor is mounted on the radiator core support in front of the A/C condenser on this vehicle.
15. **SLIDE 15 EXPLAIN** Need for Airflow Control
16. **SLIDE 16 EXPLAIN** Purpose of Automatic HVAC Controls



DEMONSTRATION: SHOW STUDENTS AN EXAMPLE OF A VACUUM CONTROL CIRCUIT. DESCRIBE HOW IT WORKS AND WHERE IT IS USED.
DOWNLOAD ONE



DEMONSTRATION: SHOW AN EXAMPLE OF AN ELECTRIC SERVOMOTOR CIRCUIT. DESCRIBE HOW IT WORKS AND WHERE IT IS USED.



FAULTY BLOWER MOTOR OPERATION CAN OFTEN BE TRACED TO A BAD BLOWER MOTOR RESISTOR.



17. **SLIDE 17 EXPLAIN** How to Diagnose Electrical ATC System Faults



SHOW VIDEO: 3 MINUTES: AUTOMATIC AC DIAGNOSIS

[HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYLABS/AKAMAI/TEMPLATE/VIDEO640X480.PHP?TITLE=DIAGNOSING%20AUTOMATIC%20TEMPERATURE%20CONTROL&CLIP=PANDC/CHET/2012/AUTOMOTIVE/TEST_READINESS_A7/A7_CD_T15.MOV&CAPTION=CHET/CHET_MYLABS/AKAMAI/2012/AUTOMOTIVE/TEST_READINESS_A7/XML/A7_CD_T15.XML](http://media.pearsoncmg.com/ph/chet/chet_myLABS/akamai/TEMPLATE/VIDEO640X480.PHP?TITLE=DIAGNOSING%20AUTOMATIC%20TEMPERATURE%20CONTROL&CLIP=PANDC/CHET/2012/AUTOMOTIVE/TEST_READINESS_A7/A7_CD_T15.MOV&CAPTION=CHET/CHET_MYLABS/akamai/2012/AUTOMOTIVE/TEST_READINESS_A7/XML/A7_CD_T15.XML)








18. **SLIDE 18 EXPLAIN** Figure 12–15 **TECH 2** scan tool factory scan tool used on GM vehicles.
19. **SLIDES 19-20 EXPLAIN** Automatic Climatic Control Diagnostic Procedure



21. **SLIDE 21 EXPLAIN** Types of Actuators in ATC Systems
22. **SLIDE 22 EXPLAIN** Figure 12–9 3 electric actuators can be easily seen on this demonstration unit. However, accessing these actuators in a vehicle can be difficult.



DEMONSTRATION: SHOW AN ACTUATOR FROM AN AUTOMOTIVE A/C SYSTEM AND DESCRIBE ITS FUNCTION

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    	<p>DISCUSSION: ASK STUDENTS TO DISCUSS THE ELECTRONIC CONTROLS OF AN AUTOMATIC A/C SYSTEM. WHICH ARE INPUT AND WHICH ARE OUTPUT CONTROLS?</p> <p>HANDS-ON TASK: HAVE STUDENTS <u>LABEL</u> ELECTRONIC CONTROLS OF AN AUTOMATIC A/C SYSTEM & SHOW WHICH ARE INPUT AND OUTPUT CONTROLS? <u>USE STICKY NOTES OR MASKING TAPE</u></p> <p>NATEF MAST TASK A7D8: CHECK OPERATION OF AUTOMATIC OR SEMI-AUTOMATIC HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC) CONTROL SYSTEMS; DETERMINE NECESSARY ACTION. P2</p> <p>23. SLIDES 23-27 EXPLAIN Summary</p>