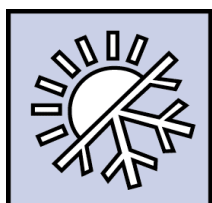




LEVEL 1



Air Conditioning Operation & Diagnosis

TC070-15-01H

Student Guide

**Mazda Motor Corporation
Technical Service Training**



Masters

OUTLINE

Air conditioning operation & diagnosis course is 2-day training and centered on Manual air conditioning system. Through this course, you can learn most frequent services for air conditioning, such as Performance check, Refrigerant charge, and Symptom troubleshooting.

The course begins with reviewing A/C Fundamentals (Mazda Masters Level F); you are required to bring your textbook "A/C Fundamentals" to this training session.

Student guide and Student activity sheet are to be provided before the session starts. In the Student guide and the Student activity sheet, you will find some questions and tables that some information is intentionally removed. Try to answer to the question in reference to what you have learnt so far and get information from relevant service materials, such workshop manual and wiring diagram.

NOTE This course is developed based on the service materials of Mazda 3 included in the CD-ESI (Electronic Service Information) 2/2004 Ver. 3.0 CD08-XX-04BE.

OBJECTIVES

After completing this course, you will be able to:

- Describe a refrigeration cycle and what part the components play in the cooling process.
- Identify major components of a manual A/C system
- Identify the components of Manual Air Conditioner and distinguish the components from those of Full-auto Air Conditioner.
- Describe a control system and how the system controls the Manual Air Conditioner.
- Identify major components of a manual A/C system
- Locate A/C system protection devices
- Explain the function of protection devices
- Conduct A/C performance checks
- Perform A/C refrigerant charging
- Perform checks for A/C components
- Isolate trouble cause based on Symptom based approach

CONTENTS

SG00 – General

SG01 – Basic System

- Activity01 - Identifying A/C Components
- Activity02 - Locating A/C Protection Devices
- Activity03 - A/C performance Check
- Activity04 - Refrigerant Charging

SG02 – Control System [Manual Air-conditioning]

- Activity05 - Units and parts checks*
- Activity06 - Symptom troubleshooting

AIR CONDITIONING

SG00 - General

TIMETABLE


Day 1		
Time	Session	Remark
8:30 – 9:00	Introductions	
9:00 – 10:20	Review A/C Fundamentals	A/C Fundamentals textbook
10:20 – 10:30	Break	
10:30 – 11:50	Basic System	SG (Classroom)
12:00 – 13:00	Lunch	
13:00 – 14:50	Identifying AC Components Locating AC Protection Devices Refrigerant Pressure Check	SG Activity (Workshop)
14:50 – 15:00	Break	
15:00 – 17:00	Performance Check	SG Activity (Workshop)

Day 2		
Time	Session	Remark
8:30 – 9:50	Control System	SG (Classroom)
9:50 – 10:00	Break	
10:00 – 11:50	Units and parts checks	SG Activity (Workshop)
12:00 – 13:00	Lunch	
13:00 – 14:50	Symptom troubleshooting	SG Activity (Workshop)
14:50 – 15:00	Break	
15:00 – 16:40	Course completion test	
16:40 – 17:00	Session evaluation Conclusion	Attendees satisfaction survey

This schedule is subject to change when necessary.

AIR CONDITIONING

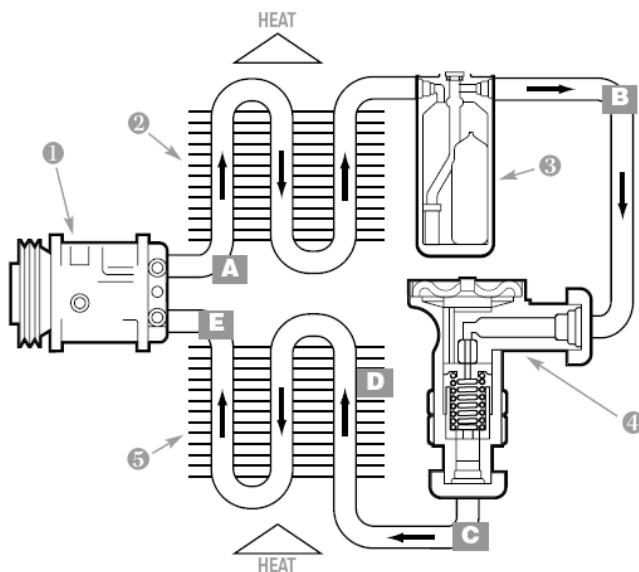
SG00b - Pre-Test


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1. Technician A says the refrigerant used in the A/C system absorbs and releases large amounts of heat as it changes from a liquid to a gas. Technician B says as the refrigerant circulates through the tubes and hoses of an operating A/C system, it constantly changes from a liquid to a gas and back to a liquid again.

Who is correct?

- Technician A
- Technician B
- Both Technicians
- Neither technician



2. Technician A says that at point E in this illustration the refrigerant is high pressure vapor. Technician B says at point E in this illustration the refrigerant is a low pressure vapor.

Who is correct?

- Technician A
- Technician B
- Both Technicians
- Neither technician

3. One BTU is the amount of heat needed at sea level to raise the temperature of one pound of water;

- One degree Centigrade
- Ten degrees Centigrade
- Ten degrees Fahrenheit
- One degree Fahrenheit


4. Technician A says the latent heat applied to change a substance from a liquid to a vapor is called the latent heat of vaporization.

Technician B says the latent heat applied to change a substance from a liquid to a vapor is called the latent heat of condensation.

- Technician A
- Technician B
- Both Technicians
- Neither technician

AIR CONDITIONING

SG00b - Pre-Test

 TC070-15-01H

5. Technician A says in a Mazda A/C system the refrigerant changes state from a liquid to a vapor in the compressor while losing heat.

Technician B says the compressor acts as a pump for the refrigerant in an A/C system.

Who is correct?

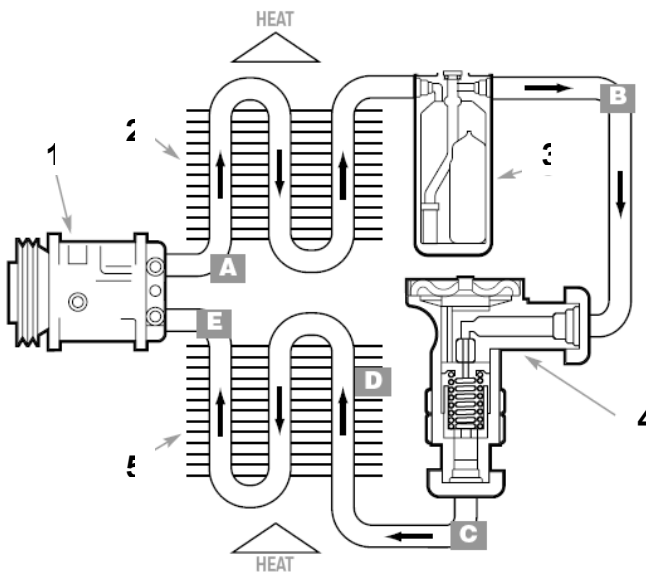
- a. Technician A
- b. Technician B
- c. Both Technicians
- d. Neither technician

6. Technician A says the compressor increases the temperature of the vaporized refrigerant without adding heat.

Technician B says the compressor raises the pressure of the vaporized refrigerant and not the temperature.

Who is correct?

- a. Technician A
- b. Technician B
- c. Both Technicians
- d. Neither technician



7. Which component in this illustration receives hot, high pressure refrigerant gas from the compressor and transfers the heat to the outside air.

- a. 2
- b. 3
- c. 4
- d. 5

8. Technician A says the expansion valve or orifice tube controls the amount of refrigerant entering the evaporator.


Technician B says the accumulator regulates the refrigerant flow to the evaporator.

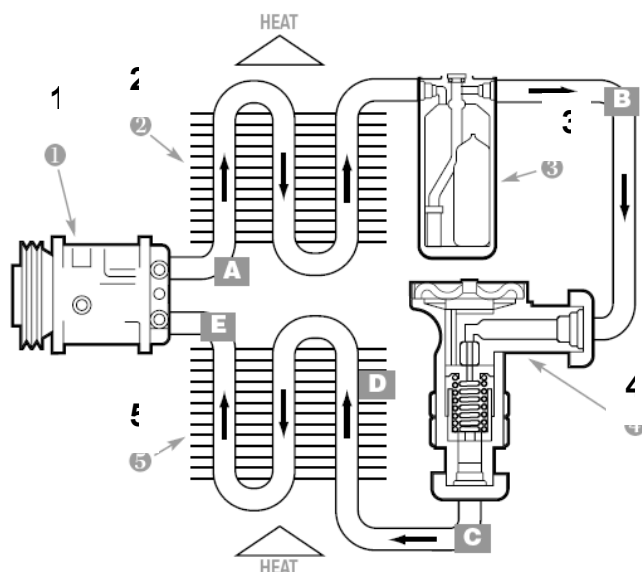
Who is correct?

- a. Technician A
- b. Technician B
- c. Both Technicians
- d. Neither technician

AIR CONDITIONING

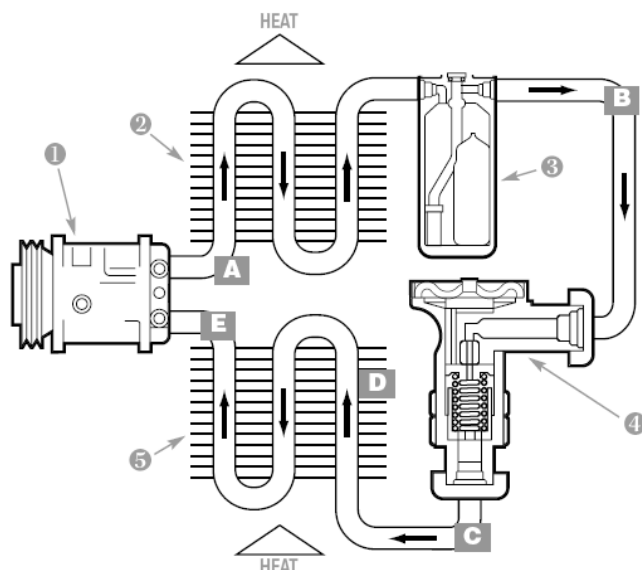
SG00b - Pre-Test

 **TC070-15-01H**



9. Which component in this illustration removes heat from the passenger compartment and transfers it to the refrigerant?

- a. 2
- b. 3
- c. 4
- d. 5



10. At point A the refrigerant is;

- a. High pressure liquid
- b. High pressure vapor
- c. Low pressure liquid
- d. Low pressure vapor

11. Technician A says R-12 and R-134a system have different-sized service valves, to prevent accidental mixing of refrigerants.

Technician B says R-134a systems use larger, metric-thread, quick connect service valves.

Who is correct?

- a. Technician A
- b. Technician B
- c. Both Technicians
- d. Neither technician