

System Troubleshooting

Course 439: System Troubleshooting

Discusses the keys to effective troubleshooting and emphasizes the importance of safety. Details a step-by-step procedure to use when troubleshooting. Covers the use of a troubleshooting flowchart. Examines three sample problems, leading the trainee through the steps necessary to locate the problem in each example.

TPC Training is accredited by IACET to offer **0.5 CEU** for this program.



Lesson 1: Preparation for Troubleshooting

Topics

Mechanical Refrigeration Systems; Keys to Effective Troubleshooting; Safety in Troubleshooting; Tools and Equipment; Supplies (Consumables); Human Relations Skills

Objectives

- Give an example of each of the following applications: process refrigeration, commercial refrigeration, process air conditioning, comfort air conditioning.
- Tell what knowledge is essential for an effective troubleshooter to have.
- Tell what safety precautions must be followed when dealing with the mechanical, electrical, chemical, and environmental hazards involved in troubleshooting.
- List the necessary tools, equipment, and supplies needed to perform troubleshooting procedures.
- Explain why human relations skills are important to the refrigeration system troubleshooter.

Lesson 2: Troubleshooting Procedures

Topics

Six Steps of Troubleshooting; Step One—Stating the Problem; Step Two—Collecting Data; Routine Preliminary Checks; Detailed Checks; Not Enough Cooling Example; Step Three—Analyzing the Data; Step Four—Deciding on an Action; Step Five—Making the Repairs; Step Six—Checking the Results; Avoiding a Recurrence of the Problem

Objectives

- Name the six basic steps in the troubleshooting procedure.
- Explain why it is important to collect information from the equipment operator when a system is malfunctioning.
- Explain what type of information is contained on a nameplate and in the operations log of a system.
- Explain the structure and use of troubleshooting charts.
- Explain how to set up a preliminary checklist and how to select the most likely components and subsystems for further examination.
- List items to check out after making repairs to a refrigeration system.

Lesson 3: Troubleshooting Electric Controls

Topics

A Troubleshooting Flowchart; Checking the Contactor; A1 Procedures: Armature, Transformer, and Bad Connections; A2 Procedures: Faulty Coils, Relays, and Switches; B Procedures: The Power Side

Objectives

- Explain how to use a troubleshooting chart.
- Explain how to isolate a control circuit failure from a motor circuit failure.
- List the causes of abnormally high control circuit resistance.
- Explain the difference between using an ohmmeter and using a voltmeter to check for a closed electric switch.
- Describe how to check contactor coils and motors for shorts and opens.

Lesson 4: Troubleshooting Pneumatic Controls

Topics

Equipment and Tools; The Problem—Unstable Control; Checking the Control Air Supply; Output Pressure Test; Checking for Air Leaks; Checking Other Controllers; Actuator Problems; Thermostat Adjustments; When All Else Fails

Objectives

- Describe the symptoms of control air contamination and explain how to remedy it.
- Explain how to check thermostat output pressure.
- List at least three kinds of actuator problems and explain how to solve them.
- Describe the calibration procedure and explain its purpose.
- Explain how to calibrate a pneumatic controller.

Lesson 5: Troubleshooting the Refrigerant Circuit

Topics

Preliminary Checks; Analyzing the Complaint; Checking Refrigerant Pressures; Checking Refrigerant Charge; Checking for Refrigerant Leaks; Compressor Cycling; Checking High-Side Components; Low-Side Problems; Distribution System Problems

Objectives

- Distinguish between a refrigerant circuit problem and a conditioned-medium problem.
- Explain the procedure for checking refrigerant charge.
- Name major causes of variance in head and suction pressures.
- Explain how to isolate the cause of compressor short cycling.
- Explain how to use head-pressure readings and suction-pressure readings in diagnosing refrigeration problems.