



# MAINTENANCE TROUBLESHOOTING INTERNATIONAL

HCD-302

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## HCD-302 HVAC CONTROL AND DISTRIBUTION FOR FACILITIES MAINTENANCE

The course explains controlling air distribution for the comfort of people and is designed for any worker involved in air distribution systems. Takes students from the basics of HVAC electrical controls through air distribution and troubleshooting. Attendees are taught how to "control" their electrical controls and use fundamental air distribution principles for achieving consistent HVAC comfort and efficiency in buildings, plants and facilities. HVAC system problems can be divided into three major categories - Air Distribution, Electrical or Mechanical. The part that causes most service headaches is the electrical portion and most of that can be traced back to control problems. A lot of the training concentrates on overcoming the most common service problems encountered in HVAC systems by teaching students to understand, troubleshoot and test HVAC electrical controls.



### THERMODYNAMICS

- Objectives
- Principles and fundamentals of heat transfer
- Pressure and vacuum
- Pressure/temperature/volume relationships
- Gas laws
- Cycle construction

### VAPOR-COMPRESSION REFRIGERATION CYCLE

- Heat-transfer process
- Follow the heat
- Typical operating conditions

### REFRIGERANTS AND OILS

- Refrigerant composition
- R-410A
- Refrigerant classifications
- Refrigerant safety
- Refrigerant cylinders
- Environmental refrigerant regulations

### REFRIGERANT EQUIPMENT COMPONENTS

- Evaporators
- Compressors
- Condensers
- Metering devices
- Refrigeration-system accessories

### HEAT LOAD IN REFRIGERATION SYSTEM

- Survey
- Calculating the total product load

### Miscellaneous heat load PSYCHROMETERICS

- Psychrometrics
- Comfort
- EPA 420-K-02-003
- Moisture control in the mold control
- Humidity
- Preservation
- Dew point
- CRM Requirements
- Air Condition System Design

### BASIC ELECTRICITY

- Basic electricity & Ohm's Law
- Meters & tools for taking electrical measurements
- Electrical circuits: series & parallel

### CONTROL CIRCUITS

- Schematics
- Ladder Diagrams
- Developing Wiring Diagrams

### CONTROLS

- Overloads
- Relays
- Contactors
- Control Transformer
- Starting Relay
- Defrost Timer
- Thermostat
- High Pressure Control
- Low Pressure Control
- Oil Pressure Control

### TROUBLESHOOTING

- General Troubleshooting
- Commercial Air Conditioning
- Heat Pump Control
- Pump Down Cycle

### DETERMINING AND IMPROVING AIR FLOW

- 400 cfm per ton
- How many square feet per ton
- Air mixture at the cooling coil

### EXHAUST AIR

- Positive pressure
- Negative pressure

### MAKE-UP AIR

- Positive pressure
- Negative pressure
- Conditioning the "make up" air

### TROUBLESHOOTING THE AIR DISTRIBUTION SYSTEM

- Temperature difference acrosscoil
- Balance in the system
- Short cycling
- Duct sizing
- Noise
- How to use a Ductulator

### CLASS FORMATS AVAILABLE

- MTI Hands-On Center \$995/person
  - ZOOM Interactive (Not Available)
  - On-Site (Your Location) Ask for Quote
- Quick Quote Available in 48 hrs.

### CLASS DURATION

2-days, 15 hours of instruction  
25% Hands-On

**Class Details:** Each student will receive class books, work activity sheets, self-test progress evaluations, as well as questions from the instructor to make sure they understand the material presented. It is expected that an attendee will leave the class with the basic knowledge of the subject and possess new found skills to better equip them when they return to their job. A certificate suitable for framing will be issued to each attendee who successfully completes the course. Call, email or check the website for the next time this course is scheduled at the MTI training center. On-site sessions? Request a quick 48-hour turnaround quote. Revised: 02/06/2021