

Chapter 6

Reading Schematic Diagrams

Objectives

- Upon completion of this course, you will be able to:
 - Read and interpret the schematic of a dehumidifier
 - Read and interpret the schematic of a window air conditioner
 - Read and interpret the schematic of a walk-in cooler

Objectives (cont'd.)

- Read and interpret the schematic of a commercial freezer
- Read and interpret the schematic of a gas furnace with a standing pilot
- Read and interpret the schematic of a small packaged residential air conditioner
- Read and interpret the schematics of light commercial air-conditioning systems with control relays

Objectives (cont'd.)

- Read and interpret the schematics of light commercial air-conditioning systems with lockout relays
- Read and interpret the schematics of two-stage heating and two-stage cooling systems
- Read and interpret the schematics of heat pumps with defrost boards and with defrost timers

Objectives (cont'd.)

- Read and interpret the schematic of a commercial refrigeration system with pump down
- Read and interpret most diagrams found in the refrigeration, heating, and air-conditioning industry

Key Terms

- Balance point
- Combustion chamber
- Control relay
- Heat pump
- Light commercial air-conditioning system
- Limit switch
- Line-voltage control system
- Lockout relay
- Low-voltage control system
- Defrost cycle

Key Terms (cont'd.)

- Dehumidifier
- Gas furnace
- Multistage thermostat
- Pump-down control system
- Reversing valve
- Set point
- Short cycle

Introduction

- Wiring diagrams
 - Many types used in the industry
 - Used for multiple purposes
 - Installing equipment
 - Locating electrical components in a control panel
 - Troubleshooting
 - Most emphasize the part they are used for

Introduction (cont'd.)

- Schematic wiring diagram (i.e., ladder diagram)
 - Important tool for installing and troubleshooting
 - Provides information regarding:
 - Equipment operation
 - Operation during specific modes
 - Installation connections
 - Troubleshooting and repairs

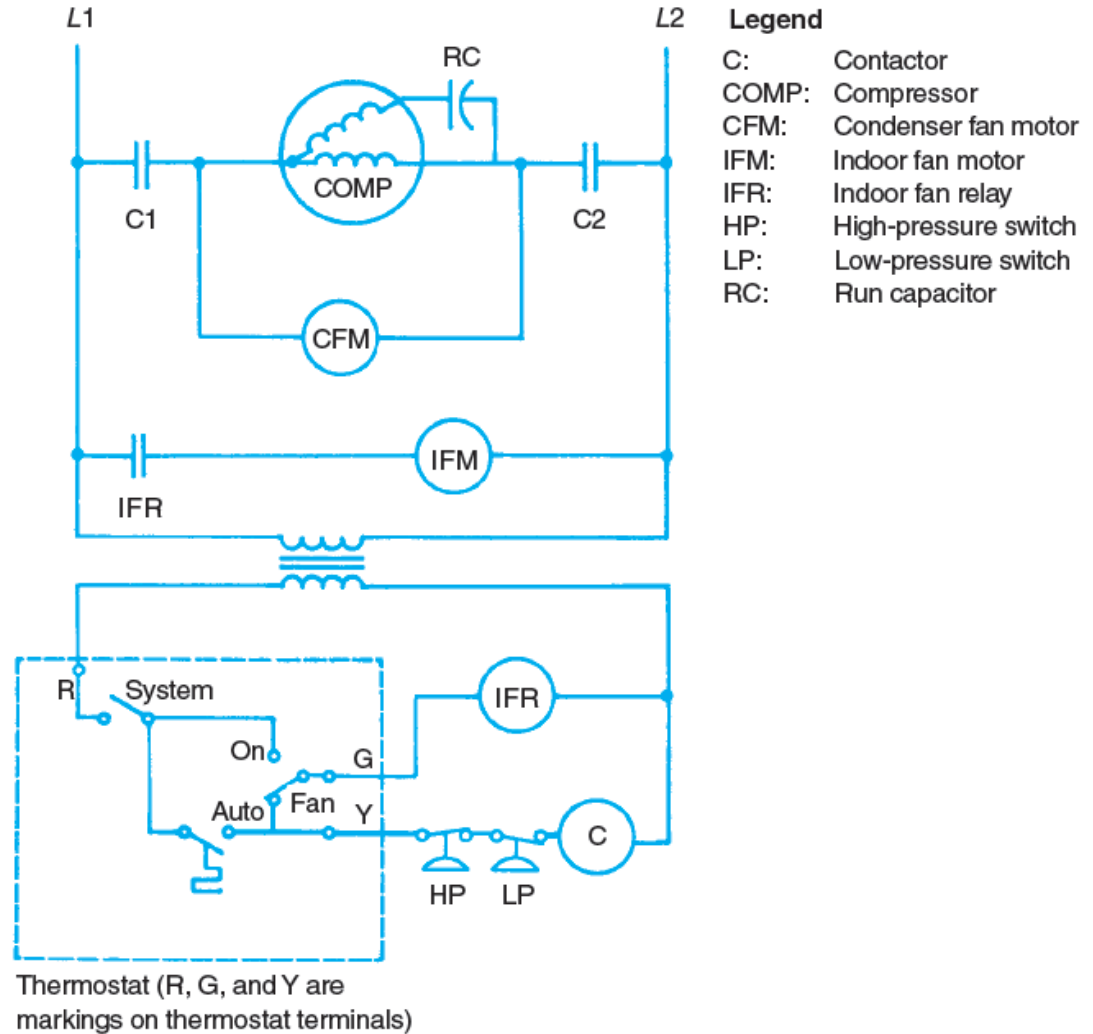
Introduction (cont'd.)

- Schematic diagrams
 - Show and identify electrical components
 - Illustrate how the unit works and electrical connections
 - Tell how, when, and why a system works as it does

ELECTRICITY

for Refrigeration, Heating and Air Conditioning

Figure 6.2
Schematic diagram.
(Delmar/Cengage Learning)



Schematic Diagram Design

- Schematic diagrams resemble a ladder
 - Two vertical lines represent incoming electrical sources
 - Electrical source: electrical energy supplied
 - Use symbols to represent electrical components
 - Made up of series and parallel circuits
 - Circuit-by-circuit arrangement

ELECTRICITY

for Refrigeration, Heating and Air Conditioning

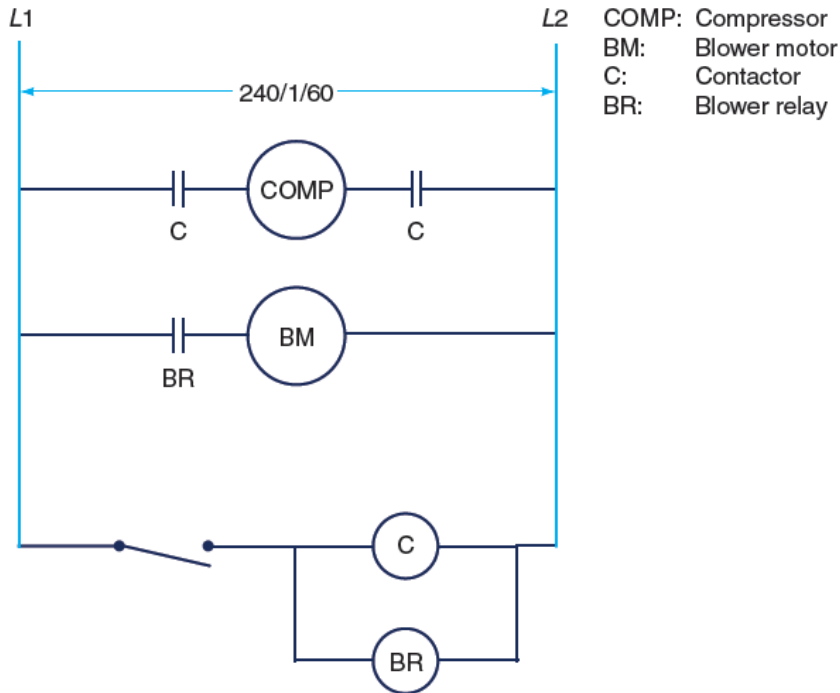


Figure 6.6
Parallel circuits in a schematic.
(Delmar/Cengage Learning)

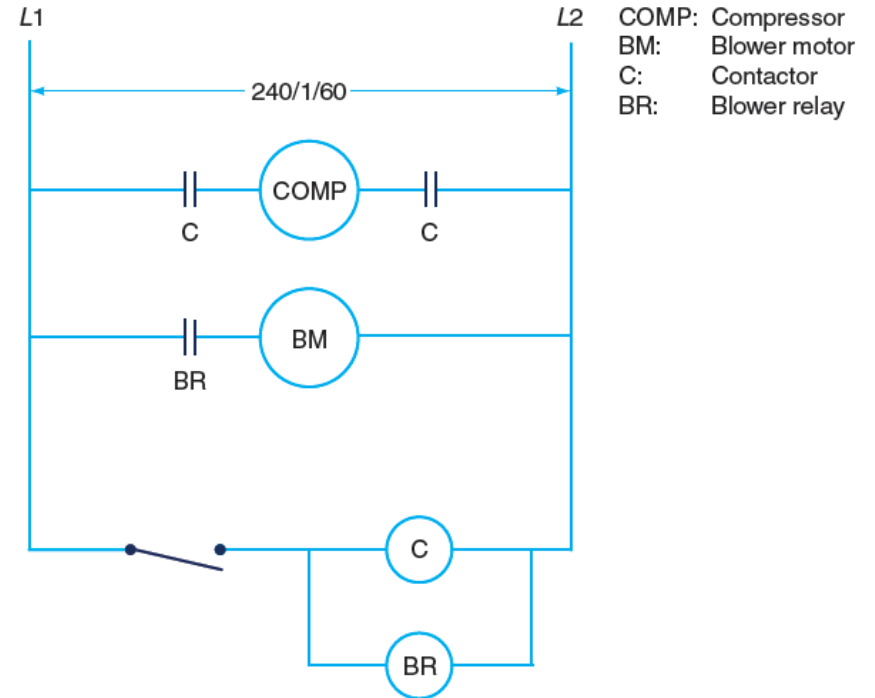


Figure 6.7
Switches connected in series with loads.
(Delmar/Cengage Learning)

Reading Basic Schematic Diagrams

- Basic schematics
 - Dehumidifier
 - Simple window air conditioner
 - Walk-in cooler
 - Commercial freezer
 - Gas furnace with standing pilot
 - Packaged air-conditioning unit

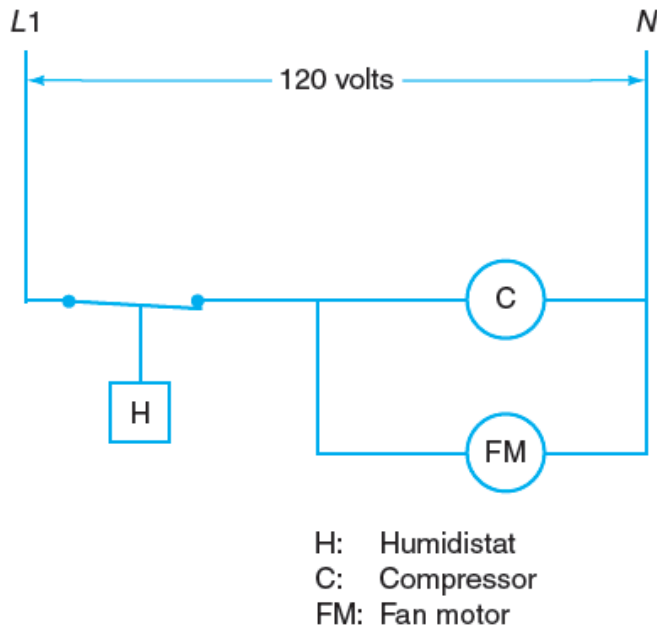


Figure 6.11 Schematic diagram of a dehumidifier.
(Delmar/Cengage Learning)

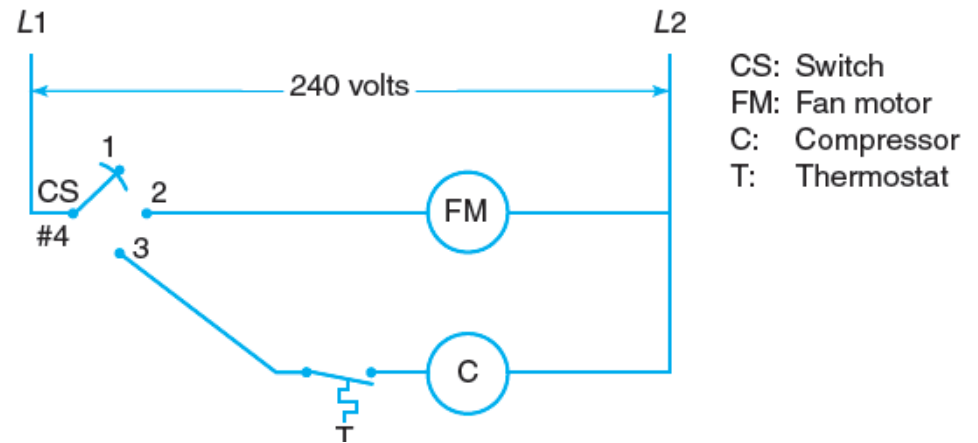


Figure 6.14 Schematic diagram of a simple window air conditioner.
(Delmar/Cengage Learning)

ELECTRICITY

for Refrigeration, Heating and Air Conditioning

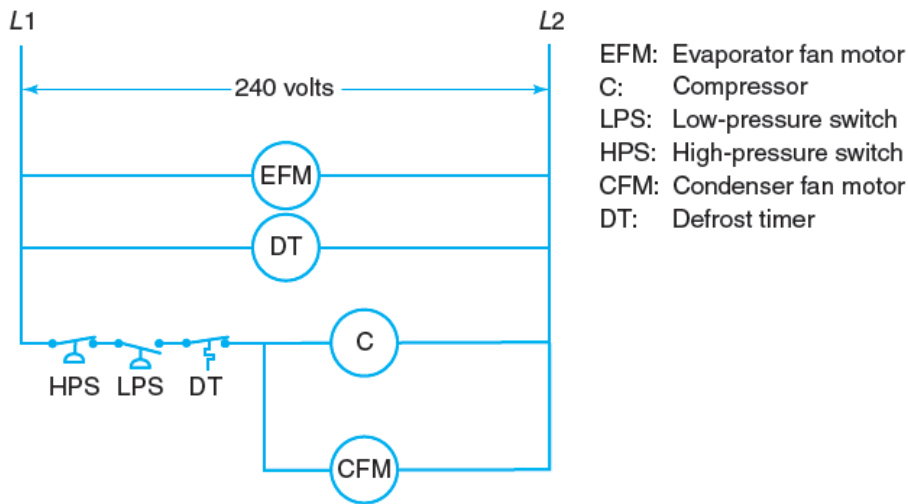


Figure 6.18 Schematic diagram of a walk-in cooler. (Delmar/Cengage Learning)

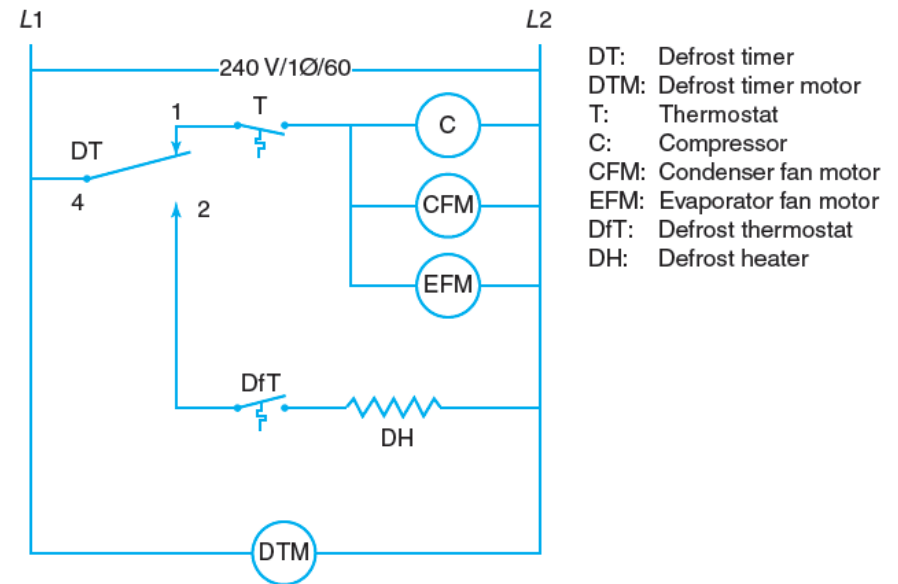


Figure 6.20 Schematic diagram of a commercial freezer. (Delmar/Cengage Learning)

ELECTRICITY

for Refrigeration, Heating and Air Conditioning

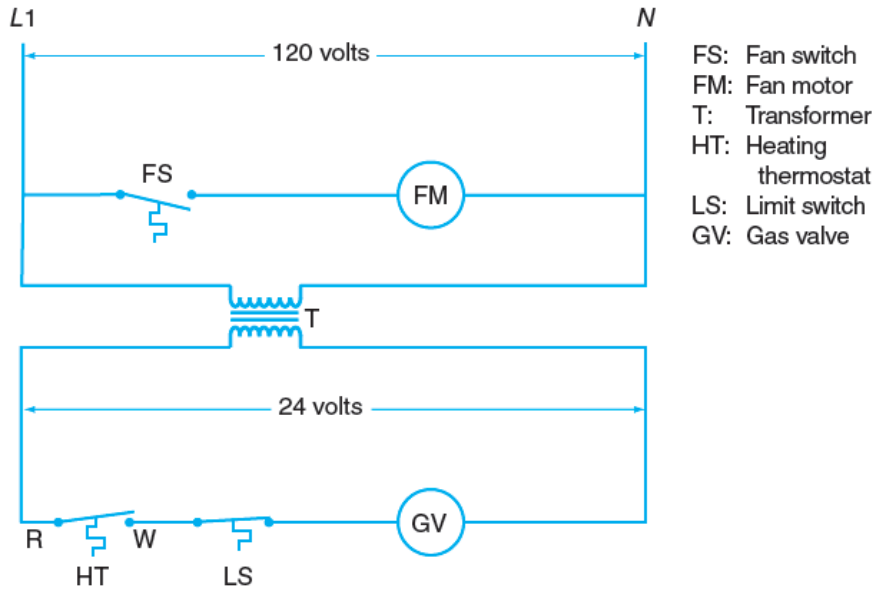


Figure 6.25 Schematic diagram of a gas furnace with a standing pilot.
 (Delmar/Cengage Learning)

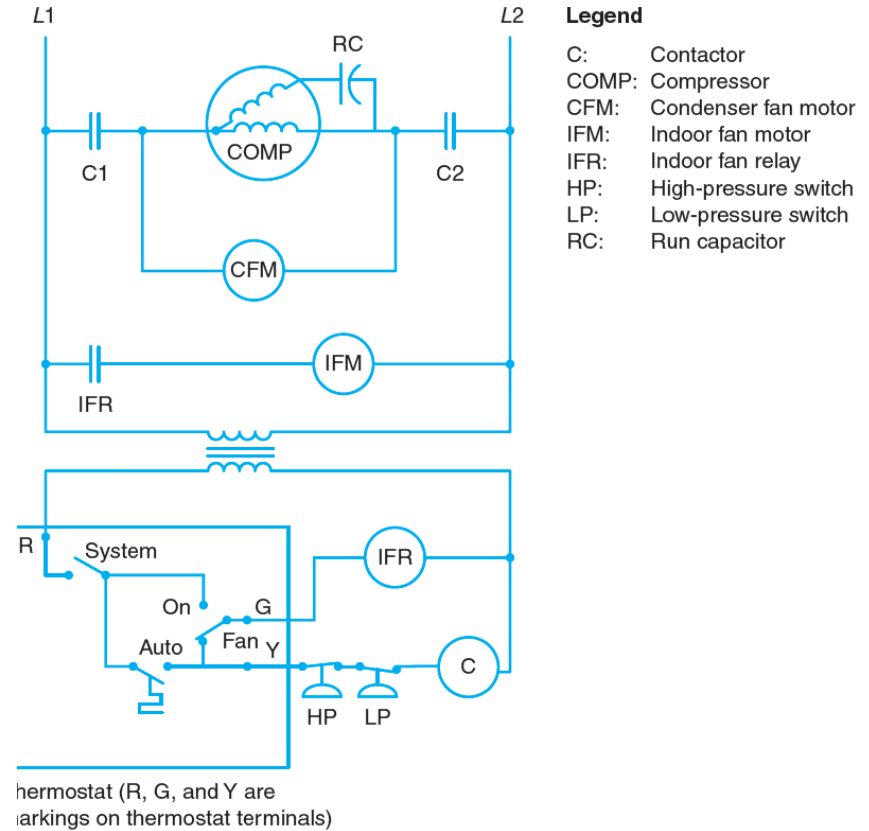


Figure 6.28 Schematic diagram of a packaged air-conditioning unit.
 (Delmar/Cengage Learning)

Reading Advanced Schematic Diagrams

- Advanced schematic diagrams
 - Light commercial air-conditioning control system with a control relay
 - Light commercial air-conditioning control system with a lockout relay
 - Two-stage heating, two-stage cooling control system

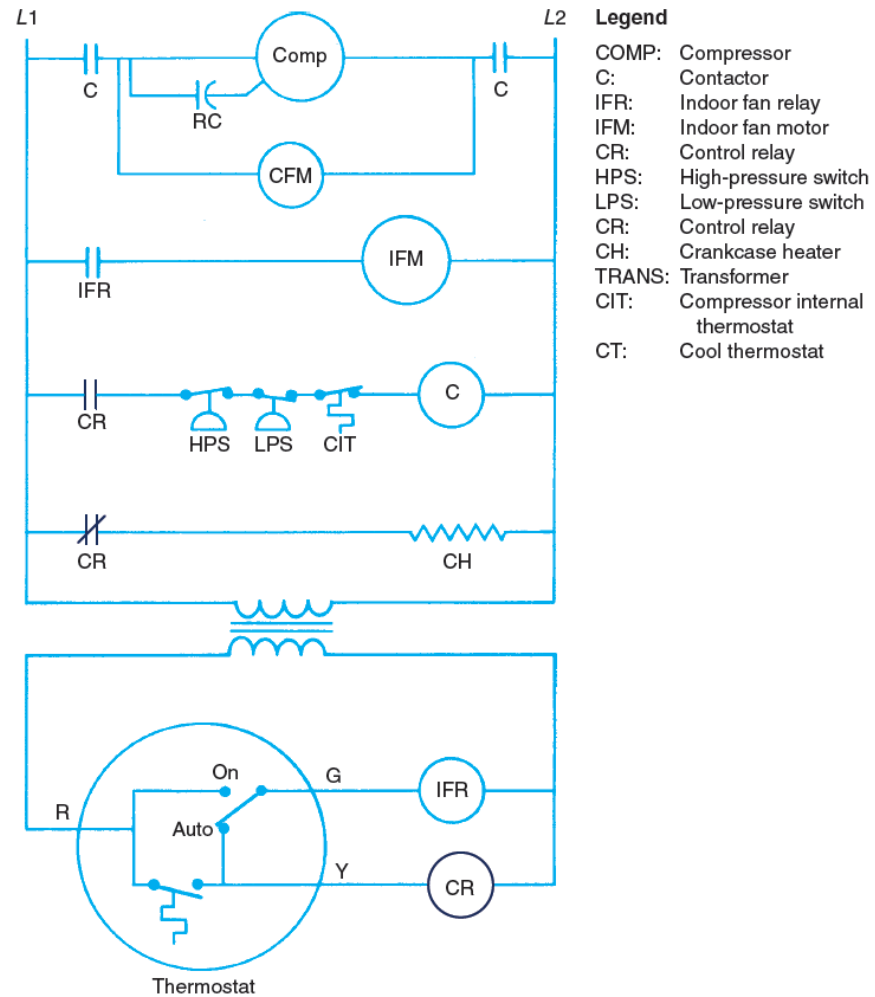
Reading Advanced Schematic Diagrams (cont'd.)

- Heat pump with defrost timer
 - Refer to Figure 6.40
- Heat pump with defrost board
- Commercial refrigeration system using a pump-down control system

ELECTRICITY

for Refrigeration, Heating and Air Conditioning

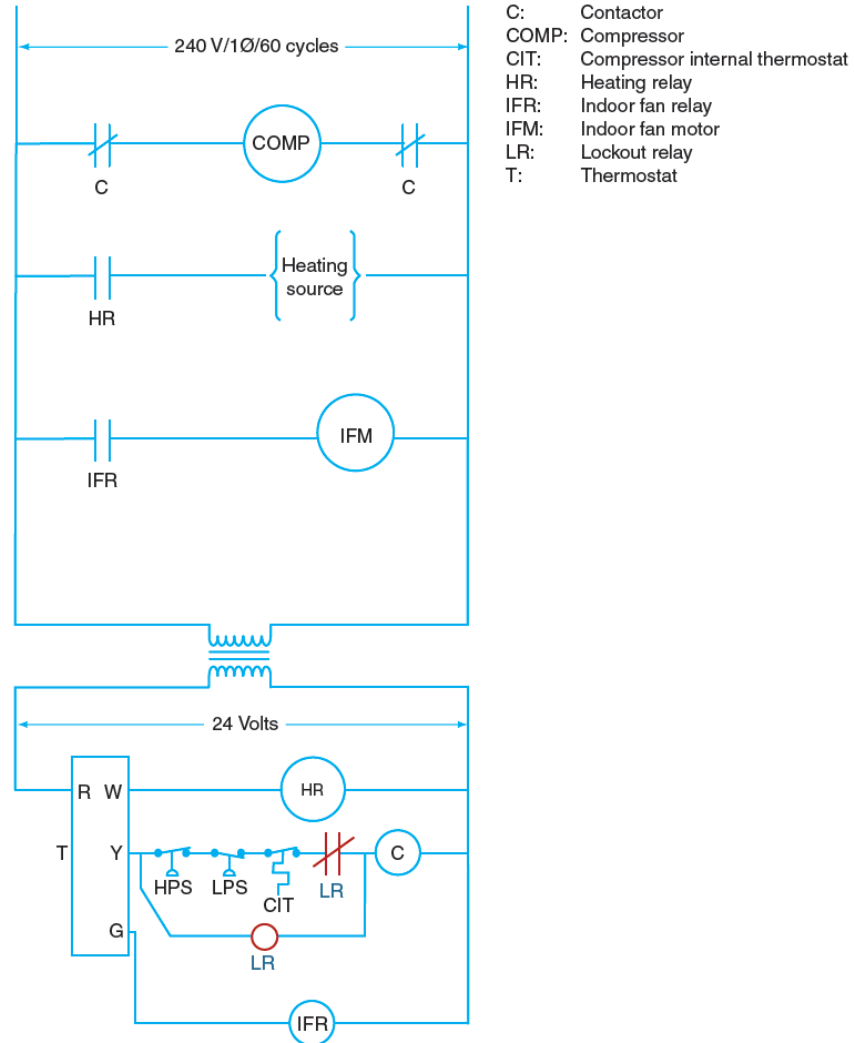
Figure 6.32
Schematic diagram of
light commercial
packaged air
conditioner with
control relay.
(Delmar/Cengage Learning)



ELECTRICITY

for Refrigeration, Heating and Air Conditioning

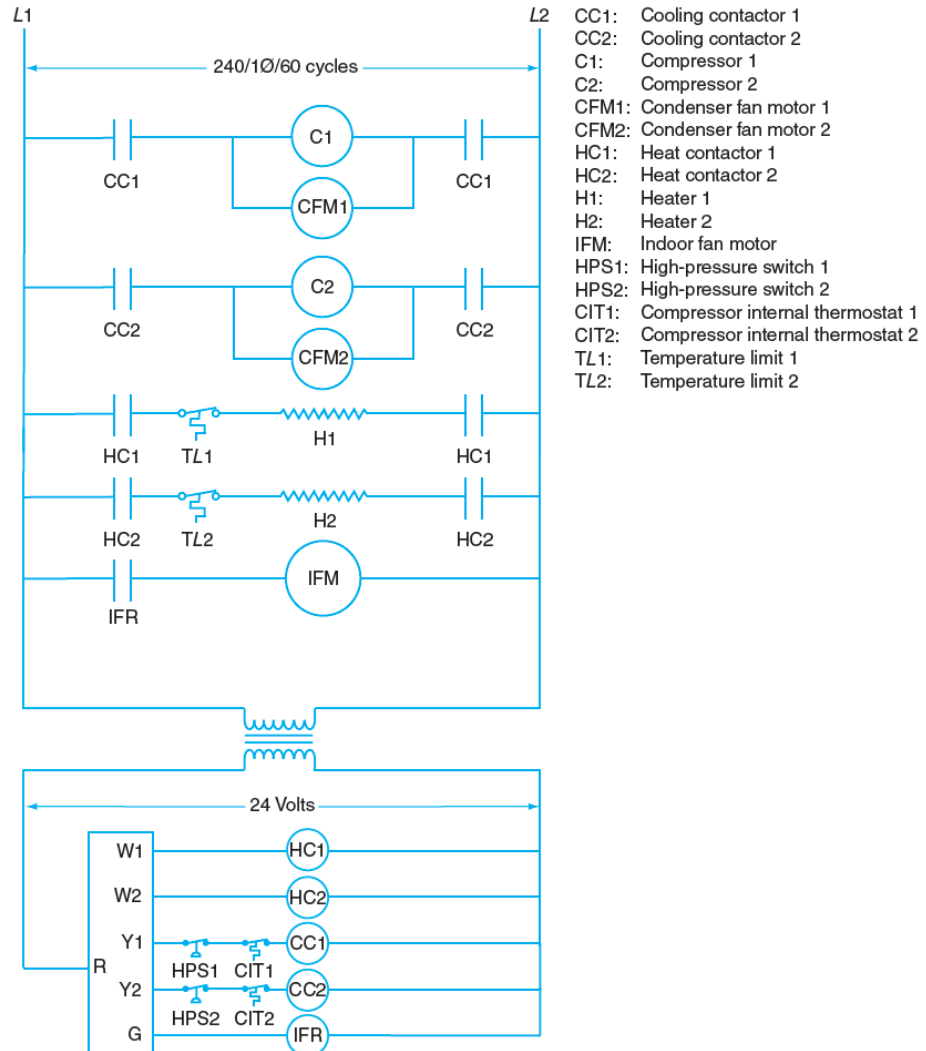
Figure 6.34
Air-conditioning system
with lockout relay.
(Delmar/Cengage Learning)



ELECTRICITY

for Refrigeration, Heating and Air Conditioning

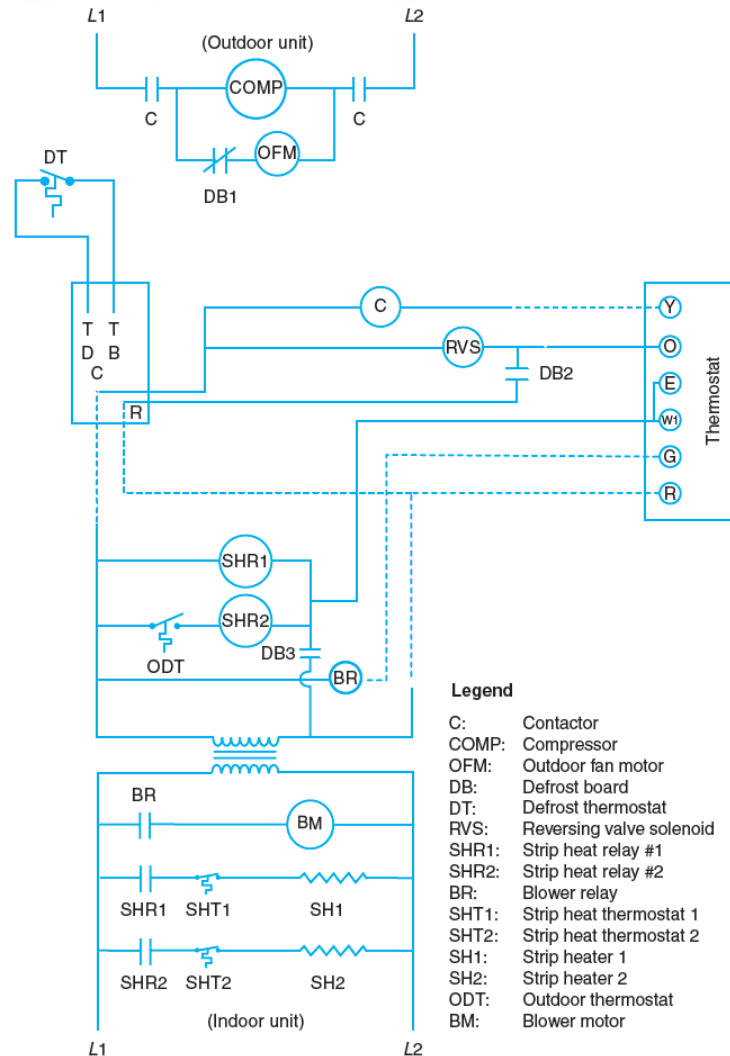
Figure 6.37
Schematic diagram of two-stage cooling, two-stage heating control system.
(Delmar/Cengage Learning)



ELECTRICITY

for Refrigeration, Heating and Air Conditioning

Figure 6.52
Schematic diagram of
heat pump with solid-
state defrost control.
(Delmar/Cengage Learning)



ELECTRICITY

for Refrigeration, Heating and Air Conditioning

Figure 6.57
Schematic diagram
of commercial
freezer with pump-
down control.
(Delmar/Cengage
Learning)

