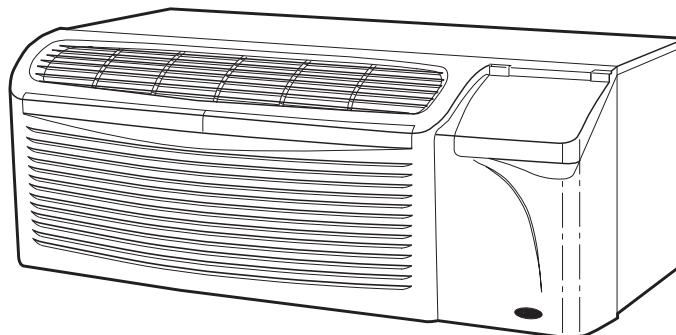


SERVICE TECHNICIAN GUIDE



PACKAGED TERMINAL AIR CONDITIONERS AND HEAT PUMPS

CONTENTS

	Page		Page
INTRODUCTION	2,3	HEATERS	18,19
SUMMARY OF DANGERS, WARNINGS, AND CAUTIONS	2	COMMON CAUSES OF HEATER FAILURE.....	18
UNIT DISASSEMBLY	3,4	HEATER REMOVAL	18
TOOLS NEEDED.....	3	OPERATING CONTROLS	20-28
REMOVE FRONT PANEL	3	UNIT-MOUNTED CONTROLS.....	20
DISCONNECT POWER FOR		WALL-MOUNTED THERMOSTAT CONTROLS...21	
CORD-CONNECTED UNIT	3	REMOTE THERMOSTAT	
DISCONNECT POWER FOR PERMANENTLY		TROUBLESHOOTING	21
CONNECTED (HARDWIRED) UNITS	3	DESCRIPTION OF SELECTOR	
OPEN THE CONTROL BOX.....	4	SWITCH SETTINGS	23
REMOVE THE UNIT FROM THE WALL SLEEVE ..	4	NON-USER ADJUSTABLE CONTROLS	23
ACCESSING UNIT COMPONENTS	5-8	SEQUENCE OF OPERATION	24
ACCESSING INDOOR-AIR SECTION		COMPONENT OPERATION AND	
COMPONENTS.....	5	TROUBLESHOOTING	24
ACCESSING OUTDOOR-AIR SECTION		ELECTRICAL COMPONENTS REMOVAL	
COMPONENTS.....	5	AND REPLACEMENT	27
REINSTALL FRONT PANEL.....	8	FAN MOTOR	29-31
GENERAL CLEANING	9-12	FAN MOTOR TROUBLESHOOTING.....	29
CLEANING AND SAFETY	9	BASIC FAN MOTOR ELECTRICAL TESTS.....	29
TOOLS NEEDED.....	10	FAN MOTOR REPLACEMENT	31
MONTHLY CLEANING.....	10	FIELD TEMPERATURE CHARTS	32-40
SEASONAL CLEANING	11	WIRING DIAGRAMS	41-45
COMPRESSOR	13-17	MOST FREQUENT PTAC SERVICE	
COMPRESSOR TROUBLESHOOTING.....	14	QUESTIONS.....	46
BASIC HERMETIC COMPRESSOR		ACCESSORIES	47
ELECTRICAL MEASUREMENTS	14	52C PERFORMANCE AND PHYSICAL DATA	48
COMPRESSOR REPLACEMENT	15	52P PERFORMANCE AND PHYSICAL DATA	49

PTAC Customer Support Center
1•800•894•6449

INTRODUCTION

The focus of this manual is to provide basic information on service procedures, safety, troubleshooting, cleaning, and component replacement for service technicians. **It is intended for use only by HVAC service technicians who have successfully completed instruction and received Type I Certification from the U.S. Environmental Protection Agency.**

The instructions in this manual are general in nature and are not to be substituted for installation and service instructions shipped with the unit. No attempt to install, operate, adjust, repair, or dismantle any equipment should be made until the manufacturer's instructions are read and thoroughly understood by the service technician. Even equipment that seems familiar may have specific model differences from year to year. Always review manufacturer's instructions.

Model 52C,P packaged terminal air conditioner (PTAC) and heat pump units are self-contained for installation through the wall for individual room heating and cooling. The Model 52C,P polymer and metal sleeves are permanently fastened to the wall; the unit chassis slides out of the sleeve to allow the service technician easy access. Many accessories are offered to complement the unit's performance and comfort control.

Before beginning any service procedures, it is important to check the unit model number. See Figure 1 and 2. Units that seem similar may have subtle differences that could affect service procedures. The following units are covered in this manual:

- 52CE — 60 Hz cooling with electric heat units
- 52CQ — 60 Hz heat pump with electric heat units
- 52PE — 60 Hz cooling with electric heat units
- 52PQ — 60 Hz heat pump with electric heat units
- 52PC — 60 Hz cooling only units

Knowing which model is being serviced will help determine if the unit is performing at optimum levels. The model number is located on the data information plate beneath the front panel of the unit. See Figure 1. The data information plate also lists voltage ranges and other important electrical information about the unit.

SUMMARY OF DANGERS, WARNINGS, AND CAUTIONS

The terms DANGER, WARNING, and CAUTION have specific meanings that identify the degree of hazard. Typically in the HVAC industry, these specific meanings are:

⚠ DANGER

There is an immediate hazard which WILL result in severe personal injury or death.

⚠ WARNING

Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ CAUTION

Potential hazards or unsafe practices which COULD result in minor personal injury or equipment damage.



MODEL	52PQA312301AA		
SERIAL	3701X11520		
DATE OF MFG.	09/12/2001		
VOLT RANGE	187-253		
VOLTS	230/208		
PH	1	HZ	60
MIN CKT AMPACITY	19.3		
R-22 OZ	34		
DESIGN PSIG	350 HIGH SIDE, 150 LOW SIDE		
COOLING			
BTU/HR	12,100/12,000		
AMPS	4.8/5.3		
WATTS	1090/1122		
EER	11.1/10.7		
COMP	RLA	6.1	
	LRA	29	
FAN	FLA	0.75	
MOTOR	HP	1/8	
HEATING			
BTU/HR	11,000/11,000		
AMPS	15.6/14.5		
WATTS	3570/2997		
COP	3.2/3.2		
HEATER	AMPS	14.8/13.7	
	WATTS	3400/2850	
BTU/HR	WATER		
	STEAM		
USE	20	AMP	CANADIAN INSTALLATION
TIME DELAY FUSE	MAX FUSE	MAX BREAKER	
OR HACR TYPE	20	AMP	20
CIRCUIT BREAKER			
ABOVE DATA FOR PERMANENTLY CONNECTED UNIT ONLY			
MOTOR - COMPRESSOR THERMALLY PROTECTED			
 LISTED PACKAGED TERMINAL AIR CONDITIONER SPAC		 Carrier Corporation	
MADE IN MEXICO 99LR520212 REV D			
TELEPHONE 1-800-894-6449 FOR SERVICE/TECHNICAL ASSISTANCE			

FIGURE 1 — SAMPLE DATA INFORMATION PLATE

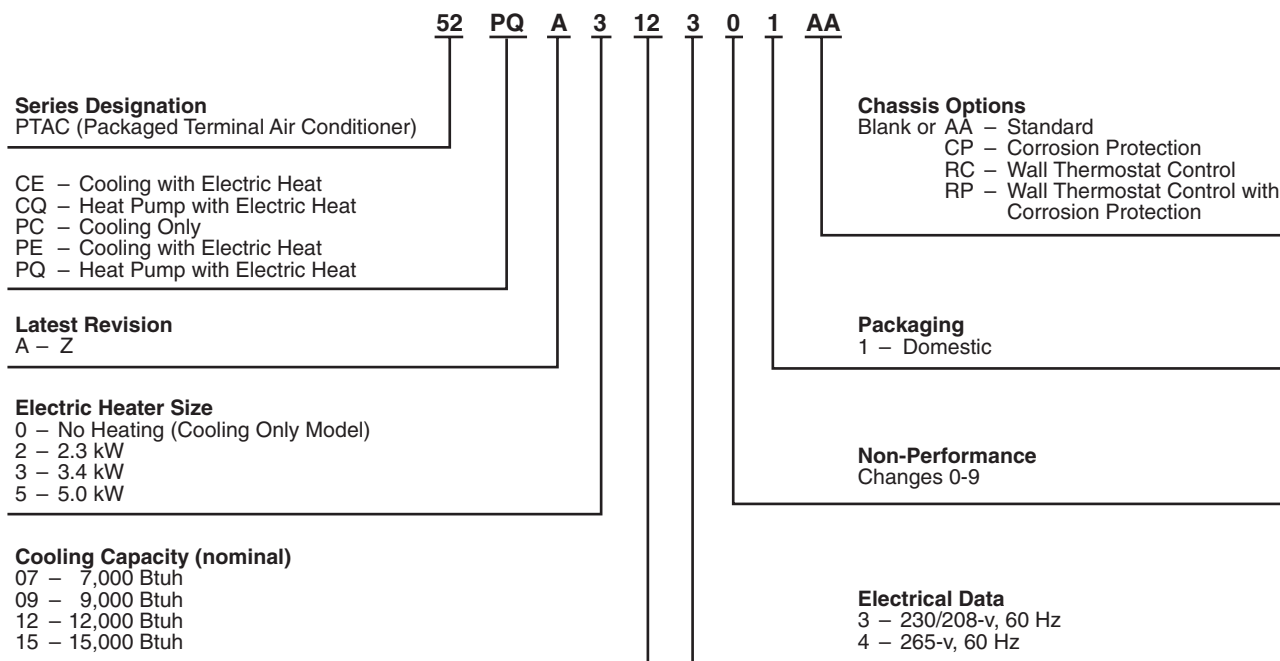


FIGURE 2 — MODEL NUMBER NOMENCLATURE

UNIT DISASSEMBLY

This section includes common procedures for disassembly and re-assembly of unit.

IMPORTANT: Follow manufacturer's instructions when disassembling and re-assembling a unit for cleaning, maintenance, or part replacement. When disassembling wiring, it is strongly recommended that numbered stickers be attached to identify leads and terminals to aid in the re-assembly process. Always review safety procedures prior to the start of a job.

⚠ WARNING

Prior to servicing electrical equipment, disconnect all power to avoid electric shock! Tag all disconnects. Never alter cord or plug and do not use extension cords.

TOOLS NEEDED

The following field-supplied items are recommended for general disassembly of the unit:

- Flat head screw driver
- $\frac{5}{16}$ -in. nut driver
- Safety glasses
- Needle nose pliers

REMOVE FRONT PANEL

NOTE: Before removing front panel, remove 2 locking screws (if installed) located behind the filter handles.

See Figure 3. If a lateral duct accessory is installed, the plenum must be removed before removing the front panel. Refer to Remove Lateral Duct Extension section for removal instructions.

1. Grasp the front panel firmly at the center of the top and bottom of the panel.
2. Pull the panel upward at the bottom and forward at the top to release magnetic latches and partition hooks. See Figure 4.

DISCONNECT POWER FOR CORD-CONNECTED UNIT

1. Turn selector switch to OFF position.
2. Open the disconnect switch at main power supply. Use proper Lockout and Tag procedures.
3. Unplug the unit service cord.

DISCONNECT POWER FOR PERMANENTLY CONNECTED (HARDWIRED) UNITS

1. Turn selector switch to OFF position.
2. Open the disconnect switch at main power supply. Use proper Lockout and Tag procedures.
3. Remove screw from access cover and remove access cover.
4. Pull out the plug assembly and disconnect. See Figure 5.

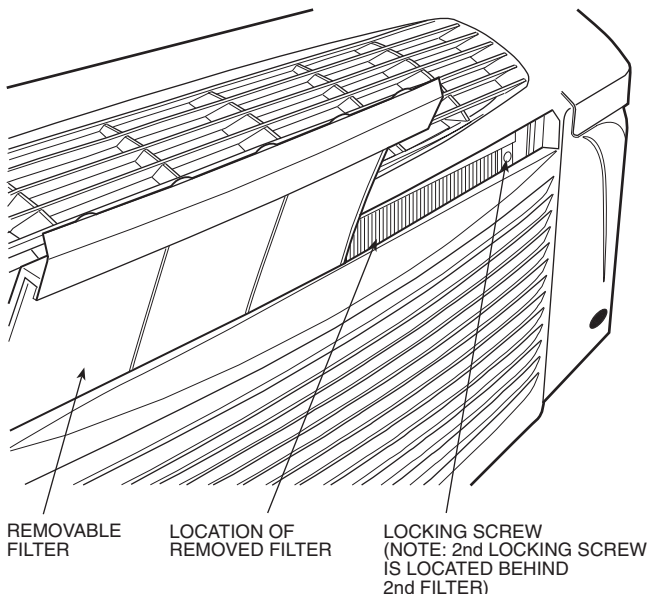


FIGURE 3 — LOCATION OF LOCKING SCREWS BEHIND FILTERS

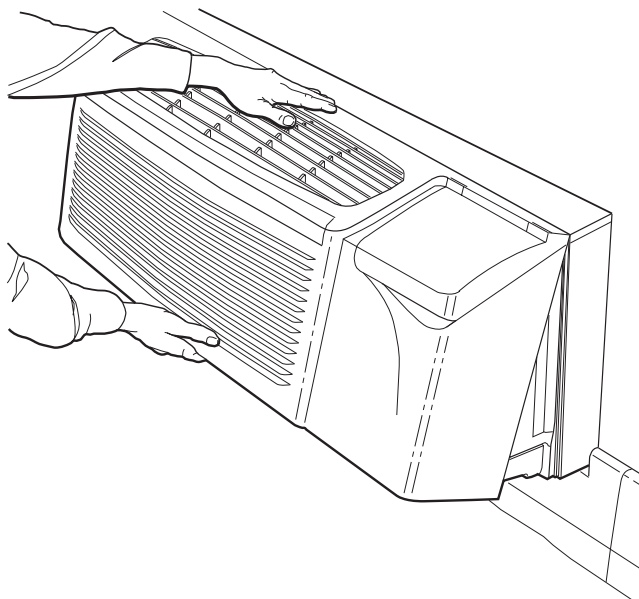


FIGURE 4 — REMOVING FRONT PANEL

Replacement Package Terminal Air Conditioner, CLASSIFIED BY UNDERWRITERS LABORATORIES INC., AS TO ELECTRIC SHOCK, FIRE AND CASUALTY HAZARDS ONLY. FOR FIELD INSTALLATION WITH EXISTING WALL SLEEVES, OUTDOOR, LOUVERS, AND INDOOR PANELS AS SPECIFIED ON THE PRODUCT.



OPEN THE CONTROL BOX

The control box is factory wired. To open the box, remove the 2 screws on the top of the control box and lower the front hinged panel. See Figure 6.

REMOVE THE UNIT FROM THE WALL SLEEVE

1. Remove the four mounting screws that secure the PTAC unit to the wall sleeve (2 screws per side). See Figure 7.
2. Grasp the sides of the unit and slide it from the sleeve.

NOTE: The mounting screws may be in a different location depending on brand of wall sleeve attached.

⚠ CAUTION

The chassis weighs between 110 and 150 lbs. Take proper safety precautions to avoid personal injury when lifting and moving the chassis.

⚠ CAUTION

The unit basepan may have water in it. Tilt the unit back slightly when removing it from the sleeve to drain some of the water into the sleeve.

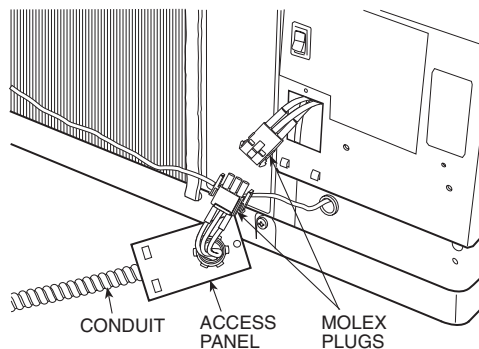


FIGURE 5 — PLUG ASSEMBLY ON HARDWIRE UNITS

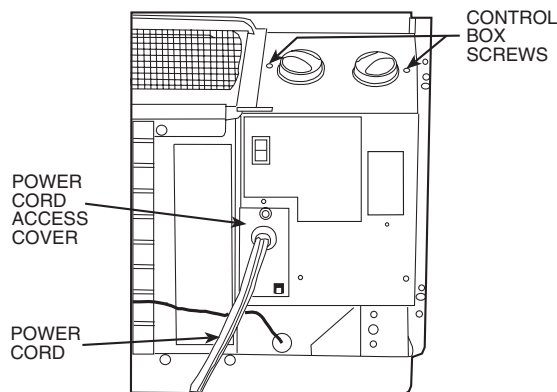


FIGURE 6 — CONTROL BOX COVER

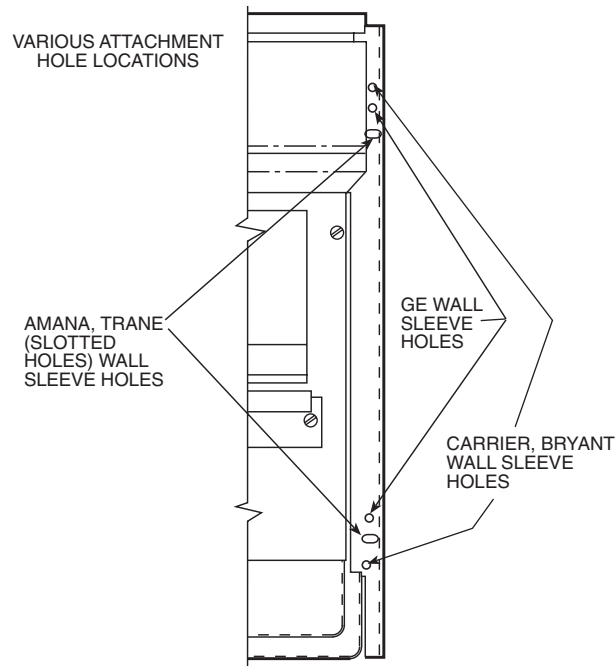


FIGURE 7 — PTAC UNIT TO WALL SLEEVE MOUNTING SCREWS

ACCESSING UNIT COMPONENTS

ACCESSING INDOOR-AIR SECTION COMPONENTS

■ REMOVE LATERAL DUCT EXTENSION ACCESSORY FOR UNITS EQUIPPED WITH THE LATERAL DUCT

1. Remove the 2 top screws that secure the lateral duct plenum to the top of the lateral duct extension. See Figure 8.
2. Locate and remove the 2 bottom bracket screws (located opposite extension duct) that secure the lateral duct plenum to the bracket flange. See Figure 8.
3. Carefully lift the plenum up and away from front panel and duct extension.

■ REMOVE THE DISCHARGE DECK ASSEMBLY

1. Remove the front panel. Refer to **Remove Front Panel** section and Figure 4.
2. Remove discharge screen screw using a $\frac{5}{16}$ -in. nut driver. See Figure 9.
3. Remove the discharge deck assembly screws using a $\frac{5}{16}$ -in. nut driver. See Figure 9.
4. Gently pull the deck/grille up and away from the unit.
5. Reassemble by reversing steps above.

■ **ACCESSING THE HEATER ASSEMBLY** — Once the discharge deck assembly is removed, the Heater Assembly should now be accessible. See Figure 10.

1. Using pliers, carefully remove all wires connected to the heater assembly. Label each wire for ease of re-assembly.
2. Gently pull the heater assembly up and away from scroll. See Figure 11.
3. Reassemble by reversing steps above.

ACCESSING OUTDOOR-AIR SECTION COMPONENTS

■ REMOVE THE GUSSETS (See Figure 12)

1. Remove the 2 screws on each side that secure the gussets to the partition.
2. Remove the 2 screws that secure the gussets to the plastic condenser orifice and remove the gussets.

52C,P SERIES

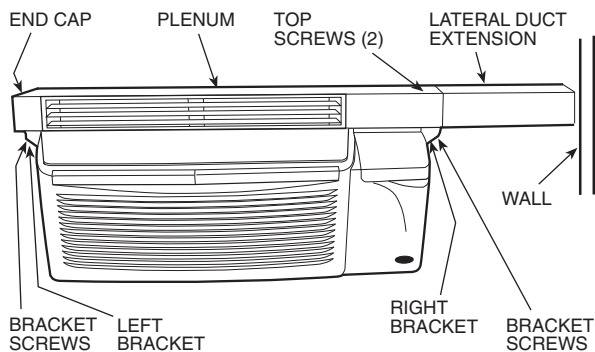


FIGURE 8 — PTAC UNIT WITH LATERAL DUCT ACCESSORY INSTALLED

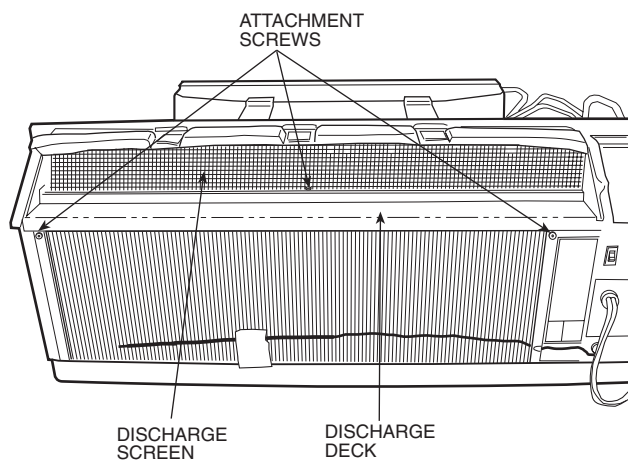


FIGURE 9 — LOCATION OF ATTACHMENT SCREWS ON DISCHARGE DECK OF UNIT

■ DETACH THE CONDENSER ORIFICE FROM THE CONDENSER COIL

1. Remove top half of condenser orifice.
 - a. Unscrew the top half of the condenser orifice by backing off the 4 captive screws. See Figure 13.
 - b. Using a flat head screwdriver, gently pry the top half of the orifice from the tube sheets. See Figure 14.
 - c. Remove top of condenser orifice. See Figure 15.
2. Remove bottom half of condenser orifice.
 - a. Using a flat head screwdriver, gently pry the bottom half of the orifice from the tube sheets. See Figure 14.
 - b. Remove 2 outdoor coil tube sheet screws using a Phillips head screwdriver. See Figure 16.
 - c. Carefully lift condenser up and away from condenser fan. Rest condenser on basepan. See Figure 17.

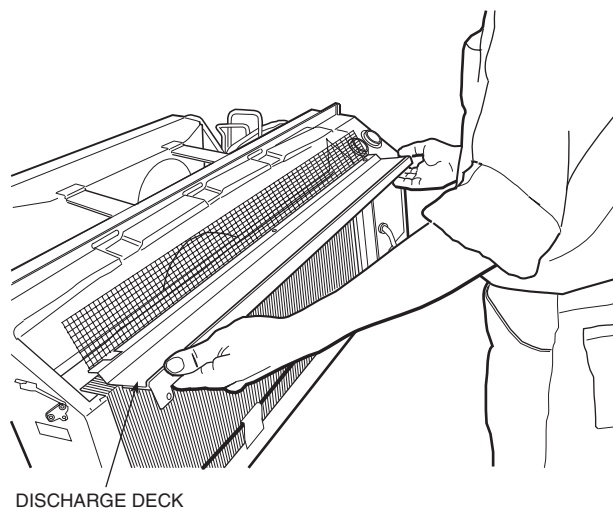


FIGURE 10 — ACCESSING HEATER PLATE ASSEMBLY

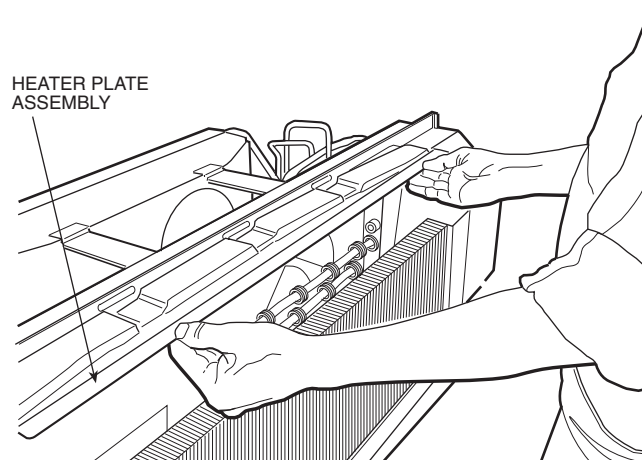


FIGURE 11 — REMOVAL OF HEATER PLATE ASSEMBLY

- d. Using Needle Nose Pliers remove condenser fan hub clamp. See Figure 18.
 - e. Pull condenser fan off fan motor shaft.
 - f. Remove bottom half of condenser orifice.
3. Reassemble by reversing steps above.

■ REMOVE THE AIR DISCHARGE GRILLE

1. Remove the front panel from the unit, reference Remove Front Panel section.
 2. Flip the front panel over to the backside. Remove the 2 screws on each end of the air discharge grille and remove grille. See Figure 19.
- The grille can be positioned to direct the discharge air up or out by simply rotating the grille 180 degrees.

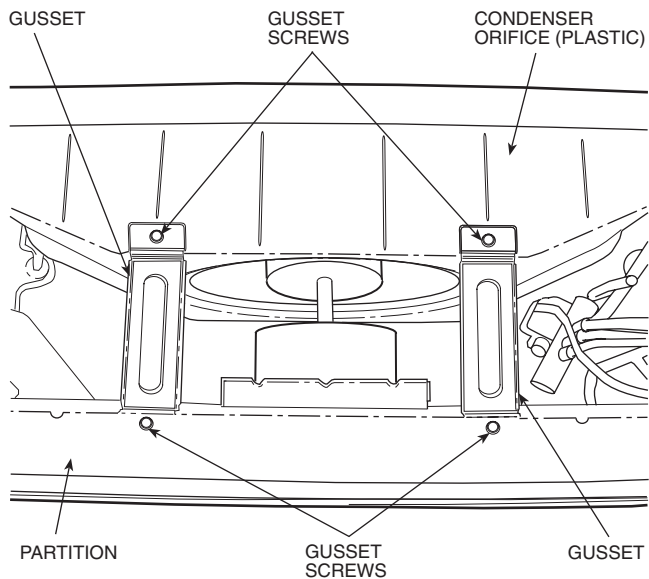


FIGURE 12 — GUSSET REMOVAL

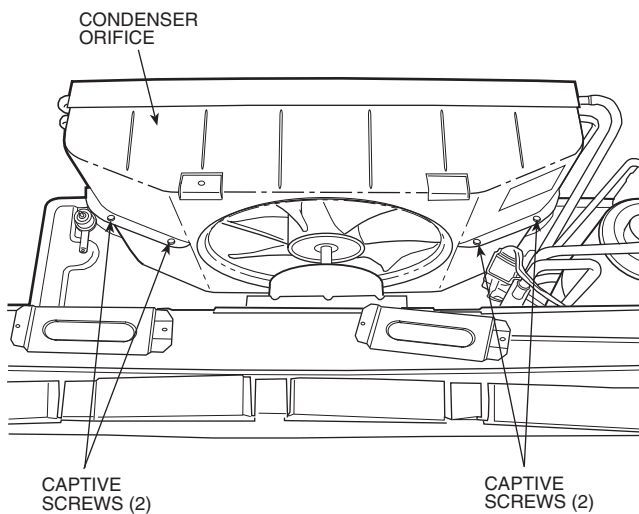


FIGURE 13 — LOCATION OF CAPTIVE SCREWS ON CONDENSER ORIFICE

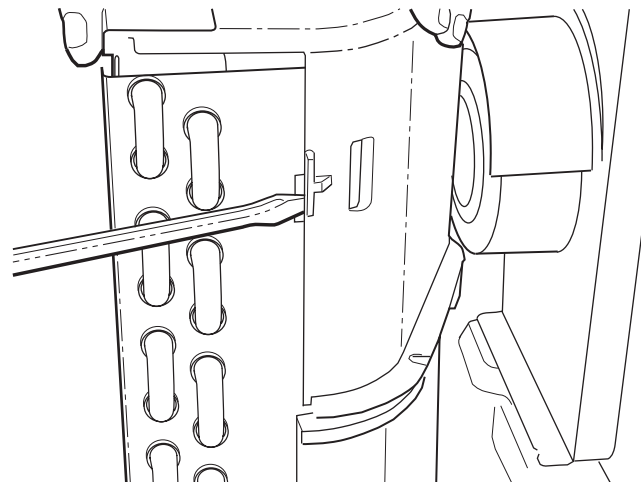


FIGURE 14 — PRYING CONDENSER ORIFICE AWAY FROM TUBE SHEET

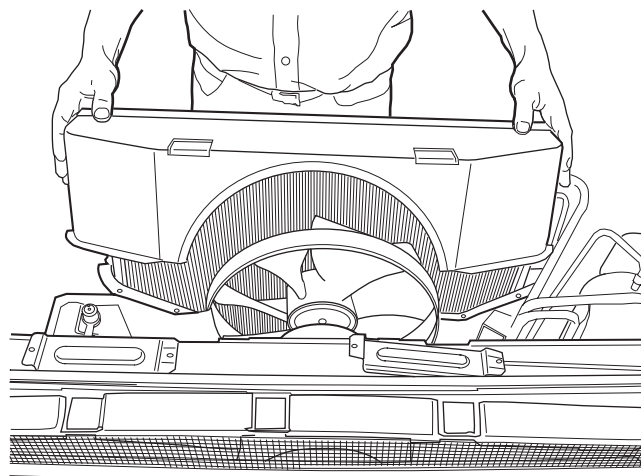


FIGURE 15 — REMOVING TOP OF CONDENSER ORIFICE

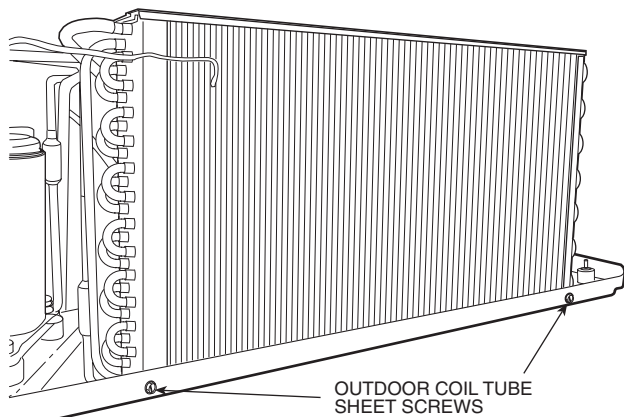


FIGURE 16 — LOCATION OF OUTDOOR COIL TUBE SHEET SCREWS

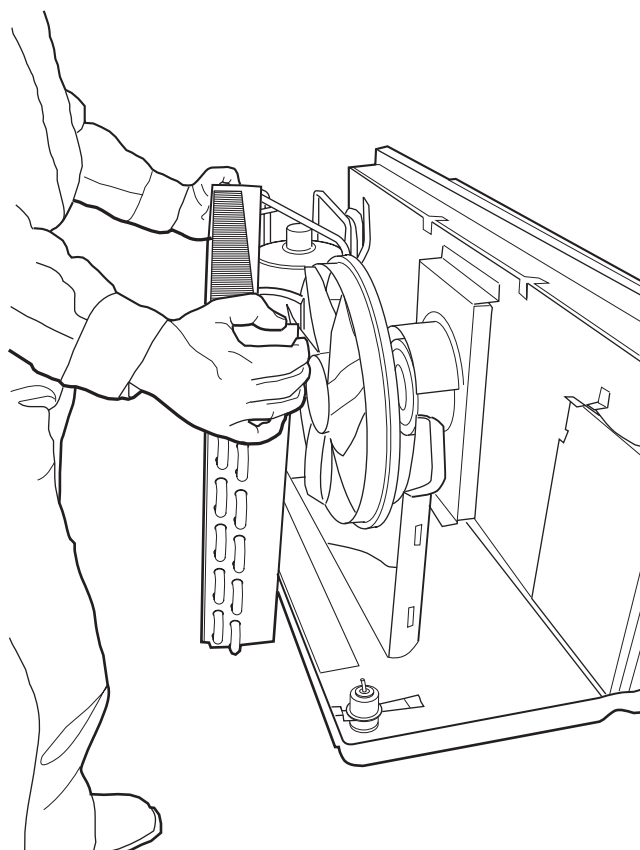


FIGURE 17 — REMOVING OUTDOOR COIL FROM CONDENSER FAN

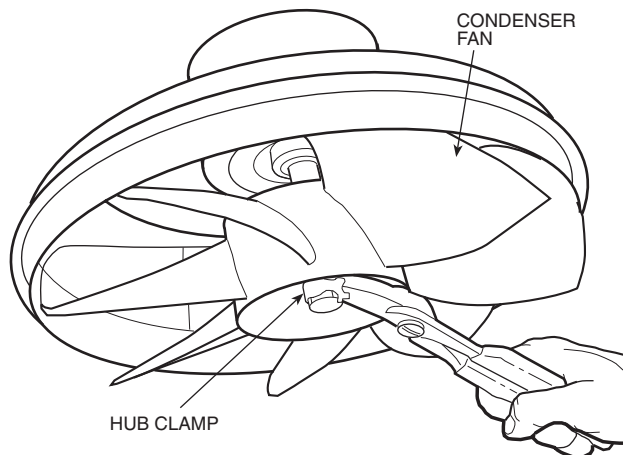


FIGURE 18 — REMOVING CONDENSER FAN HUB CLAMP

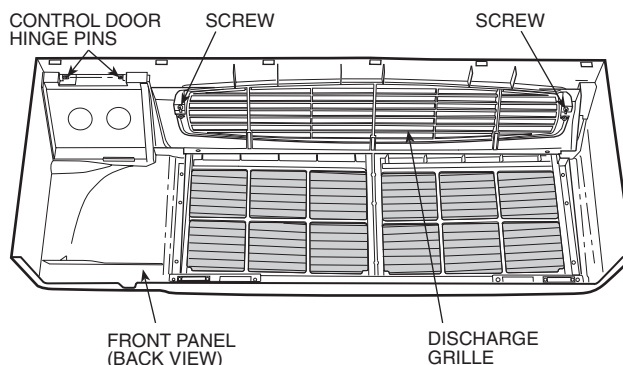


FIGURE 19 — LOCATION OF SCREWS ON DISCHARGE GRILLE

REINSTALL FRONT PANEL

1. Grasp the front panel firmly at the center of the top and bottom of the panel, tilting it forward 5 to 10 degrees from the vertical. See Figure 4.
2. Place the top of the front panel onto the unit, making sure the top engagement posts have engaged the slots on the unit. The top edge of the front panel should be flat against the top of the unit.
3. Gently lower the front panel onto the chassis, ensuring the conduit/cord is routed through the panel notch. Magnetic latches at the bottom of the front panel will secure the front panel to the unit.

GENERAL CLEANING

Maintaining proper performance of 52C,P systems requires conscientious cleaning and care of components. See Figure 20. Specific components require periodic cleaning and/or replacement, including the following:

COMPONENT CLEANING SCHEDULE

Indoor Air Filter	Monthly
Vent Air Filter	Monthly
Indoor Coil	Seasonally
Indoor Fan	Seasonally
Outdoor Coil	Seasonally

CLEANING AND SAFETY

Before starting to clean a unit, read the instructions thoroughly and gather the necessary tools for the job. Review all safety information on unit and in literature.

⚠ WARNING

Before cleaning, servicing, performing maintenance, or removing the chassis from the wall sleeve, disconnect all power to the unit to avoid the possibility of electrical shock and personal injury. Only trained and qualified service personnel should perform installation and service procedures on these units. Untrained personnel may perform basic maintenance tasks such as cleaning and replacing filters. Refer to General Disassembly section of this manual for proper procedures to disconnect power to 52C,P units.

Consider the following safety issues before beginning:

- New and unfamiliar tasks should be performed under the supervision of an experienced service technician.
- Personal protective equipment, such as safety glasses and work gloves, should be used.
- The floor around the work area should be clean and free of debris.
- The 52C,P unit weighs up to 150 pounds. Use a lifting device or ask for assistance if the unit must be moved.
- Make sure tools are the correct tools for the job, and that they are working properly and in good condition.

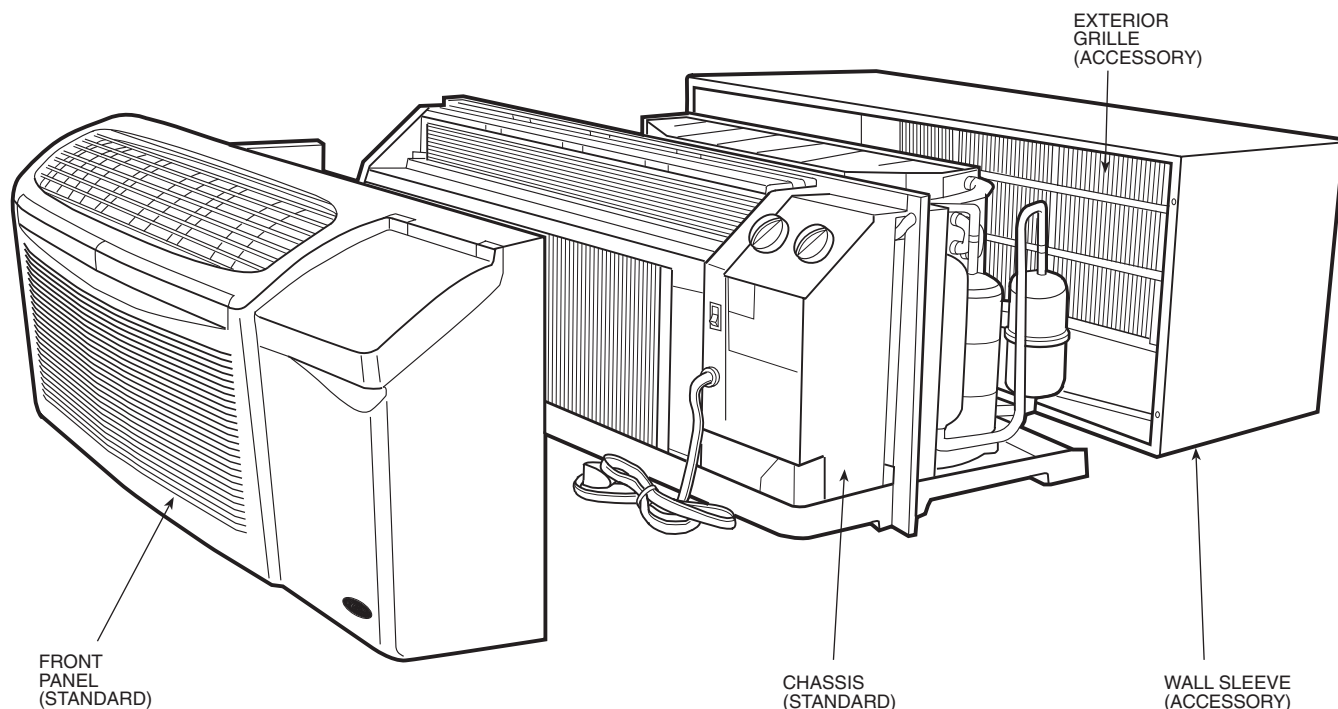


FIGURE 20 — STANDARD 52C UNIT

52C,P SERIES

TOOLS NEEDED

The following list includes the recommended tools, devices, and cleaning solutions for use in cleaning the 52C,P unit and components.

Vacuum Cleaner with Crevice Tool Attachment, or Soft Plastic Bristle Brush
Mild Household Detergent
Phillips Head Screwdriver
⁵ / ₁₆ -in. Nut Driver
Flat Head Screw Driver
Needle Nose Pliers, 90° Bend
Lifting Device (or another person for assistance)
Tank Sprayer (Part No. P9021001) or Trigger Spray Extension Tube (Part No. P9029000)
Compressed Air Tank
Clean Water Supply
Indoor Air Filter Replacement (Part No. AIR-FILTER-10PK)
Vent Air Filter Replacement (Part No. 52CQ500144)
Condenser Coil Cleaning Solution (Part No. P9020501)
Evaporator Coil Cleaning Solution (Part No. P90221001)
10-in. by 29-in. Piece of Clean Cardboard
3% Solution of Hydrogen Peroxide in Spray Bottle
Clean Cloth
Safety Glasses
Protective Gloves

MONTHLY CLEANING

■ **AIR FILTERS** — The indoor and vent air filters should be cleaned once per month. Filters that are not cleaned become clogged and will restrict airflow. This may lead to major component damage. If a filter becomes torn, has holes, or other damage, replace it with a new one. Replacement filters are available through Carrier Finished Goods and Carrier Replacement Component Division.

■ **CLEANING THE INDOOR AIR FILTER** — Two air filters are located in the unit's front panel. To remove each filter simply grasp each filter handle with both hands and gently pull the filter up and away from the unit. See Figure 21.

■ REPLACING THE INDOOR AIR FILTER —

Remove the indoor air filter as detailed in Cleaning the Indoor Air Filter. If damaged, use a filter replacement with the Carrier Part No. AIR-FILTER-10PK, available through Carrier Finished Goods and Carrier Replacement Component Division.

NOTE: Both filters are completely interchangeable.

■ CLEANING THE OUTDOOR AIR VENT FILTER

1. Remove the unit chassis from wall sleeve as described in the General Disassembly section of this manual. Refer to **Remove the Unit from the Wall Sleeve** section.
2. Swing open vent door. The filter is located directly behind the vent door. See Figure 22.
3. Once the filter is accessed, it may be cleaned using either a vacuum cleaner, or a soft bristle brush and a small amount of mild dish detergent. If detergent is used, remove detergent residue with a gentle, clean water stream. Allow the filter to air dry.

■ REPLACING THE OUTDOOR AIR VENT FILTER — If vent filter requires replacement:

1. Open vent door to access vent filter.
2. Remove vent door from hinges.
3. Using a small flat head screwdriver, pry the filter from the partition.
4. Replace vent filter using Carrier Part No. 52CQ500144.
5. Reverse Steps 1-3 to reattach vent door.

■ CHASSIS

Occasional cleaning of the exterior surfaces of the PTAC unit optimizes the unit's appearance and removes particles that may enter the air system. See Figure 23. Mild detergents clean and reduce electrostatic charges on the plastic components of the PTAC unit.

Use a clean cloth or brush to gently wipe exterior surfaces. Be careful not to push dirt or other fibers into the unit's interior components. Accessible wall sleeve surfaces should also be wiped clean.

SEASONAL CLEANING

The indoor and outdoor coils should be cleaned at least once during every season. Refer to **ACCESSING UNIT COMPONENTS** section to prepare unit.

■ CLEANING THE INDOOR AND OUTDOOR COILS

⚠ CAUTION

Coil fins are sharp and may cut hands. Wear heavy **protective gloves** when cleaning coils.

⚠ WARNING

Use only cleaning solutions that meet local codes.

1. Use a vacuum cleaner or soft bristle brush to remove surface fibers and dirt from the interior surface of evaporator coil and both surfaces of condenser coil. See Figure 24. It is important to apply the tool in the **same direction of the fins**, not against them. Applying the tool against the fins may cause damage (fin edges may bend over).
2. With a tank sprayer or a trigger spray extension tube, spray coil cleaning solution evenly across the coils, making sure coils are thoroughly saturated. See Figure 25. Refer to instructions on the cleaning solution containers for best results. **Do not use a high-pressure sprayer.**
3. Rinse the coils thoroughly with low-velocity, clean warm water (less than 200 F).
4. Repeat steps 2 and 3 for each coil surface.
5. Drain water and cleaning solution that may have collected in the basepan during the cleaning process by carefully tilting the chassis. This allows excess water to flow out of the overflow notches.

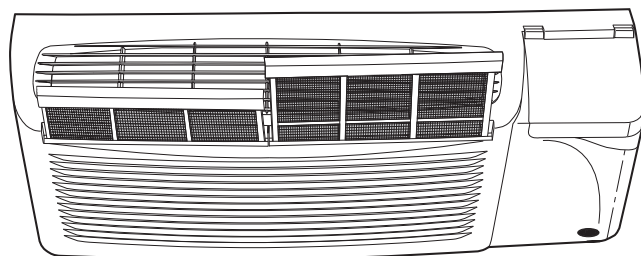


FIGURE 21 — LOCATION OF TWO-PIECE INDOOR FILTER

⚠ CAUTION

Do not set unit on end to drain water from basepan, or at any other time. Oil will drain from the compressor sump, which could cause compressor failure.

6. Thoroughly clean the basepan and drain passages by rinsing with clean water. Be sure all debris is removed from the drain valve. See Figure 26.
7. Thoroughly clean outdoor fan assembly and all other mechanical components located in outdoor coil area. Be sure to remove all dirt and debris.
8. Clean wall sleeve.

■ **CLEANING THE INDOOR FAN AND FAN SCROLL** — Dried debris and build-up on the blower wheel and fan scroll can reduce the efficiency of the unit.

1. ACCESS AND CLEAN INDOOR FAN AND FAN SCROLL

- a. Reach behind the indoor coil and vacuum any loose debris from the condensate drain pan, fan and other areas accessible to the fan scroll, being careful to avoid damage to the coil fins.
- b. Use mild detergent and a damp cloth to remove stubborn debris from surfaces around scroll and fan blades.

2. **CLEAN HEATER ASSEMBLY** — Use compressed air to blow off any dirt or dust that has accumulated on the heater coils.

NOTE: Do not direct air at the bi-metal discs on the temperature limiter switches.

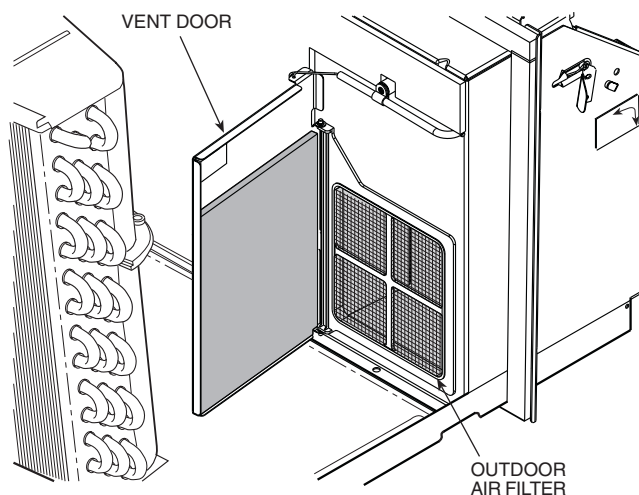


FIGURE 22 — LOCATION OF OUTDOOR AIR VENT FILTER

52C,P SERIES

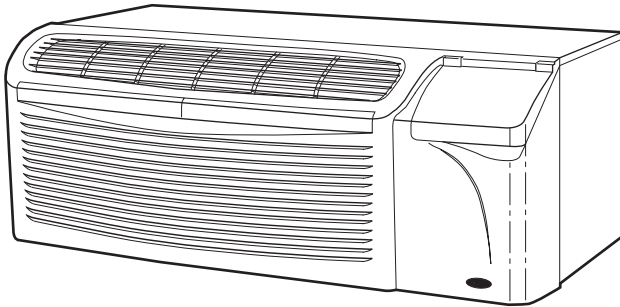
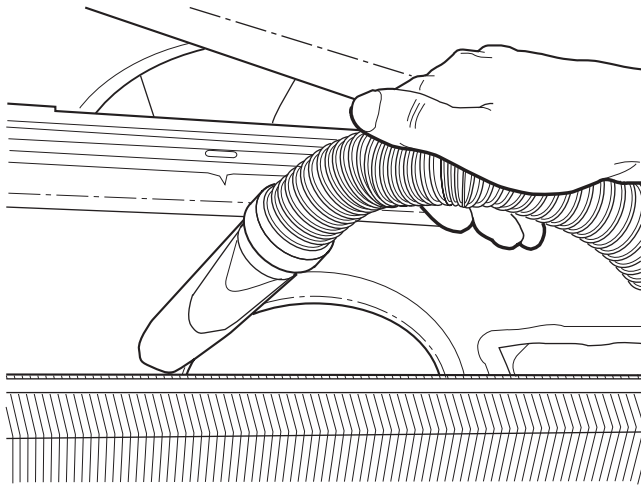


FIGURE 23 — PTAC EXTERIOR SURFACES



**FIGURE 24 — VACUUMING EVAPORATOR
COIL**

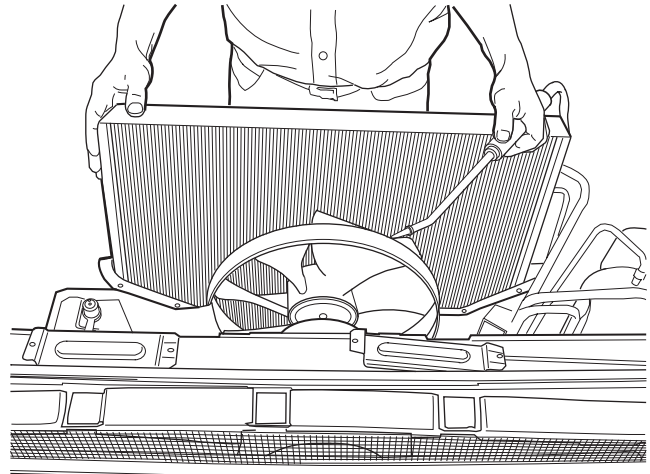


FIGURE 25 — CLEANING COILS

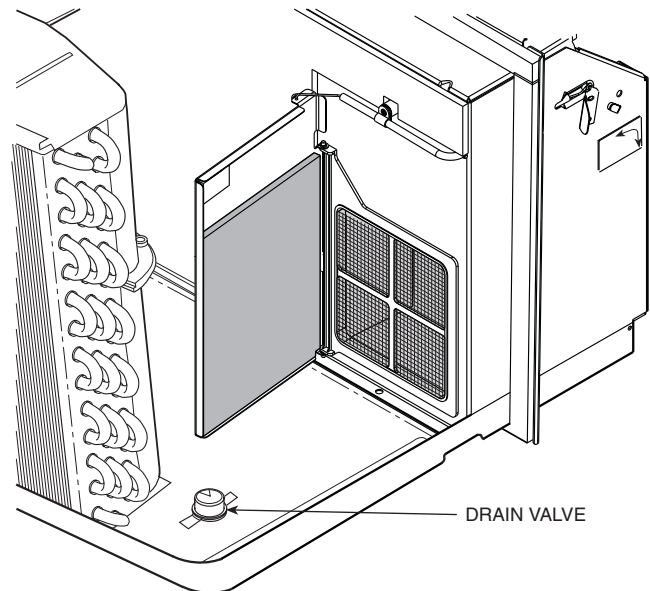


FIGURE 26 — BASEPAN SECTION

COMPRESSOR

A cutaway view of the rotary compressor with key components labeled is shown in Figure 27. The motor stator is rigidly attached to the compressor shell. The rotor is pressed onto the eccentric shaft, which is supported by 2 bearings. Both the discharge valve and discharge muffler are attached to the motor bearing. The

pump bearing provides a thrust surface for the shaft and the rolling piston. Compressed gas is separated from the suction gas by the vane. Discharge gas pressure and the vane spring keep the vane in contact with the rolling piston.

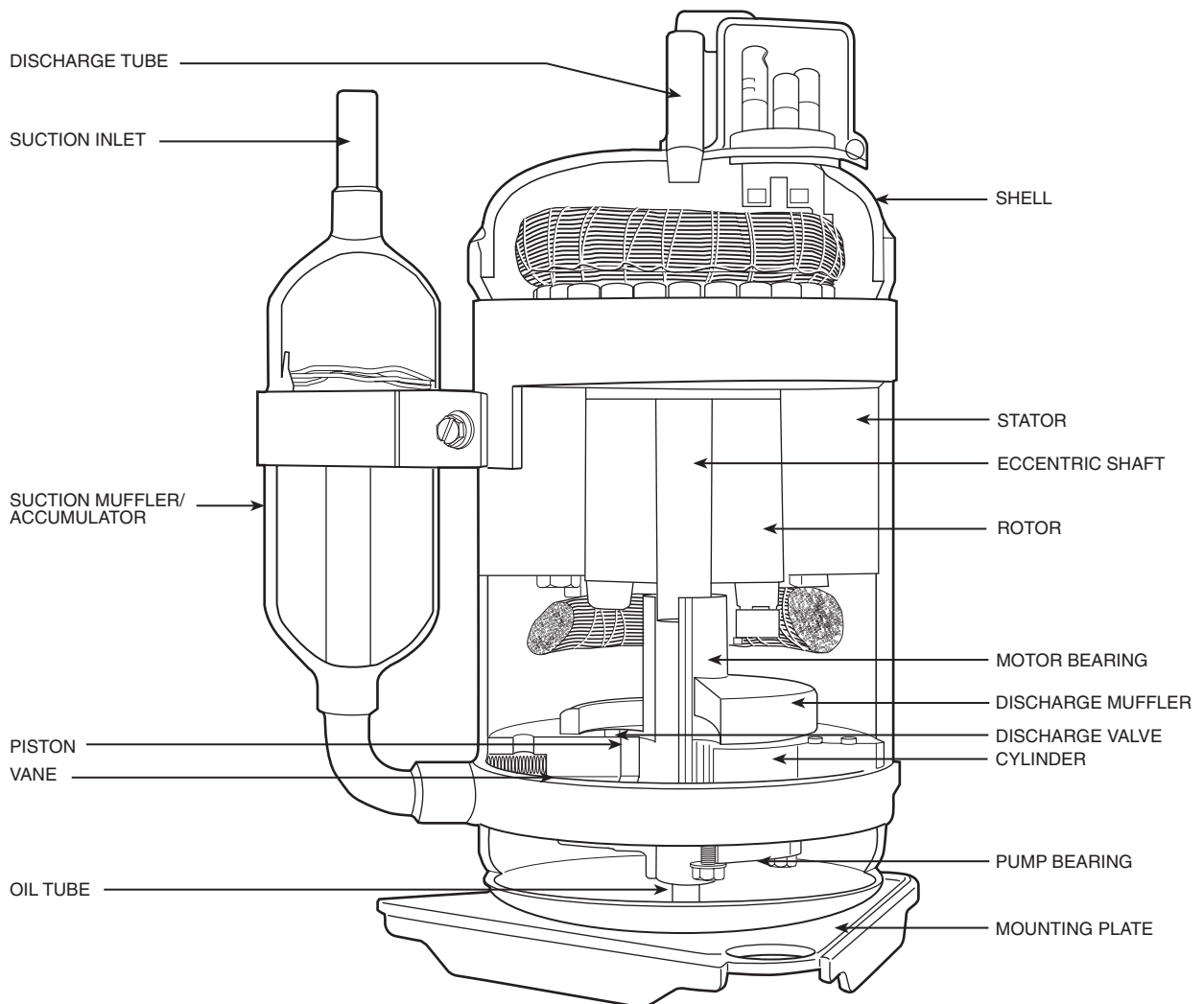


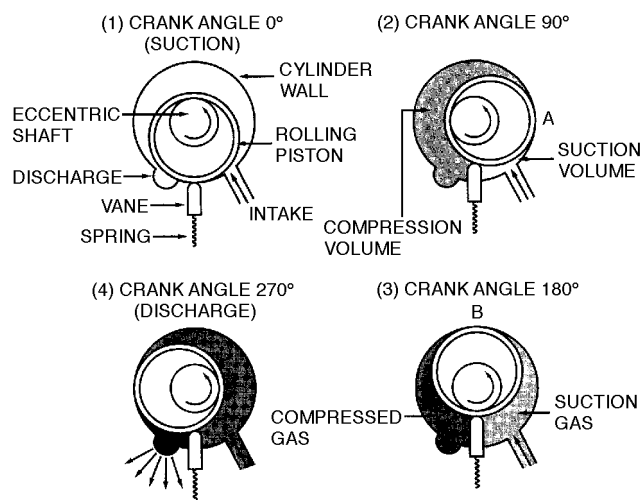
FIGURE 27 — ROTARY COMPRESSOR COMPONENTS

The rotary compression process (Figure 28), starts at top dead center as shown in (1). Suction gas flows through the suction inlet and into the cylinder area. As the shaft rotates through 90 degrees, the rolling piston moves to position A as shown in (2). The suction volume is now the area defined by point A and the tip of the vane. Gas in the remaining volume has been compressed above suction pressure. After another 90 degrees of shaft rotation, the rolling piston has moved to position B as shown in (3). Both the compressed gas and suction gas volumes are now equal. Another 90 degrees of shaft rotation is shown in (4). Compressed gas has reached a pressure sufficient to open the discharge valve, and flows from the cylinder into the compressor shell. After another 90 degrees of shaft rotation, the entire process begins again. Continuous suction and discharge allows for a smooth compression process.

The rolling piston is not in actual contact with the cylinder wall, vane, or bearing faces. Hydrodynamic sealing prevents leakage from the compressed gas volume to the suction volume via these paths. Precise control of machining tolerances, surfaces, finishes, and assembly clearances is critical to achieve high efficiency performance. In addition, the line contact between the vane tip and the rolling piston requires careful selection and control of materials to provide wear resistance and reliable long-term operation.

COMPRESSOR TROUBLESHOOTING

Refer to Figure 29 for a basic compressor troubleshooting chart.



**FIGURE 28 — ROTARY COMPRESSOR
COMPRESSION PROCESS**

BASIC HERMETIC COMPRESSOR ELECTRICAL MEASUREMENTS

There are 2 basic electrical tests for hermetic compressors that will determine the electrical state of the motor. The first test requires checking the electrical resistance of each of the electrical motor windings. The second test requires checking the electrical resistance of each of the electrical motor windings to ground. These tests may be accomplished by performing the following steps:

1. **DISCONNECT ALL POWER TO THE UNIT.**
2. Remove the unit chassis from the sleeve as detailed in the **UNIT DISASSEMBLY** section.
3. Open the control box as detailed in the **UNIT DISASSEMBLY** section, then locate, label, and remove the 3 compressor wires from the following locations: the RUN wire (BLACK) from the capacitor, the START wire (BLUE) from the capacitor. The third wire, COMMON wire (YELLOW) may be connected to one of the following locations: **for PC units** the wire is on the indoor thermostat, **for CE, PE Remote Control Units** the wire is on the RC Control Board, **for all other CE, PE Units** the wire is located on the rotary selector switch. **For ALL CQ, PQ Units** the wire is on the outdoor frost thermostat.

⚠ DANGER

For compressors that are known to be damaged: Remove refrigerant prior to disconnecting compressor wires. Damaged hermetic compressor terminals may become loose and eject from the compressor. Wear safety glasses and keep your face away from the area above the terminals when removing compressor wires.

4. Perform a shorted/open windings test to measure the resistance between the windings of the compressor motor. Use a volt-ohmmeter set to the lowest ohm reading level then read and record the resistance between the RUN and START, START and COMMON, and RUN and COMMON wires. See Figure 30. The typical resistance readings will be about 4, 3, and 1 ohms respectively. The smaller values should add to equal the larger value. If this is not true then the compressor is likely shorted winding to winding.

NOTE: The rotary compressor has the compressor overload located under the terminal cover. If the overload is open it can show ohm readings that are infinite. The unit should be off for at least an hour to give this overload time to reset if it is open.

POSSIBLE CAUSE	SYMPTOM				
	Compressor Starts and Runs But Cycles On the Overload	Compressor Starts After Cycling the Overload Several Times	Compressor Will Not Start. It Hums and Cycles On the Overload	Compressor Will Not Start and Makes No Noise	Compressor Cycles Off (Not On Overload)
COILS/FILTERS DIRTY OR PLUGGED	X				
AIR OR NONCONDENSABLE GASES IN SYSTEM	X	X			
SYSTEM REFRIGERANT OVERCHARGED	X				X
DISCHARGE LINE RESTRICTED	X	X			
CAPILLARY TUBE OR STRAINER RESTRICTED OR PLUGGED	X	X			X
FAN BLADE OR MOTOR DEFECTIVE	X				X
FAN BLADE OR BLOWER WHEEL STUCK	X				X
SYSTEM REFRIGERANT UNDERCHARGED	X				X
EVAPORATOR AIRFLOW RECIRCULATION					X
UNIT OVERSIZED FOR APPLICATION					X
COMPRESSOR REQUIRES START ASSIST		X	X		
NO POWER TO UNIT				X	
LOW VOLTAGE TO UNIT	X	X	X		X
OVERLOAD PROTECTOR OPEN				X	
OVERLOAD PROTECTOR INCORRECT OR DEFECTIVE	X		X	X	
CAPACITOR INCORRECT OR DEFECTIVE	X	X	X		X
THERMOSTAT CONTACTS ARE OPEN				X	
THERMOSTAT IS SET TOO HIGH OR LOW				X	
SELECTOR SWITCH IS OPEN OR DEFECTIVE				X	
WIRING IS INCORRECT OR DEFECTIVE	X		X	X	X
SYSTEM PRESSURES NOT EQUALIZED		X	X		X
COMPRESSOR MOTOR OR MECHANISM DEFECTIVE	X	X	X	X	X
COMPRESSOR GROUNDED			X		

FIGURE 29 — BASIC COMPRESSOR TROUBLESHOOTING GUIDE

- Next, perform a grounded windings test to test the resistance individually of each wire to the shell of the compressor. The paint on the compressor can prevent good contact between the probe and the metal. The paint should be removed from a small section of the shell of the compressor to ensure good contact by the meter probe. The volt-ohmmeter should be set to at least the 100X ohm level. The measured resistance between each wire and ground should be infinite or O.L. on the readout. If there is measurable resistance one of the windings is likely shorted to ground. See Figure 31.
- A compressor that has a winding to winding short or a winding to compressor shell short is electrically failed and needs to be replaced. See the **Compressor Replacement** section for details.

COMPRESSOR REPLACEMENT

Before working on the compressor, read the instructions thoroughly and gather the necessary tools for the job. Review all safety information on unit and in literature. Always turn off all power to unit to avoid the possibility of electrical shock.

Consider the following safety issues before beginning:

- New and unfamiliar tasks should be performed under the supervision of an experienced service technician.
- Personal protective equipment, such as work gloves and safety glasses, should be worn.
- The floor around the work area should be clean and free of debris.
- Make sure tools are the correct tools for the job and that they are working properly and in good condition.
- Never replace a blown fuse without correcting the cause of the original failure. If thermally operated circuit breakers or overloads are tripping, make sure the trip is not due to excessively high temperatures or loose connections.
- When brazing suction and discharge lines, cool the lines with a damp, clean cloth to prevent injury.
- Oil may be present in the compressor accumulator and interconnecting tubing. Use caution when removing tubing.

52C,P SERIES

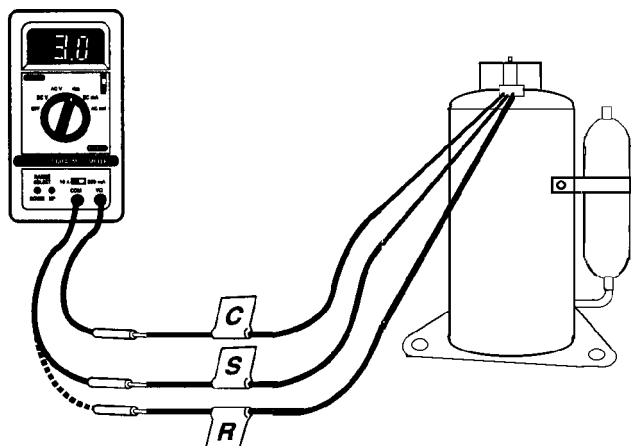


FIGURE 30 — SHORTED/OPEN WINDINGS TEST

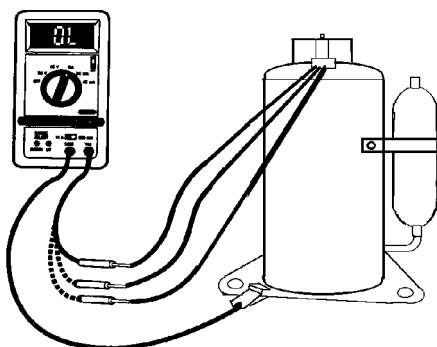


FIGURE 31 — GROUNDED WINDINGS TEST

⚠ DANGER

For compressors that are known to be damaged: Remove refrigerant prior to disconnecting compressor wires. Damaged hermetic compressor terminals may become loose and eject from the compressor. Wear safety glasses and keep your face away from the area above the terminals when removing compressor wires.

■ **TOOLS NEEDED** — The following list includes the recommended tools and devices for removing and replacing the compressor.

1/2-in. and 3/8-in. Tube Benders
1/2-in. Nut Driver
5/16-in. Nut Driver
Flat Head Screwdriver
Piercing Valve
2 Parker Access Valves (Part No. AVUSE-5)
Pinch Off Tool
Filter Drier — All Units (Part No. P504-80845)
Carrier TOTALTEST Kit (Part No. TT1-001)
Totalclaim System
Charging Cylinder or an Electronic Scale
Refrigerant-22
Tubing Cutter
Torch
Nitrogen Cylinder with Regulator
Strainers
Capillary Tubes

■ **REMOVING THE COMPRESSOR** — Follow the steps below to remove the compressor:

1. **Disconnect all power to unit.**
2. Remove unit from wall sleeve as detailed in the UNIT DISASSEMBLY section. The unit weighs up to 150 pounds. Seek assistance or use a lifting device when removing unit from wall sleeve.
3. **If the unit is a heat pump:** Disconnect the wire plug on the reversing valve solenoid and carefully remove the outdoor thermostat capillary from the outdoor coil. See Figure 32.
4. Attach the piercing valve to the suction side process tube below the crimps. Attach Carrier TOTALTEST® kit (Part No. TT1-001), to the piercing valve to verify acidity of the system. After verifying the system acidity, remove the refrigerant using a certified refrigerant recovery system.
5. When all the refrigerant has been recovered, remove the terminal cover from the compressor with a nut driver. Disconnect the 3 wires from the compressor and label the location of each. Once the wires are labeled, replace the terminal cover to protect the compressor terminals.
6. Remove the air system components by following the procedure detailed in the ACCESSING UNIT COMPONENTS section.
7. Remove the piercing valve and cut the crimped portion of both process tubes off with a small tubing cutter. Braze an access valve on each process tube. Using a torch, disconnect the suction and discharge tubes from the compressor connections.
8. Remove the compressor mounting bolts, and remove the compressor.

⚠ CAUTION

The compressor may still be hot from the brazing process.

IMPORTANT: Any time the compressor is replaced, the strainer and capillary tubes must be removed and replaced also.

9. **For all units:** Remove and replace the strainer and capillary tubes from the system. See Figure 32 for strainer and capillary tube location.
10. **For Heat/Cool Units:** Use an in-line filter drier (P/N P504-80845). The filter drier can be installed in any location in suction line. See Figure 33A for general installation location.
For Heat Pump Units: Use an in-line filter drier (P/N P504-80845) and **install between the reversing valve and the compressor accumulator.** There are several suction tube configurations and the in-line filter drier will be field piped and brazed into the suction tube for your unit. See Figure 33B for a general installation location.
11. Remove the grommets from the existing compressor and install them onto the new compressor.

12. Install the new compressor and the new capillary assembly (the correct capillary and strainer may be obtained from Carrier RCD), into the unit.
13. Leak check the unit with 150 psi of nitrogen pressure.
14. For 52C,P units, the system should be evacuated from the high side to the low side to a minimum of 200 microns of mercury. This evacuation removes residual moisture from the system prior to charging.
15. **For Heat Pump Units:** Recharge unit to the nameplate refrigerant charge using a charging cylinder.
16. Pinch off each access valve on the process tubes, in 2 places, using a pinch off tool such as Imperial tool #105-FF or Robinair Tool #12294. Release any refrigerant pressure trapped in the access valve by depressing the valve core, then confirm that no R-22 is leaking past the pinch off tool location. Cut the access valve stem of the process tube above the top crimp and braze the top of each process tube to ensure the system is sealed, (leave the pinch off tool in place until after the brazing process is complete).
17. Reassemble the unit by reversing steps 1-9.
18. Connect the compressor wires and energize the unit to verify operation.

■ **REFRIGERANT CHARGING** — Every mechanical refrigeration system that is opened for servicing must be accurately charged before it is returned to service. Run the compressor **ONLY** after charging the system with refrigerant.

IMPORTANT: The compressor should never be operated without refrigerant!

It is important to remember that recovered and/or recycled refrigerant may only be recharged into the system from which it was initially recovered, or another one owned by the same customer. Charge level is important. Charge units only as recommended by manufacturer.

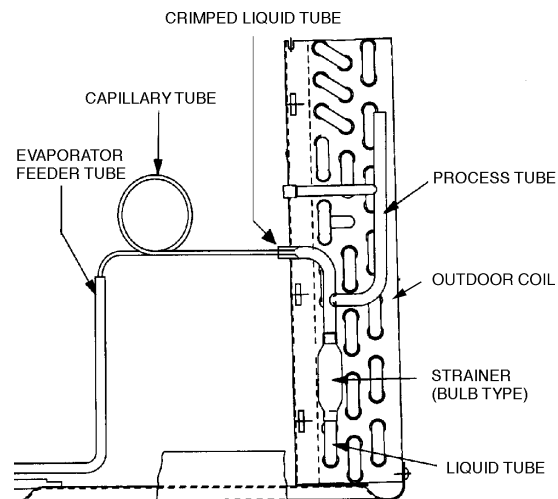


FIGURE 32 — STRAINER AND CAPILLARY TUBE LOCATION

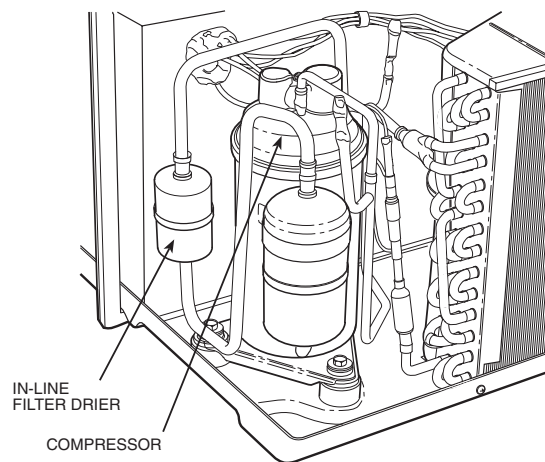


FIGURE 33A — IN-LINE FILTER DRIER — GENERAL INSTALLATION LOCATION FOR HEAT/COOL UNIT

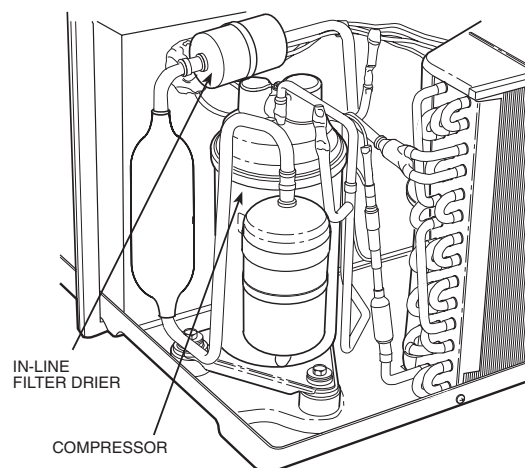


FIGURE 33B — IN-LINE FILTER DRIER — GENERAL INSTALLATION LOCATION FOR HEAT PUMP UNIT

HEATERS

The heater in 52C,P units is located directly behind the evaporator coil. The heater assembly includes the heater (2.3 kW, 3.4 kW or 5 kW), a primary limit switch, and a secondary limit switch. See Figure 34. The primary and secondary limit switches are safety switches that regulate heater operation. The primary limit switch disables current to the heater when the temperature exceeds the setting on the switch.

For example, a 3.4 kW heater may have a primary limit switch setting of 150 F. If the temperature at the switch exceeds 150 F, the primary limit switch will electrically open and shut off power to the heater. Once the temperature drops below 110 F, the primary limit switch will automatically reset.

The secondary limit switch works in the same manner as the primary limit switch, except it is a one time switch and has a slightly higher temperature setting. Once this switch is thermally opened, it must be replaced. Together the primary and secondary switches help maintain safe temperature limits for unit operation.

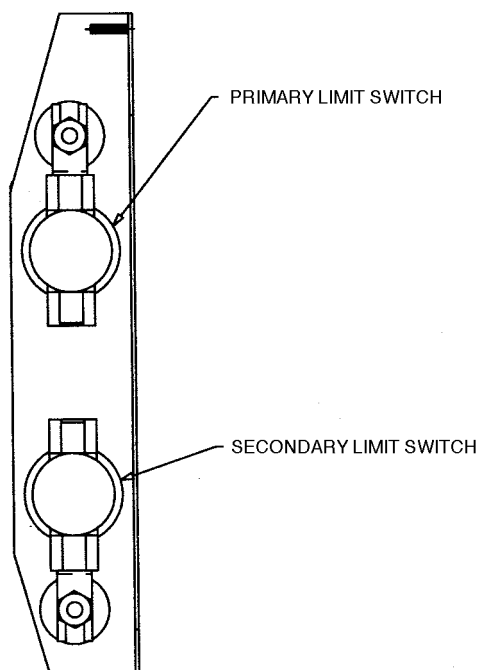


FIGURE 34 — LIMIT SWITCH LOCATION

COMMON CAUSES OF HEATER FAILURE

Heater failure may result from broken heater coils, primary limit switch failure, or an open secondary limit switch. These conditions are generally caused by low or no airflow.

HEATER REMOVAL

Before working on the heater, read the instructions thoroughly and gather the necessary tools for the job. Review all safety information on the unit and in the product literature.

⚠ WARNING

Before performing any cleaning, servicing, or maintenance to the unit, **Disconnect All Power** to avoid the possibility of electric shock and personal injury.

The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Consider the following safety issues:

- Prior to performing any service or maintenance on electrical equipment you must **Disconnect All Power**.
- New and unfamiliar tasks should be performed under the supervision of an experienced service technician.
- Personal protective equipment, such as safety glasses and work gloves, should be worn.
- The floor around the work area should be clean and free of debris.
- Make sure tools are the correct tools for the job, and that they are working properly and in good condition.

■ **TOOLS NEEDED** — The following list includes recommended tools and devices for working on the heater section of 52C,P units.

Phillips Head Screw Driver
Needle Nose Pliers
Volt-ohmmeter
Nut Driver $\frac{5}{16}$ -in.

Perform the following steps to **remove the Heater Assembly**.

1. **DISCONNECT ALL POWER TO UNIT.**
2. Remove heater by following instructions in **ACCESSING UNIT COMPONENTS** section.

After the heater is removed, examine the heater as follows to determine if it is operational:

Perform a visual inspection. The heater coil should be free of breaks. If there are any breaks in the coil, replacement of the heater assembly is necessary. See Figure 35.

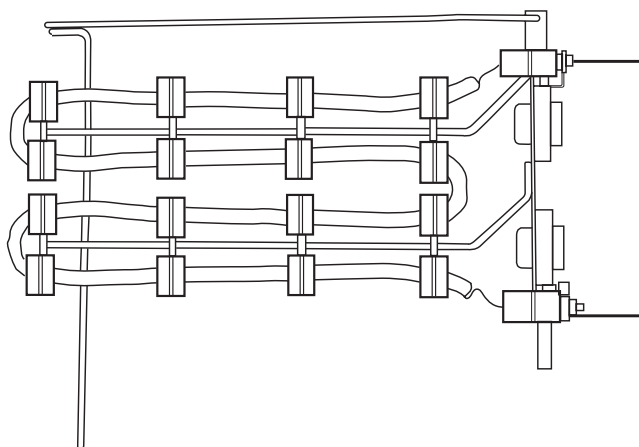


FIGURE 35 — HEATER COIL (Removed)

Coil resistance must also be checked to verify the heater is operating correctly. The resistance of the heater coils must meet approximate levels for the heater to perform at its optimum efficiency. See Figure 36 for approximate resistance for heaters at 75 F. Before checking the heater coil resistance, **be sure all power to unit is off.**

To check resistance, set the volt-ohmmeter selector switch to the lowest ohms value. Next connect the volt-ohmmeter leads to each side of the heater coil at the studs that hold the limit switches in place. Incorrect readings can be obtained if the wires are not removed from the limit switches on the heater assembly. If the resistive reading is infinite or zero, the heater is failed and replacement is necessary. Reinstall the heater assembly.

HEATER SIZE	WATTS	VOLTS	ACCEPTABLE RESISTANCE (Ohms)
2.3 kW	2300	230	20-23
	2300	265	28-31
3.4 kW	3400	230	13-16
	3400	265	19-21
5.0 kW	5000	230	9-11
	5000	265	13-15

FIGURE 36 — ACCEPTABLE HEATER RESISTANCE VALUES

OPERATING CONTROLS

UNIT-MOUNTED CONTROLS

The controls and components used in the **52C,P cooling only or heat/cool units** are as follows: the selector switch, the indoor thermostat, the dual capacitor, the temperature limiter, the vent lever, and the fan cycle switch. See Figure 37.

The *selector switch* is used to determine the mode of operation: heat, cool, fan, or off. The *indoor thermostat* controls the room ambient temperature and cycles the heater or the compressor based on the selector switch setting. The *dual capacitor* aids in the start-up of the compressor and the fan motor. The *temperature limiter* is integrated into the control box top cover located under front panel. It is a mechanical device that restricts the amount of rotation of the thermostat. The temperature limiter device may be adjusted by moving the plastic temperature selector tabs to another temperature location on the control box. The *vent lever* is located on the front left side of the chassis. It is a slide mechanism that opens and closes the vent door. The vent control may be accessed by removing the front panel of the unit. The *fan cycle switch* is used to provide 2 options of fan control. The first option, CON, causes the fan to run continuously. The second option, CYC, causes the fan to cycle on with the compressor or electric heater and off when the thermostat is satisfied.

The **52C,P heat pump unit** contains all the components of the heat/cool and cooling only unit, and the following additional ones: the *outdoor frost thermostat* and the *reversing valve*. The outdoor frost thermostat prevents operation of the unit in the heat pump mode when the outdoor coil temperature drops below 20 F, or at about 35 F outdoor ambient temperature. The unit automatically engages the electric heat strip and disables the compressor under these conditions.

The outdoor frost thermostat has a *manual override* to place the unit in *electric heat mode operation only*. The override switch is located behind the front panel on the front side of the unit control box door.

IMPORTANT: Placing the override switch to electric heat mode operation will *disable the compressor for ALL heating or cooling operations (for all units except RC units)*. Placing the override switch to electric heat mode operation on RC units will only disable the compressor in heating mode.

The *reversing valve* allows for operation in reverse cycle heat pump mode. The valve is located in the piping system and is controlled by the reversing valve solenoid coil. The coil is energized only during the heating mode.

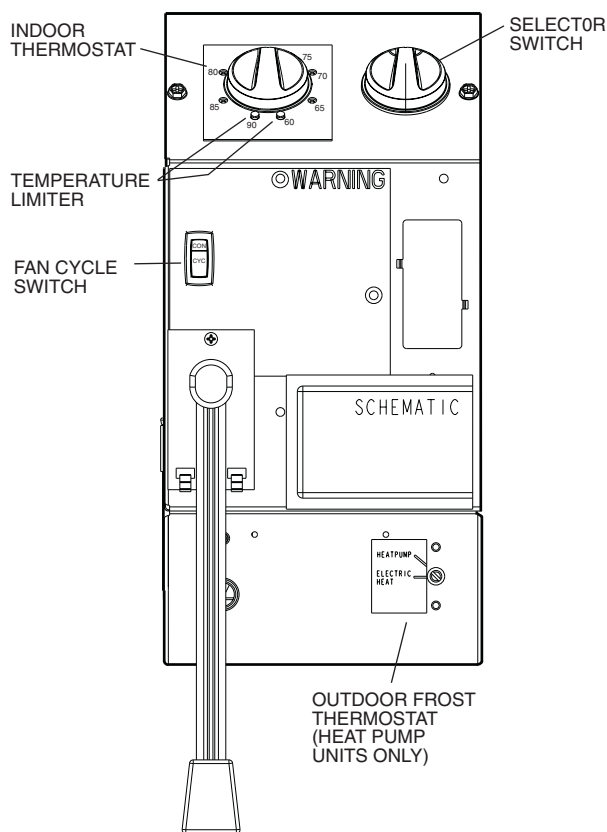


FIGURE 37 — 52C,P OPERATING CONTROLS

WALL-MOUNTED THERMOSTAT CONTROLS

For **52C,P wall thermostat control (RC, RP) units**, all controls are located on the wall-mounted thermostat except the vent lever and outdoor thermostat. *Remote control is a factory or field-installed option.* There are 3 styles of thermostats qualified for use with 52C,P series Remote Control units. See Figures 38-40. On remote control units, the fan cycle function is located on the wall thermostat. The rocker switch on the control box door is used to set fan speed to high or low. Factory default is low speed.

See Figures 41-43 for thermostat wiring.

A field conversion kit is available to convert an AA model (standard unit-mounted controls) to an RC model (wall-mounted controls).

IMPORTANT: No conversion kit is available to convert from an RC model back to an AA model.

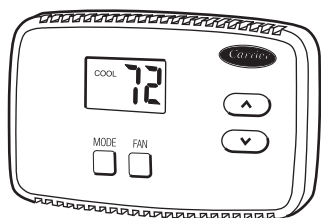


FIGURE 38 — NON-PROGRAMMABLE THERMOSTAT

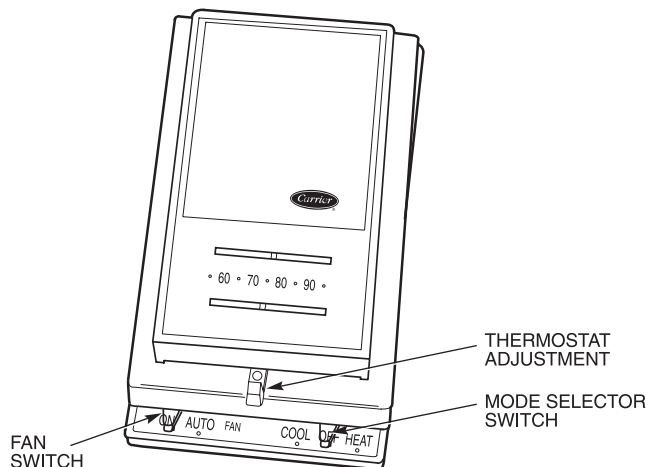


FIGURE 39 — MANUAL THERMOSTAT

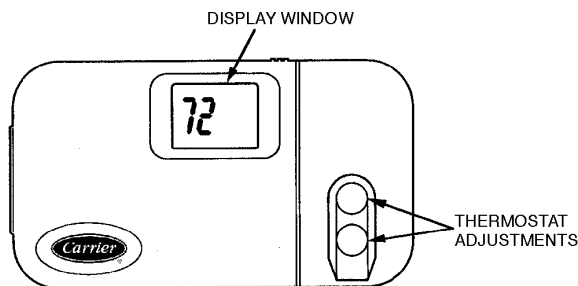
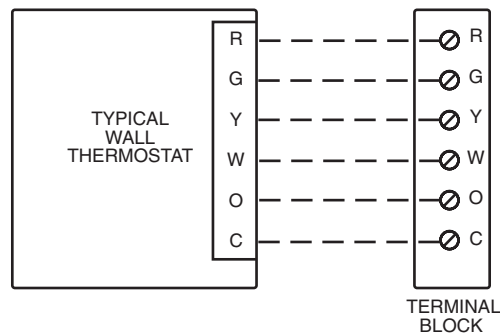


FIGURE 40 — PROGRAMMABLE THERMOSTAT



TERMINAL	DESIGNATION
R	24 VAC
G	Fan
Y	Compressor
W	Electric Heat
O	Reversing Valve
C	Common

NOTES:

1. Use terminal "O" for heat pump connection only.
2. See table at left for terminal descriptions.
3. Common wire "C" is typically used only for digital thermostats.
4. Power stealing is NOT allowed. There must always be a hard common connection between unit and digital thermostat.

FIGURE 41 — WIRING CONNECTIONS

REMOTE THERMOSTAT TROUBLESHOOTING

Thermostat display is blank:

Check to make sure there is 24 VAC to the thermostat (measure across terminals R and C at the thermostat). If there is 24 VAC at the thermostat, check connections at the thermostat terminal block. If connections are good and there is 24 VAC with no display, the thermostat should be replaced.

Thermostat display is working but unit is not heating or cooling:

At the RC terminal block on the unit, measure the control inputs coming from the thermostat. (Place one of the meter leads on C and use the other to check the voltage at each of the terminals.)

MODE	TERMINAL METER READINGS (VAC)				
	R	G	Y	W	O (For HP Only)
Fan Only	24	24	0	0	0
Cooling	24	24	24	0	24
Heating					
Heat Pump Unit	24	24	24	0/24*	0
Heat/Cool Unit	24	24	0	24	0

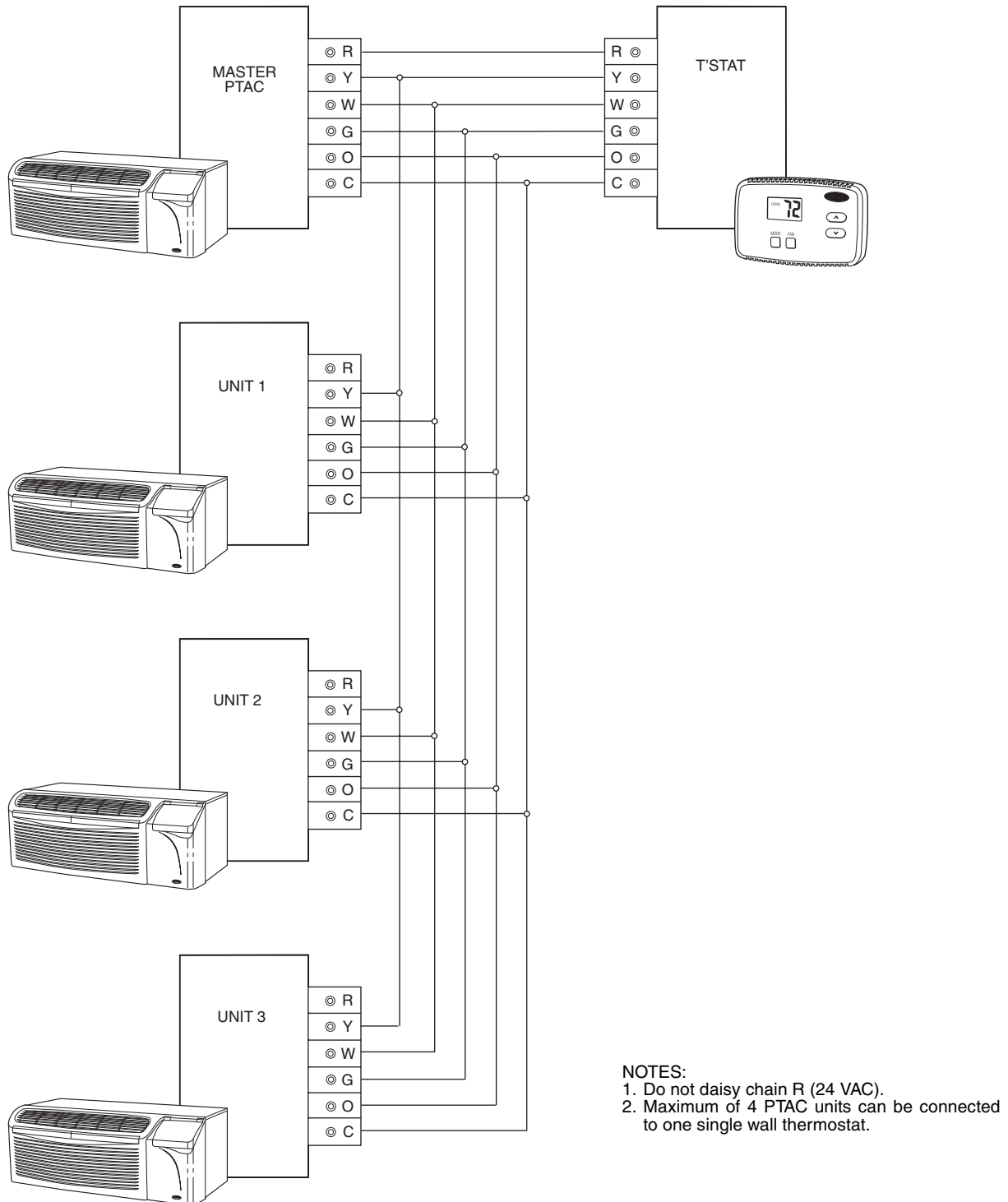
*24 VAC supplied if thermostat is in 2nd stage heating demand (large difference between room temperature and setpoint).

NOTE: For heat pump units, the Outdoor Frost Thermostat (OFT) will determine, based on outdoor temperature, whether to bring on the compressor or electric heat in the Heating mode.

FIGURE 42 — THERMOSTAT TROUBLESHOOTING

If the inputs are not correct, then the thermostat is not making a call for the mode requested. This could be because the thermostat is in a unit protection mode, not set up properly, miswired, has a broken wire, or it may have failed.

52C,P SERIES



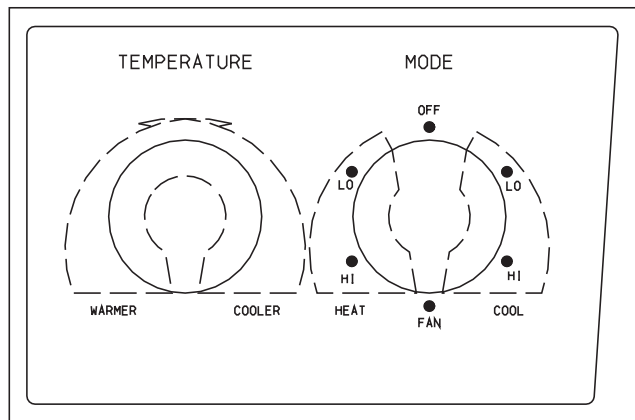
⚠ CAUTION

All units must be connected to same ground source. To accomplish this, be sure to connect all units back to the same breaker box.

FIGURE 43 — TYPICAL WIRING FOR MULTIPLE 52C PTAC UNITS CONNECTED TO ONE WALL THERMOSTAT

DESCRIPTION OF SELECTOR SWITCH SETTINGS (Figure 44)

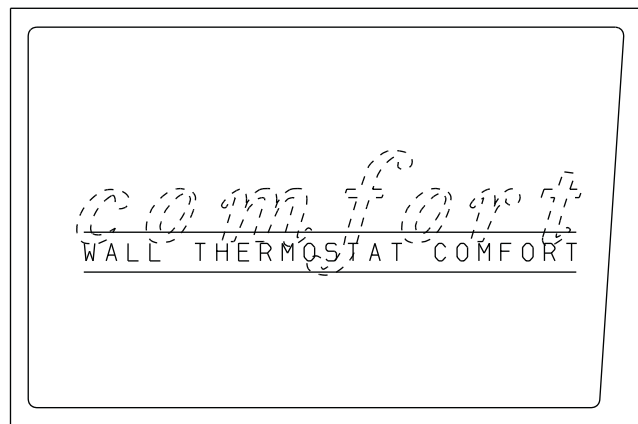
- **OFF MODE** — The OFF position terminates unit operation.
- **FAN ONLY MODE** — Use fan only position for air circulation without heating or cooling. Fan runs at high speed.
- **HIGH HEAT OR HIGH COOL MODE** — Position selector and temperature control knobs to desired comfort level. This function provides maximum heating or cooling, and is recommended to raise or lower the room temperature quickly.
- **LOW HEAT OR LOW COOL MODE** — Position selector and temperature control knobs to desired comfort level. This function provides minimum heating or cooling with maximum dehumidification during cooling. This setting also allows for very quiet fan operation.
- **FINDING TEMPERATURE SETTING FOR COMFORT LEVEL** — Set temperature knob in the middle. Select High Heat, Low Heat or Cool position and allow unit to run for 15 to 30 minutes. If room is not comfortable, turn knob setting slowly to change setting. When room is comfortable, keep control knob at that position.



TYPICAL 52C UNIT CONTROLS

NON-USER ADJUSTABLE CONTROLS

- **OUTSIDE OR VENT AIR** — Slide the vent lever to the fully open position for outside air or fully closed position for vented air.
- **FAN CYCLE** — The fan cycle switch allows the fan to operate in 2 modes:
 - CON — Fan runs continuously, circulating air even when the temperature setting has been satisfied. This helps to maintain the room temperature closer to the thermostat setting.
 - CYC — Fan cycles on and off with the compressor during heating or cooling. Fan stops when the temperature setting is satisfied. This results in longer unit off-time and slightly larger variations in room temperature and humidity.
- **OUTDOOR THERMOSTAT (52CQ, PQ Units Only)** — The outdoor thermostat has 2 operating modes. The heat pump mode (selector screw set fully clockwise), allows the unit to operate normally in the reverse cycle mode. The electric heat mode (selector screw set fully counterclockwise), disables all **compressor** operating modes, both heating and cooling for units with mounted controls. For wall thermostat controlled models the compressor is only disabled in heating and still allowed to run in cooling.



TYPICAL 52C UNIT WITH
WALL THERMOSTAT CONTROLS (Blank Plate)

FIGURE 44 — TYPICAL CONTROL PANEL (52C Unit Shown)

52C,P SERIES

SEQUENCE OF OPERATION

■ HEAT/COOL UNITS (Figure 45)

Fan Mode — With the selector switch set to FAN contacts L1 to HI and FCS1 to LS are made.

Cooling (Low) — With the selector switch set to low speed cooling contacts FCS2 to LO, COMP to FCS1, and COMP to IT3 are made.

Cooling (High) — With the selector switch set to high speed cool contacts FCS2 to HI, COMP to FCS1, and COMP to IT3 are made.

Heating (Low) — With the selector switch set to low speed heat contacts FCS2 to LO, IT1 to LS, L2 to HTR, and FCS1 to LS are made.

Heating (High) — With the selector switch set to high speed heat contacts FCS2 to HI, IT1 to LS, L2 to HTR, and FCS1 to LS are made.

SWITCH POSITION	CONTACTS MADE
OFF	NONE
FAN	L1 TO HI, FCS1 TO LS
LO HEAT	FCS2 TO LO, IT1 TO LS, L2 TO HTR, FCS1 TO LS
HI HEAT	FCS2 TO HI, IT1 TO LS, L2 TO HTR, FCS1 TO LS
LO COOL	FCS2 TO LO, COMP TO FCS1, COMP TO IT3
HI COOL	FCS2 TO HI, COMP TO FCS1, COMP TO IT3

FIGURE 45 — SELECTOR SWITCH CONTACTS, ALL 52CE, PE ELECTRIC HEAT/COOL UNITS

■ COOLING ONLY UNITS (Figure 46)

Fan Mode (Low) — With the selector switch set to FAN contact L1 to LO is made.

Fan Mode (High) — With the selector switch set to FAN contact L1 to HI is made.

Cooling (Low) — With the selector switch set to low speed cooling contacts FCS to LO and L1 to IT3 are made.

Cooling (High) — With the selector switch set to high speed cool contacts FCS to HI, L1 to IT3 are made.

SWITCH POSITION	CONTACTS MADE
OFF	NONE
FAN LO	L1 TO LO
FAN HI	L1 TO HI
LO COOL	L1 TO IT3, FCS TO LO
HI COOL	L1 TO IT3, FCS TO HI

FIGURE 46 — SELECTOR SWITCH CONTACTS, ALL 52CE, PE COOLING ONLY UNITS

■ HEAT PUMP UNITS (Figure 47)

Fan Mode — With the selector switch set to fan contact L1 to HI is made.

Cooling (Low) — With the selector switch set to low cool contacts L1 to IT3 and FCS to LO are made.

Cooling (High) — With the selector switch set to high cool, contacts L1 to IT3 and FCS to HI are made.

Heating (Low) — With the selector switch set to low heat contacts L1 to IT1, FCS to LO and L2 to HTR are made.

Heating (High) — With the selector switch set to high heat contacts L1 to IT1, FCS to HI, and L2 to HTR are made.

Defrost Cycle — When heat pump unit is operating in reverse cycle, the outdoor coil may begin to frost. As frost accumulates on the outdoor coil the unit may switch into defrost mode. The defrost mode is activated when the outdoor frost thermostat sensor detects a temperature below 20 F on the coil. At this point, the thermostat deenergizes the compressor and activates the electric heat. The unit will remain in electric heat mode until the outdoor thermostat senses 35 F coil temperature. The defrost mode is a passive operation and may take some time before the coil defrosts.

SWITCH POSITION	CONTACTS MADE
OFF	NONE
FAN	L1 TO HI
LO HEAT	L1 TO IT1, FCS TO LO, L2 TO HTR
HI HEAT	L1 TO IT1, FCS TO HI, L2 TO HTR
LO COOL	L1 TO IT3, FCS TO LO
HI COOL	L1 TO IT3, FCS TO HI

FIGURE 47 — SELECTOR SWITCH CONTACT, ALL 52CQ, PQ HEAT PUMP UNITS

COMPONENT OPERATION AND TROUBLESHOOTING

■ TOOLS NEEDED

Volt-Ohmmeter
Flat and Phillips Screw Drivers
⁵ / ₁₆ -in. Nut Driver
Side Cutting Pliers

⚠ WARNING

Before cleaning, servicing, performing maintenance or removing the chassis from the wall sleeve, disconnect all power to the unit to avoid the possibility of electrical shock and personal injury. Only trained and qualified service personnel should perform installation and service procedures on these units. Untrained personnel may perform basic maintenance tasks such as cleaning and replacing filters. Refer to **UNIT DISASSEMBLY** section of this manual for proper procedures to disconnect power to 52C,P units.

The Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Consider the following safety issues:

- Prior to performing any service or maintenance on electrical equipment you must **Disconnect All Power**.
- New and unfamiliar tasks should be performed under the supervision of an experienced service technician.
- Personal protective equipment, such as safety glasses and work gloves, should be worn.
- The floor around the work area should be clean and free of debris.
- Make sure tools are the correct tools for job, and that they are working properly and in good condition.
- The 52C,P unit may weigh up to 150 pounds. Use a lifting device or ask for assistance if the unit must be moved.

■ **INDOOR THERMOSTAT (Heat/Cool and Cool Only Units) (Figure 48)** — The thermostat maintains the selected temperature by cycling the compressor on and off during cooling operation and the electric heater during heating operation. **The thermostat DOES NOT switch from heating to cooling, or cooling to heating.** If the switch is in the CYCLE position, then the fan will be cycled off when the thermostat satisfies.

To verify the operation of the thermostat switch, a continuity test may be performed as follows:

1. **Turn off unit power** as described in **UNIT DISASSEMBLY** section.
2. Remove wire leads from thermostat. Note their locations to ease re-assembly.

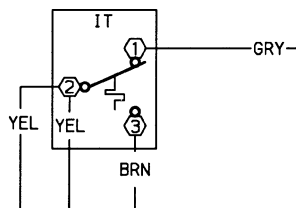


FIGURE 48 — INDOOR THERMOSTAT (IT) CONTACTS, ALL 52CE, PE MODELS

LEGEND (Figures 48-50)

COMP	— Compressor
HTR	— Heater
IT	— Indoor Thermostat
OFT	— Outdoor Frost Thermostat
OL	— Overload
PLS	— Primary Limit Switch
SLS	— Secondary Limit Switch

3. Place one of the leads of the continuity tester on the terminal marked 2, and the other lead on either the terminal marked 1 or the terminal marked 3.
4. Adjust the thermostat up or down to verify the contacts of the switch open and close. When verifying continuity of a *closed* switch, the ohm reading should be 0 ohms. An *open* switch will show OL on the meter.
5. When testing is complete, reconnect the leads.

■ INDOOR THERMOSTAT (Heat Pump Units)

(Figure 49) — The heat pump indoor thermostat uses a two-stage switch for the heating mode. The first stage engages the compressor and reversing valve, and the unit operates in normal heat pump mode. The indoor thermostat maintains the selected temperature by cycling the compressor on and off in cooling mode. In the heating mode, the indoor thermostat will cycle the compressor or the heater, depending on the difference between the actual room temperature and the thermostat temperature setting.

When the room temperature is more than 4 F cooler than the indoor thermostat setting, the second heating stage of the indoor thermostat engages the electric heat strip. This design feature allows the user to rapidly warm the room with the electric heat strip by turning the thermostat to its highest setting. When room temperatures approach the desired temperature, the user may adjust the thermostat to a personal comfort setting, which allows for normal heat pump operation.

NOTE: For outdoor coil temperatures below approximately 20 F, the outdoor frost thermostat prevents heat pump mode operation and immediately engages the electric heat strip upon a call for heating. The electric heat strip is NEVER energized at the same time as the compressor.

To verify operation of the heat pump indoor thermostat switch, a continuity test may be performed as follows:

1. Turn off unit power as described in **UNIT DISASSEMBLY** section.
2. Remove wire leads from thermostat. Note their locations to ease re-assembly.
3. To test stage A, place one lead of the continuity tester on the terminal marked 2, and the other lead on either the terminal marked 1 or the terminal marked 3.
4. Adjust the thermostat up or down to verify the contacts of the switch open and close. When verifying continuity of the *closed* switch, the reading on the meter should be 0 ohms. An *open* switch will show OL on the meter.
5. To test stage B contacts, place one lead of the continuity tester on contact 5 and the other lead on either contact 4 or contact 6.
6. Adjust the thermostat up or down to verify the contacts of the switch open and close as in Step 4.
7. When testing is complete, reconnect the leads.

52C,P SERIES

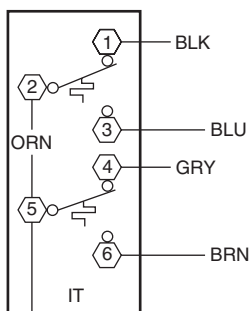


FIGURE 49 — INDOOR THERMOSTAT (IT) CONTACTS, ALL 52CQ, PQ MODELS

■ **OUTDOOR FROST THERMOSTAT (Heat Pump Units) (Figure 50A and 50B)** — The Outdoor Frost Thermostat (OFT) is a thermostat that uses a single-pole switch with a manual override selector. The thermostat switches between electric heat and compressor operation when the temperature of the outdoor coil falls below 20 F or rises above 35 F. Switching the override selector to electric heat disables the reverse cycle operation of the thermostat and is manually switched to electric heat operation.

IMPORTANT: Placing the override switch to electric heat mode operation will *disable the compressor for ALL heating or cooling operations (for all units except RC units)*. Placing the override switch to electric heat mode operation on RC units will only disable the compressor in heating mode.

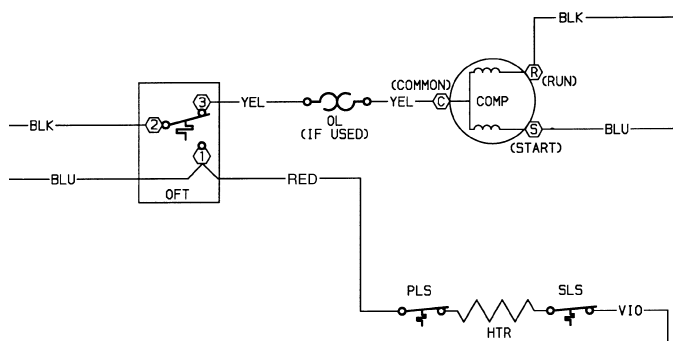


FIGURE 50A — OUTDOOR FROST THERMOSTAT (OFT) CONTACTS, ALL 52CQ, PQ UNITS WITH MOUNTED CONTROLS

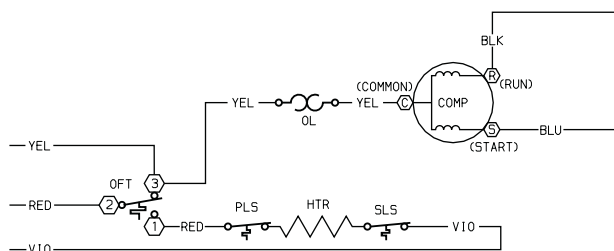


FIGURE 50B — OUTDOOR FROST THERMOSTAT (OFT) CONTACTS, ALL 52CQ, PQ UNITS WITH WALL THERMOSTAT CONTROL

To verify the OFT is operational, a continuity test may be performed as follows:

1. Turn off unit power as described in **UNIT DISASSEMBLY** section.
2. Remove the leads from the OFT. Note their locations to ease re-assembly.
3. Connect the continuity tester to the switch terminals marked 1 and 2.
4. Rotate the override switch to the electric heat setting and verify that there is continuity between terminals 1 and 2.
5. To check the other contacts, move the lead on terminal 1 to terminal 3. Rotate the override switch to the heat pump setting. There should now be continuity between terminals 2 and 3.
6. Once the test is complete, reconnect the leads.

■ **CAPACITOR** — The 52C,P units use a *dual capacitor*. One part of the capacitor is used with the fan motor. The other part of the capacitor is used by the compressor.

Run circuits on single-phase compressor motors use capacitors which dramatically affect the motor operation. *Run capacitors are connected to the motor circuit at all times.*

To evaluate the capacitor, perform a visual check first. A shorted capacitor may give a visual indication of its failure. For example, the pop-out hole at the top of a start capacitor may bulge or blow out. A run capacitor may bulge or leak. In these instances, the capacitor must be replaced with one recommended by the manufacturer. If there are no visual signs of capacitor failure, testing of the capacitor resistance may be done with a volt-ohmmeter as detailed below:

1. **Turn off unit power** as described in **UNIT DISASSEMBLY** section but do not unplug the service cord; it will supply ground connection for the unit chassis. **Check to ensure power is off and LOCKED OUT.**
2. Connect one lead of a 20,000 ohm, 2-watt resistor to the center group of terminals on the dual capacitor. Attach the other lead from the resistor to an unpainted metal section of the unit chassis. This allows that section of the dual capacitor to discharge. Repeat this process between the other group of terminals.

⚠ CAUTION

Capacitors are capable of holding charge similar to a battery and may cause an electrical shock.

3. Locate and disconnect the wires from the start and/or run capacitor to isolate them from the remainder of the circuit. Refer to the unit wiring diagram if you need assistance locating wires.
4. Perform capacitor test. Set up the volt-ohmmeter to measure resistance by connecting terminals C to FAN and C to HERM on the meter. See Figure 51.

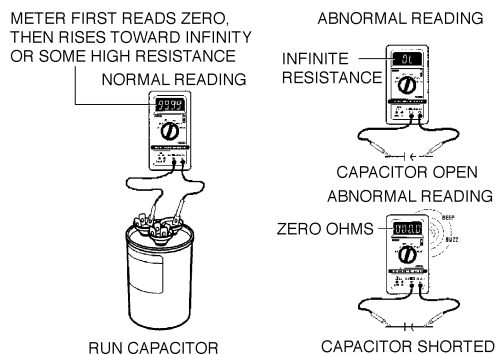


FIGURE 51 — CAPACITOR TEST

- The reading on the meter should first indicate zero, or a low resistance, then slowly rise toward infinity or some high value or measurable resistance. This indicates the capacitor is most likely good. If the reading goes to zero or a low resistance and stays there, the capacitor is likely shorted and needs replacement. If the reading immediately indicates infinity, the capacitor is likely open and must be replaced.
- Replace the capacitor if failed and rewire according to the **WIRING SCHEMATICS** located in the control box of the unit.

■ **FAN CYCLE SWITCH** — The fan cycle switch has 2 operating modes, continuous (CON) and cycle (CYC). To verify the fan cycle switch is operational, a continuity test may be performed as follows:

- Turn off unit power** as described in **UNIT DISASSEMBLY** section.
- Label and remove the leads connected to fan cycle switch. See Figure 52.
- Connect the volt-ohmmeter for 1X ohms and check for continuity from terminal 2 to 1 then change the switch position and check for continuity from terminal 2 to 3.
- Once test is complete, reconnect the leads.

ELECTRICAL COMPONENTS REMOVAL AND REPLACEMENT

■ **INDOOR THERMOSTAT** — To remove the indoor thermostat, perform the following steps:

- Turn off unit power** as described in **UNIT DISASSEMBLY** section.
- Remove front panel.
- Remove thermostat knob to expose 2 Phillips head mounting screws.
- Open the control box as described in the **UNIT DISASSEMBLY** section of this manual.
- Carefully remove the thermostat bulb from the clip by gently pressing it down and out of the clip.
- Remove the leads from the indoor thermostat. Note the wire locations to ease re-assembly.

- Remove the 2 screws mounting the thermostat to the control box. Route thermostat bulb and capillary out of control box.
- Remove thermostat.
- Reverse Steps 1-8 to reinstall.

■ **OUTDOOR FROST THERMOSTAT (Heat Pump Units)** — To remove the outdoor frost thermostat (OFT), perform the following steps:

- Turn off unit power** as described in **UNIT DISASSEMBLY** section.
- Remove front panel.
- Remove the 2 screws mounting the thermostat to the bottom of the control box. See Figure 53.

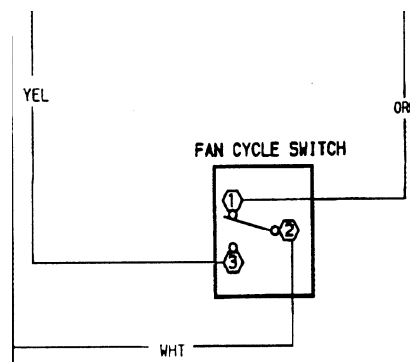


FIGURE 52 — FAN CYCLE SWITCH (3 Terminal)

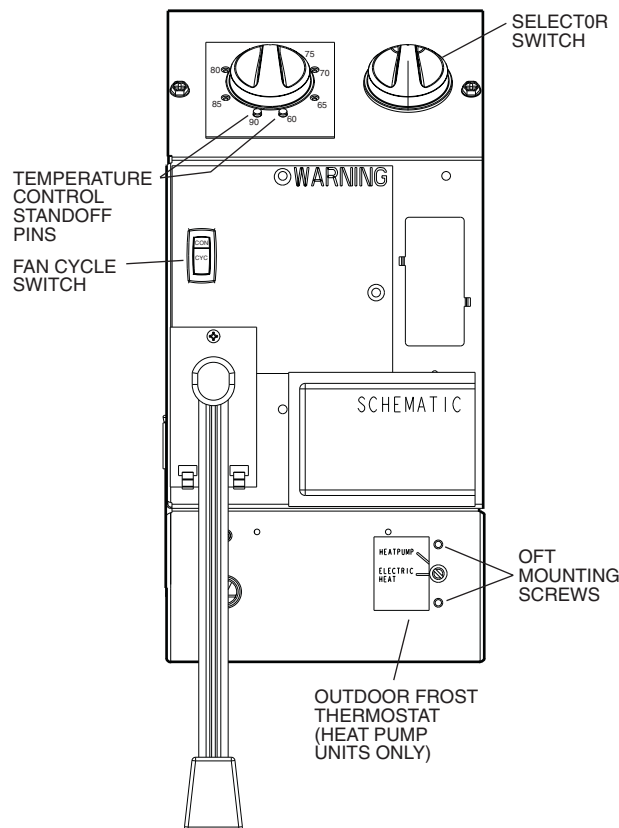


FIGURE 53 — 52C,P OPERATING CONTROLS

52C,P SERIES

4. Remove the thermostat capillary from the outdoor coil and clip any wire ties holding the capillary in place.
5. Disconnect the wires and carefully remove the thermostat and capillary from the unit, noting location of wires for easy re-assembly.
6. Reverse Steps 1-5 to reinstall.

■ **CAPACITOR** — To remove the capacitor, perform the following steps:

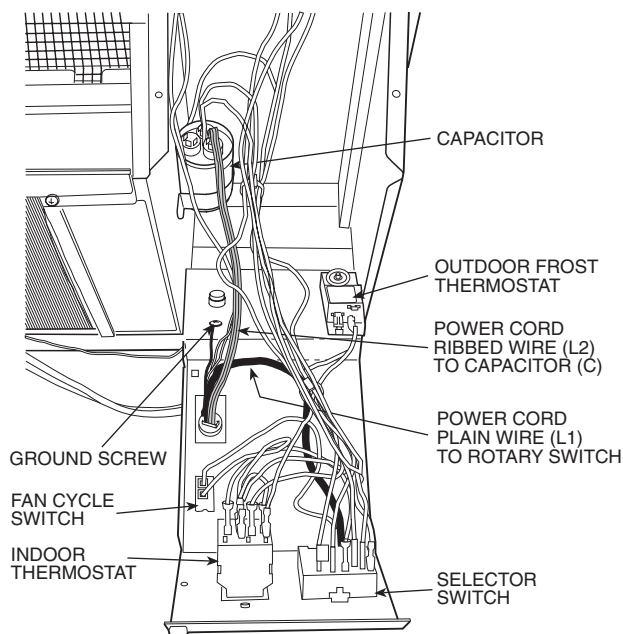
1. **Turn off unit power** as described in **UNIT DISASSEMBLY** section.
2. Open the control box as detailed in the **UNIT DISASSEMBLY** section of this manual.
3. Properly discharge the capacitor as described in the Capacitor section under **Component Operation and Troubleshooting**.
4. Remove the leads to the capacitor. Note the wire locations to ease re-assembly.
5. Remove the screw holding the capacitor.
6. Remove capacitor.
7. Reverse Steps 1-6 to reinstall.

■ **FAN CYCLE SWITCH** — The fan cycle switch is located on the front of the control box. To remove the fan cycle switch, perform the following steps:

1. **Turn off unit power** as described in **UNIT DISASSEMBLY** section.
2. Open the control box as described in **UNIT DISASSEMBLY** section of this manual.
3. Remove the 3 wires from the fan cycle switch. See Figure 54 for location, noting location of wires for re-assembly.
4. Push the snaps of the switch housing toward the switch with a pair of pliers or small screwdriver. Gently push the switch out of the housing.
5. Reverse Steps 1-4 to reinstall.

■ **SELECTOR SWITCH** — To remove the selector switch from the unit, perform the following steps:

1. **Turn off unit power** as described in **UNIT DISASSEMBLY** section.
2. Remove selector switch knob. See Figure 53.
3. Open control box as described in the **UNIT DISASSEMBLY** section of this manual.
4. Remove all the wires to the selector switch. Label wires to simplify re-assembly. See Figure 54.
5. Remove the 2 screws mounting the switch and remove switch.
6. Reverse Steps 1-5 to reinstall.



**FIGURE 54 — COMPONENT LOCATIONS
IN OPEN CONTROL BOX**

FAN MOTOR

The fan motor is a permanent split capacitor (PSC) type motor. This motor is common in air-conditioning system applications. A PSC motor does not require the use of a relay and always has a run capacitor connected between the run and start windings of the motor. See Figure 55.

The 52C,P series fan motor has a motor shaft extended through both ends. It powers both the indoor and the outdoor fans. It has permanently sealed bearings that require no lubrication. There are many different fan motor models, but they typically are 2-speed and in 2 voltage categories, 208/230 and 265 volts.

FAN MOTOR TROUBLESHOOTING

Refer to Figure 56 for a basic fan motor troubleshooting chart.

■ **TOOLS NEEDED** — The following list includes recommended tools and devices for working on the fan motor of 52C,P units.

Gloves
Safety Glasses
Regular and Phillips Head Screw Drivers
Small Adjustable Wrench
Channel Lock Pliers
Volt-ohmmeter
5/16-in. Nut Driver

⚠ WARNING

Before cleaning, servicing, performing maintenance or removing the chassis from the wall sleeve, disconnect all power to the unit to avoid the possibility of electrical shock and personal injury. Only trained and qualified service personnel should perform installation and service procedures on these units. Untrained personnel may perform basic maintenance tasks such as cleaning and replacing filters. Refer to **UNIT DISASSEMBLY** section of this manual for proper procedures to disconnect power to 52C,P units.

The Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

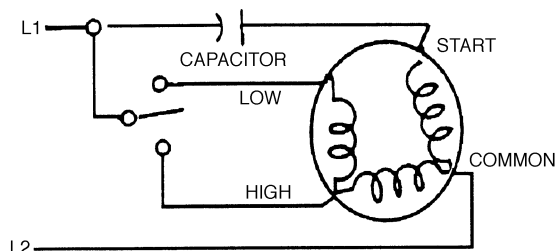


FIGURE 55 — TWO-SPEED, PERMANENT SPLIT CAPACITOR MOTOR (PSC)

Consider the following safety issues:

- Prior to performing any service or maintenance on electrical equipment you must **Disconnect All Power**.
- New and unfamiliar tasks should be performed under the supervision of an experienced service technician.
- Personal protective equipment, such as safety glasses and work gloves, should be worn.
- The floor around the work area should be clean and free of debris.
- Make sure tools are the correct tools for the job, and that they are working properly and in good condition.
- The 52C,P unit may weigh up to 150 pounds. Use a lifting device or ask for assistance if the unit must be moved.

BASIC FAN MOTOR ELECTRICAL TESTS

There are 2 basic electrical tests for PSC fan motors that will determine the electrical state of the motor. The first test requires checking the electrical resistance between the motor windings. The second test requires checking the electrical resistance between the motor windings and ground. These tests may be accomplished by performing the following steps:

1. **DISCONNECT ALL POWER TO UNIT.**
2. Open the control box as detailed in the **UNIT DISASSEMBLY** section.
3. Label and disconnect the fan motor wires from the selector switch and capacitor as shown in Figure 54. Two-speed motors have 2 wires on the capacitor and 2 wires on the push button switch.
4. Measure and record the resistance between the black wire and each of the other wires. Make sure the motor is cool before attempting to measure resistance. The internal thermostat of the motor may be electrically open and will not close until the motor cools. See Figure 57 for typical motor winding resistance measurements. The resistance values in the table are approximate. Values that are within 10% of those listed are acceptable. If the motor in your model is not listed, find a motor of similar horsepower and voltage on the chart and compare it to the resistance measurements of your motor.
5. Measure the resistance of each of the motor wires to the motor casing. The resistance should be infinite. Make sure the motor is cool before attempting to measure resistance. The internal thermostat of the motor may be electrically open and will not close until the motor cools. A motor that has measurable resistance to ground is shorted to ground and must be replaced.

52C,P SERIES

POSSIBLE CAUSE	SYMPTOM				
	Motor Hums But Does Not Start	Makes No Noise and Does Not Start	Starts But Stops After Short Time	Starts But Runs Slow	Runs On One Speed, Not On Others
DEFECTIVE BEARING	X		X	X	
CAPACITOR DEFECTIVE	X		X		
SWITCH DEFECTIVE		X			X
LOW LINE VOLTAGE	X		X	X	
SHORTED MOTOR WINDING	X	X			X
NO POWER TO UNIT		X			
INTERNAL THERMOSTAT OPEN		X			
MISWIRED	X	X	X		X
FAN STUCK	X				
BROKEN MOTOR WIRE	X	X	X		X
MOTOR WINDING GROUNDED	X	X			
OPEN MOTOR WINDING	X	X	X		X

FIGURE 56 — FAN MOTOR TROUBLESHOOTING CHART

TYPICAL 208/230 VOLT MOTORS

UNIT 52C,P (BTUH)	7,000/9,000	12,000/15,000
CARRIER MOTOR PART NUMBER	HC37GE237	HC37GE238
MANUFACTURER'S PART NUMBER	5KCP29ECA299A	5KCP29ECA301
MOTOR VOLTAGE	208/230	208/230
MOTOR HORSEPOWER	.075	.125
MOTOR SPEEDS	2	2
RESISTANCE (OHMS) BLACK TO WHITE WIRE	101.4	90
RESISTANCE (OHMS) BLACK TO BROWN WIRE	45.8	71
RESISTANCE (OHMS) BLACK TO RED WIRE	38.8	32.9

NOTE: Resistance values are approximate.

TYPICAL 265 VOLT MOTORS

UNIT 52C,P (BTUH)	7,000/9,000	12,000/15,000
CARRIER MOTOR PART NUMBER	HC29GE236	HC33GE239
MANUFACTURER'S PART NUMBER	5KCP29FCA315	5KCP29FCA316
MOTOR VOLTAGE	265	265
MOTOR HORSEPOWER	.075	.125
MOTOR SPEEDS	2	2
RESISTANCE (OHMS) BLACK TO WHITE WIRE	144.0	83.7
RESISTANCE (OHMS) BLACK TO BROWN WIRE	29.3	39.1
RESISTANCE (OHMS) BLACK TO RED WIRE	82.1	45.2

NOTE: Resistance values are approximate.

FIGURE 57 — TYPICAL 52C,P FAN MOTORS

FAN MOTOR REPLACEMENT

1. **DISCONNECT ALL POWER TO UNIT.**
2. Remove the unit from the sleeve as detailed in the **UNIT DISASSEMBLY** section and place the unit on a large flat surface.
3. Remove the discharge deck and grille as detailed in Remove the Discharge Deck Assembly section.
4. Remove heater plate assembly as detailed in Accessing the Heater Assembly section. The blower wheel should now be accessible.

⚠ WARNING

Safety glasses should be worn to protect eyes in the event the spring clip breaks free from pliers.

5. Using adjustable pliers, carefully remove the $\frac{5}{32}$ -in. Allen clip that secures the blower wheel to the fan shaft. Remove the blower wheel.
6. Open the Control box as described in the **UNIT DISASSEMBLY** section, **Open the Control Box**. Disconnect the fan motor wires from the rotary switch and capacitor. All units are equipped with two-speed motors, which have 2 wires on the capacitor and 2 wires on the rotary switch. Refer to the unit wiring schematic which is attached to the front panel of the control box. See Figure 58.
7. Carefully pull fan motor leads through the partition hole, located in the back of the control box.
8. Remove the top gussets, as detailed in Remove the Gussets section.

9. Remove the top half of the condenser orifice as detailed in Detach the Condenser Orifice From the Condenser Coil section.
10. Using a Phillips head screwdriver, remove the fan motor shield. The fan motor mounting screws should now be accessible. Remove the 3 mounting screws that secure the fan motor to the motor mount and remove the fan motor from the unit.
11. Using needle nose pliers, remove condenser fan hub clamp. Slide condenser fan off fan motor shaft.
12. Re-install the new fan motor by reversing Steps 1 through 11.

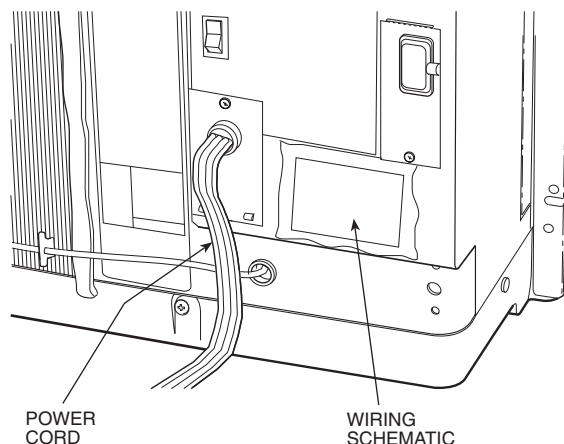


FIGURE 58 — LOCATION OF WIRING SCHEMATIC ON FRONT PANEL OF CONTROL BOX

FIELD TEMPERATURE CHARTS

Refer to Figures 59-67 for field temperature data.

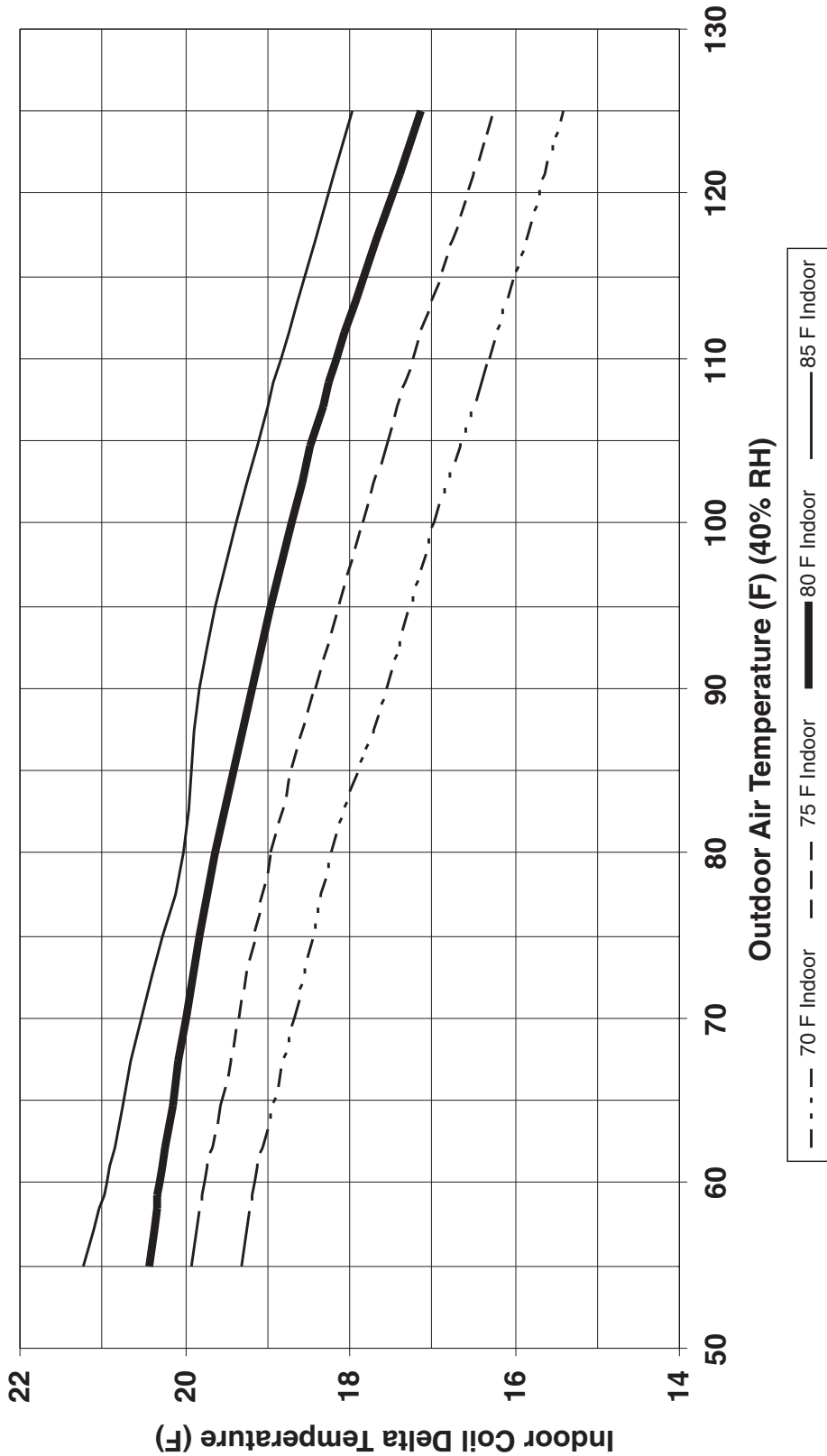


FIGURE 59 — 52C AND 52P 7000 BTU UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

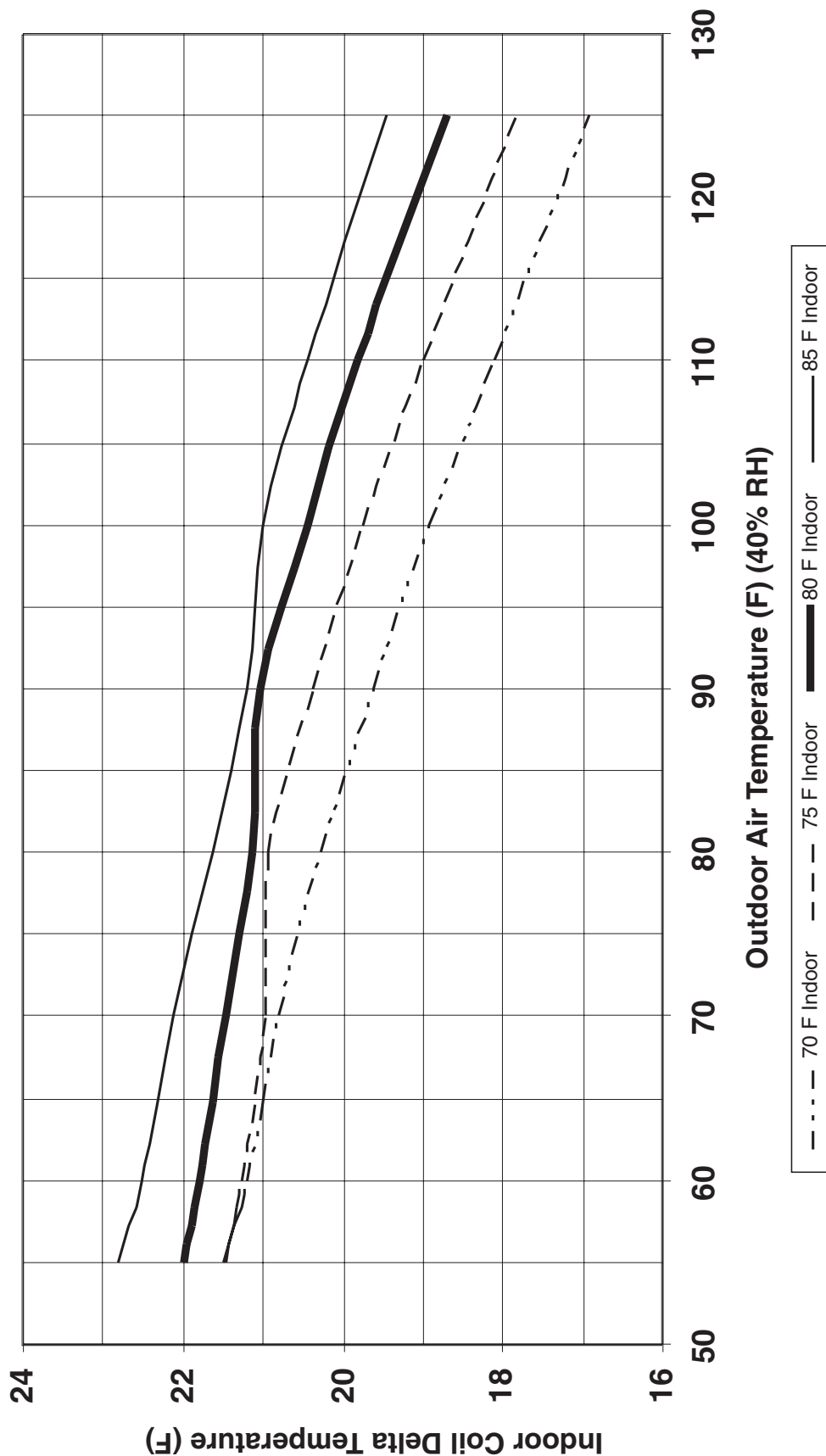


FIGURE 60 — 52C AND 52P 9000 BTU UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

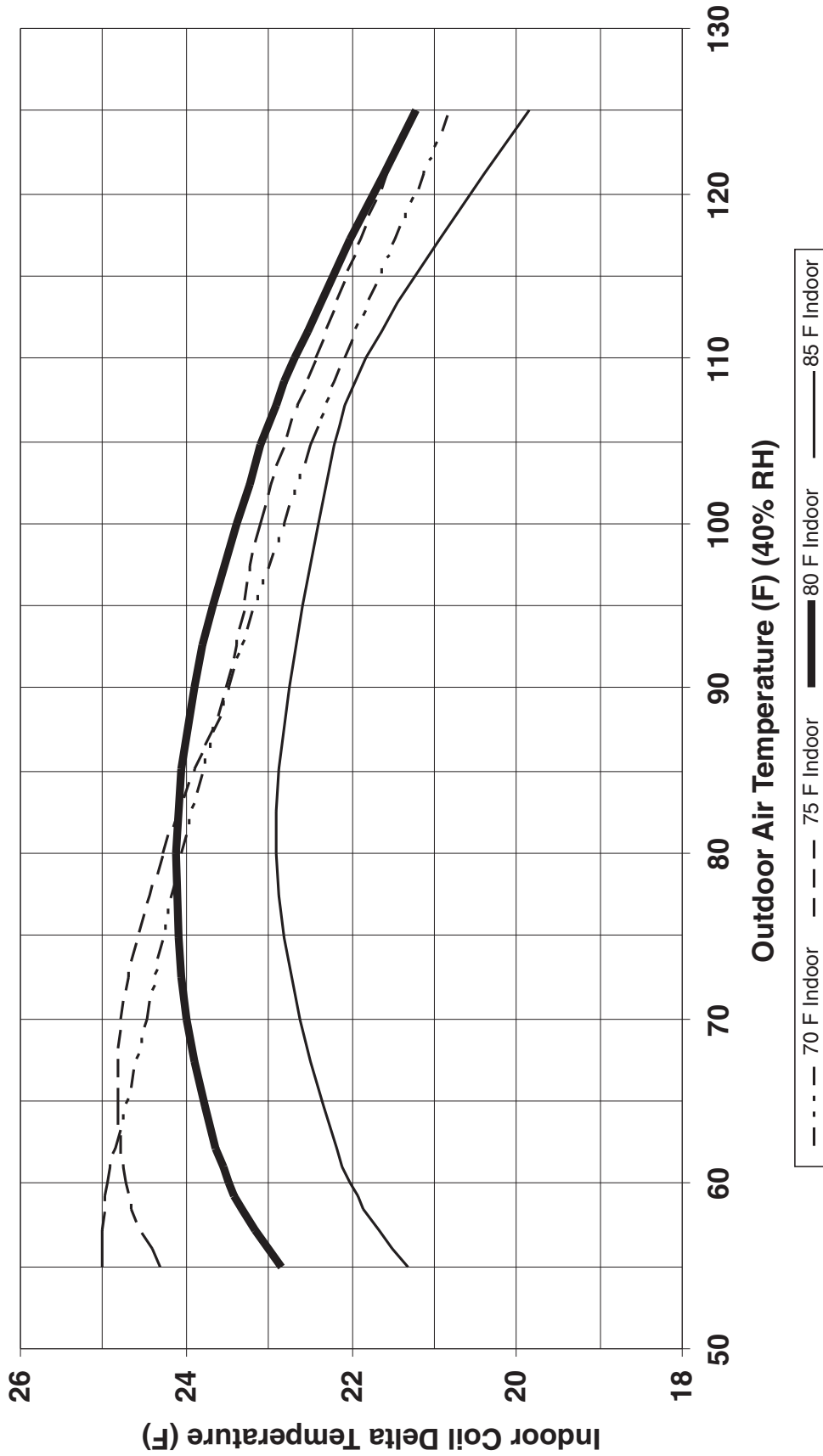


FIGURE 61 — 52P 12,000 BTU UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

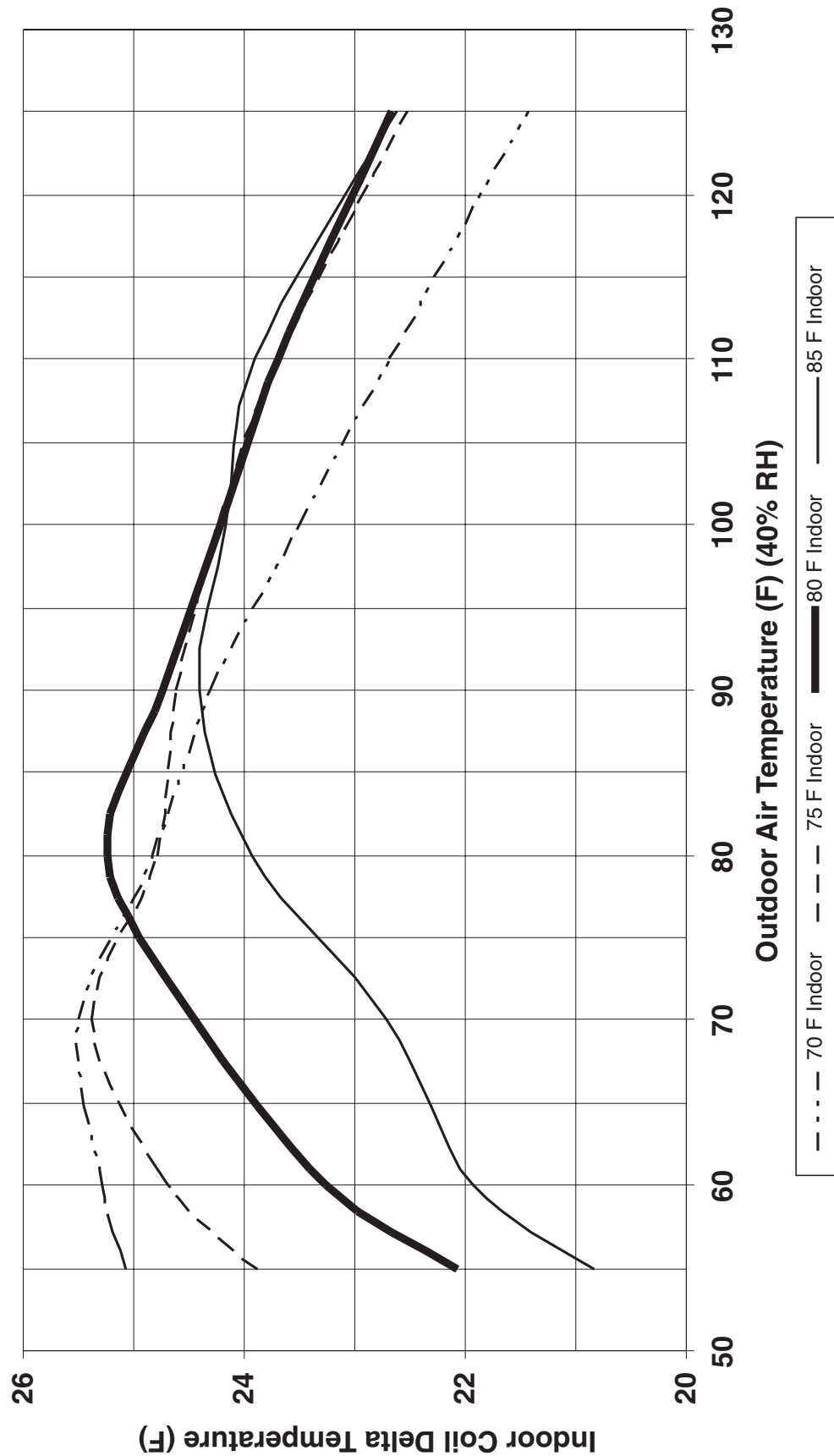


FIGURE 62 — 52CQ 12,000 BTU HEAT PUMP UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

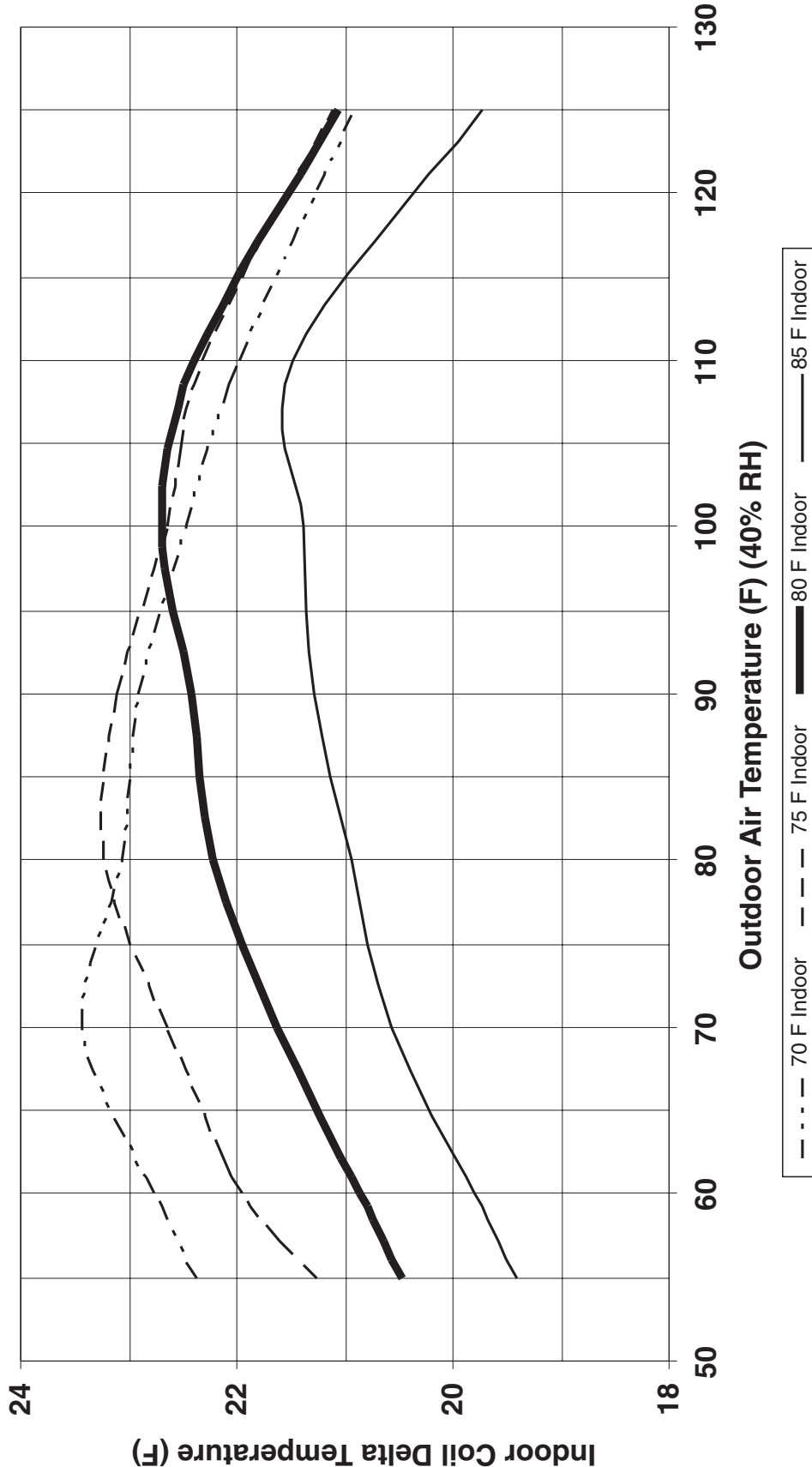


FIGURE 63 — 52CE 12,000 BTU HEAT/COOL UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

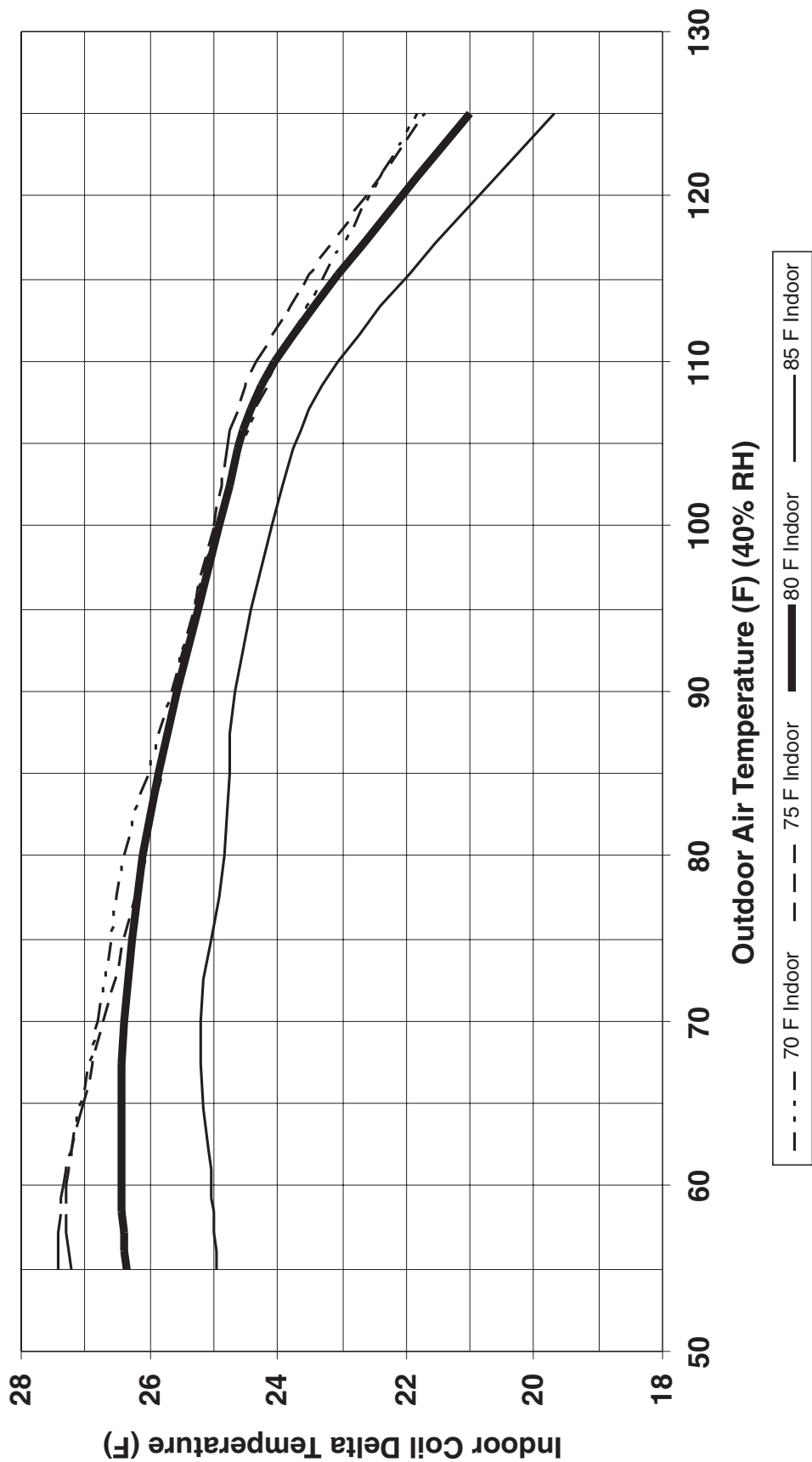


FIGURE 64 — 52C AND 52P 15,000 BTU UNIT FIELD TEMPERATURE CHART — HIGH COOL — 50% RH

52C,P SERIES

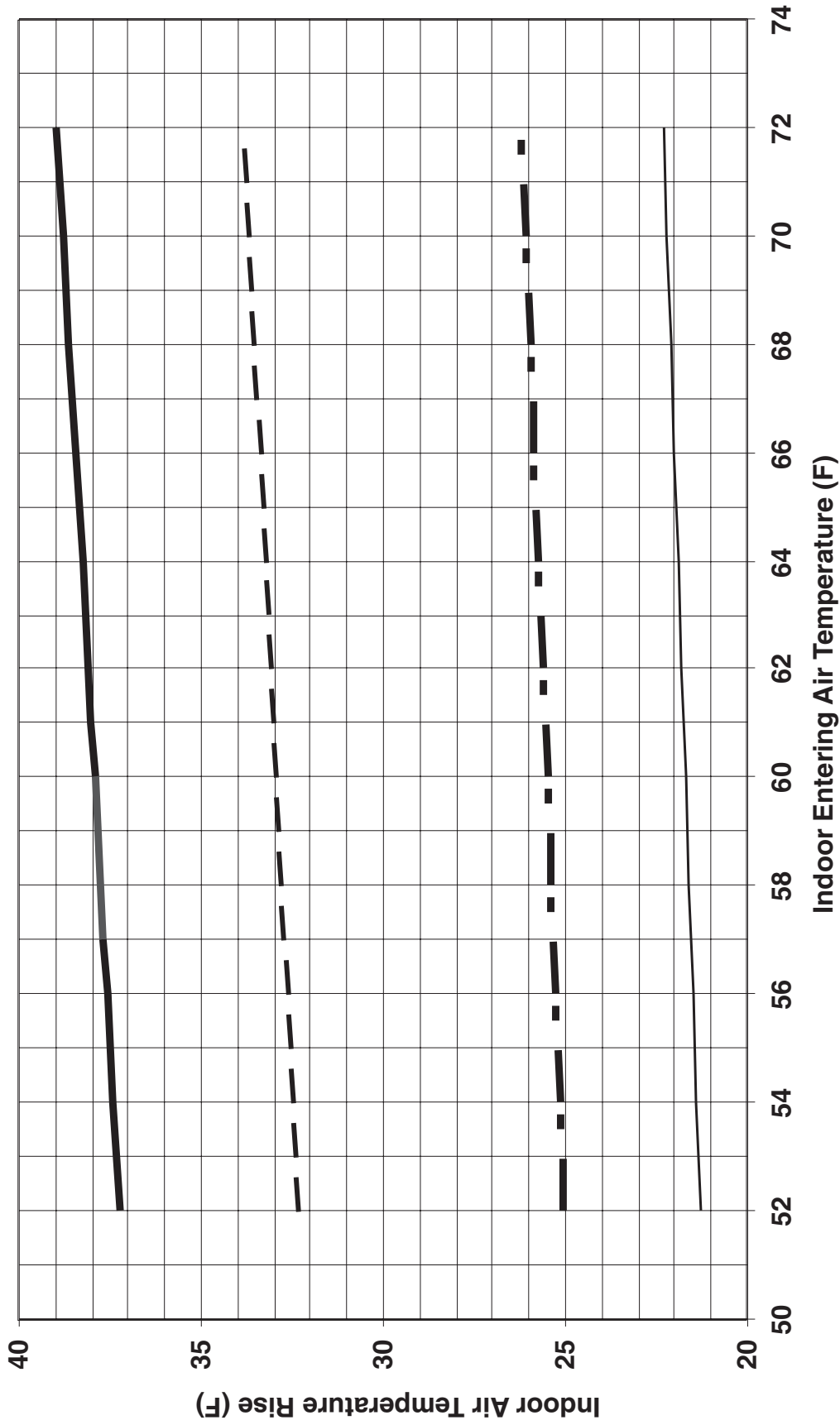


FIGURE 65 — 52C AND 52P 7000/9000 BTU UNIT FIELD TEMPERATURE CHART FOR ELECTRIC HEAT — HIGH HEAT

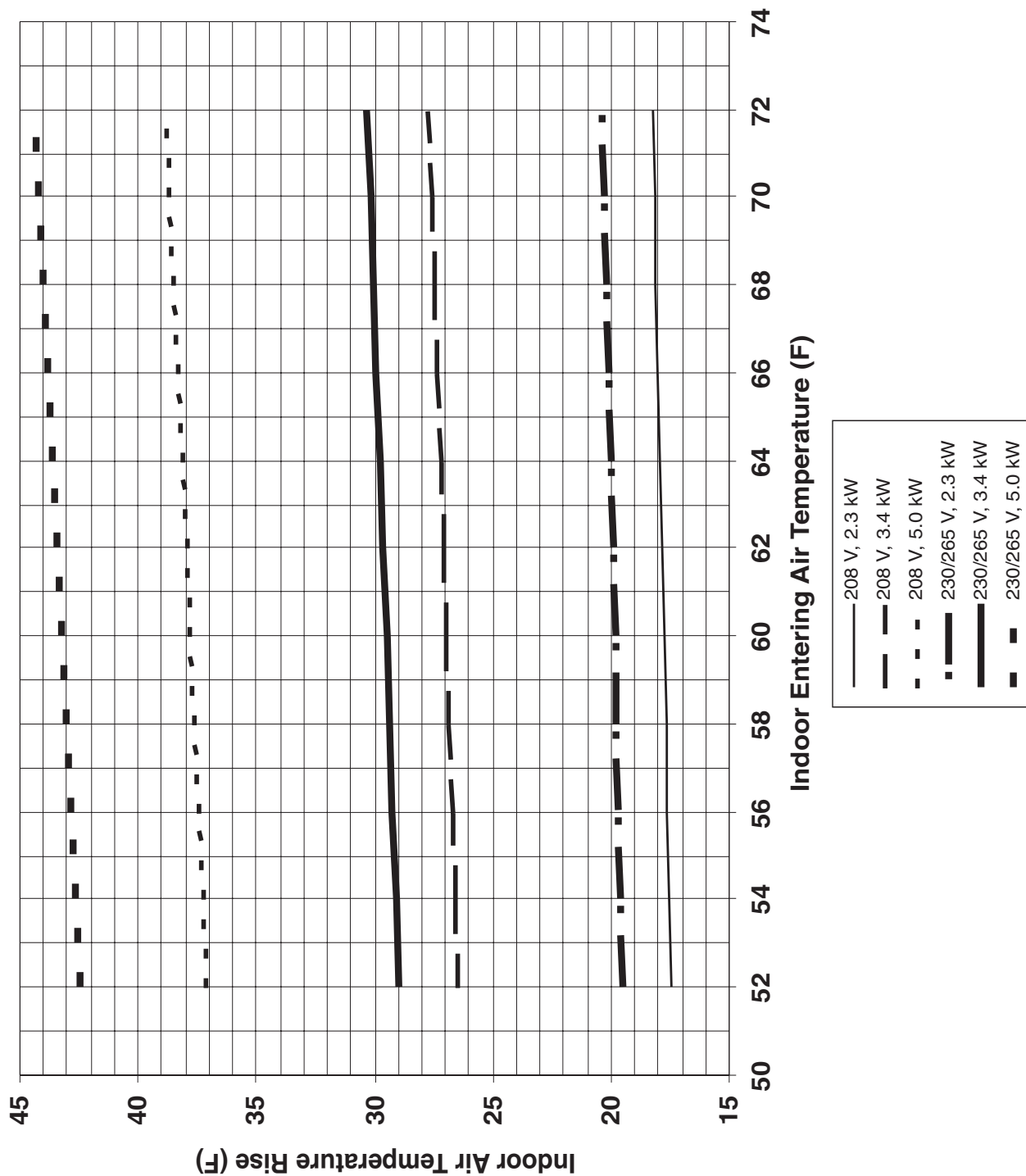


FIGURE 66 — 52C AND 52P 12,000/15,000 BTU UNIT FIELD TEMPERATURE CHART FOR ELECTRIC HEAT — HIGH HEAT

52C,P
SERIES

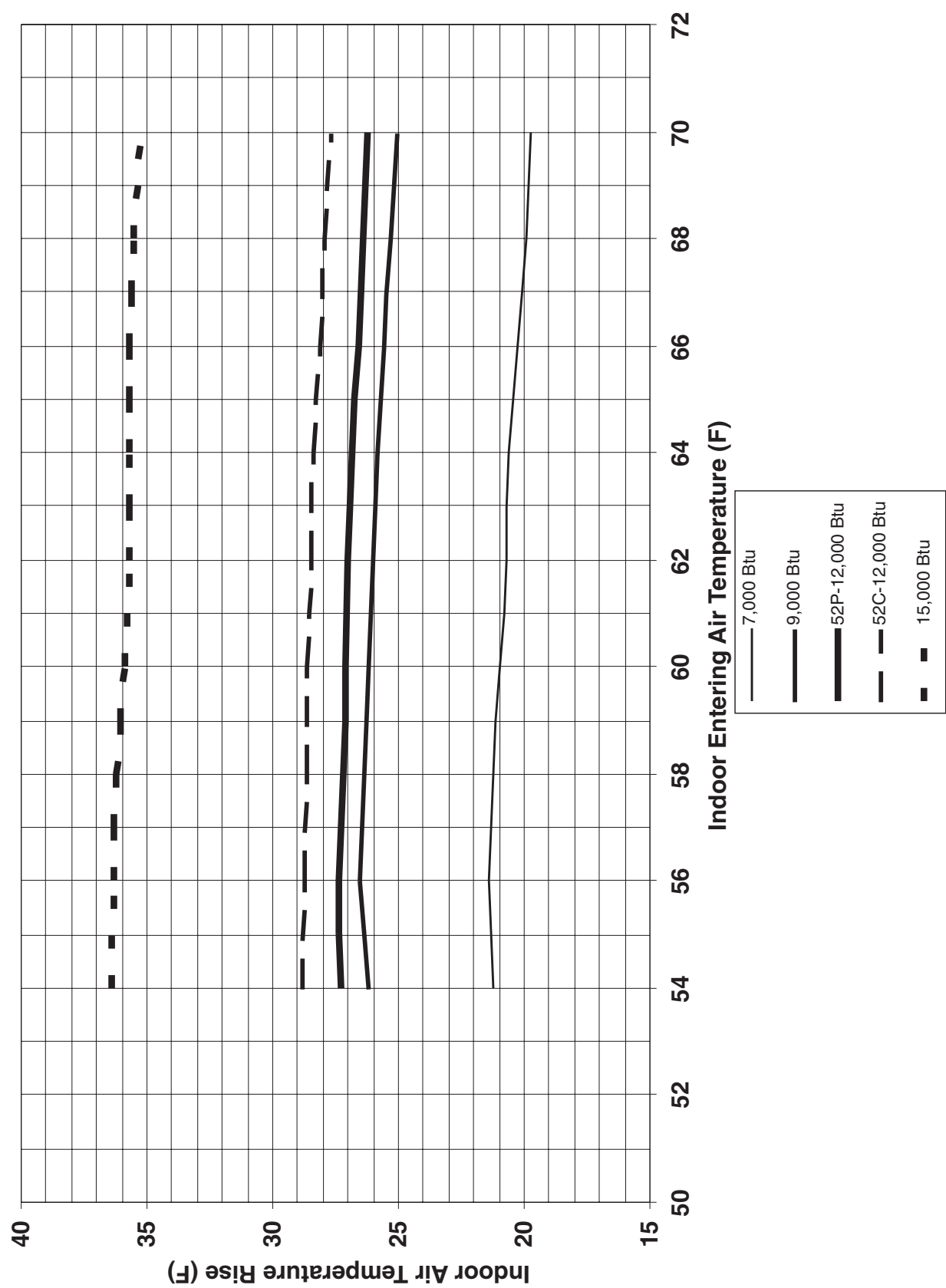
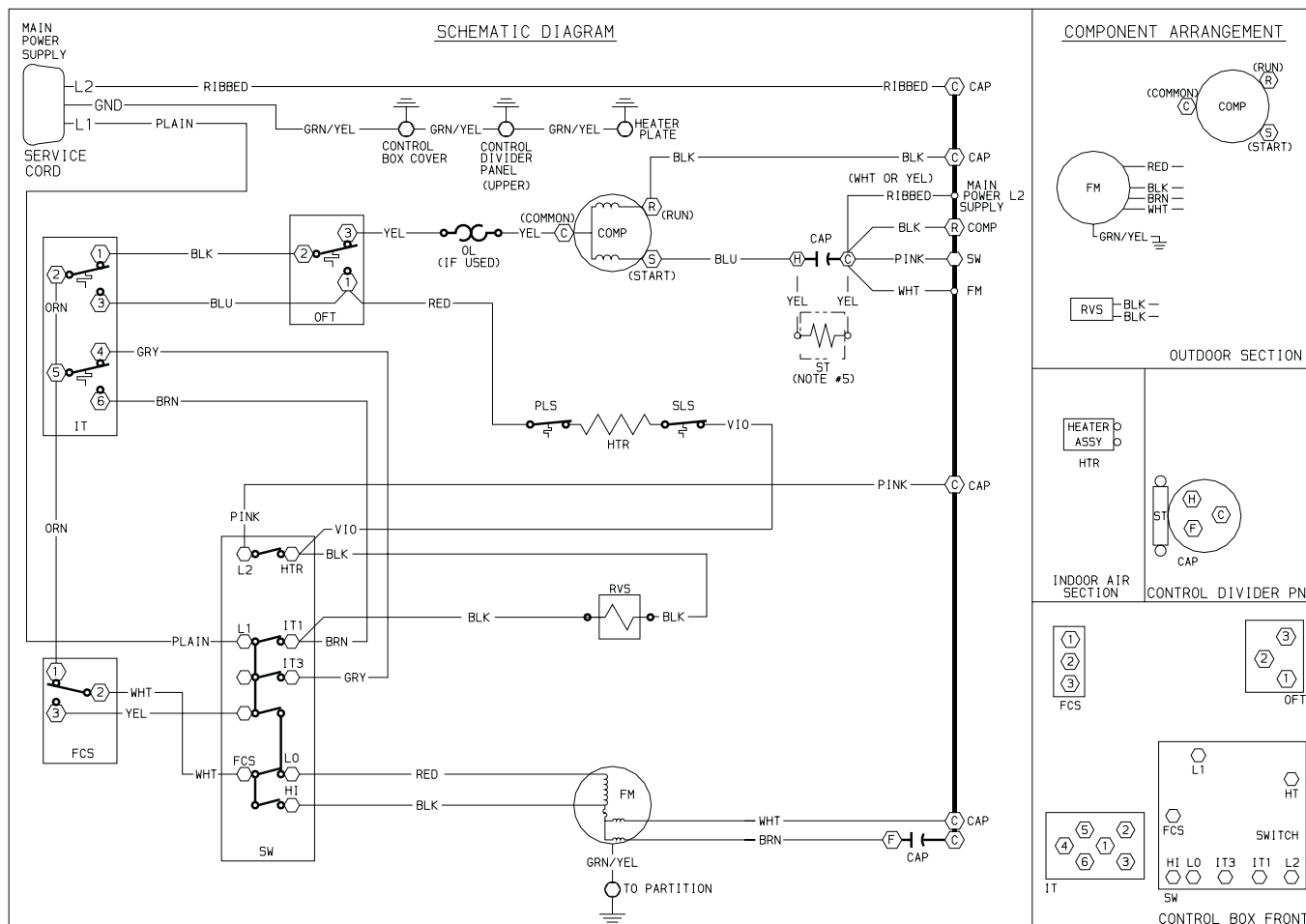


FIGURE 67 — 52C AND 52P 7,000-15,000 BTU UNIT FIELD TEMPERATURE CHART FOR REVERSE CYCLE HEAT — HIGH HEAT
47 F (DRYBULB)/43 F (WET BULB) OUTDOOR AIR

WIRING DIAGRAMS

Refer to Figures 68-72 for Typical Wiring Schematics.

NOTE: Figures 68-72 should not be substituted for the schematic located on control box.



COMPONENT LEGEND

	Component Connection (Marked)
	Component Connection (Unmarked)
	Accessory or Optional Wiring To Indicate Common Potential Only Not To Represent Wire
CAP	Capacitor
COMP	Compressor
FM	Fan Motor
FCS	Fan Cycle Switch
HTR	Heater
IT	Indoor Thermostat
NEC	National Electrical Code
OFT	Outdoor Frost Thermostat
OL	Overload
PLS	Primary Limit Switch
RVS	Reversing Valve Solenoid
SLS	Secondary Limit Switch
ST	Start Thermistor
SW	Switch

NOTES:

1. Recommended for use on grounded power supply only.
2. Compressor and fan motor thermally protected.
3. Use copper conductors only.
4. All wiring must conform with NEC and local codes.
5. Dashed lines indicate components when used.
6. OFT determines whether to bring on compressor heat or electric heat.

POSITION	CONTACTS MADE
SELECTOR SWITCH	
OFF	NONE
FAN	L1 TO L0
LO HEAT	L1 TO IT1, FCS TO L0, L2 TO HTR
HI HEAT	L1 TO IT1, FCS TO HI, L2 TO HTR
LO COOL	L1 TO IT3, FCS TO L0
HI COOL	L1 TO IT3, FCS TO HI
FAN CYCLE SWITCH	
CYCLE	1 TO 2
CONSTANT	3 TO 2

FIGURE 68 — 52CQ & 52PQ — TYPICAL WIRING SCHEMATIC FOR STANDARD HEAT PUMP UNITS

52C,P SERIES

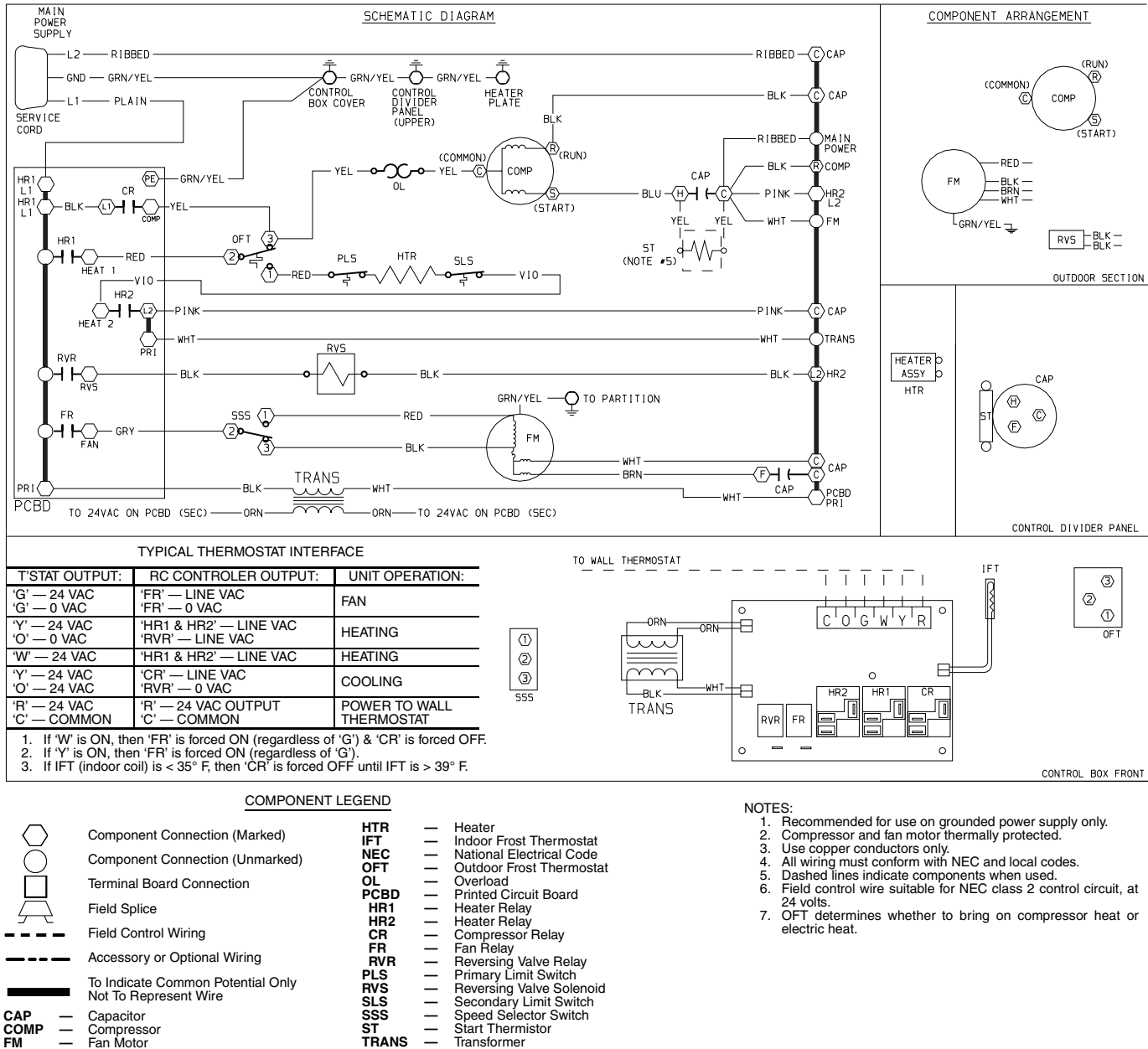
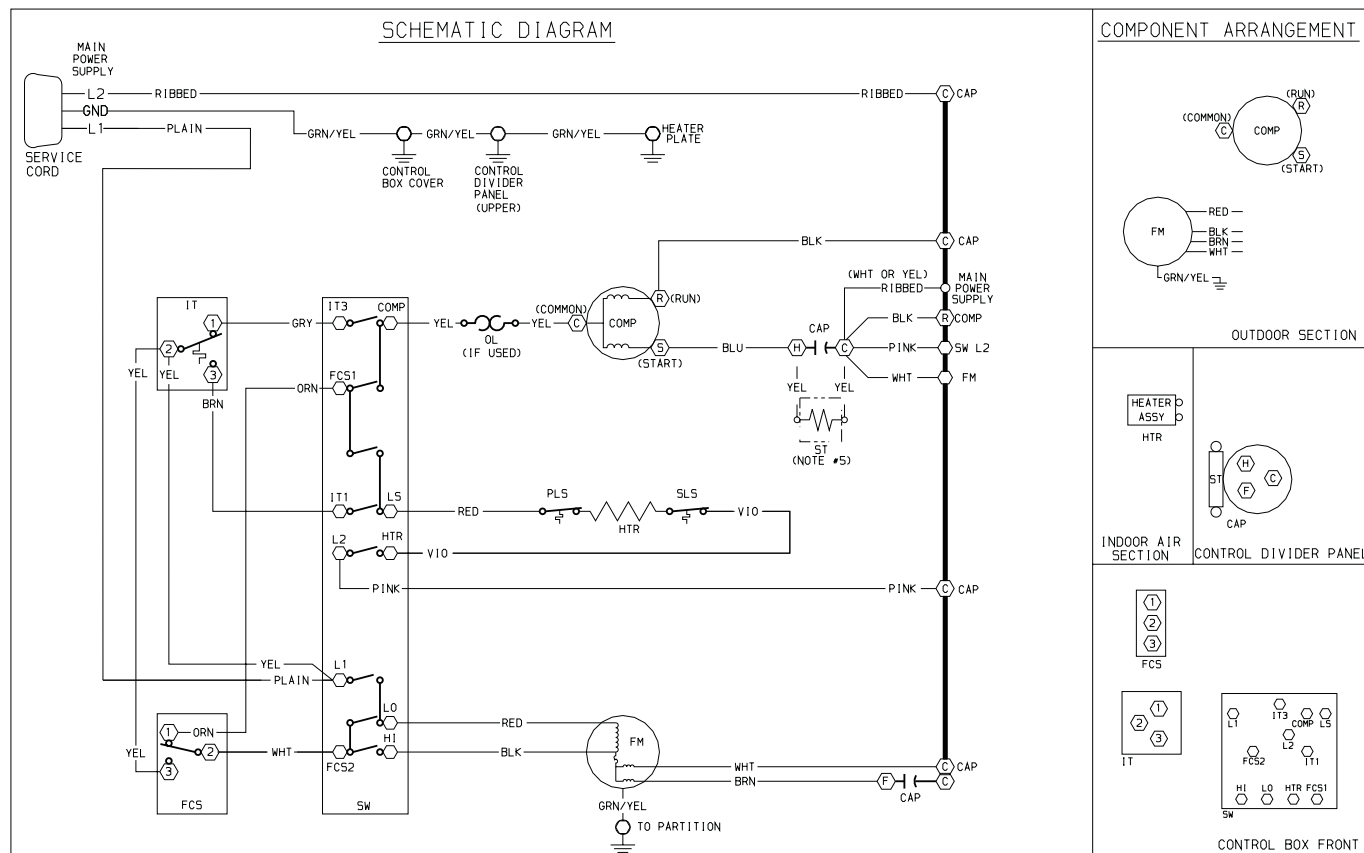


FIGURE 69 — 52CQ AND 52 PQ — TYPICAL WIRING SCHEMATIC FOR WALL THERMOSTAT HEAT PUMP UNITS



COMPONENT LEGEND

	Component Connection (Marked)
	Component Connection (Unmarked)
	Accessory or Optional Wiring To Indicate Common Potential Only Not To Represent Wire
CAP	Capacitor
COMP	Compressor
FM	Fan Motor
FCS	Fan Cycle Switch
HTR	Heater
IT	Indoor Thermostat
NEC	National Electrical Code
OL	Overload
PLS	Primary Limit Switch
SLS	Secondary Limit Switch
ST	Start Thermistor
SW	Switch

NOTES:

1. Recommended for use on grounded power supply only.
2. Compressor and fan motor thermally protected.
3. Use copper conductors only.
4. All wiring must conform with NEC and local codes.
5. Dashed lines indicate components when used.

POSITION	CONTACTS MADE
SELECTOR SWITCH	
OFF	NONE
FAN	L1 TO HI, FCS1 TO LS
LO HEAT	FC52 TO LO, IT1 TO LS, L2 TO HTR, FCS1 TO LS
HI HEAT	FC52 TO HI, IT1 TO LS, L2 TO HTR, FCS1 TO LS
LO COOL	FC52 TO LO, COMP TO FCS1, COMP TO IT3
HI COOL	FC52 TO HI, COMP TO FCS1, COMP TO IT3
FAN CYCLE SWITCH	
CYCLE	1 TO 2
CONTINUOUS	3 TO 2

FIGURE 70 — 52CE AND 52PE — TYPICAL WIRING SCHEMATIC FOR STANDARD HEAT/COOL UNITS

52C,P SERIES

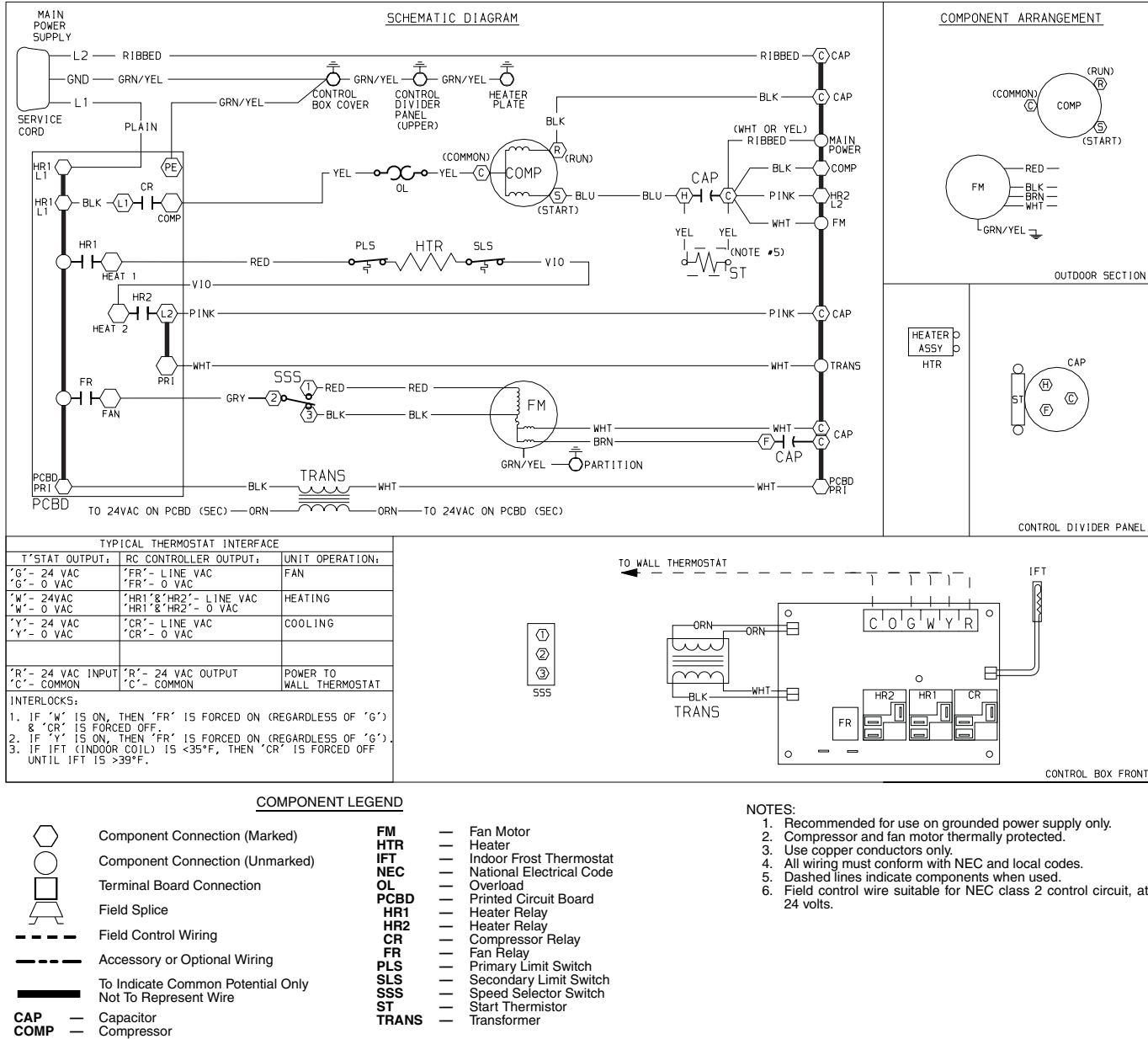
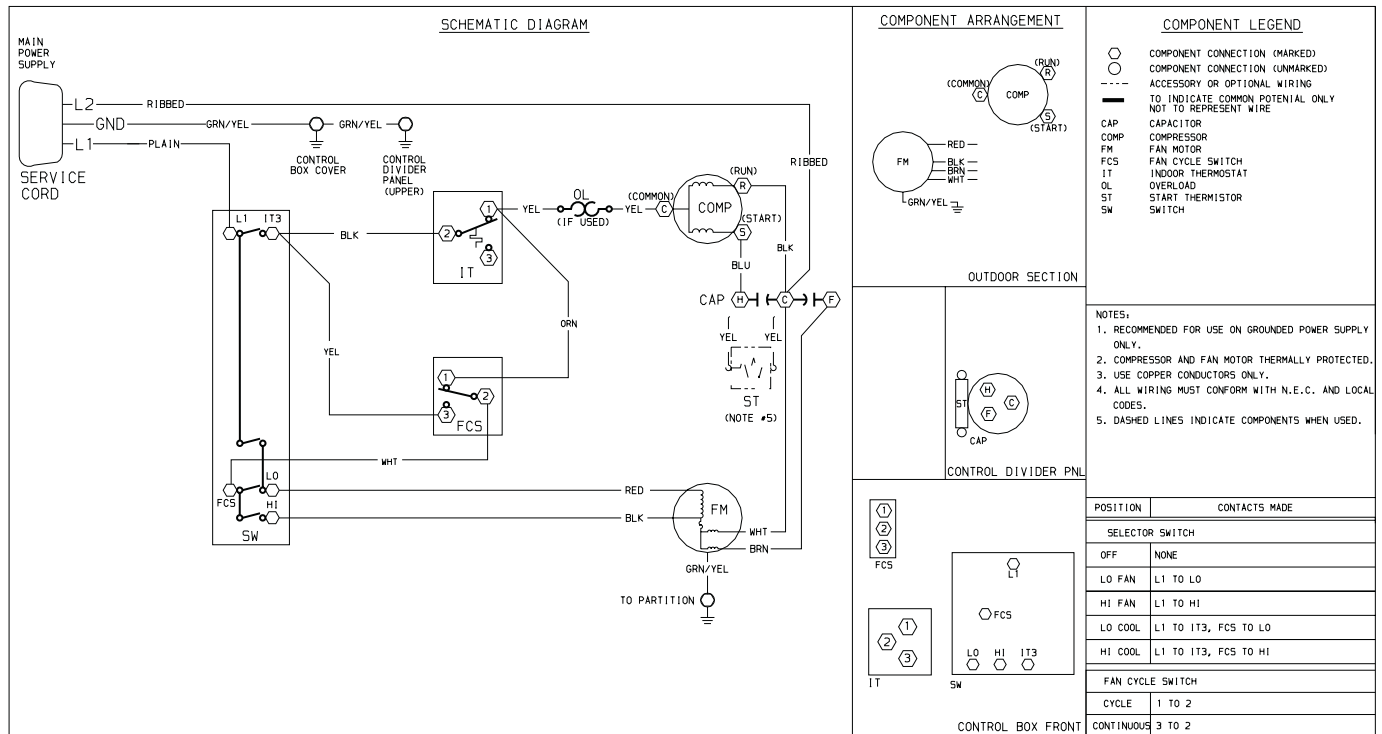


FIGURE 71 — 52CE AND 52PE — TYPICAL WIRING SCHEMATIC FOR WALL THERMOSTAT CONTROL HEAT/COOL UNITS



**FIGURE 72 — 52PC — TYPICAL WIRING SCHEMATIC FOR
STANDARD COOLING ONLY UNITS**

MOST FREQUENT PTAC SERVICE QUESTIONS

1. Can remote wall thermostats be used on standard (AA) models?	No, only for use on remote control (RC,RP) models. However, accessory RC-Retrofit Kit can be ordered to convert standard units to RC units.
2. Which remote thermostats are acceptable for use on 52C,P products?	HH01AD045 — Manual changeover thermostat TSTATCCBPC01-B (Heat/Cool) — Non-Programmable thermostat TSTATCCBPH01-B (Heat Pump) — Non-Programmable thermostat TSTATCCPAC01-B (Heat/Cool) — Digital Programmable thermostat TSTATCCPHP01-B (Heat Pump) — Digital Programmable thermostat
3. How many 52C,P series units can be controlled by one remote thermostat?	Maximum of 4.
4. What is the vent capacity of the 52C,P products?	50 cfm (standalone). Capacity can be increased with the use of an external exhaust fan.
5. How do the 52C,P series models handle condensate removal?	By using a 2-stage condensate removal system. First stage uses a slinger ring to pick up condensate and move it to the outdoor coil to be evaporated. In second stage, a vortex pump will suck condensate water into the condenser airstream where it will be blown onto the outdoor coil for evaporation.
6. At what temperature will the outdoor (defrost) thermostat switch the unit (heat pumps only) into defrost (emergency heat) mode?	When the outdoor coil temperature falls below 20 F (outdoor ambient temperature of approximately 35 F) and will stay in a passive defrost until outdoor coil is greater than 35 F.
7. Can the PTAC unit be configured to allow continuous fan operation?	Yes. A switch located on the front of the control box is used to toggle between continuous or cycle fan mode.
8. Can the discharge air grille be changed to alter the direction of the airflow?	Yes. Remove the 2 screws and flip the grille over 180 degrees.
9. What does the outdoor thermostat switch do?	The selector screw, located on the front of the control box, prevents the compressor from energizing in heating mode during subfreezing conditions to ensure adequate heating capacity. For units with unit-mounted controls, the switch must be returned to the “heat pump” position for compressor operation during cooling modes.

ACCESSORIES

ACCESSORY	FORM NUMBER	PART NUMBER	DESCRIPTION
Wall Sleeves	52S-48SI	WALL-SLEEVE-1PK WALL-SLEEVE-9PK SLEEVE-INSUL-1PK	Non-Insulated Plastic Wall Sleeve, 1 per pack Non-Insulated Plastic Wall Sleeve, 9 per pack Insulated Plastic Wall Sleeve, 1 per pack
	52S-50SI	SLEEVE-STEEL-1PK	Insulated Metal Wall Sleeve, 1 per pack
	52S-49SI*	SLEEVE-EXT24-1PK	Extended Metal Wall Sleeve for Deep Wall Applications (24 in. deep), 1 per pack
	52C,P-20SI	FR-SLEEVE-EXT	Friedrich wall sleeve extension to retrofit Carrier PTAC unit into Friedrich 11 1/2" deep (T Series) wall sleeve. 1 per pack
Exterior Grilles†	52S-59SI	GRILLE-ALU-STAMP	Stamped Aluminum Exterior Grille, Clear Finish
	52S-65SI	GRILLE-PLA-BROWN GRILLE-PLA-BEIGE	Plastic Architectural Rear Grille, Brown Plastic Architectural Rear Grille, Beige
	52S-60SI	GRILLE-ALU-CLEAR GRILLE-ALU-WHITE GRILLE-ALU-BRONZ GRILLE-ALU-MBRNZ GRILLE-ALU-BROWN GRILLE-ALU-BEIGE GRILLE-ALU-ALPIN GRILLE-ALU-PEACH GRILLE-ALU-MELON GRILLE-ALU-LGREY GRILLE-ALU-SGREY GRILLE-ALU-RDBRK GRILLE-ALU-BLUE GRILLE-ALU-GREEN	Aluminum Architectural Exterior Grille, Clear Finish Aluminum Architectural Exterior Grille, White Aluminum Architectural Exterior Grille, Light Bronze Aluminum Architectural Exterior Grille, Medium Bronze Aluminum Architectural Exterior Grille, Brown (Dark Bronze) Aluminum Architectural Exterior Grille, Beige Aluminum Architectural Exterior Grille, Alpine (matches Carrier Wall Sleeve) Aluminum Architectural Exterior Grille, Peach Aluminum Architectural Exterior Grille, Melon Aluminum Architectural Exterior Grille, Light Grey Aluminum Architectural Exterior Grille, Slate Gray Aluminum Architectural Exterior Grille, Red Brick Aluminum Architectural Exterior Grille, Blue Aluminum Architectural Exterior Grille, Green
	52C,P-1SI	SUBBASE-NON-ELEC	Non-electrical Subbase
	52C,P-2SI	SUBBASE-230V-15A SUBBASE-230V-20A SUBBASE-230V-30A SUBBASE-265V-15A SUBBASE-265V-20A SUBBASE-265V-30A	Electrical subbase with factory-installed 208/230 V, 15 amp receptacle Electrical subbase with factory-installed 208/230 V, 20 amp receptacle Electrical subbase with factory-installed 208/230 V, 30 amp receptacle Electrical subbase with factory-installed 265 V, 15 amp receptacle Electrical subbase with factory-installed 265 V, 20 amp receptacle Electrical subbase with factory-installed 265 V, 30 amp receptacle
	52C,P-3SI	SUBBASE-HARDWIRE	Electrical subbase with factory-installed hardwire kit (230/208 V and 265 V)
	52C,P-4SI	SUBBASE-SWITCH	Field-Installable Switch kit for an electrical subbase
	52C,P-5SI	SUBBASE-FUSE-15A SUBBASE-FUSE-20A SUBBASE-FUSE-30A	Field-Installed Fuse Kit (15 amp) for electrical subbase Field-Installed Fuse Kit (20 amp) for electrical subbase Field-Installed Fuse Kit (30 amp) for electrical subbase
	52C,P-11SI	HARDWIRE-KIT-1PK	Permanent power connection to the unit (includes 36" of flexible conduit and unit-mounted connector, 230/208 V and 265 V) 1 per pack
	52C,P-19SI	CONDUIT-INTF-4PK	Interface kit for field-supplied conduit to provide permanent power connection (230/208 V and 265 V) to the unit. Kit includes Molex connector for easy connect/disconnect. 4 per pack
Condensate Drain Kit	52S-53SI	DRAIN-KIT-4PK	Attaches to wall sleeve for controlled internal or external disposal of condensate 4 per pack
Wall Thermostats	N/A	HH01AD045 TSTATCCBPC01-B TSTATCCBPH01-B TSTATCCPAC01-B TSTATCCPHP01-B	Electro-mechanical Wall Thermostat (Heat/Cool and Heat Pump) Value Series Electronic Thermostat w/Digital display (Heat/Cool Models) Value Series Electronic Thermostat w/Digital display (Heat Pump Models) 7-Day Programmable Electronic Thermostat (Heat/Cool Models) 7-Day Programmable Electronic Thermostat (Heat Pump Models)
Wall Thermostat Interface Retrofit Kit	52C,P-16SI	RC-FIELDKIT230HC RC-FIELDKIT230HP RC-FIELDKIT265HC RC-FIELDKIT265HP	Field-installed wall thermostat retrofit kit to convert a standard 230 V Heat/Cool unit to an RC unit. Wall thermostat sold separately (can be used to convert a cool only unit to RC). Field-installed wall thermostat retrofit kit to convert a standard 230-V Heat Pump unit to an RC unit. Wall thermostat sold separately. Field-installed wall thermostat retrofit kit to convert a standard 265 V Heat/Cool unit to an RC unit. Wall thermostat sold separately (can be used to convert a cool only unit to RC). Field-installed wall thermostat retrofit kit to convert a standard 265-V Heat Pump unit to a RC unit. Wall thermostat sold separately.
	N/A	TSTAT-COVER-6X7	Clear plastic locking thermostat cover prevents unauthorized access to thermostat. Cover for use with non-programmable and electro-mechanical thermostats. Outside dimensions: 6 1/2" x 7 1/2" x 2 15/16". 1 per pack
	N/A	TSTAT-COVER-7X10	Clear plastic locking thermostat cover prevents unauthorized access to thermostat. Cover for use with programmable thermostats. Outside dimensions: 7 1/4" x 9 3/4" x 3 3/8". 1 per pack
Replacement Filters	N/A	AIR-FILTER-10PK	Replacement air filters in package of 10
Energy Management	52C,P-24SI	EM-KIT	Allows unit to be turned on and off from a remote location (includes freeze guard protection)
Locking Security Control Door	52C,P-23SI	SECURITY-DOOR	Key-locking security door to prevent access to heating and cooling controls
Lateral Duct Kit	52C,P-14SI	LATERAL-DUCT	Ductwork to allow one unit to heat and cool two rooms (plenum plus extension duct and registers)
Air/Curtain Deflector	52C,P-9SI	DEFLECTOR-1PK	Lateral air deflector, with individually adjustable louvers, to enhance air circulation, 1 per pack
	N/A	CURTDFL-52CP-1PK	Curtain deflector for 52C and 52P models — prevents curtains from blowing into discharge airstream. 1 per pack. NOTE: Curtain deflector for previous models are also available. Contact Carrier Representative.

*Extended metal wall sleeve also available in 26 in. and 28 in. depth.

†Custom colors are also available.

52C,P SERIES

52C PERFORMANCE AND PHYSICAL DATA

CATALOG NUMBER	COOLING (Btuh)	EER	ELECTRIC HEAT (Btuh)	COP	REVERSE CYCLE HEAT (Btuh)	EVAP. FAN CFM (HI-SPEED)	APPROX. WEIGHT (SHIP)	1-PH, 60 Hz VOLTS	CURRENT (AMPS)		INPUT POWER (WATTS)		BRANCH CIRCUIT FUSE (AMPS)	R-22 CHARGE (oz)
									Cooling	Electric Heat	Cooling	Electric Heat		
52CE-207---3	7,000/ 6,900	11.1/11.1	7,800/ 6,400	—	—	260/250	125	230/208	2.7/2.9	10.4/ 9.5	631/ 622	2393/1985	15	24
52CE-307---3	7,000/ 6,900	11.1/11.1	11,600/ 9,700	—	—	260/250	125	230/208	2.7/2.9	15.2/14.1	631/ 622	3493/2935	20	24
52CE-209---3	9,000/ 8,900	10.7/10.7	7,800/ 6,400	—	—	260/250	125	230/208	3.7/3.8	10.4/ 9.5	841/ 832	2393/1985	15	24
52CE-309---3	9,000/ 8,900	10.7/10.7	11,600/ 9,700	—	—	260/250	125	230/208	3.7/3.8	15.2/14.1	841/ 832	3493/2935	20	24
52CE-212---3	12,000/11,900	10.1/10.1	7,800/ 6,400	—	—	350/320	140	230/208	5.2/5.6	10.8/ 9.9	1188/1178	2470/2047	15	34
52CE-312---3	12,000/11,900	10.1/10.1	11,600/ 9,700	—	—	350/320	140	230/208	5.2/5.6	15.6/14.5	1188/1178	3570/2997	20	34
52CE-512---3	12,000/11,900	10.1/10.1	17,000/13,600	—	—	350/320	140	230/208	5.2/5.6	22.5/20.0	1188/1178	5170/4147	30	34
52CE-215---3	14,500/14,000	9.4/ 9.5	7,800/ 6,400	—	—	350/320	150	230/208	6.8/7.6	10.9/10.0	1543/1473	2517/2117	15	35
52CE-315---3	14,500/14,000	9.4/ 9.5	11,600/ 9,700	—	—	350/320	150	230/208	6.8/7.6	15.7/14.6	1543/1473	3617/3067	20	35
52CE-515---3	14,500/14,000	9.4/ 9.5	17,000/13,600	—	—	350/320	150	230/208	6.8/7.6	22.6/20.1	1543/1473	5217/4217	30	35
52CE-207---4	7,000	11.1	7,800	—	—	260	125	265	2.4	9.2	631	2396	15	26
52CE-307---4	7,000	11.1	11,600	—	—	260	125	265	2.4	13.3	631	3496	20	26
52CE-209---4	8,900	10.7	7,800	—	—	260	125	265	3.1	9.2	832	2396	15	24
52CE-309---4	8,900	10.7	11,600	—	—	260	125	265	3.1	13.3	832	3496	20	24
52CE-212---4	12,000	10.1	7,800	—	—	340	140	265	4.6	9.4	1188	2470	15	34
52CE-312---4	12,000	10.1	11,600	—	—	340	140	265	4.6	13.5	1188	3570	20	34
52CE-512---4	12,000	10.1	17,000	—	—	340	140	265	4.6	19.6	1188	5170	25	34
52CE-215---4	14,500	9.4	7,800	—	—	340	150	265	6.0	9.7	1543	2517	15	36
52CE-315---4	14,500	9.4	11,600	—	—	340	150	265	6.0	13.8	1543	3617	20	36
52CE-515---4	14,500	9.4	17,000	—	—	340	150	265	6.0	19.9	1543	5217	25	36

FIGURE 73 — 52CE — PERFORMANCE AND PHYSICAL DATA FOR STANDARD HEAT/COOL UNITS

CATALOG NUMBER	COOLING (Btuh)	EER	ELECTRIC HEAT (Btuh)	COP	REVERSE CYCLE HEAT (Btuh)	EVAP. FAN CFM (HI-SPEED)	APPROX. WEIGHT (SHIP)	1-PH, 60 Hz VOLTS	CURRENT (AMPS)		INPUT POWER (WATTS)		BRANCH CIRCUIT FUSE (AMPS)	R-22 CHARGE (oz)
									Cooling	Electric Heat	Cooling	Electric Heat		
52CQ-207---3	7,000/ 6,900	11.1/11.1	7,800/ 6,400	3.1/3.1	6,100/ 6,000	260/250	125	230/208	2.7/2.9	10.4/ 9.5	631/ 622	2393/1985	15	24
52CQ-307---3	7,000/ 6,900	11.1/11.1	11,600/ 9,700	3.1/3.1	6,100/ 6,000	260/250	125	230/208	2.7/2.9	15.2/14.1	631/ 622	3493/2935	20	24
52CQ-209---3	9,000/ 8,900	10.7/10.7	7,800/ 6,400	3.1/3.1	7,900/ 7,800	260/250	125	230/208	3.7/3.8	10.4/ 9.5	841/ 832	2393/1985	15	24
52CQ-309---3	9,000/ 8,900	10.7/10.7	11,600/ 9,700	3.1/3.1	7,900/ 7,800	260/250	125	230/208	3.7/3.8	15.2/14.1	841/ 832	3493/2935	20	24
52CQ-212---3	12,000/11,900	10.1/10.1	7,800/ 6,400	3.0/3.0	10,800/10,700	350/320	140	230/208	4.7/5.2	10.8/ 9.9	1188/1178	2470/2047	15	34
52CQ-312---3	12,000/11,900	10.1/10.1	11,600/ 9,700	3.0/3.0	10,800/10,700	350/320	140	230/208	4.7/5.2	15.6/14.5	1188/1178	3570/2997	20	34
52CQ-512---3	12,000/11,900	10.1/10.1	17,000/13,600	3.0/3.0	10,800/10,700	350/320	140	230/208	4.7/5.2	22.5/20.0	1188/1178	5170/4147	30	34
52CQ-215---3	14,500/14,000	9.4/ 9.5	7,800/ 6,400	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	10.9/10.0	1543/1473	2517/2117	15	35
52CQ-315---3	14,500/14,000	9.4/ 9.5	11,600/ 9,700	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	15.7/14.6	1543/1473	3617/3067	20	35
52CQ-515---3	14,500/14,000	9.4/ 9.5	17,000/13,600	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	22.6/20.1	1543/1473	5217/4217	30	35
52CQ-207---4	7,000	11.1	7,800	3.1	6,100	260	125	265	2.4	9.2	631	2396	15	26
52CQ-307---4	7,000	11.1	11,600	3.1	6,100	260	125	265	2.4	13.3	631	3496	20	26
52CQ-209---4	8,900	10.7	7,800	3.1	7,700	260	125	265	3.1	9.2	832	2396	15	24
52CQ-309---4	8,900	10.7	11,600	3.1	7,700	260	125	265	3.1	13.3	832	3496	20	24
52CQ-212---4	12,000	10.1	7,800	3.0	10,800	340	140	265	4.5	9.4	1188	2470	15	34
52CQ-312---4	12,000	10.1	11,600	3.0	10,800	340	140	265	4.5	13.5	1188	3570	20	34
52CQ-512---4	12,000	10.1	17,000	3.0	10,800	340	140	265	4.5	19.6	1188	5170	25	34
52CQ-215---4	14,500	9.4	7,800	2.9	13,400	340	150	265	6.0	9.7	1543	2517	15	36
52CQ-315---4	14,500	9.4	11,600	2.9	13,400	340	150	265	6.0	13.8	1543	3617	20	36
52CQ-515---4	14,500	9.4	17,000	2.9	13,400	340	150	265	6.0	19.9	1543	5217	25	36

FIGURE 74 — 52CQ — PERFORMANCE AND PHYSICAL DATA FOR STANDARD HEAT PUMP UNITS

52P PERFORMANCE AND PHYSICAL DATA

CATALOG NUMBER	COOLING (Btuh)	EER	ELECTRIC HEAT (Btuh)	COP	REVERSE CYCLE HEAT (Btuh)	EVAP. FAN CFM (HI-SPEED)	APPROX. WEIGHT (SHIP)	1-PH, 60 Hz VOLTS	CURRENT (AMPS)		INPUT POWER (WATTS)		BRANCH CIRCUIT FUSE (AMPS)	R-22 CHARGE (oz)
									Cooling	Electric Heat	Cooling	Electric Heat		
52PE-207---3	7,200/ 7,100	12.7/12.7	7,800/ 6,400	—	—	260/250	125	230/208	2.7/2.9	10.4/ 9.5	567/ 559	2393/1985	15	24
52PE-307---3	7,200/ 7,100	12.7/12.7	11,600/ 9,700	—	—	260/250	125	230/208	2.7/2.9	15.2/14.1	567/ 559	3493/2935	20	24
52PE-209---3	9,100/ 9,000	11.5/11.5	7,800/ 6,400	—	—	260/250	125	230/208	3.7/3.8	10.4/ 9.5	791/ 783	2393/1985	15	24
52PE-309---3	9,100/ 9,000	11.5/11.5	11,600/ 9,700	—	—	260/250	125	230/208	3.7/3.8	15.2/14.1	791/ 783	3493/2935	20	24
52PE-212---3	12,100/12,000	11.1/10.7	7,800/ 6,400	—	—	350/320	140	230/208	4.8/5.3	10.8/ 9.9	1090/1122	2470/2047	15	34
52PE-312---3	12,100/12,000	11.1/10.7	11,600/ 9,700	—	—	350/320	140	230/208	4.8/5.3	15.6/14.5	1090/1122	3570/2997	20	34
52PE-512---3	12,100/12,000	11.1/10.7	17,000/13,600	—	—	350/320	140	230/208	4.8/5.3	22.5/20.0	1090/1122	5170/4147	30	34
52PE-215---3	14,500/14,000	9.4/ 9.5	7,800/ 6,400	—	—	350/320	150	230/208	6.8/7.6	10.9/10.0	1543/1473	2517/2117	15	35
52PE-315---3	14,500/14,000	9.4/ 9.5	11,600/ 9,700	—	—	350/320	150	230/208	6.8/7.6	15.7/14.6	1543/1473	3617/3067	20	35
52PE-515---3	14,500/14,000	9.4/ 9.5	17,000/13,600	—	—	350/320	150	230/208	6.8/7.6	22.6/20.1	1543/1473	5217/4217	30	35
52PE-207---4	7,200	12.7	7,800	—	—	260	125	265	2.4	9.2	567	2396	15	26
52PE-307---4	7,200	12.7	11,600	—	—	260	125	265	2.4	13.3	567	3496	20	26
52PE-209---4	9,100	11.5	7,800	—	—	260	125	265	3.1	9.2	791	2396	15	24
52PE-309---4	9,100	11.5	11,600	—	—	260	125	265	3.1	13.3	791	3496	20	24
52PE-212---4	12,100	11.1	7,800	—	—	340	140	265	4.2	9.4	1090	2470	15	34
52PE-312---4	12,100	11.1	11,600	—	—	340	140	265	4.2	13.5	1090	3570	20	34
52PE-512---4	12,100	11.1	17,000	—	—	340	140	265	4.2	19.6	1090	5170	25	34
52PE-215---4	14,500	9.4	7,800	—	—	340	150	265	6.0	9.7	1543	2517	15	36
52PE-315---4	14,500	9.4	11,600	—	—	340	150	265	6.0	13.8	1543	3617	20	36
52PE-515---4	14,500	9.4	17,000	—	—	340	150	265	6.0	19.9	1543	5217	25	36

FIGURE 75 — 52PE — PERFORMANCE AND PHYSICAL DATA FOR STANDARD HEAT/COOL UNITS

CATALOG NUMBER	COOLING (Btuh)	EER	ELECTRIC HEAT (Btuh)	COP	REVERSE CYCLE HEAT (Btuh)	EVAP. FAN CFM (HI-SPEED)	APPROX. WEIGHT (SHIP)	1-PH, 60 Hz VOLTS	CURRENT (AMPS)		INPUT POWER (WATTS)		BRANCH CIRCUIT FUSE (AMPS)	R-22 CHARGE (oz)
									Cooling	Electric Heat	Cooling	Electric Heat		
52PQ-207---3	7,200/ 7,100	12.7/12.7	7,800/ 6,400	3.4/3.4	6,300/ 6,300	260/250	125	230/208	2.7/2.9	10.4/ 9.5	567/ 559	2393/1985	15	24
52PQ-307---3	7,200/ 7,100	12.7/12.7	11,600/ 9,700	3.4/3.4	6,300/ 6,300	260/250	125	230/208	2.7/2.9	15.2/14.1	567/ 559	3493/2935	20	24
52PQ-209---3	9,100/ 9,000	11.5/11.5	7,800/ 6,400	3.2/3.2	7,900/ 7,900	260/250	125	230/208	3.7/3.8	10.4/ 9.5	791/ 783	2393/1985	15	24
52PQ-309---3	9,100/ 9,000	11.5/11.5	11,600/ 9,700	3.2/3.2	7,900/ 7,900	260/250	125	230/208	3.7/3.8	15.2/14.1	791/ 783	3493/2935	20	24
52PQ-212---3	12,100/12,000	11.1/10.7	7,800/ 6,400	3.2/3.2	11,000/11,000	350/320	140	230/208	4.8/5.3	10.8/ 9.9	1090/1122	2470/2047	15	34
52PQ-312---3	12,100/12,000	11.1/10.7	11,600/ 9,700	3.2/3.2	11,000/11,000	350/320	140	230/208	4.8/5.3	15.6/14.5	1090/1122	3570/2997	20	34
52PQ-512---3	12,100/12,000	11.1/10.7	17,000/13,600	3.2/3.2	11,000/11,000	350/320	140	230/208	4.8/5.3	22.5/20.0	1090/1122	5170/4147	30	34
52PQ-215---3	14,500/14,000	9.4/ 9.5	7,800/ 6,400	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	10.9/10.0	1543/1473	2517/2117	15	35
52PQ-315---3	14,500/14,000	9.4/ 9.5	11,600/ 9,700	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	15.7/14.6	1543/1473	3617/3067	20	35
52PQ-515---3	14,500/14,000	9.4/ 9.5	17,000/13,600	2.9/2.9	13,400/13,200	350/320	150	230/208	6.8/7.6	22.6/20.1	1543/1473	5217/4217	30	35
52PQ-207---4	7,200	12.7	7,800	3.4	6,300	260	125	265	2.4	9.2	567	2396	15	26
52PQ-307---4	7,200	12.7	11,600	3.4	6,300	260	125	265	2.4	13.3	567	3496	20	26
52PQ-209---4	9,100	11.5	7,800	3.2	7,700	260	125	265	3.1	9.2	791	2396	15	24
52PQ-309---4	9,100	11.5	11,600	3.2	7,700	260	125	265	3.1	13.3	791	3496	20	24
52PQ-212---4	12,100	11.1	7,800	3.2	10,800	340	140	265	4.2	9.4	1090	2470	15	34
52PQ-312---4	12,100	11.1	11,600	3.2	10,800	340	140	265	4.2	13.5	1090	3570	20	34
52PQ-512---4	12,100	11.1	17,000	3.2	10,800	340	140	265	4.2	19.6	1090	5170	25	34
52PQ-215---4	14,500	9.4	7,800	2.9	13,400	340	150	265	6.0	9.7	1543	2517	15	36
52PQ-315---4	14,500	9.4	11,600	2.9	13,400	340	150	265	6.0	13.8	1543	3617	20	36
52PQ-515---4	14,500	9.4	17,000	2.9	13,400	340	150	265	6.0	19.9	1543	5217	25	36

FIGURE 76 — 52PQ — PERFORMANCE AND PHYSICAL DATA FOR STANDARD HEAT PUMP UNITS

