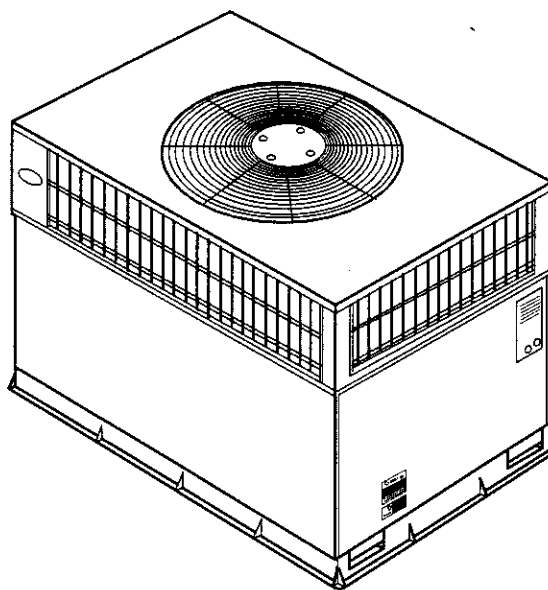


# Installation, Start-Up, and Service Instructions

**NOTE:** Read the entire instruction manual before starting the installation.

### TABLE OF CONTENTS

|   |    |
|---|----|
| SAFETY CONSIDERATIONS .....   | 1  |
| INTRODUCTION .....  | 2  |
| RECEIVING AND INSTALLATION .....  | 2  |
| Check Equipment .....   | 2  |
| IDENTIFY UNIT .....   | 2  |
| INSPECT SHIPMENT .....  | 2  |
| Provide Unit Support .....  | 2  |
| ROOF CURB .....   | 2  |
| SLAB MOUNT .....  | 2  |
| GROUND MOUNT .....  | 2  |
| Provide Clearances .....  | 2  |
| Rig and Place Unit .....  | 2  |
| INSPECTION .....  | 2  |
| INSTALLATION .....  | 2  |
| Select and Install Ductwork .....   | 4  |
| CONVERTING HORIZONTAL DISCHARGE UNITS TO<br>DOWNFLOW (VERTICAL) DISCHARGE UNITS ..... | 5  |
| Provide for Condensate Disposal .....   | 7  |
| Install Electrical Connections .....  | 8  |
| HIGH-VOLTAGE CONNECTIONS .....  | 10 |
| ROUTING POWER LEADS INTO UNIT .....   | 10 |
| CONNECTING GROUND LEAD TO GROUND LUG .....  | 10 |
| ROUTING CONTROL POWER WIRES (24-V) .....  | 13 |
| SPECIAL PROCEDURES FOR 208-V OPERATION .....  | 15 |
| PRE-START-UP .....  | 17 |
| START-UP .....  | 17 |
| Check for Refrigerant Leaks .....   | 17 |
| Start-Up Adjustments .....  | 17 |
| CHECKING COOLING AND HEATING<br>CONTROL OPERATION .....                               | 17 |
| CHECKING AND ADJUSTING REFRIGERANT<br>CHARGE .....                                    | 18 |
| REFRIGERANT CHARGE .....  | 18 |
| NO CHARGE .....   | 18 |
| LOW CHARGE COOLING .....  | 19 |
| TO USE COOLING CHARGING CHARTS .....  | 19 |
| INDOOR AIRFLOW AND AIRFLOW ADJUST-<br>MENTS .....                                     | 19 |
| MAINTENANCE .....   | 20 |
| Air Filter .....  | 21 |
| Indoor blower and motor .....   | 21 |
| OUTDOOR COIL, INDOOR COIL, AND<br>CONDENSATE DRAIN PAN .....                          | 22 |
| Outdoor fan .....   | 23 |
| Electrical controls and wiring .....  | 23 |
| Refrigerant circuit .....   | 24 |
| Indoor airflow .....  | 25 |
| Metering device .....   | 25 |
| Liquid line strainers .....   | 25 |



C99001

**Fig. 1—Model 50JS/50JX**

|   |    |
|---|----|
| High Flow Valves .....  | 25 |
| Time-delay relay .....  | 25 |
| Loss of charge switch .....   | 25 |
| Check defrost thermostat .....  | 25 |
| Defrost Thermostat .....  | 25 |
| TROUBLESHOOTING .....   | 25 |
| START-UP CHECKLIST .....  | 25 |
| NOTE TO INSTALLER — READ THESE INSTRUCTIONS<br>CAREFULLY AND COMPLETELY before installing this unit.<br>Also, make sure the Owner's Manual and Service Instructions are<br>left with the unit after installation. |    |

### SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags, and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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

## ⚠ WARNING

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electric shock, or other occurrences, which could cause serious injury or death or damage your property. Consult a qualified installer or service agency for information or assistance. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the product or in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words — DANGER, WARNING, CAUTION, and NOTE. Danger identifies the most serious hazards, which **will** result in severe personal injury or death. Warning indicates a condition that **could** cause serious personal injury or death. Caution is used to identify unsafe practices, which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

1. The power supply (volts, phase, and hertz) must correspond to that specified on unit rating plate.
2. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.
3. This installation must conform with local building codes and with NEC (National Electrical Code). Refer to provincial and local plumbing or waste water codes and other applicable local codes.

## ⚠ WARNING

Before performing service or maintenance operations on system, turn off main power to unit. Turn off accessory heater power switch if applicable. Electrical shock could cause severe injury or death.

## INTRODUCTION

The 50JS and 50JX heat pumps are fully self-contained and designed for outdoor installation (See Fig. 1). Standard units are shipped in a horizontal-discharge configuration for installation on a ground-level slab. Units can be converted to downflow (vertical) discharge configurations for rooftop applications.

## RECEIVING AND INSTALLATION

### Step 1—Check Equipment

#### IDENTIFY UNIT

The unit model number and serial number are stamped on the unit identification plate. Check this information against shipping papers.

#### INSPECT SHIPMENT

Inspect for shipping damage while unit is still on shipping pallet. If unit appears to be damaged or is torn loose from its anchorage, have it examined by transportation inspectors before removal. Forward claim papers directly to transportation company. Manufacturer is not responsible for any damage incurred in transit. Check all items against shipping list. Immediately notify the nearest Carrier Air Conditioning office if any item is missing. To prevent loss or damage, leave all parts in original packages until installation.

### Step 2—Provide Unit Support

#### ROOF CURB

Install accessory roof curb in accordance with instructions shipped with curb (See Fig. 5). Install insulation, cant strips, roofing, and flashing. Ductwork must be attached to curb.

**IMPORTANT:** The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasketing material supplied with the roof curb. Improperly applied gasketing also can result in air leaks and poor unit performance.

Curb should be level to within 1/4 in. (See Fig. 6). This is necessary for unit drain to function properly. Refer to accessory roof curb installation instructions for additional information as required.

#### SLAB MOUNT

Place the unit on a solid, level concrete pad that is a minimum of 4 in. thick with 2 in. above grade (See Fig. 7). The slab should extend approximately 2 in. beyond the casing on all 4 sides of the unit. Do not secure the unit to the slab *except* when required by local codes.

#### GROUND MOUNT

The unit may be installed either on a slab or placed directly on the ground if local codes permit. Place the unit on level ground prepared with gravel for condensate discharge.

### Step 3—Provide Clearances

The required minimum service clearances are shown in Figs. 2 and 3. Adequate ventilation and outdoor air must be provided. The outdoor fan draws air through the outdoor coil and discharges it through the top fan grille. Be sure that the fan discharge does not recirculate to the outdoor coil. Do not locate the unit in either a corner or under an overhead obstruction. The minimum clearance under a partial overhang (such as a normal house overhang) is 36 in. above the unit top. The maximum horizontal extension of a partial overhang must not exceed 48 in. For extended overhangs, provide a minimum clearance of 48 in.

**IMPORTANT:** Do not restrict outdoor airflow. An air restriction at either the outdoor-air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab-mounted units should be at least 4 in. above the highest expected water and runoff levels. Do not use unit if it has been under water.

### Step 4—Rig and Place Unit

Rigging and handling of this equipment can be hazardous for many reasons due to the installation location (roofs, elevated structures, etc.)

Only trained, qualified crane operators and ground support staff should handle and install this equipment.

When working with this equipment, observe precautions in the literature, on tags, stickers, and labels attached to the equipment, and any other safety precautions that might apply.

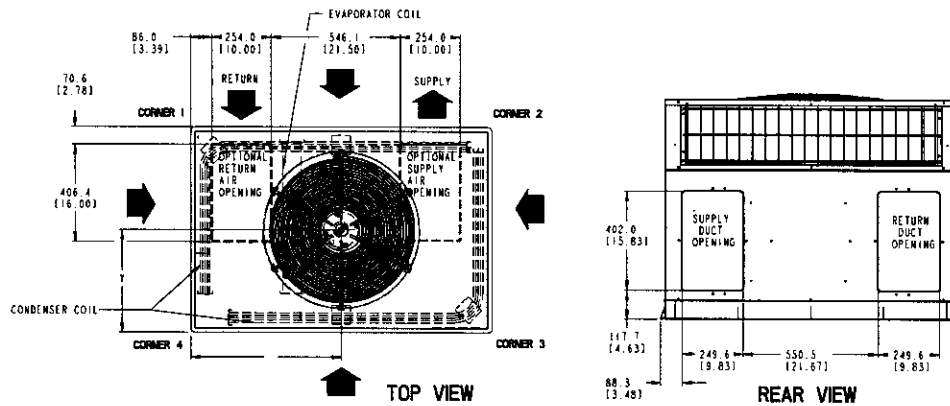
Follow all applicable safety codes. Wear safety shoes and work gloves.

#### INSPECTION

Prior to initial use, and at monthly intervals, all rigging brackets and straps should be visually inspected for any damage, evidence of wear, structural deformation, or cracks. Particular attention should be paid to excessive wear at hoist hooking points and load support areas. Brackets or straps showing any kind of wear in these areas must not be used and should be discarded.

#### INSTALLATION

1. Remove unit from shipping carton. Leave top shipping skid on the unit as a spreader bar to prevent the rigging straps from damaging the unit. If the wood skid is not available, use a spreader bar of sufficient length to protect unit from damage.



**REQUIRED CLEARANCES TO COMBUSTIBLE MATL**

|                     | MILLIMETERS (IN) |
|---------------------|------------------|
| TOP OF UNIT         | 355.6 (14.00)    |
| DUCT SIDE OF UNIT   | 50.8 (2.00)      |
| SIDE OPPOSITE DUCTS | 355.6 (14.00)    |
| BOTTOM OF UNIT      | 12.7 (0.50)      |
| ELECTRIC HEAT PANEL | 914.4 (36.00)    |

**NEC REQUIRED CLEARANCES**

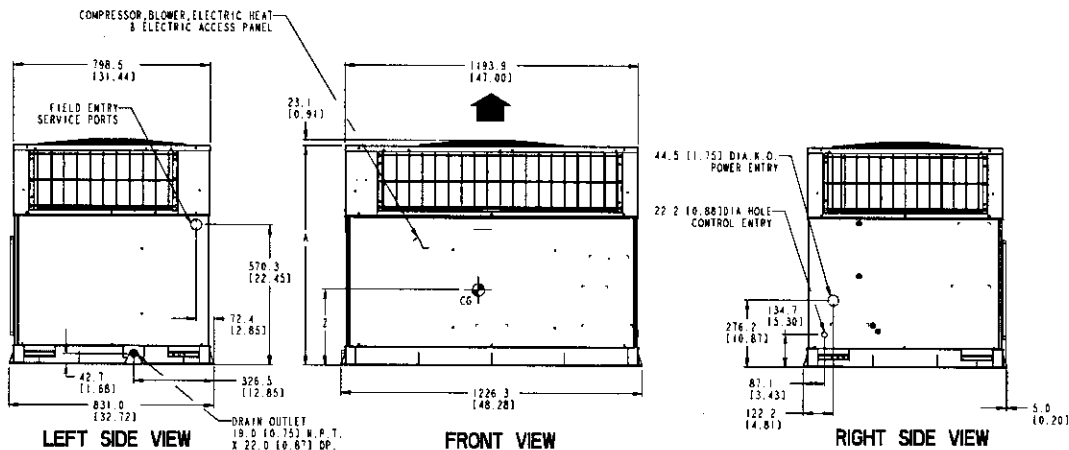
|  | MILLIMETERS (IN) |
|--|------------------|
| BETWEEN UNITS, POWER ENTRY SIDE  | 1066.8 (42.00)   |
| UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE                                 | 914.0 (36.00)    |
| UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE | 1066.8 (42.00)   |

**REQUIRED CLEARANCE FOR OPERATION AND SERVICING**

|                               | MILLIMETERS (IN) |
|-------------------------------|------------------|
| EVAP. COIL ACCESS SIDE        | 914.0 (36.00)    |
| POWER ENTRY SIDE              | 914.0 (36.00)    |
| (EXCEPT FOR NEC REQUIREMENTS) |                  |
| UNIT TOP                      | 914.0 (36.00)    |
| SIDE OPPOSITE DUCTS           | 914.0 (36.00)    |
| DUCT PANEL                    | 304.8 (12.00)    |

\*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 (12.00) FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

DIMENSIONS IN [ ] ARE IN INCHES



C00137

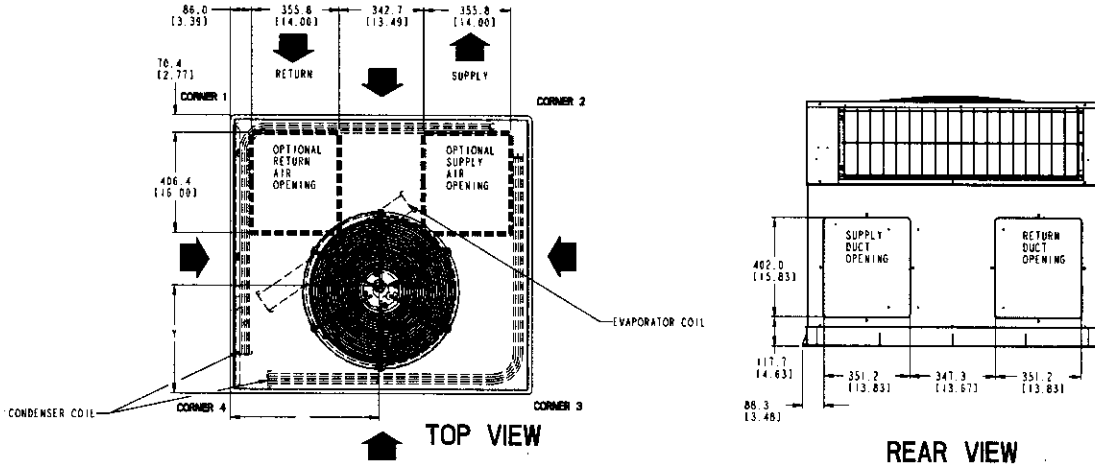
| UNIT    | ELECTRICAL CHARACTERISTICS | UNIT WEIGHT |       | UNIT HEIGHT<br>IN. (MM)<br>"A" | CENTER OF GRAVITY<br>IN. (MM) |              |              |
|---------|----------------------------|-------------|-------|--------------------------------|-------------------------------|--------------|--------------|
|         |                            | lb          | kg    |                                | X                             | Y            | Z            |
| 50JS030 | 208/230-3-60               | 287         | 130.2 | 39.02 (991.1)                  | 19.5 (495.3)                  | 13.7 (348.0) | 15.0 (381.0) |
| 50JS036 | 208/230-3-60, 460-3-60     | 291         | 132.0 | 37.02 (940.3)                  | 19.5 (495.3)                  | 13.7 (348.0) | 13.0 (330.2) |
| 50JS042 | 208/230-3-60, 460-3-60     | 323         | 146.5 | 37.02 (940.3)                  | 19.7 (500.4)                  | 14.0 (355.6) | 13.0 (330.2) |
| 50JX030 | 208/230-3-60               | 320         | 145.2 | 37.02 (940.3)                  | 19.7 (500.4)                  | 14.0 (355.6) | 17.6 (447.0) |
| 50JX036 | 208/230-3-60, 460-3-60     | 328         | 148.8 | 37.02 (940.3)                  | 19.7 (500.4)                  | 14.0 (355.6) | 16.5 (419.1) |

Fig. 2—50JS030-042/50JX030-036 Unit Dimensions

- Position the lifting bracket assembly around the base of the unit. Be sure the strap does not twist.
- Place each of the 4 metal lifting brackets into the rigging holds in the composite pan.
- Thread lifting bracket strapping around bottom perimeter of unit as follows:
  - Open lever of tension buckle (ratchet type).
  - Feed strapping through tension buckle as shown in Fig. 8.
  - Pull strapping through tension buckle unit taut.
  - Snap lever down to lock strap in tension buckle. To release strapping, squeeze safety latch, lift lever, and pull webbing outward.
- Tighten the tension buckle until it is taut. Lifting brackets must be secure in the rigging holds.
- Attach field-supplied clevis or hook of sufficient strength to hole in the lifting bracket (See Fig. 8).
- Attach the 2 safety straps directly to the clevis or hook at the 4 rigging brackets. **DO NOT** attach the safety straps to the lifting brackets (See Fig. 8).
- Position lifting point directly over the unit's center of gravity.
- Lift unit. When unit is directly over the roof curb, remove the 2 safety straps. Lower the equipment onto the roof curb.

**Step 5—Select and Install Ductwork**

The design and installation of the duct system must be in accordance with the standards of the NFPA for installation of



**REQUIRED CLEARANCES TO COMBUSTIBLE MATL.**

|                     | MILLIMETERS [IN] |
|---------------------|------------------|
| TOP OF UNIT         | 355.6 [14.00]    |
| DUCT SIDE OF UNIT   | 50.8 [2.00]      |
| SIDE OPPOSITE DUCTS | 355.6 [14.00]    |
| BOTTOM OF UNIT      | 12.7 [0.50]      |
| ELECTRIC HEAT PANEL | 914.4 [36.00]    |

**NEC. REQUIRED CLEARANCES**

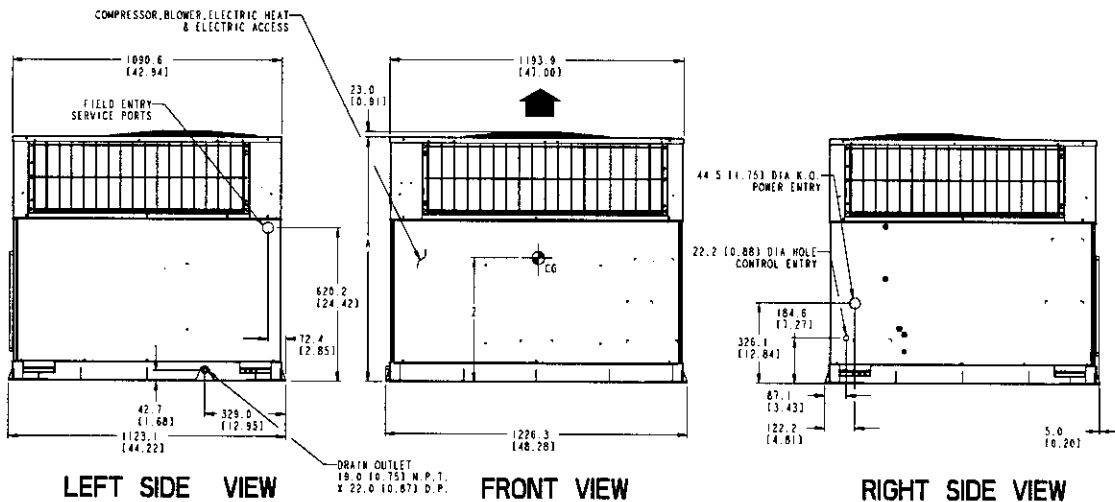
|  | MILLIMETERS [IN] |
|--|------------------|
| BETWEEN UNITS, POWER ENTRY SIDE  | 1066.8 [42.00]   |
| UNIT AND UNGROUNDED SURFACES, POWER ENTRY SIDE                                 | 914.0 [36.00]    |
| UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, POWER ENTRY SIDE | 1066.8 [42.00]   |

**REQUIRED CLEARANCE FOR OPERATION AND SERVICING**

|  | MILLIMETERS [IN] |
|--|------------------|
| EVAP. COIL ACCESS SIDE                         | 914.0 [36.00]    |
| POWER ENTRY SIDE (EXCEPT FOR NEC REQUIREMENTS) | 914.0 [36.00]    |
| UNIT TOP                                       | 914.0 [36.00]    |
| SIDE OPPOSITE DUCTS                            | 914.0 [36.00]    |
| DUCT PANEL                                     | 304.8 [12.00]    |

\*MINIMUM DISTANCES: IF UNIT IS PLACED LESS THAN 304.8 [12.00] FROM WALL SYSTEM, THEN SYSTEM PERFORMANCE MAYBE COMPROMISED.

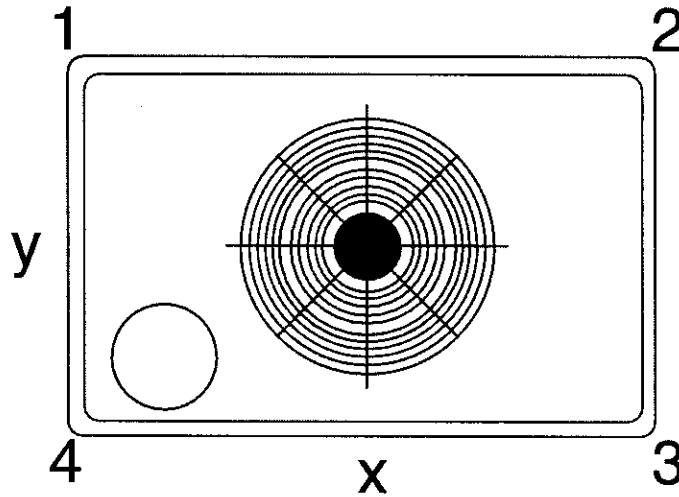
DIMENSIONS IN [ ] ARE IN INCHES



C00136

| UNIT    | ELECTRICAL CHARACTERISTICS | UNIT WEIGHT |       | UNIT HEIGHT IN. (MM) "A" | CENTER OF GRAVITY IN. (MM) |              |              |
|---------|----------------------------|-------------|-------|--------------------------|----------------------------|--------------|--------------|
|         |                            | lb          | kg    |                          | X                          | Y            | Z            |
| 50JS048 | 208/230-3-60, 460-3-60     | 353         | 160.1 | 38.98 (990.2)            | 19.9 (505.5)               | 15.7 (398.8) | 17.0 (431.8) |
| 50JS060 | 208/230-3-60, 460-3-60     | 418         | 189.6 | 38.98 (990.2)            | 19.9 (505.5)               | 15.7 (398.8) | 17.0 (431.8) |
| 50JX042 | 208/230-3-60, 460-3-60     | 350         | 158.8 | 40.98 (1040.9)           | 19.9 (505.5)               | 15.7 (398.8) | 16.6 (421.6) |
| 50JX048 | 208/230-3-60, 460-3-60     | 315         | 170.1 | 40.98 (1040.9)           | 19.9 (505.5)               | 15.7 (398.8) | 18.0 (457.2) |
| 50JX060 | 208/230-3-60, 460-3-60     | 428         | 194.1 | 42.98 (1091.7)           | 19.9 (505.5)               | 15.7 (398.8) | 17.6 (447.0) |

Fig. 3—50JS048-060/50JX042-060 Unit Dimensions



C00071

| CORNER WEIGHTS (SMALL CABINET) |                 |     |     |     | CORNER WEIGHTS (LARGE CABINET) |                 |     |     |   |
|--------------------------------|-----------------|-----|-----|-----|--------------------------------|-----------------|-----|-----|---|
| Model 50JS                     | Unit            | 30  | 36  | 42  | Model 50JS                     | Unit            | 48  | 60  | — |
|                                | Total Weight    | 287 | 291 | 323 |                                | Total Weight    | 353 | 418 | — |
|                                | Corner Weight 1 | 66  | 67  | 83  |                                | Corner Weight 1 | 76  | 90  | — |
|                                | Corner Weight 2 | 54  | 55  | 55  |                                | Corner Weight 2 | 49  | 58  | — |
|                                | Corner Weight 3 | 62  | 63  | 78  |                                | Corner Weight 3 | 96  | 114 | — |
|                                | Corner Weight 4 | 105 | 106 | 107 |                                | Corner Weight 4 | 132 | 156 | — |

| CORNER WEIGHTS (SMALL CABINET) |                 |     |     |   | CORNER WEIGHTS (LARGE CABINET) |            |                 |     |     |     |
|--------------------------------|-----------------|-----|-----|---|--------------------------------|------------|-----------------|-----|-----|-----|
| Model 50JX                     | Unit            | 30  | 36  | — | —                              | Model 50JX | Unit            | 42  | 48  | 60  |
|                                | Total Weight    | 320 | 328 | — | —                              |            | Total Weight    | 350 | 375 | 428 |
|                                | Corner Weight 1 | 63  | 64  | — | —                              |            | Corner Weight 1 | 75  | 81  | 92  |
|                                | Corner Weight 2 | 74  | 76  | — | —                              |            | Corner Weight 2 | 49  | 52  | 60  |
|                                | Corner Weight 3 | 56  | 58  | — | —                              |            | Corner Weight 3 | 95  | 102 | 116 |
|                                | Corner Weight 4 | 127 | 130 | — | —                              |            | Corner Weight 4 | 131 | 140 | 160 |

Fig. 4—Corner Weights (in Pounds)

non-residence type air conditioning and ventilating systems, NFPA 90A or residence type, NFPA 90B and/or local codes and ordinances.

Select and size ductwork, supply-air registers, and return air grilles according to ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) recommendations.

The unit has duct flanges on the supply- and return-air openings on the side of the unit.

When designing and installing ductwork, consider the following:

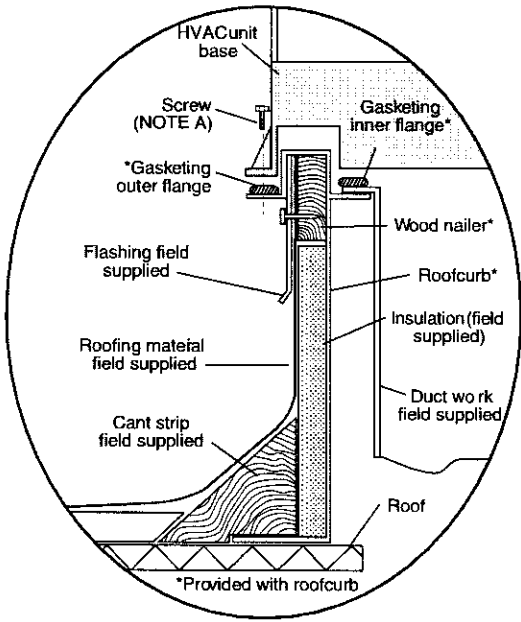
**⚠ WARNING**

For vertical supply and return units, tools or parts could drop into ductwork and cause serious injury or death. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Units with electric heaters require 90 degree elbow in supply duct.

1. All units should have field-supplied filters or accessory filter rack installed in the return-air side of the unit. Recommended sizes for filters are shown in Tables 1 and 2.
2. Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

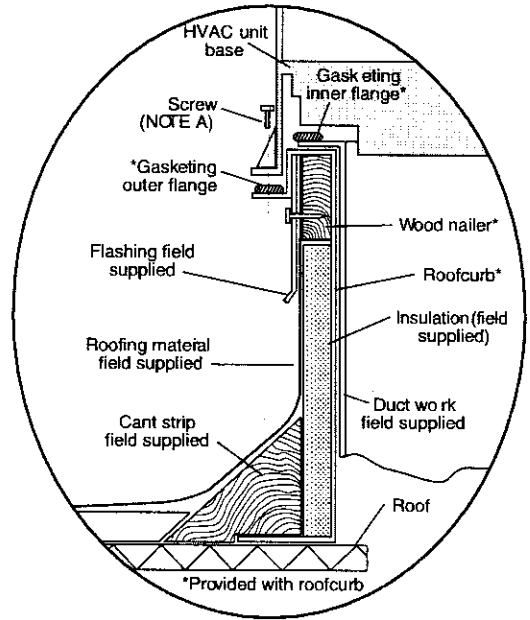
**IMPORTANT:** Use flexible connectors between ductwork and unit to prevent transmission of vibration. Use suitable gaskets to ensure weather tight and airtight seal. When electric heat is installed, use fireproof canvas (or similar heat resistant material) connector between ductwork and unit discharge connection. If flexible duct is used, insert a sheet metal sleeve inside duct. Heat resistant duct connector (or sheet metal sleeve) must extend 24-in. from electric heater element.

3. Size ductwork for cooling air quantity (cfm). The minimum air quantity for proper electric heater operation is listed in Tables 3 and 4. Heater limit switches may trip at air quantities below those recommended.
4. Seal, insulate, and weatherproof all external ductwork. Seal, insulate and cover with a vapor barrier all ductwork passing through conditioned spaces. Follow latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA) and Air Conditioning Contractors Association (ACCA) minimum installation standards for residential heating and air conditioning systems.
5. Secure all ducts to building structure. Flash, weatherproof, and vibration-isolate duct openings in wall or roof according to good construction practices.



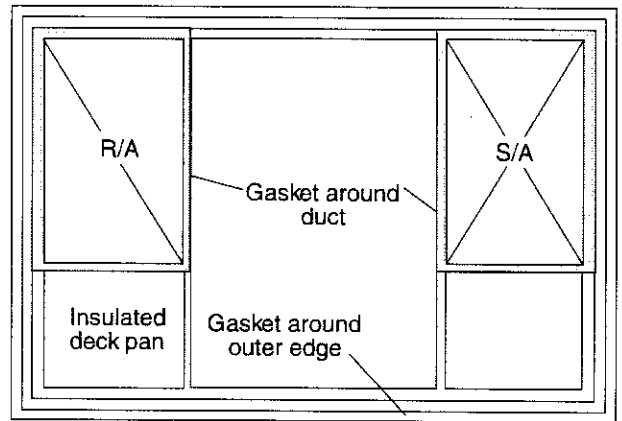
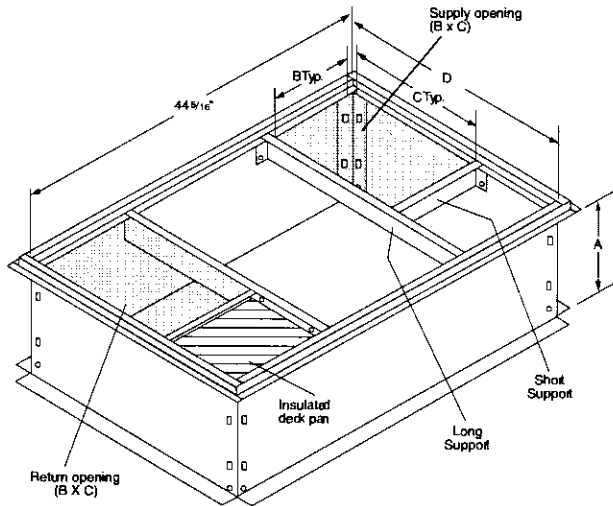
**Roof Curb for Small Cabinet**

Note A: When unit mounting screw is used, retainer bracket must also be used.



**Roof Curb for Large Cabinet**

Note A: When unit mounting screw is used, retainer bracket must also be used.



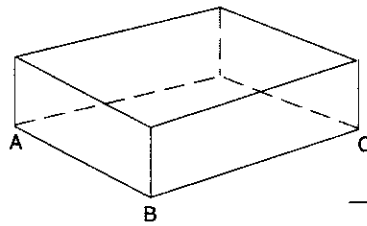
C00076

| UNIT SIZE   |             | ODS CATALOG NUMBER | A<br>IN. (MM) | B<br>IN. (MM) | C<br>IN. (MM) | D<br>IN. (MM) |
|-------------|-------------|--------------------|---------------|---------------|---------------|---------------|
| 50JS030-042 | 50JX030-036 | CPRFCURB006A00     | 8 (203)       | 11 (279)      | 16 1/2 (419)  | 28-3/4 (730)  |
|             |             | CPRFCURB007A00     | 14 (356)      | 11 (279)      | 16 1/2 (419)  | 28-3/4 (730)  |
| 50JS048-060 | 50JX042-060 | CPRFCURB008A00     | 8 (203)       | 16 3/16 (411) | 17 3/8 (441)  | 40-1/4 (1022) |
|             |             | CPRFCURB009A00     | 14 (356)      | 16 3/16 (411) | 17 3/8 (441)  | 40-1/4 (1022) |

**NOTES:**

1. Roof curb must be set up for unit being installed.
2. Seal strip must be applied, as required, to unit being installed.
3. Dimensions in ( ) are in millimeters.
4. Roof curb is made of 16-gauge steel.
5. Table lists only the dimensions, per part number, that have changed.
6. Attach ductwork to curb (flanges of duct rest on curb).
7. Insulated panels: 1-in. thick fiberglass 1 lb density.
8. Dimensions are in inches.
9. When unit mounting screw is used (see Note A), a retainer bracket must be used as well. This bracket must also be used when required by code for hurricane or seismic conditions. This bracket is available through Micromet.

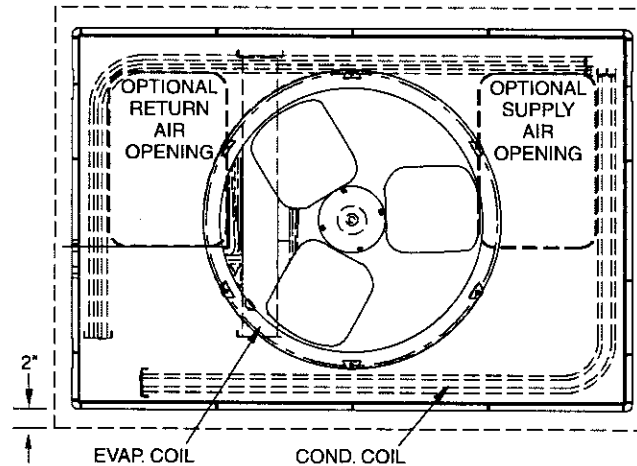
**Fig. 5—Roof Curb Dimensions**



| MAXIMUM ALLOWABLE DIFFERENCE (in.) |     |     |
|------------------------------------|-----|-----|
| A-B                                | B-C | A-C |
| 1/4                                | 1/4 | 1/4 |

C99065

**Fig. 6—Unit Leveling Tolerances**



C99096

**Fig. 7—Slab Mounting Detail**

**CONVERTING HORIZONTAL DISCHARGE UNITS TO DOWNFLOW (VERTICAL) DISCHARGE UNITS**

**⚠ WARNING**

Before performing service or maintenance operations on system, turn off main power to unit and install lockout tag. Turn off accessory heater power switch if applicable. Electrical shock could cause serious injury or death.

1. Open all electrical disconnects and install lockout tag before starting any service work.
2. Remove side duct covers to access bottom return and supply knock outs.

**NOTE:** These panels are held in place with tabs similar to an electrical knockout.

3. Use a screwdriver and hammer to remove the panels in the bottom of the composite unit base.
4. Ensure the side duct covers are in place to block off the horizontal air openings.

**NOTE:** Avoid abrupt duct size increases and reductions. Abrupt change in duct size adversely affects air performance.

**Step 6—Provide for Condensate Disposal**

**NOTE:** Ensure that condensate-water disposal methods comply with local codes, restrictions, and practices.

The units dispose of condensate through a 3/4 in. NPT female fitting that exits on the compressor end of the unit. Condensate water can be drained directly onto the roof in rooftop installations (where permitted) or onto a gravel apron in ground level installations. Install a field-supplied condensate trap at end of condensate connection to ensure proper drainage. Make sure that the outlet of the trap is at least 1 in. lower than the drain-pan condensate connection to prevent the pan from overflowing. Prime the trap with water. When using a gravel apron, make sure it slopes away from the unit.

If the installation requires draining the condensate water away from the unit, install a field-supplied 2-in. trap at the condensate connection to ensure proper drainage. Condensate trap is available as an accessory or is field-supplied. Make sure that the outlet of the trap is at least 1 in. lower than the unit drain-pan condensate connection to prevent the pan from overflowing. Connect a drain trough using a minimum of field-supplied 3/4 -in. PVC or field-supplied 3/4 -in. copper pipe at outlet end of the 2 -in. trap (See Fig. 11). Do not undersize the tube. Pitch the drain trough downward at a slope of at least 1 in. every 10 ft. of horizontal run. Be sure to check the drain trough for leaks. Prime the trap at the beginning of the cooling season start-up.

**Table 1—Physical Data**

| UNIT SIZE  | 50JS030                     | 50JS036                     | 50JS042                     | 50JS048                     | 50JS060                   |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|
| NOMINAL CAPACITY (ton)   | 2-1/2                       | 3                           | 3-1/2                       | 4                           | 5                         |
| OPERATING WEIGHT (lb.)   | 287                         | 291                         | 323                         | 353                         | 418                       |
| COMPRESSOR QUANTITY  | 1                           |                             |                             |                             |                           |
| TYPE   | RECIPROCATING COMPRESSOR    |                             | SCROLL COMPRESSOR           |                             |                           |
| REFRIGERANT  | R-22                        |                             |                             |                             |                           |
| REFRIGERANT METERING DEVICE  | AccuRater®                  |                             |                             |                             |                           |
| Refrigerant (R-22) Quantity (lb.)                                      | 5.6                         | 7.6                         | 8.0                         | 7.85                        | 9.3                       |
| ORIFICE ID (in.)   | 0.068                       | 0.078                       | 0.078                       | 0.088                       | 0.093                     |
| ORIFICE OD (in.)   | 0.042 (2)                   | 0.046 (2)                   | 0.052 (2)                   | 0.057 (2)                   | 0.061 (2)                 |
| OUTDOOR COIL<br>Rows... Fins/in.<br>Face Area (sq. ft.)                | 1...17<br>12.0              | 2...17<br>10.3              | 2...17<br>10.3              | 2...17<br>11.6              | 2...17<br>11.6            |
| OUTDOOR FAN<br>Nominal Airflow (CFM)<br>Diameter<br>Motor HP (RPM)     | 2400<br>22<br>1/8 (825)     | 2800<br>22<br>1/4 (1100)    | 2400<br>22<br>1/8 (825)     | 3300<br>22<br>1/4 (1100)    | 3300<br>22<br>1/4 (1100)  |
| INDOOR COIL<br>Rows... Fins/in.<br>Face Area (sq. ft.)                 | 3...15<br>3.7               | 3...15<br>3.7               | 4...15<br>3.7               | 3...15<br>4.7               | 4...15<br>4.7             |
| INDOOR BLOWER<br>Nominal Airflow (CFM)<br>Size (in.)<br>Motor HP (RPM) | 1000<br>10X10<br>1/4 (1075) | 1200<br>11X10<br>1/2 (1075) | 1250<br>11X10<br>3/4 (1075) | 1600<br>11X10<br>3/4 (1075) | 2000<br>11X10<br>1 (1100) |
| RETURN-AIR FILTERS (in.)<br>throwaway                                  | 20X20X1                     | 20X24X1                     | 24X30X1                     | 24X30X1                     | 24X30X1                   |

**Table 2—Physical Data**

| UNIT SIZE  | 50JX030                     | 50JX036                     | 50JX042                     | 50JX048                     | 50JX060                   |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|
| NOMINAL CAPACITY (ton)   | 2-1/2                       | 3                           | 3-1/2                       | 4                           | 5                         |
| OPERATING WEIGHT (lb.)   | 320                         | 328                         | 350                         | 375                         | 428                       |
| COMPRESSOR QUANTITY  | 1                           |                             |                             |                             |                           |
| TYPE   | SCROLL COMPRESSOR           |                             |                             |                             |                           |
| REFRIGERANT  | R-22                        |                             |                             |                             |                           |
| REFRIGERANT METERING DEVICE  | AccuRater®                  |                             |                             |                             |                           |
| Refrigerant (R-22) Quantity (lb.)                                      | 6.4                         | 7.0                         | 10.8                        | 10.1                        | 12.3                      |
| ORIFICE ID (in.)   | 0.073                       | 0.076                       | 0.080                       | 0.088                       | 0.093                     |
| ORIFICE OD (in.)   | 0.043 (2)                   | 0.040 (2)                   | 0.052 (2)                   | 0.057 (2)                   | 0.063 (2)                 |
| OUTDOOR COIL<br>Rows... Fins/in.<br>Face Area (sq. ft.)                | 2...17<br>10.3              | 2...17<br>10.3              | 2...17<br>13.7              | 2...17<br>13.7              | 2...17<br>15.7            |
| OUTDOOR FAN<br>Nominal Airflow (CFM)<br>Diameter<br>Motor HP (RPM)     | 2350<br>22<br>1/8 (825)     | 2800<br>22<br>1/4 (1100)    | 2800<br>22<br>1/8 (825)     | 3300<br>22<br>1/4 (1100)    | 3300<br>22<br>1/4 (1100)  |
| INDOOR COIL<br>Rows... Fins/in.<br>Face Area (sq. ft.)                 | 3...15<br>3.7               | 4...15<br>3.7               | 4...15<br>4.7               | 4...15<br>4.7               | 4...15<br>5.7             |
| INDOOR BLOWER<br>Nominal Airflow (CFM)<br>Size (in.)<br>Motor HP (RPM) | 1000<br>10X10<br>1/4 (1075) | 1200<br>10X10<br>1/2 (1075) | 1400<br>11X10<br>1/2 (1075) | 1450<br>11X10<br>1/2 (1075) | 1750<br>11X10<br>1 (1040) |
| RETURN-AIR FILTERS (in.)<br>throwaway                                  | 20X20X1                     | 20X24X1                     | 24X30X1                     | 24X30X1                     | 24X30X1                   |

NOTE: Air filter pressure drop for non-standard filters must not exceed 0.08 in. wg.

**Table 3—Minimum Airflow for Reliable Electric Heater Operation (Cfm)**

| SIZE          | 50JS030 | 50JS036 | 50JS042 | 50JS048 | 50JS060 |
|---------------|---------|---------|---------|---------|---------|
| AIRFLOW (CFM) | 1000*   | 1200    | 1400    | 1600    | 2000    |

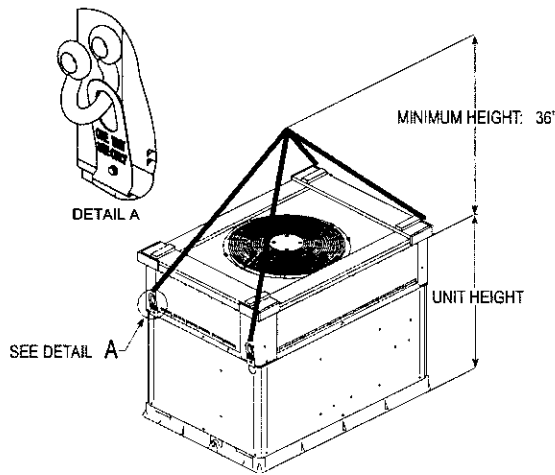
\* The 030 size models must be run on medium or high speed when used in conjunction with 15 kw electric heat accessory



**Table 4—Minimum Airflow for Reliable Electric Heater Operation (Cfm)**

| SIZE          | 50JX030 | 50JX036 | 50JX042 | 50JX048 | 50JX060 |
|---------------|---------|---------|---------|---------|---------|
| AIRFLOW (CFM) | 1000*   | 1200    | 1400    | 1600    | 2000    |

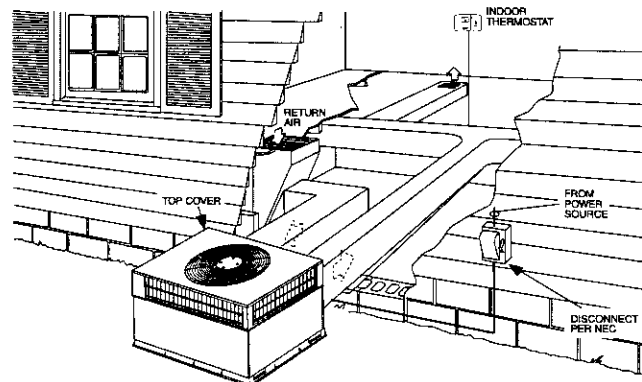
\* The 030 size models must be run on medium or high speed when used in conjunction with 15 kw electric heat accessory



A05179

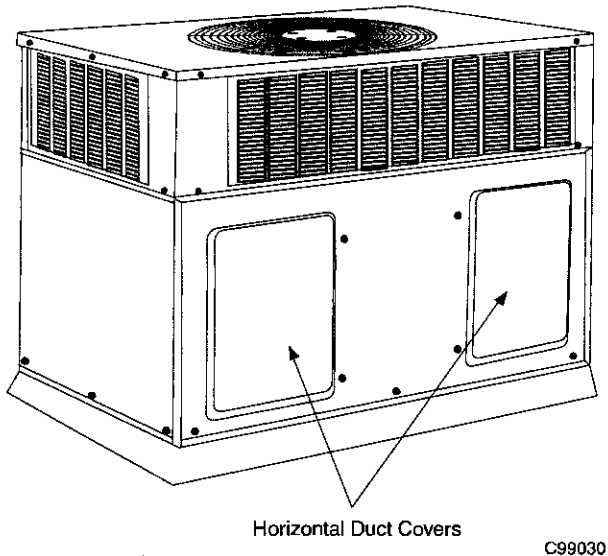
| UNIT<br>Size | MAXIMUM WEIGHT<br>(INCLUDES SHIPPING SKID) |       | A    |       | B     |       |
|--------------|--|-------|------|-------|-------|-------|
|              | Lb   | Kg    | In.  | Mm.   | In.   | Mm.   |
| 50JS030      | 309  | 140.2 | 19.5 | 495.3 | 17.50 | 444.5 |
| 50JS036      | 313  | 142.0 | 19.5 | 495.3 | 17.75 | 450.9 |
| 50JS042      | 345  | 156.4 | 19.5 | 495.3 | 17.75 | 450.9 |
| 50JS048      | 375  | 170.1 | 20.5 | 520.7 | 20.62 | 523.8 |
| 50JS060      | 440  | 199.6 | 19.5 | 495.3 | 19.75 | 501.7 |
| 50JX030      | 342  | 155.2 | 20.0 | 508   | 19.25 | 489   |
| 50JX036      | 350  | 158.8 | 20.0 | 508   | 19.0  | 482.6 |
| 50JX042      | 372  | 168.8 | 21.0 | 533.4 | 20.5  | 520.7 |
| 50JX048      | 377  | 171.0 | 20.0 | 508   | 21.25 | 539.8 |
| 50JX060      | 450  | 204.2 | 21.0 | 533.4 | 20.0  | 508.0 |

**Fig. 8—Suggested Rigging**

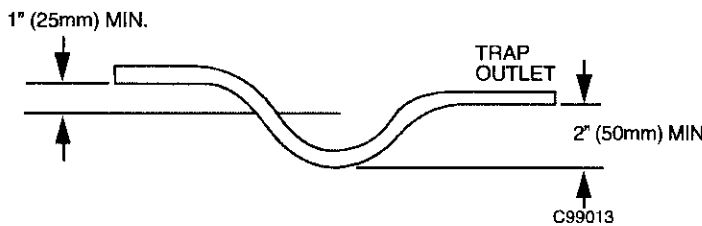


**Fig. 9—Typical Installation**

C00139



**Fig. 10—50JX with Duct Covers On  
(Unit Shown with Optional Louvered Grille)**



**Fig. 11—Condensate Trap**

### Step 7—Install Electrical Connections

#### **⚠ WARNING**

The unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of an electrical wire connected to the unit ground lug in the control compartment, or conduit approved for electrical ground when installed in accordance with NEC, ANSI/NFPA—American National Standards Institute/National Fire Protection Association (latest edition) (in Canada, Canadian Electrical Code CSA C22.1) and local electrical codes. Failure to adhere to this warning could result in serious injury or death.

#### **⚠ CAUTION**

Failure to follow these precautions could result in damage to the unit being installed:

1. Make all electrical connections in accordance with NEC ANSI/NFPA (latest edition) and local electrical codes governing such wiring. In Canada, all electrical connections must be in accordance with CSA standard C22.1 Canadian Electrical Code Part 1 and applicable local codes. Refer to unit wiring diagram.
2. Use only *copper* conductor for connections between field-supplied electrical disconnect switch and unit. **DO NOT USE ALUMINUM WIRE.**
3. Be sure that high-voltage power to unit is within operating voltage range indicated on unit rating plate. On all 3-phase units, ensure phases are balanced within 2 percent. Consult local power company for correction of improper voltage and/or phase imbalance.
4. Insulate low-voltage wires for highest voltage contained within conduit when low-voltage control wires are in same conduit as high-voltage wires.
5. Do not damage internal components when drilling through any panel to mount electrical hardware, conduit, etc.

#### HIGH-VOLTAGE CONNECTIONS

The unit must have a separate electrical service with a field-supplied, waterproof disconnect switch mounted at, or within sight from the unit. Refer to the unit rating plate, NEC and local codes for maximum fuse/circuit breaker size and minimum circuit amps (ampacity) for wire sizing (See Tables 5 and 6 for electrical data).

The field-supplied disconnect may be mounted on the unit over the high-voltage inlet hole (See Fig. 2 and 3).

If the unit has an electric heater, a second disconnect may be required. Consult the Installation, Start-Up, and Service Instructions provided with the accessory for electrical service connections.

Operation of unit on improper line voltage constitutes abuse and may cause unit damage that could affect warranty.

#### ROUTING POWER LEADS INTO UNIT

Use only copper wire between disconnect and unit. The high-voltage leads should be in a conduit until they enter the duct panel; conduit termination at the duct panel must be watertight. Run the high-voltage leads through the power entry knockout on the power entry side panel. See Fig. 2 and 3 for location and size. When the leads are inside the unit, run leads up the high-voltage raceway to the line wiring splice box (See Fig. 12–17). On all 3-phase units, connect the leads to the black, yellow, and blue wires (See Fig. 16).

#### CONNECTING GROUND LEAD TO GROUND LUG

Connect the ground lead to the chassis using the ground lug in the wiring splice box (See Fig. 16).

#### ROUTING CONTROL POWER WIRES (24-V)

Form a drip-loop with the thermostat leads before routing them into the unit. Route the thermostat leads through grommeted, low-voltage hole provided in unit into unit control power splice box (See Fig. 2 and 3). Connect thermostat leads to unit control power leads as shown in Fig. 15.

The unit transformer supplies 24-v power for complete system including accessory electrical heater. An automatic-reset circuit breaker (See Fig. 17) is provided in the 24-v circuit; see the caution label on the transformer or Fig. 18. Transformer is factory wired for 230-v operation. If supply voltage is 208-v, rewire transformer primary as described in Special Procedures for 208-v Operation section.

Table 5—Electrical Data—50JS

| UNIT 50JS SIZE | V-PH-HZ      | VOLTAGE RANGE |     | COMPRESSOR |     | OFM FLA | IFM FLA | ELECTRIC HEAT |           | SINGLE POINT POWER SUPPLY |                 |      |
|----------------|--------------|---------------|-----|------------|-----|---------|---------|---------------|-----------|---------------------------|-----------------|------|
|                |              | MIN           | MAX | RLA        | LRA |         |         | Nominal kW*   | FLA       | MCA                       | FUSE OR CKT BKR | MOCP |
| 030            | 208/230-3-60 | 187           | 253 | 9.9        | 78  | 0.9     | 2.0     | -/-           | -/-       | 15.3/15.3                 | 20/20           | -    |
|                |              |               |     |            |     |         |         | 3.8/5.0       | 10.4/12.0 | 28.3/30.3                 | 30/35           | -    |
| 036            | 208/230-3-60 | 187           | 253 | 9.9        | 78  | 1.5     | 4.1     | -/-           | -/-       | 18.0/18.0                 | 25/25           | -    |
|                |              |               |     |            |     |         |         | 3.8/5.0       | 10.4/12.0 | 31.0/33.0                 | 35/35           | -    |
| 036            | 460-3-60     | 414           | 506 | 5.5        | 40  | 0.8     | 1.9     | -/-           | -/-       | 9.6                       | 15              | -    |
|                |              |               |     |            |     |         |         | 5             | 6.0       | 17.1                      | 20              | -    |
| 042            | 208/230-3-60 | 187           | 253 | 12.4       | 90  | 0.9     | 3.8     | -/-           | -/-       | 20.2/20.2                 | 25/25           | -    |
|                |              |               |     |            |     |         |         | 3.8/5.0       | 10.4/12.0 | 33.2/35.2                 | 40/40           | -    |
| 042            | 460-3-60     | 414           | 506 | 6.7        | 45  | 0.8     | 1.8     | -/-           | -/-       | 11.0                      | 15              | -    |
|                |              |               |     |            |     |         |         | 5             | 6.0       | 18.5                      | 20              | -    |
| 048            | 208/230-3-60 | 187           | 253 | 14.1       | 105 | 1.5     | 3.5     | -/-           | -/-       | 22.6/22.6                 | 30/30           | -    |
|                |              |               |     |            |     |         |         | 3.8/5.0       | 10.4/12.0 | 35.7/37.7                 | 40/40           | -    |
| 048            | 460-3-60     | 414           | 506 | 7.1        | 53  | 0.8     | 1.8     | -/-           | -         | 11.5                      | 15              | -    |
|                |              |               |     |            |     |         |         | 5             | 6.0       | 19.0                      | 20              | -    |
| 060            | 208/230-3-60 | 187           | 253 | 19.4       | 125 | 1.5     | 6.2     | -/-           | -/-       | 32.0/32.0                 | 40/40           | -    |
|                |              |               |     |            |     |         |         | 3.8/5.0       | 10.4/12.0 | 45.0/47.0                 | 50/50           | -    |
| 060            | 460-3-60     | 414           | 506 | 8.0        | 63  | 0.8     | 3.2     | -/-           | -         | 14.0                      | 20              | -    |
|                |              |               |     |            |     |         |         | 5             | 6.0       | 21.5                      | 25              | -    |

Table 6—Electrical Data—50JX

| UNIT 50JX<br>SIZE | V-PH-HZ      | VOLTAGE<br>RANGE |     | COMPRESSOR |      | OFM<br>FLA | IFM<br>FLA | ELECTRIC HEAT |           | SINGLE POINT POWER SUPPLY |                    |       |       |
|-------------------|--------------|------------------|-----|------------|------|------------|------------|---------------|-----------|---------------------------|--------------------|-------|-------|
|                   |              | MIN              | MAX | RLA        | LRA  |            |            | Nominal kW*   | FLA       | MCA                       | FUSE OR<br>CKT BKR | MOCP  |       |
| 030               | 208/230-3-60 | 187              | 253 | 10.4       | 63   | 0.9        | 2.1        | -/-           | -/-       | 16.0/16.0                 | 20/20              | -     |       |
|                   |              |                  |     |            |      |            |            | 3.8/5.0       | 10.4/12.0 | 29.0/31.0                 | 35/35              | -     |       |
|                   |              |                  |     |            |      |            |            | 7.5/10.0      | 20.8/24.1 | 42.1/46.1                 | 45/50              | -     |       |
|                   |              |                  |     |            |      |            |            | 11.3/15.0     | 31.3/36.1 | 55.1/61.1                 | -                  | 60/70 |       |
| 036               | 208/230-3-60 | 187              | 253 | 11.2       | 75   | 1.6        | 3.6        | -/-           | -/-       | 19.2/19.2                 | 25/25              | -     |       |
|                   |              |                  |     |            |      |            |            | 3.8/5.0       | 10.4/12.0 | 32.2/34.2                 | 35/35              | -     |       |
|                   |              |                  |     |            |      |            |            |               | 7.5/10.0  | 36.1/41.7                 | 45.2/49.3          | 50/50 | -     |
|                   |              |                  |     |            |      |            |            |               | 11.3/15.0 | 31.3/36.1                 | 58.3/64.3          | -     | 60/70 |
|                   | 460-3-60     | 414              | 506 | 5.4        | 37.5 | 0.9        | 1.9        | -/-           | -/-       | 9.6                       | 15                 | -     |       |
|                   |              |                  |     |            |      |            |            | 5             | 6         | 17.1                      | 20                 | -     |       |
|                   |              |                  |     |            |      |            |            | 10            | 12        | 24.6                      | 25                 | -     |       |
|                   |              |                  |     |            |      |            |            | 15            | 18        | 32.1                      | 35                 | -     |       |
| 042               | 208/230-3-60 | 187              | 253 | 12.4       | 88   | 0.9        | 4.1        | -/-           | -/-       | 20.5/20.5                 | 25/25              | -     |       |
|                   |              |                  |     |            |      |            |            | 3.8/5.0       | 10.4/12.0 | 33.5/35.5                 | 40/40              | -     |       |
|                   |              |                  |     |            |      |            |            |               | 7.5/10.0  | 20.8/24.1                 | 46.6/50.6          | 50/60 | -     |
|                   |              |                  |     |            |      |            |            |               | 11.3/15.0 | 31.3/36.1                 | 59.6/65.6          | -     | 60/70 |
|                   |              |                  |     |            |      |            |            | 15.0/20.0     | 41.6/48.0 | 72.5/80.5                 | -                  | 80/90 |       |
|                   | 460-3-60     | 414              | 506 | 5.8        | 44   | 0.9        | 2.0        | -/-           | -/-       | 10.2                      | 15                 | -     |       |
|                   |              |                  |     |            |      |            |            | 5             | 6         | 17.7                      | 20                 | -     |       |
|                   |              |                  |     |            |      |            |            | 10            | 12        | 25.2                      | 30                 | -     |       |
|                   |              |                  |     |            |      |            |            | 15            | 18        | 32.7                      | 35                 | -     |       |
|                   |              |                  |     |            |      |            |            | 20            | 24.1      | 40.2                      | 45                 | -     |       |
| 048               | 208/230-3-60 | 187              | 253 | 13.0       | 93   | 1.6        | 4.1        | -/-           | -/-       | 21.9/21.9                 | 30/30              | -     |       |
|                   |              |                  |     |            |      |            |            | 3.8/5.0       | 10.4/12.0 | 34.9/36.9                 | 40/40              | -     |       |
|                   |              |                  |     |            |      |            |            |               | 7.5/10.0  | 20.8/24.1                 | 47.9/51.9          | 50/60 | -     |
|                   |              |                  |     |            |      |            |            |               | 11.3/15.0 | 31.3/36.1                 | 60.9/67.0          | -     | 70/70 |
|                   |              |                  |     |            |      |            |            | 15.0/20.0     | 41.6/48.0 | 73.8/81.8                 | -                  | 80/90 |       |
|                   | 460-3-60     | 414              | 506 | 6.4        | 46.5 | 0.9        | 2.0        | -/-           | -/-       | 10.8                      | 15                 | -     |       |
|                   |              |                  |     |            |      |            |            | 5             | 6         | 18.3                      | 20                 | -     |       |
|                   |              |                  |     |            |      |            |            | 10            | 12        | 25.8                      | 30                 | -     |       |
|                   |              |                  |     |            |      |            |            | 15            | 18        | 33.3                      | 35                 | -     |       |
|                   |              |                  |     |            |      |            |            | 20            | 24.1      | 40.8                      | 45                 | -     |       |
| 060               | 208/230-3-60 | 187              | 253 | 17.3       | 123  | 1.4        | 6.2        | -/-           | -/-       | 29.2/29.2                 | 35/35              | -     |       |
|                   |              |                  |     |            |      |            |            | 3.8/5.0       | 10.4/12.0 | 42.3/44.3                 | 50/50              | -     |       |
|                   |              |                  |     |            |      |            |            |               | 7.5/10.0  | 20.8/24.1                 | 55.2/59.4          | 60/60 | -     |
|                   |              |                  |     |            |      |            |            |               | 11.3/15.0 | 31.3/36.1                 | 68.3/74.3          | -     | 70/80 |
|                   |              |                  |     |            |      |            |            | 15.0/19.9     | 41.6/48.0 | 81.2/89.2                 | -                  | 90/90 |       |
|                   | 460-3-60     | 414              | 506 | 9.0        | 62   | 0.9        | 3.2        | -/-           | -/-       | 15.4                      | 20                 | -     |       |
|                   |              |                  |     |            |      |            |            | 5             | 6         | 22.9                      | 25                 | -     |       |
|                   |              |                  |     |            |      |            |            | 10            | 12        | 30.4                      | 35                 | -     |       |
|                   |              |                  |     |            |      |            |            | 15            | 18        | 37.9                      | 40                 | -     |       |
|                   |              |                  |     |            |      |            |            | 20            | 24.1      | 45.4                      | 50                 | -     |       |

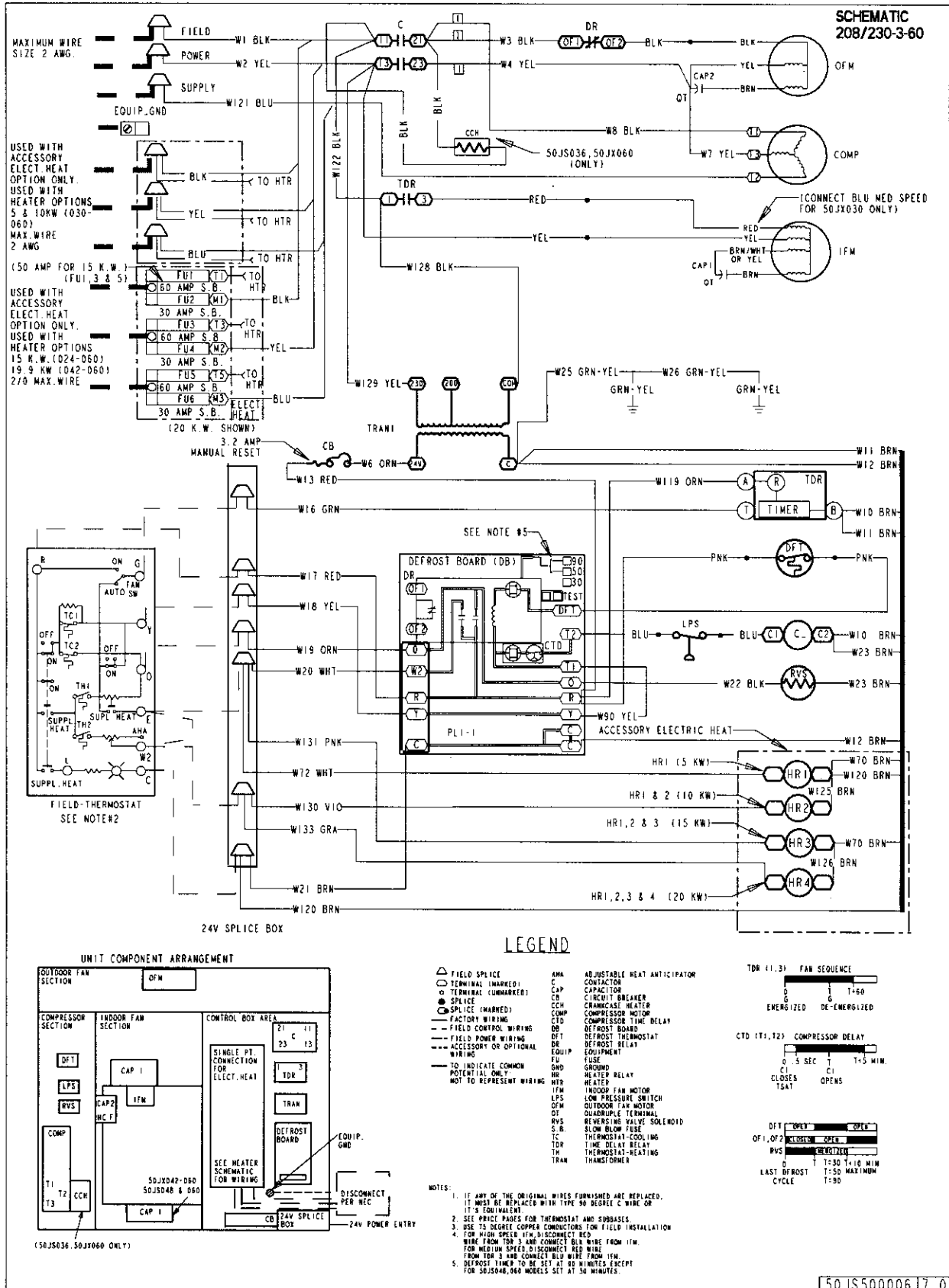


Fig. 12—Wiring Schematics (208/230-3-60)

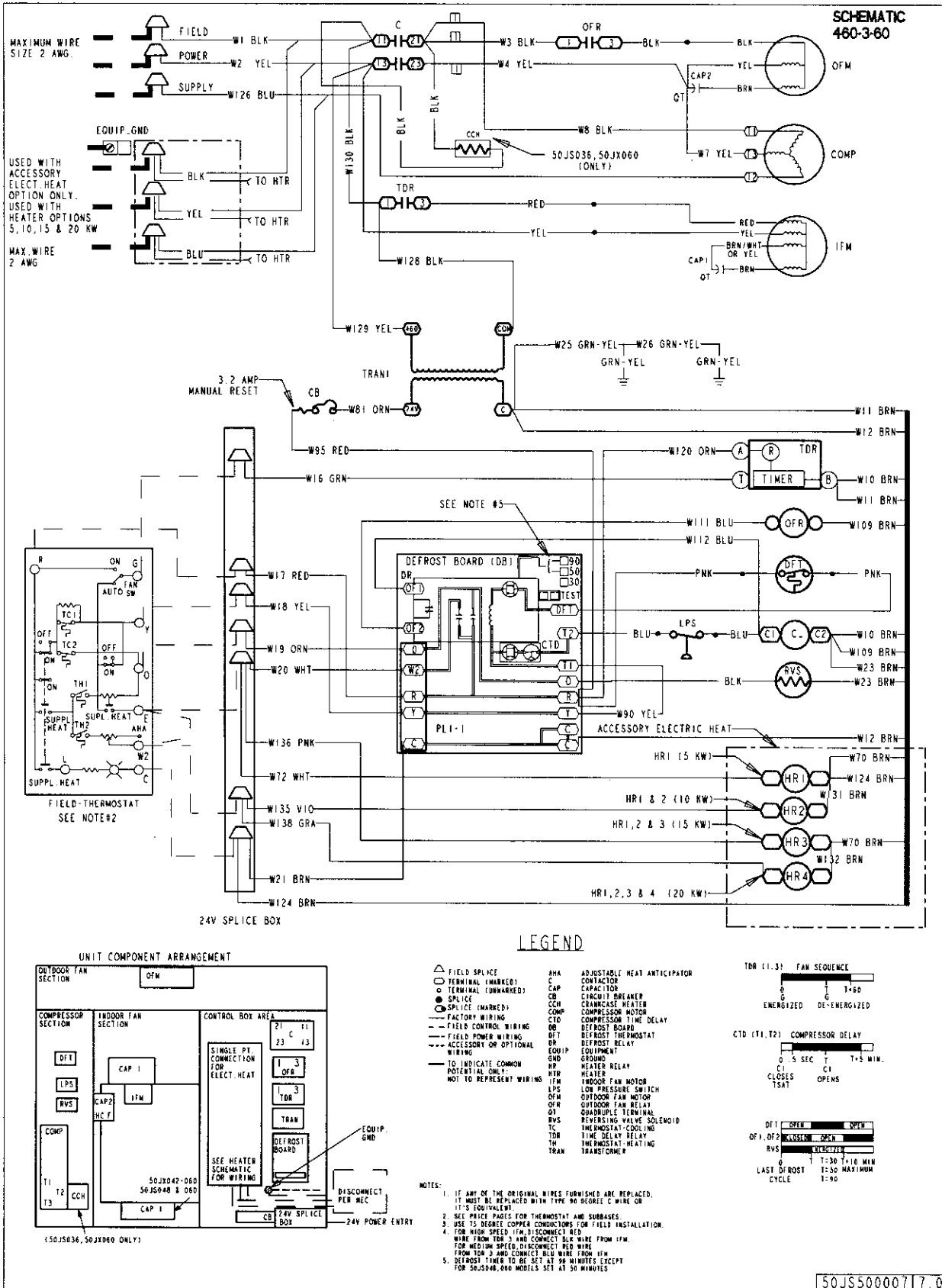


Fig. 13—Wiring Schematics (460-3-60)

- LEGEND**
- FLA — Full Load Amps
  - LRA — Locked Rotor Amps
  - MCA — Minimum Circuit Amps
  - MOCP — Maximum Overcurrent Protection
  - RLA — Rated Load Amps
  - CKT BKR — Circuit Breaker



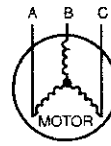
**NOTES:**

1. In compliance with NEC (National Electrical Code) requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be Power Supply fuse. Canadian units may be fuse or circuit breaker.
2. Minimum wire size is based on 60 C copper wire. If other than 60 C wire is used, or if length exceeds wire length in table, determine size from NEC.
3. Unbalanced 3-Phase Supply Voltage  
*Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.*

% Voltage imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v  
BC = 464 v  
AC = 455 v

$$\begin{aligned} \text{Average Voltage} &= \frac{452 + 464 + 455}{3} \\ &= \frac{1371}{3} \\ &= 457 \end{aligned}$$

Determine maximum deviation from average voltage.

(AB) 457 - 452 = 5 v  
(BC) 464 - 457 = 7 v  
(AC) 457 - 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

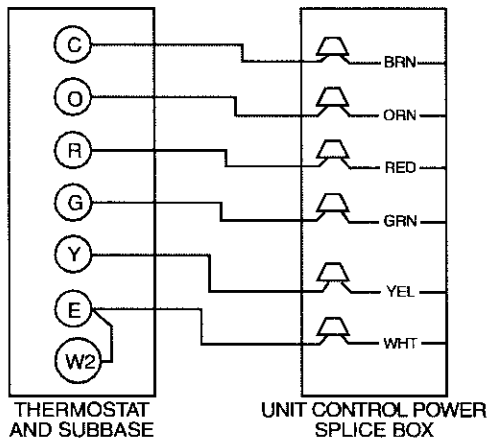
$$\begin{aligned} \% \text{ Voltage Imbalance} &= 100 \times \frac{7}{457} \\ &= 1.53\% \end{aligned}$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

**IMPORTANT:** If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

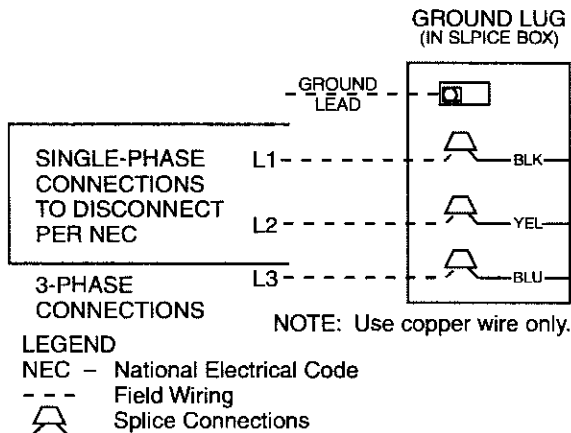
C99024

**Fig. 14—Electrical Data Legend**



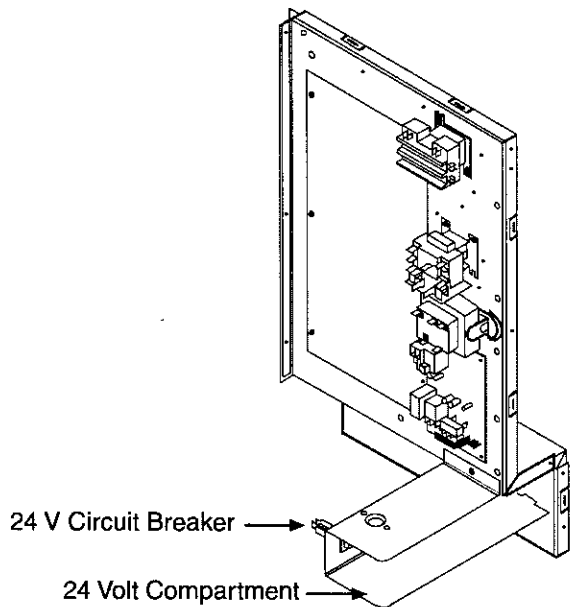
C99056

**Fig. 15—Control Connections**



C99057

**Fig. 16—Line Power Connections**



C99070

**Fig. 17—Control Wiring Plate**

TRANSFORMER CONTAINS A MANUAL RESET OVERCURRENT PROTECTOR  
IT WILL NOT AUTOMATICALLY RESET  
DISCONNECT POWER AND INSTALL LOCKOUT TAG PRIOR TO SERVICING  
THIS COMPARTMENT MUST BE CLOSED EXCEPT WHEN SERVICING

C99058

**Fig. 18—Transformer Label**

## SPECIAL PROCEDURES FOR 208-V OPERATION

1. Disconnect the yellow primary lead from the transformer. See unit wiring label (See Fig. 12).
2. Connect the yellow primary lead to the transformer terminal labeled 200-v.

Indoor blower-motor speeds may need to be changed for 208-v operation. Refer to indoor airflow and airflow adjustments section.

## PRE-START-UP

### ⚠ WARNING

Failure to observe the following warnings could result in serious personal injury or death:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected and tagged.
4. Relieve and recover all refrigerant from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure.  
To remove a component, wear protective goggles and proceed as follows:
  - a. Shut off electrical power to unit and install lockout tag.
  - b. Relieve and reclaim all refrigerant from system using both high- and low-pressure ports.
  - c. Cut component connecting tubing with tubing cutter and remove component from unit.
  - d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Use the Start-Up Checklist supplied at the end of this book and proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove access panel.
2. Read and follow instructions on all DANGER, WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
  - a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
  - b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, see following Check for Refrigerant Leaks section.
  - c. Inspect all field and factory-wiring connections. Be sure that connections are completed and tight.
  - d. Ensure wires do not touch refrigerant tubing or sharp sheetmetal edges.
  - e. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
  - a. Make sure that outdoor-fan blade is correctly positioned in fan orifice (See Fig. 19).

- b. Make sure that condensate drain pan and trap are filled with water to ensure proper drainage.
  - c. Make sure that all tools and miscellaneous loose parts have been removed.
5. Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.
  6. Each unit system has 2 Schrader-type ports, one low-side Schrader fitting located on the suction line, and one high-side Schrader fitting located on the compressor discharge line. Be sure that caps on the ports are tight.
  7. High flow valves are located on the compressor hot gas and suction tubes. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

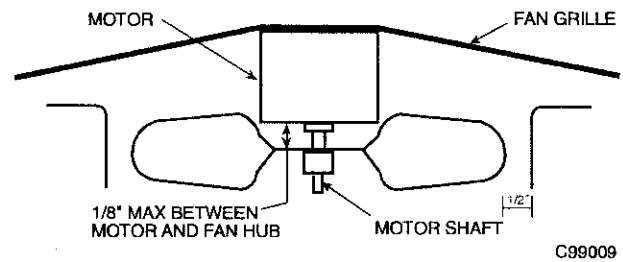


Fig. 19—Fan Blade Clearance

## START-UP

Using the Start-Up Checklist supplied at the end of this book, proceed as follows:

### Step 1—Check for Refrigerant Leaks

Locate and repair refrigerant leaks and charge the unit as follows:

1. Use both high- and low-pressure ports to relieve system pressure and reclaim remaining refrigerant.
2. Repair leak following accepted practices.

**NOTE:** Install a bi-flow filter drier whenever the system has been opened for repair.

3. Check system for leaks using an approved method.
4. Reclaim refrigerant and evacuate refrigerant system to 500 microns if no additional leaks are found.
5. Charge unit with R-22 refrigerant, using a volumetric-charging cylinder or accurate scale. Refer to unit rating plate for required charge. Be sure to add extra refrigerant to compensate for internal volume of filter drier.

### Step 2—Start-Up Adjustments

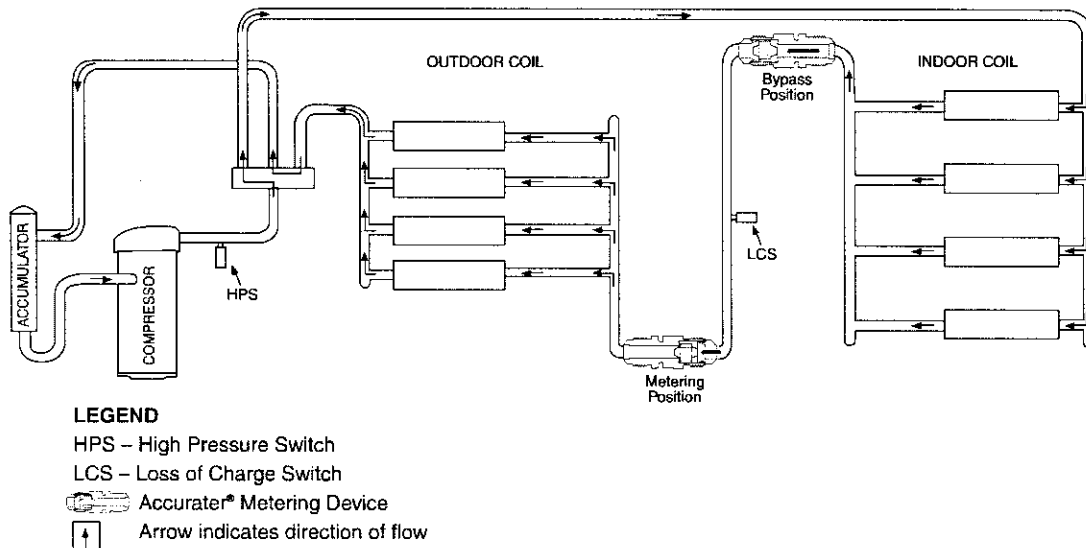
Complete the required procedures given in the Pre-Start-Up section before starting the unit. Do not jumper any safety devices when operating the unit. Do not operate the unit in Cooling mode when the outdoor temperature is below 40° F (unless accessory low-ambient kit is installed). Do not rapid-cycle the compressor. Allow 5 minute between "on" cycles to prevent compressor damage.

## CHECKING COOLING AND HEATING CONTROL OPERATION

Start and check the unit for proper control operation as follows:

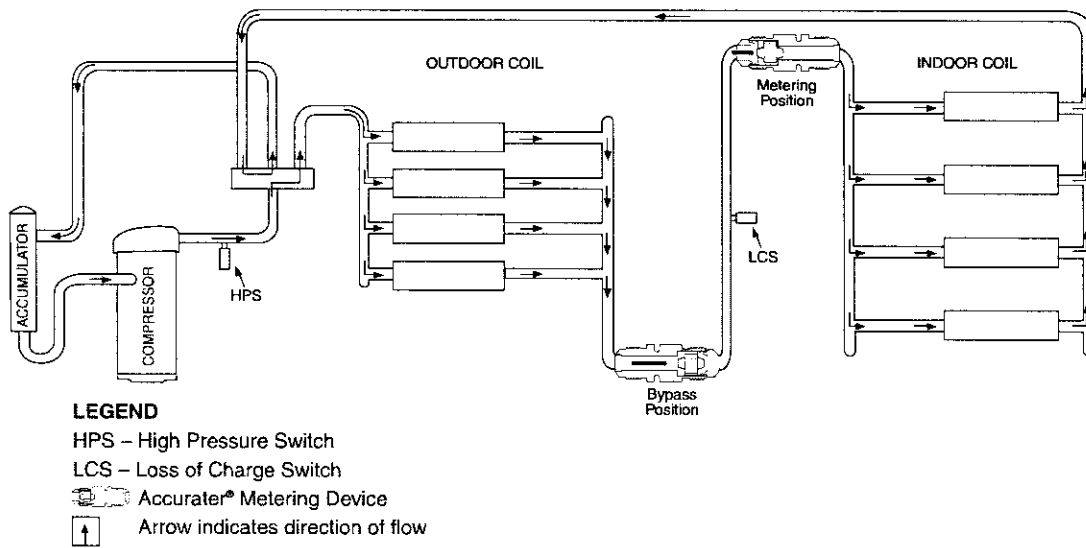
1. Place room thermostat SYSTEM switch in OFF position. Observe that blower motor starts when FAN switch is placed in ON position and shuts down within 60 sec. when FAN switch is placed in AUTO position.
2. Place SYSTEM switch in COOL position and FAN switch in AUTO position. Set control below room temperature. Observe that cooling cycle shuts down when control setting is satisfied.





C00095

**Fig. 20—Typical Heat Pump Operation, Heating Mode**



C00096

**Fig. 21—Typical Heat Pump Operation, Cooling Mode**

- Place system switch in HEAT position. Set control above room temperature. Observe that compressor, outdoor fan, and indoor blower motors start. Observe that heating cycle shuts down when control setting is satisfied.
- When using an automatic changeover room thermostat, place both SYSTEM and FAN switches in AUTO positions. Observe that unit operates in Cooling mode when temperature control is set to “call for Cooling” (below room temperature), and unit operates in Heating mode when temperature control is set to “call for Heating” (above room temperature).

**IMPORTANT:** Three-phase, scroll compressors are direction oriented. Unit must be checked to ensure proper compressor 3-phase power lead orientation. If not corrected within 5 minute, the internal protector will shut off the compressor. The 3-phase power leads to the unit must be reversed to correct rotation. When turning backwards, scroll compressors emit elevated noise levels, and the difference between compressor suction and discharge pressures may be dramatically lower than normal.

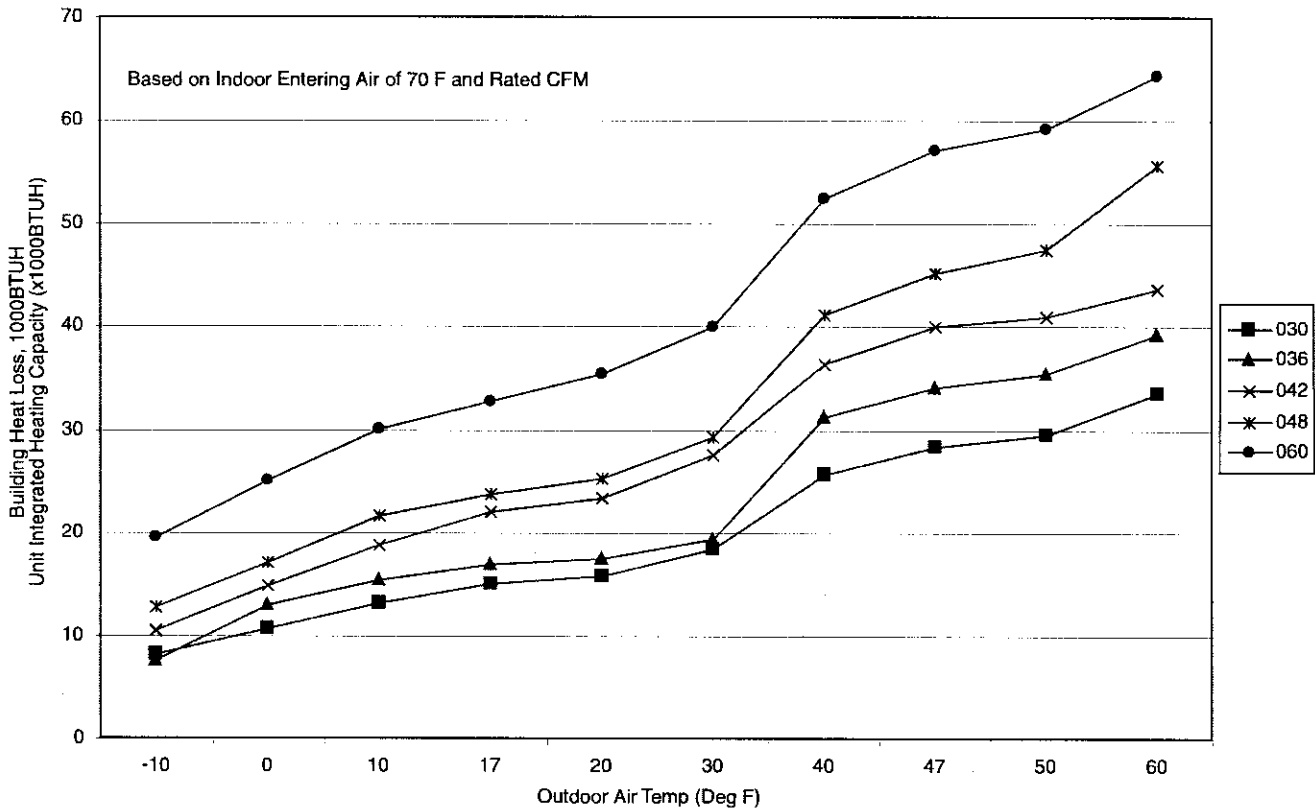
#### CHECKING AND ADJUSTING REFRIGERANT CHARGE

The refrigerant system is fully charged with R-22 refrigerant and is tested and factory sealed. Allow system to operate a minimum of 15 minutes before checking or adjusting charge.

**NOTE:** Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge. The charging label and the tables shown refer to system temperatures and pressures in cooling mode only. A refrigerant charging label is attached to the outside of the service access door. If charge level is suspect in Heating mode, reclaim all refrigerant and charge to nameplate amount. (This information may be obtained from the physical data table also.)

**IMPORTANT:** When evaluating the refrigerant charge, an indicated adjustment to the specified factory charge must always be very minimal. If a substantial adjustment is indicated, an abnormal condition exists somewhere in the cooling system, such as insufficient airflow across either coil or both coils.

## Balance Point Worksheet



**Fig. 22—50JX Balance Point Worksheet**

C00093 Rev 2

### REFRIGERANT CHARGE

The amount of refrigerant charge is listed on the unit nameplate and/or the physical data table. Refer to the Refrigeration Service Techniques Manual, Refrigerants Section.

### NO CHARGE

Check for leak. Use standard evacuating techniques. After evacuating system to 500 microns, weigh in the specified amount of refrigerant (refer to system data plate).

### LOW CHARGE COOLING

Use Cooling Charging Charts (Fig. 24-33). Vary refrigerant until the conditions of the chart are met. Note that charging charts are different from type normally used. Charts are based on charging the units to correct superheat for the various operating conditions. Accurate pressure gauge and temperature sensing devices are required. Connect the pressure gauge to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that the outdoor ambient does not affect the reading. Indoor air CFM must be within the normal operating range of the unit.

### TO USE COOLING CHARGING CHARTS

Take the outdoor ambient temperature and read the suction pressure gauge. Refer to the chart to determine what the suction temperature should be.

**NOTE:** If the problem causing the inaccurate readings is a refrigerant leak, refer to Check for Refrigerant Leaks section.

### INDOOR AIRFLOW AND AIRFLOW ADJUSTMENTS

#### ⚠ CAUTION

For heating and cooling operation, the recommended airflow is 350 to 450 cfm for each 12,000 Btuh of rated cooling capacity. For units with optional electric heat, the airflow must not be reduced below the levels stated in Tables 3 and 4. Failure to maintain these airflows could result in damage to the unit.

Tables 7 and 8 shows both heating and cooling airflows at various external static pressures. Refer to these tables to determine the airflow for the system being installed.

**NOTE:** Be sure that all supply-and return-air grilles are open, free from obstructions, and adjusted properly.

Airflow can be changed by changing the lead connection of the blower motor.

Unit 50JS and 50JX three-speed motors (except 50JX 030) are factory wired for low speed operation. Unit 50JX 030 is factory wired for medium speed.

For 208/230-v Motors:— The motor leads are color-coded as follows:

#### 3-SPEED

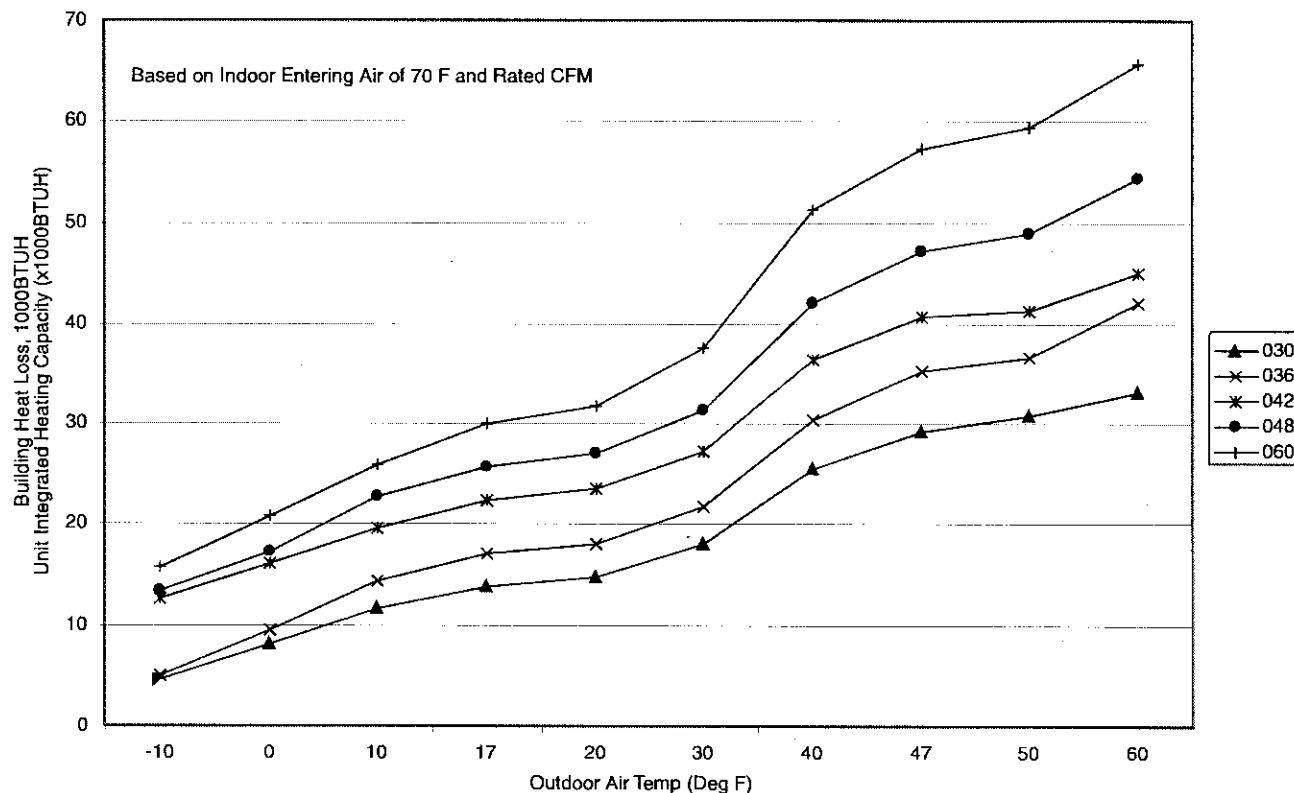
Black = high speed

Blue = medium speed

Red = low speed

To change the speed of the indoor fan motor (IFM), remove the fan motor speed leg lead from the Time Delay Relay (TDR). This wire is attached to TDR-3 for 3-phase units. To change the speed, remove and replace with lead for desired blower motor speed. *Insulate the removed lead* to avoid contact with chassis parts.

## Balance Point Worksheet



C00094rev2

**Fig. 23—50JS Balance Point Worksheet**

For 460-v GE Motors—The motor leads are color coded as follows:

3-SPEED

Black = high

Violet = jumper

Orange = medium

Red = low

To change the speed of the indoor fan motor (IFM), remove fan motor speed lead from the Time Delay Relay (TDR) and replace with the lead for the desired blower motor speed. The motor speed lead is attached to terminal TDR-3. For low and medium speeds, black must be connected to the jumper wire. Insulate removed lead end to avoid contact with chassis parts. To select high speed on 460-v GE motors, separate the black female quick connect (QC) from the jumper lead male quick connect (QC) and connect the black lead to the BR. Insulate the jumper to avoid contact with any chassis parts.

### MAINTENANCE

To ensure continuing high performance, and to minimize the possibility of premature equipment failure, periodic maintenance must be performed on this equipment. This heat pump unit should be inspected at least once each year by a qualified service person. To troubleshoot unit, refer to Table 11.

**NOTE TO EQUIPMENT OWNER:** Consult your local dealer about the availability of a maintenance contract.

### ⚠ WARNING

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment, other than those procedures recommended in the User's Manual. **FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS INJURY OR DEATH AND POSSIBLE DAMAGE TO THIS EQUIPMENT.**

### ⚠ WARNING

Failure to follow these warnings could result in serious injury or death:

1. Turn off electrical power to the unit and install lockout tag before performing any maintenance or service on this unit.
2. Use extreme caution when removing panels and parts. As with any mechanical equipment, personal injury can result from sharp edges.
3. Never place anything combustible either on, or in contact with, the unit.

### ⚠ CAUTION

Errors made when reconnecting wires may cause improper and dangerous operation. Label all wires prior to disconnecting when servicing.

The minimum maintenance requirements for this equipment are as follows:

**Table 7—Wet Coil Air Delivery  
Unit 50JS 030-060 (Deduct 10 percent for 208-V)\***

| UNIT | MOTOR SPEED |       | EXTERNAL STATIC PRESSURE (IN. WG) |      |      |      |      |      |      |      |      |      |     |
|------|-------------|-------|-----------------------------------|------|------|------|------|------|------|------|------|------|-----|
|      |             |       | 0.0                               | 0.1  | 0.2  | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0 |
| 30   | Low         | Watts | 295                               | 292  | 289  | -    | -    | -    | -    | -    | -    | -    | -   |
|      |             | Cfm   | 928                               | 882  | 802  | -    | -    | -    | -    | -    | -    | -    | -   |
|      | Med         | Watts | 388                               | 383  | 377  | 372  | 366  | 361  | -    | -    | -    | -    | -   |
|      |             | Cfm   | 1203                              | 1120 | 1062 | 1004 | 930  | 838  | -    | -    | -    | -    | -   |
|      | High        | Watts | -                                 | -    | -    | -    | 469  | 458  | 449  | 442  | -    | -    | -   |
|      |             | Cfm   | -                                 | -    | -    | -    | 1141 | 1027 | 924  | 828  | -    | -    | -   |
| 36   | Low         | Watts | 592                               | 581  | 567  | 552  | 538  | 525  | 512  | 499  | -    | -    |     |
|      |             | Cfm   | 1499                              | 1421 | 1351 | 1281 | 1207 | 1125 | 1034 | 936  | -    | -    |     |
|      | Med         | Watts | -                                 | -    | -    | 660  | 636  | 617  | 603  | 592  | 581  | 566  |     |
|      |             | Cfm   | -                                 | -    | -    | 1475 | 1371 | 1274 | 1186 | 1105 | 1024 | 928  |     |
|      | High        | Watts | -                                 | -    | -    | -    | -    | 776  | 761  | 744  | 725  | 706  | 689 |
|      |             | Cfm   | -                                 | -    | -    | -    | -    | 1452 | 1356 | 1254 | 1145 | 1030 | 910 |
| 42   | Low         | Watts | 606                               | 596  | 586  | 575  | 563  | 550  | 537  | -    | -    | -    |     |
|      |             | Cfm   | 1464                              | 1399 | 1341 | 1282 | 1218 | 1146 | 1066 | -    | -    | -    |     |
|      | Med         | Watts | 680                               | 665  | 649  | 635  | 622  | 611  | 600  | 590  | -    | -    |     |
|      |             | Cfm   | 1608                              | 1535 | 1461 | 1387 | 1316 | 1247 | 1180 | 1111 | -    | -    |     |
|      | High        | Watts | 768                               | 755  | 742  | 730  | 718  | 707  | 696  | 684  | 671  | -    |     |
|      |             | Cfm   | 1656                              | 1576 | 1508 | 1447 | 1390 | 1331 | 1268 | 1198 | 1119 | -    |     |
| 48   | Low         | Watts | 741                               | 724  | 709  | 690  | 664  | 631  | 594  | 562  | 552  | 543  |     |
|      |             | Cfm   | 1994                              | 1937 | 1869 | 1797 | 1722 | 1645 | 1566 | 1480 | 1384 | 1269 |     |
|      | Med         | Watts | -                                 | -    | -    | 773  | 744  | 715  | 687  | 662  | 640  | 625  |     |
|      |             | Cfm   | -                                 | -    | -    | 1957 | 1867 | 1787 | 1719 | 1653 | 1575 | 1463 |     |
|      | High        | Watts | -                                 | -    | -    | -    | -    | 799  | 782  | 773  | 756  | 704  |     |
|      |             | Cfm   | -                                 | -    | -    | -    | -    | 1914 | 1842 | 1774 | 1686 | 1538 |     |
| 60   | Low         | Watts | 742                               | 723  | 698  | 666  | 629  | 591  | 559  | 540  | -    | -    |     |
|      |             | Cfm   | 2197                              | 2141 | 2103 | 2057 | 1988 | 1894 | 1783 | 1674 | -    | -    |     |
|      | Med         | Watts | 838                               | 822  | 803  | 780  | 752  | 721  | 689  | 661  | 639  | 632  |     |
|      |             | Cfm   | 2485                              | 2406 | 2269 | 2127 | 2012 | 1937 | 1894 | 1855 | 1770 | 1571 |     |
|      | High        | Watts | -                                 | 934  | 913  | 891  | 866  | 837  | 806  | 776  | 750  | 735  |     |
|      |             | Cfm   | -                                 | 2483 | 2391 | 2283 | 2170 | 2061 | 1960 | 1868 | 1780 | 1687 |     |

\* Air delivery values are based on operating voltage of 230-v or 460-v, wet coil, without filter or electric heater. Deduct filter and electric heater pressure drops to obtain static pressure available for ducting.

**NOTES:**

1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator coil frosting may occur at airflows below this point.
2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.
3. Deduct 10 percent for 208-v.

1. Inspect air filter(s) each month. Clean or replace when necessary.
2. Inspect indoor coil, drain pan, and condensate drain each cooling season for cleanliness. Clean when necessary.
3. Inspect blower motor and wheel for cleanliness each cooling season. Clean when necessary.
4. Check electrical connections for tightness and controls for proper operation each cooling season. Service when necessary.
5. Ensure wires are not contacting refrigerant tubing or sharp sheet metal edges.

**Step 1—Air Filter**

**IMPORTANT:** Never operate the unit without a suitable air filter in the return-air duct system. Always replace the filter with the same dimensional size and type as originally installed (See Tables 1 and 2 for recommended filter sizes.)

Inspect air filter(s) at least once each month and replace (throwaway-type) or clean (cleanable-type) at least twice during each cooling season or whenever the filter becomes clogged with dust and lint.

**Step 2—Indoor blower and motor**

**NOTE:** All motors are prelubricated. Do not attempt to lubricate these motors.

For longer life, operating economy, and continuing efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

|   |
|---|
| <p><b>⚠ WARNING</b></p> <p>Disconnect and tag electrical power to the unit before cleaning and lubricating the blower motor and wheel. Failure to adhere to this warning could cause serious injury or death.</p> |
|---|

**Step 3—OUTDOOR COIL, INDOOR COIL, AND CONDENSATE DRAIN PAN**

Inspect the condenser coil, evaporator coil, and condensate drain pan at least once each heating and cooling season or sooner if conditions require.

The coils are easily cleaned when dry; therefore, inspect and clean the coils either before or after each cooling season. Remove all obstructions, including weeds and shrubs, that interfere with the airflow through the condenser coil.

**Table 8—Wet Coil Air Delivery  
Unit 50JX 030-060 (Deduct 10 percent for 208-V)\***

| UNIT | MOTOR SPEED |       | EXTERNAL STATIC PRESSURE (IN. WG) |      |      |      |      |      |      |      |      |      |      |
|------|-------------|-------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|
|      |             |       | 0.0                               | 0.1  | 0.2  | 0.3  | 0.4  | 0.5  | 0.6  | 0.7  | 0.8  | 0.9  | 1.0  |
| 30   | Low         | Watts | 276                               | 276  | 272  | -    | -    | -    | -    | -    | -    | -    | -    |
|      |             | Cfm   | 963                               | 929  | 781  | -    | -    | -    | -    | -    | -    | -    | -    |
|      | Med         | Watts | 375                               | 377  | 371  | 362  | 354  | 350  | -    | -    | -    | -    | -    |
|      |             | Cfm   | 1202                              | 1170 | 1079 | 976  | 884  | 807  | -    | -    | -    | -    | -    |
|      | High        | Watts | -                                 | -    | -    | -    | 469  | 449  | 435  | 428  | -    | -    | -    |
|      |             | Cfm   | -                                 | -    | -    | -    | 1174 | 988  | 828  | 718  | -    | -    | -    |
| 36   | Low         | Watts | 462                               | 451  | 431  | 411  | 394  | 381  | -    | -    | -    | -    |      |
|      |             | Cfm   | 1374                              | 1290 | 1205 | 1116 | 1020 | 916  | -    | -    | -    | -    |      |
|      | Med         | Watts | 523                               | 506  | 490  | 471  | 449  | 426  | -    | -    | -    | -    |      |
|      |             | Cfm   | 1500                              | 1408 | 1301 | 1190 | 1082 | 977  | -    | -    | -    | -    |      |
|      | High        | Watts | -                                 | 645  | 628  | 610  | 595  | 584  | 575  | -    | -    | -    |      |
|      |             | Cfm   | -                                 | 1474 | 1369 | 1267 | 1169 | 1069 | 962  | -    | -    | -    |      |
| 42   | Low         | Watts | 620                               | 600  | 586  | 574  | 562  | 548  | 530  | 510  | 487  | 462  | 439  |
|      |             | Cfm   | 1662                              | 1621 | 1581 | 1540 | 1496 | 1447 | 1392 | 1331 | 1263 | 1186 | 1103 |
|      | Med         | Watts | -                                 | -    | -    | -    | 686  | 661  | 634  | 606  | 577  | 547  | 517  |
|      |             | Cfm   | -                                 | -    | -    | -    | 1722 | 1662 | 1594 | 1515 | 1427 | 1330 | 1227 |
|      | High        | Watts | -                                 | -    | -    | -    | -    | -    | -    | 757  | 730  | 704  | 682  |
|      |             | Cfm   | -                                 | -    | -    | -    | -    | -    | -    | 1669 | 1577 | 1486 | 1402 |
| 48   | Low         | Watts | 620                               | 600  | 586  | 574  | 562  | 548  | 530  | -    | 487  | -    | -    |
|      |             | Cfm   | 1662                              | 1621 | 1581 | 1540 | 1496 | 1447 | 1392 | 1331 | 1263 | -    | -    |
|      | Med         | Watts | 763                               | 747  | 729  | 709  | 686  | 661  | 634  | 606  | 577  | 547  | 517  |
|      |             | Cfm   | 1917                              | 1868 | 1822 | 1774 | 1722 | 1662 | 1594 | 1515 | 1427 | 1330 | 1227 |
|      | High        | Watts | -                                 | -    | -    | 852  | 832  | 809  | 784  | 757  | 730  | 704  | 682  |
|      |             | Cfm   | -                                 | -    | -    | 1982 | 1914 | 1839 | 1757 | 1669 | 1577 | 1486 | 1402 |
| 60   | Low         | Watts | 597                               | 592  | 578  | 526  | 460  | 452  | 445  | -    | -    | -    | -    |
|      |             | Cfm   | 2265                              | 2190 | 2101 | 2033 | 1974 | 1869 | 1614 | -    | -    | -    | -    |
|      | Med         | Watts | 754                               | 730  | 707  | 687  | 671  | 658  | 646  | 630  | 603  | 558  | 486  |
|      |             | Cfm   | 2383                              | 2282 | 2202 | 2134 | 2070 | 2005 | 1935 | 1858 | 1771 | 1667 | 1576 |
|      | High        | Watts | 901                               | 876  | 856  | 836  | 813  | 785  | 755  | 723  | 696  | 681  | 687  |
|      |             | Cfm   | 2480                              | 2383 | 2301 | 2233 | 2175 | 2122 | 2066 | 1998 | 1910 | 1788 | 1619 |

\* Air delivery values are based on operating voltage of 230-v or 460-v, wet coil, without filter or electric heater. Deduct filter and electric heater pressure drops to obtain static pressure available for ducting.

**NOTES:**

1. Do not operate the unit at a cooling airflow that is less than 350 cfm for each 12,000 Btuh of rated cooling capacity. Evaporator coil frosting may occur at airflows below this point.
2. Dashes indicate portions of table that are beyond the blower motor capacity or are not recommended.
3. Deduct 10 percent for 208-v.

Straighten bent fins with a fin comb. If coated with dirt or lint, clean the coils with a vacuum cleaner, using the soft brush attachment. Be careful not to bend the fins. If coated with oil or grease, clean the coils with a mild detergent-and-water solution. Rinse coils with clear water, using a garden hose. Be careful not to splash water on motors, insulation, wiring, or air filter(s). For best results, spray condenser coil fins from inside to outside the unit. On units with an outer and inner condenser coil, be sure to clean between the coils. Be sure to flush all dirt and debris from the unit base.

Inspect the drain pan and condensate drain line when inspecting the coils. Clean the drain pan and condensate drain by removing all foreign matter from the pan. Flush the pan and drain trough with clear water. Do not splash water on the insulation, motor, wiring, or air filter(s). If the drain trough is restricted, clear it with a "plumbers snake" or similar probe device. Ensure that the auxiliary drain port above the drain trough is also clear.

**Step 4—Outdoor fan**

**⚠ CAUTION**

Keep the condenser fan free from all obstructions to ensure proper cooling operation. Never place articles on top of the unit. Damage to unit may result.

1. Inspect the fan blades for cracks or bends.
2. If fan needs to be removed, remove screws holding outdoor air intake grille and remove grille.
3. Loosen the setscrew and slide the fan off the motor shaft.
4. When replacing fan blade, position blade so that the hub is 1/8 in. (See Fig. 19) away from the motor end (1/8 in. of motor shaft will be visible).
5. Ensure that setscrew engages the flat area on the motor shaft when tightening.
6. Replace grille.

**Step 5—Electrical controls and wiring**

Inspect and check the electrical controls and wiring annually. *Be sure to turn off the electrical power to the unit and install lockout tag.*

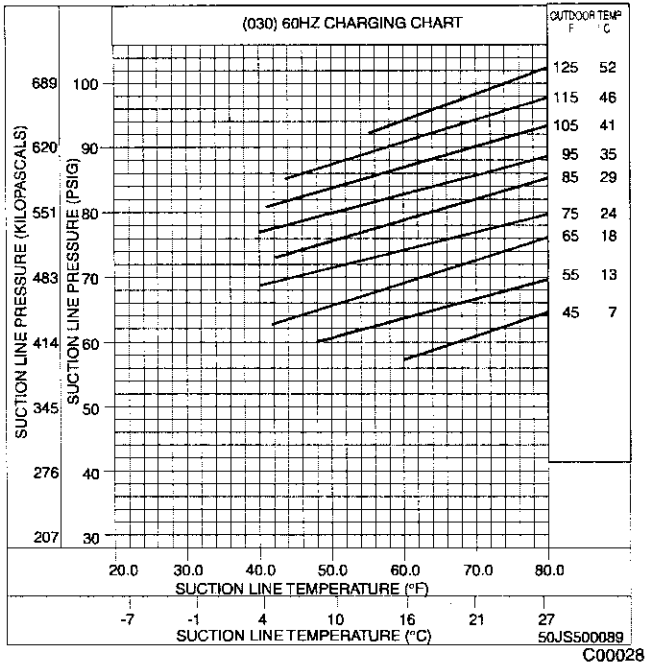


Fig. 24—Cooling Charging Chart, 50JS030

Remove access panel to locate all the electrical controls and wiring. Check all electrical connections for tightness. Tighten all screw connections. If any smoky or burned connections are noticed, disassemble the connection, clean all the parts, restrip the wire end and reassemble the connection properly and securely.

After inspecting the electrical controls and wiring, replace all the panels. Start the unit, and observe at least one complete cooling cycle to ensure proper operation. If discrepancies are observed in operating cycle, or if a suspected malfunction has occurred, check each electrical component with the proper electrical instrumentation. Refer to the unit wiring label when making these checkouts.

**NOTE:** Refer to the Sequence of Operation section as an aid in determining proper control operation.

#### Step 6—Refrigerant circuit

Inspect all refrigerant tubing connections and the unit base for oil accumulation annually. Detecting oil generally indicates a refrigerant leak.

### ⚠ WARNING

System under pressure. Relieve pressure and recover all refrigerant before system repair or final unit disposal to avoid serious injury or death. Use all service ports and open all flow-control devices, including solenoid valves.

If oil is detected or if low performance is suspected, leak-test all refrigerant tubing using an electronic leak detector, or liquid-soap solution. If a refrigerant leak is detected, refer to Check for Refrigerant Leaks section.

If no refrigerant leaks are found and low performance is suspected, refer to Checking and Adjusting Refrigerant Charge section.

#### Step 7—Indoor airflow

The indoor airflow does not require checking unless improper performance is suspected. *If a problem exists, be sure that all supply- and return-air grilles are open and free from obstructions, and that the air filter is clean.* When necessary, refer to Indoor Airflow and Airflow Adjustments section to check the system airflow.

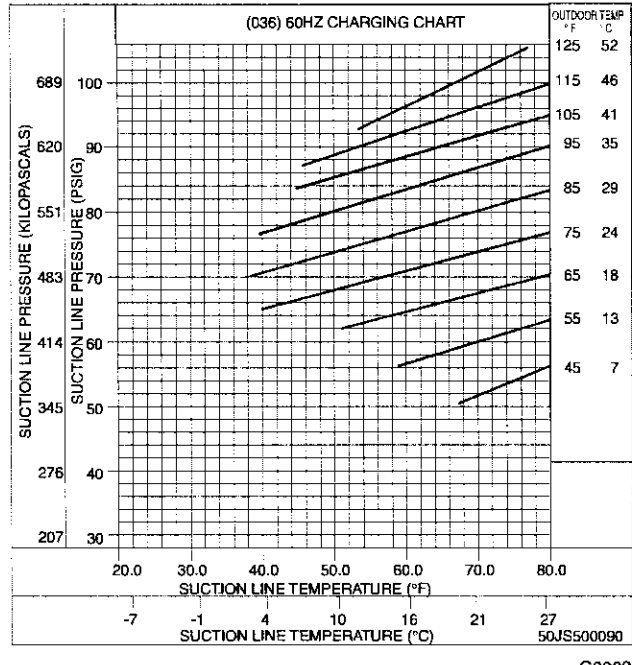


Fig. 25—Cooling Charging Chart, 50JS 036 Units

#### Step 8—Metering device

Refrigerant metering devices are fixed orifices and are located in the inlet header to the indoor and outdoor coils.

#### Step 9—Liquid line strainers

The liquid line strainers (to protect metering devices) are made of wire mesh and are located in the liquid lines on the inlet side of the metering devices.

#### Step 10—High Flow Valves

High flow valves are located on the compressor hot gas and suction tubes. Large black plastic caps distinguish these valves with O-rings located inside the caps. These valves can not be accessed for service in the field. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

#### Step 11—Time-delay relay

The Time-Delay Relay (TDR) is a solid-state control, recycle delay timer which keeps indoor blower operating for 60 sec. after thermostat is satisfied. This delay enables blower to remove residual cooling in coil after compression shutdown, thereby improving efficiency of system. The sequence of operation is that on closure of wall thermostat and at end of a fixed on delay of 1 sec., fan relay is energized. When thermostat is satisfied, an off delay is initiated. When fixed delay of  $60 \pm 5$  sec. is completed, fan relay is de-energized and fan motor stops. If wall thermostat closes during this delay, TDR is reset and fan relay remains energized. TDR is a 24-v device that operates within a range of 15-v to 30-v and draws about 0.5 amps. If the blower runs continuously instead of cycling off when the fan switch is set on AUTO, the TDR is probably defective and must be replaced.

#### Step 12—Loss of charge switch

The loss of charge switch is located on the outdoor liquid line. This switch contains a Schrader core depressor. This switch opens at 7 psig and closes at 22 psig. No adjustment is necessary.

**NOTE:** Because these switches are attached to refrigeration system under pressure, it is not advisable to remove this device for troubleshooting unless you are reasonably certain that a problem exists. If switch must be removed, remove and recover all system

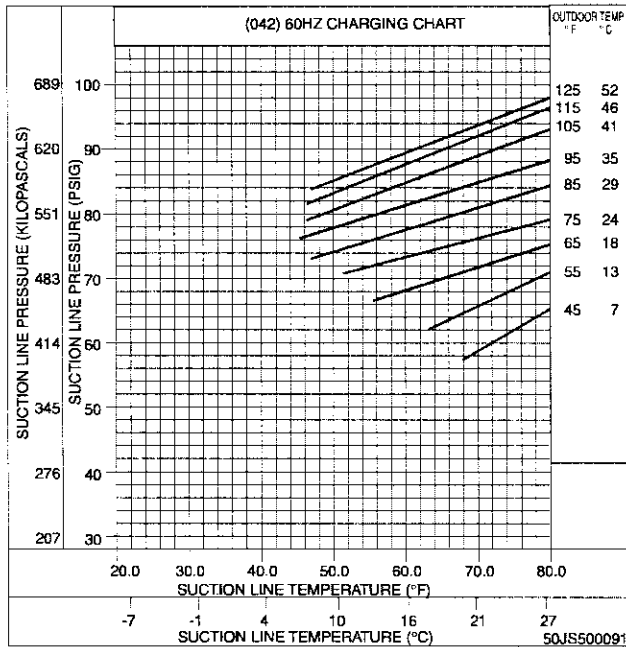


Fig. 26—Cooling Charging Chart, 50JS 042 Units C00030

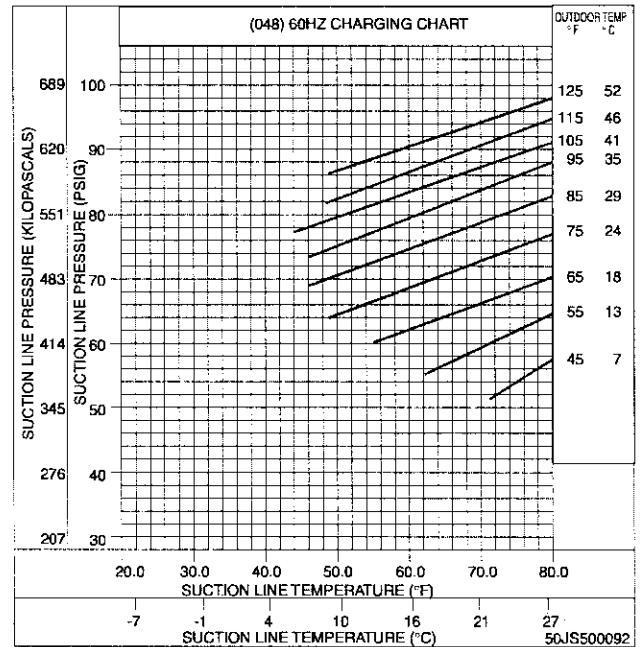


Fig. 27—Cooling Charging Chart, 50JS 048 Units C00031

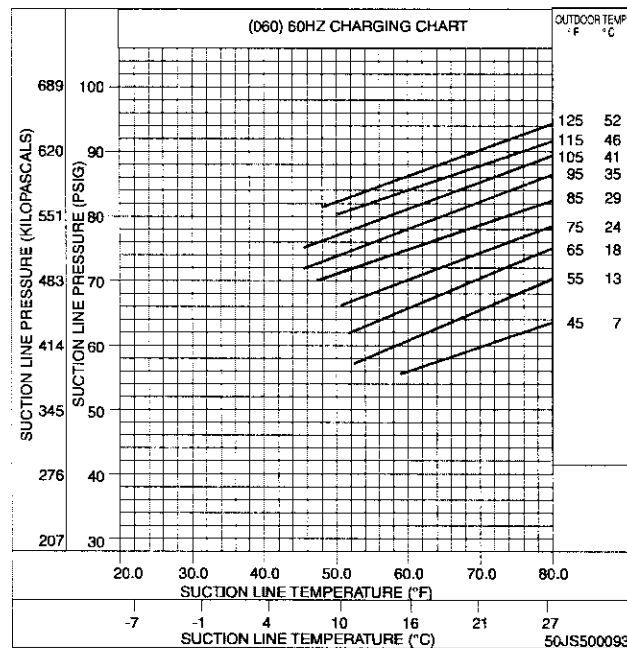


Fig. 28—Cooling Charging Chart, 50JS 060 Units C00032

charge so that pressure gauges read 0 psi. Never open system without breaking vacuum with dry nitrogen.

### Step 13—Check defrost thermostat

There is a liquid header with a brass distributor and feeder tube going into outdoor coil. At the end of 1 of the feeder tubes, there is a 3/8-in. OD stub tube approximately 3 in. long (See Fig. 35). The defrost thermostat should be located on this stub tube. Note that there is only 1 stub tube used with liquid header, and on most units it is the bottom circuit.

### Step 14—Defrost Thermostat

Defrost thermostat signals heat pump that conditions are right for defrost or that conditions have changed to terminate defrost. It is

a thermally actuated switch clamped to outdoor coil to sense its temperature. Normal temperature range is closed at 30° +/- 3°F and open at 80° +/- 5°F.

**NOTE:** The defrost thermostat must be located on the liquid side of the outdoor coil on the bottom circuit and as close to the coil as possible.

## TROUBLESHOOTING

Refer to the Cooling and Heating Troubleshooting Chart (Table 11) for troubleshooting information.

## START-UP CHECKLIST

Use the Start-Up Checklist to ensure proper start-up procedures are followed.

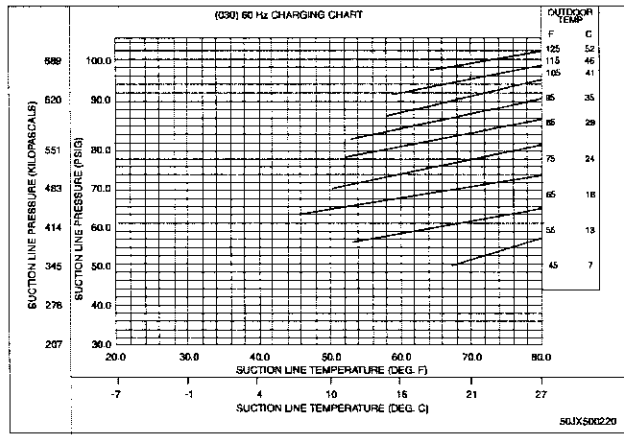


Fig. 29—Cooling Charging Chart, 50JX 030 Units <sup>C99032</sup>

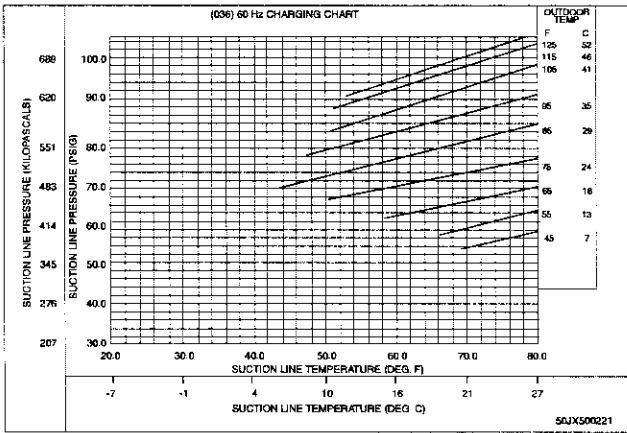


Fig. 30—Cooling Charging Chart, 50JX 036 Units <sup>C99033</sup>

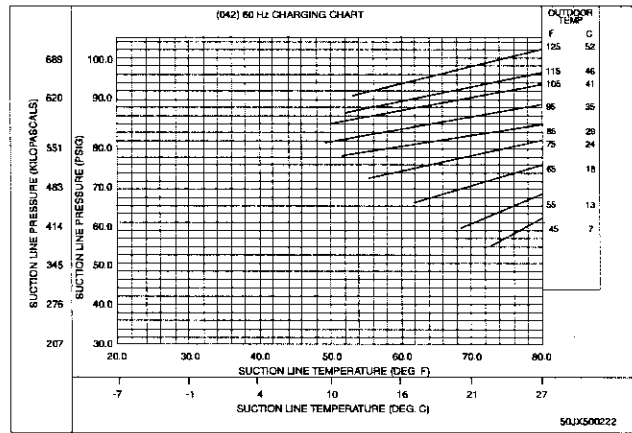


Fig. 31—Cooling Charging Chart, 50JX 042 Units <sup>C99034</sup>

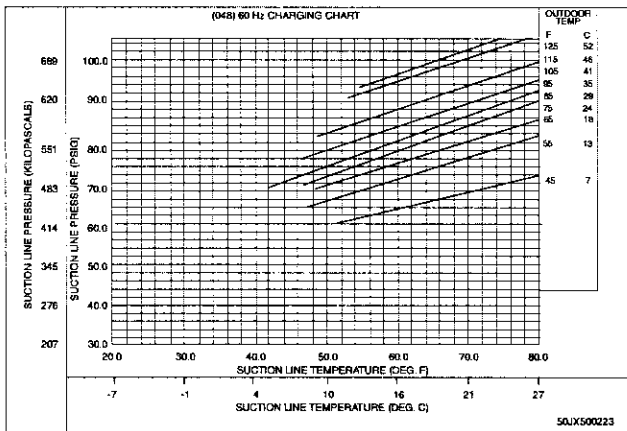


Fig. 32—Cooling Charging Chart, 50JX 048 Units <sup>C99035</sup>

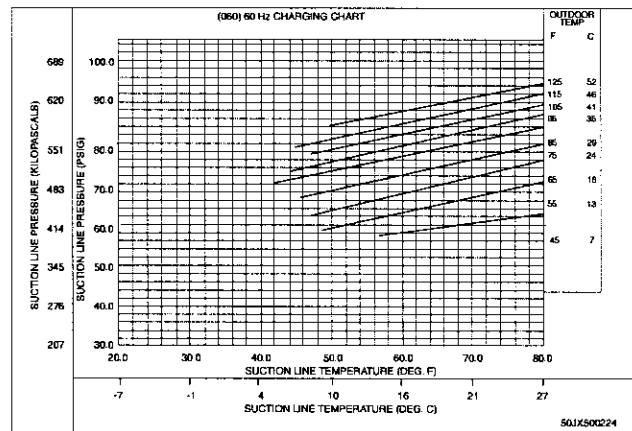


Fig. 33—Cooling Charging Chart, 50JX 060 Units <sup>C99036</sup>



**Table 9—FILTER PRESSURE DROP (In. wg)**

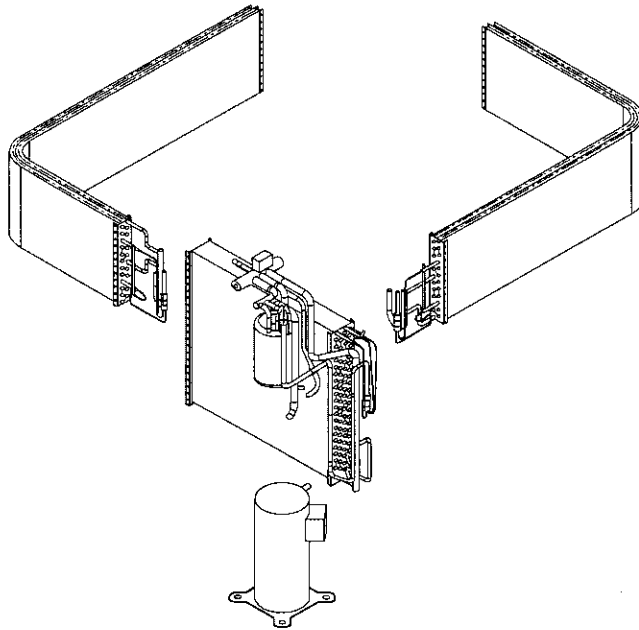
| FILTER SIZE | CFM  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|             | 500  | 600  | 700  | 800  | 900  | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 |
| 20 X 20 X 1 | 0.05 | 0.07 | 0.08 | 0.10 | 0.12 | 0.13 | 0.14 | 0.15 | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| 20 X 24 X 1 | —    | —    | —    | —    | 0.09 | 0.10 | 0.11 | 0.13 | 0.14 | 0.15 | 0.16 | —    | —    | —    | —    | —    | —    | —    | —    |
| 24 X 30 X 1 | —    | —    | —    | —    | —    | —    | —    | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 | 0.16 | 0.17 | 0.18 |

**Table 10—ELECTRIC HEAT PRESSURE DROP TABLE  
Small Cabinet**

| STATIC | CFM  |      |      |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|
|        | 500  | 600  | 700  | 800  | 900  | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 |
| 5 kW   | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.07 |
| 10 kW  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.07 | 0.09 | 0.10 | 0.11 |
| 15 kW  | 0.00 | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 | 0.16 | 0.18 |
| 20 kW  | 0.00 | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.09 | 0.11 | 0.13 | 0.15 | 0.17 | 0.19 |

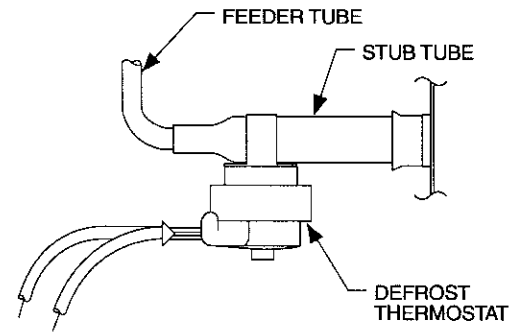
**Large Cabinet**

| STATIC | CFM  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|        | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 | 2500 |
| 5 kW   | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 |
| 10 kW  | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 |
| 15 kW  | 0.00 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 |
| 20 kW  | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 | 0.16 |



**Fig. 34—Refrigerant Circuit**

C99097



**Fig. 35—Defrost Thermostat**

C99092

**Table 11—Cooling and Heating Troubleshooting Chart**

| SYMPTOM   | CAUSE   | REMEDY  |
|---|---|---|
| <b>Compressor and outdoor fan will not start</b>  | Power Failure   | Call power company  |
|   | Fuse blown or circuit breaker tripped   | Replace fuse or reset circuit breaker   |
|   | Defective thermostat, contractor, transformer, control relay or defrost board           | Replace component   |
|   | Insufficient line voltage   | Determine cause and correct   |
|   | Incorrect or faulty wiring  | Check wiring diagram and rewire correctly   |
|   | Thermostat setting too high   | Lower thermostat setting below room temperature   |
|   | Units have a 5-minute time delay  | DO NOT bypass this compressor time delay—wait for 5 minute until time-delay relay is de-energized             |
| <b>Compressor will not start but condenser fan runs</b>   | Faulty wiring or loose connections in compressor circuit                                | Check wiring and repair or replace  |
|   | Compressor motor burned out, seized, or internal overload open                          | Determine cause.<br>Replace compressor  |
|   | Defective run capacitor, overload, or PTC (positive temperature coefficient) thermistor | Determine cause and replace   |
|   | Defective run capacitor, overload, or PTC (positive temperature coefficient) thermistor | Determine cause and replace   |
|   | One leg of 3-phase power dead   | Replace fuse or reset circuit breaker<br>Determine cause  |
| <b>Three-phase scroll compressor (size 030-060 units) makes excessive noise, and there may be a low pressure differential</b> | Scroll compressor is rotating in the wrong direction                                    | Correct the direction of rotation by reversing the 3-phase power leads to the unit                            |
| <b>Compressor cycles (other than normally satisfying thermostat)</b>  | Refrigerant overcharge or undercharge   | Recover refrigerant, evacuate system, and recharge to capacities shown on nameplate                           |
|   | Defective compressor  | Replace and determine cause   |
|   | Insufficient line voltage   | Determine cause and correct   |
|   | Blocked outdoor coil  | Determine cause and correct   |
|   | Defective run/start capacitor, overload or start relay                                  | Determine cause and replace   |
|   | Defective thermostat  | Replace thermostat  |
|   | Faulty outdoor-fan motor or capacitor   | Replace   |
|   | Damaged reversing valve   | Determine cause and correct   |
| <b>Compressor operates continuously</b>   | Restriction in refrigerant system   | Locate restriction and remove   |
|   | Dirty air filter  | Replace filter  |
|   | Unit undersized for load  | Decrease load or increase unit size   |
|   | Thermostat set too low  | Reset thermostat  |
|   | Low refrigerant charge  | Locate leak, repair, and recharge   |
|   | Leaking valves in compressor  | Replace compressor  |
|   | Frosted coil with incorrect defrost operation   | Check defrost time settings<br>Reset as necessary<br>Check defrost temperature switch<br>Replace as necessary |
|   | Air in system   | Recover refrigerant, evacuate system, and recharge  |
|   | Outdoor coil dirty or restricted  | Clean coil or remove restriction  |
| <b>Excessive head pressure</b>  | Dirty air filter  | Replace filter  |
|   | Dirty indoor or outdoor coil  | Clean coil  |
|   | Refrigerant overcharged   | Recover excess refrigerant  |
|   | Air in system   | Recover refrigerant, evacuate system, and recharge  |
|   | (Heat) Indoor air restricted or recirculating   | Determine cause and correct   |
|   | Indoor or outdoor air restricted or air short-cycling                                   | Determine cause and correct   |
| <b>Head pressure too low</b>  | Low refrigerant charge  | Check for leaks, repair and recharge  |
|   | Compressor valves leaking   | Replace compressor  |
|   | Restriction in liquid tube  | Remove restriction  |
| <b>Excessive suction pressure</b>   | (Heat) Outdoor coil frosted   | Move timer on control board to 30 minute between defrost cycles   |
|   | (Cool) High Heat load   | Check for source and eliminate  |
|   | Compressor valves leaking   | Replace compressor  |
|   | Reversing valve hung up or leaking internally   | Replace valve   |
|   | Refrigerant overcharged   | Recover excess refrigerant  |

(Continued next page)

**Table 11—Cooling and Heating Troubleshooting Chart (Cont'd)**

| SYMPTOM                                  | CAUSE   | REMEDY   |
|--|---|--|
| Suction pressure too low                 | (Cool) Dirty air filter   | Replace filter   |
|  | (Heat) Outdoor coil frosted   | Move timer on control board to 30 minutes between defrost cycles   |
|  | Low refrigerant charge  | Check for leaks, repair and recharge   |
|  | Metering device or low side restricted  | Remove source of restriction   |
|  | (Cool) Insufficient coil airflow  | Increase air quantity<br>Check filter—replace if necessary   |
|  | (Cool) Temperature too low in conditioned area  | Reset thermostat   |
|  | (Cool) Outdoor ambient below 40° F  | Install low-ambient kit  |
|  | Field-installed filter-drier restricted   | Replace  |
| Compressor runs but outdoor fan does not | NC (normally closed) contacts on defrost board open   | Check condition of relay on board<br>Replace if necessary  |
| IFM* does not run                        | Blower wheel not secured to shaft   | Properly tighten blower wheel to shaft   |
|  | Insufficient voltage at motor   | Determine cause and correct  |
|  | Power connectors not properly sealed  | Connectors should snap easily; do not force  |
| IFM* runs when it should be off          | Motor programmed with a delay profile   | Allow a few minute for motor to shut off   |
|  | With thermostat in off state, the voltage on G, Y1, Y, Y2, W with respect to common, should be 1/2 of actual low voltage supply | If measured voltage is more than 1/2, the thermostat is incompatible with motor<br>If voltage is less than 1/2, the motor has failed |
| IFM* operation is intermittent           | Water dripping into motor   | Verify proper drip loops in connector wires  |
|  | Connectors not firmly sealed  | Gently pull wires individually to be sure they are crimped into the housing  |

\* IFM—Indoor Fan Motor

**Start-up checklist  
(REMOVE AND STORE IN JOB FILE)**

**I. PRELIMINARY INFORMATION**

Model No .....  
 Serial No .....  
 Date .....  
 Technician .....  
 Job Location .....

**II. PRE-START-UP**

- \_\_\_ Verify that all packing materials have been removed from unit
- \_\_\_ Remove all shipping holddown bolts and brackets per installation instructions
- \_\_\_ Verify that condensate connection is installed per installation instructions
- \_\_\_ Check all electrical connections and terminals for tightness
- \_\_\_ Check that indoor (evaporator) air filter is clean and in place
- \_\_\_ Verify that unit installation is level
- \_\_\_ Check fan wheel propeller for location in housing and setscrew tightness

**III. START-UP**

Supply Voltage: L1-L2 \_\_\_\_\_ L2-L3 \_\_\_\_\_ L3-L1 \_\_\_\_\_  
 Compressor Amps: L1 \_\_\_\_\_ L2 \_\_\_\_\_ L3 \_\_\_\_\_  
 Indoor Fan Amps: \_\_\_\_\_

**TEMPERATURE**

Outdoor-Air Temperature: \_\_\_\_\_ DB  
 Return-Air Temperature: \_\_\_\_\_ DB \_\_\_\_\_ WB  
 Heat Pump Supply Air: \_\_\_\_\_  
 Electric Heater Supply Air: \_\_\_\_\_

**PRESSURES**

Refrigerant Suction \_\_\_\_\_ psig  
 Refrigerant Discharge \_\_\_\_\_ psig

- \_\_\_ Verify Refrigerant charge using charging tables
- \_\_\_ Verify that 3-phase scroll compressor is rotating in correct direction

---

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