



# 50LJQ008,012 (50 Hz) Single-Package Rooftop Heat Pump Units

## Installation, Start-Up and Service Instructions

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### SAFETY CONSIDERATIONS

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

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing 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.

#### **▲ WARNING**

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

### INSTALLATION

Unit is shipped in the vertical configuration. To convert to horizontal configuration, remove side duct opening covers. Using the same screws, install covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight.

**IMPORTANT:** An external filter kit **MUST** be used, or the filters **MUST** be field-installed outside the unit on horizontal applications with accessory economizer or two-position damper. Otherwise, the economizer or two-position must be partially removed to access the filters. The area of the field-installed filters should be equal to the area of the factory-installed filters.

### Step 1 — Provide Unit Support

**ROOF CURB** — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 1. Install insulation, cant strips, roofing and counter flashing as shown. *Ductwork must be attached to curb, not to the unit.* If electric or control power is to be routed through the curb, attach the accessory thru-the-curb service connection plates to the roof curb in accordance with the accessory installation instructions. Connection plates must be installed before unit is set in roof curb.

**IMPORTANT:** The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 1. Improperly applied gasket also can result in air leaks and poor unit performance.

Curb should be level. Unit leveling tolerances are shown in Fig. 2. This is necessary for unit drain to function properly. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

**SLAB MOUNT (Horizontal Units Only)** — Provide a level concrete slab that extends a minimum of 152 mm (6 in.) beyond unit cabinet. The slab should be 203 mm (8 in.) thick with 102 mm (4 in.) above grade. Install a gravel apron in front of outdoor coil air inlet to prevent grass and foliage from obstructing airflow. In areas where high snowfall occurs, increase height of slab to ensure that snow does not block coil.

**NOTE:** Horizontal units may be installed on a roof curb if required.

**Step 2 — Field Fabricate Ductwork** — On vertical discharge units, secure all ducts to roof curb and building structure. *Do not connect ductwork to unit.* For horizontal applications, field-supplied flanges should be attached to horizontal discharge openings and all ductwork attached to the flanges. Insulate and weatherproof all external ductwork, joints and roof openings with counter flashing and mastic in accordance with applicable codes.

Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

If a plenum return is used on a vertical unit, the return should be ducted through the roof deck to comply with applicable fire codes.

A minimum clearance to combustibles is not required around ductwork on vertical discharge units. On horizontal discharge units, a minimum clearance of 25 mm (one in.) is required for the first 305 mm (12 in.) of ductwork.


Cabinet return-air static shall not exceed -87 Pa (-.35 in. wg) with economizer or -112 Pa (-.45 in. wg) without economizer.

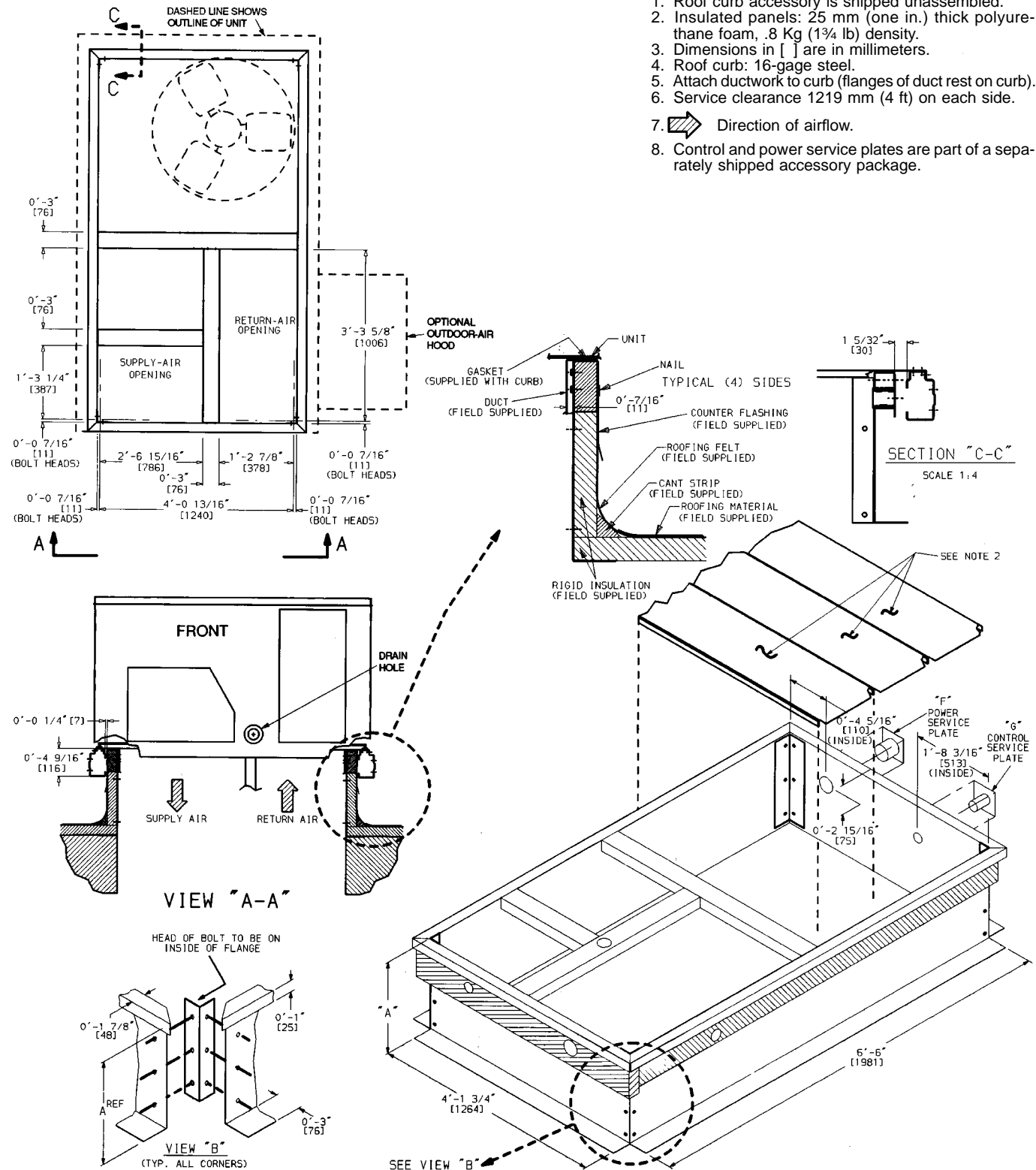
Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ901371	1'-2" [356]	50LJQ008,012
50DJ901381	2'-0" [610]	

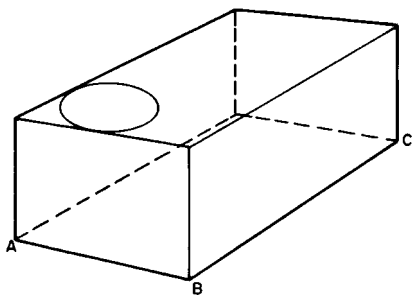
UNIT SIZE	"F" POWER	"G" CONTROL	CONNECTOR PKG. ACC.
50LJQ008,012	1" [25] NPT or 2" [51] NPT	3/4" [19] NPT	50DJ901311

**NOTES:**

1. Roof curb accessory is shipped unassembled.
2. Insulated panels: 25 mm (one in.) thick polyurethane foam, .8 Kg (1 3/4 lb) density.
3. Dimensions in [ ] are in millimeters.
4. Roof curb: 16-gage steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 1219 mm (4 ft) on each side.
7.  Direction of airflow.
8. Control and power service plates are part of a separately shipped accessory package.



**Fig. 1 — Roof Curb Dimensions**



MAXIMUM ALLOWABLE DIFFERENCE

A-B		B-C		A-C	
mm	in.	mm	in.	mm	in.
13	.5	25	1.0	25	1.0

Fig. 2 — Unit Leveling Tolerance

**Step 3 — Make Field Connection for Condensate Disposal** — Units must have an external trap added. See Fig. 3. A 3/4-in. FPT connection is located on the side of the unit. Use a trap at least 100 mm (4 in.) deep, and protect against freeze-up.

If drain line is run to a drain, pitch line away from unit at 25 mm (one in.) per 3 m (10 ft) of run. Do not use a pipe size smaller than the unit connection.

**Step 4 — Rig and Place Unit** — Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Tables 1A and 1B and Fig. 4 for additional information. Operating weight is shown in Tables 1A and 1B and Fig. 4.

Lifting holes are provided in base rails as shown in Fig. 4 and 5. Refer to rigging instructions on unit.

**⚠ CAUTION**  
All panels must be in place when rigging.

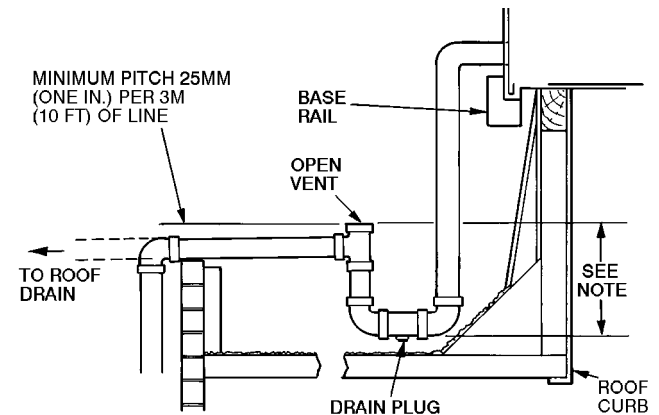
**POSITIONING** — Maintain clearance around and above unit to provide proper air flow and service access. See Fig. 5.

Position unit on roof curb so that the following clearances are maintained; 6 mm (1/4 in.) clearance between roof curb and base rails on each side and front of unit; 29 mm (1 1/2 in.) clearance between roof curb and rear of unit (see Fig. 1, section C-C).

Do not install unit in an indoor location. Do not locate unit air inlet near exhaust vents or other sources of contaminated air.

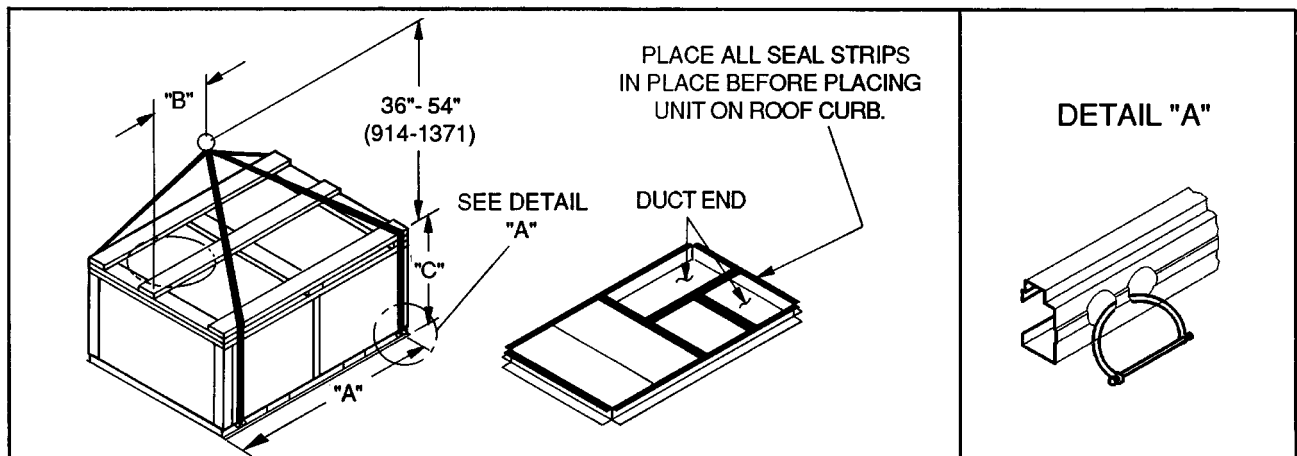
Although unit is weatherproof, guard against water from higher level runoff and overhangs.

After unit is in position, remove polyethylene shipping wrapper and rigging skid.



NOTE: Trap should be deep enough to offset maximum unit static difference. A 100 mm (4 in.) trap is recommended.

Fig. 3 — External Trap Condensate Drain



NOTES:

- Dimensions in ( ) is in millimeters.
- Hood rigging shackles through holes in base rail, as shown in detail "A". Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.
- Weights do not include economizer. See Tables 1A and 1B for economizer weights.

**⚠ CAUTION**  
All panels must be in place when rigging.

UNIT 50LJQ	MAX WEIGHT		DIMENSIONS					
	lb	kg	"A"		"B"		"C"	
			in.	mm	in.	mm	in.	mm
008	840	381	87.38	2219	40.25	1022	41.31	1050
012	940	426	87.38	2219	40.25	1022	48.31	1253

Fig. 4 — Rigging Details

**Table 1A — Physical Data (SI)**

BASE UNIT 50LJQ	008	012
NOMINAL CAPACITY (kW)	23.2	28.8
OPERATING WEIGHT (kg)		
Unit	381	426
With Economizer	401	446
Roof Curb	101	101
COMPRESSOR		Hermetic
Quantity	2	2
Oil (ml) (each compressor)	1627	2071
REFRIGERANT TYPE		R-22
Operating Charge (kg)		
Circuit 1	3.7	4.0
Circuit 2	3.2	3.9
OUTDOOR FAN		Propeller
Quantity...Diameter (mm)	1...660	1...660
Nominal L/s	2900	3260
Motor BkW...r/s	.25...16.0	.25...16.0
OUTDOOR COIL	Enhanced Copper Tubes, Aluminum Fins, Acutrol™ Feed Device	
Rows...Fins/m	2...669	2...669
Total Face Area (sq m)	1.9	2.3
INDOOR FAN		Centrifugal
Size (mm)	381 x 381	381 x 381
Type Drive	Belt	Belt
Nominal L/s	1200	1600
Motor BkW per NEC*	1.12	1.50
Maximum Continuous BkW	1.79	2.16
Motor Frame	56	56
Fan r/s Range	10.30-14.70	11.50-15.00
Motor Bearing Type	Ball	Ball
Maximum Fan r/s	26.7	26.7
Motor Pulley Pitch Diameter		
A/B (mm)	61/86	86/112
Fan Pulley Pitch Diameter (mm)	140	178
Belt — Type...Length (mm)	A...1219	A...1295
Pulley Center Line Distance (mm)	425-489	464-527
Fan Shaft Diameter at Pulley (mm)	25	25
Speed Change per Full Turn of Movable Pulley Flange (r/s)	.88	.70
Movable Pulley Maximum Full Turns from Closed Position	5	5
Factory Setting — Full Turns Open	5	5
Factory Speed Setting (r/s)	10.3	11.5
INDOOR COIL	Enhanced Copper Tubes, Aluminum Double Wavy Fins, Acutrol Feed Device	
Rows...Fins/m	3...590	3...590
Total Face Area (sq m)	.74	.93
OUTDOOR-AIR INLET SCREENS		Cleanable
Quantity...Size (mm)		1...508 x 635 x 25 1...406 x 635 x 25
RETURN-AIR FILTERS		Disposable
Quantity...Size (mm)	4...406 x 508 x 50	4...508 x 508 x 50

**LEGEND**

**BkW** — Brake Kilowatt

**NEC** — National Electrical Code (U.S.A. Standard)

\*Used to determine wire sizing per NEC.

**Table 1B — Physical Data (English)**



BASE UNIT 50QJ	008	012
NOMINAL CAPACITY (tons)	6.6	8.2
OPERATING WEIGHT (lb)		
Unit	840	940
With Economizer	884	984
Roof Curb	223	223
COMPRESSOR		Hermetic
Quantity	2	2
Oil (fluid oz) (each compressor)	55	70
REFRIGERANT TYPE		R-22
Operating Charge (lb-oz)		
Circuit 1	8-2	8-14
Circuit 2	7-0	8-10
OUTDOOR FAN		Propeller
Quantity...Diameter (in.)	1...26	1...26
Nominal Cfm	6100	6900
Motor Hp...Rpm	1/3...960	1/3...960
OUTDOOR COIL	Enhanced Copper Tubes, Aluminum Fins, Acutrol™ Feed Device	
Rows...Fins/in.	2...17	2...17
Total Face Area (sq ft)	20.5	25.0
INDOOR FAN		Centrifugal
Size (in.)	15 x 15	15 x 15
Type Drive	Belt	Belt
Nominal Cfm	2600	3400
Horsepower per NEC*	1.5	2.0
Maximum Continuous Bhp	2.4	2.9
Motor Frame	56	56
Fan Rpm Range	622-882	692-896
Motor Bearing Type	Ball	Ball
Maximum Fan Rpm	1600	1600
Motor Pulley Pitch Diameter		
A/B (in.)	2.4/3.4	3.4/4.4
Fan Pulley Pitch Diameter (in.)	5.5	7.0
Belt — Type...Length (in.)	A...48	A...51
Pulley Center Line Distance (in.)	16.75-19.25	18.25-20.75
Fan Shaft Diameter at Pulley (in.)	1	1
Speed Change per Full Turn of Movable Pulley Flange (rpm)	52	42
Movable Pulley Maximum Full Turns from Closed Position	5	5
Factory Setting — Full Turns Open	5	5
Factory Speed Setting (Rpm)	620	690
INDOOR COIL	Enhanced Copper Tubes, Aluminum Double Wavy Fins, Acutrol Feed Device	
Rows...Fins/in.	3...15	3...15
Total Face Area (sq ft)	8.0	10.0
OUTDOOR-AIR INLET SCREENS		Cleanable
Quantity...Size (in.)		1...20 x 25 x 1 1...16 x 25 x 1
RETURN-AIR FILTERS		Disposable
Quantity...Size (in.)	4...16 x 20 x 2	4...20 x 20 x 2

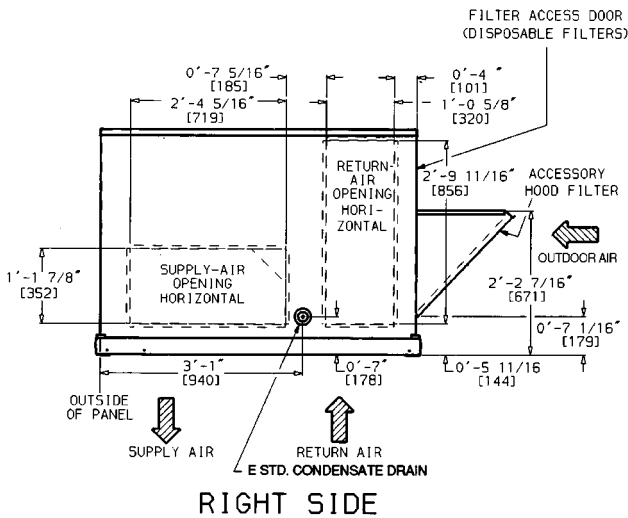
**LEGEND**

**Bhp** — Brake Horsepower  
**NEC** — National Electrical Code (U.S.A. Standard)  
 \*Used to determine wire sizing per NEC.

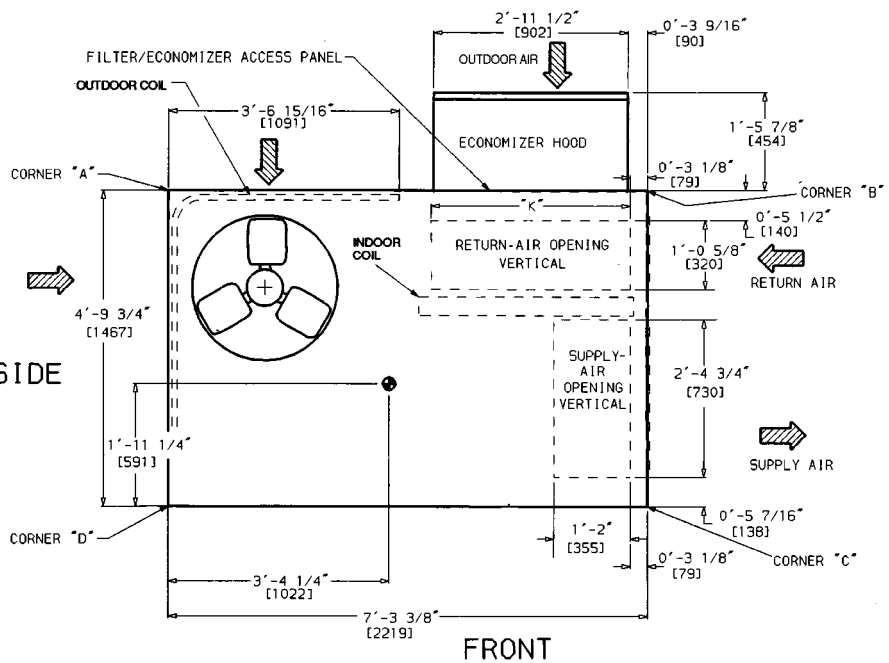
UNIT 50LJQ	STD. UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT "A"		CORNER WEIGHT "B"		CORNER WEIGHT "C"		CORNER WEIGHT "D"		"H"		"J"		"K"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
008	840	381	44	20	182	83	156	71	231	105	271	123	2-0 <sup>7</sup> / <sub>16</sub>	632	3-5 <sup>5</sup> / <sub>16</sub>	1050	2-9 <sup>1</sup> / <sub>16</sub>	856
012	940	426	44	20	204	93	174	79	259	117	303	137	1-2 <sup>7</sup> / <sub>16</sub>	378	4-1 <sup>5</sup> / <sub>16</sub>	1253	3-0 <sup>3</sup> / <sub>8</sub>	924

NOTES:

- Dimensions in [ ] are in millimeters.
-  Center of gravity.
-  Direction of airflow.
- Ductwork to be attached to accessory roof curb only.
- Minimum clearance (local codes or jurisdiction may prevail):
  - Bottom to combustible surfaces (when not using curb) 25 mm (one in.).
  - Condenser coil, for proper airflow, 914 mm (36 in.) one side, 305 mm (12 in.) the other. The side getting the greater clearance is optional.
  - Overhead 1524 mm (60 in.) to assure proper outdoor fan operation.
  - Between units, control box side, 1067 mm (42 in.).
  - Between unit and ungrounded surfaces, control box side, 914 mm (36 in.).
  - Between unit and block or concrete walls and other grounded surfaces, control box side 1067 mm (42 in.).
  - Horizontal supply and return end, zero mm (zero in.).
- With the exception of the clearance for the outdoor coil as stated in notes 5b and c, a removable fence or barricade requires no clearance.

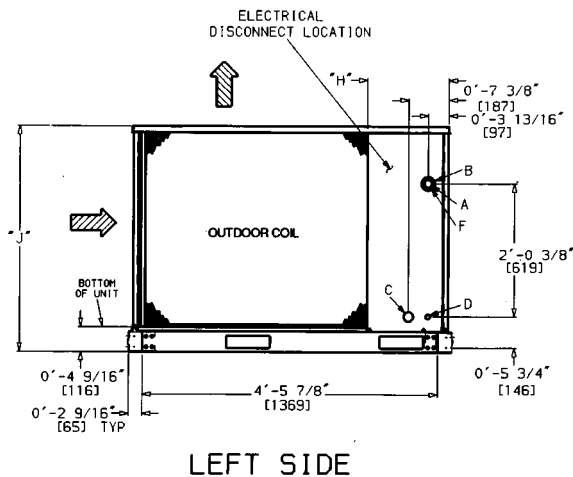


REAR

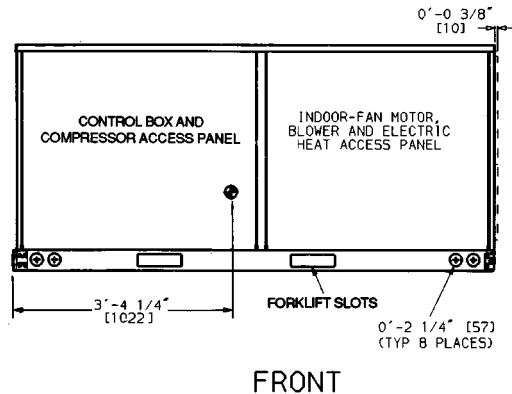


LEFT SIDE

CONNECTION SIZES	
A	1 <sup>3</sup> / <sub>8</sub> " dia [35] field power supply hole
B	2 <sup>1</sup> / <sub>2</sub> " dia [64] power supply knockout
C	1 <sup>3</sup> / <sub>4</sub> " dia [44] charging-port hole
D	7/8" dia [22] field control wiring hole
E	3/4"-14 NPT condensate drain
F	2" dia [51] power supply knockout



LEFT SIDE



FRONT

Fig. 5 — Base Unit Dimensions

## Step 5 — Make Electrical Connections

### ⚠ WARNING

Unit cabinet must have uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with U.S.A. National Electrical Code (Ref: ANSI/NFPA 70-1987) or equivalent local electrical codes. Failure to follow this warning could result in the installer being liable for personal injury of others.

**FIELD POWER SUPPLY** — Pigtails are provided for field wire connections. Use factory-supplied splices or copper/aluminum connector.

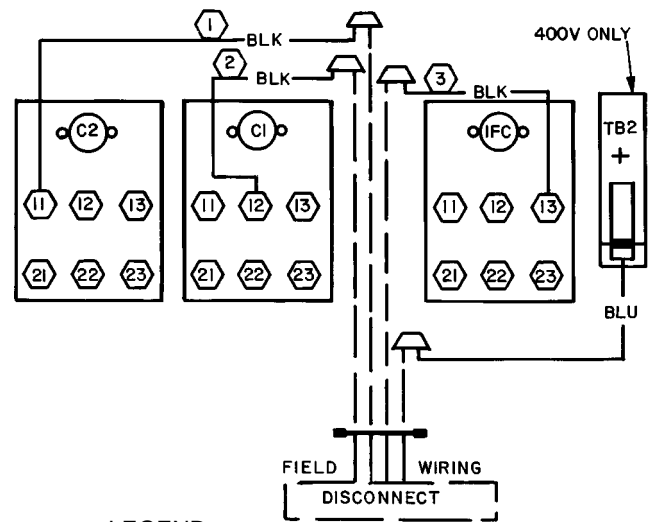
When installing units, provide a disconnect per local codes.

All field wiring must comply with local requirements.

Install conduit through side panel openings. For units without electric heat, install conduit between disconnect and control box. Install power lines to terminal connections as shown in Fig. 6. For units with electric resistance heat, refer to Table 2 to determine appropriate power wiring figure (Fig.7-13) and route lines as indicated in appropriate figure.

Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 2). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 3 to determine the % voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

When electric heat is installed, remove knockouts for appropriate size conduit from unit block-off panel and single point box. Install conduit (rigid or electro-metallic tubing) through conduit drip boot as shown in Fig. 14. Drip boot eliminates the need for water tight conduit fittings at the single point box. Refer to Fig. 15 for component locations.



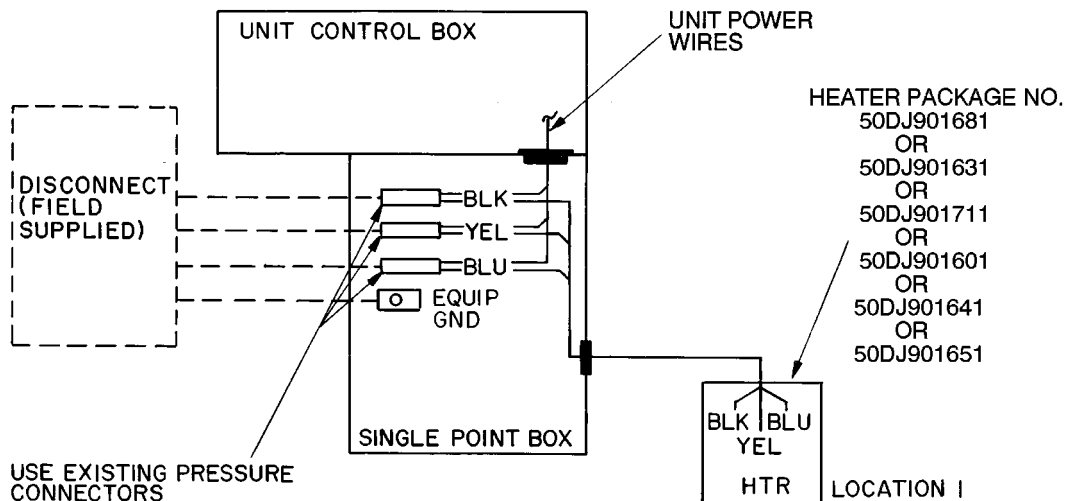
#### LEGEND

- C — Contactor
- IFC — Indoor-Fan Contactor
- TB — Terminal Block
- Field Wiring
- Factory Wiring
- ⌒ Splice Connection (Factory Supplied)

**Fig. 6 — Power Wiring Connections**

#### LEGEND FOR FIG. 7-13

- EQUIP — Equipment
- FU — Fuse
- GND — Ground
- HTR — Heater
- TB — Terminal Block



**Fig. 7 — Electric Heater Power Wiring Connections — 50LJQ, 220-3-50 and 400-3-50; Single Point Kit 50DJ902021 and 50DJ902071**

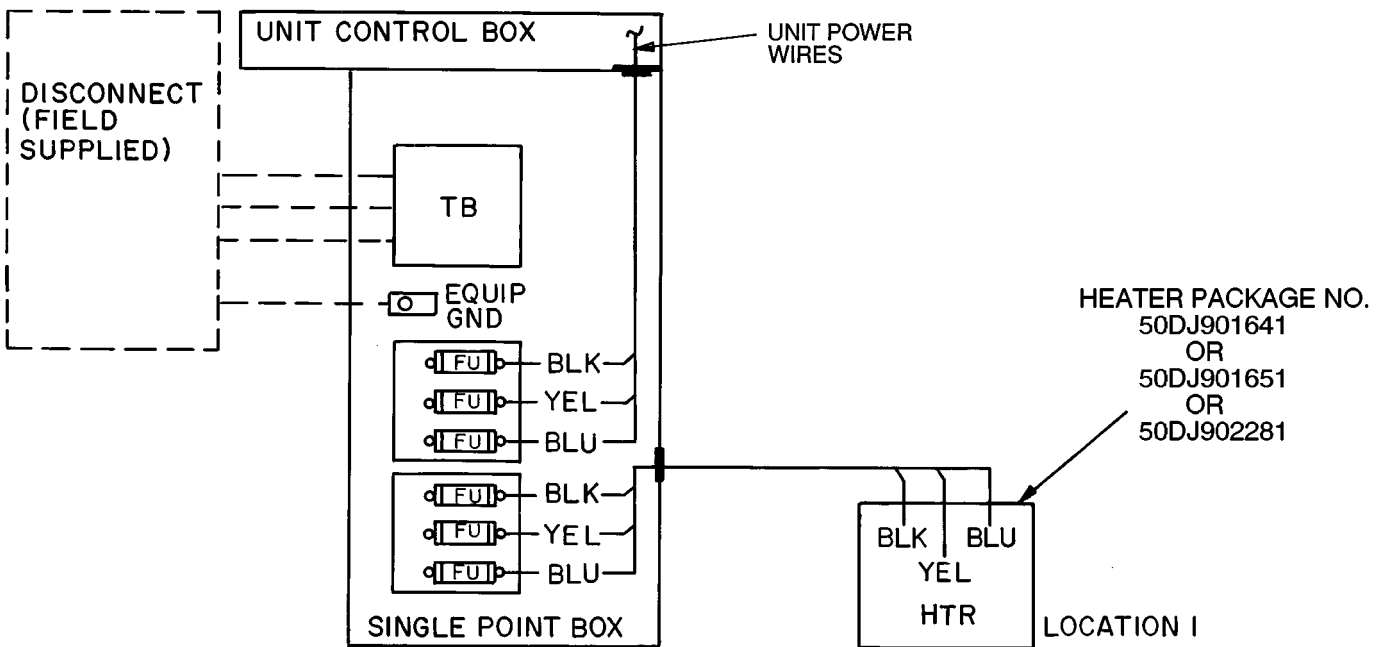


Fig. 8 — Electric Heater Power Wiring Connections — 50LJQ, 400-3-50;  
Single Point Kit 50DJ902041 and 50DJ902101

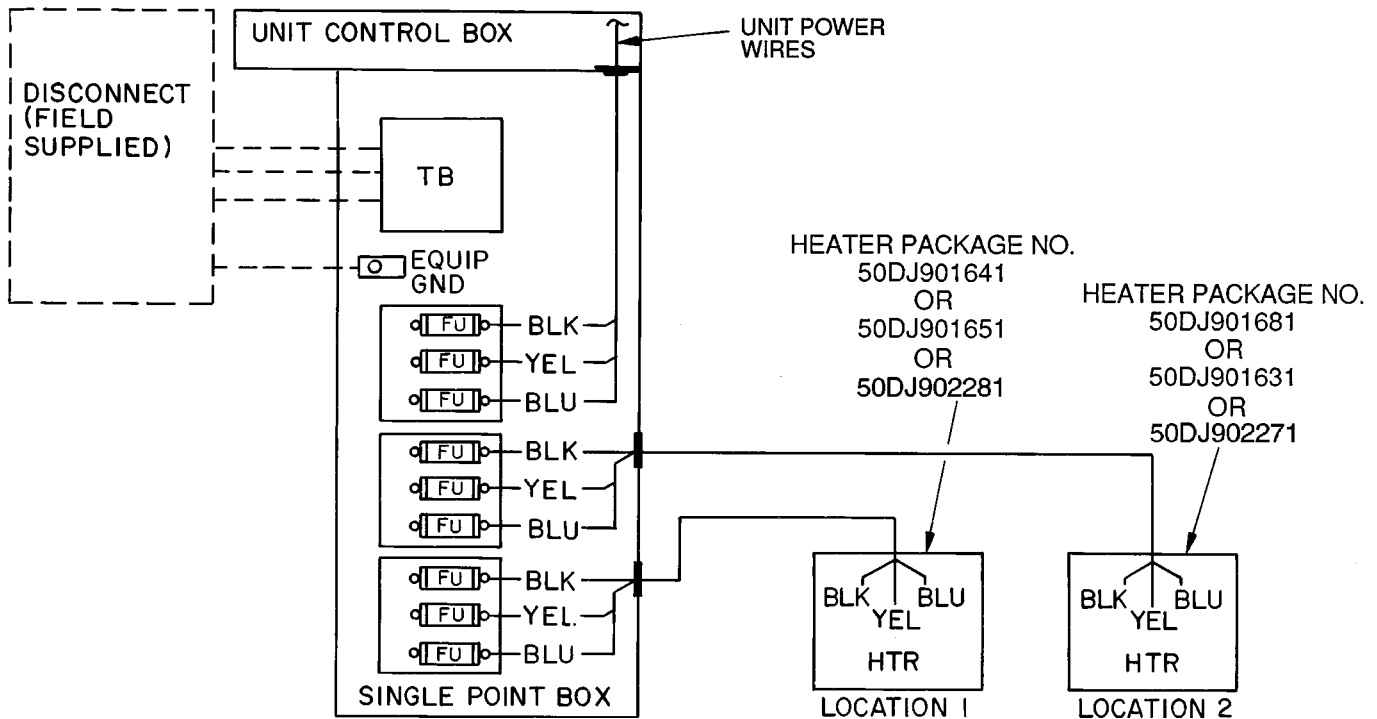


Fig. 9 — Electric Heater Power Wiring Connections — 50LJQ, 400-3-50;  
Single Point Kit 50DJ902061 and 50DJ902121



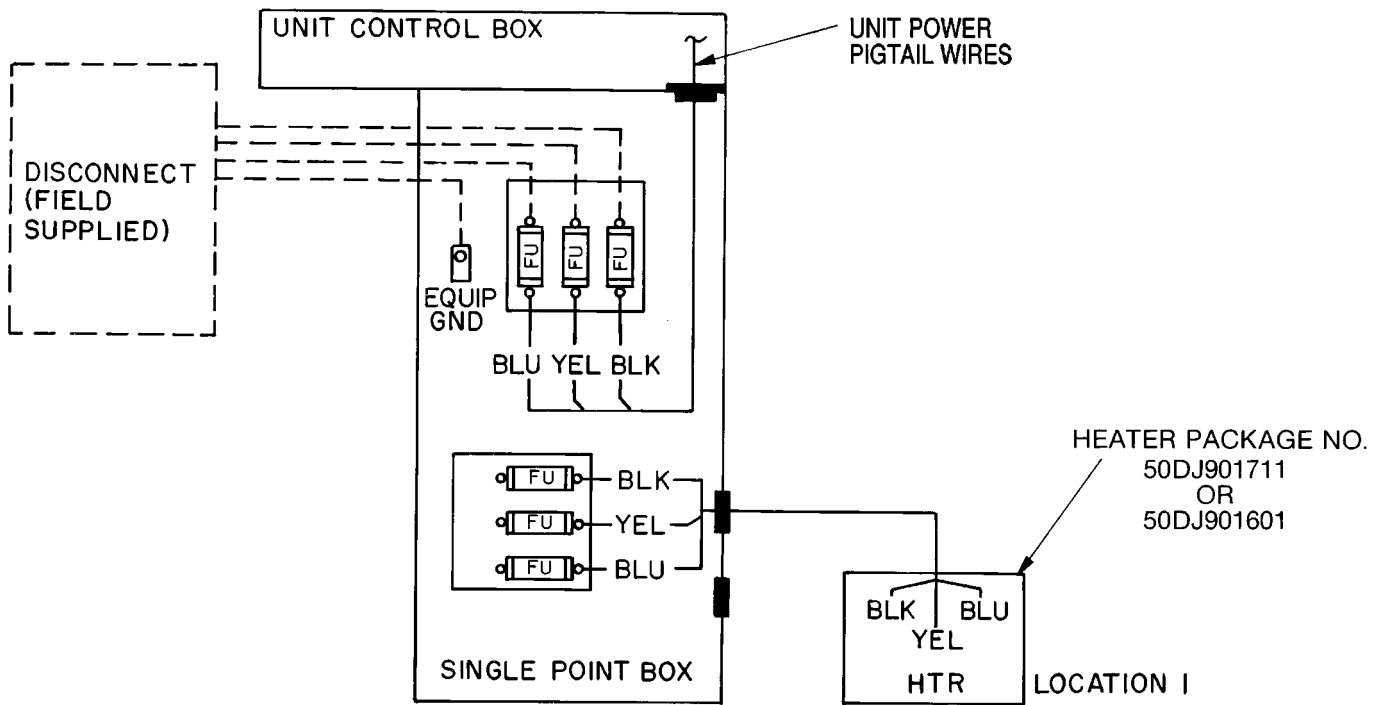


Fig. 10 — Electric Heater Power Wiring Connections — 50LJQ, 220-3-50;  
Single Point Kit 50DJ902031 and 50DJ902081

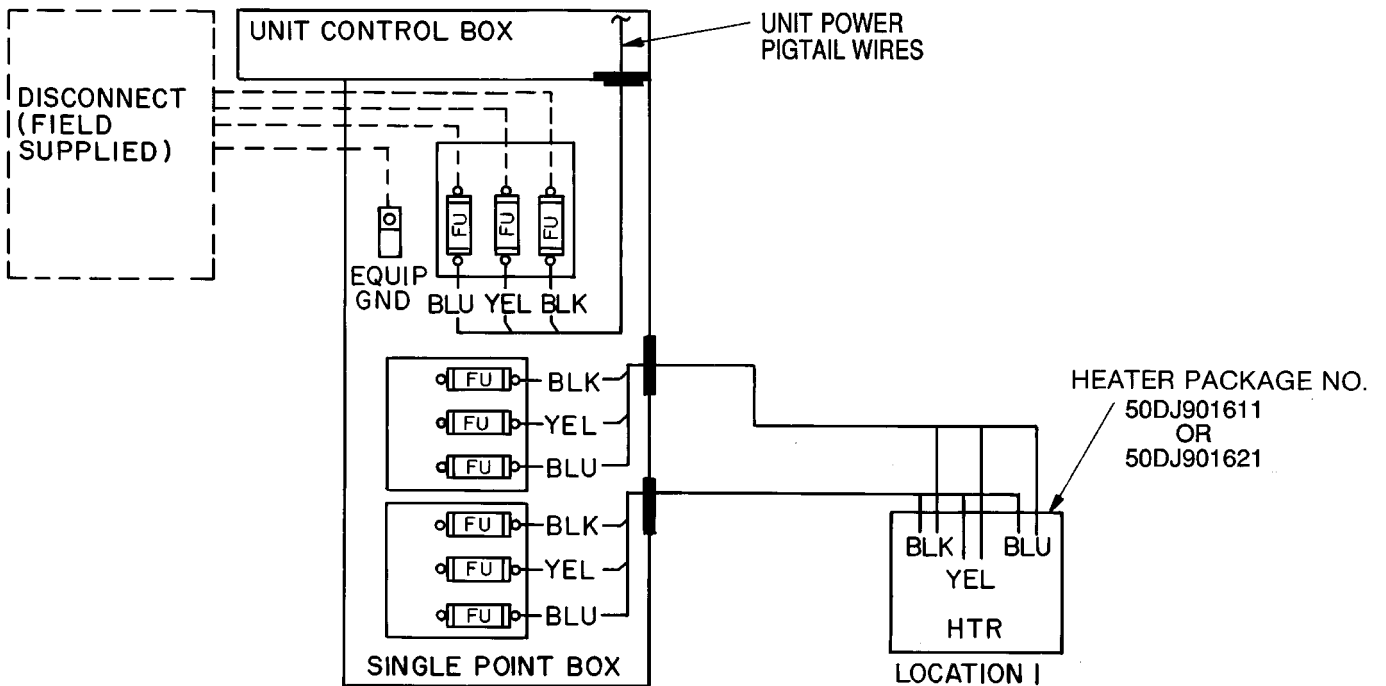


Fig. 11 — Electric Heater Wiring Connections — 50LJQ, 220-3-50;  
Single Point Kit 50DJ902051 and 50DJ902111

**LEGEND FOR FIG. 7-13**

- EQUIP — Equipment
- FU — Fuse
- GND — Ground
- HTR — Heater
- TB — Terminal Block

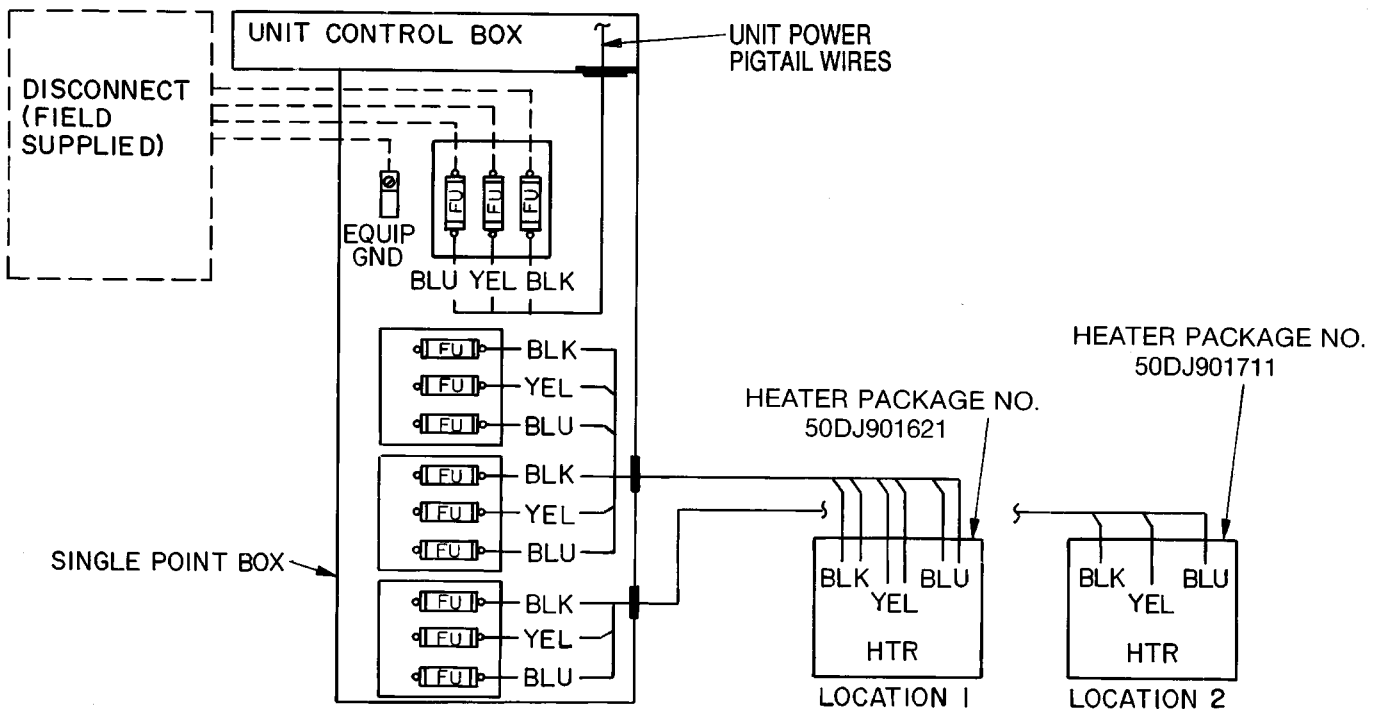


Fig. 12 — Electric Heater Power Wiring Connections — 50LJQ, 220-3-50;  
Single Point Kit 50DJ902091

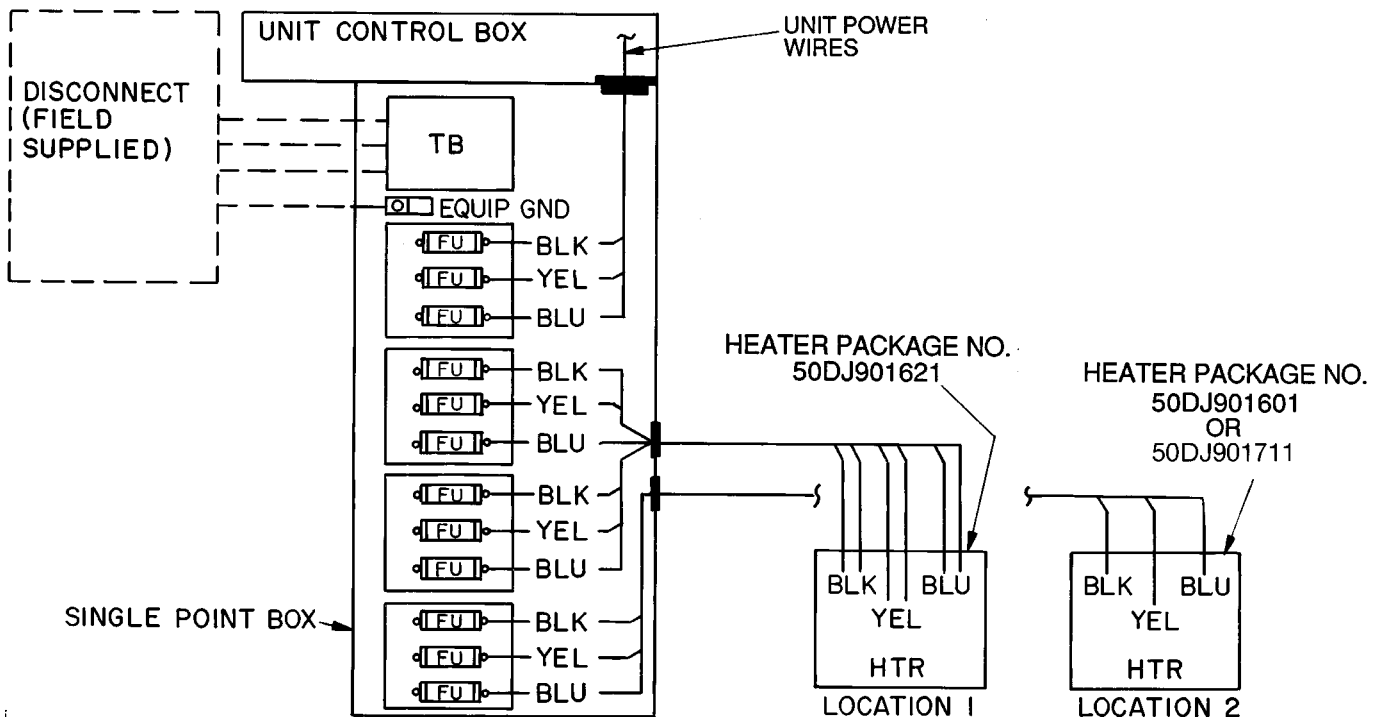


Fig. 13 — Electric Heater Power Wiring Connections — 50LJQ, 220-3-50;  
Single Point Kit 50DJ902131

**LEGEND FOR FIG. 7-13**

- EQUIP — Equipment
- FU — Fuse
- GND — Ground
- HTR — Heater
- TB — Terminal Block

Table 2 — Electrical Data

UNIT 50LJQ	NOMINAL V-PH-HZ	VOLTAGE RANGE		COMPR (each)		OFM		IFM		ELECTRIC HEAT		POWER SUPPLY		ELECTRIC HEAT POWER WIRING FIG. NO.	ELECTRIC HEAT PART NO. 50DJ901—
		Min	Max	RLA	LRA	FLA	Hp	FLA	Nominal kW*	FLA	MCA	MOCPT†			
008	220-3-50	198	242	15.3	82.0	1.5	1.5	5.8	—	—	41.7	50	—	—	
									9.5	24.7	70.3	80	10	711	
									14.6	38.0	85.7	90	10	601	
									22.7	59.0	130.0	150	11	611	
									29.3	76.2	158.5	175	11	621	
	38.8	100.9	179.5	200	12	711, 621**									
	400-3-50	360	440	7.7	41.0	1.5	1.5	2.6	10.5	15.2	21.4	25	7	681	
									12.5	18.0	44.0	45	7	631	
									21.0	30.3	59.3	60	8	641	
									25.0	36.1	66.5	70	8	651	
31.5									45.5	78.3	80	9	681, 641**		
012	220-3-50	198	242	19.6	105.0	1.5	2.0	7.5	—	—	53.1	60	—	—	
									9.5	24.7	81.6	90	10	711	
									14.6	38.0	97.1	100	10	601	
									29.3	76.2	141.3	150	11	621	
									43.9	114.1	190.9	200	13	601, 621**	
	400-3-50	360	440	10.4	55.0	1.5	2.0	3.5	10.5	15.2	28.4	35	7	681	
									12.5	18.0	51.0	60	7	631	
									21.0	30.3	66.3	70	8	641	
									25.0	36.1	73.5	80	8	651	
									31.5	45.5	85.2	90	9	681, 641**	
37.5	54.2	96.6	100	9	631, 651**										

LEGEND

- COMPR — Compressor
- FLA — Full Load Amps
- HACR — Heating, Air Conditioning and Refrigeration
- IFM — Indoor-Fan Motor
- LRA — Locked Rotor Amps
- MCA — Minimum Circuit Amps
- MOCPT — Maximum Overcurrent Protection
- OFM — Outdoor-Fan Motor
- RLA — Rated Load Amps

\*Heaters are field-installed only. Heater capacity (kW) is based on heater voltage of 230 v or 400 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.

†Fuse or HACR circuit breaker.

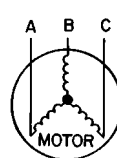
\*\*Requires 2 heater packages.

NOTES:

- MCA and MOCPT values are calculated in accordance with NEC (National Electric Code) (U.S.A. Standard), Article 440.
- Motor RLA and FLA values are established in accordance with UL (Underwriters' Laboratories) Standard 465 (U.S.A. Standard).
- 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 % voltage imbalance.

% Voltage Imbalance  
= 100 x  $\frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$

Example: Supply voltage is 400-3-50.



- AB = 393 v
- BC = 403 v
- AC = 396 v

Average Voltage =  $\frac{393 + 403 + 396}{3}$   
=  $\frac{1192}{3} = 397$

Determine maximum deviation from average voltage.

- (AB) 397 - 393 = 4 v
- (BC) 403 - 397 = 6 v
- (AC) 397 - 396 = 1 v

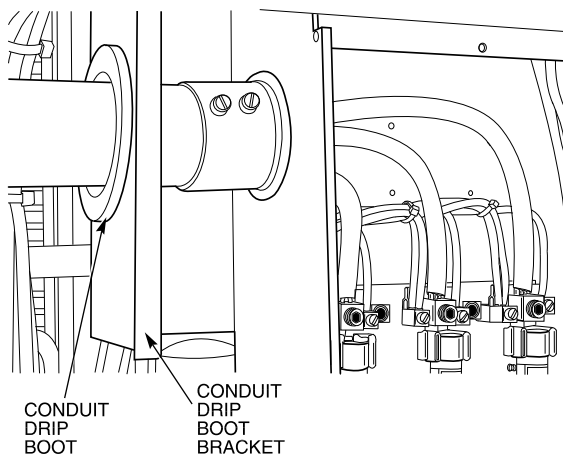
Maximum deviation is 6 v.

Determine % voltage imbalance.

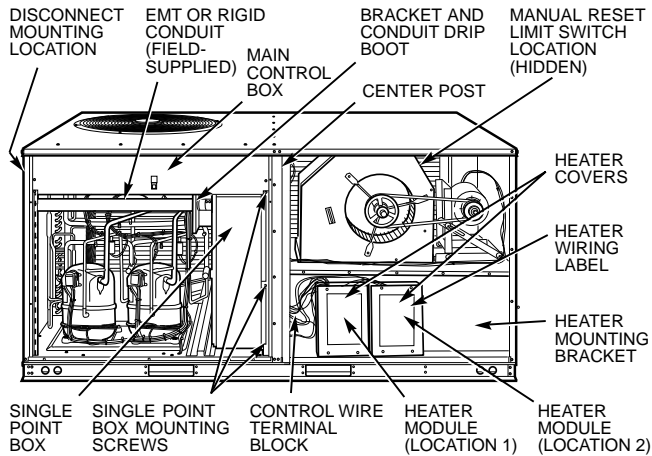
% Voltage Imbalance = 100 x  $\frac{6}{397} = 1.5\%$

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.



**Fig. 14 — Conduit Installation**



**Fig. 15 — Component Location**

**FIELD CONTROL WIRING** — Install a Carrier-approved accessory thermostat assembly according to installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature in accordance with thermostat installation instructions.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals to low-voltage connections on unit (shown in Fig. 16) as described in Steps 1-4 below.

**NOTE:** For wire runs up to 15 m (50 ft), use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For

15 to 23 m (51 to 75 ft), use no. 16 AWG insulated wire (35 C minimum). For over 23 m (75 ft), use no. 14 AWG insulated wire (35 C minimum). See Table 3 for wire conversions.

1. If unit is mounted on roof curb and accessory thru-the-curb service plate connection is used, route wire through connection plate.
2. Pass control wires through the hole provided on unit (see connection D, Connection Sizes table, Fig. 5).
3. Feed wire through the raceway built into the corner post to the 24-v barrier located on the left side of the control box. See Fig. 17. The raceway provides the UL (U.S.A. Standard) required clearance between high- and low-voltage wiring.
4. Connect thermostat wires to screw terminals of low-voltage connector. The connector plugs into the control board and may be removed to make connection. Plug connector back into the control board after making connection or unit will not operate.

**HEAT ANTICIPATOR SETTINGS** — Set first-stage heat anticipator settings at 1.0. Set second-stage heat anticipator settings at 0.6. For units with optional electric heat, set anticipator for second stage as shown in Table 4.

**Table 3 — American/European Wire Conversions**

AMERICAN		EUROPEAN
Industry Standard Size	American Conversion (mm <sup>2</sup> )	Industry Standard Size (mm <sup>2</sup> )
18 AWG	0.82	1.0
16 AWG	1.30	1.5
14 AWG	2.08	2.5
12 AWG	3.30	4.0
10 AWG	5.25	6.0
8 AWG	6.36	10.0
6 AWG	13.29	16.0
4 AWG	21.14	25.0
3 AWG	26.65	—
2 AWG	33.61	35.0
1 AWG	42.39	50.0
1/0 AWG	53.49	—
2/0 AWG	67.42	70.0
3/0 AWG	85.00	95.0
4/0 AWG	107.19	120.0
250 kcmil	126.64	150.0
300 kcmil	151.97	—
350 kcmil	177.90	185.0
400 kcmil	202.63	240.0
500 kcmil	253.29	300.0
600 kcmil	303.95	—

**LEGEND**

**AWG** — American Wire Gage  
**kcmil** — Thousand Circular Mills

**Table 4 — Unit Voltage**

220			400		
Heater kW	Anticipator Setting	Part No. 50DJ901—	Heater kW	Anticipator Setting	Part No. 50DJ901—
9.5	0.3	711	10.5	0.3	681
14.6	0.3	601	12.5	0.3	631
22.7	0.6	611	21.0	0.3	641
29.3	0.6	621	25.0	0.3	651
38.8	0.9	711, 621*	31.5	0.6	681, 641*
43.9	0.9	711, 621*	37.5	0.6	631, 651*

\*Requires 2 heater packages.

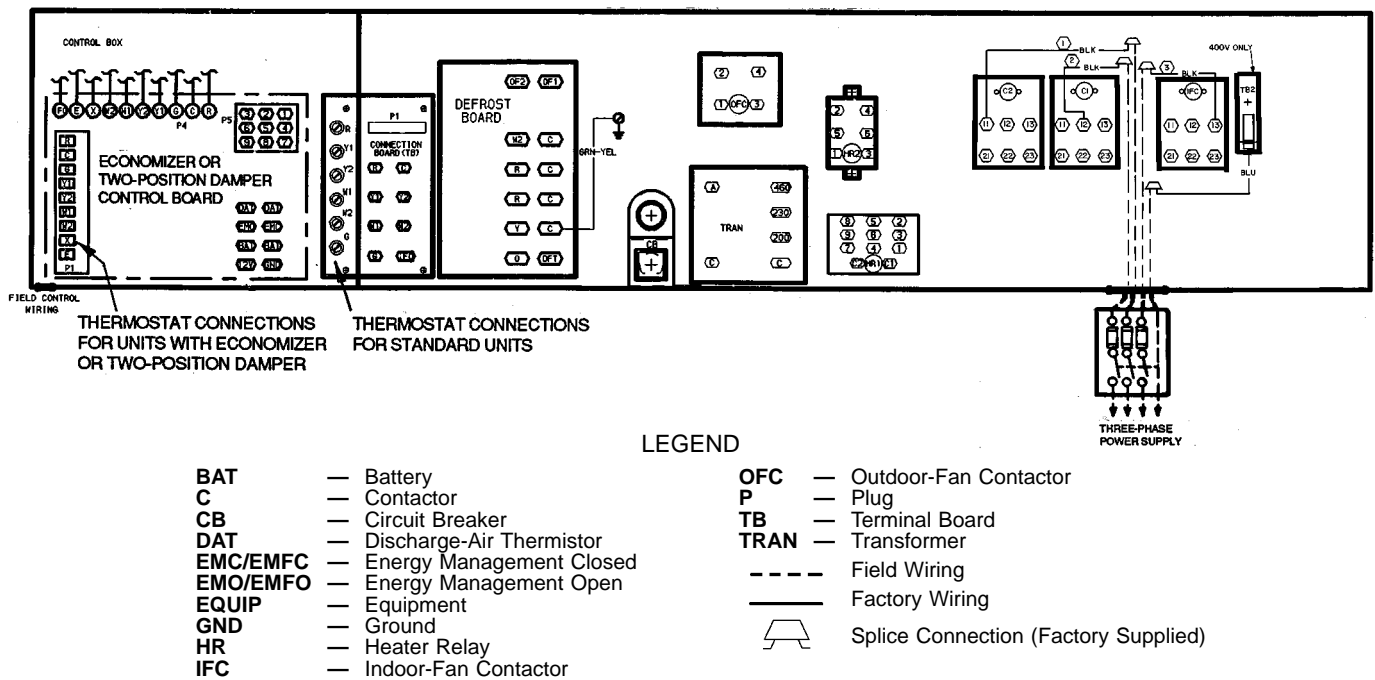


Fig. 16 — Field Wiring Connections

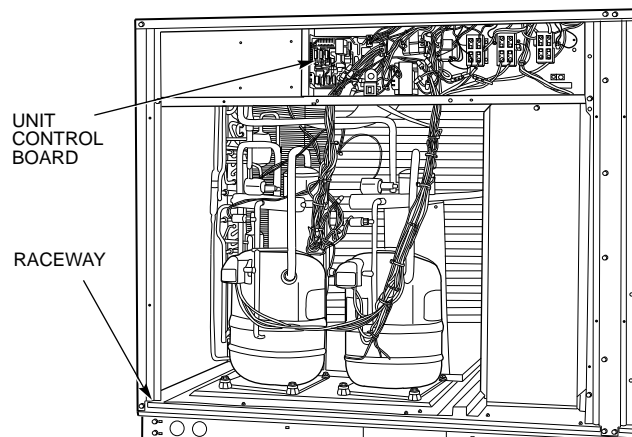


Fig. 17 — Field Control Wiring Raceway

**Step 6 — Adjust Indoor-Fan Speed** — Adjust indoor fan speed to meet jobsite conditions.

For units with electric resistance heating, required minimum L/s (cfm) is 1062 (2250) for 50LJQ008 and 1416 (3000) or 50LJQ012, with the following exceptions.

UNIT 50LJQ	UNIT VOLTAGE	HEATER kW	UNIT CONFIG- URATION	REQUIRED MINIMUM	
				L/s	Cfm
012	220	50.0	Horizontal or Vertical	1534	3250
	400	50.0	Horizontal or Vertical	1605	3400

Tables 5A and 5B show fan rps and rpm at motor pulley settings. Refer to Tables 6-13 to determine fan speed settings.

Fan motor pulleys are factory set for speed shown in Tables 1A and 1B.

To change fan speed:

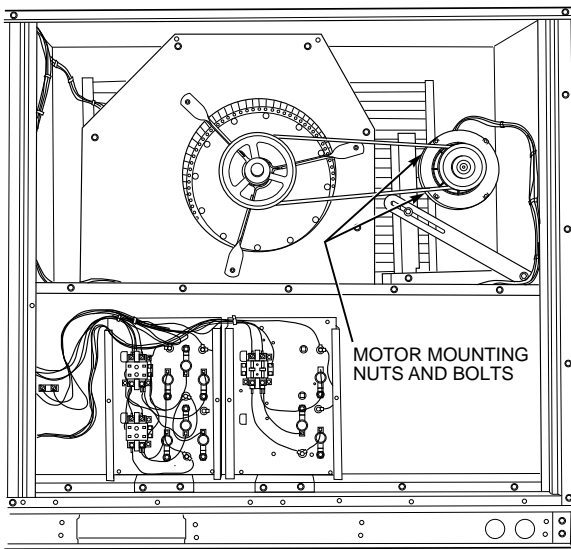
- Shut off unit power supply.
- Loosen belt by loosening fan motor mounting nuts. See Fig. 18.
- Loosen movable pulley flange setscrew (see Fig. 19).
- Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Tables 1A and 1B.
- Set movable flange at nearest keyway of pulley hub and tighten setscrew (see Tables 1A and 1B for speed change for each full turn of pulley flange).

To align fan and motor pulleys:

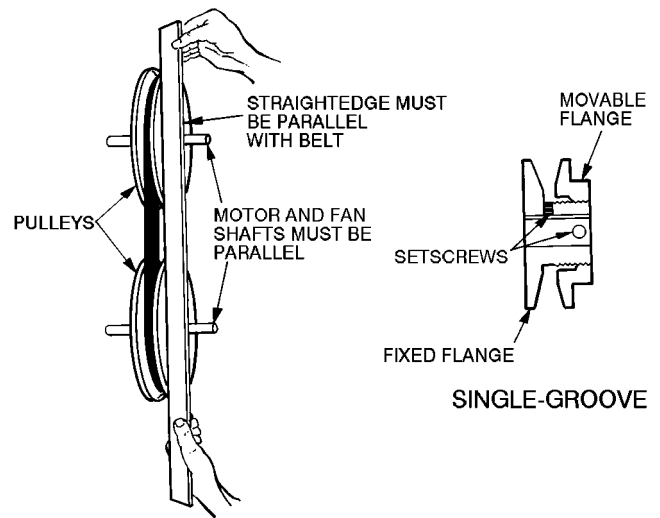
- Loosen fan pulley setscrews.
- Slide fan pulley along fan shaft.
- Make angular alignment by loosening motor from mounting plate.

To adjust belt tension (see Fig. 18):

- Loosen fan motor mounting bolts.
- Slide motor mounting plate away from fan scroll for proper belt tension (13 mm [ $\frac{1}{2}$ -in.] deflection with one finger) and tighten mounting bolts.
- Adjust bolt and nut on motor mounting plate to secure motor in fixed position.



**Fig. 18 — Belt-Drive Motor Mounting**



**Fig. 19 — Indoor-Fan Pulley Adjustment**

**Table 5A — Fan R/s at Motor Pulley Settings (SI)**

50LJQ	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
<b>008</b>	14.70	14.26	13.82	13.38	12.94	12.50	12.06	11.62	11.18	10.74	10.30
<b>012</b>	15.00	14.65	14.30	13.95	13.60	13.25	12.90	12.55	12.20	11.85	11.50

**Table 5B — Fan Rpm at Motor Pulley Settings (English)**

50LJQ	MOTOR PULLEY TURNS OPEN										
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
<b>008</b>	882	856	830	804	778	752	726	700	674	648	622
<b>012</b>	896	875	855	834	814	794	774	753	733	712	692

**Table 6 — Fan Performance (SI), 50LJQ08 (50 Hz) — Horizontal Discharge Units**

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW
1100	7.9	0.35	9.4	0.50	10.6	0.68	11.7	0.85	12.7	1.03	13.6	1.25	14.4	1.46	14.9	1.69	15.1	1.92	15.0	2.15
1200	8.3	0.42	9.8	0.59	11.0	0.78	12.0	0.95	13.0	1.15	13.9	1.36	14.8	1.58	15.5	1.82	16.0	2.06	16.4	2.31
1300	8.8	0.51	10.2	0.69	11.3	0.88	12.4	1.08	13.3	1.28	14.2	1.49	15.0	1.72	15.8	1.96	16.5	2.21	17.1	2.47
1400	9.2	0.60	10.6	0.80	11.7	0.99	12.7	1.22	13.7	1.42	14.5	1.63	15.3	1.87	16.1	2.12	16.9	2.38	—	—
1500	9.7	0.71	11.0	0.91	12.1	1.12	13.0	1.35	14.0	1.59	14.8	1.81	15.6	2.04	16.4	2.30	—	—	—	—
1600	10.1	0.82	11.3	1.04	12.5	1.28	13.4	1.49	14.3	1.75	15.2	2.00	15.9	2.24	—	—	—	—	—	—
1700	10.6	0.93	11.8	1.20	12.9	1.44	13.8	1.67	14.7	1.92	15.5	2.20	—	—	—	—	—	—	—	—

**Table 7 — Fan Performance (SI), 50LJQ012 (50 Hz) — Horizontal Discharge Units**

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW
1300	7.6	0.30	8.9	0.41	10.2	0.56	11.1	0.64	12.1	0.77	13.1	0.92	13.9	0.93	14.0	0.52	15.0	1.13	15.6	1.32
1400	8.0	0.40	9.3	0.51	10.5	0.64	11.4	0.75	12.4	0.88	13.3	1.01	14.1	1.11	14.6	0.96	15.4	1.32	16.0	1.42
1500	8.4	0.48	9.6	0.60	10.7	0.72	11.8	0.86	12.7	0.99	13.5	1.12	14.3	1.26	15.1	1.35	15.7	1.49	16.4	1.54
1600	8.8	0.58	10.0	0.69	11.1	0.82	12.1	0.96	12.9	1.10	13.8	1.24	14.5	1.38	15.3	1.54	16.0	1.64	16.7	1.72
1700	9.1	0.69	10.3	0.78	11.3	0.93	12.3	1.07	13.2	1.22	14.0	1.37	14.8	1.52	15.5	1.66	16.3	1.84	17.0	1.95
1800	9.5	0.81	10.7	0.90	11.7	1.05	12.6	1.20	13.5	1.36	14.3	1.52	15.0	1.67	15.8	1.83	16.4	1.99	17.2	2.17
1900	9.9	0.95	11.0	1.02	12.0	1.18	12.9	1.34	13.8	1.50	14.6	1.68	15.3	1.83	16.0	2.00	16.7	2.16	17.3	2.33
2000	10.3	1.11	11.4	1.17	12.3	1.32	13.2	1.48	14.1	1.66	14.9	1.83	15.6	2.01	16.3	2.18	17.0	2.36	17.6	2.53
2100	10.7	1.29	11.8	1.33	12.7	1.47	13.5	1.65	14.4	1.84	15.1	2.00	15.9	2.20	16.6	2.38	—	—	—	—
2200	11.2	1.48	12.1	1.51	13.1	1.64	13.9	1.83	14.6	2.01	15.4	2.20	16.2	2.38	—	—	—	—	—	—
2300	11.6	1.70	12.5	1.71	13.4	1.83	14.2	2.01	15.0	2.20	15.7	2.41	—	—	—	—	—	—	—	—

**Table 8 — Fan Performance (SI), 50LJQ08 (50 Hz) — Vertical Discharge Units**

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW
1100	8.7	0.42	10.1	0.59	11.1	0.75	12.2	0.93	13.1	1.12	14.0	1.30	14.8	1.51	15.7	1.77	16.4	2.02	17.2	2.35
1200	9.3	0.52	10.5	0.69	11.6	0.87	12.6	1.05	13.5	1.26	14.3	1.46	15.1	1.66	15.9	1.88	16.7	2.14	17.4	2.44
1300	9.8	0.64	11.0	0.81	12.1	1.01	13.0	1.20	13.9	1.41	14.7	1.63	15.5	1.84	16.2	1.98	16.9	2.29	17.6	2.56
1400	10.4	0.77	11.5	0.94	12.6	1.16	13.5	1.37	14.3	1.58	15.1	1.80	15.9	2.04	16.6	2.27	17.3	2.51	—	—
1500	11.0	0.92	12.0	1.10	13.0	1.33	13.9	1.56	14.7	1.78	15.5	2.00	16.3	2.25	17.0	2.50	—	—	—	—
1600	11.6	1.08	12.6	1.28	13.5	1.50	14.4	1.76	15.2	2.00	16.0	2.23	16.7	2.47	—	—	—	—	—	—
1700	12.2	1.26	13.1	1.48	14.0	1.70	14.9	1.97	15.7	2.23	16.4	2.48	—	—	—	—	—	—	—	—

**Table 9 — Fan Performance (SI), 50LJQ012 (50 Hz) — Vertical Discharge Units**

AIRFLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)																			
	50		100		150		200		250		300		350		400		450		500	
	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW	r/s	BkW
1300	8.4	0.37	9.6	0.51	10.8	0.61	11.7	0.69	12.6	0.81	13.3	0.90	14.3	1.05	15.1	1.27	15.9	1.48	16.7	1.67
1400	8.8	0.46	10.0	0.59	11.1	0.71	12.0	0.82	12.9	0.93	13.7	1.04	14.5	1.17	15.4	1.35	16.2	1.56	16.8	1.75
1500	9.2	0.55	10.4	0.68	11.5	0.81	12.4	0.94	13.2	1.06	14.0	1.19	14.8	1.26	15.6	1.44	16.4	1.62	17.1	1.83
1600	9.7	0.65	10.8	0.79	11.8	0.93	12.8	1.07	13.6	1.19	14.4	1.33	15.1	1.46	15.8	1.59	16.5	1.72	17.3	1.91
1700	10.2	0.75	11.2	0.91	12.2	1.06	13.1	1.20	13.9	1.34	14.7	1.48	15.4	1.63	16.1	1.76	16.7	1.89	17.4	2.04
1800	10.6	0.87	11.7	1.05	12.6	1.20	13.5	1.35	14.3	1.51	15.0	1.65	15.7	1.80	16.4	1.95	17.1	2.10	17.7	2.24
1900	11.1	1.01	12.1	1.19	13.0	1.35	13.9	1.52	14.7	1.68	15.4	1.84	16.1	1.99	16.8	2.14	17.4	2.31	18.0	2.46
2000	11.6	1.16	12.5	1.35	13.4	1.52	14.3	1.69	15.0	1.86	15.8	2.04	16.5	2.21	17.1	2.36	17.7	2.53	—	—
2100	12.0	1.32	13.0	1.53	13.8	1.70	14.6	1.88	15.4	2.07	16.1	2.25	16.8	2.43	—	—	—	—	—	—
2200	12.5	1.50	13.4	1.71	14.3	1.91	15.1	2.09	15.8	2.29	16.5	2.48	—	—	—	—	—	—	—	—
2300	13.0	1.70	13.9	1.91	14.7	2.13	15.5	2.31	16.2	2.52	—	—	—	—	—	—	—	—	—	—

**LEGEND**

r/s — Wheel Speed (Revolutions per Second)  
 BkW — Fan Shaft Power (kW)

**NOTES:**

1. **Boldface** indicates field-supplied drive required.
2.  indicates field-supplied motor and drive required.
3. Maximum usable output power (BkW) on the 50LJQ008 unit is 1.79 (2.40 Bhp) with standard 1.12 BkW (1.5 hp) motor. The maximum usable output power (BkW) increases to 2.16 (2.90 Bhp) on the 50LJQ012 unit with standard 1.5 BkW (2 hp) motor. Extensive

4. Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
5. Values include losses for filters, unit casings and wet coils.
6. Motor drive range is 10.30 to 14.70 r/s (622 to 882 rpm) on the 50LJQ008 and 11.50 to 15.00 r/s (692 to 896 rpm) on the 50LJQ012. All other r/s (rpms) will require a field-supplied drive.

**Table 10 — Fan Performance (English), 50LJQ008 (50 Hz) — Horizontal Discharge Units**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	459	0.42	549	0.62	625	0.83	691	1.06	753	1.31	805	1.58	842	1.87	857	2.16	851	2.45	823	2.70
2400	482	0.50	569	0.71	645	0.95	708	1.18	768	1.40	824	1.72	872	2.01	<b>909</b>	<b>2.32</b>	931	2.64	935	2.96
2600	507	0.59	592	0.82	663	1.08	727	1.32	784	1.58	839	1.87	<b>891</b>	<b>2.17</b>	936	2.49	973	2.82	999	3.16
2800	533	0.71	615	0.95	683	1.20	747	1.49	802	1.75	855	2.04	<b>906</b>	<b>2.35</b>	954	2.67	997	3.01	1034	3.36
3000	559	0.83	637	1.09	704	1.35	765	1.66	823	1.94	872	2.22	921	2.54	969	2.88	1014	3.22	—	—
3200	585	0.96	660	1.24	727	1.52	785	1.83	841	2.15	892	2.45	939	2.76	984	3.10	—	—	—	—
3400	610	1.10	682	1.41	750	1.72	806	2.01	860	2.36	912	2.69	958	3.01	1002	3.34	—	—	—	—
3600	636	1.25	707	1.60	772	1.93	828	2.23	880	2.57	930	2.95	978	3.29	—	—	—	—	—	—
3800	661	1.41	733	1.82	795	2.15	852	2.48	901	2.80	949	3.20	—	—	—	—	—	—	—	—

**Table 11 — Fan Performance (English), 50LJQ012 (50 Hz) — Horizontal Discharge Units**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	484	0.55	560	0.70	631	0.87	690	1.03	747	1.20	800	1.38	850	1.52	879	1.38	925	1.81	964	1.92
3200	505	0.66	579	0.81	646	0.98	708	1.16	761	1.34	812	1.51	862	1.71	908	1.85	944	2.01	984	2.09
3400	527	0.78	599	0.93	664	1.11	724	1.30	775	1.48	827	1.67	873	1.85	920	2.07	963	2.21	1001	2.31
3600	548	0.92	619	1.05	680	1.24	738	1.43	794	1.64	840	1.83	888	2.04	931	2.23	976	2.47	1017	2.62
3800	571	1.08	639	1.19	698	1.39	756	1.60	810	1.81	856	2.02	901	2.23	945	2.44	986	2.65	1029	2.89
4000	593	1.25	659	1.35	717	1.56	773	1.78	823	1.98	875	2.22	915	2.42	960	2.65	1000	2.87	1039	3.10
4200	616	1.45	680	1.53	737	1.74	789	1.95	841	2.18	889	2.41	934	2.65	972	2.87	1015	3.12	1053	3.34
4400	639	1.67	701	1.73	757	1.92	807	2.16	858	2.41	903	2.62	951	2.89	990	3.12	1028	3.36	—	—
4600	662	1.91	722	1.95	777	2.13	827	2.38	874	2.62	921	2.87	965	3.11	1008	3.39	—	—	—	—
4800	686	2.17	744	2.20	797	2.36	846	2.62	891	2.85	938	3.14	980	3.37	—	—	—	—	—	—
5000	710	2.45	766	2.47	816	2.61	866	2.86	910	3.12	934	3.39	—	—	—	—	—	—	—	—

**Table 12 — Fan Performance (English), 50LJQ008 (50 Hz) — Vertical Discharge Units**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	503	0.50	585	0.71	653	0.92	716	1.15	772	1.38	824	1.63	884	1.95	934	2.30	916	2.64	1019	3.09
2400	534	0.61	613	0.84	677	1.06	738	1.30	794	1.55	844	1.81	892	2.08	944	2.40	987	2.76	1039	3.20
2600	565	0.74	639	0.97	703	1.20	761	1.46	816	1.74	866	2.01	913	2.29	957	2.58	1004	2.91	1050	3.31
2800	597	0.89	665	1.12	731	1.40	786	1.66	839	1.93	889	2.23	935	2.52	978	2.62	1019	3.13	1061	3.47
3000	629	1.06	694	1.29	759	1.59	812	1.88	862	2.15	911	2.46	957	2.78	1000	3.09	1040	3.41	—	—
3200	662	1.25	724	1.50	785	1.80	840	2.11	887	2.41	934	2.71	980	3.04	1022	3.38	—	—	—	—
3400	696	1.46	756	1.73	811	2.02	868	2.37	914	2.69	959	3.00	1003	3.32	—	—	—	—	—	—
3600	729	1.69	787	1.98	839	2.27	894	2.64	942	2.99	984	3.32	—	—	—	—	—	—	—	—
3800	763	1.95	819	2.27	869	2.56	920	2.92	970	3.31	—	—	—	—	—	—	—	—	—	—

**Table 13 — Fan Performance (English), 50LJQ012 (50 Hz) — Vertical Discharge Units**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	532	0.64	605	0.81	670	0.97	725	1.12	778	1.28	825	1.43	874	1.60	926	1.82	974	2.11	1012	2.36
3200	557	0.75	628	0.93	690	1.10	746	1.28	796	1.44	844	1.61	888	1.70	934	1.94	988	2.18	1025	2.47
3400	583	0.88	651	1.06	711	1.25	767	1.44	815	1.61	863	1.79	907	1.97	947	2.14	991	2.32	1038	2.57
3600	609	1.01	674	1.22	732	1.42	787	1.61	836	1.80	880	1.98	926	2.18	966	2.36	1004	2.54	1045	2.74
3800	635	1.16	698	1.39	755	1.59	808	1.80	857	2.01	901	2.20	943	2.39	985	2.60	1023	2.79	1059	2.98
4000	662	1.33	722	1.57	778	1.78	829	2.01	878	2.22	922	2.44	962	2.63	1003	2.84	1042	3.06	1078	3.26
4200	689	1.52	746	1.77	801	1.99	851	2.23	898	2.45	943	2.69	983	2.91	1021	3.11	1060	3.34	—	—
4400	715	1.72	772	1.99	825	2.22	873	2.46	919	2.71	963	2.94	1004	3.19	1042	3.41	—	—	—	—
4600	742	1.94	797	2.22	848	2.48	896	2.72	940	2.98	984	3.22	1025	3.48	—	—	—	—	—	—
4800	770	2.18	823	2.46	872	2.75	919	3.00	963	3.27	—	—	—	—	—	—	—	—	—	—
5000	797	2.44	849	2.73	897	3.04	943	3.30	—	—	—	—	—	—	—	—	—	—	—	—

**LEGEND**

**Rpm** — Wheel Speed (Revolutions per Minute)  
**Bhp** — Fan Shaft Power (Brake Horsepower)

**NOTES:**

- 1. Boldface** indicates field-supplied drive required.
- indicates field-supplied motor and drive required.
- Maximum usable output power (Bhp) on the 50LJQ008 unit is 2.40 (1.79 BkW) with standard 1.5 hp (1.12 BkW) motor. The maximum usable output power (Bhp) increases to 2.90 Bhp (2.16 BkW) on the 50LJQ012 unit with standard 2 hp (1.5 BkW) motor.

Extensive motor and electrical testing on the Weathermaker I units ensures that the full power range of the motor can be utilized with confidence. Using the fan motors up to the power ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

- Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- Values include losses for filters, unit casings, and wet coils.
- Motor drive range is 622 to 882 rpm (10.30 to 14.70 r/s) on the 50LJQ008 and 692 to 896 rpm (11.50 to 15.00 r/s) on the 50LJQ012. All other rpms (r/s) will require a field-supplied drive.



**IMPORTANT:** Energize crankcase heaters 24 hours prior to base unit start-up to remove entrapped refrigerant from the oil. Heaters are energized as long as there is power to the unit.

**Unit Preparation** — Make sure that unit has been installed in accordance with these installation instructions and applicable codes.

**Return-Air Filters** — Make sure correct filters are installed in unit (see Tables 1A and 1B). Do not operate unit without return-air filters.

**Compressor Mounting** — Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.

**Internal Wiring** — Check all electrical connections in unit control boxes; tighten as required.

**Refrigerant Service Ports** — Each refrigerant system has 3 Schrader-type service gage ports: one on the suction line, one on the liquid line and one on the compressor discharge line. Be sure that caps on the ports are tight.

**Cooling** — To start unit, turn on main power supply. Set system selector switch at COOL position and fan switch at AUTO. position. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor.

Check unit charge. Refer to Refrigerant Charge section on page 20.

Reset thermostat at a position above room temperature. Compressor will shut off.

**TO SHUT OFF UNIT** — Set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting.

**Heating** — To start unit, turn on main power supply.

Set thermostat at HEAT position and a setting above room temperature, fan at AUTO. position.

First stage of thermostat energizes Compressor no. 1 and Compressor no. 2; second stage energizes the electric heat (where applicable). Check heating effects at air supply grille(s).

If unit does not energize, reset limit switch (located on indoor-fan scroll) by depressing button located between terminals on the switch.

**TO SHUT OFF UNIT** — Set system selector switch at OFF position. Resetting heating selector lever below room temperature will shut unit off temporarily until the space temperature falls below thermostat setting.

**Safety Relief** — A soft-solder joint at the suction line fitting provides pressure relief under abnormal temperature and pressure conditions.

**Ventilation (Continuous Fan)** — Set fan and system selector switches at ON and OFF positions, respectively. Indoor fan operates continuously to provide constant air circulation.

**Operating Sequence** (See Fig. 20)

**COOLING** — *With accessory economizer* — Upon a request for cooling from the space thermostat, terminals Y1 and G will be energized with 24 v. As a result, the indoor-fan contactor (IFC), indoor-fan motor (IFM), and reversing valve solenoids (RVS1 and RVS2) will be energized and the

economizer damper blade will open to minimum position. Note that if the indoor fan is on when the space thermostat calls for cooling, terminal G is already energized and the economizer damper blade is at minimum position.

If the outdoor-air temperature is below the outdoor-air thermostat (OAT) setting, then the position of the damper blade will be determined by the temperature of the discharge air as sensed by the discharge-air thermistor (DAT). The damper blade will slide open for 5 seconds, and rest for 30 seconds until the proper discharge-air temperature is obtained. The damper blade will modulate to different positions to maintain this discharge-air temperature.

If the thermostat calls for a second stage of cooling by supplying 24 v to Y2, the outdoor-fan contactor (OFC) and Compressor contactor no. 1 (C1) will be energized, which will bring on the outdoor fan and Compressor no. 1, respectively.

When the thermostat is satisfied, Y2 will be deenergized first, which will deenergize the outdoor fan and Compressor no. 1. When the indoor fan is deenergized, the economizer will return to a fully closed position.

If the outdoor-air temperature is above the OAT setting, the economizer will move to the minimum position and the unit will operate as described in Cooling, Units Without Accessory Economizer section below.

*Without accessory economizer* — Upon a request for cooling from the space thermostat, terminals Y1 and G will be energized with 24 v. As a result, the indoor-fan contactor (IFC), outdoor-fan contactor (OFC) and Compressor contactor no. 1 (C1) will be energized, which in turn will energize the indoor fan, outdoor fan and Compressor no. 1, respectively.

If the space thermostat calls for a second stage of cooling by supplying 24 v to Y2, Compressor contactor no. 2 (C2) will be energized, thus energizing Compressor no. 2.

When the space thermostat is satisfied, Y2 will be deenergized first, which will deenergize Compressor no. 2.

Upon a further drop in space temperature, Y1 will be deenergized which will deenergize Compressor no. 1, and the outdoor and indoor fans.

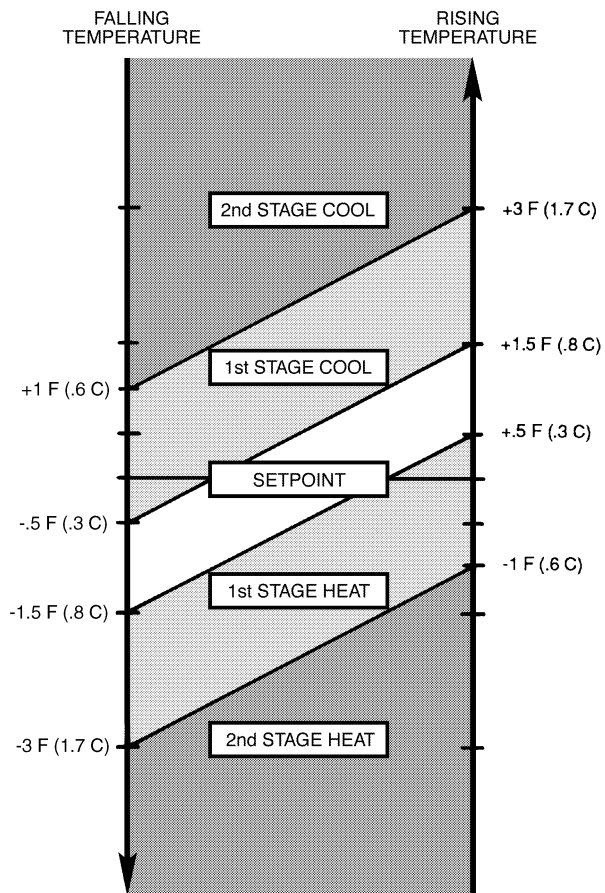
**HEATING** — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. On units with economizer, the economizer damper blade will move to minimum position regardless of the outdoor-air temperature, and the unit will operate as described in Cooling, Without Accessory Economizer section above. The IFC, OFC, C1 and C2 will be energized. The reversing valves switch position and the indoor fan, outdoor fan, Compressor no. 1, and Compressor no. 2 are energized.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24 v, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be deenergized first, and the electric heater(s) will be deenergized.

Upon a further rise in space temperature, W1 will be deenergized, and the reversing valve solenoids (RVS1 and RVS2) will be energized. On units with economizer, the economizer damper blade will move to the fully closed position.

**DEFROST** — When the temperature of the outdoor coil drops below 28 F as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 50 or 90 minutes). RVS1 and RVS2 are energized and the OFC is deenergized. This switches the



**NOTES:**

1. In heating mode, economizer damper blade will move to the minimum position, and unit will operate as described for units without economizer, regardless of outdoor air temperature.
2. The temperatures given in the graph are for demonstration purposes only and may vary depending on which thermostat is used.

**LEGEND**

- C** — Contactor
- HC** — Heater Contactor
- IFC** — Indoor-Fan Contactor
- OAT** — Outdoor-Air Thermostat
- OFC** — Outdoor-Fan Contactor
- RVS** — Reversing Valve Solenoid
- W** — Heating Stage
- X** — Contact Energized
- Y** — Cooling Stage

**UNITS WITH ECONOMIZER**

AVERAGE OUTDOOR-AIR TEMPERATURE GREATER THAN OAT SETTING												
Thermostat Demand	G	Y1	Y2	W1	W2	C1	C2	IFC	OFC	RVS1	RVS2	HC
Second Stage Cooling	X	X	X			X	X	X	X	X	X	
First Stage Cooling	X	X				X		X	X	X	X	
Deadband (Offset)												
First Stage Heating				X		X		X	X			
Second Stage Heating				X	X	X	X	X	X			

AVERAGE OUTDOOR-AIR TEMPERATURE LESS THAN OAT SETTING, BUT GREATER THAN -2 C (28 F)												
Thermostat Demand	G	Y1	Y2	W1	W2	C1	C2	IFC	OFC	RVS1	RVS2	HC
Second Stage Cooling	X	X	X			X		X	X	X	X	
First Stage Cooling	X	X						X	X	X	X	
Deadband(Offset)												
First Stage Heating				X		X		X	X			
Second Stage Heating				X	X	X	X	X	X			

**UNITS WITHOUT ECONOMIZER**

AVERAGE OUTDOOR-COIL TEMPERATURE LESS THAN -2C (28 F)												
Thermostat Demand	G	Y1	Y2	W1	W2	C1	C2	IFC	OFC	RVS1	RVS2	HC
Second Stage Cooling	X	X	X			X	X	X	X	X	X	
First Stage Cooling	X	X				X		X	X	X	X	
Deadband (Offset)												
First Stage Heating				X		X		X	X			
Second Stage Heating				X	X	X	X	X	X			

AVERAGE OUTDOOR-COIL TEMPERATURE GREATER THAN -2 C (28 F)												
Thermostat Demand	G	Y1	Y2	W1	W2	C1	C2	IFC	OFC	RVS1	RVS2	HC
Second Stage Cooling	X	X	X			X	X	X	X	X	X	
First Stage Cooling	X	X				X		X	X	X	X	
Deadband (Offset)												
First Stage Heating				X		X		X	X			
Second Stage Heating				X	X	X	X	X	X			

**Fig. 20 — Typical Operating Sequence**

position of the reversing valves and shuts off the outdoor fan. The electric heaters (if installed) will be energized. On units with economizer, the economizer damper blade will move to the fully closed position.

The unit continues to defrost until the coil temperature as measured by DFT2 reaches 65 F or the duration of defrost cycle completes a 10-minute period.

During the defrost mode, if circuit 1 defrosts first, RVS1 will oscillate between heating and cooling modes until the defrost mode is complete.

At the end of the defrost cycle, the electric heaters (if installed) will be deenergized; the reversing valves switch and the outdoor-fan motor will be energized. On units with economizer, the economizer damper blade will move to the minimum position. The unit will now operate in the heating mode.

If the space thermostat is satisfied during a defrost cycle, the unit will continue in the defrost mode until the time or temperature constraints are satisfied.

## SERVICE

### ▲ CAUTION

When servicing unit, shut off all electrical power to unit to avoid shock hazard or injury from rotating parts.

**Cleaning** — Inspect unit interior at the beginning of each heating and cooling season and as operating conditions require.

### INDOOR COIL

1. Turn unit power off. Remove indoor coil access panel.
2. If accessory economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. Refer to Accessory Economizer Installation Instructions for more details.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material.
5. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

**OUTDOOR COIL** — Inspect coil monthly. Clean outdoor coil annually, and as required by location and outdoor air conditions.

**2-Row Coils** — Clean coil as follows:

1. Turn off unit power.
2. Remove top panel screws on outdoor-coil end of unit.
3. Remove outdoor-coil corner post. See Fig. 21. To hold top panel open, place coil corner post between top panel and center post. See Fig. 22.
4. Remove device holding coil sections together at return end of outdoor coil. Carefully separate the outer coil section 75 to 100 mm (3 to 4 in.) from the inner section. See Fig. 23.
5. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.

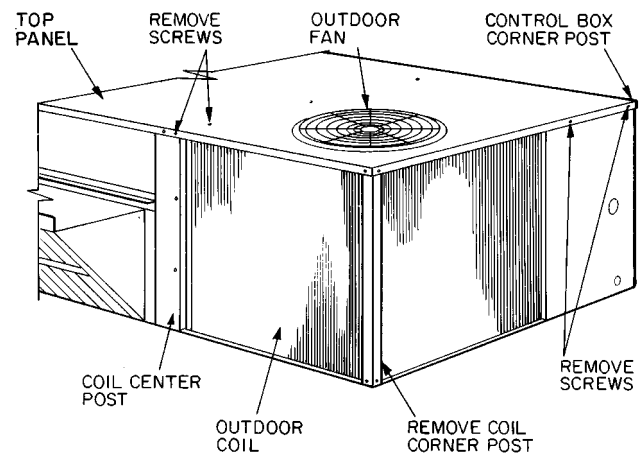


Fig. 21 — Cleaning Outdoor Coil

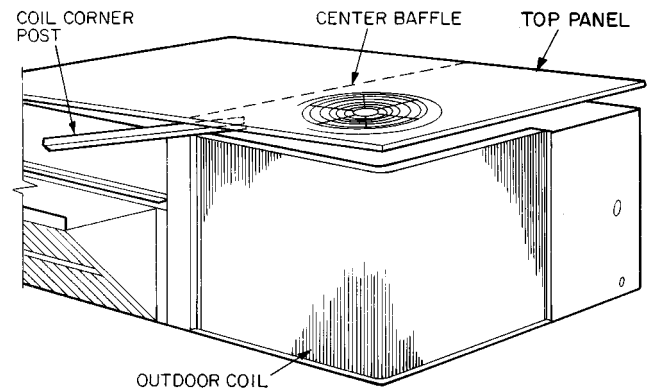


Fig. 22 — Propping Up Top Panel

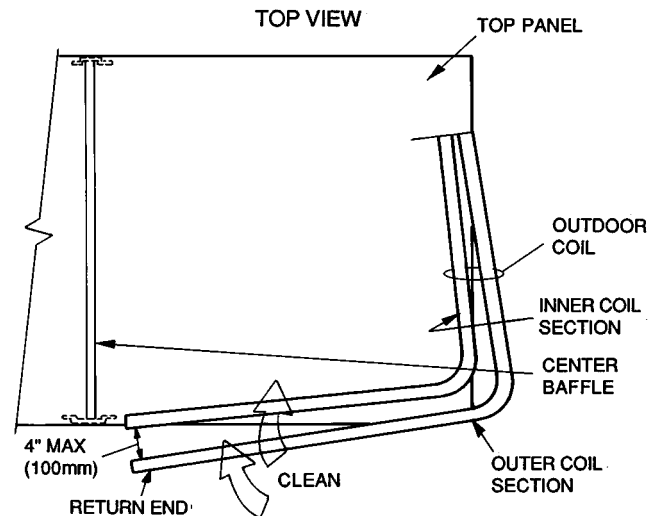


Fig. 23 — Separating Coil Sections

6. Reposition the outer coil panel section and remove the coil corner post from between the top panel and center post. Secure the sections together.
7. Install the coil corner post, coil center post and replace all screws.

**CONDENSATE DRAIN** — Check and clean each year at start of cooling season. In winter, keep drain dry or protect against freeze-up.

**FILTERS** — Clean or replace at start of each heating and cooling season, or more often if operating conditions require it. Replacement filters must be same dimensions as original filters.

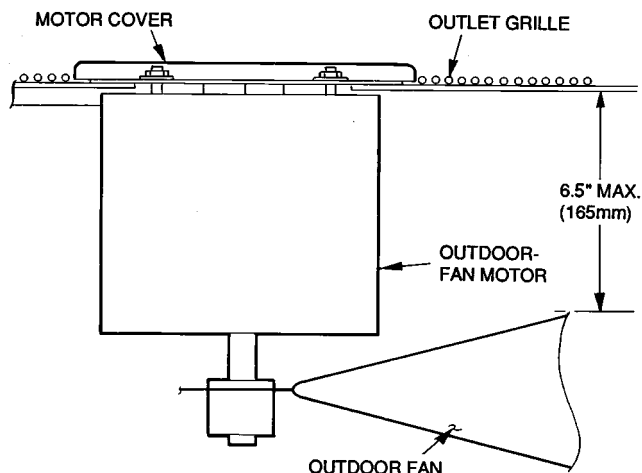
**OUTDOOR-AIR INLET SCREENS** — Clean screens with steam or hot water and a mild detergent. Do not use disposable filters in place of screens.

### Lubrication

**COMPRESSORS** — Each compressor is charged with correct amount of oil at the factory.

**FAN-MOTOR BEARINGS** — *Fan motor bearings are of the permanently-lubricated type. No further lubrication is required.* No lubrication of outdoor- or indoor-fan motors is required.

### Outdoor-Fan Adjustment (Fig. 24)



**Fig.24 — Outdoor-Fan Adjustment**

1. Shut off unit power supply.
2. Remove outdoor-fan assembly (grille, motor, motor cover and fan) and loosen fan hub setscrews.
3. Adjust fan height as shown in Fig. 24.
4. Tighten setscrews and replace outdoor-fan assembly.

**Refrigerant Charge** — Amount of refrigerant charge is listed on the unit nameplate (also refer to Tables 1A and 1B). Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants section.

Unit panels must be in place when unit is operating during charging procedure.

**LOW CHARGE HEATING OR NO CHARGE** — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Tables 1A and 1B).

**LOW CHARGE COOLING** — Use Cooling Charging Chart, Fig. 25 and 26. Vary refrigerant until the conditions of the chart are met. Note the charging chart is different from type normally used. Chart is based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air L/s (cfm) must be within the normal operating range of the unit.

**TO USE COOLING CHARGING CHART** — Take the outdoor ambient temperature and read the suction pressure gage. Refer to chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully blow some of the charge. Re-check the suction pressure as charge is adjusted.

Example: (Fig. 26) (Circuit 1)

Outdoor Temperature	..... 29 C (85 F)
Suction Pressure	..... 483 kPa (70 psig)
Suction Temperature should be	..... 7 C (46 F)
(Suction Temperature may vary $\pm 3^{\circ}$ C (5 $^{\circ}$ F))	

If Chargemaster<sup>®</sup> charging device is used, temperature and pressure readings must be accomplished using the charging chart.

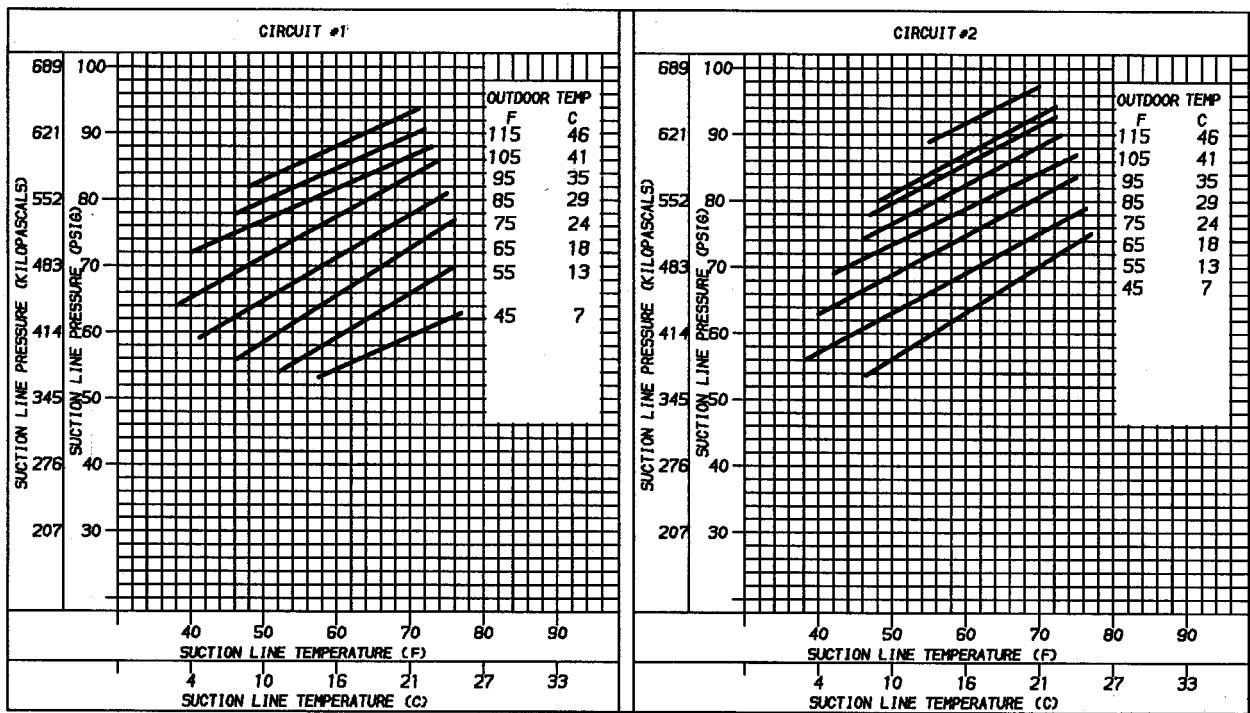


Fig. 25 — Cooling Charging Charts, 50LJQ008

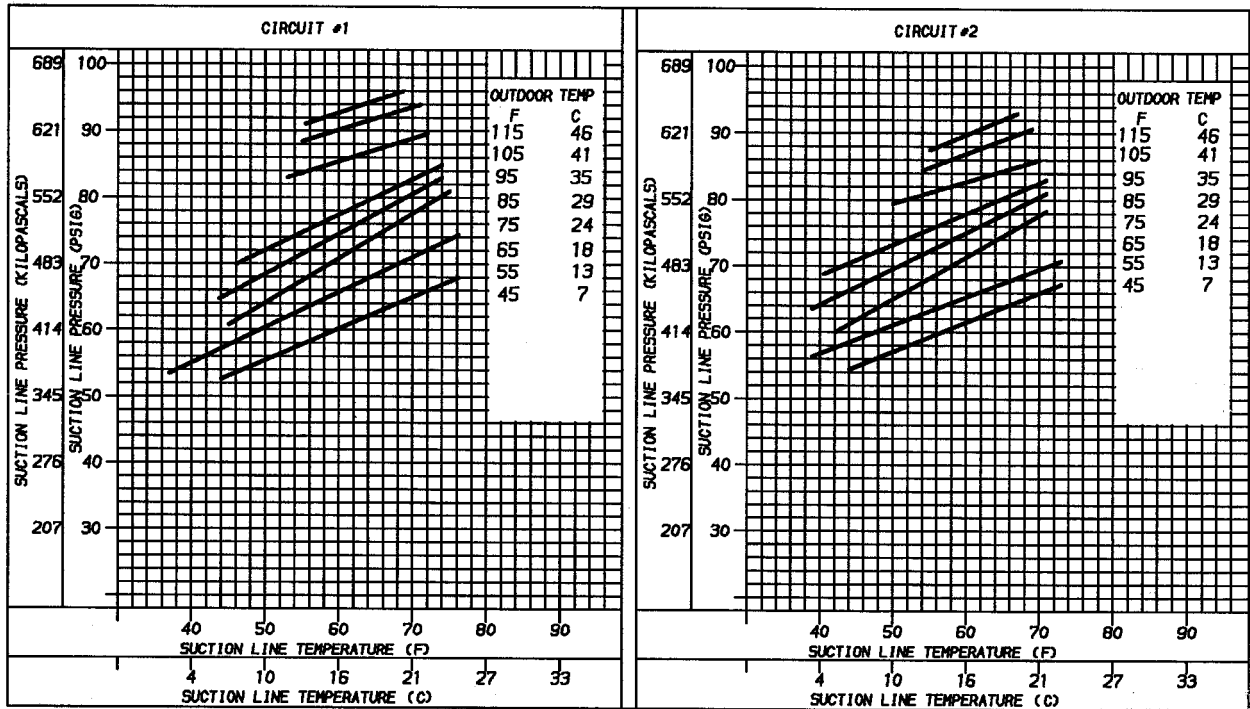


Fig. 26 — Cooling Charging Charts, 50LJQ012









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