



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 extinguishers 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

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install accessory roof curb in accordance with instructions shipped with the curb. Accessory roof curb and information required to field fabricate a roof curb are shown in Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be secured to roof curb before unit is set in place.

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

Curb should be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is $\pm 1/16$ in. per linear ft in any direction. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

ALTERNATE UNIT SUPPORT — When the curb cannot be used, support unit with sleepers using unit curb support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Step 2 — Rig and Place Unit — Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright, and do not drop. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is $\pm 1/16$ in. per linear ft in any direction. See Fig. 3 for additional information. Unit weight is shown in Table 1.

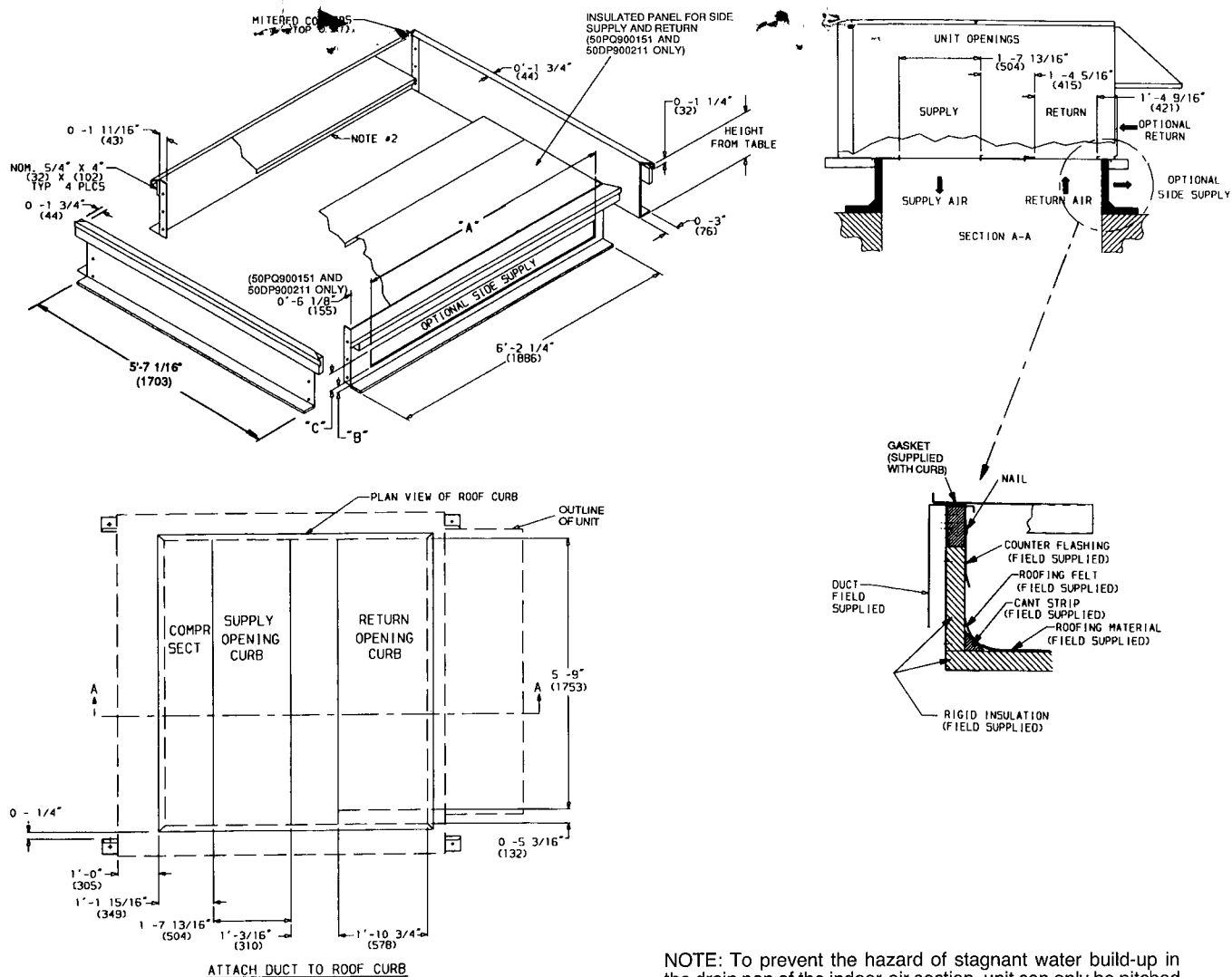
Four lifting holes are provided in ends of unit base rails as shown in Fig. 3. Refer to rigging instructions on unit.

POSITIONING — Provide clearance around and above unit for airflow, safety, and service access (Fig. 4 and 5).

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

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

ROOF MOUNT — Check building codes for weight distribution requirements.



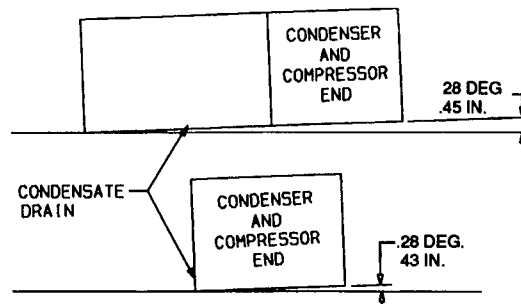
NOTE: To prevent the hazard of stagnant water build-up in the drain pan of the indoor-air section, unit can only be pitched as shown

LEGEND

COMP. SECT. — Compressor Section

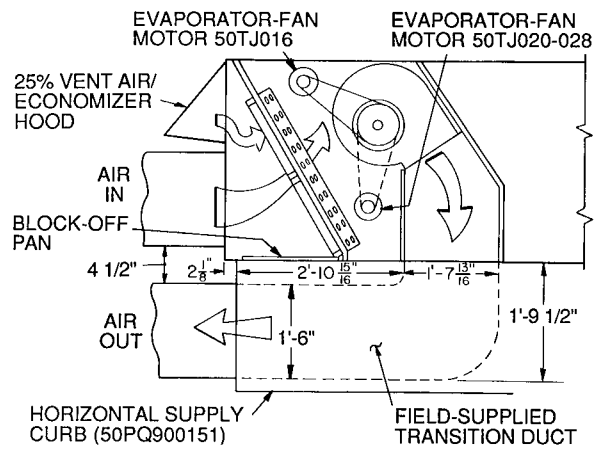
NOTES

1. Roof curb accessory is shipped unassembled
2. Insulated panels, 1/2-in. thick neoprene-coated, 2 lb density.
3. Dimensions in () are in millimeters.
4. Direction of airflow.
5. Roof curb: 18 gage steel.
6. Attach all ductwork to roof curb.



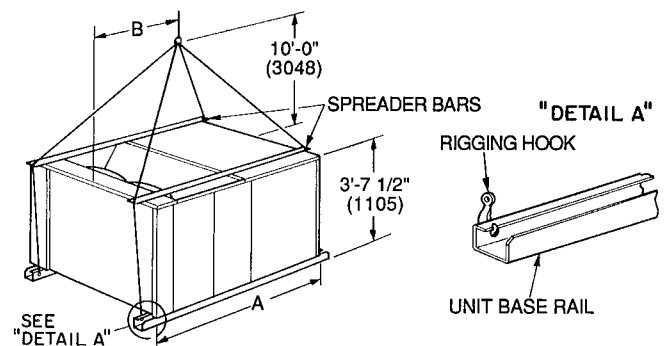
ACCESSORY PACKAGE NO.	CURB HEIGHT	DESCRIPTION	"A"	"B"	"C"
50PQ900221	1'-2" (305)	Standard Curb — 14" High	—	—	—
50PQ900141	2'-0" (610)	Standard Curb for Units Requiring High Installation	—	—	—
50PQ900151	2'-0" (610)	Horizontal Adapter Curb	5'-6" (1676)	0'-2 1/2" (64)	1'-6" (457)
50DP900211	1'-11" (584)	Pre-Assembled, High-Static, Horizontal Adapter Curb	6'-2" (1880)	0'-6 1/4" (159)	1'-2 5/8" (371)

Fig. 1 — Roof Curb Details



NOTE. For preassembled horizontal adapter curb part no. 50DP900211, the accessory kit includes a factory-designed, high-static, regain transition duct. For horizontal adapter curb part no. 50PQ900151, a field-supplied transition duct is required

Fig. 2 — Horizontal Adapter Curbs



UNIT 50TJ	MAXIMUM SHIPPING WEIGHT		DIMENSIONS			
			A		B	
	Lb	Kg	Ft-in.	mm	Ft-in.	mm
016	1779	807	6-11 1/2	2121	3-2	965
020,024	2010	912	6-11 1/2	2121	3-4	1016
028	2394	1086	6-11 1/2	2121	3-0	914

NOTES:

- 1 Dimensions in () are in millimeters.
- 2 Refer to Table 1 for unit operating weights.
- 3 Remove boards at ends of unit and runners prior to rigging
- 4 Rig by inserting hooks into unit base rails as shown. Use corner post from packaging to protect coil from damage. Use bumper boards for spreader bars.
- 5 Weights do not include optional economizer. See Table 1 for economizer weight.
6. Weights given are for aluminum evaporator coil plate fins and copper condenser coil plate fins. Weights of other metal combinations are listed in Table 1.

⚠ CAUTION

All panels must be in place when rigging.

Fig. 3 — Rigging Details

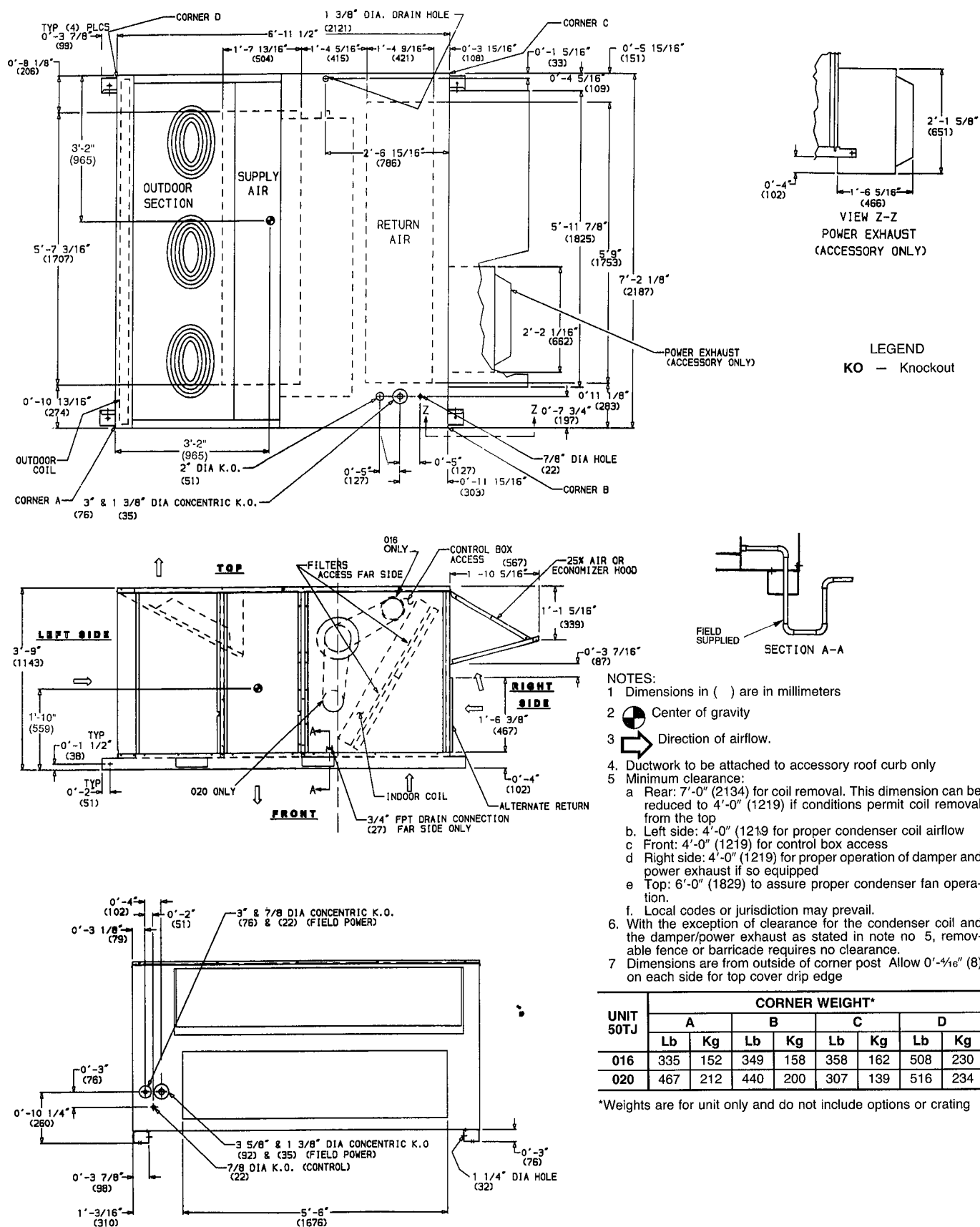


Fig. 4 — Base Unit Dimensions, 50TJ016,020

UNIT 50TJ	CORNER WEIGHT*								DIMENSIONS			
	A		B		C		D		A		B	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft.-in.	mm	Ft.-in.	mm
024	467	212	440	200	307	139	516	234	3-4	1016	3-7	1092
028	504	229	523	237	533	242	554	251	3-4 $\frac{3}{4}$	1035	3-7	1092

*Weights are for unit only and do not include options or crating

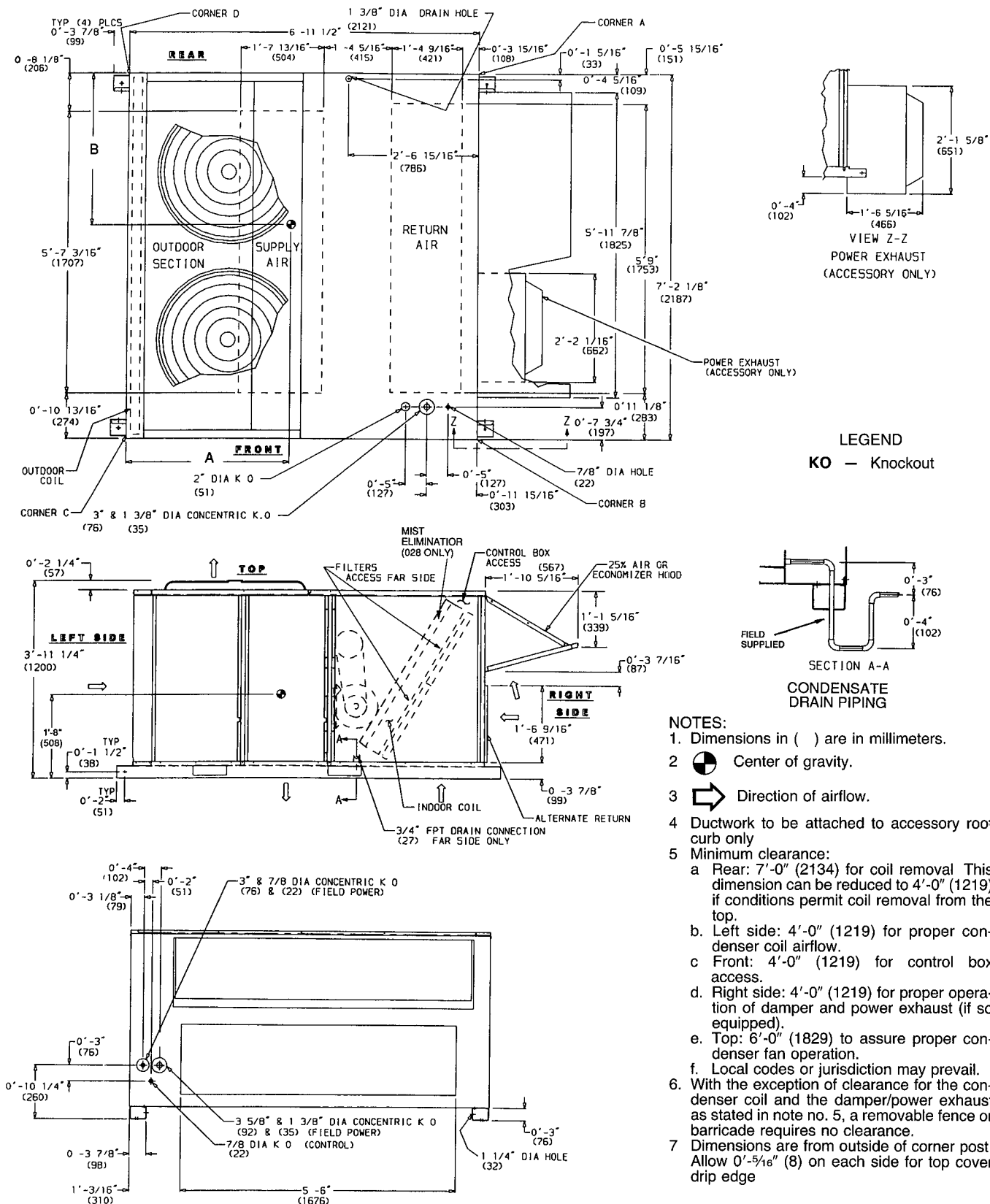


Fig. 5 — Base Unit Dimensions, 50TJ024,028

Table 1 — Physical Data

UNIT SIZE	016		020	024	028
	208/230,460 v	575 v			
NOMINAL CAPACITY (tons)	15		18	20	25
OPERATING WEIGHT (lb)					
Unit					
Al/Al*	1549		1730	1730	2114
Al/Cu*	1629		1860	1860	2244
Economizer	110		110	110	110
Roof Curb†	200		200	200	200
COMPRESSOR	Semi-Hermetic			Hermetic	Semi-Hermetic
Quantity	1		2	2	2
Oil (oz)	130		65 ea	65 ea	152 ea
REFRIGERANT TYPE			R-22		
Operating Charge (lb-oz)					
Circuit 1**	19-4		15-4	15-8	16-12
Circuit 2	—		12-6	15-8	15-12
CONDENSER COIL			Enhanced Copper Tubes, Aluminum Lanced or Copper Fins		
Rows...Fins/in.	2.. 17		3 15	4 ..15	4...15
Total Face Area (sq ft)	22.2		22 2	22 2	22.2
CONDENSER FAN			Propeller Type		
Nominal Cfm	10,500		10,500	14,200	14,200
Quantity...Diameter (in.)	3 ..22		3...22	2.. 30	2...30
Motor Hp...Rpm	½ ..1050		½...1050	1...1075	1 ..1075
Watts Input (Total)	1100		1100	3400	3400
EVAPORATOR COIL			Copper Tubes, Aluminum or Copper Plate Fins		
Rows...Fins/in.	2. 17		3. 17	4 ..15	4 15
Total Face Area (sq ft)	17 9		17.9	17.9	17.9
EVAPORATOR FAN			Centrifugal Type		
Quantity...Size (in.)	2...10 x 10	2 .10 x 10	2. .12 x 12	2...12 x 12	2...12 x 12
Type Drive	Belt	Belt	Belt	Belt	Belt
Nominal Cfm	6000	6000	7200	8000	10,000
Motor Hp	3.7	3	5	7½	10
Maximum Continuous Bhp	4.25	3.45	5.90	8.7 [208/230,575 v]	10.26 [208/230,575 v]
				9.5 [460 v]	11 80 [460 v]
Motor Frame Size	56H	56H	184T	213T	215T
Fan Rpm Range	1194-1526	1201-1462	1047-1251	1238-1494	1323-1579
Motor Bearing Type	Ball	Ball	Ball	Ball	Ball
Maximum Allowable Rpm	1550	1550	1550	1550	1550
Motor Pulley Pitch Diameter	3 4/4 4	4 3/5.3	4.9/5.9	5.4/6.4	5 8/7 0
Min/Max (in.)					
Nominal Motor Shaft Diameter (in.)	7/8	7/8	1 1/8	1 3/8	1 3/8
Fan Pulley Pitch Diameter (in.)	5.0	6 4	8 4	7 9	7 9
Belt, Quantity...Type...Length (in.)	1 ..AX. 42	1. .BX...45	1.. BX...50	1 ..BX 50	1 BX. 51
Pulley Center Line Distance (in.)	13 5-15.5	13.5-15.5	13.3-14.8	14 6-15 4	14 6-15 4
Speed Change per Full Turn of Movable Pulley Flange (rpm)	66	52	34	43	43
Movable Pulley Maximum Full Turns From Closed Position	5	5	6	6	6
Factory Setting	3.5	3.5	3	3	3
Factory Speed Setting (rpm)	1293	1279	1149	1366	1451
Fan Shaft Diameter at Pulley (in.)	1 3/16	1 3/16	1 7/16	1 7/16	1 7/16
HIGH-PRESSURE SWITCH (psig)					
Standard Compressor Internal Relief (Differential)			—		
Cutout			426		
Reset (Auto.)			320		
LOW-PRESSURE SWITCH (psig)					
Cutout			7		
Reset (Auto.)			22		
FREEZE PROTECTION THERMOSTAT (F)					
Opens			30 ± 5		
Closes			45 ± 5		
OUTDOOR-AIR INLET SCREENS					
Quantity...Size (in.)			Cleanable		
			2. 20 x 25 x 1		
			1. 20 x 20 x 1		
RETURN-AIR FILTERS					
Quantity...Size (in.)			Throwaway††		
			4 .20 x 20 x 2		
			4 16 x 20 x 2		

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material.

†Weight of 14-in. roof curb

**On 50TJ020-028 units, Circuit 1 consists of lower portion of both the condenser and evaporator coils, and Circuit 2 consists of the upper portion of both coils.

††The 50TJ028 units require 2-in. industrial-grade filters capable of handling face velocities up to 625 ft/min (such as American Air Filter no. 5700 or equivalent)

NOTE: The 50TJ016-028 units have a low-pressure switch on the suction side (standard)

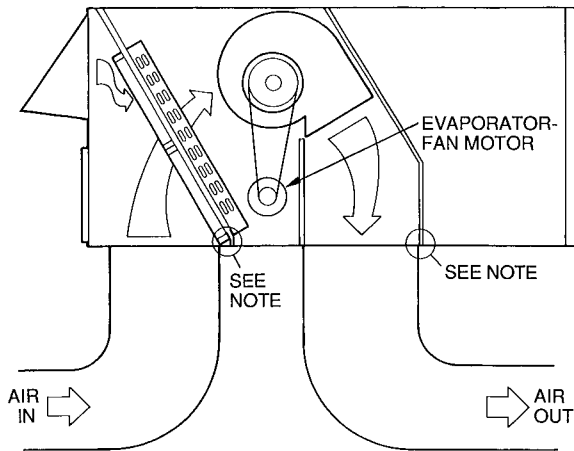
Step 3 — Field Fabricate Ductwork — Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

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

The 50TJ units with electric heat require a 1-in. clearance for the first 24 in. of ductwork.

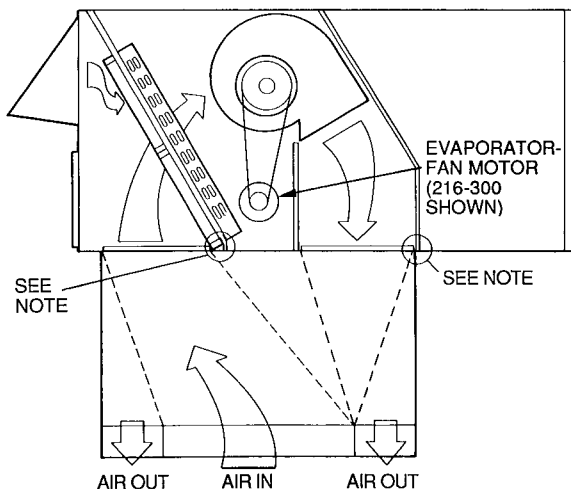
Outlet grilles must not lie directly below unit discharge.

Step 4 — Make Unit Duct Connections — Unit is shipped for through-the-bottom duct connections. Ductwork openings are shown in Fig. 6. Field-fabricated concentric ductwork may be connected as shown in Fig. 7 and 8. Attach all ductwork to roof curb and roof curb basepans. Refer to installation instructions shipped with accessory roof curb for more information.



NOTE: Do not drill in this area, as damage to basepan may result in water leak.

Fig. 6 — Air Distribution — Through-the-Bottom

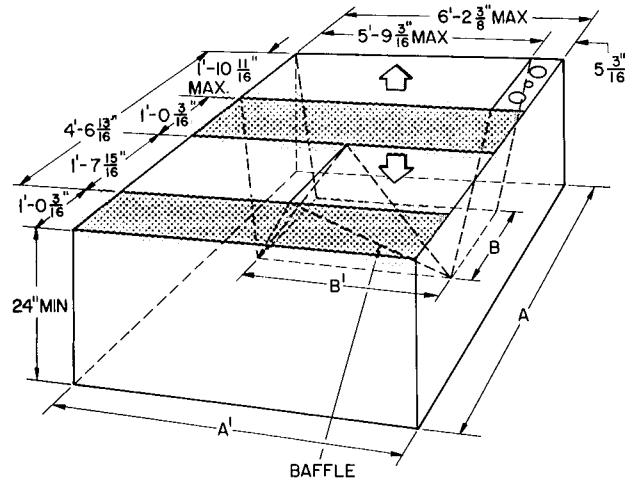


NOTE: Do not drill in this area, as damage to basepan may result in water leak.

Fig. 7 — Concentric Duct Air Distribution

Step 5 — Trap Condensate Drain — See Fig. 4, 5, and 9 for drain location. Plug is provided in drain hole and must be removed when unit is operating. One 3/4-in. half coupling is provided inside unit evaporator section for condensate drain connection. An 8 1/2 in. x 3/4-in. diameter

nipple and a 2-in. x 3/4-in. diameter pipe nipple are coupled to standard 3/4-in. diameter elbows to provide a straight path down through holes in unit base rails (see Fig. 10). A trap at least 4-in. deep must be used.



Shaded area indicates block-off panels.

NOTE: Dimension A, A' and B, B' are obtained from field-supplied ceiling diffuser.

Fig. 8 — Concentric Duct Details

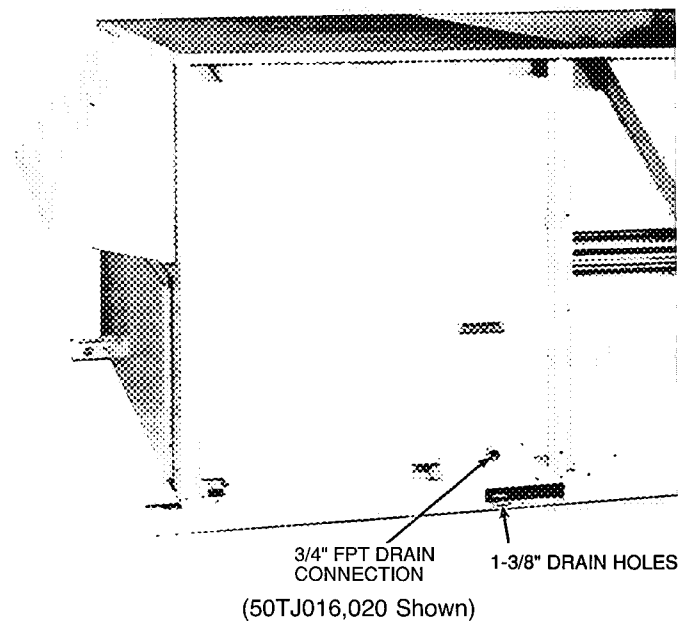


Fig. 9 — Condensate Drain Details

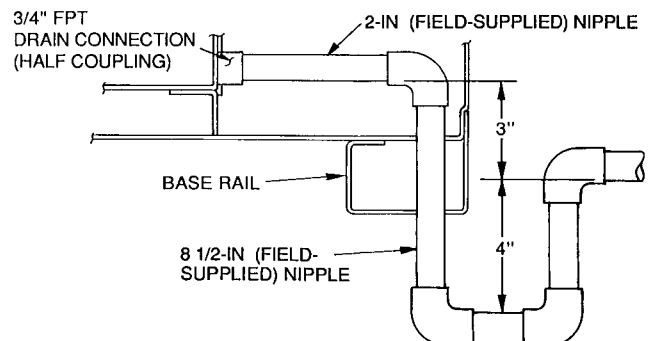


Fig. 10 — Condensate Drain Piping Details

Step 6 — Make Electrical Connections

FIELD POWER SUPPLY — Unit is factory wired for voltage shown on nameplate.

When installing units, provide a disconnect, per NEC (National Electrical Code) requirements, of adequate size (Table 2).

All field wiring must comply with NEC and local requirements.

Route power lines through control box access panel or unit basepan (Fig. 4 and 5) to connections as shown on unit wiring diagram and Fig. 11.

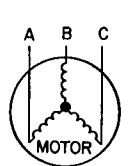
Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current must be balanced within 10%.

Use the following formula to determine the percentage of voltage imbalance.

Percentage of Voltage Imbalance

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

Example: Supply voltage is 460-3-60.



$$\begin{aligned} AB &= 452 \text{ v} \\ BC &= 464 \text{ v} \\ AC &= 455 \text{ v} \end{aligned}$$

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage:

$$\begin{aligned} (AB) \quad 457 - 452 &= 5 \text{ v} \\ (BC) \quad 464 - 457 &= 7 \text{ v} \\ (AC) \quad 457 - 455 &= 2 \text{ v} \end{aligned}$$

Maximum deviation is 7 v.

Determine the percentage of voltage imbalance:

$$\text{Percentage of Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

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.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

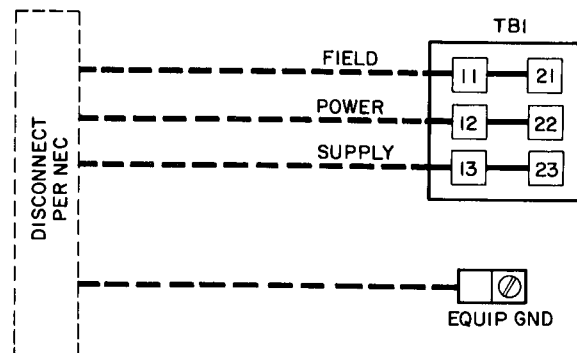
FIELD CONTROL WIRING — Install a Carrier-approved accessory thermostat assembly according to the installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of no. 18 AWG (American Wire Gauge) colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 12.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as indicated in Table 3. Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to accessory remote control instructions as required.



TB1 MAXIMUM WIRE SIZE

UNIT	VOLTAGE		
	208/230	460	575
50TJ			
016	350 kcmil	2/0	2/0
020,024	350 kcmil	2/0	2/0
028	350 kcmil	2/0	2/0

LEGEND

EQUIP — Equipment
GND — Ground
kcmil — Thousand Circular Mills
NEC — National Electrical Code
TB — Terminal Block

Fig. 11 — Field Power Wiring Connections

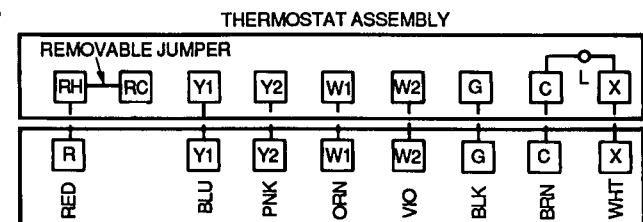


Fig. 12 — Field Control Thermostat Wiring

Table 2 — Electrical Data

UNIT 50TJ	NOMINAL VOLTAGE (60 Hz)	IFM TYPE	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		ELECTRIC HEAT*		POWER SUPPLY	
					No. 1		No. 2										
			Min	Max	RLA	LRA	RLA	LRA	Quantity	Hp	FLA (ea)	Hp	FLA	Nom kW	FLA	MCA	MOCP†
016 (15 Tons)	208/230 (3 phase)	Std	187	254	61.0	266	—	—	3	½	1.70	3.7	12 0/12.0	— 26/34 42/56 56/75**	— 72/ 82 117/135 156/180	93/ 93 105/118 161/150 171/195	150/150 150/150 175/150 175/200
	460 (3 phase)	Std	414	508	28.0	120	—	—	3	½	0.80	3.7	5 4	— 32 55 80**	— 39 66 96	43 56 73 103	70 70 80 110
	575 (3 phase)	Std	518	632	23 0	96	—	—	3	½	0.75	3	3 8	— 50	— 50	35 57	50 70
020 (18 Tons)	208/230 (3 phase)	Std	187	254	28 3	205	25.0	185 0	3	½	1.70	5	16 7/15 2	— 26/34 42/56 56/75**	— 72/ 82 117/135 156/180	82/ 81 111/122 167/154 177/199	110/100 125/125 175/175 200/200
	460 (3 phase)	Std	414	508	14 4	104	12.4	89 0	3	½	0 80	5	7 6	— 32 55 80**	— 39 66 96	40 58 76 106	50 60 80 110
	575 (3 phase)	Std	518	632	11 4	78.4	10 4	78 4	3	½	0 75	5	6.1	—	—	33	40
024 (20 Tons)	208/230 (3 phase)	Std	187	254	34 5	239	28.3	205.0	2	1	5.50	7½	24.2/22.0	— 26/34 42/56 56/75**	— 72/ 82 117/135 156/180	107/107 120/130 177/163 186/208	125/125 125/150 200/175 200/225
	460 (3 phase)	Std	414	508	17	119	14 4	104.0	2	1	2.80	7½	11.0	— 32 55 80**	— 39 66 96	52 63 80 110	60 70 90 110
	575 (3 phase)	Std	518	632	15.2	111	11.4	78 4	2	1	3 40	7½	9 0	—	—	46	60
028 (25 Tons)	208/230 (3 Phase)	Std	187	254	43 6	228	43.6	228 0	2	1	5 50	10	30 8/28 0	— 26/34 42/56 56/75**	— 72/ 82 117/135 156/180	140/137 140/138 185/170 195/215	175/175 175/175 200/175 225/225
	460 (3 phase)	Std	414	508	22 1	114	22 1	114.0	2	1	2 80	10	14.0	— 32 55 80**	— 39 66 96	69 69 83 113	90 90 90 125
	575 (3 phase)	Std	518	632	17 9	91	17 9	91 0	2	1	3 40	10	11 0	—	—	58	70

LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, 480 v, and 575 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly

†Fuse or HACR circuit breaker

**Heaters are field installed only

NOTES:

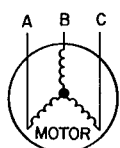
- In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The Canadian units may be fuse or circuit breaker.

2. **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 percent of voltage imbalance.

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

EXAMPLE: Supply voltage is 460-3-60



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

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.

- MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA)



Step 7 — Make Outdoor-Air Inlet Adjustments

MANUAL OUTDOOR-AIR DAMPER — All units (except those equipped with a factory-installed economizer) have a manual outdoor-air damper to provide ventilation air. Damper can be preset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move damper to desired setting. Then retighten screws to secure damper (Fig. 13).

OPTIONAL ECONOMIZER

Economizer Motor Control Module (Fig. 14-16) — Set to the "D" setting (Fig. 15). The control module is located on the economizer motor. See Fig. 14 and 16

Damper Vent Position Setting

1. Set fan switch at ON position (continuous fan operation) and close night switch if used.
2. Set system selector switch to OFF position.
3. Turn adjustment screw slowly until dampers assume desired vent position. *Do not manually operate economizer motor since damage to motor will result.*

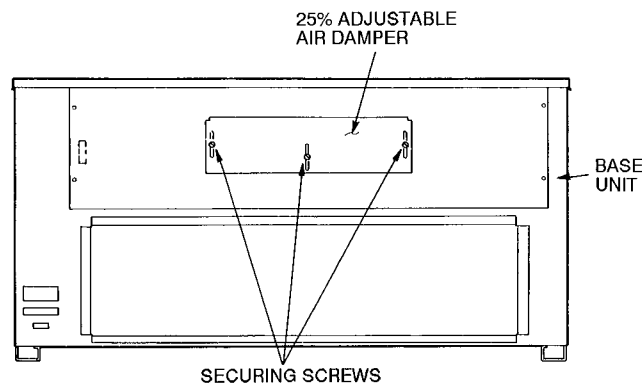


Fig. 13 — 25% Outdoor-Air Section Details

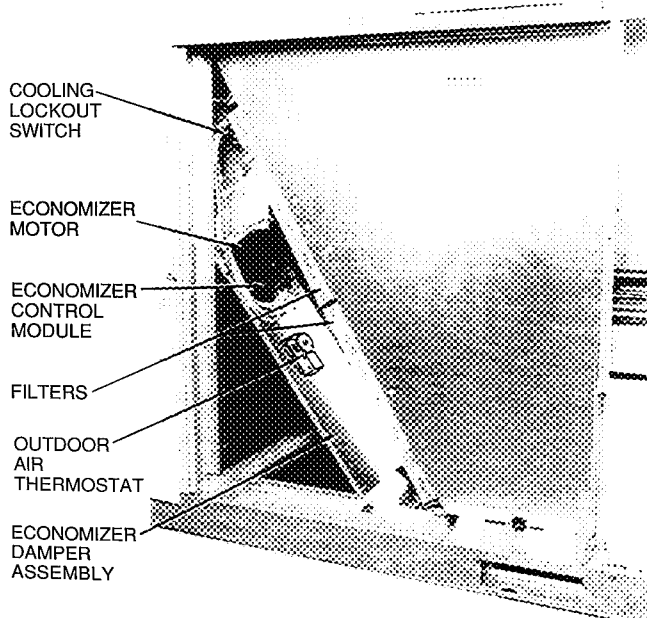
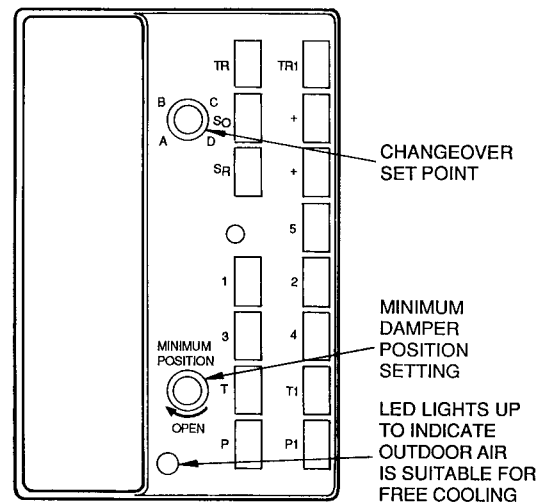


Fig. 14 — Economizer Damper Assembly — End View

Table 3 — Heat Anticipator Settings

UNIT 50TJ	UNIT VOLTAGES	kW*	STAGE 1	STAGE 2
016-028	208/230-3-60	26/34	40	66
		42/56	66	40
		56/75	66	66
	460-3-60	32	40	40
		55	40	66
		80	66	66
	575-3-60	50	.66	.66

*Heater kW is based on heater voltage of 208 v, 240 v, 480 v, and 575 v



LED — Light-Emitting Diode

Fig. 15 — Economizer Control Module

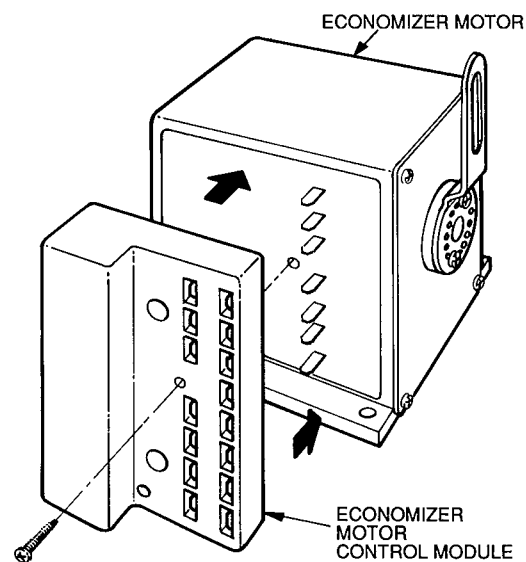


Fig. 16 — Economizer Control Module Location

Step 8 — Install Outdoor-Air Hood — The same type of factory-installed hood is used on units with 25% air ventilation and units with an economizer.

NOTE: The hood top panel, upper and lower filter retainers, hood drain pan, baffle (020-028), and filter support bracket are secured opposite the condenser end of the unit. The screens, hood side panels, remaining section of filter support bracket, seal strip, and all other hardware are in a package located inside the return-air filter access panel (Fig. 17).

1. Attach seal strip to upper filter retainer. See Fig. 18.
2. Assemble hood top panel and side panels, upper filter retainer, and hood drain pan (Fig. 19).

3. Secure lower filter retainer and filter support bracket to unit. See Fig. 19. Leave screws loose on 020-028 units.
4. Slide baffle (020-028) behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for base unit top panel located above outdoor-air inlet opening.
6. Match notches in hood top panel to unit top panel screws. Insert hood flange between unit top panel flange and unit. Tighten screws.
7. Insert outdoor-air inlet screens and spacer in channel created by lower filter retainer and filter support bracket.
8. Attach remaining section of filter support bracket.

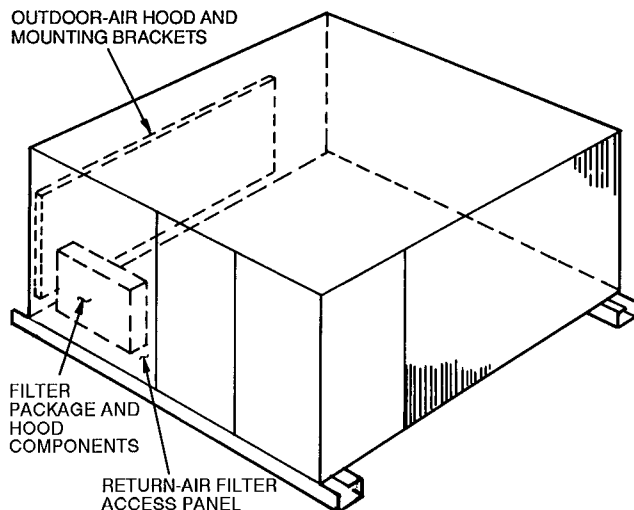


Fig. 17 — Outdoor-Air Hood Component Location

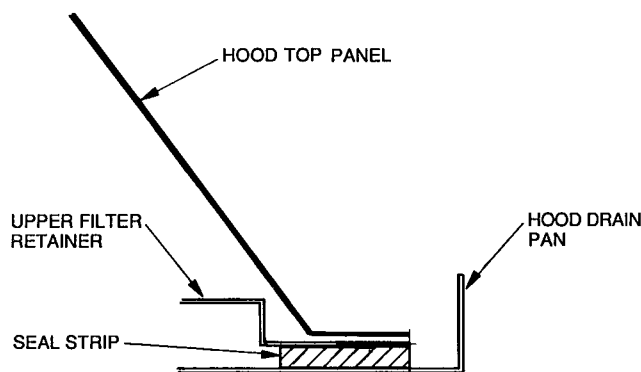


Fig. 18 — Seal Strip Location (Air Hood Crossectional View)

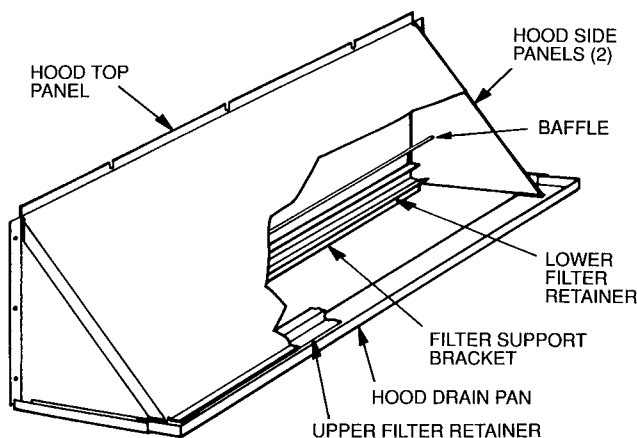


Fig. 19 — Outdoor-Air Hood Details

START-UP

Use the following information and Start-Up Checklist on page CL-1 to check out unit PRIOR to start-up.

Unit Preparation — Check that unit has been installed in accordance with these installation instructions and all applicable codes.

Compressor Mounting — Loosen compressor hold-down bolts on 50TJ016 and 028 units until sideways movement of the washer under each holddown bolt head can be obtained. Do not loosen completely, as bolts are self-locking and will maintain adjustment.

NOTE: DO NOT loosen holddown bolts on 50TJ020 and 024 units with hermetic compressors.

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

Refrigerant Service Ports — Each refrigerant system has one located in the top of the compressor motor casing (semi-hermetic compressors) or on the suction line (hermetic compressors). All units also have one service port on the liquid line and one on either the discharge flange or discharge line. Be sure that the caps on the ports are tight.

Crankcase Heater(s) (50TJ016 and 028 only)

— Heater(s) is energized as long as there is power to unit.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

Evaporator Fan — Fan belt and variable pulleys are factory installed. Remove tape from the fan pulley. See Table 4 for Air Quantity Limits. See Tables 5-8 for Fan Performance data. Be sure that fans rotate in the proper direction. See Table 9 for Static Pressure information for accessories and options. To alter fan performance, see Evaporator-Fan Performance Adjustment sections, page 19.

Table 4 — Air Quantity Limits

UNIT 50TJ	MINIMUM CFM	MAXIMUM CFM
016	4500	7,500
020	5400	9,000
024	6000	10,000
028	7500	11,250

Condenser Fans and Motors — Fans and motors are factory set. Refer to Condenser-Fan Adjustment section (page 20) as required

Return-Air Filters — Check that correct filters are installed in filter tracks. See Table 1. Do not operate unit without return-air filters.

Outdoor-Air Inlet Screens — Outdoor-air inlet screens must be in place before operating unit.

Accessory Economizer Adjustment — Remove filter access panel. Check that outdoor-air damper is closed and return-air damper is open.

Economizer operation and adjustment is described in Base Unit Operation and Economizer Adjustment sections (pages 18 and 20), respectively.

Table 5A — Fan Performance Data, 50TJ016 — 208/230-V and 460-V Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.1		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	790	1.02	906	879	1.23	1092	960	1.43	1270	1039	1.64	1456	1114	1.85	1643	1152	1.97	1751
4800	830	1.21	1075	915	1.43	1270	993	1.64	1456	1068	1.86	1652	1140	2.09	1856	1175	2.21	1958
5100	870	1.42	1261	953	1.65	1465	1028	1.88	1670	1099	2.11	1874	1168	2.35	2087	1202	2.47	2194
5400	911	1.66	1474	991	1.90	1687	1063	2.15	1909	1131	2.39	2123	1197	2.64	2345	1230	2.77	2456
5700	952	1.92	1705	1030	2.18	1936	1099	2.44	2167	1165	2.69	2389	1228	2.95	2620	1259	3.09	2740
6000	994	2.21	1963	1069	2.48	2202	1136	2.76	2451	1200	3.03	2691	1260	3.29	2922	1290	3.43	3047
6300	1035	2.53	2247	1109	2.82	2504	1174	3.10	2753	1235	3.39	3011	1294	3.67	3259	1323	3.81	3384
6600	1078	2.88	2558	1148	3.18	2824	1213	3.48	3019	1271	3.78	3357	1329	4.07	3615	1357	4.22	3748
6900	1120	3.26	2895	1188	3.58	3179	1251	3.89	3455	1309	4.20	3730	—	—	—	—	—	—
7200	1163	3.68	3268	1229	4.01	3561	—	—	—	—	—	—	—	—	—	—	—	—
7500	1205	4.13	3668	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	1189	2.09	1856	1264	2.36	2096	1338	2.67	2371	1410	3.00	2664	1479	3.36	2984
4800	1210	2.32	2060	1280	2.58	2291	1351	2.88	2558	1420	3.20	2842	1488	3.55	3153
5100	1235	2.59	2300	1301	2.85	2531	1367	3.13	2780	1433	3.44	3055	1499	3.78	3357
5400	1262	2.89	2567	1325	3.15	2798	1386	3.42	3037	1449	3.72	3304	1512	4.05	3597
5700	1290	3.22	2860	1351	3.48	3091	1410	3.76	3339	1468	4.05	3597	—	—	—
6000	1320	3.57	3171	1379	3.85	3419	1436	4.13	3668	—	—	—	—	—	—
6300	1351	3.95	3508	1408	4.24	3766	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

NOTES:

1. Factory-shipped motor drive range is 1194 to 1526 rpm. Other rpms may require a field-supplied drive
2. Maximum continuous bhp is 4.25 and maximum continuous watts are 3775. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm

3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information
6. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 5B — Fan Performance Data, 50TJ016 — 575-V Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.1		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	790	1.02	906	879	1.23	1092	960	1.43	1270	1039	1.64	1456	1114	1.85	1643	1152	1.97	1751
4800	830	1.21	1075	915	1.43	1270	993	1.64	1456	1068	1.86	1652	1140	2.09	1856	1175	2.21	1958
5100	870	1.42	1261	953	1.65	1465	1028	1.88	1670	1099	2.11	1874	1168	2.35	2087	1202	2.47	2194
5400	911	1.66	1474	991	1.90	1687	1063	2.15	1909	1131	2.39	2123	1197	2.64	2345	1230	2.77	2456
5700	952	1.92	1705	1030	2.18	1936	1099	2.44	2167	1165	2.69	2389	1228	2.95	2620	1259	3.09	2740
6000	994	2.21	1963	1069	2.48	2202	1136	2.76	2451	1200	3.03	2691	1260	3.29	2922	1290	3.43	3047
6300	1035	2.53	2247	1109	2.82	2504	1174	3.10	2753	1235	3.39	3011	—	—	—	—	—	—
6600	1078	2.88	2558	1148	3.18	2824	—	—	—	—	—	—	—	—	—	—	—	—
6900	1120	3.26	2895	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	1189	2.09	1856	1264	2.36	2096	1338	2.67	2371	1410	3.00	2664	1479	3.36	2984
4800	1210	2.32	2060	1280	2.58	2291	1351	2.88	2558	1420	3.20	2842	—	—	—
5100	1235	2.59	2300	1301	2.85	2531	1367	3.13	2780	1433	3.44	3055	—	—	—
5400	1262	2.89	2567	1325	3.15	2798	1386	3.42	3037	—	—	—	—	—	—
5700	1290	3.22	2860	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

NOTES:

1. Factory-shipped motor drive range is 1201 to 1462 rpm. Other rpms may require a field-supplied drive.
2. Maximum continuous bhp is 3.45 and maximum continuous watts are 3065. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.

3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 6 – Fan Performance; 50TJ020

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5000	617	1.00	903	721	1.30	1157	819	1.60	1424	909	1.90	1710	994	2.30	2019
5500	658	1.30	1143	757	1.60	1418	850	1.90	1701	935	2.20	2000	1015	2.60	2318
6000	702	1.60	1428	796	1.90	1723	884	2.30	2025	965	2.60	2339	1041	3.00	2669
6500	747	2.00	1757	835	2.30	2073	919	2.70	2394	997	3.10	2725	1070	3.40	3069
7000	792	2.40	2138	877	2.80	2476	957	3.20	2816	1031	3.50	3165	1102	3.90	3525
7200	856	2.60	2311	893	3.00	2657	973	3.40	3006	1045	3.74	3362	1115	4.14	3729
7500	838	2.90	2571	918	3.30	2929	996	3.70	3290	1067	4.10	3658	1135	4.50	4035
8000	885	3.40	3060	962	3.90	3440	1036	4.30	3822	1105	4.70	4209	1170	5.20	4604
8500	932	4.00	3610	1005	4.50	4011	1077	4.90	4414	1143	5.40	4821	—	—	—
9000	980	4.70	4223	1050	5.20	4647	1119	5.70	5071	—	—	—	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)											
	1.2			1.4			1.6			1.8		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5000	1076	2.60	2351	1155	3.00	2704	1230	3.40	3076	1302	3.90	3462
5500	1093	3.00	2658	1168	3.40	3017	1240	3.80	3396	1310	4.20	3793
6000	1115	3.40	3018	1186	3.80	3385	1251	4.20	3771	1322	4.70	4175
6500	1140	3.80	3429	1208	4.30	3805	1274	4.70	4198	1338	5.20	4609
7000	1169	4.40	3898	1233	4.80	4285	1296	5.20	4687	1358	5.70	5106
7200	1181	4.60	4108	1245	5.04	4500	—	—	—	—	—	—
7500	1199	4.90	4422	1262	5.40	4822	—	—	—	—	—	—
8000	1232	5.60	5008	—	—	—	—	—	—	—	—	—
8500	—	—	—	—	—	—	—	—	—	—	—	—
9000	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

NOTES:

- 1 Factory-shipped motor drive range is 1047 to 1251 rpm. Other rpms may require a field-supplied drive.
- 2 Maximum continuous bhp is 5.90 and maximum continuous watts are 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.

- 3 Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
- 4 Interpolation is permissible. Do not extrapolate.
- 5 Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information.
- 6 Extensive motor and drive testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 7 — Fan Performance Data, 50TJ024

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5000	617	1.00	903	721	1.30	1157	819	1.60	1424	909	1.90	1710	994	2.30	2019
5500	658	1.30	1143	757	1.60	1418	850	1.90	1701	935	2.20	2000	1015	2.60	2318
6000	702	1.60	1428	796	1.90	1723	884	2.30	2025	965	2.60	2339	1041	3.00	2669
6500	747	2.00	1757	835	2.30	2073	919	2.70	2394	997	3.10	2725	1070	3.40	3069
7000	792	2.40	2138	877	2.80	2476	957	3.20	2816	1031	3.50	3165	1102	3.90	3525
7500	838	2.90	2571	918	3.30	2929	996	3.70	3290	1067	4.10	3658	1135	4.50	4035
8000	885	3.40	3060	962	3.90	3440	1036	4.30	3822	1105	4.70	4209	1170	5.20	4604
8500	932	4.00	3610	1005	4.50	4011	1077	4.90	4414	1143	5.40	4821	1206	5.90	5234
9000	980	4.70	4223	1050	5.20	4647	1119	5.70	5071	1183	6.20	5498	1244	6.60	5930
9500	1028	5.50	4904	1096	6.00	5350	1162	6.50	5796	1224	7.00	6243	1283	7.50	6695
10000	1077	6.30	5655	1141	6.90	6123	1205	7.40	6591	1266	7.90	7059	1323	8.40	7531

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5000	1076	2.60	2351	1155	3.00	2704	1230	3.40	3076	1302	3.90	3462	1374	4.40	3848
5500	1093	3.00	2658	1168	3.40	3017	1240	3.80	3396	1310	4.20	3793	1380	4.60	4190
6000	1115	3.40	3018	1186	3.80	3385	1255	4.20	3771	1322	4.70	4175	1389	5.20	4579
6500	1140	3.80	3429	1208	4.30	3805	1274	4.70	4198	1338	5.20	4609	1402	5.70	5020
7000	1169	4.40	3898	1233	4.80	4285	1296	5.20	4687	1358	5.70	5106	1420	6.20	5525
7500	1199	4.90	4422	1262	5.40	4822	1322	5.90	5235	1381	6.30	5662	1440	6.70	6089
8000	1232	5.60	5008	1292	6.10	5422	1350	6.50	5847	1407	7.00	6286	1464	7.50	6725
8500	1266	6.30	5655	1324	6.80	6085	1380	7.30	6524	1435	7.80	6975	1490	8.30	7426
9000	1302	7.10	6369	1359	7.60	6816	1413	8.10	7270	1466	8.70	7735	1519	9.30	8200
9500	1340	8.00	7152	1394	8.50	7616	1447	9.10	8088	1508	9.40	8428	—	—	—
10000	1378	9.00	8007	1431	9.50	8489	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Input Watts to Motor

NOTES:

1. **Boldface** indicates additional capability of 460 v motor.
2. Factory-shipped motor drive range is 1238 to 1494 rpm. Other rpms may require a field-supplied drive.
3. Maximum continuous bhp is 8.7 (208/230, 575 v) or 9.5 (460 v) and maximum continuous watts are 7915 (208/230, 575 v) or 8640 (460 v). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.

4. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
5. Interpolation is permissible. Do not extrapolate.
6. Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information.
7. Extensive motor and drive testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 8 – Fan Performance Data, 50TJ028

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5,000	645	1.06	972	750	1.33	1226	844	1.63	1497	933	1.94	1789	1017	2.28	2,104	1098	2.65	2,442
5,500	690	1.34	1231	789	1.63	1505	878	1.95	1793	961	2.28	2098	1041	2.63	2,422	1117	3.01	2,768
6,000	736	1.67	1536	830	1.99	1831	915	2.32	2136	944	2.67	2456	1069	3.03	2,792	1141	3.42	3,147
6,500	784	2.05	1890	872	2.40	2206	953	2.75	2530	1028	3.11	2866	1100	3.49	3,216	1169	3.89	3,583
7,000	832	2.49	2297	916	2.86	2634	993	3.23	2978	1065	3.62	3332	1134	4.01	3,697	1200	4.43	4,076
7,500	881	3.00	2761	961	3.39	3119	1035	3.78	3483	1104	4.19	3855	1170	4.60	4,237	1233	5.03	4,631
8,000	930	3.57	3284	1007	3.98	3664	1077	4.40	4049	1144	4.82	4440	1207	5.25	4,840	1268	5.70	5,249
8,500	980	4.20	3873	1053	4.64	4274	1121	5.08	4679	1185	5.53	5090	1246	5.98	5,508	1305	6.44	5,934
9,000	1030	4.92	4528	1100	5.38	4951	1166	5.84	5377	1228	6.31	5808	1286	6.78	6,244	1343	7.26	6,689
9,500	1081	5.70	5254	1148	6.19	5700	1211	6.67	6146	1271	7.16	6597	1328	7.66	7,053	1383	8.16	7,515
10,000	1132	6.57	6055	1197	7.08	6523	1257	7.59	6991	1315	8.10	7462	1370	8.62	7,937	1423	9.14	8,418
10,500	1183	7.53	6935	1245	8.06	7425	1304	8.59	7913	1360	9.13	8404	1413	9.66	8,899	1465	10.21	9,400
11,000	1235	8.57	7896	1295	9.13	8408	1351	9.68	8918	1405	10.24	9430	1457	10.80	9,944	1507	11.36	10,465
11,250	1261	9.13	8408	1320	9.70	8932	1375	10.26	9452	1428	10.83	9974	1479	11.40	10,499	—	—	—

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)								
	1.4			1.6			1.8		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5,000	1176	3.04	2801	1250	3.45	3177	1321	3.87	3568
5,500	1191	3.40	3134	1263	3.82	3519	1332	4.26	3922
6,000	1212	3.82	3521	1280	4.25	3915	1346	4.70	4324
6,500	1236	4.31	3966	1301	4.74	4366	1364	5.19	4784
7,000	1263	4.85	4470	1326	5.30	4880	1386	5.76	5307
7,500	1294	5.47	5038	1353	5.93	5458	1411	6.40	5893
8,000	1327	6.16	5670	1384	6.63	6102	1440	7.11	6549
8,500	1362	6.92	6371	1416	7.40	6816	1470	7.90	7215
9,000	1398	7.75	7141	1451	8.25	7602	1503	8.77	8074
9,500	1436	8.67	7985	1487	9.19	8462	—	—	—
10,000	1475	9.67	8905	1525	10.21	9400	—	—	—
10,500	1515	10.76	9907	—	—	—	—	—	—
11,000	—	—	—	—	—	—	—	—	—
11,250	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
Watts — Watts Input to Motor

NOTES:

- Boldface** indicates additional capability of 460-v motor
- Factory-shipped motor drive range is 1323 to 1579 rpm. Other rpms may require a field-supplied drive.
- Maximum continuous bhp is 10.26 (208/230, 575 v) or 11.80 (460 v) and maximum continuous watts are 9510 (208/230, 575 v) or 11,000 (460 v). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm

- Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table
- Interpolation is permissible. Do not extrapolate.
- Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information
- Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected

Table 9 — Accessory/FIOP Static Pressure (in. wg)

UNIT 50TJ	HEATER RATED VOLTAGE	CFM	ELECTRIC HEATERS PRESSURE DROP (kW)			ECONOMIZER PRESSURE DROP	FACTORY-ASSEMBLED HORIZONTAL ADAPTER CURB PRESSURE INCREASE
016	208/240-3-60	4,000	0.05 (26/34)	0.06 (42/56)	0.07 (56/75)	0.03	0.68
		5,000	0.07 (26/34)	0.08 (42/56)	0.10 (56/75)	0.05	0.65
		6,000	0.09 (26/34)	0.12 (42/56)	0.15 (56/75)	0.07	0.60
		7,200	0.11 (26/34)	0.16 (42/56)	0.20 (56/75)	0.09	0.48
		7,500	0.12 (26/34)	0.17 (42/56)	0.21 (56/75)	0.10	0.45
	480-3-60	4,000	0.05 (32)	0.06 (55)	0.07 (80)	0.03	0.68
		5,000	0.07 (32)	0.08 (55)	0.10 (80)	0.05	0.65
		6,000	0.09 (32)	0.12 (55)	0.15 (80)	0.07	0.60
		7,200	0.11 (32)	0.15 (55)	0.20 (80)	0.09	0.48
		7,500	0.12 (32)	0.17 (55)	0.21 (80)	0.10	0.45
	575	4,000		0.07 (50)		0.03	0.68
		5,000		0.10 (50)		0.05	0.65
		6,000		0.15 (50)		0.07	0.60
		7,200		0.20 (50)		0.09	0.48
		7,500		0.21 (50)		0.10	0.45
020- 028	208/230,575*-3-60	5,000	0.08 (26/34)	0.11 (42/56)	0.14 (56/75)	0.06	0.65
		6,000	0.09 (26/34)	0.12 (42/56)	0.15 (56/75)	0.07	0.60
		7,200	0.11 (26/34)	0.16 (42/56)	0.20 (56/75)	0.09	0.48
		9,000	0.15 (26/34)	0.19 (42/56)	0.24 (56/75)	0.11	0.30
		10,000	0.17 (26/34)	0.21 (42/56)	0.26 (56/75)	0.12	0.26
		11,250	0.20 (26/34)	0.24 (42/56)	0.29 (56/75)	0.14	0.24
	460-3-60	5,000	0.08 (32)	0.11 (55)	0.14 (80)	0.06	0.65
		6,000	0.09 (32)	0.12 (55)	0.15 (80)	0.07	0.60
		7,200	0.11 (32)	0.15 (55)	0.20 (80)	0.09	0.48
		9,000	0.15 (32)	0.19 (55)	0.24 (80)	0.11	0.30
		10,000	0.17 (32)	0.21 (55)	0.26 (80)	0.12	0.26
		11,250	0.20 (32)	0.24 (55)	0.29 (80)	0.14	0.24

LEGEND

FIOP — Factory-Installed Option

*There are no electric heaters available for 575-v units.

NOTES:

1 Heaters are rated at 208/240 v, 480 v, and 575 v

2 The factory-assembled horizontal adapter curb substantially improves 50TJ016-028 fan performance (by the amount of static pressure listed).

Base Unit Operation

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), and compressor contactor no. 1 (C1) are energized and evaporator-fan motor, compressor no. 1 (50TJ020-028) or unloaded compressor (50TJ016), and condenser fans start. The condenser-fan motors run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts (50TJ020-028), or compressor no. 1 runs fully loaded (50TJ016)

HEATING, UNITS WITHOUT ECONOMIZER (If Accessory or Optional Heater is Installed) — Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

COOLING, UNITS WITH ECONOMIZER — Upon a call for cooling, when outdoor ambient temperature is above the outdoor-air temperature control setting, the evaporator and condenser fans and compressor energize. The economizer damper moves to VENT position.

Upon a first-stage call for cooling, when outdoor ambient temperature is below the temperature control setting, the evaporator fan starts and economizer damper modulates to maintain mixed-air temperature. The compressor(s) remains off.

Upon a second-stage call for cooling, compressor no. 1 (50TJ020-028) or unloaded compressor (50TJ016) is energized and mechanical cooling is integrated with economizer cooling. Compressor no. 2 is locked out. If the outdoor-air temperature is below 50 F, a cooling lockout switch prevents the compressor(s) from running.

When supply-air temperature drops below a fixed set point, the economizer damper modulates to maintain the temperature at the fixed set point.

A freeze protection thermostat (FPT) is located on the evaporator coil. It detects frost buildup and turns off the compressor, allowing the coil to clear. Once frost has melted, the compressor can be reenergized.

HEATING, UNITS WITH ECONOMIZER (If Accessory or Optional Heater is Installed) — The outdoor air damper stays at VENT position while the evaporator fan is operating. Upon a call for heating through terminal W1, the indoor (evaporator) fan contactor (IFC) and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

SERVICE

⚠ WARNING

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

Cleaning — Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

EVAPORATOR COIL — Clean as required with a commercial coil cleaner.

NOTE: The 50TJ028 unit has a mist eliminator screen attached to the evaporator coil to prevent condensate runoff at high wet-bulb conditions. Check periodically and clean as necessary.

CONDENSER COIL — Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly — clean as required.

CONDENSATE DRAIN — Check and clean each year at start of cooling season.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Table 1 for type and size.

NOTE: The 50TJ028 unit requires industrial grade throw-away filters capable of withstanding face velocities up to 625 fpm. Ensure that replacement filters for the 50TJ028 units are rated for 625 fpm

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.

The 50TJ016 compressor runs with a slightly low sight glass oil level. Oil level with compressor off should be about $\frac{1}{4}$ of the sight glass as shown in Fig. 20. If oil is above this level in the sight glass, do not remove any oil until the compressor crankcase heater has been energized for at least 24 hours.

FAN SHAFT BEARINGS — For 016 units, bearings are permanently lubricated. No field lubrication is required. For 020-028 units, the bearings are of the pillow block type and have grease fittings. The bearing opposite the motor end has an extended tube line so it can be lubricated from the motor side. Lubricate the bearings twice annually.

Typical lubricants are given below.

MANUFACTURER	LUBRICANT
Texaco	Regal AFB-2*
Mobil	Mobilplex EP No. 1
Sunoco	Prestige 42
Texaco	Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

CONDENSER AND EVAPORATOR-FAN MOTOR BEARINGS — The condenser and evaporator-fan motors have permanently-sealed bearings, so no field lubrication is necessary.

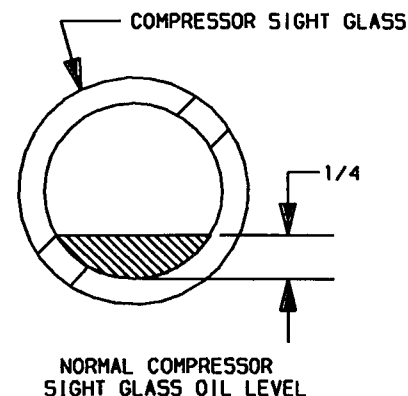


Fig. 20 — 50TJ016 Compressor Sight Glass Oil Level

Evaporator Fan Performance Adjustment (Fig. 21-23) — Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speeds:

1. Shut off unit power supply.
- 2a. 016 Only: Loosen belt by loosening fan motor mounting plate nuts (see Fig. 22).
- b. 020-028 Only: Loosen nuts on the 2 carriage bolts in the motor mounting base. Install jacking bolt and plate under motor base (bolt and plate are shipped in installer's packet). See Fig. 23. Using bolt and plate, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
3. Loosen movable-pulley flange setscrew (see Fig. 21).
4. 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 Table 1. See Table 4 for air quantity limits.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)
6. Tighten belts. See Belt Tension Adjustment section on page 20.

To align fan and motor pulleys:

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

Evaporator Fan Service and Replacement

50TJ016 UNITS (See Fig. 22)

NOTE: To remove belts only, follow Steps 1-6.

1. Remove filter and supply-air section panels.
2. Remove unit top cover.
3. Loosen carriage nuts A and B holding motor mount assembly to fan scroll side plates.
4. Loosen screw C.
5. Rotate motor mount assembly (with motor attached) as far as possible away from evaporator coil.
6. Remove belt.
7. Rotate motor mount assembly back past original position toward evaporator coil.
8. Remove motor mounting nuts D and E (both sides).

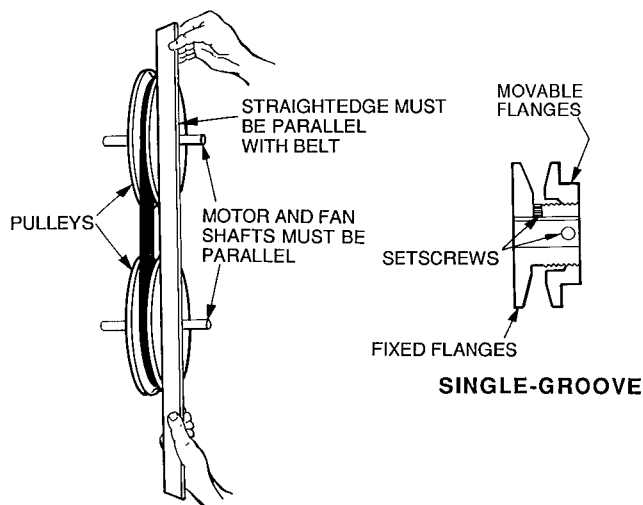


Fig. 21 — Evaporator-Fan Pulley Alignment and Adjustment

9. Lift motor up through top of unit.
10. Reverse above procedure to reinstall motor.
11. Check and adjust belt tension as necessary.

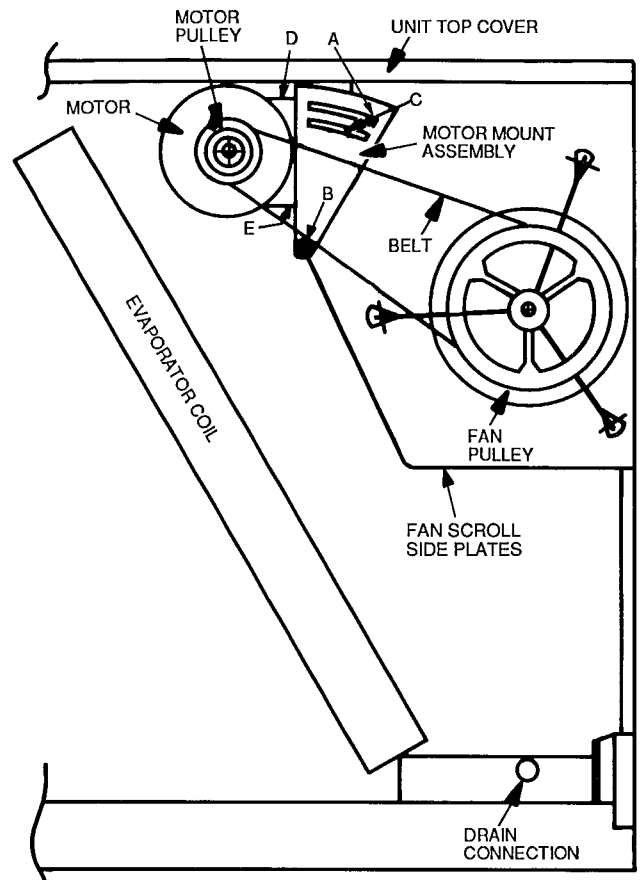
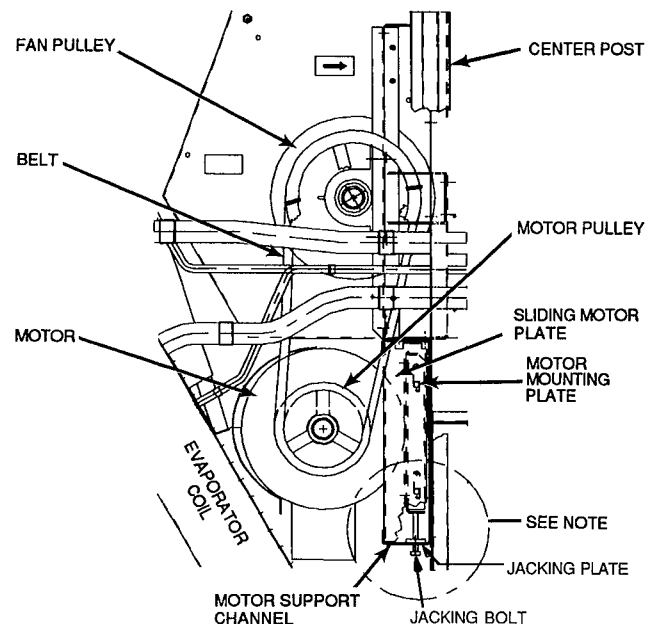


Fig. 22 — 50TJ016 Evaporator-Fan Motor Section



NOTE A 3½-in. bolt and threaded plate are included in the installer's packet. They can be added to the motor support channel below the motor mounting plate to aid in raising the motor.

Fig. 23 — 50TJ020-028 Evaporator-Fan Motor Section

50TJ020-028 UNITS (See Fig. 23) — The 50TJ020-028 units use a fan motor mounting system that features a slide-out motor mounting plate. To replace or service the motor, slide out the bracket.

1. Remove the evaporator-fan access panel and the heating control access panel.
2. Remove the center post (located between the evaporator fan and heating control access panels) and all screws securing it.
3. Loosen nuts on the two carriage bolts in the motor mounting base.
4. Using jacking bolt under motor base, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
5. Remove the belt drive.
6. Remove jacking bolt and tapped jacking bolt plate.
7. Remove the 2 screws that secure the motor mounting plate to the motor support channel.
8. Remove the 3 screws from the end of the motor support channel that interfere with the motor slide path.
9. Slide out the motor and motor mounting plate.
10. Disconnect wiring connections and remove the 4 mounting bolts.
11. Remove the motor.
12. To install the new motor, reverse Steps 1-10.

Belt Tension Adjustment — To adjust belt tension:

1. Loosen fan motor bolts.
2. Adjust belt tension:
 - a. 016 Units: Move motor mounting plate up or down for proper belt tension ($\frac{1}{2}$ in. deflection with one finger).
 - b. 020-028 Units: Turn motor jacking bolt to move motor mounting plate up or down for proper belt tension ($\frac{3}{8}$ in. deflection at midspan with one finger [9 lb force]).
3. Tighten nuts.
4. Adjust bolts and nut on mounting plate to secure motor in fixed position.

Condenser-Fan Adjustment

50TJ016,020 UNITS (Fig. 24)

1. Shut off unit power supply.
2. Remove access panel(s) closest to the fan to be adjusted.
3. Loosen fan hub setscrews.
4. Adjust fan height on shaft using a straightedge placed across the fan orifice.
5. Tighten setscrews and replace panel(s).
6. Turn on unit power.

50TJ024,028 UNITS (Fig. 25)

1. Shut off unit power supply.
2. Remove fan top-grille assembly and loosen fan hub screws.
3. Adjust fan height on unit, using a straightedge placed across the fan orifice.
4. Tighten setscrews and replace rubber hubcap to prevent hub from rusting to motor shaft.
5. Fill hub recess with permagum if rubber hubcap is missing.

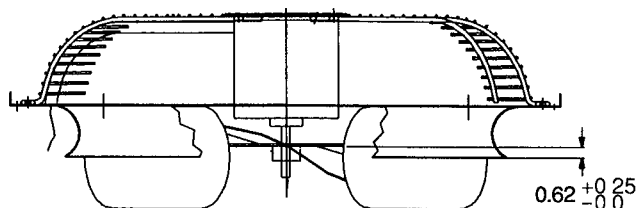


Fig. 24 — Condenser Fan Adjustment, 50TJ016,020

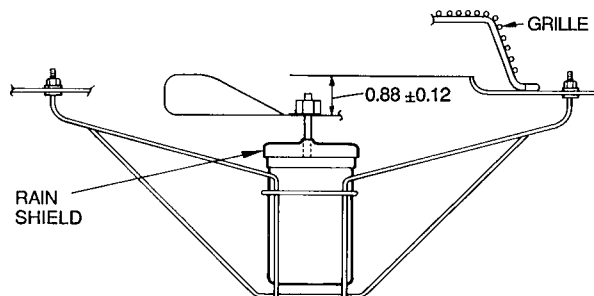


Fig. 25 — Condenser-Fan Adjustment, 50TJ024,028

Economizer Adjustment — See Tables 10 and 11 for checkout and enthalpy simulation. Make certain the outdoor-air damper is fully closed and the return-air damper is fully open before completing the following steps.

1. Turn on power to the unit.
 2. Turn the thermostat fan switch to the ON position. The damper will go to the vent position.
 3. Adjust the vent position with the minimum position adjustment on the module. See Fig. 15.
 4. Set the system selector switch to COOL position and set the cooling temperature selector to its lowest setting.
- NOTE: The cooling mode may also be simulated by removing the thermostat wires from terminals Y1 and Y2 and installing a jumper between terminals R and Y1. Refer to unit label diagram for terminal locations.
5. Set the outdoor-air thermostat (OAT) located in the economizer section of the unit to 75 F.
 6. If the outdoor temperature is below 75 F, the economizer will control the mixed air with the mixed-air sensor. If the outdoor air is above 75 F, place a jumper around the contacts of the OAT.
 7. Jumper terminal T to terminal T1 on the module (see Fig. 15). The economizer will go to the full open position. The outdoor-air damper will go to the full open position, and the return-air damper will go to the full closed position.
 8. Adjust mechanical linkage, if necessary, for correct positioning. It may be necessary to remove the filters to adjust the linkage.
 9. Remove the jumper from around the contacts of the OAT if installed in Step 6. Remove the jumper from terminals T and T1 installed in Step 7.
 10. If the cooling mode was simulated to operate the unit in Step 4, remove the jumper and reconnect the thermostat wires to terminals Y1 and Y2.

Table 10 — Economizer Checkout Procedures

TEST PROCEDURE	RESULTS
A. Disconnect power at TR and TR1. Disconnect jumper between P and P1. See Fig. 15 B. Jumper TR to 1. C. Jumper T1 to T. D. Disconnect outdoor-air thermostat connections from S _O and +. Factory-installed 800 ohm resistor should remain connected to S _R and + E. Reconnect power to terminals TR and TR1.	1. LED (light-emitting diode) should be off. 2. Motor is in closed position

TEST PROCEDURE	RESULTS
A. Disconnect factory-installed resistor from terminals S _R and +.	1. LED (light-emitting diode) should be on 2. Motor drives toward open.

Table 11 — High and Low Enthalpy Simulation

TEST PROCEDURE	RESULTS
A. Reconnect factory-installed 800 ohm resistor between terminals S _R and + B. Connect 1200 ohm checkout resistor between terminals S _O and + C. Turn set point potentiometer to position A.	Low outdoor-air test results: 1. LED (light-emitting diode) should be on 2. Motor drives toward open.
D. Turn set point potentiometer to position D. E. Disconnect 1200 ohm checkout resistor.	High outdoor-air test results: 1. LED should be off 2. Motor drives toward closed.

Power Failure — Dampers have a spring return. In event of power failure, dampers will return to fully closed position until power is restored. *Do not manually operate damper motor.*

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate and in Table 1. Refer to Carrier GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures.

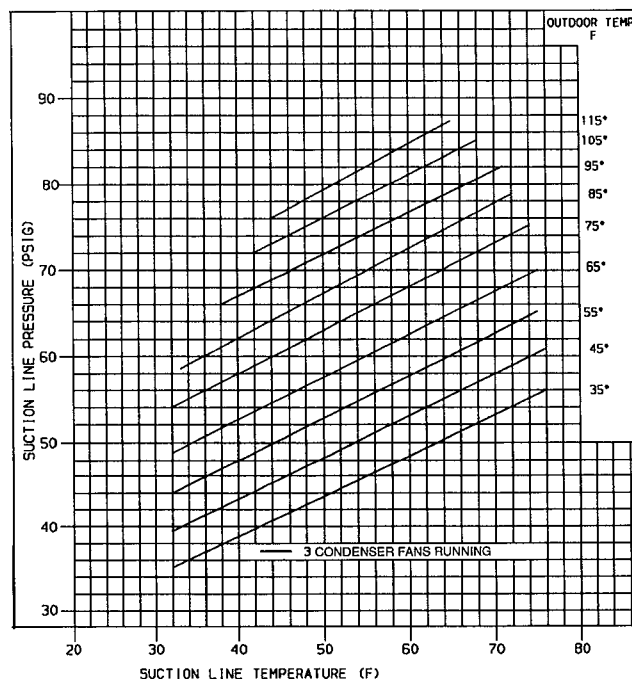
Unit panels must be in place when unit is operating during charging procedure.

NOTE: On 020,024 units, do not adjust charge until after compressors have been running for at least 20 minutes and pressures and temperatures have stabilized.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

LOW CHARGE COOLING — Using appropriate cooling charging chart (see Fig. 26-29), add refrigerant until conditions of the appropriate chart are met. Note that charging chart is different from those normally used. Chart is based on charging units to correct superheat for various operating conditions. An accurate pressure gage and temperature sensing device are required. Connect temperature sensing device to service port on suction line and insulate it so that outdoor ambient temperature does not affect reading. Indoor-air cfm must be within normal operating range of unit.

TO USE COOLING CHARGING CHART — Take outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine correct suction temperature. If suction temperature is high, add refrigerant. If suction temperature is low, carefully reclaim some of the charge. Recheck suction pressure as charge is adjusted.

**Fig. 26 — Cooling Charging Chart, 50TJ016**

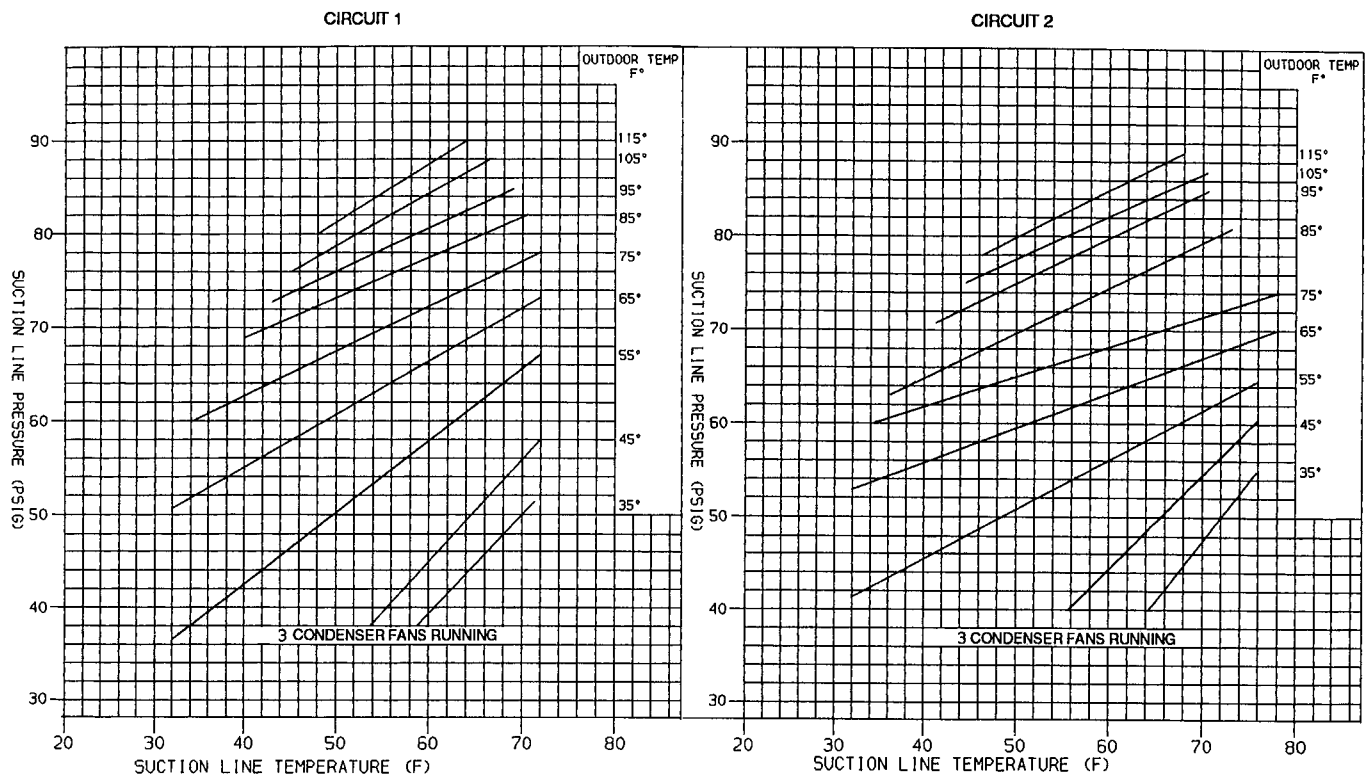


Fig. 27 — Cooling Charging Chart — 50TJ020

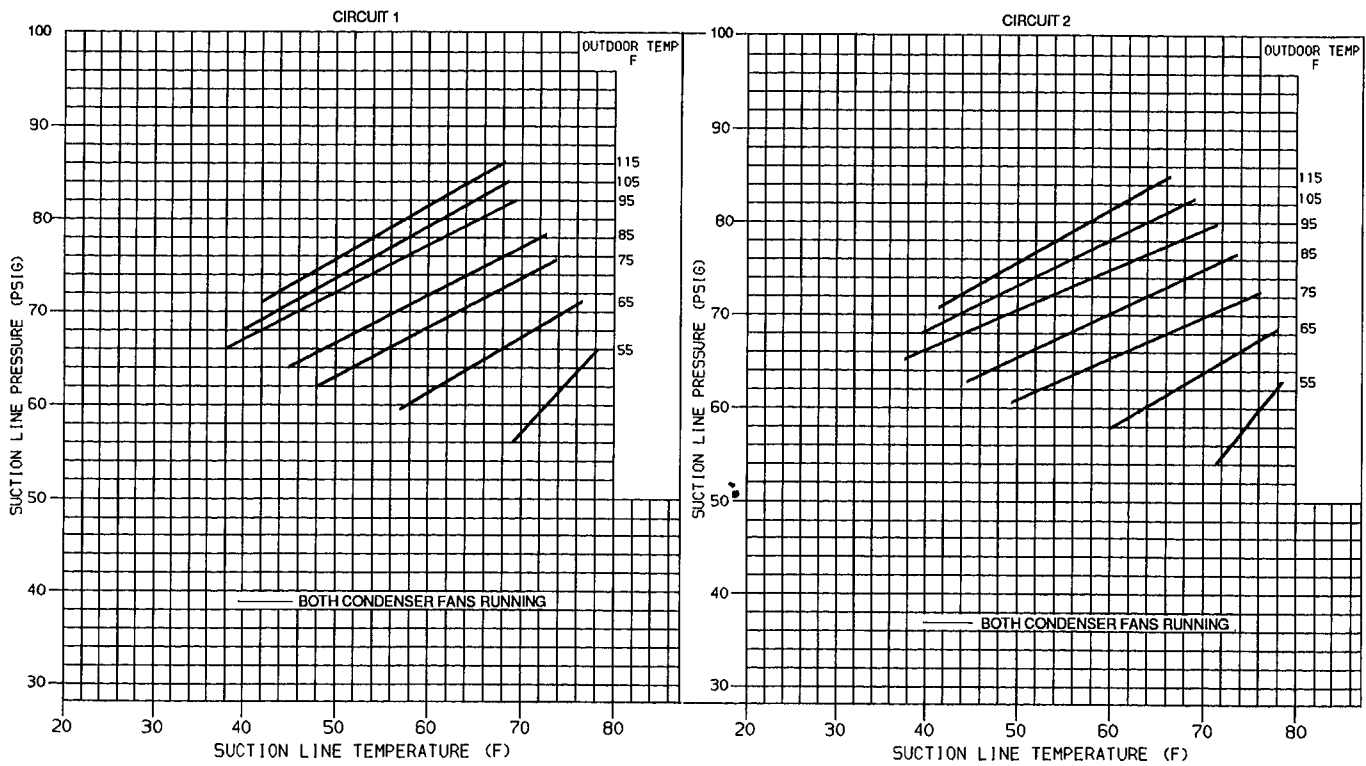
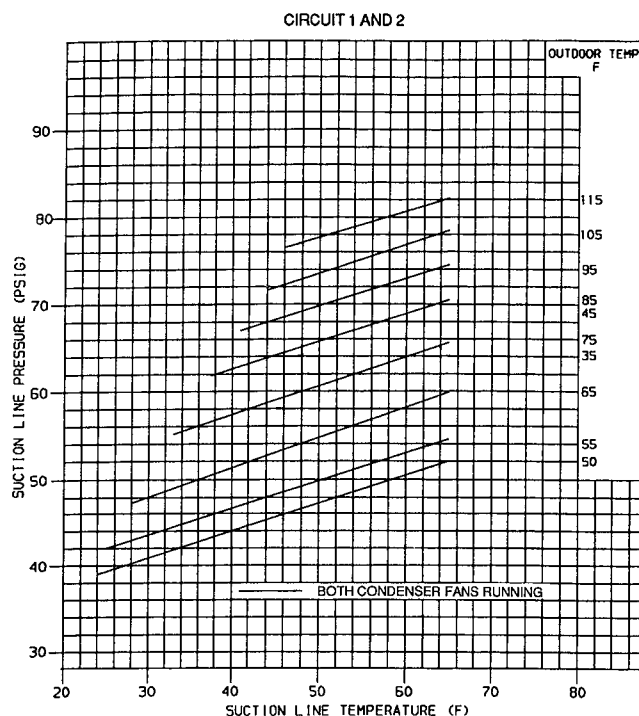


Fig. 28 — Cooling Charging Chart — 50TJ024



Filter Drier — Replace whenever refrigerant system is exposed to atmosphere.

Protective Devices

COMPRESSOR PROTECTION

Overcurrent (016 and 028) — Each compressor has one manual reset, calibrated trip, magnetic circuit breaker. Do not bypass connections or increase the size of the circuit breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

NOTE: The 50TJ020 and 024 units have overcurrent protection inherent in the compressor. The 50TJ020 and 024, 575-v units have internal sensors and an external protection module for this purpose.

Overtemperature — Each compressor has an internal protector to protect it against excessively high discharge gas temperatures.

Crankcase Heater (016 and 028 only) — Each semi-hermetic compressor has a 125-watt crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. Since power for the crankcase heaters is drawn from the unit incoming power, main unit power must be on for the heaters to be energized.

IMPORTANT: After a prolonged shutdown or service job, energize the crankcase heaters for 24 hours before starting the compressors.

Compressor Lockout — If any of the safeties (high-, low-pressure, freeze protection thermostat, compressor internal thermostat) trip, or if there is loss of power to the compressors, the CLO (Compressor Lockout) will lock the compressors off. To reset, manually move the thermostat setting.

EVAPORATOR FAN MOTOR PROTECTION — A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

CONDENSER-FAN MOTOR PROTECTION — Each condenser-fan motor is internally protected against over-temperature.

HIGH- AND LOW-PRESSURE SWITCHES — If either switch trips, or if the compressor overtemperature switch activates, that refrigerant circuit will be automatically locked out by the CLO. To reset, manually move the thermostat setting.

FREEZE PROTECTION THERMOSTAT (FPT) — An FPT is located on the evaporator coil. It detects frost buildup and turns off the compressor, allowing the coil to clear. Once the frost has melted, the compressor can be reenergized.

Relief Devices — All units have relief devices to protect against damage from excessive pressures (i.e., fire). These devices protect the high and low side.

Control Circuit, 24-V — This control circuit is protected against overcurrent by a 3.2-amp circuit breaker. Breaker can be reset. If it trips, determine cause of trouble before resetting.

Replacement Parts — A complete list of replacement parts may be obtained from any Carrier distributor upon request.

START-UP CHECKLIST

MODEL NO.: _____

SERIAL NO.: _____

DATE: _____

TECHNICIAN: _____

PRE-START-UP:

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE ALL SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTRUCTIONS
- ☐ VERIFY INSTALLATION OF ECONOMIZER HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK THAT INDOOR-AIR FILTER IS CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SET SCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED

START-UP

ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

COMPRESSOR AMPS — COMPRESSOR NO. 1 L1 _____ L2 _____ L3 _____

— COMPRESSOR NO. 2 L1 _____ L2 _____ L3 _____

SUPPLY FAN AMPS _____ EXHAUST FAN AMPS _____

ELECTRIC HEAT AMPS L1 _____ L2 _____ L3 _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry-Bulb)

RETURN-AIR TEMPERATURE _____ F DB _____ F WB (Wet-Bulb)

COOLING SUPPLY AIR _____ F

ELECTRIC HEAT SUPPLY AIR _____ F

PRESSURES

REFRIGERANT SUCTION CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 _____ PSIG

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS ON PAGES 21-23

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS

PACKAGED SERVICE TRAINING

Our packaged service training programs provide an excellent way to increase your knowledge of the equipment discussed in this manual. Product programs cover:

- Unit Familiarization
- Maintenance
- Installation Overview
- Operating Sequence

A large selection of product, theory, and skills programs is available. All programs include a video cassette and/or slides and a companion booklet. Use these for self teaching or to conduct full training sessions.

For a free Service Training Material Catalog (STM), call 1-800-962-9212. Ordering instructions are included.