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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 the 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.

⚠ WARNING

1. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier, call the fire department.

⚠ WARNING

Disconnect gas piping from unit when pressure testing at pressure greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

INSTALLATION

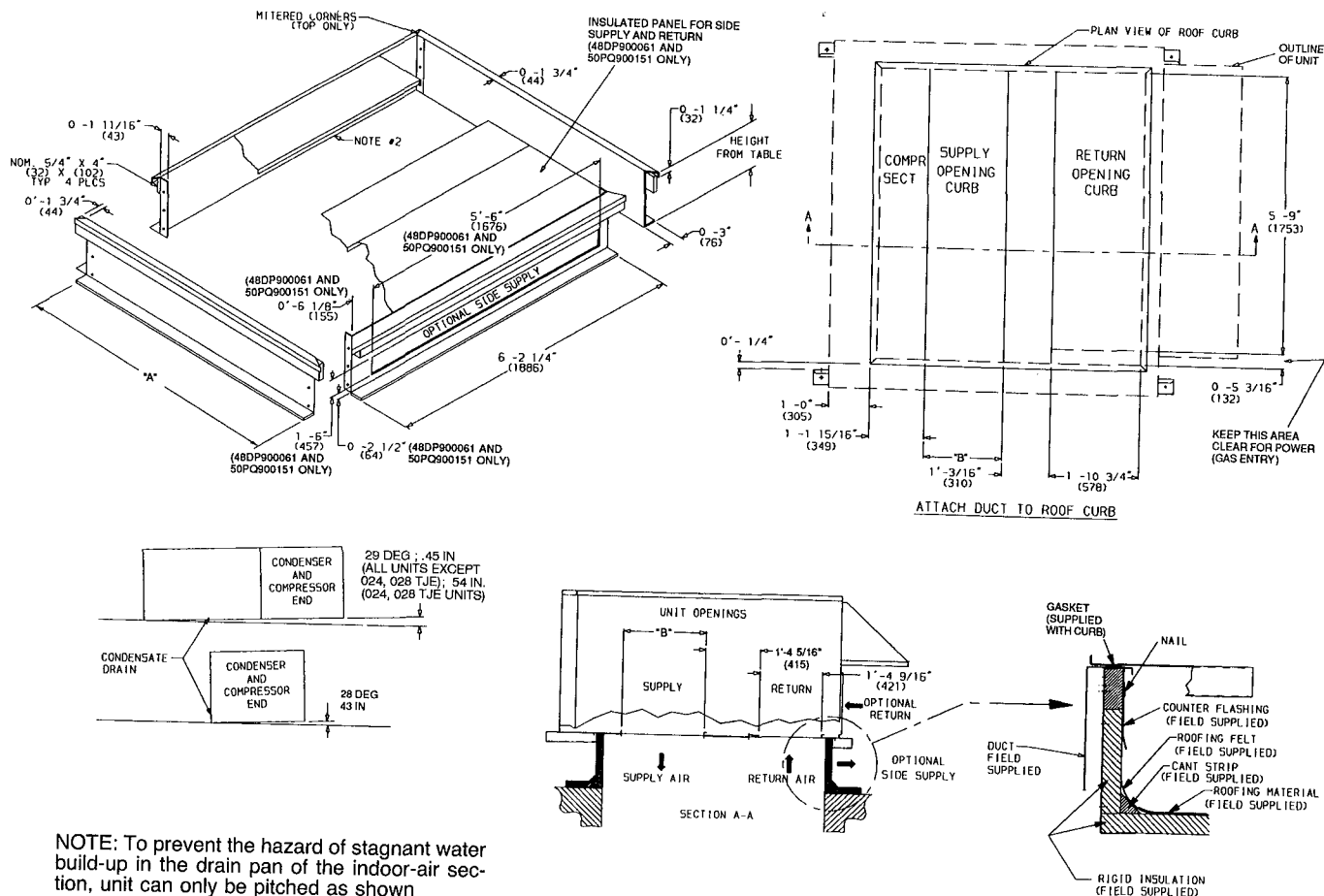
Step 1 – Provide Unit Support

⚠ CAUTION

When handling 48TJE024 and 028 units with a forklift truck, use a minimum of 48-in. long forks and lift **ONLY** through factory-provided holes in base rail. Otherwise, damage to the unit may result.

ROOF CURB — Assemble or install accessory roof curb in accordance with instructions shipped with this accessory. See Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be installed to roof curb before unit is set in place. Curb should be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is $\pm \frac{1}{16}$ in. per linear ft in any direction. Refer to Accessory Roof Curb Installation Instructions for additional information as required. When accessory roof curb is used, unit may be installed on class A, B, or C roof covering material.

Instructions continued on page 3



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

COMPR SECT. — Compressor Section

NOTES:

1. Roof curb accessory is shipped unassembled
2. Insulated panels, 1-in thick neoprene-coated, 1½ lb density.
3. Dimensions in () are in millimeters.
4.  Direction of airflow
5. Roof curb: 16 gage steel.

ACCESSORY PACKAGE NO.	CURB HEIGHT	DESCRIPTION	"A"	"B"
50PQ900221	1'-2" (355)	Standard Curb — 14" High	5'-7 1/16" (1703)	1'-7 13/16" (503)
50PQ900141	2'-0" (610)	Standard Curb for Units Requiring High Installation	5'-7 1/16" (1703)	1'-7 13/16" (503)
50PQ900151	2'-0" (610)	Horizontal Supply and Return Curb	5'-7 1/16" (1703)	1'-7 13/16" (503)
48DP900041*	1'-2" (355)	Standard Curb — 14" High	7'-2 13/16" (2205)	3'-3 5/8" (1006)
48DP900051*	2'-0" (610)	Standard Curb for Units Requiring High Installation	7'-2 13/16" (2205)	3'-3 5/8" (1006)
48DP900061*	2'-0" (610)	Horizontal Supply and Return Curb	7'-2 13/16" (2205)	3'-3 5/8" (1006)

*For high-heat applications

Fig. 1 — Roof Curb Details

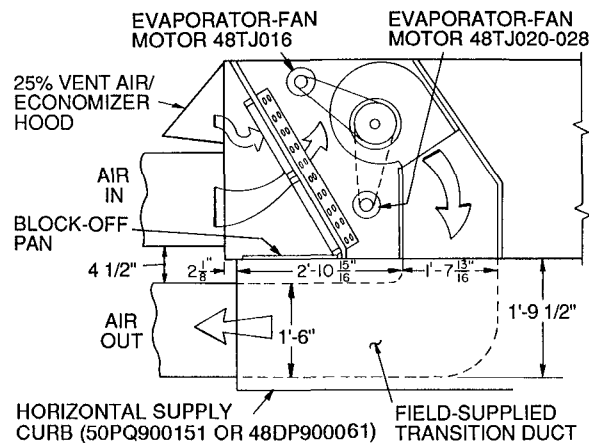


Fig. 2 — Horizontal Supply/Return Curb Details

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

ALTERNATE UNIT SUPPORT — When the curb cannot be used, install unit on a noncombustible surface. 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.

Do not drop unit; keep upright. 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 operating 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 — Maintain clearance, per Fig. 4 and 5, around and above unit to provide minimum distance from combustible materials, proper airflow, and service access.

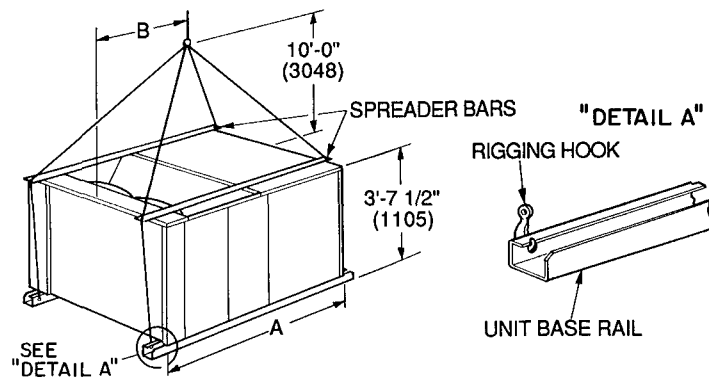
Do not install unit in an indoor location. Do not locate unit air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

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

Locate mechanical draft system flue assembly at least 4 ft from any opening through which combustion products could enter the building, and at least 4 ft from any adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

ROOF MOUNT — Check building codes for weight distribution requirements. Unit weight is shown in Table 1.

Instructions continued on page 9.



UNIT 48TJ	MAXIMUM SHIPPING WEIGHT		DIMENSIONS			
			A		B	
	Lb	Kg	Ft-in.	mm	Ft-in.	mm
D016	1800	816	6-11½	2121	3-5	1041
D020	2131	967	6-11½	2121	3-3	991
D024	2131	967	6-11½	2121	3-3	991
D028	2514	1140	6-11½	2121	3-3	991
E016	1820	826	6-11½	2121	3-2	965
E024	2441	1094	8- 7¼	2623	4-2	1270
E028	2793	1267	8- 7¼	2623	4-2	1270

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 on all units except 48TJE024 and 028
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

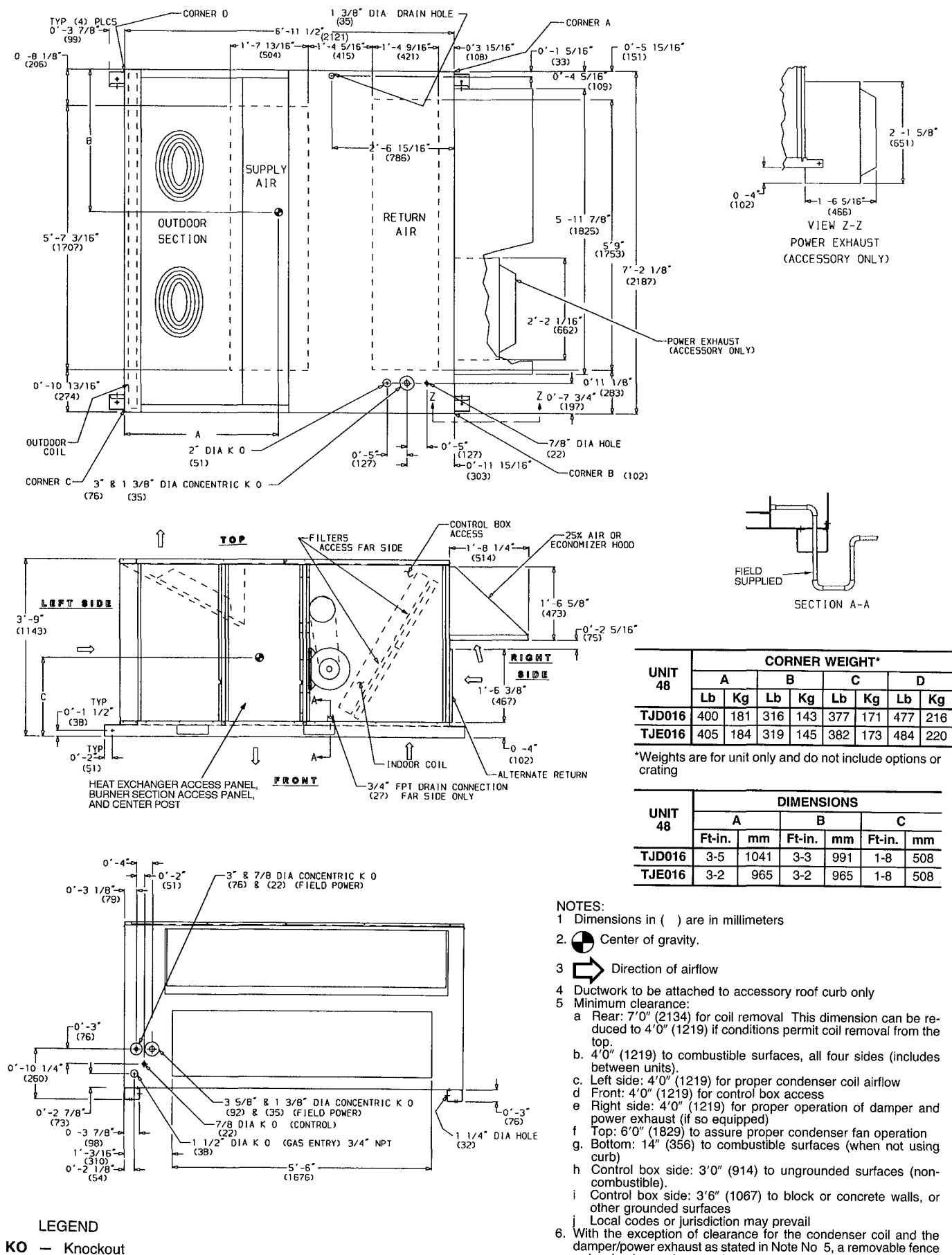


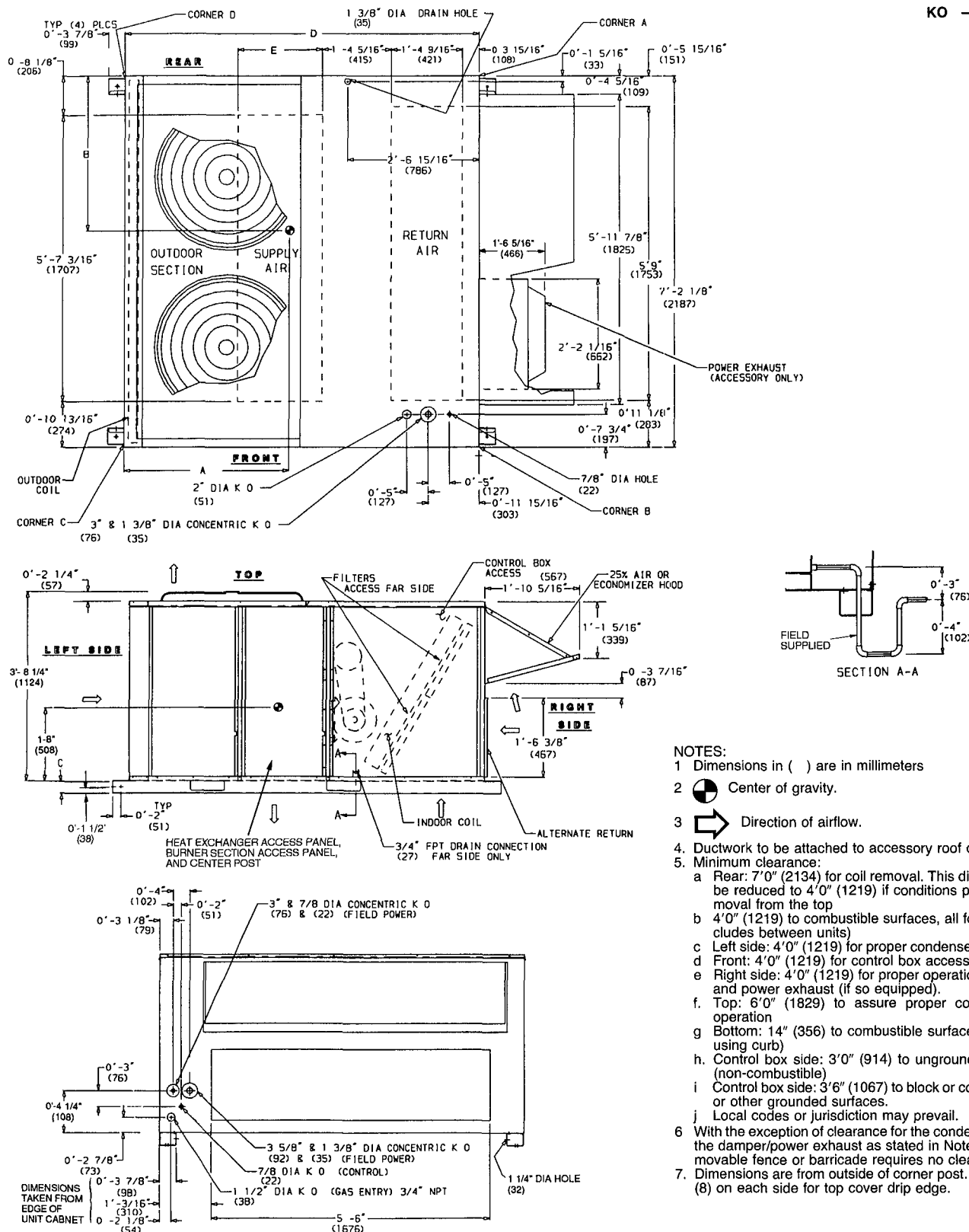
Fig. 4 — Base Unit Dimensions, 48TJ016

UNIT 48TJ	CORNER WEIGHT*								DIMENSIONS									
	A		B		C		D		A		B		C		D		E	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm
D020	495	225	483	219	362	164	511	232	3-3	991	3-7	1092	0-3	76	6-11½	2121	1-7⅓⅓	504
D024	495	225	483	219	362	164	511	232	3-3	991	3-7	1092	0-3	76	6-11½	2121	1-7⅓⅓	504
E024	431	195	421	191	494	224	685	311	4-2	1270	3-4	1016	0-4½	114	8- 7¼	2623	3-3⅝	1006
D028	523	237	541	245	574	260	596	270	3-3	991	3-7	1092	0-3	76	6-11½	2121	1-7⅓⅓	504
E028	465	211	486	220	725	329	737	334	4-2	1270	3-5	1041	0-4½	114	8- 7¼	2623	3-3⅝	1006

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

LEGEND

KO — Knockout



NOTES:

- 1 Dimensions in () are in millimeters
- 2 Center of gravity.
- 3 Direction of airflow.
4. Ductwork to be attached to accessory roof curb only
5. Minimum clearance:
 - a Rear: 7'0" (2134) for coil removal. This dimension can be reduced to 4'0" (1219) if conditions permit coil removal from the top
 - b 4'0" (1219) to combustible surfaces, all four sides (includes between units)
 - c Left side: 4'0" (1219) for proper condenser coil airflow
 - d Front: 4'0" (1219) for control box access
 - e Right side: 4'0" (1219) for proper operation of damper and power exhaust (if so equipped).
 - f Top: 6'0" (1829) to assure proper condenser fan operation
 - g Bottom: 14" (356) to combustible surfaces (when not using curb)
 - h. Control box side: 3'0" (914) to ungrounded surfaces (non-combustible)
 - i Control box side: 3'6" (1067) to block or concrete walls, or other grounded surfaces.
 - j Local codes or jurisdiction may prevail.
- 6 With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note No. 5, a removable fence or barricade requires no clearance.
7. Dimensions are from outside of corner post. Allow 0'-5/16" (8) on each side for top cover drip edge.

Table 1 — Physical Data

UNIT SIZE	016D/E	020D	024D/E	028D/E
NOMINAL CAPACITY (tons)	15	18	20	25
OPERATING WEIGHT (lb)				
Unit				
Al/Al*	1570/1590	1851	1851/2031	2234/2413
Al/Cu*	1650/1670	1981	1981/2161	2364/2543
Economizer	110	110	110	110
Roof Curb†	200	200	200/213	200/213
COMPRESSOR	Semi-Hermetic		Hermetic	Semi-Hermetic
Quantity	1	2	2	2
Oil (oz)	152	65 ea	65 ea	152 ea
REFRIGERANT TYPE			R-22	
Operating Charge (lb-oz)				
Circuit 1**	23-9	15-8	15-8	16-12
Circuit 2	—	15-8	15-8	15-12
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced or Copper Fins		
Rows...Fins/in.	3 ..13.6	4 ..15	4...15	4..15
Total Face Area (sq ft)	18.9	22.2	22.2	22.2
CONDENSER FAN		Propeller Type		
Nominal Cfm	12,000	14,200	14,200	14,200
Quantity...Diameter (in.)	2 ..26	2...30	2...30	2...30
Motor Hp...Rpm	1...1075	1...1075	1...1075	1...1075
Watts Input (Total)	3550	3400	3400	3400
EVAPORATOR COIL		Copper Tubes, Aluminum or Copper Plate Fins		
Rows...Fins/in.	3 ..14.3	4 ..15	4...15	4..15
Total Face Area (sq ft)	16.5	17.9	17.9	17.9
EVAPORATOR FAN††		Centrifugal Type		
Quantity...Size (in.)	2 ..10 x 10	2 ..12 x 12	2 ..12 x 12	2 ..12 x 12
Type Drive	Belt	Belt	Belt	Belt
Nominal Cfm	6000	7200	8000	10,000
Motor Hp	3.0	5	5	7½
Maximum Continuous Bhp	3.7	—	7½	10
	Std	3.45	5.90	8.7 [208/230 v]
	Alt	4.25	—	9.5 [460 v]
Motor Frame Size	Std	56H	184T	213T
	Alt	56H	—	215T
Fan Rpm Range	Std	896-1161	—	—
	Alt	1141-1407	—	—
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Allowable Rpm of Blower	1550	1550	1550	1550
Motor Pulley Pitch Diameter A/B (in.)	Std	1.9/2.9	5.1	6.1
	Alt	3.4/4.4	—	6.9
Nominal Motor Shaft Diameter (in.)	Std	7/8	1½	1¾
	Alt	7/8	—	1¾
Fan Pulley Pitch Diameter (in.)	Std	4.9	8.4	8.4
	Alt	5.5	—	8.4
Nominal Fan Shaft Diameter (in.)	1¾/16	17/16	17/16	17/16
Belt, Quantity...Type...Length (in.)	Std	1...BX .38	1...B...50	1...BX .51
	Alt	1...A...43	—	1...BX .53
Speed Change per Full Turn of Movable Pulley Flange (rpm)	54	—	—	—
Movable Pulley Maximum Full Turns From Closed Position	5	—	—	—
Factory Setting	3.5	—	—	—
Factory Speed Setting (rpm)	Std	975	1070	1287
	Alt	1221	—	1438
Fan Shaft Diameter at Pulley (in.)	1¾/16	17/16	17/16	17/16

(Table continued on next page.)

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material.

†Weight of 14-in. roof curb.

**On 48TJ020-028 units, System 1 consists of lower portion of condenser coil and lower portion of evaporator coil, and System 2 is the upper portion of both coils.

††The alternate motor is not available on 575-v units.

‡Rollout switch is manual reset.

§The 48TJ028 unit requires 2-in. industrial-grade filters capable of handling face velocities of up to 625 ft/min (such as American Air Filter no. 5700 or equivalent).

Table 1 — Physical Data (cont)

UNIT SIZE	016D/E	020D	024D/E	028D/E
FURNACE SECTION				
Rollout Switch Cutout Temp (F)¶	190	190	190	190
Burner Orifice Diameter (in. ...drill size)				
Natural Gas	.113.. 33	113...33	113. .33	.113.. 33
Pilot Orifice Diameter (in. ...drill size)				
Natural Gas	0.64 ..52	064 .52	.064. 52/ 070...50	.064. 52/ 070. 50
Thermostat Heat Anticipator Setting (amps)				
208/230 v Stage 1	98	98	.98	98
Stage 2	.44	.44	.44	.44
460 v Stage 1	1.20	1.20	1 20	1.20
Stage 2	.44	.44	.44	.44
Gas Input (Btuh) Stage 1	115,500/115,500	115,500	115,500/242,500	115,500/242,500
Stage 2	231,000/270,000	270,000	270,000/485,000	270,000/485,000
Efficiency (Steady State) (%)	80	80	80	80
Temperature Rise Range	25-55/25-55	15-45	15-45/35-65	15-45/35-65
Manifold Pressure (in. wg)				
Natural Gas	3 5	3.5	3.5	3.5
Gas Valve Quantity	2	2	2	2
Field Gas Connection Size (in.)	¾	¾	¾	¾
HIGH-PRESSURE SWITCH (psig)				
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¶	
	2...20 x 20 x 2		4. 20 x 20 x 2	
	3...16 x 20 x 2		4. .16 x 20 x 2	
	2 16 x 25 x 2			

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material.

†Weight of 14-in. roof curb

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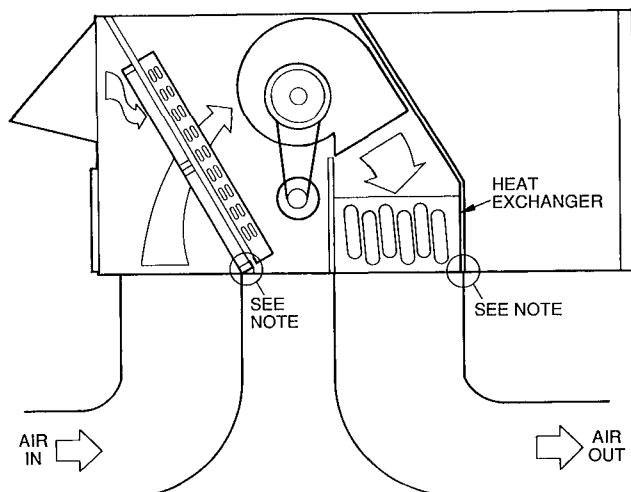
¶Rollout switch is manual reset.

¶¶The 48TJ028 unit requires 2-in. industrial-grade filters capable of handling face velocities of up to 625 ft/min (such as American Air Filter no 5700 or equivalent)

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.

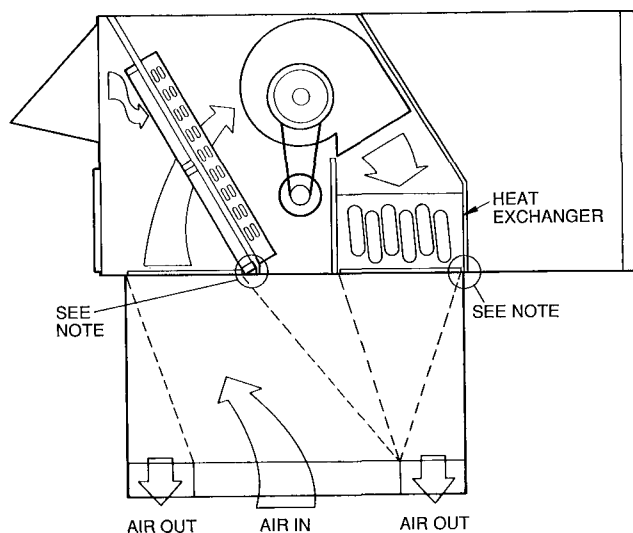
Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

Step 4 — Make Unit Duct Connections — Unit is shipped for through-the-bottom duct connections. Ductwork openings are shown in Fig. 1, 4, and 5. Duct connections 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.



NOTE: Do not drill in this area; damage to basepan may result in water leak

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

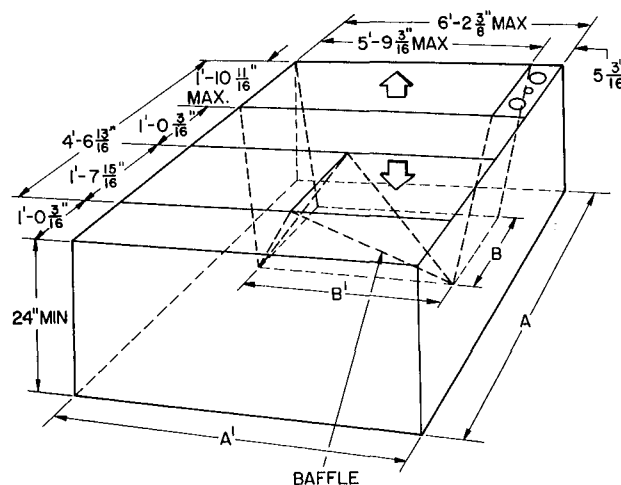


NOTE: Do not drill in this area; damage to basepan may result in water leak.

Fig. 7 — Concentric Duct Air Distribution

Step 5 — Install Flue Hood — Flue hood is shipped secured under main control box. To install, secure flue hood to access panel. See Fig. 9 and 10.

NOTE: When properly installed, flue hood will line up with combustion fan housing. See Fig. 11 and 12.



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

Shaded areas indicate block-off pans.

Fig. 8 — Concentric Duct Details

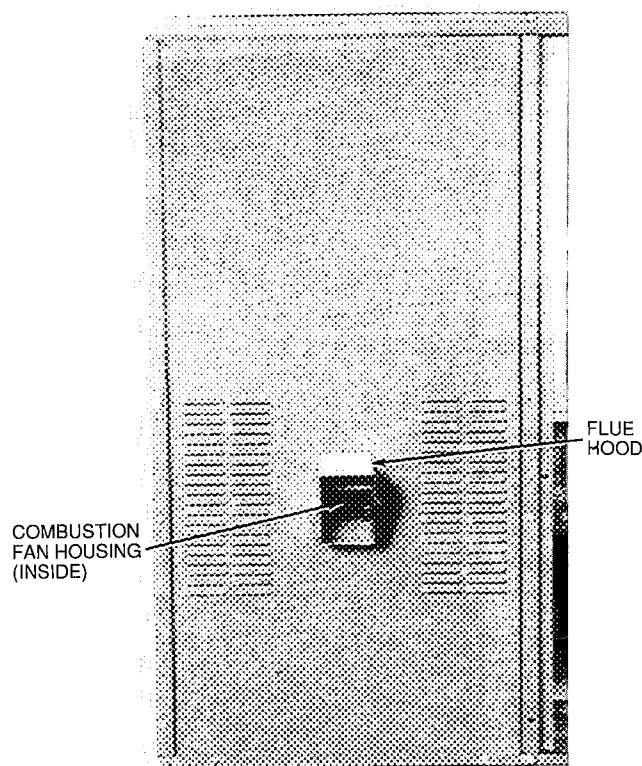


Fig. 9 — Flue Hood Location, Low-Heat and 48TJE016 High-Heat Units

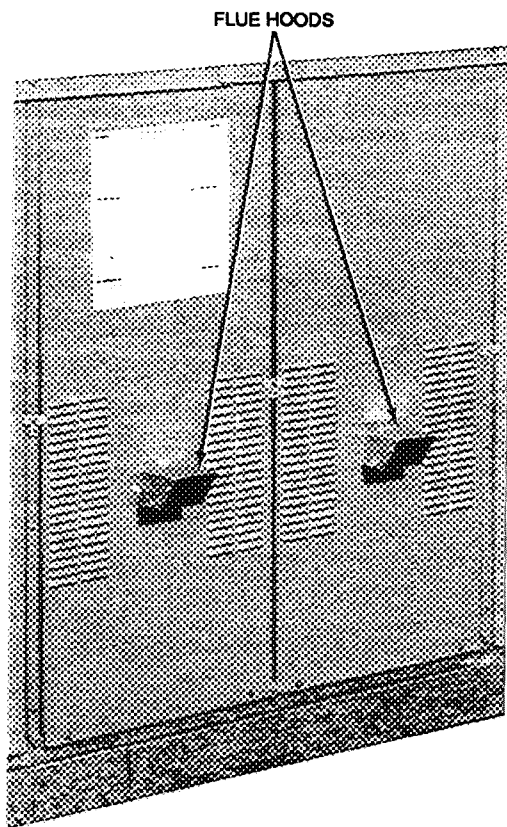


Fig. 10 — Flue Hood Locations, 48TJE024 and 028 High-Heat Units

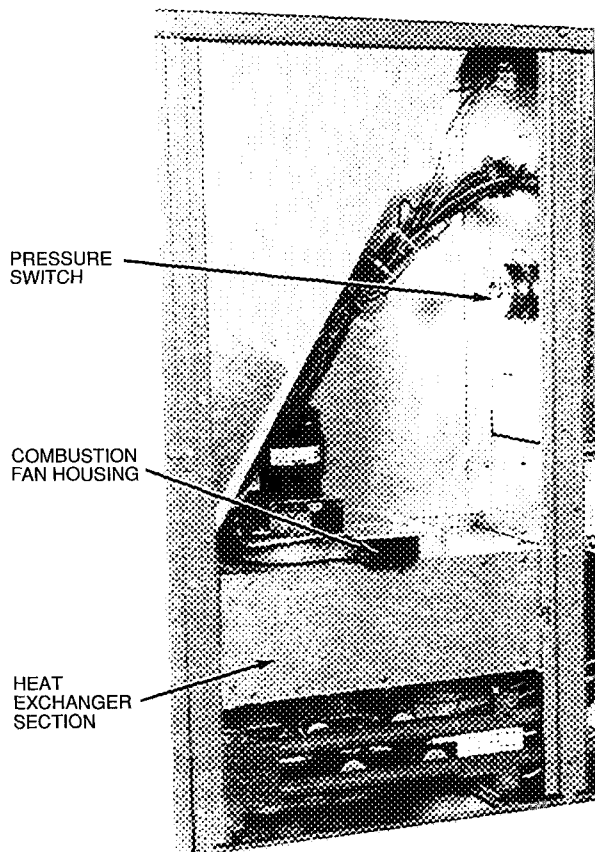


Fig. 11 — Combustion Fan Housing Location, 48TJD Low-Heat Units and 48TJE016 High-Heat Units

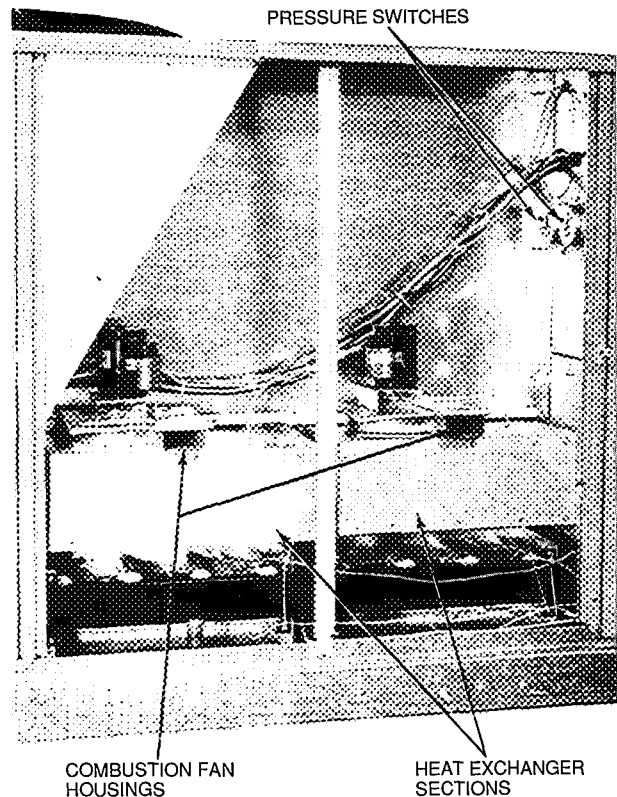


Fig. 12 — Combustion Fan Housing Location, 48TJE024 and 028 High-Heat Units

Step 6 — Trap Condensate Drain — See Fig. 13 for drain location. One $\frac{3}{4}$ -in. half coupling is provided inside unit evaporator section for condensate drain connection. An $8\frac{1}{2}$ in. x $\frac{3}{4}$ -in. diameter and 2-in. x $\frac{3}{4}$ -in. diameter pipe nipple, coupled to standard $\frac{3}{4}$ -in. diameter elbows, provides a straight path down through hole in unit base rail (see Fig. 14). A trap at least 4-in. deep must be used.

Step 7 — Install Gas Piping — Unit is equipped for use with natural gas. Installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1.

Install manual gas shutoff valve with a $\frac{1}{8}$ -in. NPT pressure tap for test gage connection at unit. Field gas piping must include sediment trap and union. See Fig. 15.

⚠ WARNING

Do not pressure test gas supply while connected to unit. Always disconnect union before servicing.

Natural gas pressure at unit gas connection must not be less than 5 in. wg or greater than 13.5 in. wg.

Size gas-supply piping for 0.5-in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.

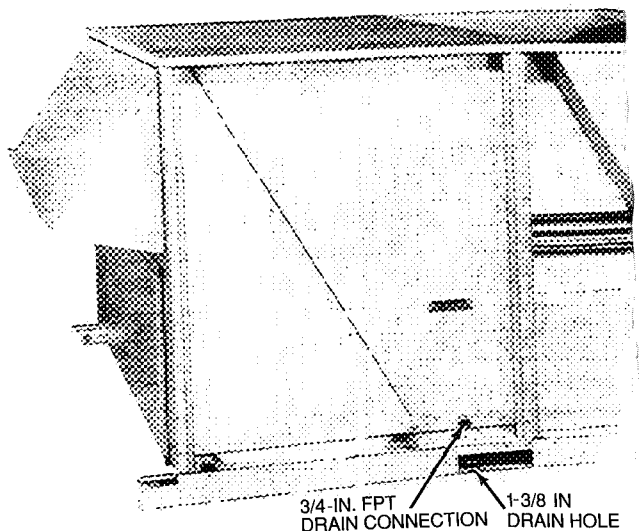


**Fig. 13 — Condensate Drain Details
(48TJ016 Shown)**

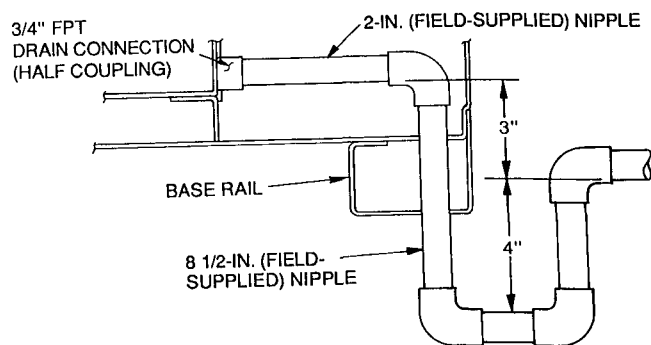


Fig. 14 — Condensate Drain Piping Details

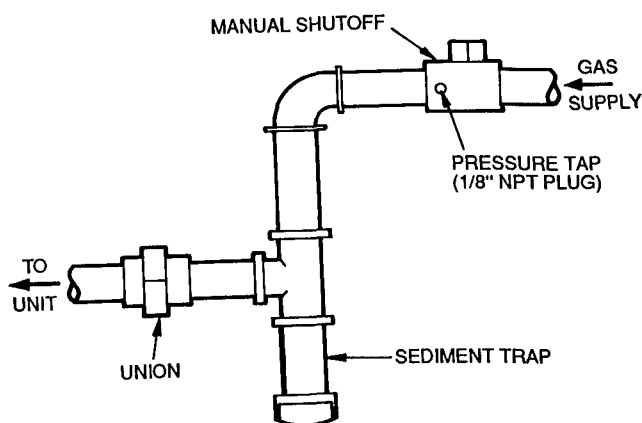


Fig. 15 — Field Gas Piping

Step 8 — Make Electrical Connections

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

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

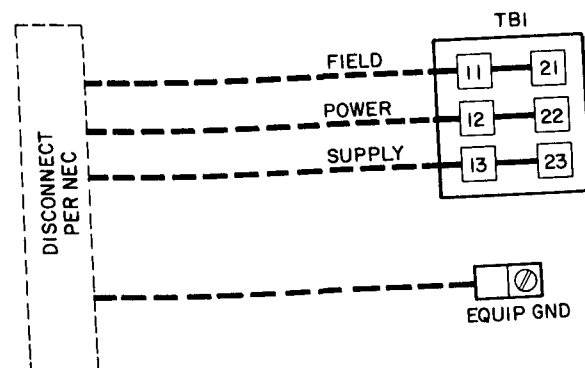
All field wiring must comply with NEC and local requirements.

Route power and ground lines through control box end panel or unit basepan (see Fig. 4 and 5) to connections as shown on unit wiring diagram and Fig. 16.

⚠ WARNING

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (National Fire Protection Association).

Field wiring must conform to temperature limitations for type "T" wire. All field wiring must comply with NEC and local requirements.



TB1 MAXIMUM WIRE SIZES

UNIT 48TJ	VOLTAGE		
	208/230	460	575
016	2/0	2/0	2/0
020,024	2/0	2/0	2/0
028	2/0	2/0	2/0

LEGEND

EQUIP — Equipment
GND — Ground
NEC — National Electrical Code
TB — Terminal Board

Fig. 16 — Field Power Wiring Connections

Transformer no. 1 is wired for 230-v unit. If 208/230-v unit is to be run with 208-v power supply, the transformer must be rewired as follows:

1. Remove cap from red (208 v) wire.
2. Remove cap from orange (230 v) spliced wire.
3. Replace orange wire with red wire.
4. Recap both wires.

IMPORTANT: BE CERTAIN UNUSED WIRES ARE CAPPED. Failure to do so may damage the transformers.

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%.

Table 2 – Electrical Data

UNIT 48TJ	NOMINAL VOLTAGE (60 Hz)	IFM TYPE	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		COMBUSTION FAN MOTOR*	POWER SUPPLY	
					NO. 1		NO. 2									
			Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	MCA	MOCP†
016	208/230 (3 phase)	Std	187	254	61.0	266	—	—	2	1	5.4	3.0	10.5/10.5	.90	98/98	150/150
		Alt										3.7	12.0/12.0	.90	99/99	150/150
	460 (3 phase)	Std	414	508	28.6	120	—	—	2	1	2.7	3.0	4.8	.30	46	70
		Alt										3.7	5.0	.30	46	70
	575 (3 phase)	Std	518	632	22.9	96	—	—	2	1	2.6	3.0	3.8	.90	38	60
		Alt														
020, 024	208/230 (3 phase)	Std	187	254	34.5	239	28.3	205	2	1	5.5	5	16.7/15.2	.57	99/98	125/125
		Alt										7½**	24.2/22.0	.57	107/104	125/125
	460 (3 phase)	Std	414	508	17.0	119	14.4	104	2	1	2.8	5	7.6	.30	49	60
		Alt										7½**	11.0	.30	52	60
	575 (3 phase)	Std	518	632	15.2	111	11.4	78	2	1	3.4	5	6.1	.57	43	50
		Alt										7½**	9.0	.57	46	60
028	208/230 (3 phase)	Std	187	254	43.6	228	43.6	228	2	1	5.5	7½	24.2/22.0	.57	133/131	175/150
		Alt										10	30.8/28.0	.57	140/137	175/175
	460 (3 phase)	Std	414	508	22.1	114	22.1	114	2	1	2.8	7½	11.0	.30	66	80
		Alt										10	14.0	.30	69	90
	575 (3 phase)	Std	518	632	17.9	91	17.9	91	2	1	3.4	7½	9.0	.57	56	70
		Alt										10	11.0	.57	57	70

LEGEND

CSA	—	Canadian Standards Association
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

*The 48TJ024 and 028 units with high heat have 2 combustion-fan motors.

†Fuse or HACR circuit breaker.

**The 7½ hp motor is not available on the 48TJ020 units. The 5 hp motor is standard.



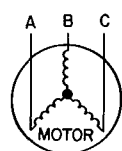
NOTE: In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. CSA units may be fuse or circuit breaker.

Use the following formula to determine the percent voltage imbalance.

% Voltage Imbalance:

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

EXAMPLE: Supply voltage is 460-3-60.



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

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

Determine maximum deviation from average voltage:

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

Maximum deviation is 7 v.

Determine percent 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.

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 installation instructions included with accessory. Locate thermostat assembly on a solid interior wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 17.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gauge) 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 at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

UNIT 48TJ	W1	W2	VOLTAGE
016-028	98 1.20	.44 44	208/230, 575 460

Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to Accessory Remote Control Panel instructions if required.

Step 9 – 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.

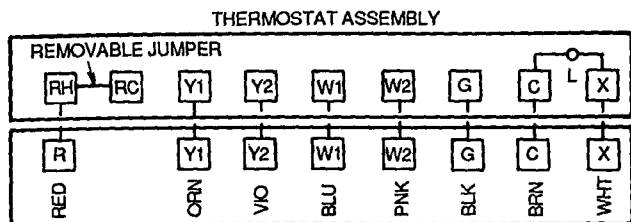


Fig. 17 – Field Control Thermostat Wiring

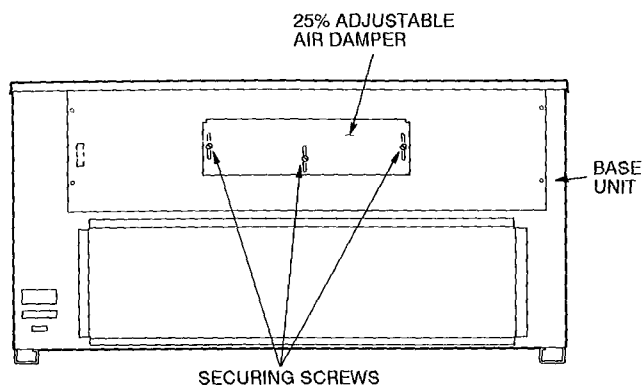


Fig. 18 – 25% Outdoor-Air Section Details

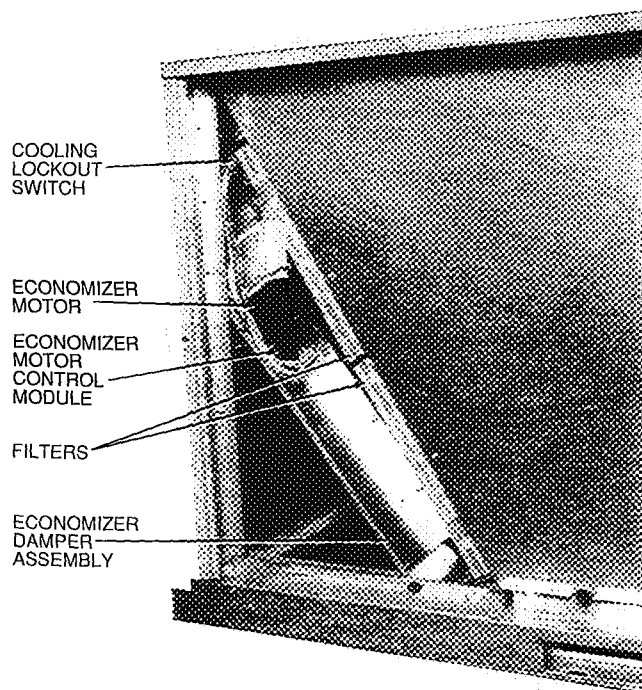


Fig. 19 – Economizer Damper Assembly-End View

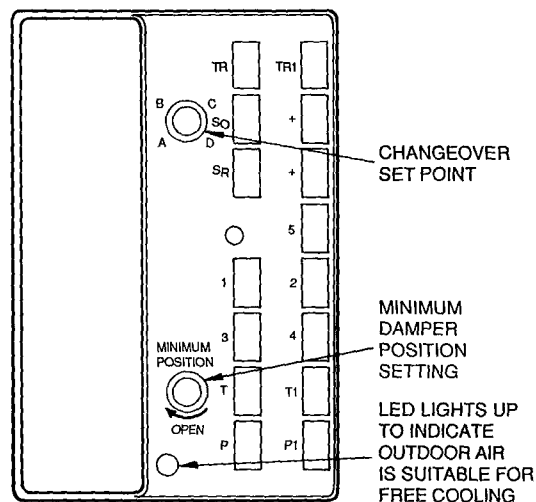
Damper can be preset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move damper to desired setting, then retighten screws to secure damper (Fig. 18).

OPTIONAL ECONOMIZER

Economizer Motor Control Module (See Fig. 19-21) — Set economizer motor to the D setting (Fig. 20).

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 at OFF position.
3. Turn damper adjustment knob located on control module clockwise slowly until dampers assume desired vent position. *Do not manually operate economizer motor. Damage to motor will result.*



LED — Light-Emitting Diode

Fig. 20 – Economizer Motor Control Module

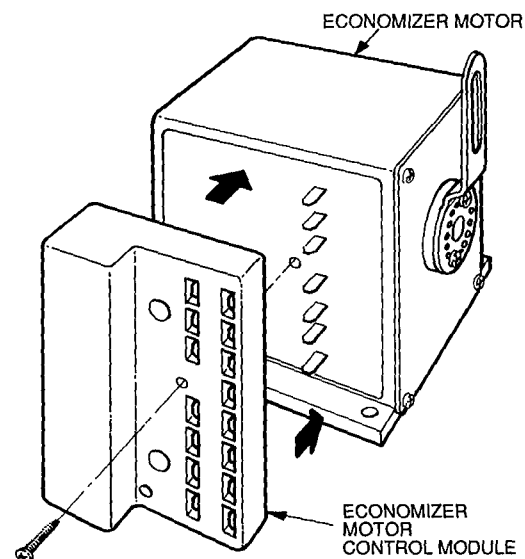


Fig. 21 – Economizer Motor Control Module Location

Step 10 — Install Outdoor-Air Hood — The outdoor-air hood is common to 25% air ventilation and economizer. If economizer is used, all electrical connections have been made and adjusted at the factory. Assemble and install hood in the field.

NOTE: The hood top cover, upper and lower filter retainers, hood drain pan, baffle (028 only), 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 hardware are in a package located inside the return-air filter access panel (Fig. 22).

1. Attach seal strip to upper filter retainer. See Fig. 23.
2. Assemble hood top cover, side panels, upper filter retainer, and drain pan (see Fig. 24).
3. Secure lower filter retainer and support bracket to unit. See Fig. 24. Leave screws loose on 028 units.
4. Slide baffle (028 only) behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for top cover of base unit located above outdoor-air inlet opening.
6. Match notches in hood top cover with unit top cover screws. Insert hood flange between top cover 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.

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 applicable codes.

Compressor Mounting — Loosen the compressor hold-down bolts on 48TJ016 and 028 units until sidewise movement of the washer under each hold-down bolt head can be obtained. Do not loosen completely as bolts are self-locking and will maintain adjustment.

NOTE: DO NOT loosen hold-down bolts on 48TJ020 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 1 suction port 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 compressor discharge flange or discharge line. Be sure that caps on the ports are tight.

Crankcase Heater(s) (48TJ016 and 028 Only)

— Crankcase heater(s) is energized as long as there is power to the 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 (48TJ016) or fixed (48TJ020-028) pulleys are factory-installed. See Tables 3-5 for Fan Performance Data. Remove tape from fan pulley. Be sure that fans rotate in the proper direction.

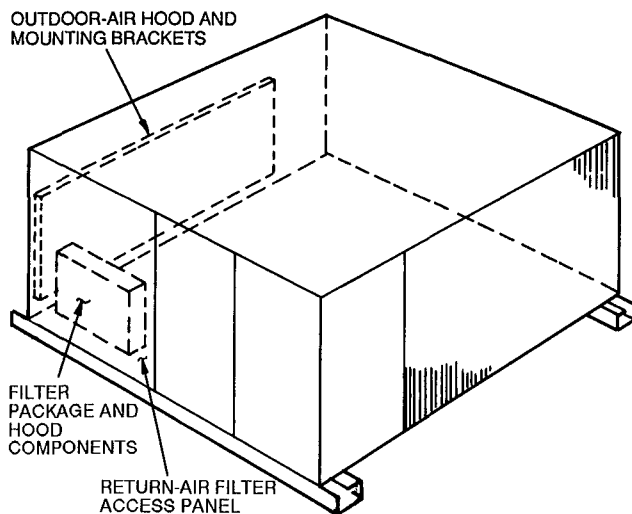


Fig. 22 — Outdoor-Air Hood Component Location

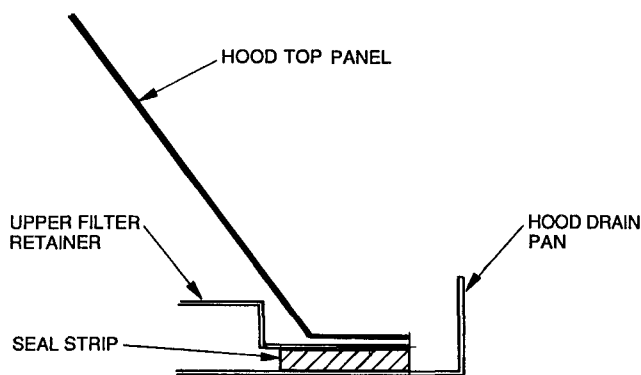


Fig. 23 — Seal Strip Location

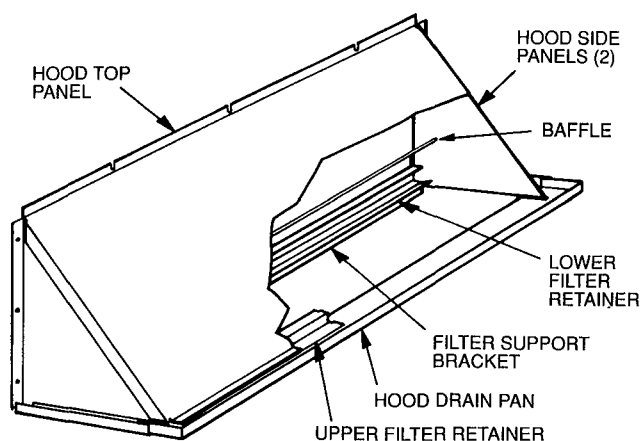


Fig. 24 — Outdoor-Air Hood Details

See Table 6 for air quantity limits. To alter fan performance, see Performance Adjustment section on pages 19 and 20.

Condenser-Fans and Motors — Condenser fans and motors are factory set. Refer to Condenser-Fan Adjustment section on page 21 as required. Be sure that fans rotate in the proper direction.

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 are described in Base Unit Operation section on page 18; and Economizer Adjustment section on page 21.

Gas Heat — Verify gas pressures before turning on heat as follows:

1. Turn off manual gas stop.

2. Connect pressure gage to supply gas tap (See Fig. 15 on page 11).
3. Connect pressure gage to manifold pressure tap on gas valve.
4. Turn on manual gas stop and set thermostat to HEAT. After the unit has run for several minutes, verify that incoming pressure is 5.0 in. wg or greater, and that the manifold pressure is 3.5 in. wg. If manifold pressure must be adjusted, refer to Gas Valve Adjustment section on page 23.
5. After unit has been in operation for 5 minutes, check temperature rise across the heat exchangers. See unit informative plate for correct rise limits of the heat supplied. Air quantities may need to be adjusted to bring the actual rise to within the allowable limits.

Table 3 — Fan Performance Data, 48TJ016

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	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
4500	801	933	890	1119	971	1297	1050	1483	1125	1670	1200	1883	1275	2123	1349	2398	1421	2691	1490	3011
4800	843	1110	928	1306	1006	1492	1081	1687	1153	1892	1223	2096	1293	2327	1364	2593	1433	2877	1501	3188
5100	885	1306	968	1510	1043	1714	1114	1918	1183	2131	1250	2345	1316	2575	1382	2824	1448	3099	1514	3428
5400	927	1519	1008	1732	1080	1954	1148	2167	1214	2389	1279	2611	1342	2842	1403	3082	1466	3348	1529	3694
5700	971	1758	1049	1989	1118	2220	1134	2442	1247	2673	1309	2913	1370	3144	1429	3384	1487	3650	—	—
6000	1016	2025	1091	2265	1158	2513	1222	2753	1282	2984	1342	3233	1401	3481	1458	3730	—	—	—	—
6300	1059	2309	1133	2567	1198	2815	1259	3073	1318	3321	1375	3570	—	—	—	—	—	—	—	—
6600	1104	2629	1174	2895	1239	3162	1297	3428	1355	3686	—	—	—	—	—	—	—	—	—	—
6900	1150	2975	1218	3259	1281	3535	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	1194	3348	1260	3641	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	1238	3757	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

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

NOTES:

1. No bold, no shading, indicates capabilities of both 3.0 hp and 3.7 hp motors.
2. **Boldface** indicates capability of 3.7 hp motor only.
3. Factory shipped motor drive range is 896 to 1161 rpm on the 3.0 hp motor and 1141 to 1407 rpm on the 3.7 hp motor. Other rpms require a field-supplied drive.
4. Static pressure losses (i.e., economizer, electric heater) must be added to external static pressure before entering Fan Performance table.
5. To convert watts to bhp, use the following equation:

$$\text{Bhp} = \frac{\text{Watts} \times \text{Motor Efficiency}}{746}$$

Motor Efficiencies:

3 hp — 0.84
 3.7 hp — 0.84

**Horsepower —
 Maximum Continuous Watts:**

3.0 — 3065
 3.7 — 3775

6. Interpolation is permissible. Do not extrapolate.
7. Fan performance is based on wet coils, clean filters, and casing losses.
8. 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 rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 4A — Fan Performance Data, 48TJ020,024 — 208/230-v and 575-v 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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
5000	669	1019	772	1291	870	1582	963	1903	1052	2251	1137	2623	1218	3016	1295	3425	1369	3849
5500	717	1292	813	1585	905	1892	992	2223	1076	2680	1157	2962	1234	3366	1309	3789	1381	4229
6000	767	1617	858	1932	944	2256	1026	2600	1104	2967	1181	3358	1255	3772	1327	4206	1396	4658
6500	817	1992	903	2329	985	2673	1062	3031	1136	3410	1209	3811	1279	4233	1348	4677	1415	5139
7000	869	2427	950	2787	1028	3151	1102	3527	1172	3919	1241	4331	1308	4762	1373	5215	1437	5686
7500	920	2919	998	3303	1073	3689	1143	4083	1210	4490	1275	4914	1339	5356	1401	5818	1462	6298
8000	973	3476	1047	3886	1119	4294	1186	4708	1250	5131	1313	5569	1373	6024	1433	6495	1493	6966
8500	1026	4102	1097	4635	1166	4967	1231	5401	1292	5843	1352	6297	1410	6765	1467	7248	1524	7731
9000	1079	4800	1147	5257	1214	5714	1276	6171	1336	6632	1393	7102	1449	7584	—	—	—	—
9500	1133	5576	1199	6058	1263	6540	1323	7018	1381	7500	—	—	—	—	—	—	—	—
10000	1188	6432	1250	6939	1313	7444	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

NOTES:

- 1 Non-bold area indicates capabilities of both 5 hp and 7½ hp (024 only) motors.
- 2 **Boldface** indicates additional capability of 7½ hp motor (024 only).
- 3 Factory shipped fan speed is 1070 rpm on the 5 hp motor and 1287 rpm on the 7½ hp motor (024 only). Other rpms may require a field-supplied drive.
- 4 Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
- 5 To convert watts to bhp, use the following equation:

$$\text{Bhp} = \frac{\text{Watts} \times \text{Motor Efficiency}}{746}$$

Motor Efficiencies:

5 hp — 0.85
7½ hp — 0.82

Horsepower —
Maximum Continuous Watts:

5 hp — 5180
7½ hp — 7915

- 6 Interpolation is permissible. Do not extrapolate.
- 7 Fan performance is based on wet coils, clean filters, and casing losses.
- 8 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 rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 4B — Fan Performance Data, 48TJ020,024 — 460-v 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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
5000	669	1019	772	1291	870	1582	963	1903	1052	2251	1137	2623	1218	3016	1295	3425	1369	3849
5500	717	1292	813	1585	905	1892	992	2223	1076	2680	1157	2962	1234	3366	1309	3789	1381	4229
6000	767	1617	858	1932	944	2256	1026	2600	1104	2967	1181	3358	1255	3772	1327	4206	1396	4658
6500	817	1992	903	2329	985	2673	1062	3031	1136	3410	1209	3811	1279	4233	1348	4677	1415	5139
7000	869	2427	950	2787	1028	3151	1102	3527	1172	3919	1241	4331	1308	4762	1373	5215	1437	5686
7500	920	2919	998	3303	1073	3689	1143	4083	1210	4490	1275	4914	1339	5356	1401	5818	1462	6298
8000	973	3476	1047	3886	1119	4294	1186	4708	1250	5131	1313	5569	1373	6024	1433	6495	1493	6966
8500	1026	4102	1097	4635	1166	4967	1231	5401	1292	5843	1352	6297	1410	6765	1467	7248	1524	7731
9000	1079	4800	1147	5257	1214	5714	1276	6171	1336	6632	1393	7102	1449	7584	1503	8033	—	—
9500	1133	5576	1199	6058	1263	6540	1323	7018	1381	7500	1436	7988	1488	8403	—	—	—	—
10000	1188	6432	1250	6939	1313	7444	1371	7946	1426	8449	1480	8956	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

NOTES:

- 1 Non-bold area indicates capabilities of both 5 hp and 7½ hp (024 only) motors.
- 2 **Boldface** indicates additional capability of 7½ hp motor (024 only).
- 3 Factory shipped fan speed is 1070 rpm on the 5 hp motor and 1287 rpm on the 7½ hp motor (024 only). Other rpms may require a field-supplied drive.
- 4 Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
- 5 To convert watts to bhp, use the following equation:

$$\text{Bhp} = \frac{\text{Watts} \times \text{Motor Efficiency}}{746}$$

Motor Efficiencies:

5 hp — 0.85
7½ hp — 0.82

Horsepower —
Maximum Continuous Watts:

5 hp — 5180
7½ hp — 8640

- 6 Interpolation is permissible. Do not extrapolate.
- 7 Fan performance is based on wet coils, clean filters, and casing losses.
- 8 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 rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 5A — Fan Performance Data, 48TJ028 — 208/230-v and 575-v 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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
7000	907	2596	989	2957	1064	3324	1136	3707	1205	4107	1273	4529	1339	4970	1403	5432	1467	5911
7500	962	3123	1039	3507	1111	3895	1179	4295	1245	4710	1309	5143	1372	5597	1434	6067	1494	6558
8000	1017	3717	1091	4126	1160	4536	1225	4954	1287	5386	1349	5833	1409	6297	1467	6779	—	—
8500	1072	4385	1143	4818	1209	5250	1271	5688	1332	6137	1390	6600	1447	7077	1504	7571	—	—
9000	1128	5129	1196	5587	1260	6042	1320	6501	1377	6968	1433	7446	1488	7938	—	—	—	—
9500	1185	5955	1250	6437	1311	6915	1369	7395	1424	7881	1478	8378	—	—	—	—	—	—
10000	1241	6865	1304	7372	1363	7873	1419	8376	1472	8882	1524	9396	—	—	—	—	—	—
10500	1298	7865	1359	8396	1415	8921	1469	9446	—	—	—	—	—	—	—	—	—	—
11000	1355	8956	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

NOTES:

1. Non-bold area indicates capabilities of both 7½ hp and 10 hp motors.
2. **Boldface** indicates capability of 10 hp motor only
3. Factory shipped fan speed is 1287 rpm on the 7½ hp motor and 1438 rpm on the 10 hp motor. Other rpms may require a field-supplied drive.
4. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
5. To convert watts to bhp, use the following equation:

$$\text{Bhp} = \frac{\text{Watts} \times \text{Motor Efficiency}}{746}$$

Motor Efficiencies

7½ hp — 0.82
10 hp — 0.80

Horsepower —
Maximum Continuous Watts:

7½ hp — 7915
10 hp — 9510

6. Interpolation is permissible. Do not extrapolate.
7. Fan performance is based on wet coils, clean filters, and casing losses.
8. 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 rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 5B — Fan Performance Data, 48TJ028 — 460 v Units

AIRFLOW (CFM)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		0.9		1.0		1.2		1.4		1.6		1.8	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
7000	907	2596	989	2957	1064	3324	1136	3707	1170	3907	1205	4107	1273	4529	1339	4970	1403	5432	1467	5911
7500	962	3123	1039	3507	1111	3895	1179	4295	1212	4503	1245	4710	1309	5143	1372	5597	1434	6067	1494	6558
8000	1017	3717	1091	4126	1160	4536	1225	4954	1256	5170	1287	5386	1349	5833	1409	6297	1467	6779	—	—
8500	1072	4385	1143	4818	1209	5250	1271	5688	1302	5913	1332	6137	1390	6600	1447	7077	1504	7571	—	—
9000	1128	5129	1196	5587	1260	6042	1320	6501	1348	6735	1377	6968	1433	7446	1488	7938	—	—	—	—
9500	1185	5955	1250	6437	1311	6915	1369	7395	1396	7638	1424	7881	1478	8378	—	—	—	—	—	—
10000	1241	6865	1304	7372	1363	7873	1419	8376	1445	8629	1472	8882	1524	9396	—	—	—	—	—	—
10500	1298	7865	1359	8396	1415	8921	1469	9446	1495	9710	1521	9973	—	—	—	—	—	—	—	—
11000	1355	8956	1414	9512	1469	10,062	1521	10,609	—	—	—	—	—	—	—	—	—	—	—	—
11250	1384	9540	1441	10,107	1495	10,668	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
Watts — Input Watts to Motor

NOTES:

1. Non-bold area indicates capabilities of both 7½ hp and 10 hp motors.
2. **Boldface** indicates additional capability of 10 hp motor
3. Factory shipped fan speed is 1287 rpm on the 7½ hp motor and 1438 rpm on the 10 hp motor. Other rpms may require a field-supplied drive.
4. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
5. To convert watts to bhp, use the following equation:

$$\text{Bhp} = \frac{\text{Watts} \times \text{Motor Efficiency}}{746}$$

Motor Efficiencies:

7½ hp — 0.82
10 hp — 0.80

Horsepower —
Maximum Continuous Watts:

7½ hp — 8,640
10 hp — 11,000

6. Interpolation is permissible. Do not extrapolate.
7. Fan performance is based on wet coils, clean filters, and casing losses.
8. 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 rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 6 — Air Quantity Limits

UNIT 48TJ	MINIMUM CFM	MAXIMUM CFM
016	4500	7500
020	5400	9000
024	6000	10000
028	7500	11250

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 (IFM), compressor no. 1 (48TJ020-028) or unloaded compressor (48TJ016), and condenser fan 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 (48TJ020-028), or compressor no. 1 runs fully loaded (48TJ016).

HEATING, UNITS WITHOUT ECONOMIZER

NOTE: The 48TJ016-028 units have 2 stages of heat.

First Stage — All Units — Turn unit power on. Open manual gas line valve. Set thermostat system switch at HEAT or AUTO. position and set fan switch to AUTO. position for heating.

First-stage thermostat calls for heat. Time-delay relay for evaporator fan begins timer sequence. Induced-draft relay closes, and induced-draft motor starts.

Pressure switch closes and pilot valve no. 1 opens, allowing gas to flow to the first-stage pilot. Spark ignitor ignites pilot flame. Sensor detects flame and the main gas valve no. 1 opens. Gas flows to main burners and first-stage burners ignite. Spark igniter turns off.

When sequence is complete, time-delay relay closes and evaporator fans start.

Second-Stage — 48TJD016-028 Low-Heat and 48TJE016 High Heat Units — With an additional heating call, the second-stage thermostat closes. (The control relay [HR2] closes during the first stage of operation.) Pilot valve no. 2 opens, and the spark ignitor ignites pilot. The sensor detects a flame and energizes main gas valve coil no. 2, opening main gas valve no. 2. Gas flows to the main burners, and the second-stage burners ignite. The spark ignitor turns off.

When the second-stage thermostat is satisfied, the second-stage gas valve closes.

When the first-stage thermostat is satisfied, the first-stage gas valve closes. The induced-draft motor turns off, the time delay relay opens, and the timer sequence begins. When the sequence is complete, the evaporator-fan motor turns off.

Second-Stage — 48TJE024,028 High-Heat Units — With an additional heating call, the second-stage thermostat closes. (The control relay [HR2] closes during the first stage of operation.) The second-stage induced-draft relay closes, and the second-stage induced-draft motor starts.

The second-stage pressure switch closes and pilot valve no. 2 opens, allowing gas to flow to the second-stage pilot. Spark ignitor ignites pilot flame. The sensor detects the flame, and main gas valve no. 2 opens. Gas flows to main burners and second-stage burners ignite. Spark ignitor turns off.

When the second-stage thermostat is satisfied, the second-stage gas valve closes and the second-stage induced-draft motor turns off.

When the first-stage thermostat is satisfied, the first-stage gas valve closes. The first-stage induced-draft motor turns off, the time relay opens, and the timer sequence begins. When the sequence is complete, the evaporator-fan motor turns off.

COOLING, UNITS WITH ECONOMIZER — Upon a call for cooling, when outdoor ambient is above the changeover control setting, the economizer damper moves to VENT

position. The compressors and evaporator and condenser fans energize and operate as per Cooling, Units Without Economizer section above.

Upon a first call for cooling, when outdoor ambient is below the changeover control setting, the evaporator fan starts and the economizer is fully open. The compressors remain off.

Upon a second-stage call for cooling, compressor no. 1 (48TJ020-028) or unloaded compressor (48TJ016) is energized and mechanical cooling is integrated with economizer cooling. If the outdoor-air temperature drops below 50 F, a cooling lockout switch prevents the compressors 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 build-up and locks out the compressors, allowing the coil to clear. Once frost has melted, the compressors can be reenergized by resetting the thermostat.

HEATING, UNITS WITH ECONOMIZER — Outdoor-air damper stays at VENT position while evaporator fan is operating.

SERVICE

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. 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.

MAIN AND PILOT BURNERS — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the pilot and main burner flames through view port (in condenser section), and adjust if necessary. Refer to Pilot Adjustment or Main Burners sections on page 23.

FLUE GAS PASSAGEWAYS — The flue collector box and heat exchanger cells may be inspected by removing heat exchanger access panel (Fig. 4 and 5), flue box cover, and main burner assembly (Fig. 25). Refer to Main Burners section on page 23 for burner removal sequence. If cleaning is required, remove heat exchanger turbulators (Fig. 26) and clean all parts with a wire brush.

COMBUSTION-AIR BLOWER — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing (Fig. 25 and 26). The motor and wheel assembly will slide up and out of the fan housing. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.

EVAPORATOR COIL — Clean as required with commercial coil cleaner.

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. In winter, keep drains and traps dry.

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 48TJ028 unit requires industrial grade throw-away filters capable of withstanding face velocities up to 625 fpm. Ensure that replacement filters for the 48TJ028 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 the correct amount of oil at the factory. On 06D compressors, observe the oil level in the sight glass at start-up. If unit oil level is below sight glass, add oil until level is approximately 1/4 sight glass.

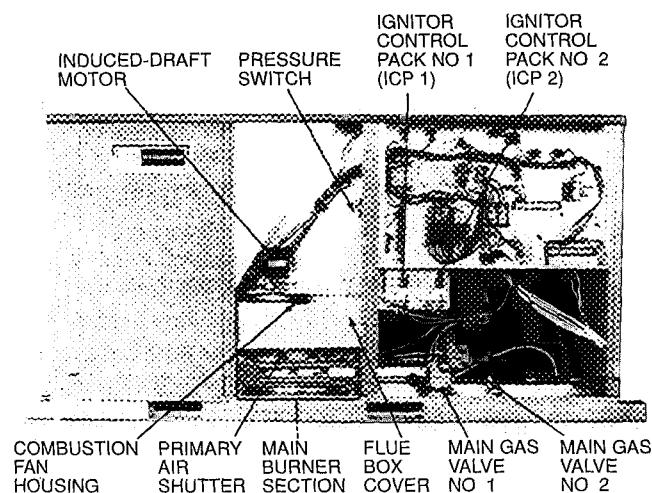


Fig. 25 — Typical Gas Heating Section, 2-Stage Units (48TJD Units Shown)

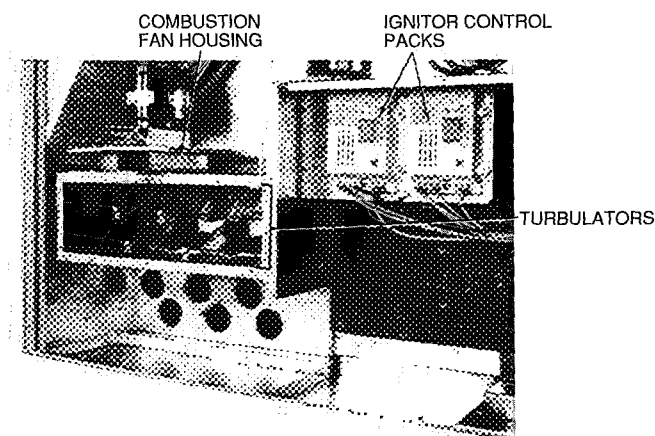


Fig. 26 — Typical Heating Section with Main Burners Removed (48TJD Units Shown)

If oil charge is above sight glass, do not remove any oil until the compressor crankcase heater has been energized for at least 24 hours.

FAN SHAFT BEARINGS — Lubricate bearings at least every 6 months with suitable bearing grease. Extended grease line is provided for far side fan bearing (opposite drive side). 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.

Evaporator Fan, 48TJ016 Units

PERFORMANCE ADJUSTMENT — Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speeds:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting plate nuts.
3. Loosen movable-pulley flange setscrew (see Fig. 27).
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.
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.)

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.

SERVICE AND REPLACEMENT (See Fig. 28)

NOTE: To remove belts only, follow Steps 1-7.

1. Remove filter and supply-air section panels.
2. Remove unit top cover.
3. Remove coil guard.
4. Loosen screws A and B on both sides of motor mount assembly.
5. Loosen screw C.
6. Rotate motor mount assembly (with motor attached) as far as possible away from evaporator coil.
7. Remove belt.
8. Rotate motor mount assembly back past original position toward evaporator coil.
9. Remove motor mounting nuts D and E (both sides).
10. Lift motor up through top of unit.
11. Reverse above procedure to reinstall motor.
12. Check and adjust belt tension as necessary.

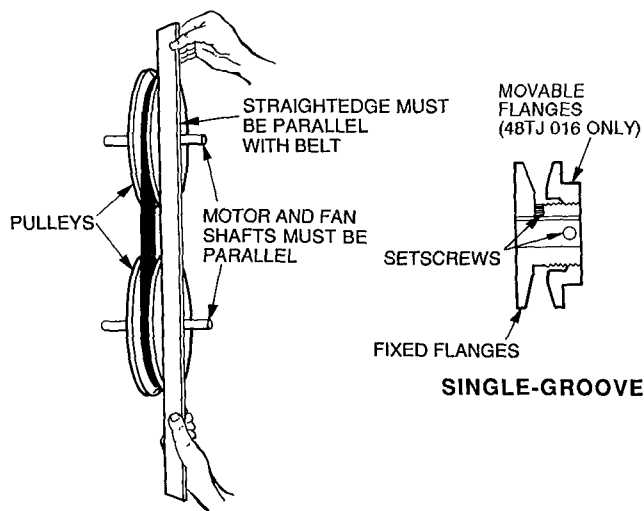


Fig. 27 — Evaporator-Fan Alignment and Adjustment

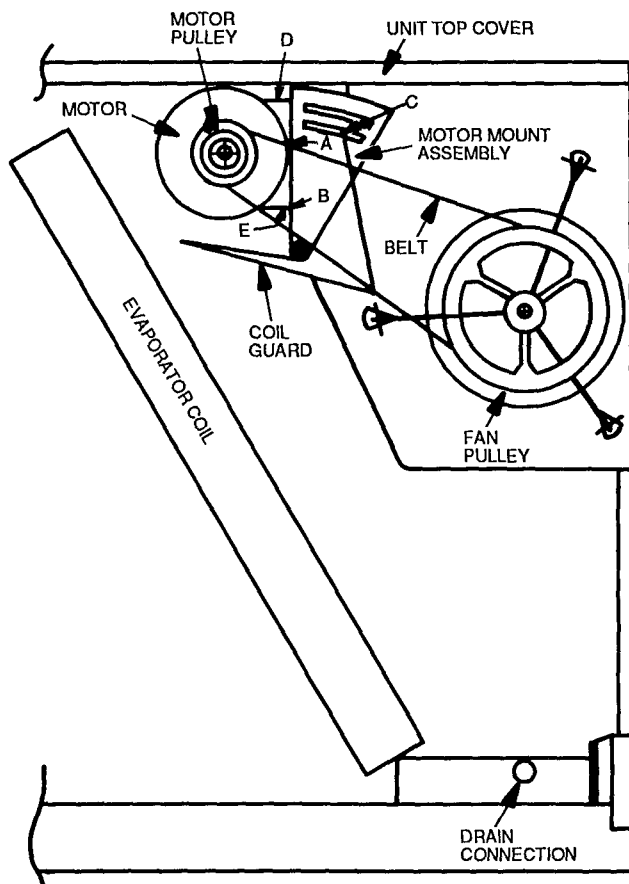


Fig. 28 — 48TJ016 Evaporator-Fan Motor Adjustment

Evaporator Fan, 48TJ020-028 Units

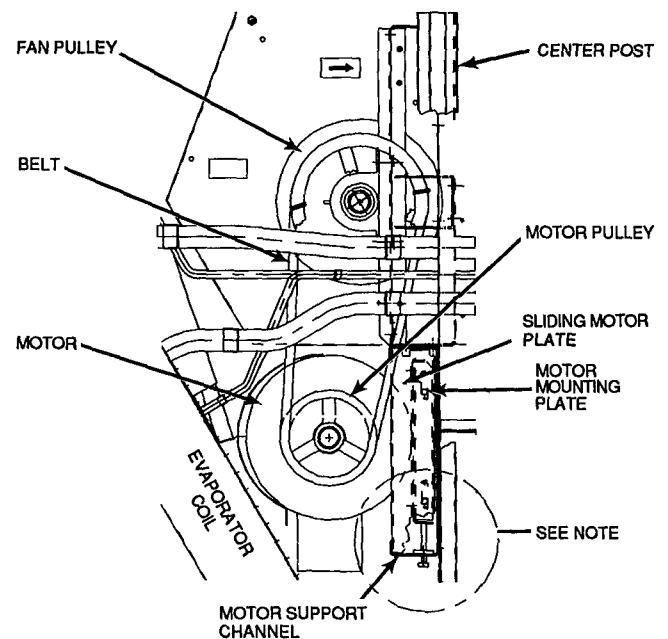
PERFORMANCE ADJUSTMENT — The 48TJ020-028 units have fixed pulleys. Fan speed can be adjusted only by changing the pulley(s) and/or belt. See Table 7 for alternate drive selection.

To align fan and motor pulleys (see Fig. 27):

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

SERVICE AND REPLACEMENT (See Fig. 29) — The 48TJ020-028 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.



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. 29 — 48TJ020-028 Evaporator-Fan Motor Section

Table 7 — Alternate Drive Components Table

UNIT 48TJ	MOTOR HP	DRIVE SOURCE	FAN RPM	MOTOR SHEAVE DATUM DIMENSION* (in.)	MOTOR SHEAVE PART NO.†	BLOWER SHEAVE DATUM DIMENSION* (in.)	BLOWER SHEAVE PART NO.†	BELT PART NO.†
020,024**	5	Factory	1070	5.1	BK57	8.4	BK90	B50
	5, 7½	Field	1181	5.6	BK62	8.4	BK90	BX50
	5, 7½	Field	1244	5.9	BK65	8.4	BK90	BX51
	7½	Factory	1287	6.1	BK67	8.4	BK90	BX51
	7½	Field	1379	6.6	BK72	8.4	BK90	BX52
028	7½	Factory	1287	6.1	BK67	8.4	BK90	BX51
	7½, 10	Field	1350	6.4	BK70	8.4	BK90	BX52
	7½, 10	Field	1379	6.6	BK72	8.4	BK90	BX52
	10	Factory	1438	6.9	BK75	8.4	BK90	BX53
	10	Field	1479	7.1	BK77	8.4	BK90	BX53
	10	Field	1541	7.4	BK80	8.4	BK90	BX54

LEGEND

MPTA — Mechanical Power Transmission Association

RMA — Rubber Manufacturer's Association

*Datum dimension is equal to the old pitch diameter per RMA/MPTA Standard IPZO-1977. To convert to new pitch diameter per RMA/MPTA Standard IP20-1988, add 0.3 in. to the sheave datum dimension.

†Part numbers for motor sheave, blower sheave, and belt are Brown-ing Catalog part numbers. The 7½ and 10 hp motor sheaves have Browning fixed-bore sheaves supplied with factory drive package.
**Alternate drives for 7½ hp motors do not apply to 020 units

Belt Tension Adjustment — To adjust belt tension:

- Loosen fan motor bolts.
- a. 016 Units:
Move motor mounting plate up or down for proper belt tension (½ 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 (⅔ in. deflection at midspan with one finger [9 lb force]).
- Tighten nuts.
- Adjust bolts and nut on mounting plate to secure motor in fixed position.

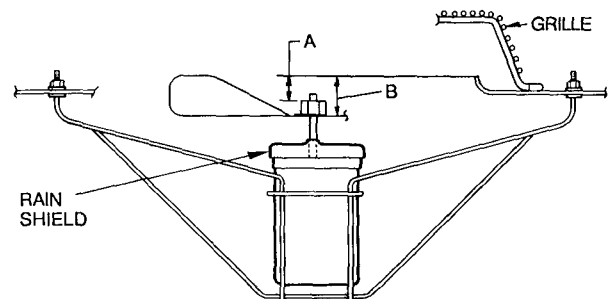
Condenser-Fan Adjustment (Fig. 30)

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

Economizer Adjustment — Make certain the outdoor-air damper is fully closed and the return-air damper is fully open before completing the following steps:

- Turn on power to the unit.
- Turn the thermostat fan switch to the ON position. The damper will go to the vent position.
- Adjust the vent position with the minimum position adjustment on the module. See Fig. 20.
- 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.



UNIT 48TJ	DIMENSION	VOLTAGE	
		208/230, 460	575
016	A	1.18 ± 0.12	0.25 ± 0.12
020-028	B	0.88 ± 0.12	0.88 ± 0.12

Fig. 30 — Condenser-Fan Adjustment

- Set the outdoor-air thermostat (OAT), located in the economizer section of the unit to 75 F.
- 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.
- Jumper terminal T to terminal T1 on the module (see Fig. 20). 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.
- Adjust mechanical linkage, if necessary, for correct positioning. If may be necessary to remove the filters to adjust the linkage.
- 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.
- 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.

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.

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. 31-33), 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.

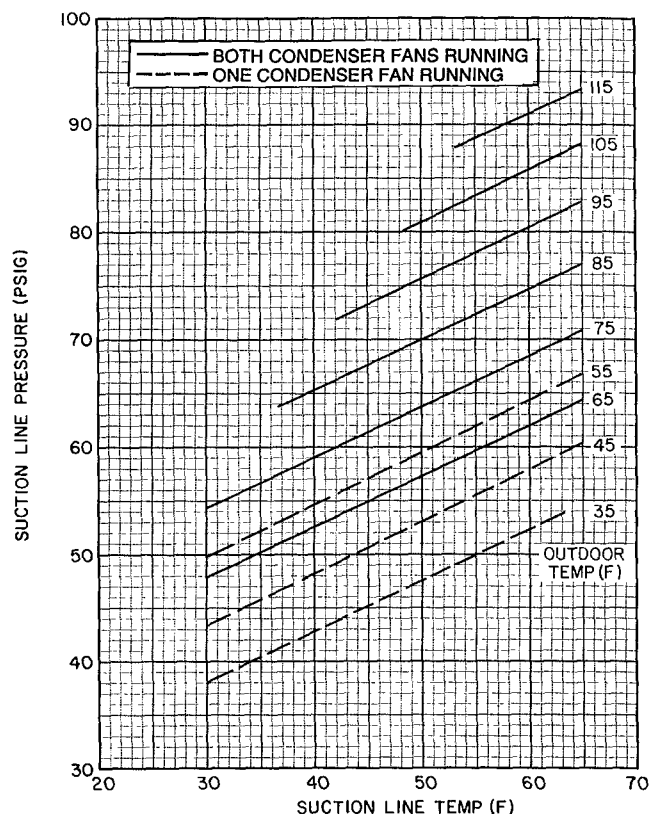


Fig. 31 — Cooling Charging Chart — 48TJ016

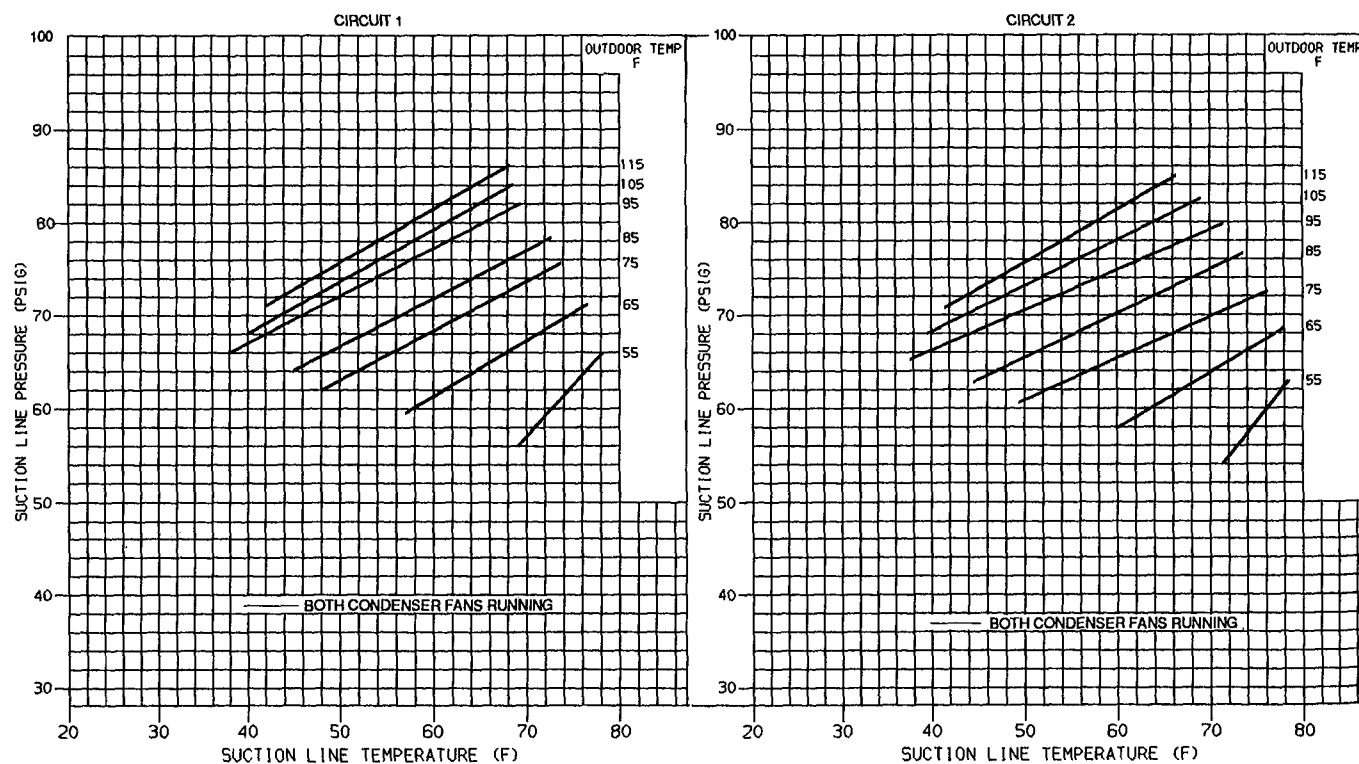


Fig. 32 — Cooling Charging Chart — 48TJ020,024

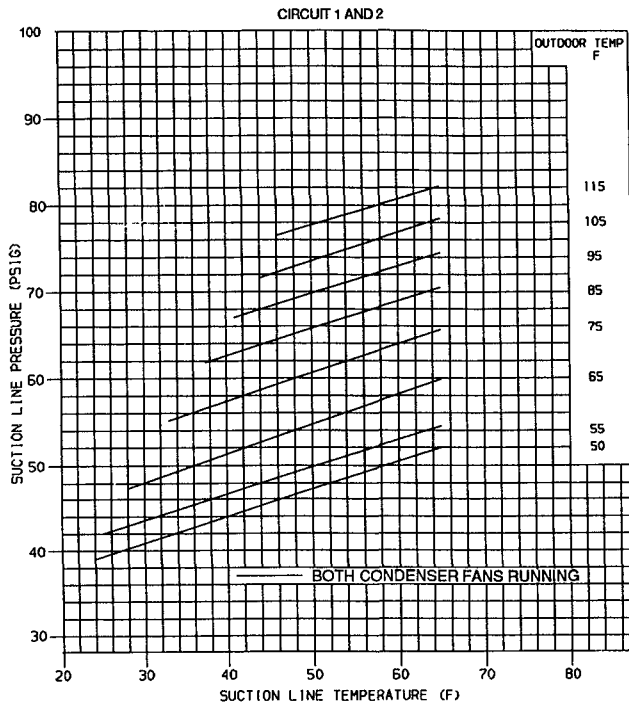


Fig. 33 — Cooling Charging Chart — 48TJ028

Pilot Light — If pilots do not light as described in Start-Up, Gas Heat section on page 15, be sure that pilot orifice is not obstructed, then check for spark ignitor malfunctions as follows:

1. Shut off control supply power to ignitor control pack (ICP).
2. Check that spark gap is $\frac{1}{8}$ in. $\pm$ $\frac{1}{32}$ inch.
3. Check that ICP is securely grounded.
4. Check that high-voltage lead is securely connected between ICP and electrode body.
5. Restore power to ICP. Check that 24 v is supplied to terminal **TH** of ICP.
6. Check unit label diagram for correct terminal usage if any wires are removed.

Pilot Adjustment

1. Set system selector switch at OFF position to shut off unit. Turn off power to unit.
2. Remove screw cap cover on pilot gas valve to expose adjusting screw (See Fig. 34).
3. Turn valve knobs to pilot position.
4. Turn on power to unit. Set system selector switch to HEAT position and set thermostat to a setting that will call for heat. Pilot ignites.
5. With a small screwdriver, turn adjustment screw until flame fully engulfs sensor. Flame can be observed through view port (Fig. 35).
6. Replace cap on pilot gas valve. Turn off power to unit. Return valve(s) to original position.
7. Check for proper burner operation by cycling the burners. Wait 30 seconds between burner cycles.
8. Check that all unit panels are in place before leaving unit.

Gas Valve Adjustment

NATURAL GAS — The gas valve opens and closes in response to the thermostat or limit control.

When power is supplied to valve terminals 3 and 4, the pilot valve opens to the preset position. When power is supplied to terminals 1 and 2, the main valve opens to its preset position.

The regular factory setting is stamped on the valve body (3.5 in. wg).

To adjust regulator:

1. Set thermostat at setting for no call for heat.
2. Turn main gas valve to OFF position.
3. Remove $\frac{1}{8}$ -in. pipe plug from manifold or gas valve pressure tap connection. Install a suitable pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat.
6. Remove screw cap covering regulator adjustment screw (See Fig. 34).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set thermostat setting for no call for heat, turn off main gas valve, remove pressure-measuring device and replace $\frac{1}{8}$ -in. pipe plug and screw cap.

Main Burners — For most applications, main burners are factory set and should require no adjustment. However, if burner adjustment is necessary:

1. Perform pilot adjustment.
2. Turn gas valve to ON position. Allow unit to operate at least 15 minutes with burner access panel in place.
3. Remove access panel.
4. Loosen primary air shutter (Fig. 35) and adjust to a minimum opening of $\frac{5}{8}$ inch.
5. Retighten primary air shutter and reinstall access panel.

To check ignition of main burners and fan switch operation, move thermostat dial above and below room temperature several times, pausing at least one minute between cycles.

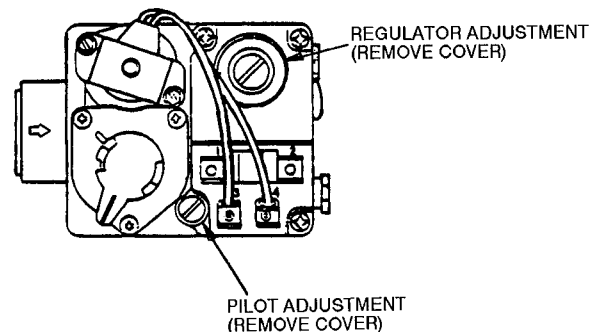


Fig. 34 — Gas Valve

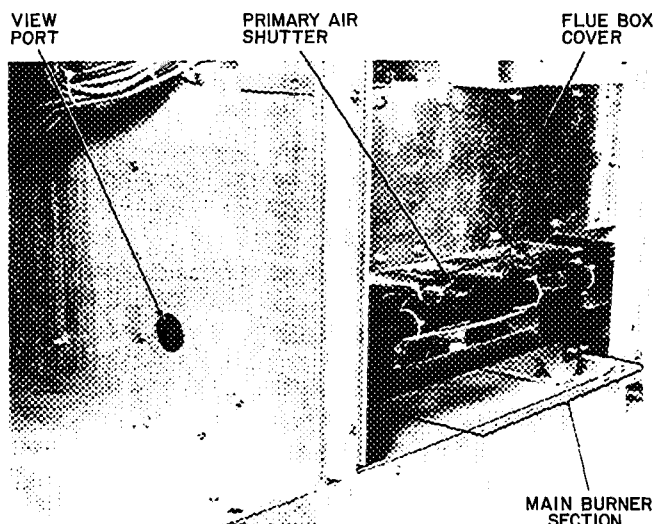


Fig. 35 — Typical Heating Section

MAIN BURNER REMOVAL

1. Shut off (field-supplied) manual main gas valve.
2. Shut off power to unit.
3. Remove unit control box/gas valve access panel, burner section access panel, and center post (Fig. 4 and 5).
4. Disconnect pilot ignitor and pilot proving sensor leads at ICP, rollout switch leads at switch, and pilot tube gas connection(s) at the pilot orifice.
5. Disconnect gas connection(s) from between gas valve(s) and main burners.
6. Remove 2 screws securing burner assembly to base unit.
NOTE: For 48TJE024 and 028 units only: Remove access plate from base rail.
7. Slide burner assembly out of unit.

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 48TJ020 and 024 units have overcurrent protection inherent in the compressor.

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

Crankcase Heater — Each compressor has a 70-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 cooling lockout (CLO) 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 overtemperature.

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.

Economizer Checkout Procedures

TEST PROCEDURE	RESULTS
A. Disconnect power at TR and TR1. Disconnect jumper between P and P1. See Fig. 20. 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
Disconnect factory-installed resistor from terminals S _R and +.	1 LED (light-emitting diode) should be on. 2. Motor drives toward open

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 enthalpy 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 enthalpy test results: 1 LED should be off. 2 Motor drives toward closed

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

LEGEND

Fig. 36 — Typical Component Arrangement

Fig. 37 — Typical Wiring Schematic

AHA — Adjustable Heat Anticipator
BKR W/AT — Breaks with Amp Turns
C — Contactor, Compressor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
CLS — Compressor Lockout Switch
COMP — Compressor Motor
CR — Control Relay
CT — Current Transformer
DM — Damper Motor
DU — Dummy Terminal
EQUIP — Equipment
FPT — Freeze Protection Thermostat
FU — Fuse
GND — Ground
HPS — High-Pressure Switch
HR — Heat Relay
HV — High Voltage
I — Ignitor
ICP — Ignitor Control Pack
IDM — Induced-Draft Motor
IDR — Induced-Draft Relay
IFC — Indoor (Evaporator) Fan Contactor
IFCB — Indoor (Evaporator) Fan Circuit Breaker

IFM — Indoor (Evaporator) Fan Motor
IFR — Indoor (Evaporator) Fan Relay
IP — Internal Protector
L — Light
LOR — Lockout Relay
LPS — Low-Pressure Switch
LS — Limit Switch
MAT — Mixed-Air Thermostat
MGV — Main Gas Valve
NEC — National Electrical Code
OAT — Outdoor-Air Thermostat
OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor
PGV — Pilot Gas Valve
PL — Plug Assembly
PRI — Primary
PS — Pressure Switch
QT — Quadruple Terminal
R — Relay
RS — Rollout Switch
SN — Sensor
SW — Switch
TB — Terminal Block
TC — Thermostat Cooling
TDR — Time Delay Relay

TH — Thermostat Heating
TRAN — Transformer
 Terminal (Marked)
 Terminal (Unmarked)
 Terminal Block
 Splice
 Splice (Marked)
 Splice (Field Supplied)
 Factory Wiring
 Field Control Wiring
 Field Power Wiring
 Accessory or Optional Wiring
 To Indicate Common Potential Only, Not To Represent Wiring

NOTES:

- Compressor and fan motors thermally protected; 3-phase motors protected against primary single-phasing conditions
- If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
- Jumpers are omitted when unit is equipped with economizer.
- Set thermostat heat anticipator(s):

- CB must-trip amps are equal to or less than 140% full load amps.
- Number(s) indicates the line location of used contacts. A bracket over (2) numbers signifies a single-pole, double-throw contact. An underlined number signifies a normally-closed contact. A plain (no line) number signifies a normally-open contact.
- The CLO locks out the compressor to prevent short cycling on compressor overload and safety devices. Before replacing CLO, check these devices.

UNIT 48TJ	W1	W2	VOLTAGE
016-028	.98 1.20	.44 .44	208/230, 575 460

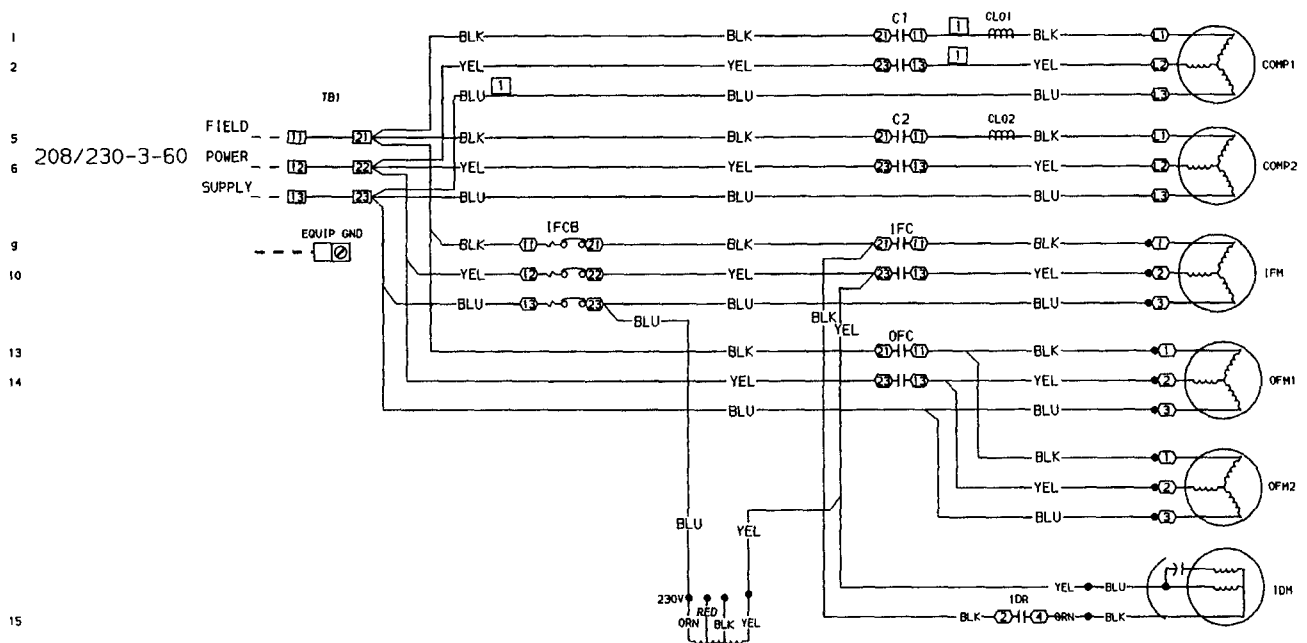


Fig. 36 — Typical Wiring Schematic

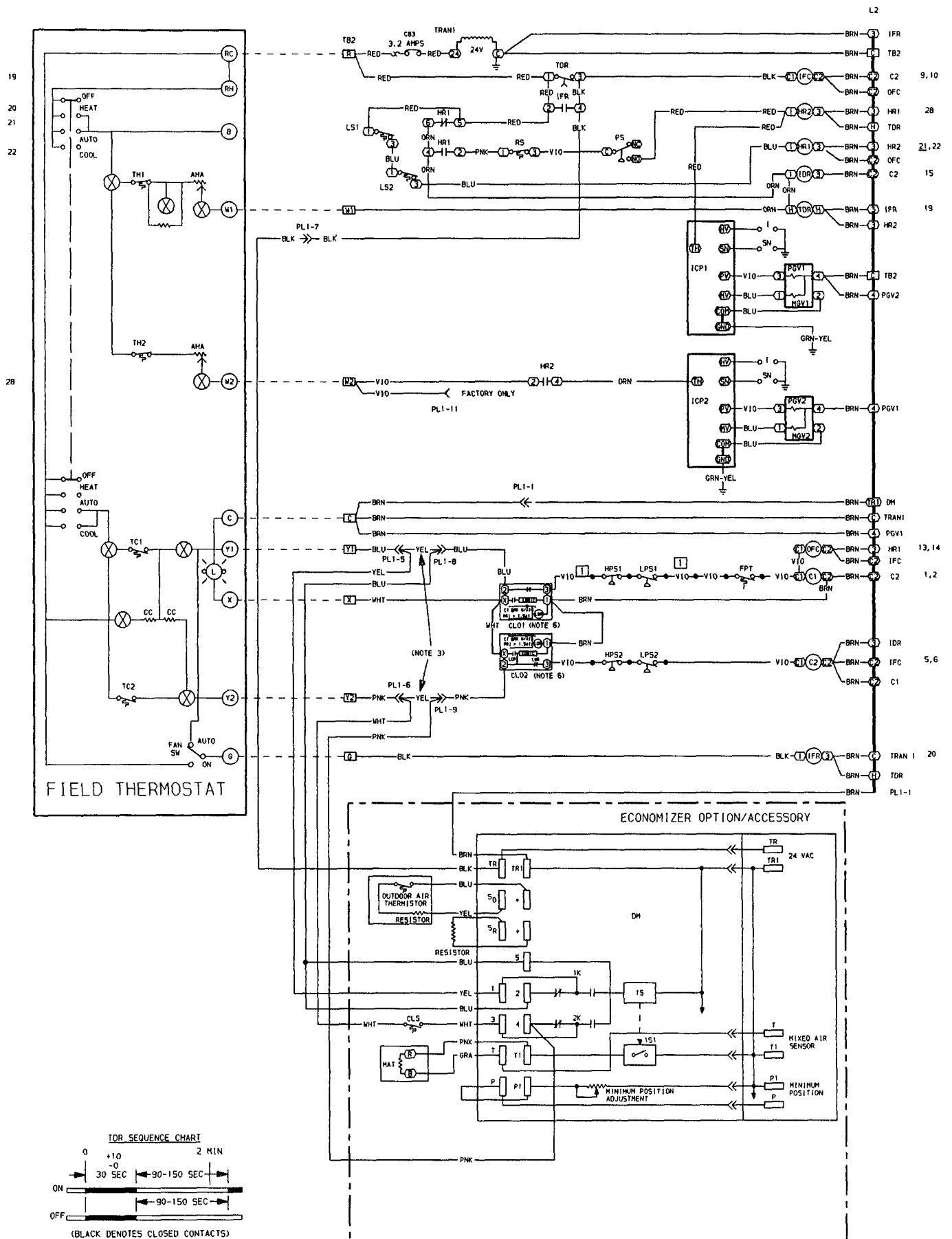
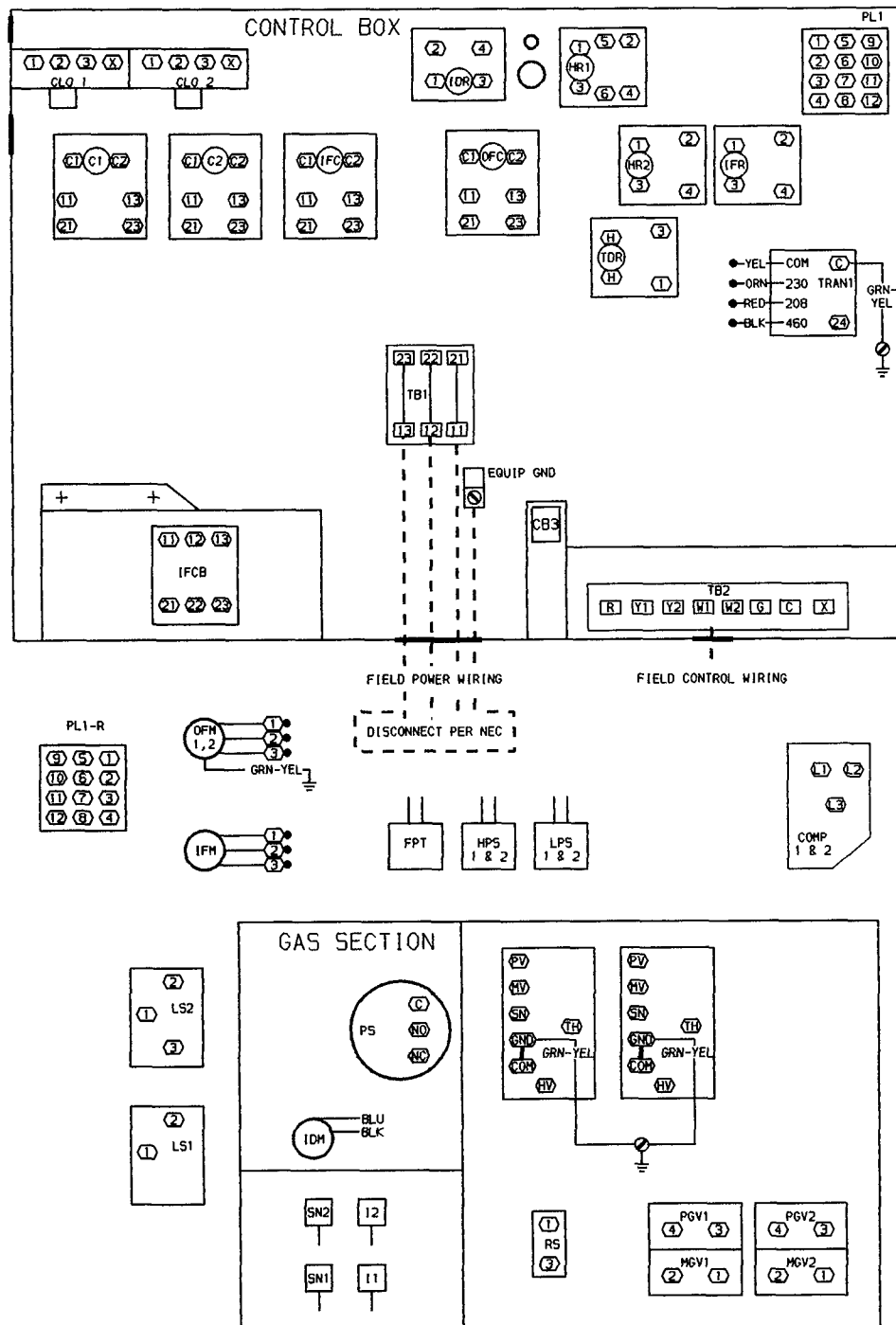


Fig. 36 – Typical Wiring Schematic (cont)



ECONOMIZER OPTION/ACCESSORY

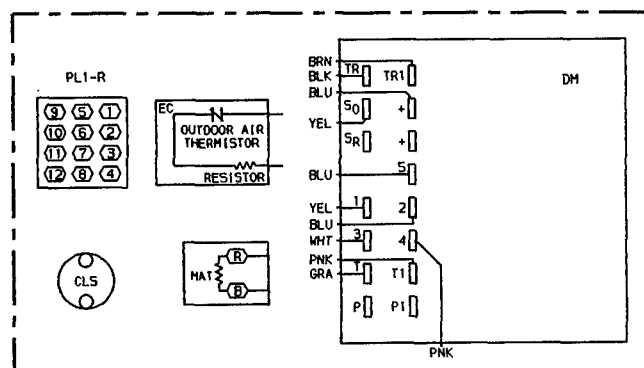


Fig. 37 — Typical Component Arrangement

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 INSTALLATION OF EXHAUST HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ 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 SETSCREW 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 _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry Bulb)

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

COOLING SUPPLY AIR _____ F

GAS HEAT SUPPLY AIR _____ F

PRESSURES

GAS INLET PRESSURE _____ IN. WG

GAS MANIFOLD PRESSURE STAGE NO. 1 _____ IN. WG STAGE NO. 2 _____ IN. WG

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 22 AND 23

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGE OVER SETTINGS TO JOB REQUIREMENTS

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