

Single-Package Rooftop Heating/Cooling Units

Installation, Start-Up and Service Instructions

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SAFETY CONSIDERATIONS

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

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

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

⚠ WARNING



Disconnect gas piping from unit when leak testing at pressure greater than ½ psig. Pressures greater than ½ psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than ½ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of ½ psig or less, a unit connected to such piping must be isolated by manually closing the gas valve(s).

⚠ WARNING

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

INSTALLATION

Unit is shipped in the vertical discharge configuration. To convert to horizontal configuration, remove screws from side duct opening covers and remove covers. Using the same screws, install covers on vertical duct openings with the insulation-side down. Seals around duct openings must be tight. See Fig. 1.

IMPORTANT: The filters must be field-installed outside the unit on horizontal applications with optional economizer. Otherwise, the economizer must be removed to access the filters. The area of the field-installed filters should be equal to the area of the factory-installed filters.

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 2. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb.* If gas, electric power or control power is to be routed through the curb, attach the accessory thru-the-curb service connection plates to the roof curb in accordance with the accessory installation instructions. Connection plates must be installed before unit is set in roof curb.

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb as shown in Fig. 2. Improperly applied gasket can also result in air leaks and poor unit performance.

Curb should be level. Unit leveling tolerances are shown in Fig. 3. This is necessary for unit drain to function properly. Refer to Accessory Roof Curb Installation Instructions for additional information as required.

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow. **NOTE:** Horizontal units may be installed on a roof curb if required.

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

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

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

A minimum clearance is not required around ductwork. Cabinet return-air static shall not exceed — .35 in. wg with economizer or .45 in. wg without economizer.

These units are designed for a minimum continuous return-air temperature of 50 F (dry bulb), or an intermittent operation down to 45 F (dry bulb), such as when used with a night set-back thermostat.

Step 3 — Install External Trap for Condensate Drain — The unit's 3/4-in. condensate drain connections are located at the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, make sure the plug in the alternate bottom connection is tight before installing the unit.

To use the bottom drain connection for a roof curb installation, relocate the factory-installed plug from the bottom connection to the side connection. See Fig. 4. The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap at least 4-in. deep and protect against

freeze-up. See Fig. 5. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection.

Step 4 — Rig and Place Unit — Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit. Rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 6 for additional information. Operating weight is shown in Table 1 and Fig. 6.

Lifting holes are provided in base rails as shown in Fig. 6 and 7. Refer to rigging instructions on unit.

⚠ CAUTION

All panels must be in place when rigging.

POSITIONING — Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. See Fig. 7.

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

Be sure that unit is installed so that snow will not block the combustion intake or flue outlet.

Unit may be installed directly on wood flooring or on Class A, B, or C roof-covering material when roof curb is used.

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

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

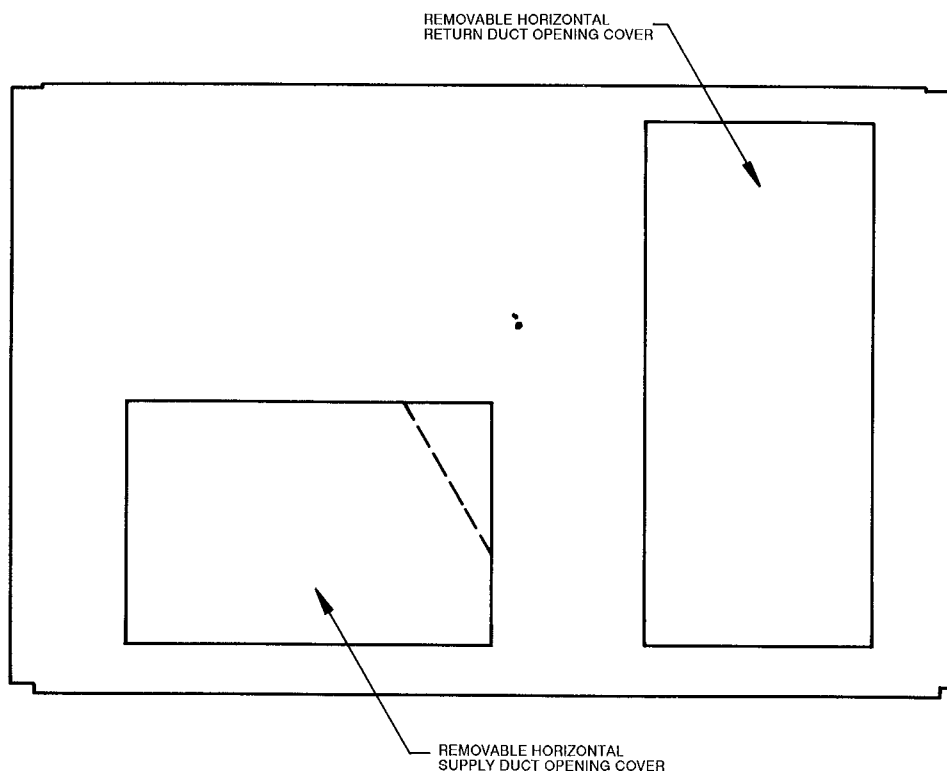
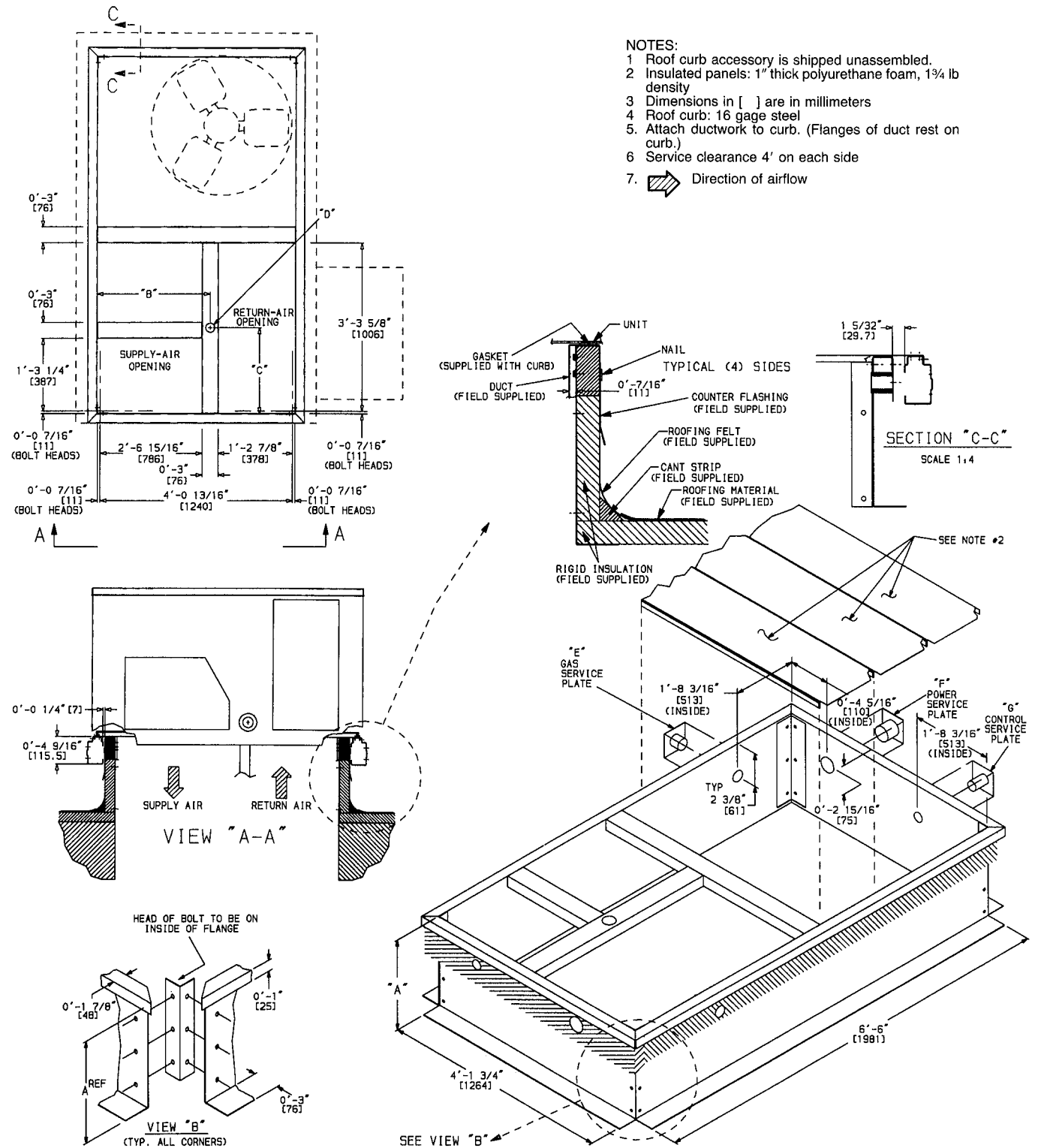


Fig. 1 — Horizontal Conversion Panels

ROOF CURB ACCESSORY	A	UNIT SIZE
50DJ901371	1'-2" [356]	48TJ008-014
50DJ901381	2'-0" [610]	

SERVICE PLATE SIZES							CONNECTOR PACKAGE ACCESSORY
UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	
48TJ008-014	2'-8 7/16" [827]	1'-10 15/16" [583]	1 3/4" [44.5]	3/4" NPT	1" NPT	3/4" NPT	50DJ901551



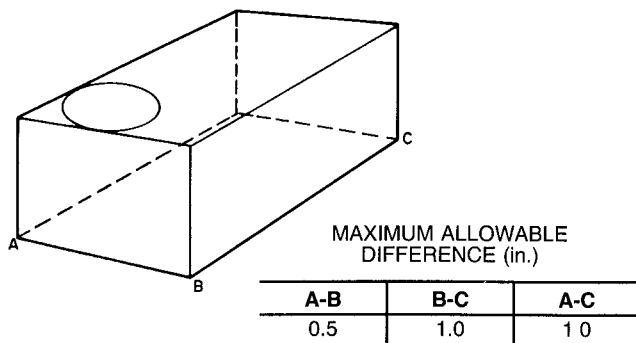
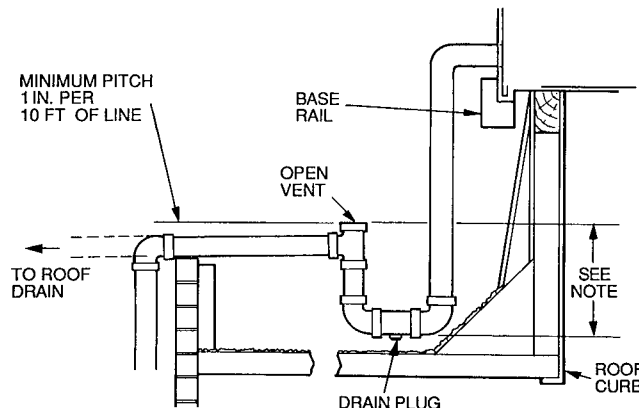


Fig. 3 – Unit Leveling Tolerances



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

Fig. 5 – External Trap Condensate Drain

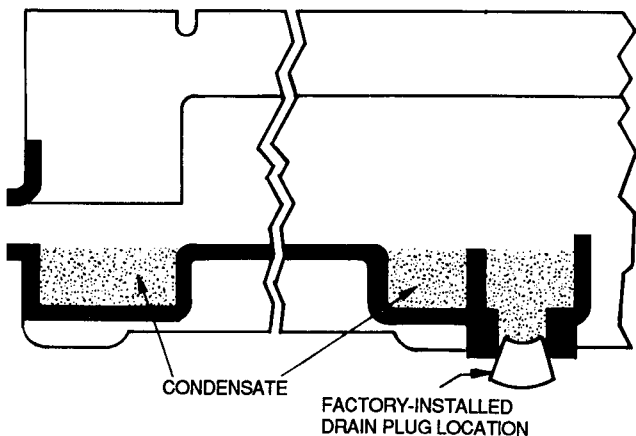


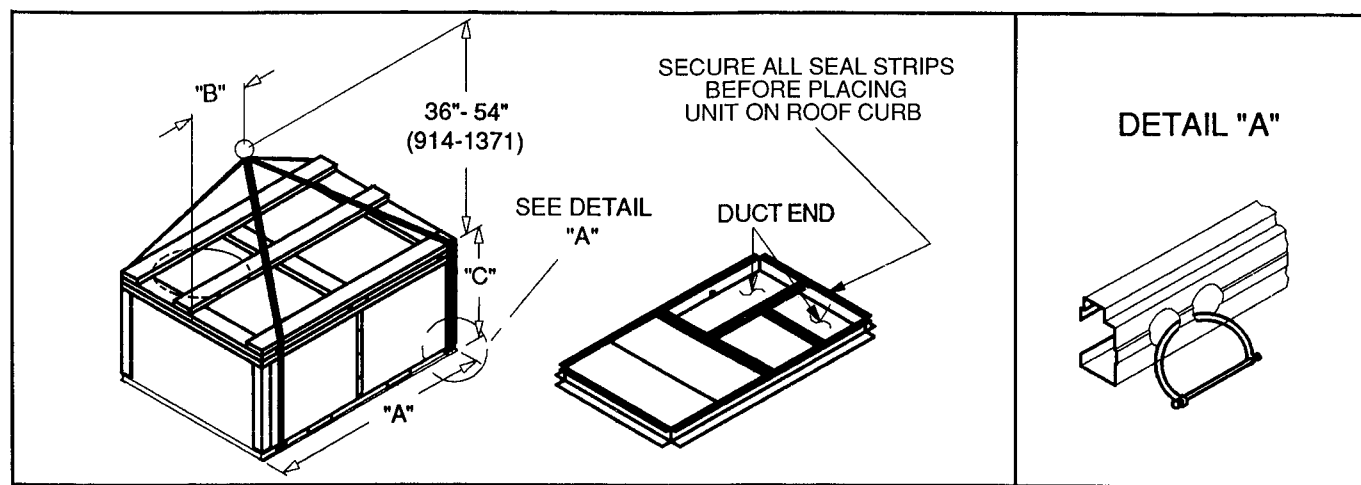
Fig. 4 – Condensate Drain Pan

Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, and at least 48 in. from an adjacent building or combustible material. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

Flue vent discharge must have a minimum horizontal clearance of 48 in. from electric and gas meters, gas regulators, and gas relief equipment.

Flue gas can deteriorate building materials. Orient unit so that flue gas will not affect building materials.

Adequate combustion-air space must be provided for proper operation of this equipment. Be sure that installation complies with all local codes and Section 5.3, Air for Combustion and Ventilation, NFPA (National Fire Protection Association), ANSI (American National Standards Institute) Z223.1-1984 and addendum Z223.1A-1987. In Canada, installation must be in accordance with the CAN1. B149.1 and CAN1. B149.2 installation codes for gas burning appliances.



NOTES:

1. Dimension in () is in millimeters
2. Hook rigging shackles through holes in base rail as shown in detail "A". Holes in base rails are centered around the unit center of gravity. Use wooden top skid when rigging to prevent rigging straps from damaging unit.
3. Weights include base unit without economizer. See Table 1 for economizer weights.

CAUTION

All panels must be in place when rigging

UNIT	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
48TJD/TJE/TJF008	870	395	87.38	2219	40.25	1022	41.31	1050
48TJD/TJE/TJF009	880	399	87.38	2219	40.25	1022	41.31	1050
48TJD/TJE/TJF012	1035	469	87.38	2219	40.25	1022	49.31	1253
48TJD/TJE014	1050	476	87.38	2219	40.25	1022	49.31	1253

Fig. 6 – Rigging Details

Table 1 — Physical Data

BASE UNIT 48	TJD/TJE/TJF008	TJD/TJE/TJF009	TJD/TJE/TJF012	TJD/TJE014
NOMINAL CAPACITY (tons)	7½	8½	10	12½
OPERATING WEIGHT (lb)				
Unit	870	880	1035	1050
Economizer	44	44	44	44
Roof Curb*	143	143	143	143
COMPRESSOR		Hermetic		
Quantity	2	2	2	2
Oil (oz)	54 ea	54 ea	54 ea	65 ea
REFRIGERANT TYPE		R-22		
Operating Charge (lb-oz)				
Circuit 1	5-3	6-8	7-8	10-0
Circuit 2	5-8	6-0	7-6	9-3
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins		
Rows...Fins/in.	1.. 17	2.. 17	2.. 17	2.. 17
Total Face Area (sq ft)	20.50	14.25	19.86	25.06
CONDENSER FAN		Propeller Type		
Nominal Cfm	6400	6400	7000	7200
Quantity...Diameter (in.)	1 26	1 26	1..26	1 26
Motor Hp...Rpm	¾..1100	¾..1100	¾..1100	¾..1100
Watts Input (Total)	950	950	950	950
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol™ Feed Device		
Rows...Fins/in.	3.. 15	3.. 15	3..15	4 15
Total Face Area (sq ft)	8.0	8.0	10.0	11.1
EVAPORATOR FAN		Centrifugal Type		
Quantity...Size (in.)	Std 1 15 x 15 Alt 1 15 x 15	1 15 x 15	1 15 x 15 1 15 x 15	1 15 x 15 1 15 x 15
Type Drive	Std Belt Alt Belt	Belt	Belt Belt	Belt Belt
Nominal Cfm	Std 3200 Alt 3200	3600	4000 4000	5000 5000
Maximum Continuous Bhp	Std 2.40 Alt —	2.40	2.40 2.90	4.20 5.25
Motor Frame Size	Std 56 Alt —	56	56 56	56 56
Fan Rpm Range	Std 590-840 Alt 685-935	685-935	685-935 835-1085	860-1080 900-1260
Motor Bearing Type	Ball	Ball	Ball	Ball
Maximum Allowable Rpm	2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)	Std 2 4/3 4 Alt 2 8/3 8	2 8/3 8	2 8/3 8 3 4/4 4	4 0/5 0 3 1/4 1
Fan Pulley Pitch Diameter (in.)	Std 7 0 Alt 7 0	7 0	7 0 7 0	8 0 5 4
Belt, Quantity...Type...Length (in.)	Std 1 A 48 Alt 1 ..A.. 48	1 A 48	1 A 48 1 ..A..48	1 ..A..48 1..BX...46
Pulley Center Line Distance (in.)	Std 16 75-19 25 Alt 16 75-19 25	16 75-19 25	15 85-17 50 15 85-17 50	15 85-17 50 15 85-17 50
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std 50 Alt 50	50	50 50	44 60
Movable Pulley Maximum Full Turns	Std 5 Alt 5	5	5 5	5 6
From Closed Position	Std 5 Alt 5	5	5 5	5 6
Factory Setting	Std 590 Alt 685	685	685 835	860 900
Factory Speed Setting (rpm)	Std 590 Alt 685	685	685 835	860 900
Fan Shaft Diameter at Pulley (in.)	Alt 1	1	1	1
FURNACE SECTION				
Rollout Switch Cutout Temp (F)†	195	195	195	195
Burner Orifice Diameter (in. ...drill size)				
Natural Gas	120 31	120 31	120 31/120 31/129 30	120 31/129 30
Liquid Propane**	096 41	096 .41	096 41/096 41/102 38	096 41/102 38
Thermostat Heat Anticipator Setting (amps)				
208/230 v Stage 1	14	14	14	.14
Stage 2	20	20	20	20
460 v Stage 1	14	14	14	14
Stage 2	.20	.20	.20	.20
Gas Input (Btuh) Stage 1	125,000/120,000/180,000	125,000/120,000/180,000	120,000/180,000/200,000	180,000/200,000
Stage 2	—/180,000/220,000	—/180,000/220,000	180,000/220,000/250,000	220,000/250,000
Efficiency (Steady State) (%)	80	80	80	80
Temperature Rise Range	20-50/35-65/45-75	20-50/35-65/45-75	35-65/35-65/40-70	35-65/40-70
Manifold Pressure (in. wg)				
Natural Gas	3 5	3 5	3 5	3 5
Liquid Propane**	3.5	3.5	3.5	3.5
Gas Valve Quantity	1	1	1	1
Field Gas Connection Size (in.)	½/¾/¾	½/¾/¾	¾/¾/¾	¾/¾
HIGH-PRESSURE SWITCH (psig)††		450 ± 50		500 ± 50
Standard Compressor Internal Relief (Differential)		428		428
Cutout		320		320
Reset (Auto.)				
LOW-PRESSURE/LOSS-OF-CHARGE SWITCH (psig)††		7 ± 3		
Cutout		22 ± 7		
Reset (Auto.)				
FREEZE PROTECTION THERMOSTAT (F)††		30 ± 5		
Opens		45 ± 5		
Closes				
OUTDOOR-AIR INLET SCREENS		Cleanable		
Quantity...Size (in.)		1 20 x 25 x 1 1...16 x 25 x 1		
RETURN-AIR FILTERS		Throwaway		
Quantity...Size (in.)	4 . 16 x 20 x 2	4 16 x 20 x 2	4 20 x 20 x 2	4 20 x 20 x 2

LEGEND

Bhp — Brake Horsepower

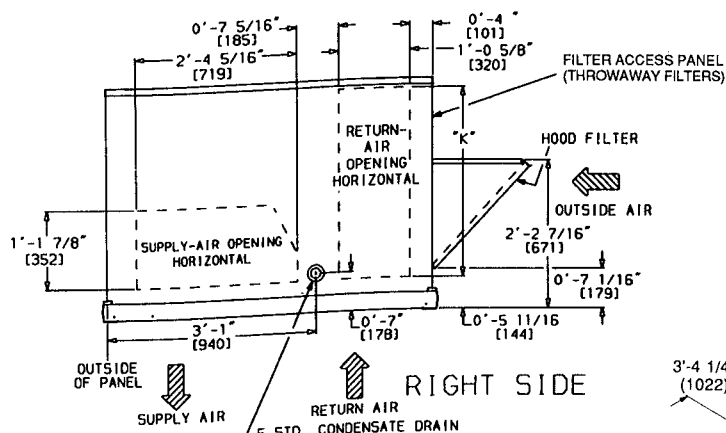
*Weight of 14-in. roof curb

†Rollout switch is manual reset

**Indicates a FIOP (factory-installed option)

††Requires an optional/accessory Controls Upgrade Kit.

UNIT	STD. UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm	Ft-in.	mm
48TJF/TJE/TJD008	870	395	44	20	189	86	161	73	239	109	280	127	2-0 ⁷ / ₁₆	632	3-5 ⁵ / ₁₆	1050	2-9 ¹ / ₁₆	856	2- 2 ⁷ / ₁₆	672
48TJF/TJE/TJD009	880	399	44	20	191	87	163	74	242	110	284	129	1-2 ⁷ / ₁₆	378	3-5 ⁵ / ₁₆	1050	2-9 ¹ / ₁₆	856	2- 2 ⁷ / ₁₆	672
48TJF/TJE/TJD012	1035	469	44	20	225	102	192	87	285	129	333	151	1-2 ⁷ / ₁₆	378	4-1 ¹ / ₁₆	1253	3-0 ⁰ / ₁₆	924	2-10 ⁷ / ₁₆	875
48TJE/TJD014	1050	476	44	20	228	103	195	88	289	131	338	153	1-2 ⁷ / ₁₆	378	4-1 ¹ / ₁₆	1253	3-0 ⁰ / ₁₆	924	2-10 ⁷ / ₁₆	875



CONNECTION SIZES	
A	1 ⁵ / ₈ " Dia [35] Field Power Supply Hole
B	2- ¹ / ₂ " Dia [64] Power Supply Knock-Out
C	1 ¹ / ₄ " Dia [44] Charging Port Hole
D	⁷ / ₈ " Dia [22] Field Control Wiring Hole
E	³ / ₄ "-14 NPT Condensate Drain
F	¹ / ₂ "-14 NPT Gas Connection 48TJD008,009 ³ / ₄ "-14 NPT Gas Connection 48TJE/F008,009, 48TJD/E012,014, 48TJF012
G	2" Dia [51] Power Supply Knock-Out

- NOTES:
- Dimensions in [] are in millimeters
 - Center of gravity
 - Direction of airflow
 - On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units field-supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges.
 - Minimum clearance (local codes or jurisdiction may prevail):
 - Between unit, flue side and combustible surfaces, 48 inches. (Minimum clearance to combustibles, flue side, is 18 in. for units with accessory flue discharge deflector)
 - Bottom of unit to combustible surfaces (when not using curb) 1 in. for all TJF and TJE014 units. Bottom of base rail to combustible surfaces (when not using curb) 0 in. for TJD, TJE units.
 - Condenser coil, for proper airflow, 36 in. One side, 12 in. the other. The side getting the greater clearance is optional.
 - Overhead, 60 in. to assure proper condenser fan operation.
 - Between units, control box side, 42 in. per NEC (National Electrical Code)
 - Between unit and ungrounded surfaces, control box side, 36 in. per NEC
 - Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC
 - Horizontal supply and return end, 0 inches
 - With the exception of the clearance for the condenser coil and combustion side as stated in Notes 5a, b, and c, a removable fence or barricade requires no clearance.
 - Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material if set on base rail.

*Indicates vertical center of gravity
†Indicates horizontal center of gravity

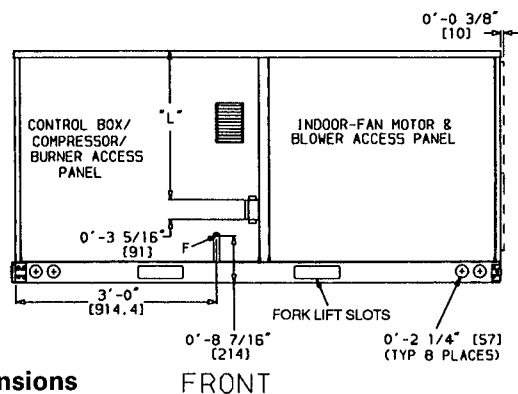
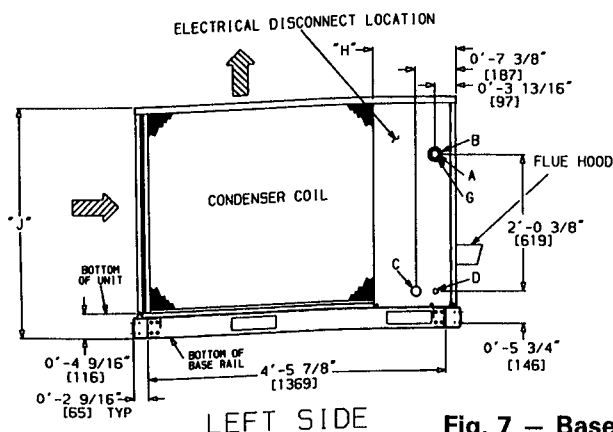
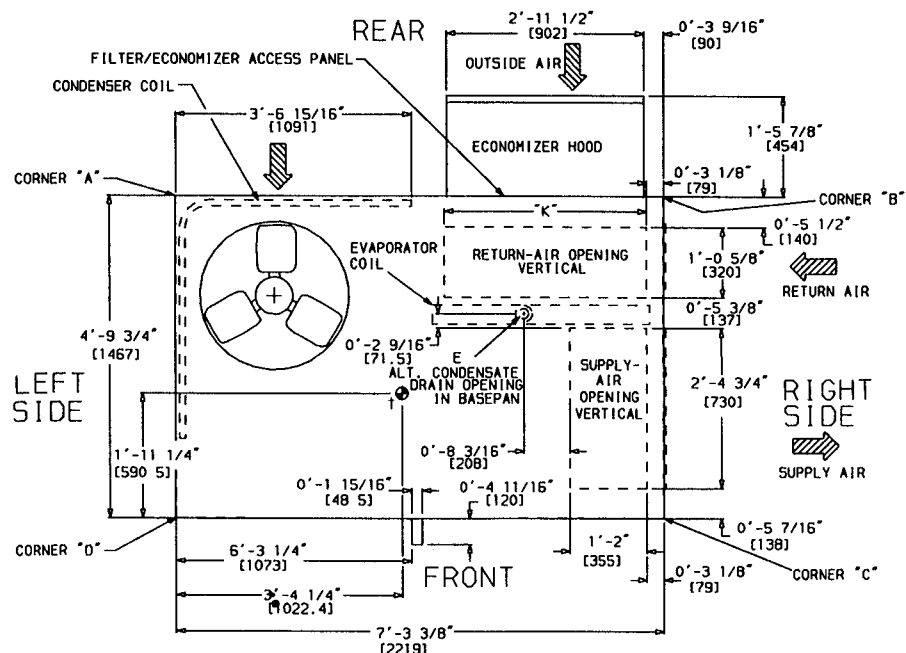


Fig. 7 – Base Unit Dimensions

Step 5 — Install Flue Hood — Flue hood is shipped screwed to the burner compartment access panel. Remove from shipping location and, using screws provided, install flue hood and screen in location shown in Fig. 8.

Step 6 — Install Gas Piping — Unit is equipped for use with type of gas shown on nameplate. Refer to local building codes, or in the absence of local codes, to ANSI Z223.1-1984 and addendum Z223.1A-1987 entitled National Fuel Gas Code. In Canada, installation must be in accordance with the CAN1.B149.1 and CAN1.B149.2 installation codes for gas burning appliances.

For natural gas applications, gas pressure at unit gas connection must not be less than 4.0 in. wg or greater than 13.0 in. wg while unit is operating. For liquid propane applications, the gas pressure must not be less than 5.0 in. wg or greater than 13.0 in. wg at the unit connection.

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

Support gas piping as shown in the table in Fig. 9. For example, a 3/4-in. gas pipe must have one field-fabricated support beam every 8 ft. Therefore, an 18-ft long gas pipe would have a minimum of 2 support beams, and a 48-ft long pipe would have a minimum of 6 support beams.

See Fig. 9 for typical pipe guide and locations of external manual gas shutoff valve.

Step 7 — Make Electrical Connections

⚠ WARNING

Unit cabinet must have an uninterrupted, unbroken electrical ground to minimize the possibility of personal injury if an electrical fault should occur. This ground may consist of electrical wire connected to unit ground lug in control compartment, or conduit approved for electrical ground when installed in accordance with NEC (National Electrical Code), ANSI/NFPA (National Fire Protection Association), latest edition, and local electrical codes. *Do not use gas piping as an electrical ground.* Failure to follow this warning could result in the installer being liable for personal injury of others.

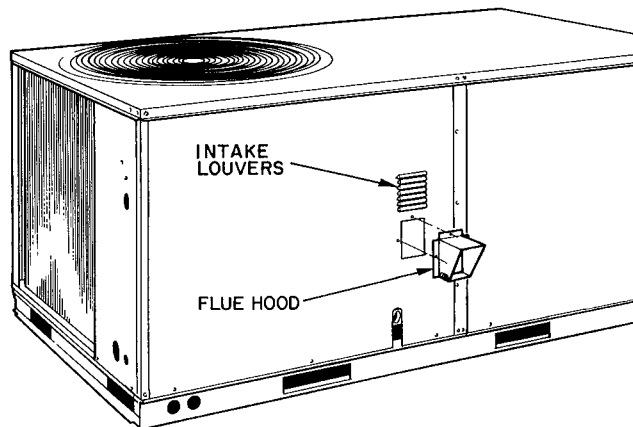


Fig. 8 — Flue Hood Details

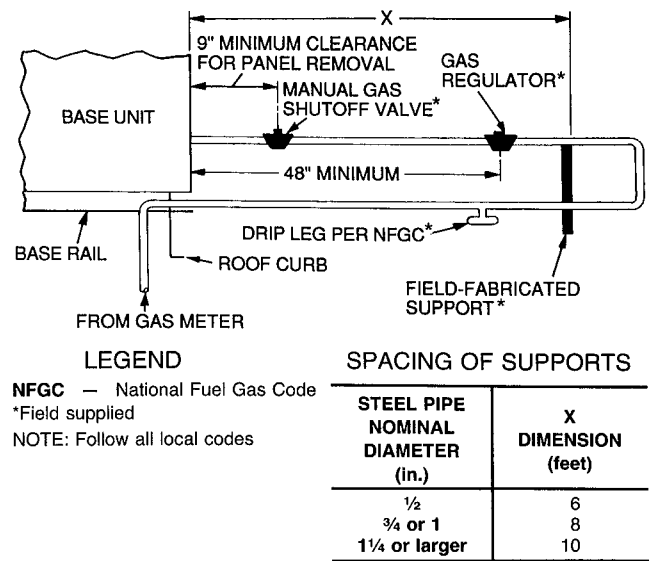


Fig. 9 — Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)

FIELD POWER SUPPLY — All units except 208/230-v units are factory wired for the voltage shown on the nameplate. If the 208/230-v unit is to be connected to a 208-v power supply, the transformer *must* be rewired by moving the black wire from the 230-v red wire on the transformer and connecting it to the 200-v blue wire from the transformer. The red wire then must be insulated.

Refer to unit label diagram for additional information. Pigtailed are provided for field service.

When installing units, provide a disconnect per NEC. Use copper conductors only when splice connectors are used.

All field wiring must comply with NEC and local requirements. In Canada, electrical connections must be in accordance with CSA (Canadian Standards Association) C22.1 Canadian Electrical Code Part One.

Install conduit through side panel openings indicated in Fig. 7. Route power lines through connector to terminal connections as shown in Fig. 10.

On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 2 to determine the percentage of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation would invalidate any applicable Carrier warranty.

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

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 to the thermostat and will require a junction box and splice at the thermostat.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals to low-voltage connections on unit (shown in Fig. 11) as described in Steps 1 - 4 below.

1. If unit is mounted on roof curb and accessory thru-the-curb service plate connection is used, route wire through connection plate.
2. Pass control wires through the hole provided on unit (see connection D in Connection Sizes table in Fig. 7).
3. Feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control

box. See Fig. 12. The raceway provides the UL-required (Underwriters' Laboratories) clearance between high- and low-voltage wiring.

4. Connect thermostat wires to screw terminals on low-voltage connection board.

HEAT ANTICIPATOR SETTINGS — Set heat anticipator settings at .14 amp for the first stage and .20 amp for second-stage heating.

Table 2 — Electrical Data

UNIT	NOMINAL V-PH-HZ	IFM TYPE	VOLTAGE RANGE		COMP (each)		OFM	IFM	COMBUSTION- FAN MOTOR	POWER SUPPLY		DISCONNECT SIZE*	
			Min	Max	RLA	LRA				MCA	MOCPT†	FLA	LRA
48TJ008 (7½ Tons)	208/230-3-60	Std	187	254	13.6	73.4	3.8	5.8	.57	40.2/40.2	45/45	42/42	206/206
	460-3-60	Std	414	508	6.2	37.7	1.9	2.6	.30	18.5	20	19	105
	575-3-60	Std	518	632	4.9	31.0	1.9	2.6	.30	14.6	15	15	86
48TJ009 (8½ Tons)	208/230-3-60	Std	187	254	15.8	92.0	3.8	5.8	.57	45.2/45.2	50/50	47/47	243/243
	460-3-60	Std	414	508	7.4	46.0	1.9	2.6	.30	21.0	25	22	122
	575-3-60	Std	518	632	5.9	44.0	1.9	2.6	.30	16.8	20	18	112
48TJ012 (10 Tons)	208/230-3-60	Std	187	254	17.9	110.0	3.8	5.8	.57	49.9/49.9	60/60	52/52	279/279
		Alt						7.5		56.1/56.1	60/60	54/54	297/297
	460-3-60	Std	414	508	8.6	55.0	1.9	2.6	.30	23.9	30	25	140
		Alt						3.4		24.7	30	26	149
	575-3-60	Std	518	632	6.4	50.0	1.9	2.6	.30	18.0	25	19	112
		Alt						3.4		18.6	25	20	119
48TJ014 (12½ Tons)	208/230-3-60	Std	187	254	22.3	142.0	3.8	12.0	.57	66.0/66.0	80/80	69/69	386/386
		Alt						15.0		69.0/69.0	80/80	73/73	410/410
	460-3-60	Std	414	508	10.4	72.0	1.9	5.4	.30	30.7	35	32	195
		Alt						7.4		32.8	40	35	207
	575-3-60	Std	518	632	9.6	58.5	1.9	5.4	.30	27.4	35	29	158
		Alt						7.4		29.1	35	31	167

IMPORTANT: Optional, alternate evaporator-fan motor and drive are not available for 48TJ009 units. The 48TJ008 units have an alternate drive, but do not have an alternate motor. Contact local Carrier representative for more information about field-installed motors.

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
- MOCPT** — Maximum Overcurrent Protection
- NEC** — National Electrical Code
- OFM** — Outdoor (Condenser) Fan Motor
- RLA** — Rated Load Amps

*Used to determine minimum disconnect size per NEC.

†Fuse or HACR circuit breaker.



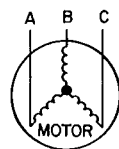
NOTES:

1. 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.
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 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

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

NOTE The 575-v units are CSA only.

Determine maximum deviation from average voltage.

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

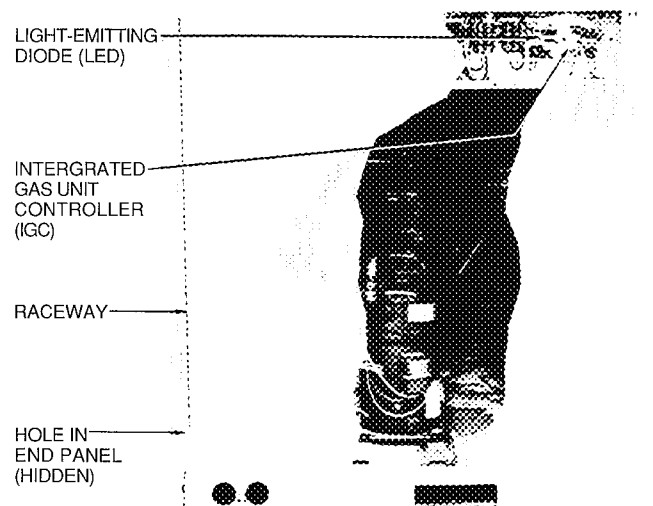
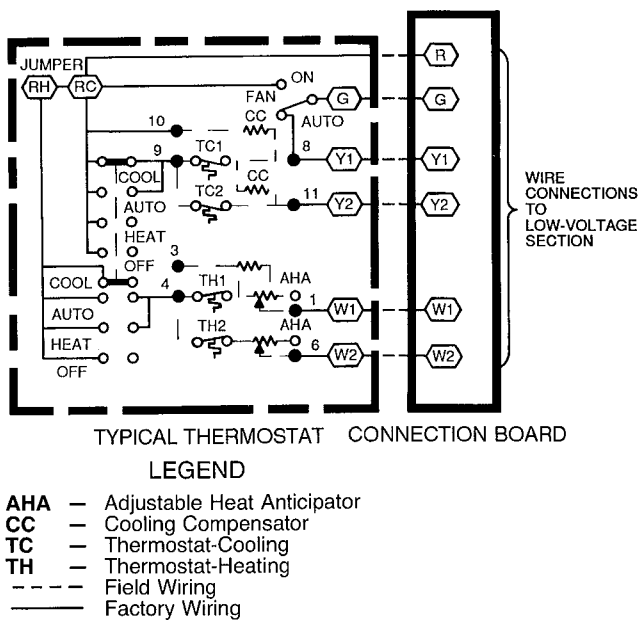
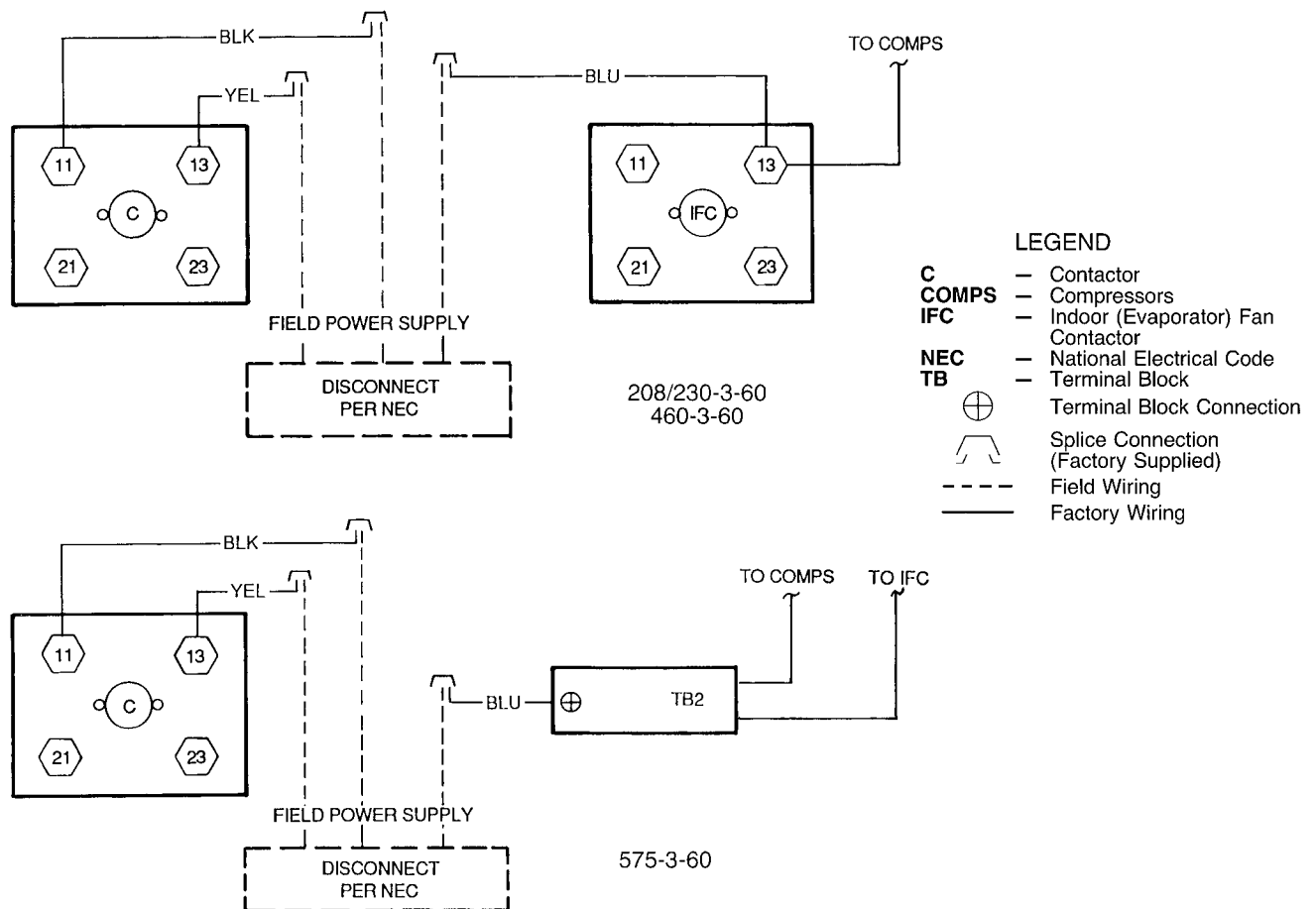
Maximum deviation is 7 v.

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.



Step 8 — Make Outdoor-Air Adjustments and Install Outdoor-Air Hood

MANUAL OUTDOOR-AIR DAMPER — The outdoor-air hood and screen are attached to the basepan at the bottom of the unit for shipping.

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove and save evaporator coil access panel and screws. See Fig. 13.
3. Separate hood and screen from basepan by removing the screws and brackets securing them. Save all screws and discard brackets.
4. Replace evaporator coil access panel.
5. Place hood on front of evaporator coil access panel. See Fig. 14 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 15.
6. Remove and save 8 screws (4 on each side) from sides of the manual outdoor-air damper.
7. Align screw holes on hood with screw holes on side of manual outdoor-air damper. See Fig. 14 and 15. Secure hood with 8 screws from Step 6.
8. Adjust minimum position setting of the damper blade by adjusting the manual outdoor-air adjustment screws on the front of the damper blade. See Fig. 13. Slide blade vertically until it is in the appropriate position determined by Fig. 16. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screen. Secure screen to hood using the screws. See Fig. 15.

OPTIONAL ECONOMIZER — The economizer hood assembly is packaged and shipped in the filter section. Damper blades are installed at the factory and the economizer is shipped in the vertical position.

Assembly:

1. Determine quantity of ventilation air required for building. Record amount of air for use in Step 9.
2. Remove evaporator coil access panel (see Fig. 17) Save panel and screws.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 18. Install seal strips on hood top and sides. Put aside screen retainer and screws for later assembly. *Do not attach hood to unit at this time.*

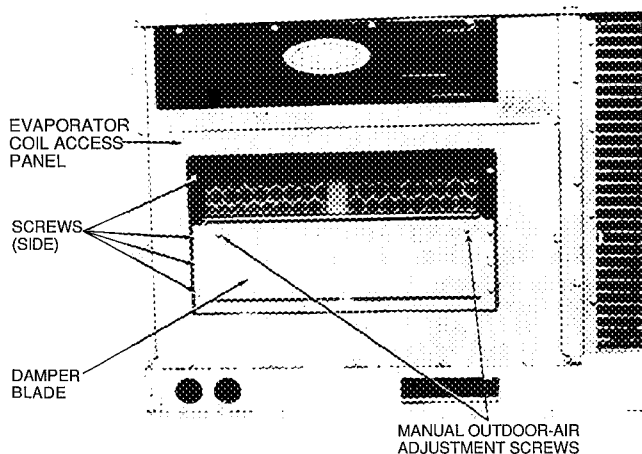


Fig. 13 — Damper Panel with Manual Outdoor-Air Damper Installed

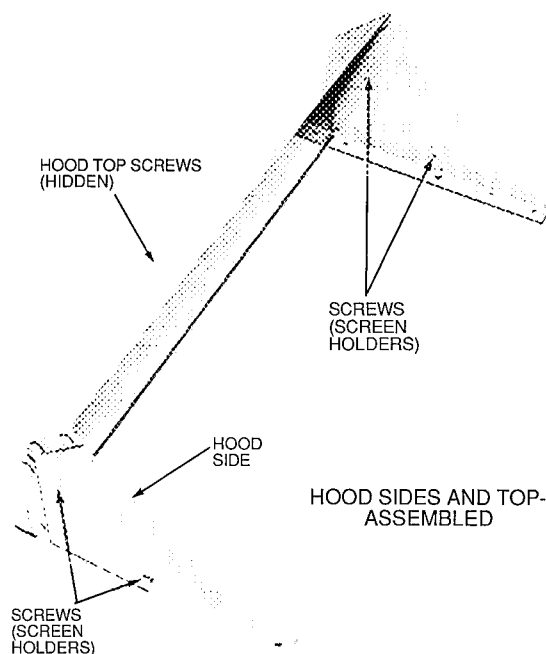


Fig. 14 — Outdoor-Air Hood Details

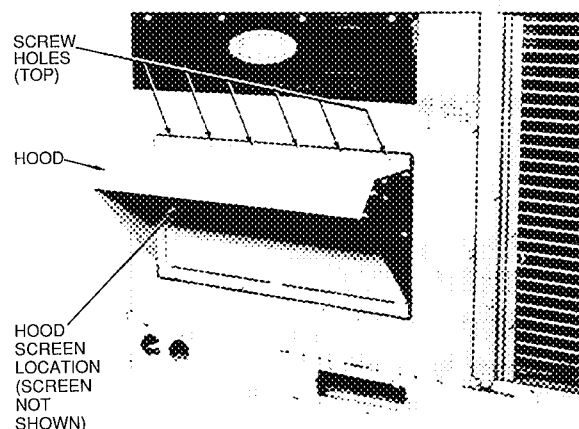


Fig. 15 — Damper with Hood Attached

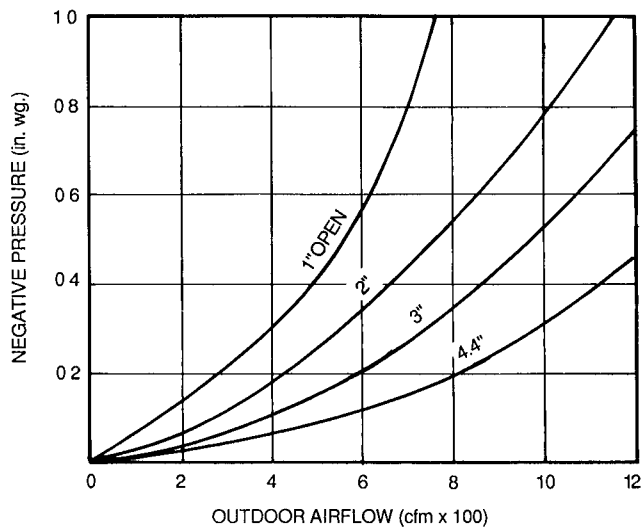


Fig. 16 — Position Setting

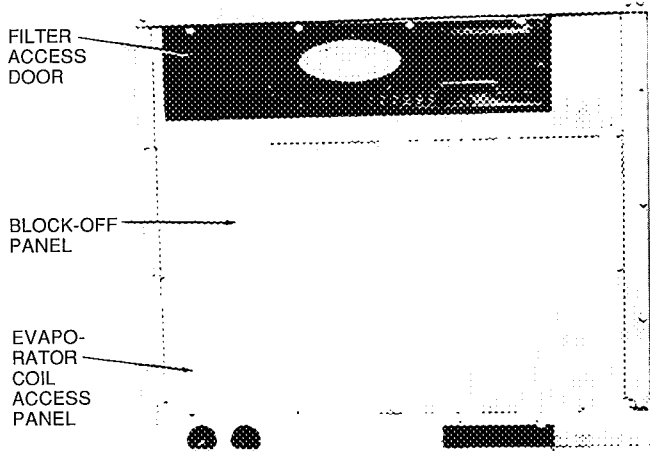
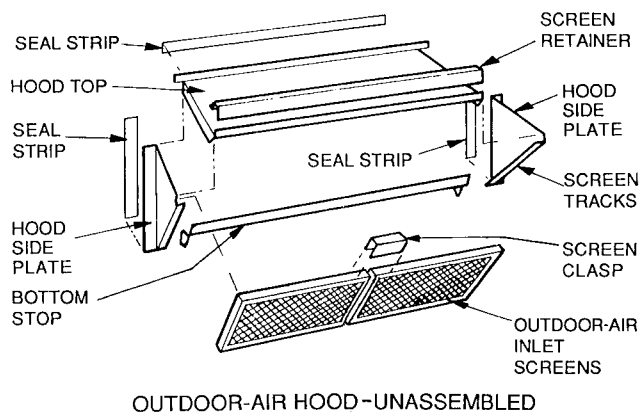
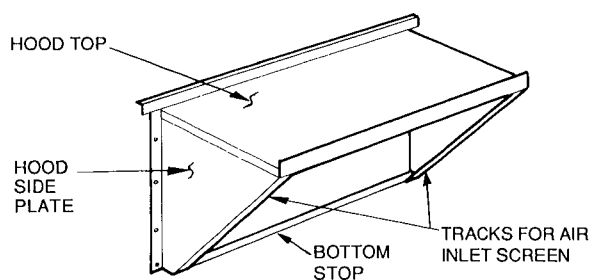


Fig. 17 - Access Panel Location



OUTDOOR-AIR HOOD-UNASSEMBLED



HOOD SIDES AND TOP ASSEMBLED
Fig. 18 - Outdoor-Air Hood Details

4. On 48TJ012,014 units, install vertical discharge block-off plate over duct openings. See Fig. 19.
5. The block-off panel should be removed from the evaporator coil access panel and discarded. Save screws. See Fig. 17.
6. Remove screws securing barometric relief damper, if desired. See Fig. 20 and 21.
7. To convert to horizontal discharge application.
 - a. Remove filters from filter track.

IMPORTANT: Filters must be installed outside the unit on horizontal applications with economizer. Otherwise, economizer must be partially removed to access the filters. The area of the field-installed filters should be equal to the area of the factory-installed filters.

- b. Rotate economizer 90 degrees until economizer motor faces condenser section (see Fig. 21.) If necessary, disassemble economizer to replace filter.
- c. Rotate barometric relief damper 90 degrees so that it opens and closes vertically.
- d. Install horizontal discharge block-off plate over opening on the access panel. Block-off plate **MUST** be installed before installing hood assembly (see Fig. 22).

NOTE: Install spacers at the same time as the horizontal block-off plate using same screws. The spacers are used to cover gaps between the economizer assembly and the unit.

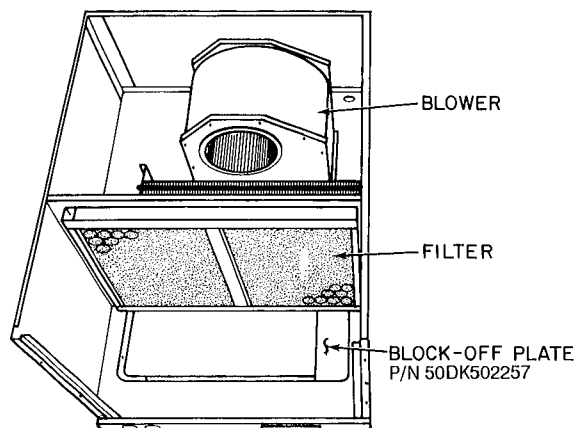


Fig. 19 - Vertical Discharge Block-Off Plate (Sizes 012,014 only)

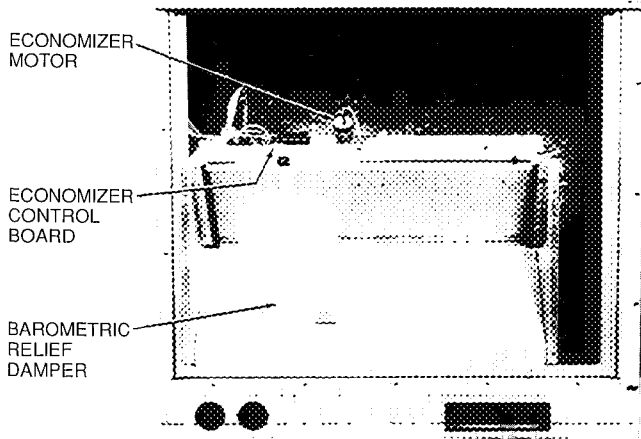


Fig. 20 – Economizer Installed in Unit

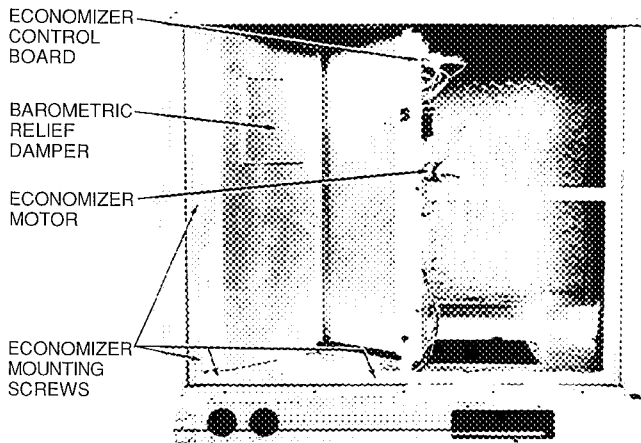


Fig. 21 – Horizontal Economizer Installation (90 Degree Rotation)

8. Insert economizer plug from the wiring harness (supplied with the unit) into the wiring plug on economizer control board. See Fig. 20 and 21.
 9. Determine economizer damper position setting (see Fig. 23). Adjust damper setting by adjusting screws on the position setting bracket (see Fig. 24). Slide position setting bracket until top screw (see Fig. 24) is in the position determined by Fig. 23. Tighten screws
 10. Install evaporator coil access panel with screws saved from Step 2.
 11. Fasten hood top, side plate assembly, and bottom stop assembly to unit with screws provided with block-off panel (see Fig. 18).
 12. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided (see Fig. 25). Make sure OAT terminals are up.
 13. Place knob, supplied with economizer, on OAT. Set it for 3 F below indoor room thermostat setting. If accessory solid-state enthalpy control (EC) is used instead of the OAT, see instructions shipped with EC for installation and adjustment (see Fig. 25)
 14. Connect OAT per Fig. 26.
 15. Slide outdoor-air inlet screens into screen track on hood side plates. While holding screens in place, fasten screen retainer to hood using screws provided.
- NOTE: A supply-air thermostat (SAT) is located in the evaporator-fan housing when an economizer is factory installed.
16. Turn on base unit power.

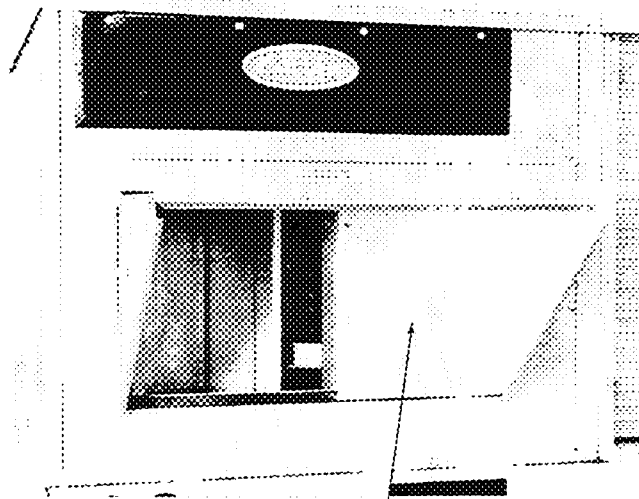
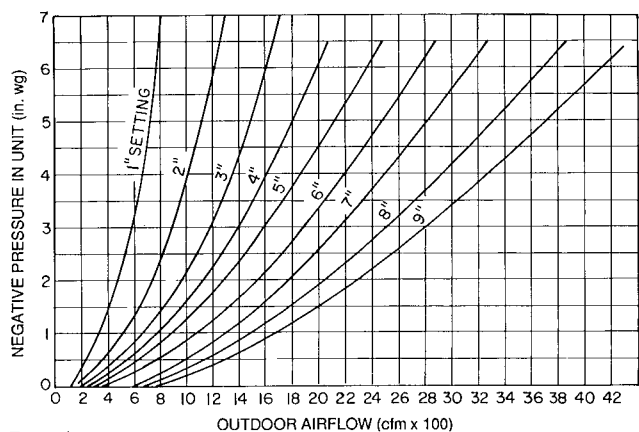


Fig. 22 — Horizontal Discharge Block-Off Plate



Example:
 Given —
 Negative Pressure 0.1 in wg
 Outdoor Airflow 1100 cfm
 Determine —
 Setting = 6"

Fig. 23 — Economizer Damper Minimum Position Setting

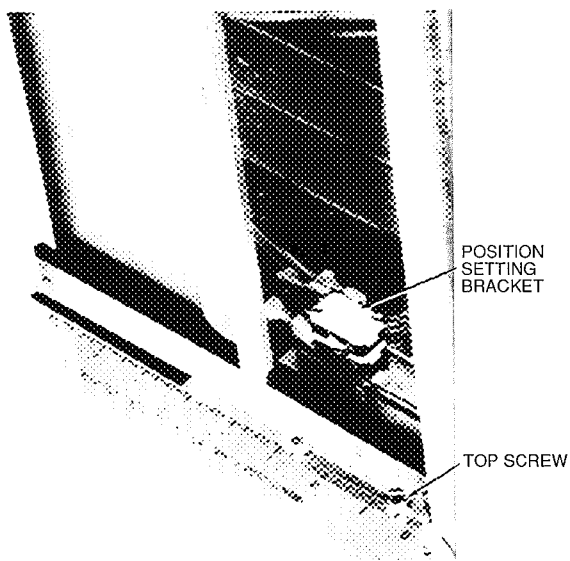


Fig. 24 — Minimum Position Damper Setting

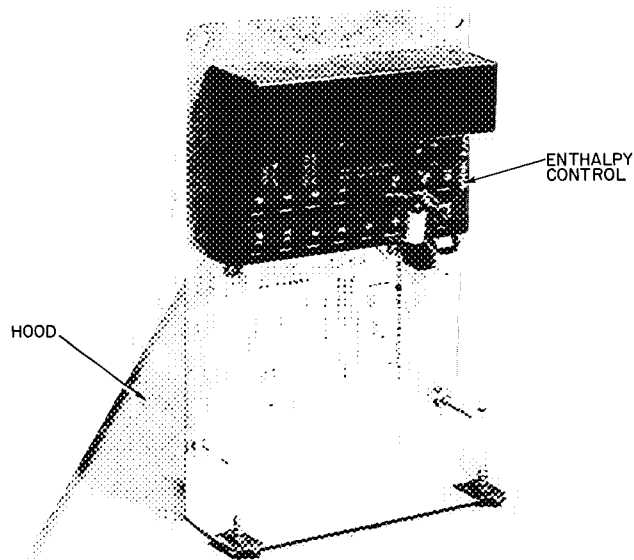
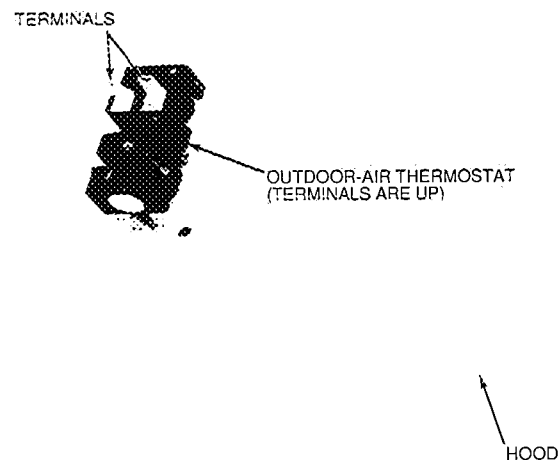
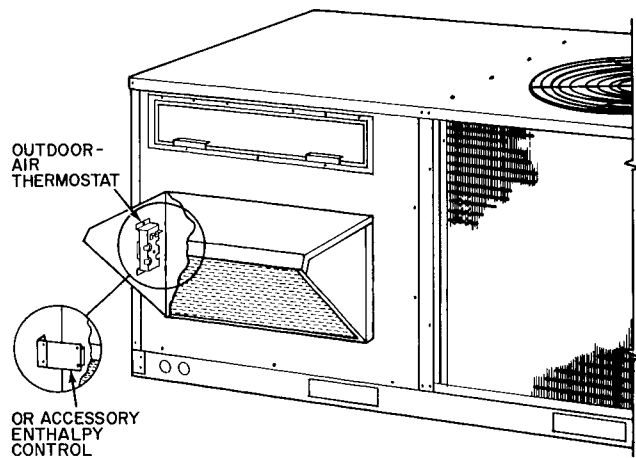


Fig. 25 — Outdoor-Air Thermostat/Enthalpy Control Installation

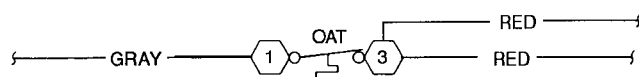


Fig. 26 — Wiring Connections for Outdoor-Air Thermostat

Step 9 — Adjust Evaporator-Fan Speed — Adjust evaporator-fan speed to meet jobsite conditions.

Table 3 shows fan rpm at motor pulley settings, Table 4 shows motor efficiencies and Table 5 gives accessory static pressure drops. Table 6 shows motor performance. Refer to Tables 7-14 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speed:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting plate nuts (see Fig. 27 and 28).
3. Loosen movable pulley flange setscrew (see Fig. 29).
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.

To adjust belt tension (see Fig. 27 and 28):

1. Loosen fan motor mounting plate nuts.
2. *Units 008,009* — Slide motor mounting plate away from fan scroll for proper belt tension ($\frac{1}{2}$ -in. deflection with one finger) and tighten mounting nuts (see Fig. 27).

Units 012,014 — Slide motor mounting plate downward to tighten belt tension. Secure motor mounting plate nuts. See Fig. 28.

3. Adjust bolt and nut on mounting plate to secure motor in fixed position.

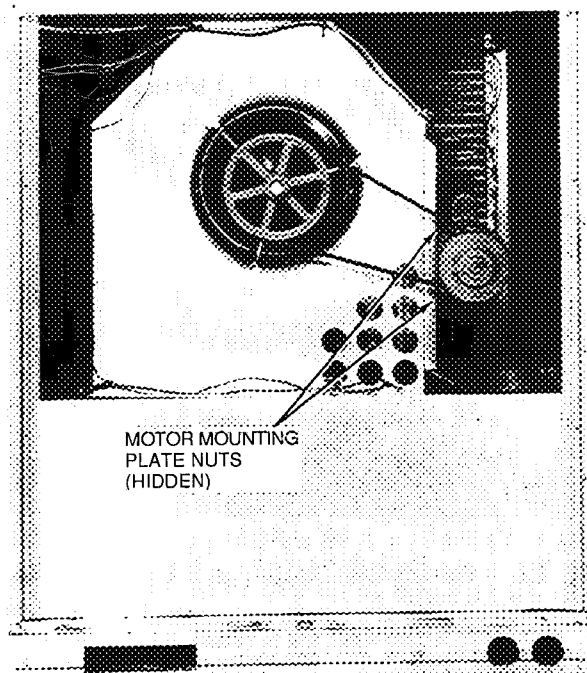


Fig. 28 — Typical Belt-Drive Motor Mounting for Sizes 012,014

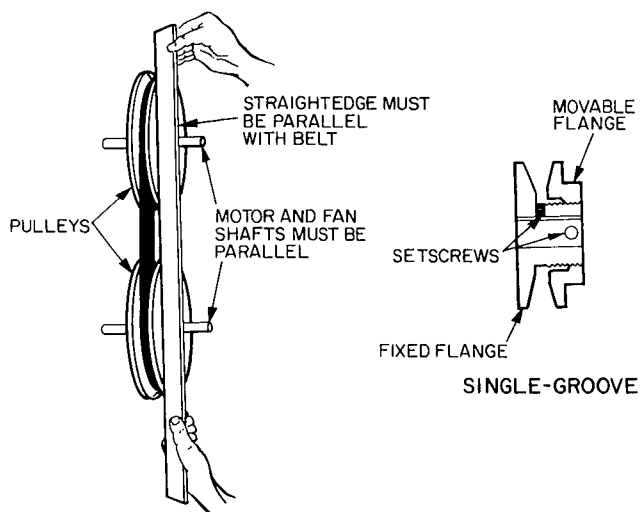


Fig. 29 — Evaporator-Fan Pulley Adjustment

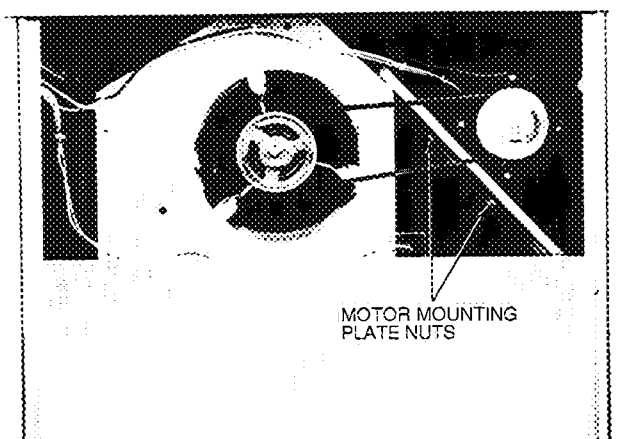


Fig. 27 — Typical Belt-Drive Motor Mounting for Sizes 008,009

Table 3 – Fan Rpm at Motor Pulley Settings*

UNIT 48TJ	MOTOR PULLEY TURNS OPEN												
	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6
008†	840	815	790	765	740	715	690	665	640	615	590	—	—
008**	935	910	885	860	835	810	785	760	735	710	685	—	—
009†	935	910	885	860	835	810	785	760	735	710	685	—	—
012†	935	910	885	860	835	810	785	760	735	710	685	—	—
012††	1085	1060	1035	1010	985	960	935	910	885	860	835	—	—
014†	1080	1060	1035	1015	990	970	950	925	905	880	860	—	—
014††	1260	1220	1185	1155	1130	1100	1075	1045	1015	990	960	930	900

*Approximate rpm shown.

†Indicates standard motor and drive.

**Indicates alternate drive

††Indicates alternate motor and drive.

Table 4 – Evaporator-Fan Motor Efficiency

MOTOR	EFFICIENCY (%)
48TJD/TJE/TJF008,009	80
48TJD/TJE/TJF012 (Std)	80
48TJD/TJE/TJF012 (Alt)	83
48TJD/TJE014 (Std)	85
48TJD/TJE014 (Alt)	87

NOTE: Convert watts to bhp using the following formula:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Table 5 – Economizer Static Pressure Drop (in. wg)

CFM								
2200	2500	3000	3500	4000	4500	5000	5500	6000
.02	.02	.03	.04	.05	.06	.07	.08	.09

Table 6 – Motor Data

UNIT 48TJ	EVAPORATOR- FAN MOTOR	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
008	Std	2.40	2120	208/230	6.1
				460	2.7
				575	2.7
009	Std	2.40	2120	208/230	6.1
				460	2.7
				575	2.7
012	Std	2.40	2120	208/230	6.1
				460	2.7
				575	2.7
	Alt	2.90	2615	208/230	7.9
				460	3.6
				575	3.6
014	Std	4.20	3775	208/230	12.6
				460	5.7
				575	5.7
	Alt	5.25	4400	208/230	15.0
				460	7.4
				575	7.4

LEGEND

Bhp — Brake Horsepower

*Extensive motor and electrical testing on these units ensures that the full horsepower and watts range of the motors can be utilized with confidence. Using your fan motors up to the ratings shown in this table will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

Table 7 – Fan Performance, 48TJD/TJE/TJF008 – Vertical Discharge 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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	499	524	580	677	652	867	717	1056	748	1165	779	1275	839	1578	905	1954	951	2266
2250	507	547	586	700	658	891	722	1097	752	1199	783	1301	843	1604	908	1989	955	2283
2350	513	562	592	723	663	916	727	1131	756	1224	786	1327	846	1630	910	2015	959	2300
2400	528	600	606	779	674	965	738	1199	766	1301	795	1404	853	1665	912	2041	967	2360
2500	542	646	619	835	686	1022	748	1258	777	1370	806	1491	859	1718	919	2093	971	2403
2550	550	669	627	867	692	1056	754	1292	783	1413	812	1543	864	1761	920	2110	974	2428
2600	557	692	634	891	698	1089	759	1327	787	1456	816	1587	868	1805	921	2136	976	2445
2700	573	747	648	956	711	1156	770	1404	798	1534	827	1665	878	1910	928	2162	983	2529
2800	588	803	662	1022	723	1233	782	1473	809	1613	837	1753	889	2023	937	2266	986	2554
2900	604	867	676	1089	737	1318	794	1560	821	1700	848	1840	900	2128	947	2377	993	2637
3000	620	932	690	1165	750	1404	806	1648	832	1788	849	1927	910	2223	958	2504	1002	2751
3100	636	1006	704	1241	764	1499	818	1744	844	1884	870	2023	920	2326	968	2620	1012	2870
3200	652	1089	718	1327	778	1595	831	1849	856	1980	882	2119	931	2428	979	2735	1023	3002
3300	668	1173	732	1413	793	1700	844	1954	869	2093	894	2232	942	2537	989	2839	1034	3121
3400	684	1258	747	1508	807	1805	857	2076	882	2206	907	2343	954	2645	1000	2948	1044	3237
3500	701	1361	762	1613	821	1910	871	2188	895	2326	919	2462	968	2751	1011	3062	1054	3340
3600	717	1465	777	1718	835	2023	895	2317	908	2453	932	2567	978	2870	1022	3165	1065	3445
3700	733	1569	792	1831	849	2136	899	2445	922	2579	945	2718	990	2987	1034	3272	1076	3544
3750	742	1630	800	1892	856	2197	907	2512	929	2653	952	2719	997	3055	1040	3333	1082	3603
3800	750	1683	807	1954	863	2257	914	2571	935	2647	958	2854	1002	3114	1045	3387	1087	3643
3900	767	1805	822	2076	877	2386	928	2702	950	2979	972	2987	1015	3244	1057	3495	1098	3733
4000	783	1927	838	2206	891	2512	942	2839	964	3187	986	3121	1028	3373	1070	3603	1110	3820
4100	800	2067	854	2343	905	2645	956	2971	978	3244	1000	3251	1042	3495	1082	3713	1122	3902
4200	817	2197	868	2479	920	2783	970	3099	992	3256	1015	3390	1055	3614	1095	3811	1134	3971
4250	825	2275	877	2554	928	2854	977	3165	999	3306	1022	3445	1062	3676	1102	3860	1140	4006
4300	834	2343	885	2629	935	2925	984	3230	1006	3313	1029	3508	1069	3728	1108	3906	1147	4036

NOTES:

1. **Boldface** indicates a field-supplied drive is required (See Note 7)
2. **Shading** indicates an alternate drive is required (See Note 7)
3. **Shading** indicates a field-supplied motor and drive are required (See Note 7)
4. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6

5. Values include losses for filters, unit casing, and wet coils
6. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
7. Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive
8. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 80

Table 8 – Fan Performance, 48TJD/TJE/TJF009 – Vertical Discharge 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	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	499	524	580	677	652	867	717	1056	748	1165	779	1275	839	1578	905	1954	951	2266
2250	507	547	586	700	658	891	722	1097	752	1199	783	1301	843	1604	908	1989	955	2283
2300	513	562	592	723	663	916	727	1131	756	1224	786	1327	846	1630	910	2015	959	2300
2400	528	600	606	779	674	965	738	1199	766	1301	795	1404	853	1665	912	2041	967	2360
2500	542	646	619	835	686	1022	748	1258	777	1370	806	1491	859	1718	919	2093	971	2403
2550	550	669	627	867	692	1056	754	1292	783	1413	812	1543	864	1761	920	2110	974	2428
2600	557	692	634	891	698	1089	759	1327	787	1456	816	1587	868	1805	921	2136	976	2445
2700	573	747	648	956	711	1156	770	1404	798	1534	827	1665	878	1910	928	2162	983	2529
2800	588	803	662	1022	723	1233	782	1473	809	1613	837	1753	899	2023	937	2266	986	2554
2900	604	867	676	1089	737	1318	794	1560	821	1700	848	1840	900	2128	947	2377	993	2637
3000	620	932	690	1165	750	1404	806	1648	832	1788	849	1927	910	2223	958	2504	1002	2751
3100	636	1006	704	1241	764	1499	818	1744	844	1884	870	2023	920	2326	968	2620	1012	2870
3200	652	1089	718	1327	778	1595	831	1849	856	1980	882	2119	931	2428	979	2735	1023	3002
3300	668	1173	732	1413	793	1700	844	1954	869	2093	894	2232	942	2537	989	2839	1034	3121
3400	684	1258	747	1508	807	1805	857	2076	882	2206	907	2343	954	2645	1000	2948	1044	3237
3500	701	1361	762	1613	821	1910	871	2188	895	2326	919	2462	968	2751	1011	3062	1054	3340
3600	717	1465	777	1718	835	2023	885	2317	908	2453	932	2587	978	2870	1022	3165	1065	3445
3700	733	1569	792	1831	849	2136	899	2445	922	2579	945	2718	990	2987	1034	3272	1076	3544
3750	742	1630	800	1892	856	2197	907	2512	929	2653	952	2719	997	3055	1040	3333	1082	3603
3800	750	1683	807	1954	863	2257	914	2571	935	2647	958	2854	1002	3114	1045	3387	1087	3643
3900	767	1805	822	2076	877	2386	928	2702	950	2979	972	2987	1015	3244	1057	3495	1098	3733
4000	783	1927	838	2206	891	2512	942	2839	964	3187	986	3121	1028	3373	1070	3603	1110	3820
4100	800	2067	854	2343	905	2645	956	2971	978	3244	1000	3251	1042	3495	1082	3713	1122	3902
4200	817	2197	868	2479	920	2783	970	3099	992	3256	1015	3390	1055	3614	1095	3811	1134	3971
4250	825	2275	877	2554	928	2854	977	3165	999	3306	1022	3445	1062	3676	1102	3860	1140	4006
4300	834	2343	885	2629	935	2925	984	3230	1006	3313	1029	3508	1069	3728	1108	3906	1147	4036

NOTES:

1. **Boldface** indicates a field-supplied drive is required (See Note 6)
2. **Shading** indicates a field-supplied motor and drive are required (See Note 6)
3. Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6

4. Values include losses for filters, unit casing, and wet coils
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
6. Standard motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive
7. To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 80

Table 9 – Fan Performance, 48TJD/TJE/TJF012 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	552	661	632	810	701	956	761	1097	816	1216	871	1370	918	1482	967	1736	1010	1903	1063	2221
3100	565	708	644	859	711	1014	722	1173	825	1292	879	1447	928	1478	973	1778	1018	1971	1070	2265
3200	578	763	656	916	723	1081	782	1241	835	1378	887	1517	937	1745	981	1861	1026	2048	1075	2318
3300	591	818	668	973	734	1148	793	1310	845	1465	895	1595	946	1828	991	1963	1032	2099	1080	2360
3400	605	883	680	1047	745	1216	803	1387	856	1552	904	1691	953	1912	1000	2074	1041	2203	1083	2389
3500	619	948	691	1106	755	1284	813	1465	867	1648	914	1796	961	1997	1009	2177	1051	2313	1096	2469
3600	633	1022	703	1173	766	1353	824	1543	877	1744	924	1901	970	2099	1017	2282	1061	2451	1099	2596
3700	648	1106	714	1241	777	1430	835	1639	887	1831	935	2015	980	2212	1024	2380	1069	2587	1108	2735
3800	662	1190	726	1310	789	1526	846	1726	897	1927	945	2169	989	2326	1033	2487	1077	2698	1118	2895
3900	677	1284	738	1387	801	1613	857	1823	908	2023	956	2282	1000	2490	1042	2624	1085	2819	1127	3049
4000	692	1378	750	1473	813	1718	868	1919	918	2119	967	2397	1010	2587	1052	2763	1093	2930	1142	3187
4100	707	1482	762	1560	825	1814	878	2015	929	2282	977	2505	1021	2726	1062	2914	1102	3097	1155	3373
4200	722	1595	775	1656	837	1910	889	2119	941	2397	987	2634	1032	2866	1072	2971	1110	3244	1169	3576
4300	737	1718	787	1761	848	2006	900	2273	952	2523	999	2744	1042	3010	1081	3141	1118	3398	1185	3794
4400	752	1840	800	1875	860	2110	912	2397	963	2642	1008	2885	1054	3158	1091	3276	1126	3552	1201	4029
4500	768	1980	814	1989	871	2265	924	2523	973	2772	1019	3029	1067	3321	1101	3414	1134	3715	1219	4281
4600	783	2119	827	2110	883	2380	937	2661	983	2904	1030	3155	1079	3433	1111	3555	1142	3883	1237	4548
4700	799	2309	841	2291	894	2496	949	2800	994	3049	1042	3296	1092	3678	1122	3700	1150	4056	1257	4832
4800	814	2469	855	2424	905	2624	961	2952	1002	3186	1052	3440	1105	3866	1132	3842	1158	4235	1277	5133
4900	—	—	868	2578	918	2754	972	3088	1013	3333	1063	3569	1119	4061	1143	3990	1166	4419	1299	5492
5000	—	—	883	2735	931	2904	985	3226	1024	3489	1075	3741	1133	4263	1154	4154	1174	4608	1322	5782

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 7)
- Shading indicates an alternate motor and drive are required (See Note 7.)
- Shading indicates a field-supplied motor and drive are required (See Note 7.)
- Maximum usable watts input is 2120 with a standard motor and 2615 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6
- Values indicate losses for filters, unit casing, and wet coils
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Standard motor drive range: 685 to 935 rpm. Alternate motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 80 (std)
83 (alt)

Table 10 – Fan Performance, 48TJD/TJE014 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	729	1259	790	1440	847	1615	902	1845	955	2044	1008	2272	1060	2494	1108	2719	1152	2919	1190	3092
3800	745	1340	805	1531	861	1700	915	1940	967	2149	1019	2378	1070	2620	1118	2846	1163	3074	1203	3267
3900	761	1423	820	1624	875	1802	928	2044	979	2272	1029	2494	1079	2737	1128	2983	1173	3221	1214	3433
4000	777	1514	836	1725	889	1914	941	2140	991	2387	1040	2620	1099	2873	1137	3120	1183	3368	1225	3590
4100	793	1615	851	1836	904	2027	955	2246	1004	2512	1052	2746	1100	3001	1147	3267	1193	3525	1236	3767
4200	810	1717	867	1948	918	2149	968	2361	1017	2638	1064	2882	1110	3138	1157	3414	1202	3674	1245	3943
4300	826	1828	883	2070	933	2272	982	2485	1030	2773	1076	3037	1121	3285	1167	3562	1212	3841	1255	4111
4400	842	1940	898	2193	948	2405	996	2611	1043	2901	1088	3184	1133	3442	1178	3720	1222	3999	1265	4279
4500	859	2061	914	2316	962	2539	1010	2755	1056	3037	1101	3341	1144	3590	1188	3878	1232	4167	1274	4466
4600	876	2184	930	2459	977	2683	1024	2910	1070	3175	1114	3498	1157	3767	1199	4046	1242	4344	1284	4642
4700	892	2316	945	2593	992	2837	1039	3065	1083	3322	1126	3655	1169	3943	1210	4223	1252	4521	1294	4838
4800	909	2468	961	2737	1008	3001	1053	3230	1097	3479	1140	3822	1181	4130	1222	4400	1263	4707	—	—
4900	926	2611	977	2891	1024	3166	1068	3405	1111	3646	1153	3971	1194	4307	1234	4605	1274	4893	—	—
5000	942	2773	993	3047	1039	3341	1080	3581	1125	3822	1166	4139	1207	4493	1247	4800	1286	5087	—	—
5100	959	2937	1009	3221	1055	3516	1097	3767	1139	4018	1180	4316	1220	4689	1259	5004	—	—	—	—
5200	976	3101	1025	3387	1071	3702	1112	3962	1153	4214	1194	4505	1233	4874	1272	5207	—	—	—	—
5300	993	3285	1041	3572	1086	3897	1127	4158	1168	4428	1208	4698	1246	5060	—	—	—	—	—	—
5400	1010	3470	1057	3757	1102	4093	1142	4372	1182	4642	1221	4902	—	—	—	—	—	—	—	—
5500	1027	3655	1073	3953	1118	4298	1157	4566	1197	4856	1235	5115	—	—	—	—	—	—	—	—
5600	1043	3860	1090	4158	1133	4512	1173	4810	1211	5087	—	—	—	—	—	—	—	—	—	—
5700	1060	4065	1106	4363	1149	4726	1189	5032	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4279	1122	4586	1165	4939	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4503	1139	4810	1181	5170	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	4725	1155	5032	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5207	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 7)
- Shading indicates an alternate motor and drive are required (See Note 7.)
- Shading indicates a field-supplied motor and drive are required. (See Note 7.)
- Maximum usable watts input is 3775 with a standard motor and 4400 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6
- Values include losses for filters, unit casing, and wet coils
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Standard motor drive range: 860 to 1080 rpm. Alternate motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

Motor efficiency = 85 (std)
87 (alt)

Table 11 – Fan Performance, 48TJD/TJE/TJF008 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	506	539	586	692	656	875	718	1064	776	1275	838	1578	898	1954
2250	514	562	593	723	662	907	724	1097	781	1318	841	1604	902	1989
2300	521	577	600	747	668	932	730	1131	786	1335	843	1621	905	2015
2400	536	623	613	795	680	989	741	1199	796	1413	849	1665	910	2041
2500	551	669	626	859	693	1056	753	1275	808	1499	859	1735	912	2050
2550	559	692	634	891	700	1089	759	1318	814	1543	864	1779	915	2067
2600	567	716	641	916	706	1123	764	1353	819	1587	869	1823	918	2093
2700	582	779	655	981	719	1199	776	1430	831	1674	880	1919	927	2180
2800	598	835	670	1056	732	1275	789	1517	842	1770	892	2023	938	2275
2900	614	899	684	1123	745	1361	802	1604	854	1866	903	2136	949	2366
3000	630	973	690	1207	759	1447	815	1700	866	1971	915	2240	961	2504
3100	646	1047	714	1292	773	1543	828	1805	878	2076	926	2352	972	2629
3200	662	1131	729	1378	787	1648	841	1910	891	2188	938	2470	983	2743
3300	679	1216	744	1473	801	1753	854	2023	904	2300	950	2587	995	2870
3400	695	1310	759	1578	816	1858	867	2136	917	2420	963	2710	1007	2967
3500	712	1413	774	1683	830	1971	881	2257	930	2546	976	2831	—	—
3600	729	1517	790	1796	845	2093	895	2366	943	2670	988	2956	—	—
3700	745	1630	805	1919	860	2223	909	2521	956	2807	—	—	—	—
3750	754	1691	813	1980	868	2283	917	2587	963	2870	—	—	—	—
3800	762	1753	821	2041	875	2343	924	2653	970	2933	—	—	—	—
3900	779	1875	836	2171	890	2479	938	2783	—	—	—	—	—	—
4000	796	2006	852	2300	905	2612	953	2925	—	—	—	—	—	—
4100	813	2136	868	2445	920	2751	—	—	—	—	—	—	—	—
4200	830	2283	884	2587	935	2894	—	—	—	—	—	—	—	—
4250	839	2360	890	2661	—	—	—	—	—	—	—	—	—	—
4300	847	2428	900	2735	—	—	—	—	—	—	—	—	—	—

NOTES:

- 1 Boldface** indicates a field-supplied drive is required (See Note 7)
- 2 Shading** indicates an alternate drive is required. (See Note 7)
- 3 Shading** indicates a field-supplied motor and drive are required (See Note 7)
- Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6

- Values include losses for filters, unit casing, and wet coils
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Standard motor drive range: 590 to 840 rpm. Alternate motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 80$$

Table 12 – Fan Performance, 48TJD/TJE/TJF009 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
2200	506	539	586	692	656	875	718	1064	776	1275	838	1578	898	1954
2250	514	562	593	723	662	907	724	1097	781	1318	841	1604	902	1989
2300	521	577	600	747	668	932	730	1131	786	1335	843	1621	905	2015
2400	536	623	613	795	680	989	741	1199	796	1413	849	1665	910	2041
2500	551	669	626	859	693	1056	753	1275	808	1499	859	1735	912	2050
2550	559	692	634	891	700	1089	759	1318	814	1543	864	1779	915	2067
2600	567	716	641	916	706	1123	764	1353	819	1587	869	1823	918	2093
2700	582	779	655	981	719	1199	776	1430	831	1674	880	1919	927	2180
2800	598	835	670	1056	732	1275	789	1517	842	1770	892	2023	938	2275
2900	614	899	684	1123	745	1361	802	1604	854	1866	903	2136	949	2366
3000	630	973	690	1207	759	1447	815	1700	866	1971	915	2240	961	2504
3100	646	1047	714	1292	773	1543	828	1805	878	2076	926	2352	972	2629
3200	662	1131	729	1378	787	1648	841	1910	891	2188	938	2470	983	2743
3300	679	1216	744	1473	801	1753	854	2023	904	2300	950	2587	995	2870
3400	695	1310	759	1578	816	1858	867	2136	917	2420	963	2710	1007	2967
3500	712	1413	774	1683	830	1971	881	2257	930	2546	976	2831	—	—
3600	729	1517	790	1796	845	2093	895	2366	943	2670	988	2956	—	—
3700	745	1630	805	1919	860	2223	909	2521	956	2807	—	—	—	—
3750	754	1691	813	1980	868	2283	917	2587	963	2870	—	—	—	—
3800	762	1753	821	2041	875	2343	924	2653	970	2933	—	—	—	—
3900	779	1875	836	2171	890	2479	938	2783	—	—	—	—	—	—
4000	796	2006	852	2300	905	2612	953	2925	—	—	—	—	—	—
4100	813	2136	868	2445	920	2751	—	—	—	—	—	—	—	—
4200	830	2283	884	2587	935	2894	—	—	—	—	—	—	—	—
4250	839	2360	890	2661	—	—	—	—	—	—	—	—	—	—
4300	847	2428	900	2735	—	—	—	—	—	—	—	—	—	—

NOTES:

- 1 Boldface** indicates a field-supplied drive is required (See Note 6)
- 2 Shading** indicates a field-supplied motor and drive are required (See Note 6)
- Maximum usable watts input is 2120. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6
- Values include losses for filters, unit casing, and wet coils

- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify
- Standard motor drive range: 685 to 935 rpm. All other rpms require field-supplied drive
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = 80$$

Table 13 – Fan Performance, 48TJD/TJE/TJF012 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3000	592	723	661	859	722	989	779	1131	829	1267	880	1404	924	1534	970	1736	1019	1828	1066	2082
3100	607	779	676	924	734	1056	791	1199	840	1344	890	1491	935	1695	977	1828	1026	1971	1070	2203
3200	622	835	690	989	746	1123	803	1275	852	1422	900	1569	946	1786	987	1920	1029	2065	1075	2265
3300	638	899	705	1056	759	1190	815	1353	864	1508	910	1665	957	1878	998	2022	1037	2169	1082	2326
3400	653	965	719	1131	772	1275	826	1439	876	1604	921	1753	967	1971	1009	2125	1047	2282	1087	2433
3500	669	1039	733	1207	786	1361	838	1526	888	1691	933	1858	976	2074	1020	2238	1058	2397	1095	2560
3600	684	1114	747	1284	800	1456	850	1613	900	1796	945	2014	986	2177	1030	2353	1069	2523	1106	2699
3700	700	1190	760	1370	814	1552	863	1700	912	1892	957	2117	998	2291	1039	2469	1082	2657	1117	2825
3800	715	1275	774	1456	828	1648	875	1805	924	1997	969	2230	1010	2406	1049	2587	1091	2732	1128	2961
3900	731	1370	787	1543	843	1753	888	1910	936	2151	981	2344	1022	2533	1060	2726	1100	2833	1143	3144
4000	747	1456	801	1639	857	1858	902	2032	948	2265	993	2469	1034	2670	1072	2868	1110	3006	1156	3332
4100	763	1560	816	1744	872	1971	916	2203	960	2380	1005	2596	1046	2810	1084	3016	1121	3213	1174	3525
4200	778	1665	831	1884	886	2084	929	2326	972	2505	1016	2735	1058	2952	1094	3155	1132	3363	1192	3753
4300	794	1770	846	1971	900	2256	943	2450	985	2642	1028	2866	1072	3117	1106	3311	1142	3531	1211	3987
4400	810	1884	861	2093	913	2380	958	2605	999	2791	1040	3010	1086	3276	1117	3473	1153	3695	1231	4235
4500	826	2006	876	2273	927	2505	973	2744	1012	2952	1053	3187	1099	3440	1128	3642	1163	3877	1253	4496
4600	842	2177	892	2406	940	2633	987	2904	1024	3117	1065	3321	1113	3611	1140	3817	1174	4033	1276	4775
4700	858	2300	907	2551	954	2782	1002	3068	1037	3275	1077	3481	1127	3789	1152	3997	1184	4235	1300	5066
4800	874	2433	922	2698	968	2933	1018	3232	1050	3439	1089	3646	1142	3973	1163	4184	1195	4422	1325	5378
4900	890	2578	938	2857	984	3093	1034	3406	1063	3608	1101	3816	1157	4163	1175	4377	1205	4617	1352	5696
5000	906	2735	953	3020	998	3216	1050	3588	1077	3785	1114	3991	1173	4360	1187	4576	1216	4818	1381	6035

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 7)
- Shading** indicates an alternate motor and drive are required (See Note 7)
- Shading** indicates a field-supplied motor and drive are required (See Note 7)
- Maximum usable watts input is 2120 with a standard motor and 2615 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6

- Values include losses for filters, unit casing, and wet coils.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Standard motor drive range: 685 to 935 rpm. Alternate motor drive range: 835 to 1085 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = \begin{matrix} 80 \text{ (std)} \\ 83 \text{ (alt)} \end{matrix}$$

Table 14 – Fan Performance, 48TJD/TJE014 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts	Rpm	Watts
3700	677	1129	748	1316	810	1498	869	1700	928	1940	984	2166	1036	2387	1080	2548	1114	2737	1135	2828
3800	691	1194	761	1390	822	1582	880	1776	937	2035	993	2272	1046	2503	1092	2719	1129	2901	1156	3028
3900	705	1267	773	1473	834	1674	891	1862	947	2131	1002	2370	1055	2620	1102	2855	1143	3056	1174	3212
4000	720	1349	786	1548	847	1768	902	1957	957	2228	1011	2485	1064	2737	1112	2983	1155	3212	1190	3405
4100	734	1423	800	1641	860	1871	914	2061	967	2316	1021	2593	1072	2855	1121	3120	1165	3368	1203	3581
4200	749	1506	813	1725	873	1974	926	2175	978	2414	1030	2710	1081	2983	1130	3258	1175	3516	1215	3757
4300	764	1598	826	1828	886	2079	938	2290	989	2521	1040	2837	1090	3111	1139	3396	1185	3664	1226	3925
4400	779	1691	840	1931	899	2193	951	2414	1000	2638	1050	2955	1100	3248	1148	3535	1194	3822	1236	4093
4500	793	1785	854	2035	912	2307	963	2548	1012	2755	1061	3065	1109	3387	1157	3674	1203	3981	1246	4260
4600	808	1888	868	2158	925	2459	975	2674	1024	2901	1071	3184	1118	3525	1166	3832	1212	4130	1255	4437
4700	822	2000	882	2281	937	2548	988	2819	1036	3056	1082	3313	1129	3674	1175	3990	1221	4298	1264	4605
4800	837	2114	896	2414	950	2674	1001	2964	1048	3212	1093	3461	1139	3813	1185	4148	1230	4456	1273	4782
4900	852	2237	910	2548	963	2810	1014	3111	1060	3368	1105	3609	1150	3943	1194	4307	1239	4603	1282	4958
5000	867	2361	924	2683	977	2946	1027	3267	1073	3535	1117	3776	1161	4093	1204	4475	1248	4810	1291	5132
5100	882	2485	938	2828	990	3092	1040	3424	1085	3702	1129	3962	1172	4251	1213	4642	1257	4995	—	—
5200	896	2629	952	2973	1003	3248	1053	3590	1098	3869	1141	4148	1183	4419	1225	4791	1267	5170	—	—
5300	911	2773	967	3129	1017	3405	1066	3757	1111	4055	1153	4335	1194	4596	1236	4958	—	—	—	—
5400	926	2919	981	3294	1030	3572	1079	3916	1124	4270	1166	4531	1206	4791	1247	5124	—	—	—	—
5500	940	3074	995	3461	1044	3748	1092	4093	1137	4437	1178	4725	1218	4958	—	—	—	—	—	—
5600	955	3239	1010	3627	1058	3943	1105	4270	1150	4633	1190	4930	1229	5124	—	—	—	—	—	—
5700	970	3405	1024	3804	1072	4139	1118	4456	1163	4837	1203	5143	—	—	—	—	—	—	—	—
5800	985	3581	1039	3981	1086	4335	1131	4652	1176	5041	—	—	—	—	—	—	—	—	—	—
5900	1000	3757	1053	4167	1100	4540	1144	4855	—	—	—	—	—	—	—	—	—	—	—	—
6000	1015	3953	1068	4363	1114	4754	1158	5060	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4139	1083	4558	1128	4967	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4344	1097	4763	1142	5180	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:

- Boldface** indicates a field-supplied drive is required (See Note 7)
- Shading** indicates an alternate motor and drive are required (See Note 7)
- Shading** indicates a field-supplied motor and drive are required (See Note 7)
- Maximum usable watts input is 3775 with a standard motor and 4400 with an alternate motor. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using your fan motors up to the wattage ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. For additional information on motor performance, refer to Table 6

- Values include losses or filters, unit casing, and wet coils.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative to verify.
- Standard motor drive range: 860 to 1080 rpm. Alternate motor drive range: 900 to 1260 rpm. All other rpms require field-supplied drive.
- To convert watts to bhp:

$$\text{bhp} = \frac{\text{watts input} \times \text{motor efficiency}}{746}$$

$$\text{Motor efficiency} = \begin{matrix} 85 \text{ (std)} \\ .87 \text{ (alt)} \end{matrix}$$

START-UP

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

Return-Air Filters — Make sure correct filters are installed in 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.

Compressor Mounting — Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts. On 48TJ014 units, remove the tiedown bands that hold the compressors together.

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

Refrigerant Service Ports — Each refrigerant system has 4 Schrader-type service gage ports: one on the suction line, one on the liquid line, and two on the compressor discharge line. Be sure that caps on the ports are tight. One Schrader-type valve is located under both the high-pressure switch and the low-pressure switch when ordered as an option.

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

Check unit charge. Refer to Service, Refrigerant Charge section, page 23.

Reset thermostat at a position above room temperature. Compressor will shut off. Evaporator fan will shut off after 30 second delay.

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

Main Burners — Main burners are factory set and should require no adjustment.

TO CHECK ignition of main burners and heating controls, move thermostat set point above room temperature and verify that the burners light and evaporator fan is energized. After ensuring that the unit continues to heat the building, lower the thermostat setting below the room temperature and verify that the burners and evaporator fan turn off (fan will turn off only if fan selector switch is in the AUTO. position). Refer to Table 15 for the correct orifice to use at high altitudes.

NOTE: Upon a call for heat, the main burners will remain on for a minimum of 60 seconds.

Heating

1. Purge gas supply line of air by opening union ahead of gas valve. When gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and open manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO or ON position. Set heating temperature lever above room temperature.
4. The induced-draft motor will start.
5. After a call for heating, the main burners should light within 5 seconds. If the burners do not light, then there is a 22-second delay before another 5-second try. If the burners still do not light, the time delay is repeated. If the burners do not light within 15 minutes, there is a lockout. To reset the control, break the 24 v power to W1.

6. The evaporator-fan motor will turn on 45 seconds after the burners are ignited.
7. The evaporator-fan motor will turn off 45 seconds after the thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate and in Table 1.

NOTE. The default value for the evaporator-fan motor ON and OFF delay is 45 seconds. The Integrated Gas Unit Controller (IGC) modifies this value when abnormal limit switch cycles occur. Based upon unit operating conditions, the ON delay can be reduced to 0 seconds and the OFF delay can be extended to 180 seconds. When one flash of the LED is observed, the evaporator-fan ON/OFF delay has been modified. If the limit switch trips at the start of the heating cycle during the evaporator ON delay, the time period of the ON delay for the next cycle will be 5 seconds less than the time at which the switch tripped. (Example: If the limit switch trips at 30 seconds, the evaporator-fan ON delay for the next cycle will occur at 25 seconds.) To prevent short-cycling, a 5 second reduction will only occur if a minimum of 10 minutes has elapsed since the last call for heating.

The evaporator-fan OFF delay can also be modified. Once the call for heating has ended, there is a 10-minute period during which the modification can occur. If the limit switch trips during this period, the evaporator-fan OFF delay will increase by 15 seconds. A maximum of 9 trips can occur, extending the evaporator-fan OFF delay to 180 seconds.

To restore the original default value, reset the power to the unit.

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

Table 15 — Altitude Compensation*

ELEVATION (Ft)	125,000, 180,000, AND 220,000 BTUH NOMINAL INPUT		250,000 BTUH NOMINAL INPUT	
	Natural Gas Orifice Size†	Liquid Propane Orifice Size†	Natural Gas Orifice Size†	Liquid Propane Orifice Size†
0-2,000	31	41	30	38
2,000	32	42	30	39
3,000	32	42	31	40
4,000	32	42	32	41
5,000	33	43	33	42
6,000	34	43	34	43
7,000	35	44	35	43
8,000	36	44	36	44
9,000	37	45	37	44
10,000	38	46	38	45
11,000	39	47	39	45
12,000	40	47	40	46
13,000	41	48	41	47
14,000	42	48	42	47

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes.

†Orifice available through your local distributor.

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

Ventilation (Continuous Fan) — Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation. When the evaporator-fan selector switch is turned to the OFF position, there is a 30 second delay before the fan turns off.

Operating Sequence

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, and condenser fan start. The condenser-fan motor runs 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.

When the thermostat is satisfied, C1 and C2 are deenergized and the compressors and outdoor (condenser) fan motor (OFM) shut off. After a 30-second delay, the indoor (evaporator) fan motor (IFM) shuts off. If the thermostat fan selector switch is in the ON position, the evaporator motor will run continuously.

HEATING, UNITS WITHOUT ECONOMIZER — When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor (IDM) is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 and W2 are deenergized, the IFM stops after a 45-second time-off delay.

COOLING, UNITS WITH ECONOMIZER — When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and the outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisfied, the damper moves to the fully closed position when using an auto fan or to the minimum position when using a continuous fan.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 57 F, the damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 52 F.

When the supply-air temperature falls to between 57 F and 52 F, the damper will remain at an intermediate open position. If the supply-air temperature falls below 52 F, the damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 52 F. When the thermostat is satisfied, the damper will move to the fully closed position when using an auto fan or to the minimum position when using a continuous fan.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second-stage cooling. Compressor no. 1 and the condenser fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and OFM will be deenergized. The damper position will be determined by the supply-air temperature.

After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the ON position, the IFM will run continuously.

HEATING, UNITS WITH ECONOMIZER — When the thermostat calls for heating, terminal W1 is energized. In

order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited and the damper moves to the minimum position. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 and W2 are deenergized, the IFM stops after a 45 second time-off delay. The economizer damper then moves to the fully closed position. When using continuous fan, the damper will remain in the minimum position.

SERVICE

▲ CAUTION

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

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

EVAPORATOR COIL

1. Turn unit power off. Remove evaporator coil access panel.
2. If economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. Refer to Accessory Economizer Installation Instructions or Optional Economizer section on page 10 for more details.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return-air section to remove foreign material.
5. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

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

One-Row Coils — Wash coil with commercial cleaner. Clean outer surfaces with a stiff brush in the normal manner. It is not necessary to remove top panel.

2-Row Coils — Clean coil as follows:

1. Turn off unit power.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 30. To hold top panel open, place coil corner post between top panel and center post. See Fig. 31.
4. Remove screws securing coil to center post.
5. Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outer coil section 3 to 4 in. from the inner coil section. See Fig. 32.
6. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris. Clean the outer surfaces with a stiff brush in the normal manner.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post.
9. Reinstall the coil corner post and replace all screws.

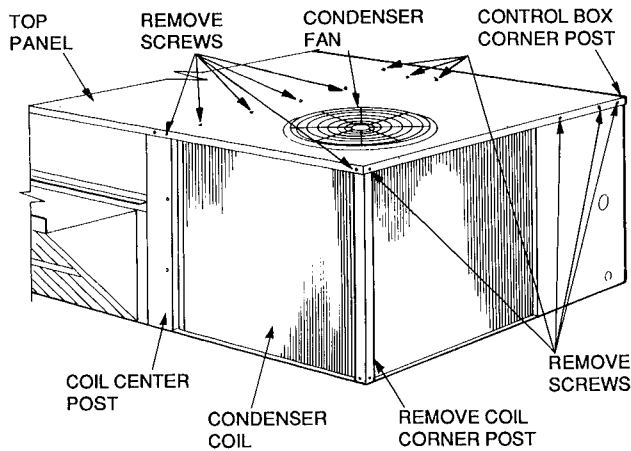


Fig. 30 — Cleaning Condenser Coil

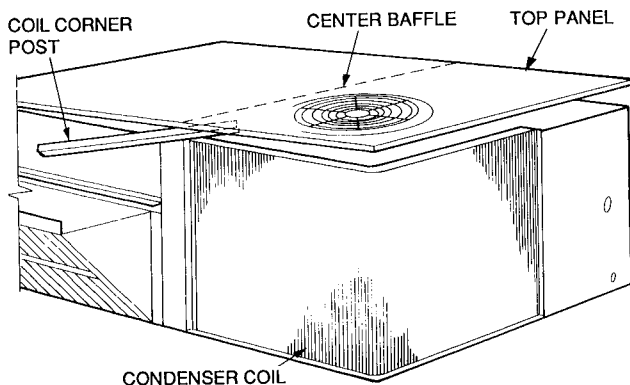


Fig. 31 — Propping Up Top Panel

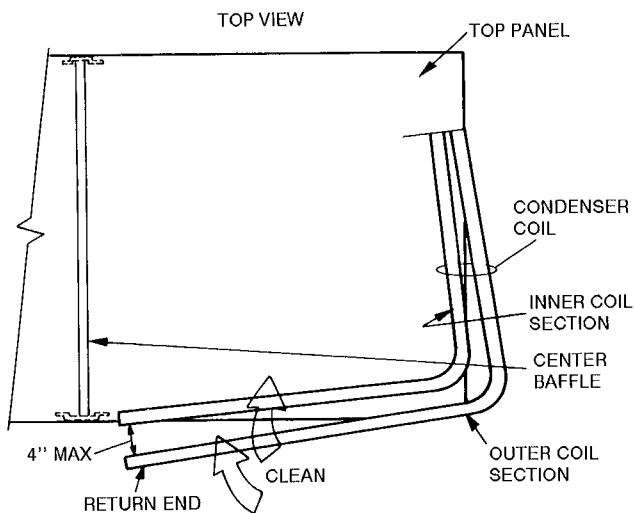


Fig. 32 — Separating Coil Sections

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

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

Lubrication

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

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

Condenser-Fan Adjustment (Fig. 33)

1. Shut off unit power supply.
2. Remove condenser-fan assembly (grille, motor, motor cover, and fan) and loosen fan hub setscrews.
3. Adjust fan height as shown in Fig. 33.
4. Tighten setscrews and replace condenser-fan assembly.

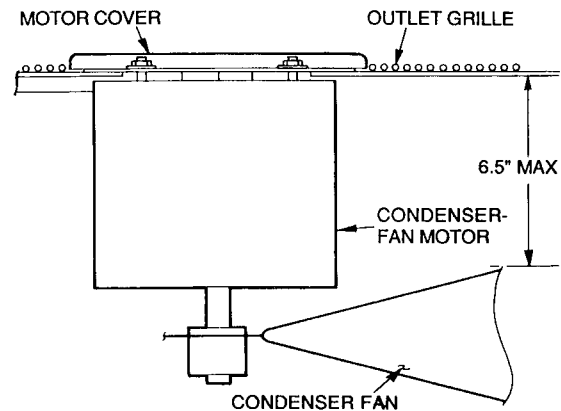


Fig. 33 — Condenser-Fan Adjustment

Manual Outdoor-Air Damper — If outdoor-air damper blade is required, see Manual Outdoor-Air Damper section on page 10

Economizer Adjustment — Refer to Optional Economizer section on page 10.

Condenser Coil Grille — Condenser coil grille is shipped factory-installed. No adjustments are required.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to Carrier GTAC 2-5 Charging, Recovery, Recycling, and Reclamation training manual and the following 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 Cooling Charging Charts, Fig. 34-37, vary refrigerant until the conditions of the appropriate chart are met. Note the charging charts are different from the type normally used. The charts are based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

TO USE COOLING CHARGING CHART — Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully reclaim some of the charge. Recheck the suction pressure as charge is adjusted. Example (Fig. 37):

Outdoor Temperature 85 F
Suction Pressure 74 psig
Suction Temperature should be 58 F
(Suction temperature may vary ± 5 F.)

If Chargemaster® charging device is used, temperature and pressure readings must be accomplished using the charging charts.

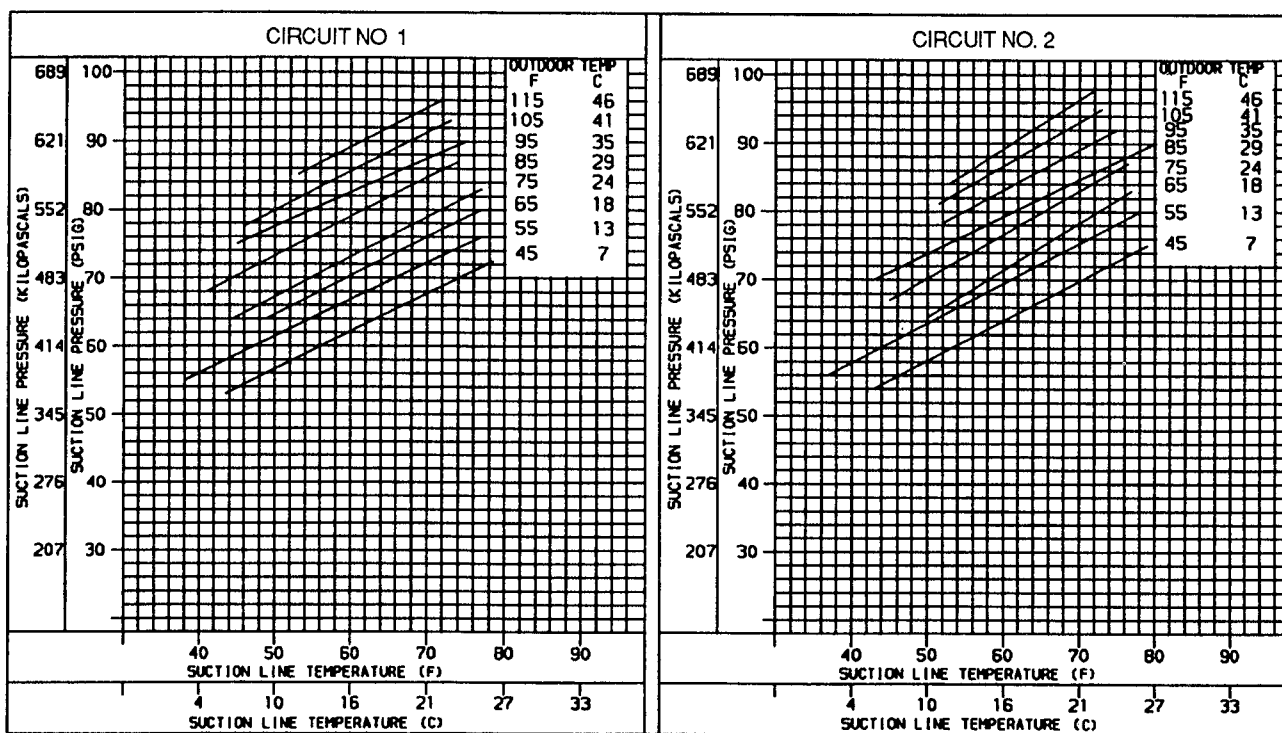


Fig. 34 — Cooling Charging Chart; 48TJ008

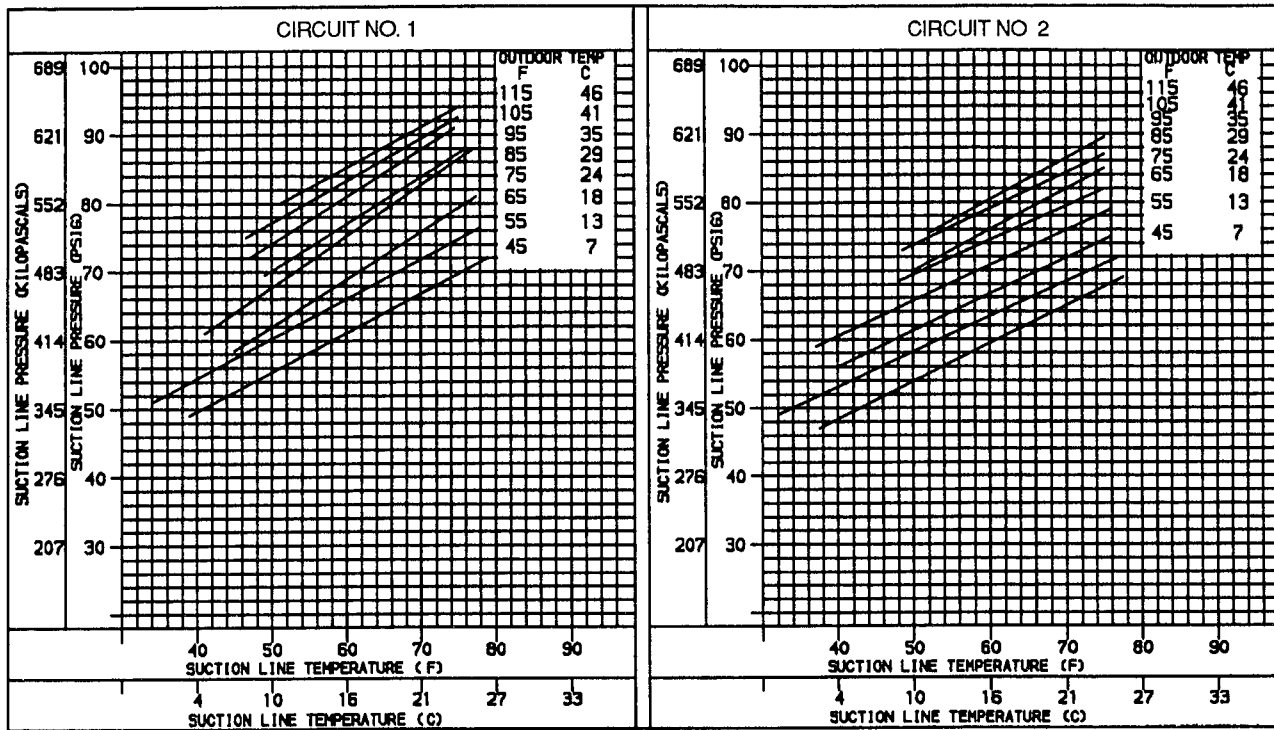


Fig. 35 – Cooling Charging Chart; 48TJ009

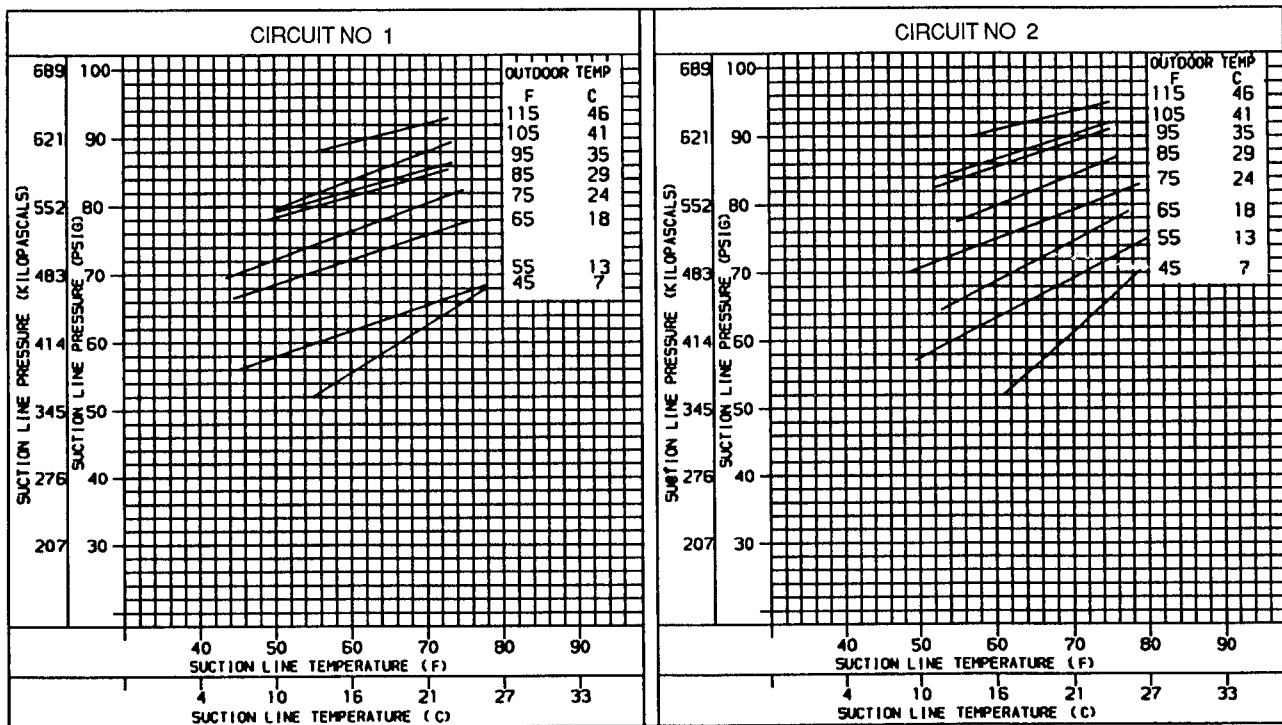


Fig. 36 – Cooling Charging Chart; 48TJ012

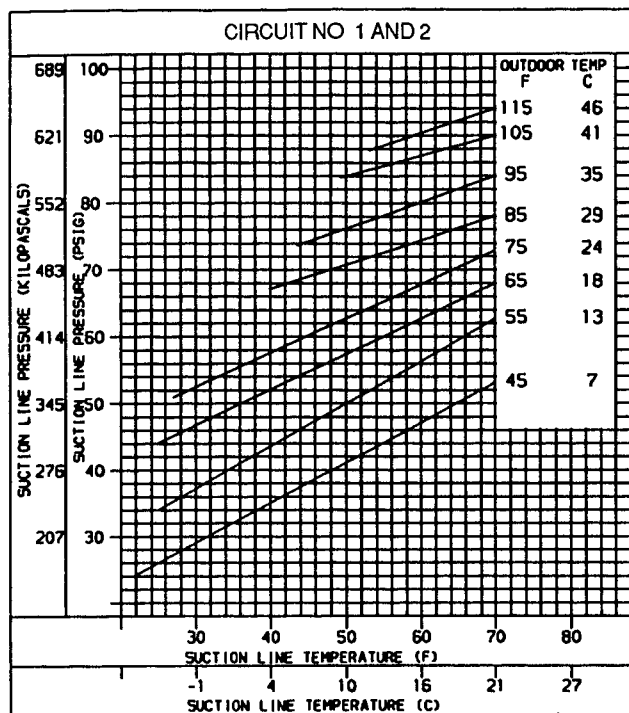


**Fig. 37 — Cooling Charging Chart;
48TJ014**

Flue Gas Passageways — To inspect the flue collector box and upper areas of the heat exchanger:

1. Remove the combustion blower wheel and motor assembly according to directions in Combustion-Air Blower section below.
2. Remove the flue cover to inspect the heat exchanger.
3. Clean all surfaces as required using 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 bimonthly to determine proper cleaning frequency.

To inspect blower wheel, shine a flashlight into draft-hood opening. If cleaning is required, remove motor and wheel as follows:

1. Slide burner access panel out.
2. Remove the 6 screws that attach induced-draft motor housing to vestibule plate (Fig. 38).
3. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 4 and 5.
4. To remove blower from the motor shaft, remove 2 setscrews.
5. To remove motor, remove the 4 screws that hold blower housing to mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
6. To reinstall, reverse the procedure outlined above.

Limit Switch — Remove blower access panel (Fig. 7). Limit switch is located on the fan deck.

Burner Ignition — Unit is equipped with a direct spark ignition 100% lockout system. Integrated Gas Unit Controller (IGC) is located in the control box (Fig. 12). Module contains a self-diagnostic LED (light-emitting diode). A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is interrupted. When a break in power occurs, the module will be reset (resulting in a loss of fault history) and the indoor (evaporator) fan ON/OFF times will be reset. For additional information, refer to the Start-Up, Heating section on page 20. The LED error code can be observed through the viewport. See Fig. 12. During servicing refer to the label on the control box cover or Table 16 for an explanation of LED error code descriptions.

If lockout occurs, unit may be adjusted by interrupting power supply to unit for at least 5 seconds.

Table 16 — LED Error Code Description*

LED INDICATION	ERROR CODE DESCRIPTION
ON	Normal Operation
OFF	Hardware Failure
1 Flash†	Evaporator Fan On/Off Delay Modified
2 Flashes	Limit Switch Fault
3 Flashes	Flame Sense Fault
4 Flashes	4 Consecutive Limit Switch Faults
5 Flashes	Ignition Lockout Fault
6 Flashes	Induced-Draft Motor Fault
7 Flashes	Rollout Switch Fault
8 Flashes	Internal Control Fault

LED — Light-Emitting Diode

*A 3-second pause exists between LED error code flashes. If more than one error code exists, all applicable codes will be displayed in numerical sequence

†Indicates a code that is not an error. The unit will continue to operate when this code is displayed

IMPORTANT: Refer to Troubleshooting Tables 17-20 for additional information

Main Burners — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust if necessary.

⚠ CAUTION

When working on gas train, do not hit or plug orifice spuds.

REMOVAL AND REPLACEMENT OF GAS TRAIN (Fig. 38 and 39)

1. Shut off manual gas valve.
2. Shut off power to unit.
3. Slide out burner section side panel (not shown).
4. Disconnect gas piping at unit gas valve.
5. Remove wires connected to gas valve. Mark each wire.
6. Remove wires from ignitor and sensor wires at the Integrated Gas Unit Controller (IGC)
7. Remove the 2 screws that attach the burner rack to the vestibule plate.
8. Slide the burner tray out of the unit (Fig. 39).
9. To reinstall, reverse the procedure outlined above.

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described in Removal and Replacement of Gas Train section, above.
2. Inspect burners; if dirty, remove burners from rack.
3. Using a soft brush, clean burners and cross-over port as required.
4. Adjust spark gap. See Fig. 40.
5. Reinstall burners on rack.
6. Reinstall burner rack as described in Removal and Replacement of Gas Train section, this page.

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

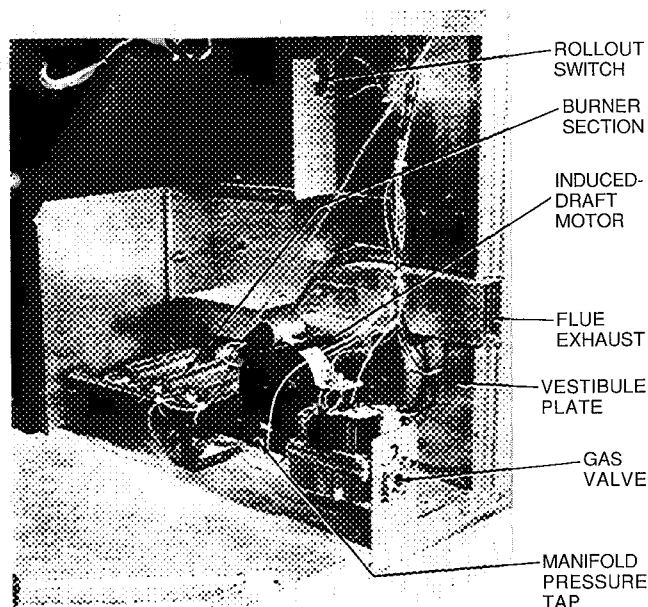


Fig. 38 — Burner Section Details

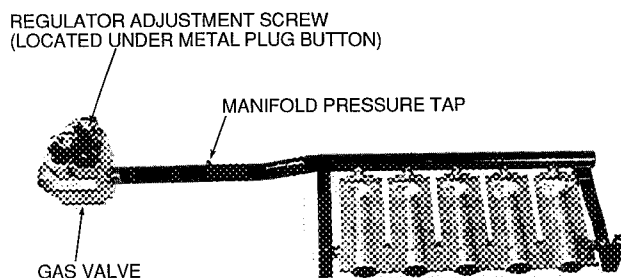
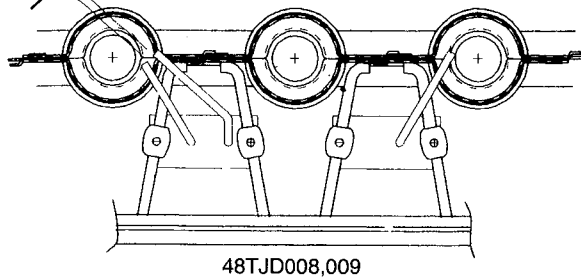


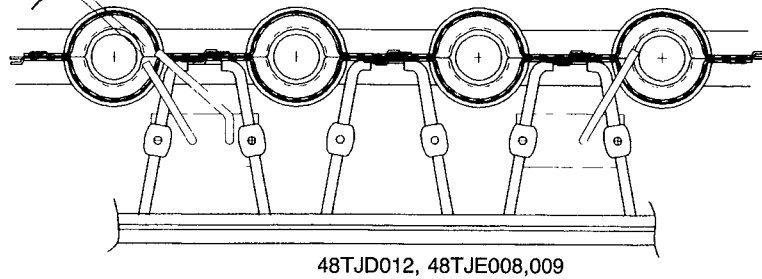
Fig. 39 — Burner Tray Details

1/8 in. (3.2) SPARK GAP



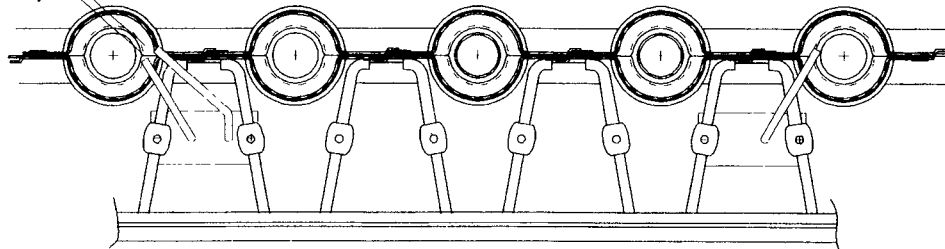
125,000 BTUH INPUT

1/8 in. (3.2) SPARK GAP



120,000-180,000 BTUH INPUT

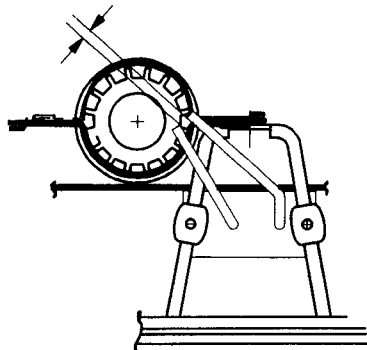
1/8 in. (3.2) SPARK GAP



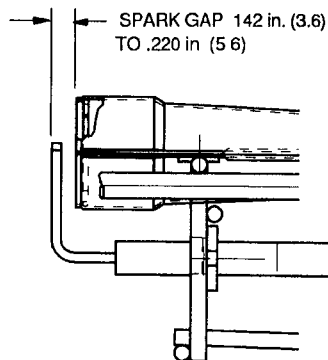
180,000-220,000 BTUH INPUT
180,000-220,000 BTUH INPUT
200,000-250,000 BTUH INPUT

48TJD014; 48TJE012
48TJF008,009
48TJE014; 48TJF012

SPARK GAP .125 in. (3.2) TO .140 in. (3.6)



SPARK GAP .142 in. (3.6)
TO .220 in. (5.6)



NOTE: Dimensions in () are millimeters

Fig. 40 — Spark Gap Adjustment

TROUBLESHOOTING

Table 17 — LED Error Code Service Analysis

PROBLEM	CAUSE	REMEDY
Hardware failure. (LED OFF)	Loss of power to control module (IGC).	Check 5-amp fuse on IGC, power to unit, 24-v circuit breaker, and transformer. Units without a 24-v circuit breaker have an internal overload in the 24-v transformer. If the overload trips, allow 10 minutes for automatic reset.
Limit switch fault. (LED 2 flashes)	High temperature limit switch is open.	Check the operation of the indoor (evaporator) fan motor. Ensure that the supply-air temperature rise is in accordance with the range on the unit nameplate.
Flame sense fault. (LED 3 flashes)	The IGC sensed flame that should not be present.	Reset unit. If problem persists, replace control board.
4 consecutive limit switch trips. (LED 4 flashes)	Inadequate airflow to unit.	Check operation of indoor (evaporator) fan motor and that supply-air temperature rise agrees with range on unit nameplate information.
Ignition lockout. (LED 5 flashes)	Unit unsuccessfully attempted ignition for 15 minutes.	Check ignitor and flame sensor electrode spacing, gaps, etc. Ensure that flame sense and ignition wires are properly terminated. Verify that unit is obtaining proper amount of gas.
Induced-draft motor fault. (LED 6 flashes)	IGC does not sense that induced-draft motor is operating.	Check for proper voltage. If motor is operating, check the speed sensor plug/IGC Terminal J2 connection. Proper connection: PIN 1 — White, PIN 2 — Red, PIN 3 — Black.
Rollout switch fault. (LED 7 flashes)	Rollout switch has opened.	Rollout switch will automatically reset, but IGC will continue to lock out unit. Check gas valve operation. Ensure that induced-draft blower wheel is properly secured to motor shaft. Reset unit at unit disconnect.
Internal control fault. (LED 8 flashes)	Microprocessor has sensed an error in the software or hardware.	If error code is not cleared by resetting unit power, replace the IGC.

LEGEND

IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode

IMPORTANT: Refer to Table 20 — Heating Service Analysis for additional troubleshooting information.

⚠ WARNING

If the IGC must be replaced, be sure to ground yourself to dissipate any electrical charge that may be present before handling new control board. The IGC is sensitive to static electricity and may be damaged if the necessary precautions are not taken.

Table 18 – Economizer Troubleshooting

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (evaporator) fan is off	1 Check to ensure that 24 vac is present at terminal C1 on the IFC or that 24 vac is present at the IFO terminal. Check whether 24 vac is present at PL6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram). 2. Check proper thermostat connection to G on the connection board
	No power to economizer motor	1 Check that SW3 is properly making contact with the damper blade. Check that SW1 is in the NC (normally closed) position 2. Check diode D1. If diode is not functioning properly, replace D1. 3 Confirm that the economizer control board is grounded properly at PL6-4 (brown wire) and at brown terminal of the economizer control board (brown wire). The economizer motor must also be grounded properly at the negative motor terminal (brown wire). 4. Verify SW1 and SW3 are working and wired properly (see unit label diagram). 5 Check for 24 vac input at both PL6-1 (red wire) and PL6-3 (black wire). If 24 vac not present, check unit wiring (see unit label diagram). If 24 vac is found in both places, check for 24 vac at the yellow terminal of the economizer control board (yellow wire). If 24 vac power is not present, replace the economizer control board.
	Economizer motor failure.	If the indoor (evaporator) fan and economizer motor are energized, verify that there is a minimum of 18 vdc at the positive motor terminal. If the motor is not operating, replace the motor.
Economizer operation limited to minimum position.	OAT or EC set too high.	1. Set at correct temperature (3 F below indoor space temperature) 2 Check OAT or EC by setting above outdoor temperature or humidity level. If the OAT or EC switches do not close, replace OAT or EC
	Verify economizer control board is correctly wired and works properly	1 Perform the following tests when OAT or EC is closed, Y1 is called for and damper is at minimum position. Confirm 24 vac on gray terminal of the economizer control board (gray wire). If 24 vac is not present, check wiring (see unit label diagram) 2 Verify that SW1 and SW3 are wired correctly and working properly (see unit label diagram). 3. Check to ensure that 24 vac exists at PL6-2 (blue wire). If 24 vac is not present, check wiring (see unit wiring label diagram) 4. Check 24 vac output at PL6-10 (white wire). If 24 vac is not present, replace economizer control board
	Check SAT.	1 After verifying that the OAT and EC settings and the economizer control board wiring are correct, check to ensure that the 24 vac terminal of the SAT has 24 vac (white wire). If OAT, EC, and control board are functioning and wired properly and no 24 vac exists, check wiring (see unit label diagram) 2. If supply-air temperature is greater than 57 F, 24 vac should be found at terminal T2 on the SAT (pink wire). If 24 vac is not present, replace SAT.
Damper does not close.	Incorrect wiring of economizer	1 Verify that SW2 and SW4 are wired and working properly (see unit label diagram) 2. Check diode D2. If diode is not functioning properly, replace D2
	Verify economizer control board is functioning properly	1. After verifying that the wiring is correct, modulate the damper to the minimum position. Remove the call for G (evaporator fan). 2. If the damper does not move, check for 24 vac at PL6-1 (red wire). If 24 vac is not present, check wiring (see unit label diagram) 3 If damper still does not move, check for 24 vac at blue terminal of economizer control board (blue wire). If 24 vac is not present, replace the economizer circuit board
	Check SAT	1 After verifying that the wiring is correct and the economizer control board is functioning properly, place the OAT or EC switch in the closed position. Place a call for Y1 and open the damper to the fully open position. Confirm that the 24 vac terminal of the SAT has 24 vac (white wire). If 24 vac is not present, check wiring (see unit label diagram). 2 If supply-air temperature is less than 52 F, 24 vac should be found at terminal T1 on the SAT (violet wire). If 24 vac not found, replace SAT.
	Economizer motor failure	If economizer control board and SAT are functioning properly, verify that there is a minimum of 18 vdc at the positive motor terminal. If a minimum of 18 vdc is present and the motor is still not operating, replace the motor
Economizer damper does not close on power loss.	Verify that close-on-power-loss and economizer control board are functioning properly	1 Check voltage potential across batteries. If lower than 14 vdc, replace close-on-power-loss power supply (9-v alkaline batteries). It is recommended that you check this emergency power supply on a regular basis or whenever the filters are changed 2 If the close-on-power-loss and economizer control board are functioning properly, check for 14 vdc or higher at the blue terminal of the economizer control board (blue wire) when power is disconnected from unit. If 14 vdc is not present, replace the control board

LEGEND

C1	— Common Power
EC	— Enthalpy Control
IFC	— Indoor (Evaporator) Fan Contactor
IFO	— Indoor (Evaporator) Fan On
OAT	— Outdoor-Air Thermostat
PL	— Plug
SAT	— Supply-Air Thermostat
SW	— Economizer Position Switch
vac	— Volts Alternating Current
vdc	— Volts Direct Current

Table 19 – Cooling Service Troubleshooting

PROBLEM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay	Replace component
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high	Lower thermostat setting below room temperature.
Compressor will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	One leg of 3-phase power dead	Replace fuse or reset circuit breaker Determine cause
Compressor cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge	Reclaim refrigerant, evacuate system, and recharge to nameplate
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat	Replace thermostat
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system	Locate restriction and remove
Compressor operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Reclaim refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Remove excess refrigerant.
	Air in system	Reclaim refrigerant, evacuate system, and recharge
	Condenser air restricted or air short-cycling	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Compressor valves leaking	Replace compressor.
	Restriction in liquid tube	Remove restriction
Excessive suction pressure.	High heat load	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Reclaim excess refrigerant.
Suction pressure too low.	Dirty air filter.	Replace filter
	Low refrigerant charge	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction
	Insufficient evaporator airflow	Increase air quantity Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary

Table 20 – Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners will not ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners	Check gas line for air purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit. Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace	Check power supply, fuses, wiring, and circuit breaker
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool down period before resetting.
	Miswired or loose connections	Check all wiring and wire nut connections.
	Burned-out heat anticipator in thermostat	Replace thermostat.
	Broken thermostat wires.	Run continuity check. Replace wires, if necessary.
Inadequate heating.	Dirty air filter.	Clean or replace filter as necessary
	Gas input to unit too low	Check gas pressure at manifold. Check gas meter for input. If too low, increase manifold pressure, or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Use high speed tap, increase fan speed, or install optional blower, as suitable for individual units.
	Limit switch cycles main burners	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
	Too much outdoor air	Adjust minimum position. Check economizer operation.
Poor flame characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Check all screws around flue outlets and burner compartment. Tighten as necessary
		Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary. Check orifice to burner alignment.
Burners will not turn off.	Unit is locked into Heating mode for a one minute minimum.	Wait until mandatory one minute time period has elapsed or power to unit.

GR — Ground

LEGEND AND NOTES FOR FIG. 41

IMPORTANT: Refer to unit wiring label for actual unit wiring information.

AHA — Adjustable Heat Anticipator
C — Contactor, Compressor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
COMP — Compressor Motor
D — Diode
EC — Enthalpy Control
EQUIP — Equipment
FPT — Freeze-Protection Thermostat
GND — Ground
HPS — High-Pressure Switch
HS — Hall Effect Sensor
I — Ignitor
IGC — Integrated Gas Unit Controller
IDM — Induced-Draft Motor

IFC — Indoor (Evaporator) Fan Contactor
IFM — Indoor (Evaporator) Fan Motor
LPS — Low-Pressure/Loss-of-Charge Switch
LS — Limit Switch
MGV — Main Gas Valve
MTR — Motor
OFM — Outdoor-Fan Motor
P — Plug
PL — Plug Assembly
QT — Quadruple Terminal
R — Relay
RS — Rollout Switch
SEN — Sensor
TC — Thermostat-Cooling
TH — Thermostat-Heating
TRAN — Transformer

 Field Splice
 Marked Wire
 Terminal (Marked)
 Terminal (Unmarked)
 Terminal Block
 Splice
 Splice (Marked)
 Factory Wiring
 Field Control Wiring
 Field Power Wiring
 Accessory or Optional Wiring
 To indicate common potential only, not to represent wiring

NOTES:

- If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
- Three-phase motors are protected under primary single phasing conditions.
- Thermostat: HH07AT170, 172, 174 and P272-2783
Subbase: HH93AZ176, 178 and P272-1882, 1883
- Set heat anticipator for first stage at 0.14 amp, second stage at 0.2 amp.

- Use copper conductors only.

- TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (RED) and connect to 200 v tap (BLU). Insulate end of 230 v tap.
- When economizer assembly is installed move GRA wire from connection board (Y1) to GRA wire from PL6,5; move ORN wire from connection board (Y2) to ORN wire from PL6,9, on economizer assembly

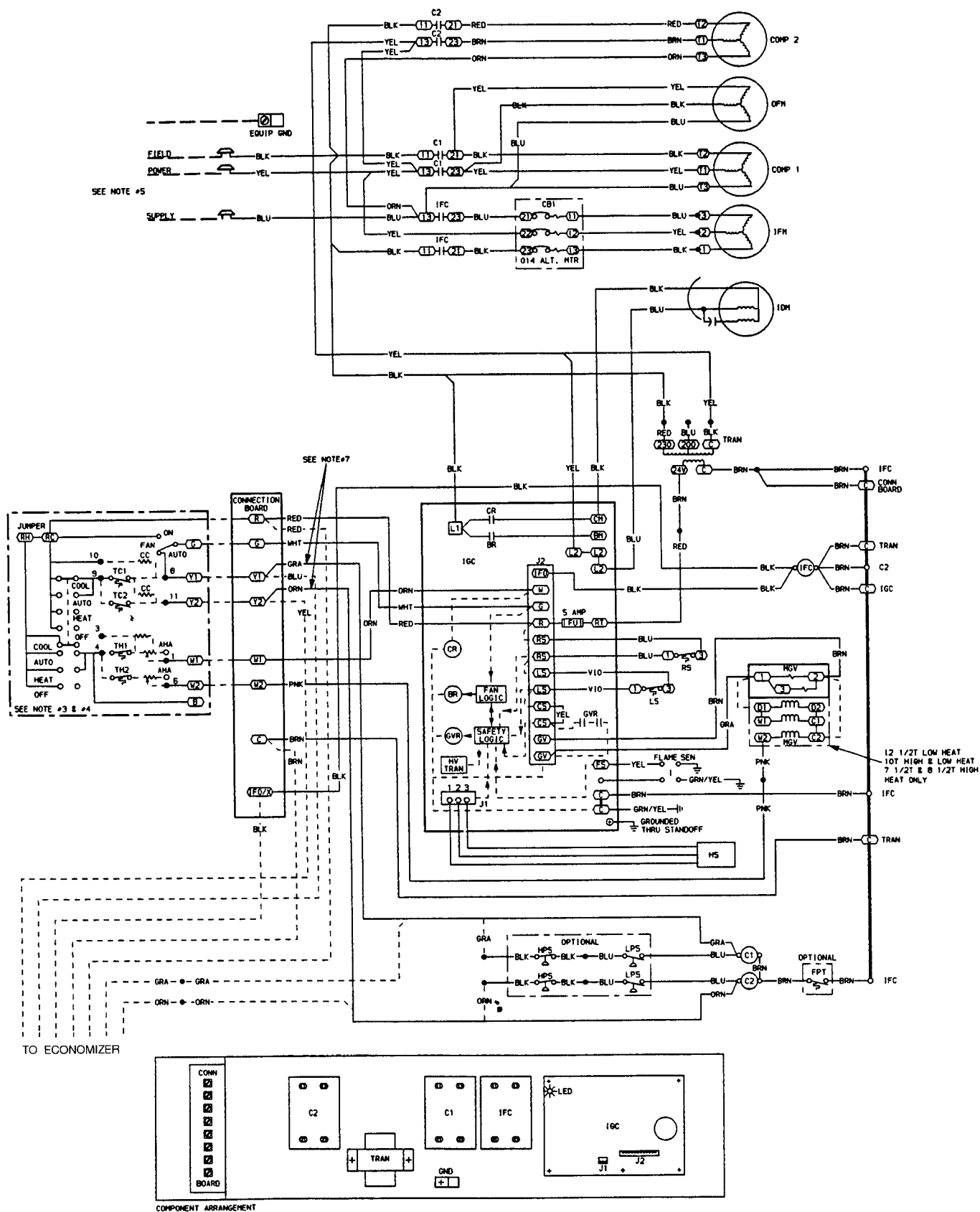


Fig. 41 – Typical Wiring Schematic and Component Arrangement