



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 $\frac{1}{2}$ psig. Pressures greater than $\frac{1}{2}$ psig will cause gas valve damage resulting in hazardous condition. If gas valve is ever subjected to pressure greater than $\frac{1}{2}$ psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of $\frac{1}{2}$ 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.

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 or electrical connections are to be routed through the curb, attach the accessory thru-the-curb service connection plate to the roof curb in accordance with the accessory installation instructions. Connections 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 or water 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.

If gas or electrical connections are to be routed through the bottom of the unit, attach accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions.

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a 6-in. 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 Durablade or EconoMiSer or $.45$ in. wg without economizer.

These units are designed for a minimum heating operation 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 on 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 (Red) 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 (Red) 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 a minimum of 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 ($3/4$ in.).

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 and lifting.

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

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 duct end of unit; $3/16$ -in. clearance between roof curb and condenser section end. (See Fig. 2, section C-C.)

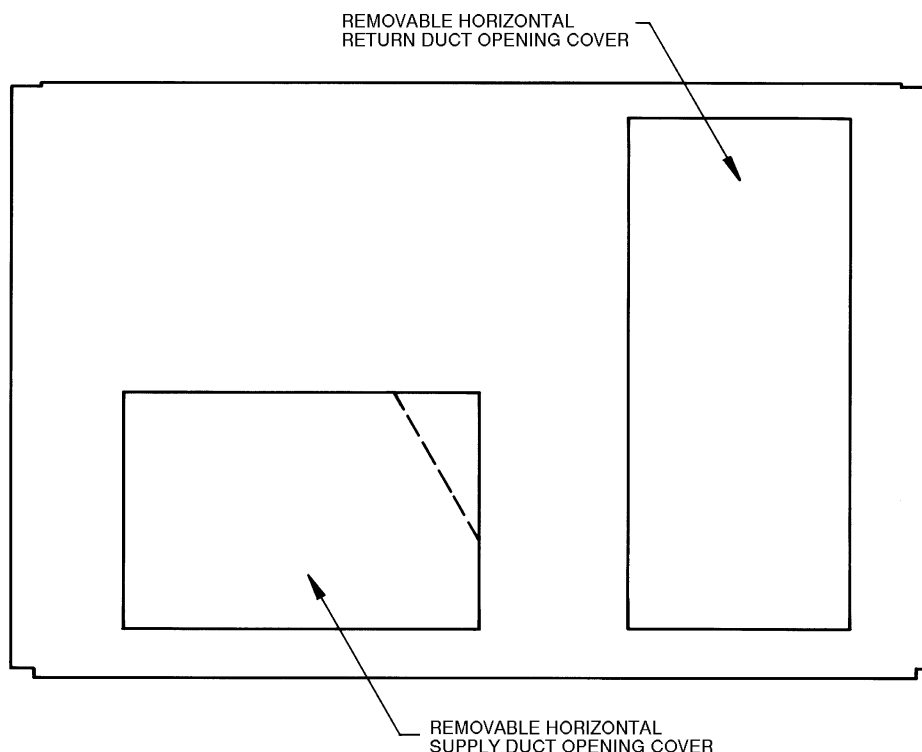


Fig. 1 — Horizontal Conversion Panels

UNIT SIZE	"A"	ROOF CURB ACCESSORY
	1'-2" [356]	CRRFCURB003A00
48TJ008-014	2'-0" [610]	CRRFCURB004A00

NOTES:

1. Roof curb accessory is shipped disassembled.
2. Insulated panels: 1" thk. polyurethane foam, 1³/₄ lb density.
3. Dimensions in [] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb (flanges of duct rest on curb).
6. Service clearance 4' on each side.
7.  Direction of airflow.

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	SERVICE PLATE SIZES		CONNECTOR PACKAGE ACCESSORY
				"E" Gas	"F" Power	
48TJ008-014	2'-8 7/16" [827]	1'-10 15/16" [583]	1 3/4" [44.5]	3/4" [19] NPT	1" [25] NPT	3/4" [19] NPT
						CRBTMPWR001A00

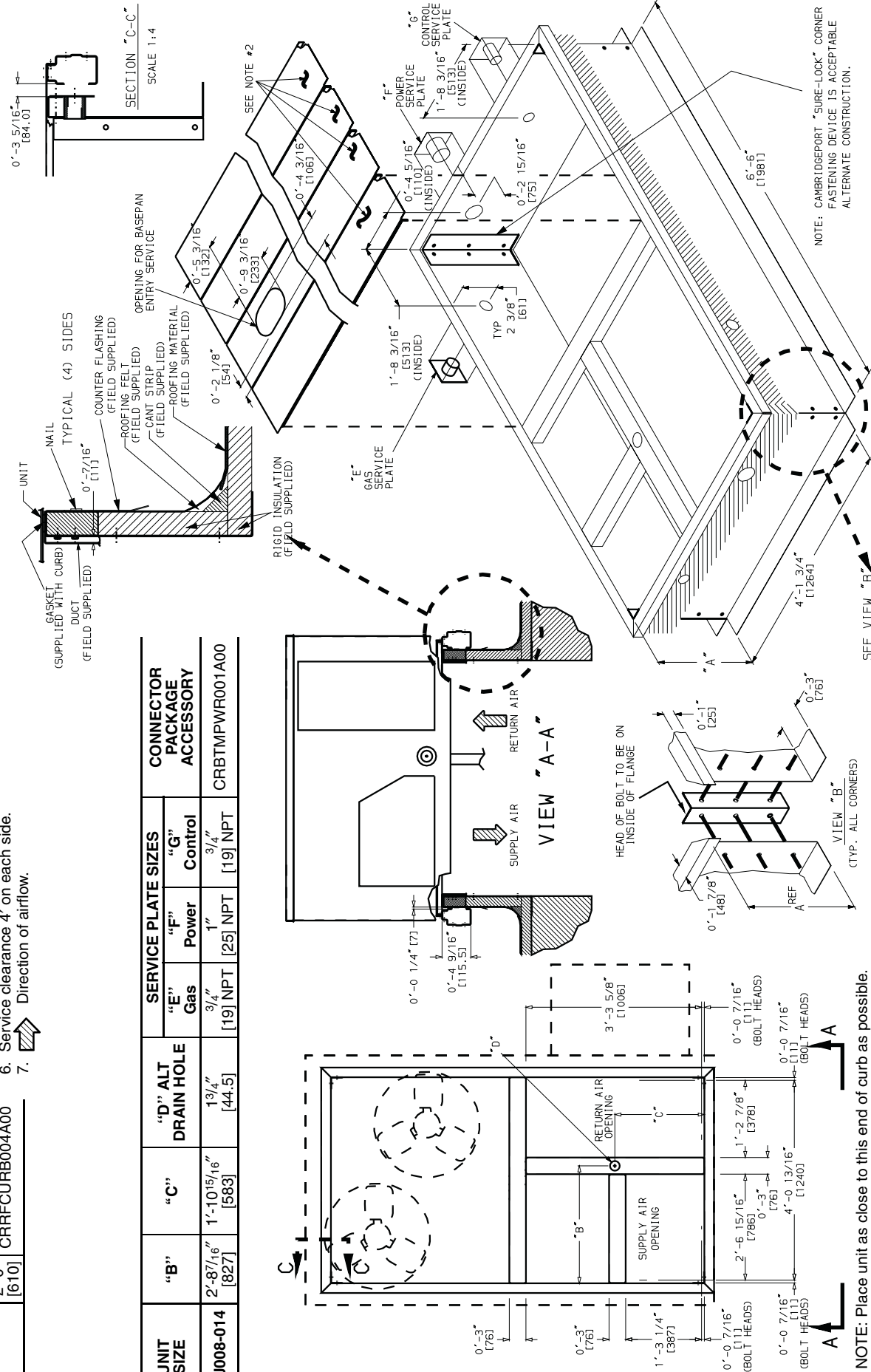


Fig. 2 — Roof Curb Details

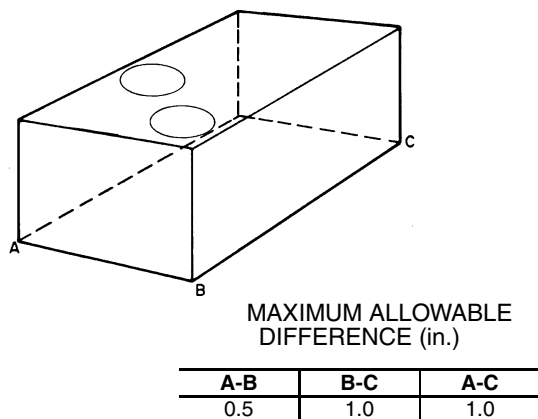
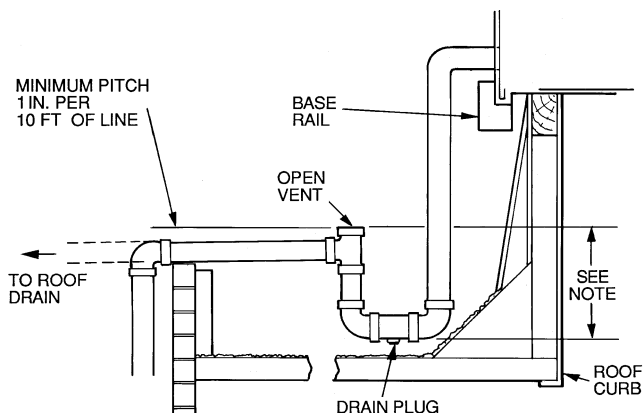


Fig. 3 — Unit Leveling Tolerances



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

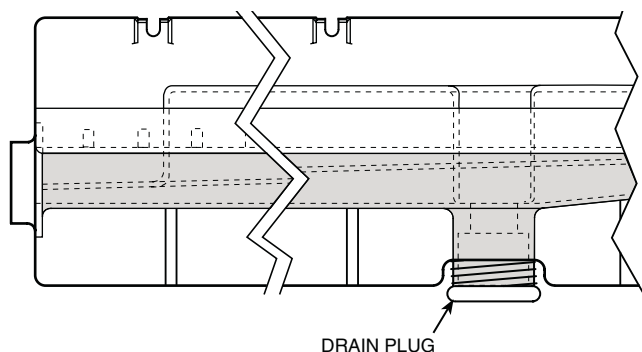
Fig. 5 — External Trap Condensate Drain

Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, or as local codes dictate, 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.

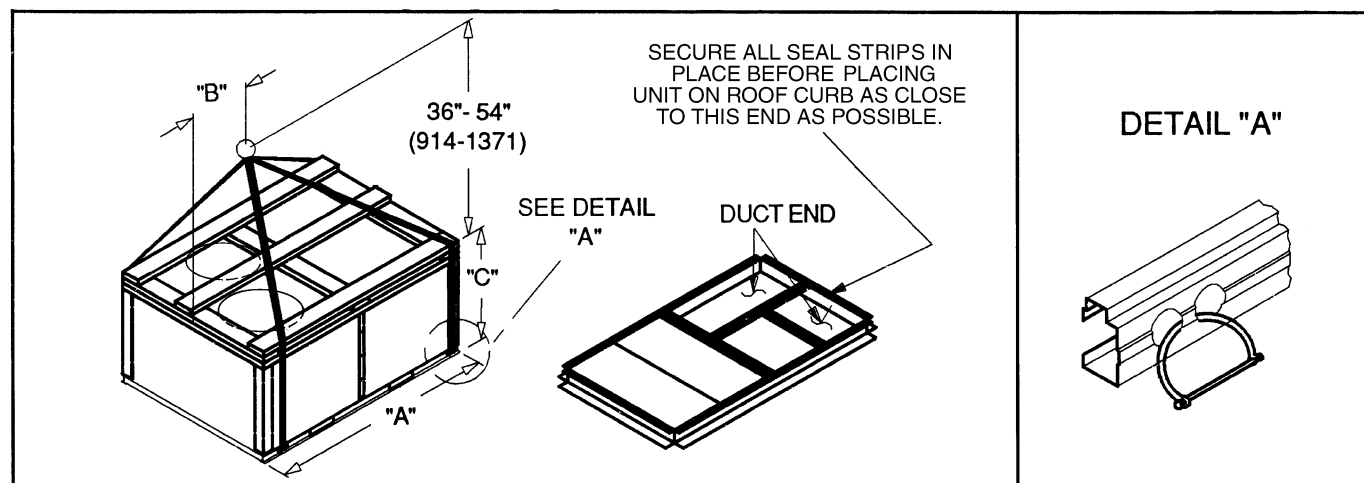
Flue gas can deteriorate building materials. Orient unit so that flue gas will not affect building materials.

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-latest year and addendum Z223.1A-latest year. In Canada, installation must be in accordance with the CAN1. B149.1 and CAN1.B149.2 installation codes for gas burning appliances.



NOTE: Drain plug is shown in factory-installed position.

Fig. 4 — Condensate Drain Pan



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.

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

CAUTION

All panels must be in place when rigging.

Fig. 6 — Rigging Details

Table 1 — Physical Data

UNIT SIZE 48TJ		D/E/F008	D/E/F009	D/E/F012	D/E/014
NOMINAL CAPACITY (tons)		7½	8½	10	12½
OPERATING WEIGHT (lb)					
Unit					
Al/Al*		870	880	1035	1050
Al/Cu*		881	896	1057	1077
Cu/Cu*		893	907	1080	1100
Economizer					
Durablade		44	44	44	44
EconoMiSer		62	62	62	62
Roof Curb†		143	143	143	143
COMPRESSOR		Reciprocating	Reciprocating	Reciprocating	Scroll
Quantity		2	2	2	2
No. Cylinders (per Circuit)		2	2	2	2
Oil (oz)		42 ea	65 ea	54 ea	54 ea
REFRIGERANT TYPE		R-22			
Expansion Device		Acutrol™ Metering Device			
Operating Charge (lb-oz)					
Circuit 1		4-13	6-14	7- 3	8-10
Circuit 2		4-14	9- 2	7-13	8- 6
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	18.00	20.47	25.00
CONDENSER FAN		Propeller Type			
Nominal Cfm		6400	6400	7000	7000
Quantity...Diameter (in.)		2...22	2...22	2...22	2...22
Motor Hp...Rpm		¼...1100	¼...1100	¼...1100	¼...1100
Watts Input (Total)		600	600	600	600
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins			
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.)		1...15 x 15	1...15 x 15	1...15 x 15	1...15 x 15
	Std	1...15 x 15	—	1...15 x 15	1...15 x 15
	Alt	1...15 x 15	—	1...15 x 15	—
	High-Static	1...15 x 15	1...15 x 15	1...15 x 15	—
Type Drive					
	Std	Belt	Belt	Belt	Belt
	Alt	Belt	Belt	Belt	Belt
	High-Static	Belt	Belt	Belt	—
Nominal Cfm		3000	3100	4000	5000
Maximum Continuous Bhp		2.40	2.40	2.40	3.70
	Std	2.40	—	2.90	5.25
	Alt	3.70	—	5.25	—
	High-Static	3.70	3.70	5.25	—
Motor Frame Size					
	Std	56	56	56	56
	Alt	56	—	56	56
	High-Static	56	56	56	—
Fan Rpm Range					
	Std	590-840	685-935	685-935	860-1080
	Alt	685-935	—	835-1085	900-1260
	High-Static	860-1080	860-1080	830-1130	—
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter Min/Max (in.)		2.4/3.4	2.8/3.8	2.8/3.8	4.0/5.0
	Std	2.8/3.8	—	3.4/4.4	3.1/4.1
	Alt	4.0/5.0	4.0/5.0	2.8/3.8	—
	High-Static	4.0/5.0	4.0/5.0	2.8/3.8	—
Nominal Motor Shaft Diameter (in.)					
	Std	5/8	5/8	5/8	7/8
	Alt	1/2	—	7/8	7/8
	High-Static	7/8	7/8	7/8	—
Fan Pulley Pitch Diameter (in.)					
	Std	7.0	7.0	7.0	8.0
	Alt	7.0	—	7.0	5.9
	High-Static	8.0	8.0	5.8	—
Belt, Quantity...Type...Length (in.)					
	Std	1...A...49	1...A...49	1...A...49	1...A...52
	Alt	1...A...49	—	1...A...49	1...BX...46
	High-Static	1...A...55	1...A...55	1...BX...46	—
Pulley Center Line Distance (in.)					
	Std	16.75-19.25	16.75-19.25	15.85-17.50	15.85-17.50
	Alt	16.75-19.25	—	15.85-17.50	15.85-17.50
	High-Static	16.75-19.25	16.75-19.25	15.85-17.50	—
Speed Change per Full Turn of Movable Pulley Flange (rpm)					
	Std	50	50	50	44
	Alt	50	—	50	50
	High-Static	60	60	60	—
Movable Pulley Maximum Full Turns From Closed Position					
	Std	5	5	5	5
	Alt	5	—	5	6
	High-Static	5	5	6	—
Factory Setting					
	Std	5	5	5	5
	Alt	5	—	5	5
	High-Static	5	5	5	—
Factory Speed Setting (rpm)					
	Std	590	685	685	860
	Alt	685	—	835	960
	High-Static	860	860	887	—
Fan Shaft Diameter at Pulley (in.)		1	1	1	1

LEGEND

Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.
†Weight of 14-in. roof curb.

**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.
††Requires an optional or accessory Controls Upgrade Kit.

NOTES:

1. The 48TJ008-014 units have a loss-of-charge switch (accessory or option) located in the liquid line.
2. High-static motor not available on size 014 units.

Table 1 — Physical Data (cont)

UNIT SIZE 48TJ	D/E/F008	D/E/F009	D/E/F012	D/E/014
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)				
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	—/180,000/224,000	—/180,000/224,000	180,000/224,000/250,000	224,000/250,000
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
Gas Valve Pressure Range				
Psig	0.180-0.487	0.180-0.487	0.180-0.487	0.180-0.487
in. wg	5.0-13.5	5.0-13.5	5.0-13.5	5.0-13.5
Field Gas Connection Size (in.)	1/2"/3/4"/3/4	1/2"/3/4"/3/4	3/4"/3/4"/3/4	3/4"/3/4
HIGH-PRESSURE SWITCH (psig)††				
Cutout		428		428
Reset (Auto.)		320		320
Standard Compressor Internal Relief (Differential)		450 ± 50		500 ± 50
LOSS-OF-CHARGE SWITCH (psig)††				
Cutout		7 ± 3		
Reset (Auto.)		22 ± 7		
FREEZE PROTECTION THERMOSTAT (F)††				
Opens		30 ± 5		
Closes		45 ± 5		
OUTDOOR-AIR INLET SCREENS				
Quantity...Size (in.)		Cleanable 1...20 x 24 x 1 1...16 x 25 x 1		
RETURN-AIR FILTERS				
Quantity...Size (in.)		Throwaway		
	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
Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper

*Evaporator coil fin material/condenser coil fin material. Contact your local representative for details about coated fins.
†Weight of 14-in. roof curb.

**Rollout switch lockout is manually reset by interrupting power to unit or resetting thermostat.
††Requires an optional or accessory Controls Upgrade Kit.

NOTES:
1. The 48TJ004-014 units have a loss-of-charge switch (accessory or option) located in the liquid line.
2. High-static motor not available on single-phase units.

UNIT 48TJ	STANDARD UNIT WEIGHT		DURABLE ECONOMIZER 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	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm	ft-in.	mm
TJ/TJE/TJD008	870	395					189	86	161	73	239	109	280	127	1'-2 1/8"	378	3'-5 1/16"	1050	2'-9 11/16"	856	2'-27 1/16"	672
TJ/TJE/TJD009	880	399	44	20			191	87	163	74	242	110	284	129	3'-3 7/8"	1013	3'-5 1/16"	1050	2'-9 11/16"	856	2'-27 1/16"	672
TJ/TJE/TJD012	1035	469					225	102	192	87	285	129	333	151	2'-5 7/8"	759	4'-15 1/16"	1253	3'-0 9/16"	924	2'-10 7/16"	875
TJ/TJE/TJD014	1050	476					228	103	195	88	289	131	338	153	1'-2 7/8"	378	4'-15 1/16"	1253	3'-0 9/16"	924	2'-10 7/16"	875

- 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 (five side) and combustible surfaces, 48 inches.
 - Bottom of unit to combustible surfaces (when not using curb) 1 inch. Bottom of base rail to combustible surfaces (when not using curb) 0 inches.
 - 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 unit, 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.
 - The vertical center of gravity is 1'-7" (483) up from the bottom of the base rail. Horizontal center of gravity is shown.

CONNECTION SIZES	
A	1 3/8" Dia [95] Field Power Supply Hole
B	2 1/2" Dia [64] Power Supply Knock-Out
C	1 3/4" Dia [44] Charging Port Hole
D	7/8" Dia [22] Field Control Wiring Hole
E	3/4"—14 NPT Condensate Drain
F	1/4"—14 NPT Gas Connection 48TJD008 & 009
F	3/8"—14 NPT Gas Connection 48TJEF008 & 009;
G	48TJD, E012 & 014, 48TJF012
G	2" Dia [51] Power Supply Knock-Out

BOTTOM POWER CHART THESE HOLES REQUIRED FOR USE WITH ACCESSORY PACKAGES - CRBTMPR001A00, 3A00 (1/2", 3/4")			
THREADED SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)	
1/2"	24V	7/8" [22.2]	
3/4"	POWER	1 3/8" [28.4]	
1"	POWER	1 7/8" [44.1]	
(003) 1/2" FPT	GAS	1 1/4" [31.8]	
(004) 3/4" FPT	GAS	1 5/8" [41.3]	

* - SELECT EITHER 3/4" OR 1 1/4" FOR POWER, DEPENDING ON WIRE SIZE.

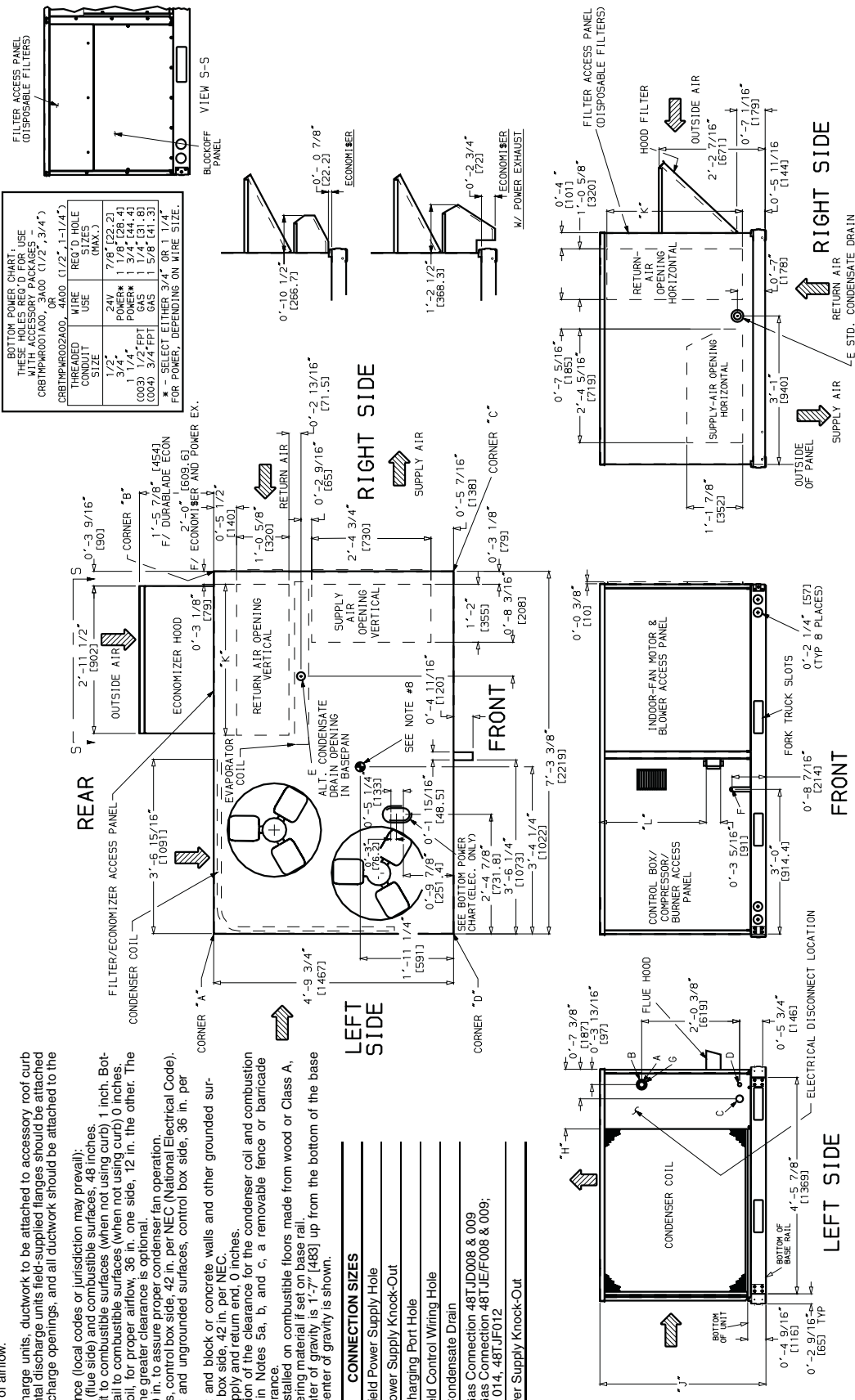


Fig. 7 — Base Unit Dimensions

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-latest year and addendum Z223.1A-latest year 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 when installing gas piping.

For natural gas applications, gas pressure at unit gas connection must not be less than 4.0 in. wg (5.0 in. wg in high heat units) 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.

NOTE: When installing gas piping to gas valve inlet, use properly sized back-up wrench on inlet flange flats.

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.

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

NOTE: If field-installed thru-the-bottom connections are used, refer to the accessory installation instructions for power wiring and gas connections. Refer to Fig. 7 for drilling holes in basepan.

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.

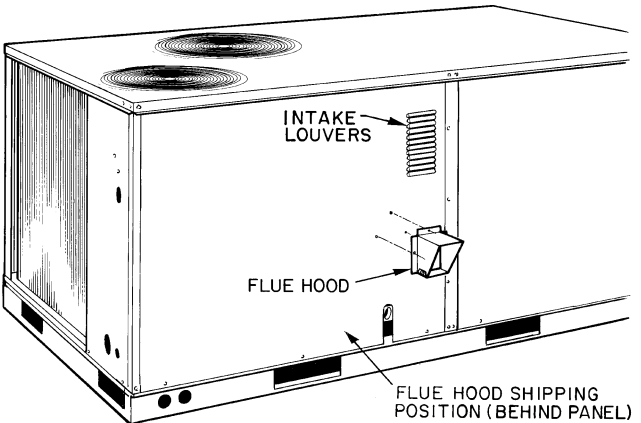


Fig. 8 — Flue Hood Details

The diagram illustrates the gas piping layout. A horizontal pipe runs from the 'FROM GAS METER' on the left, through a 'BASE RAIL' and a 'ROOF CURB', to a 'GAS REGULATOR*' on the right. A 'MANUAL GAS SHUTOFF VALVE*' is located between the curb and the regulator. A 'FIELD-FABRICATED SUPPORT*' is shown supporting the pipe. Dimensions include an '8' SPACING' between supports, a '9" MINIMUM CLEARANCE FOR PANEL REMOVAL' above the shutoff valve, and a '48" MINIMUM' distance from the curb to the regulator. A 'DRIP LEG PER NFGC*' is shown below the main line. The 'BASE UNIT' is shown on the left.

LEGEND

NFGC — National Fuel Gas Code

*Field supplied.

NOTE: Follow all local codes.

SPACING OF SUPPORTS

STEEL PIPE NOMINAL DIAMETER (in.)	8' DIMENSION (feet)
1/2	6
1/4 or 1	8
1 1/4 or larger	10

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. Pig-tails 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.

NOTE: If field-installed thru-the-bottom connections are used, refer to the accessory installation instructions for power wiring and gas connections. Refer to Fig. 7 for drilling holes in basepan.

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 Gage) 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 thermostat 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 48TJ	NOMINAL VOLTAGE	IFM TYPE	VOLTAGE RANGE		COMPR (ea)		OFM (ea)		IFM FLA	COMBUSTION FAN MOTOR FLA	POWER SUPPLY		DISCONNECT SIZE*	
			Min	Max	RLA	LRA	Hp	FLA			MCA	MOCPT†	FLA	LRA
008 (7½ Tons)	208/230-3-60	Std	187	254	14.0	91.0	1/4	1.4	5.8	.6	40.1/40.1	45/45	42/42	229/229
		Alt							5.8		40.1/40.1	45/45	42/42	229/229
		High							10.6		44.9/44.9	50/50	48/48	273/273
	460-3-60	Std	414	508	6.4	42.0	1/4	0.7	2.6	.3	18.4	20	19	108
		Alt							2.6		18.4	20	19	108
		High							4.8		20.6	25	22	130
	575-3-60	Std	518	632	5.2	39.0	1/4	0.7	2.6	.3	14.9	20	16	97
		Alt							2.6		14.9	20	16	97
		High							4.8		16.7	20	18	114
009 (8½ Tons)	208/230-3-60	Std	187	254	16.0	137.0	1/4	1.4	5.8	.6	44.6/44.6	50/50	41/41	321/321
		Alt							5.8		44.6/44.6	50/50	41/41	321/321
		High							10.6		49.4/49.4	60/60	52/52	365/365
	460-3-60	Std	414	508	8.3	69.0	1/4	0.7	2.6	.3	22.7	25	24	162
		Alt							2.6		22.7	25	24	162
		High							4.8		24.9	30	26	184
	575-3-60	Std	518	632	6.4	58.0	1/4	0.7	2.6	.3	17.6	20	18	135
		Alt							2.6		17.6	20	18	135
		High							4.8		19.4	25	20	152
012 (10 Tons)	208/230-3-60	Std	187	254	15.8	130.0	1/4	1.4	5.8	.6	44.2/44.2	50/50	46/46	307/307
		Alt							7.5		45.9/45.9	50/50	48/48	326/326
		High							15.0		53.4/53.4	60/60	57/57	374/374
	460-3-60	Std	414	508	7.9	64.0	1/4	0.7	2.6	.3	21.8	25	23	152
		Alt							3.4		22.6	25	24	191
		High							7.4		26.6	30	28	185
	575-3-60	Std	518	632	6.6	52.0	1/4	0.7	2.6	.3	18.9	25	20	126
		Alt							3.4		19.7	25	21	166
		High							7.4		23.7	30	25	160
	208/230-3-60	Std	187	254	23.0	146.0	1/4	1.4	10.6	.6	65.2/65.2	80/80	68/68	383/383
		Alt							15.0		69.6/69.6	80/80	73/73	406/406
		High							4.8		29.6	35	31	192
014 (12½ Tons)	460-3-60	Std	414	508	10.4	73.0	1/4	0.7	7.4	.3	32.2	35	34	203
		Alt							4.8		23.6	30	25	154
		High							7.4		25.7	30	27	163

LEGEND

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 per NEC.
†Fuse or HACR circuit breaker.



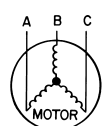
NOTES:

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. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

% 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 48TJ008-014 units are UL, Canada 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 of voltage imbalance.

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

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

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

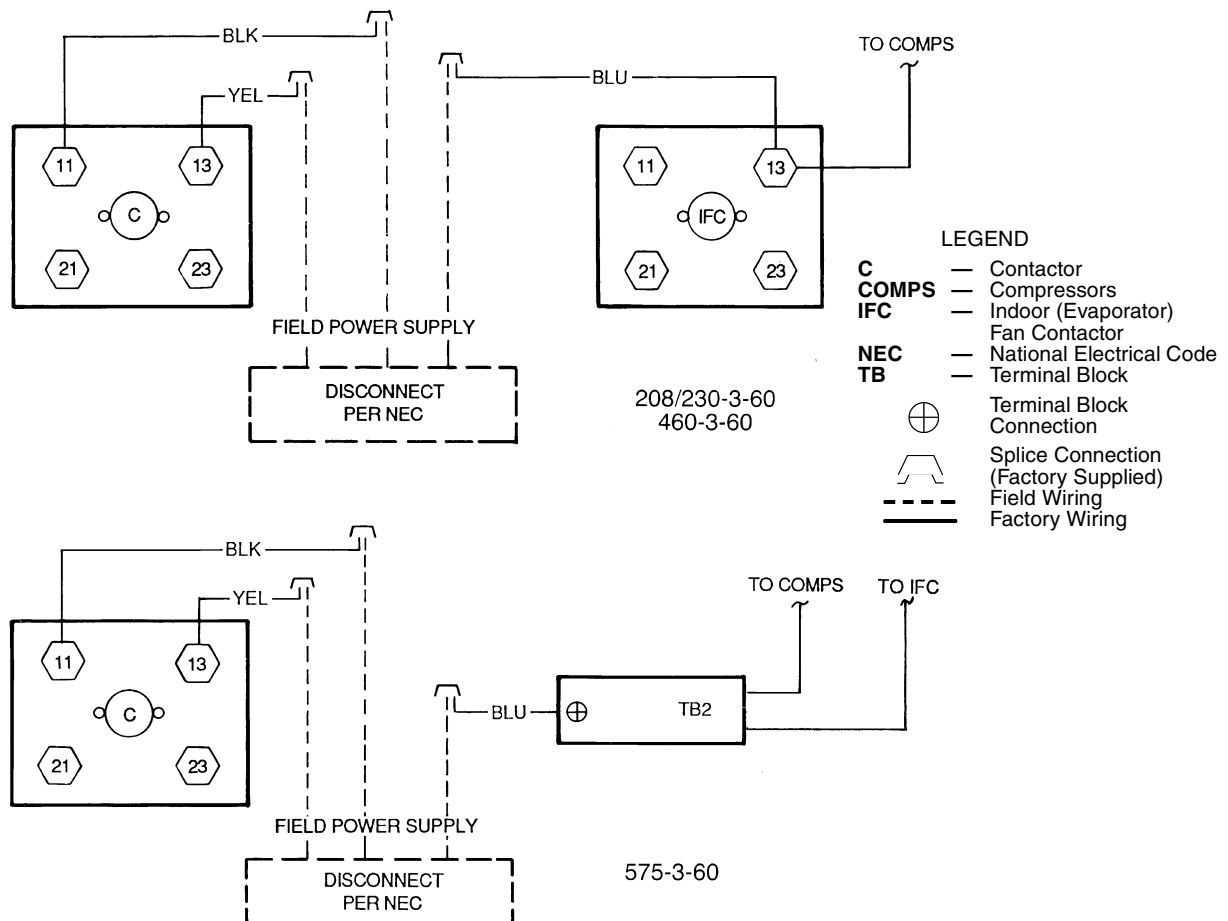


Fig. 10 — Power Wiring Connections

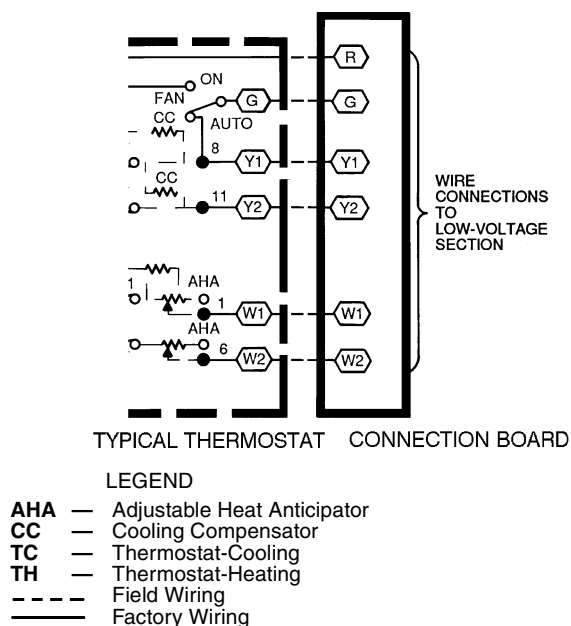


Fig. 11 — Low-Voltage Connections

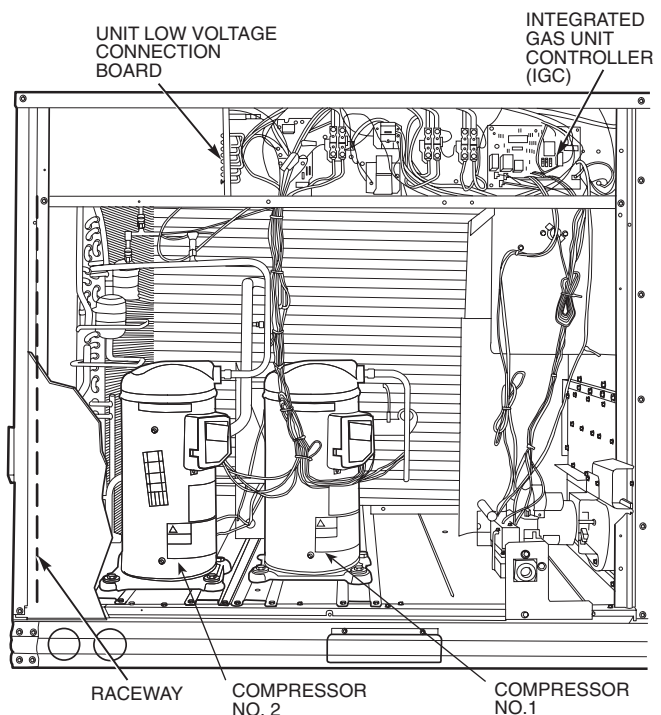


Fig. 12 — Field Control Wiring Raceway and Compressor Location

Step 8 — Adjust Factory-Installed Options

APOLLO CONTROL — The optional Apollo control is used to actively monitor all modes of operation as well as indoor (evaporator) fan status, filter status, and indoor-air quality. The Apollo control is designed to work with Carrier TEMP and VVT® systems.

The thermostat must be wired to the Apollo control before starting the unit. Refer to the Apollo control installation instructions for information on installing the thermostat. See Fig. 13 for Apollo location.

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 filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove the filter access panel. Remove outdoor-air opening panel. Save panels and screws. See Fig. 14.
3. Separate hood and screen from basepan by removing the screws and brackets securing them. Save all screws and discard brackets.
4. Replace outdoor air opening panel with screws saved from Step 2.
5. Place hood on front of outdoor-air opening panel. See Fig. 15 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 16.
6. Remove and save 6 screws (3 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. 15 and 16. Secure hood with 6 screws from Step 6.

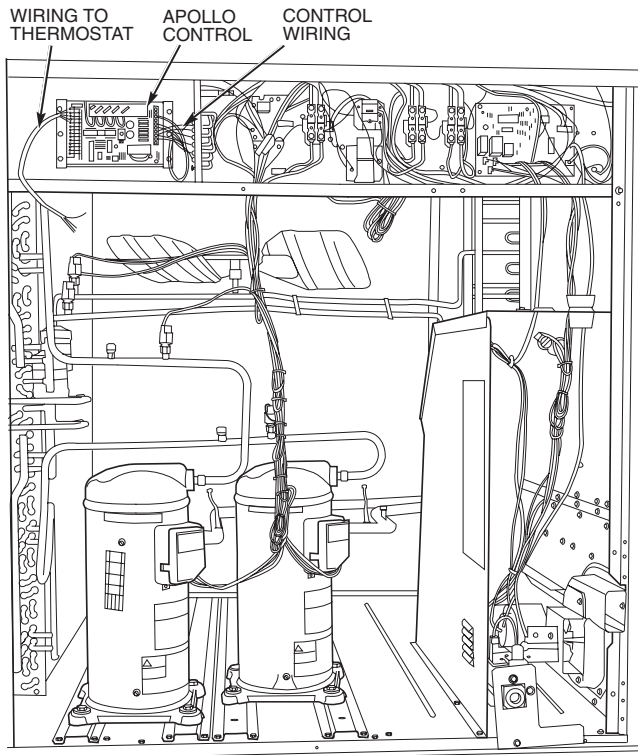


Fig. 13 — Apollo Control Factory-Installed in Typical Unit

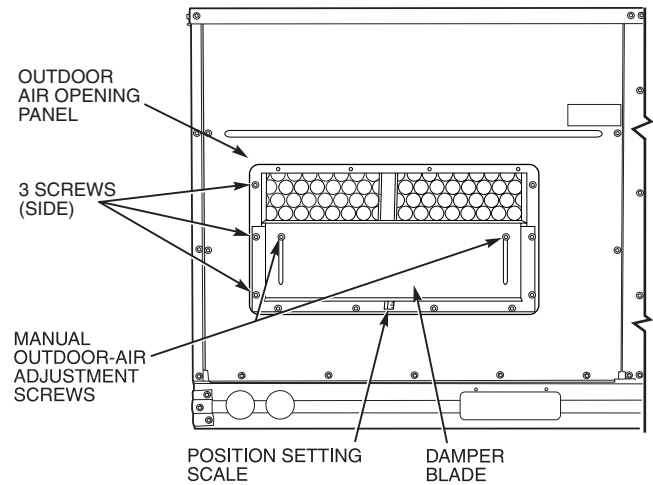


Fig. 14 — Damper Panel with Manual Outdoor-Air Damper Installed

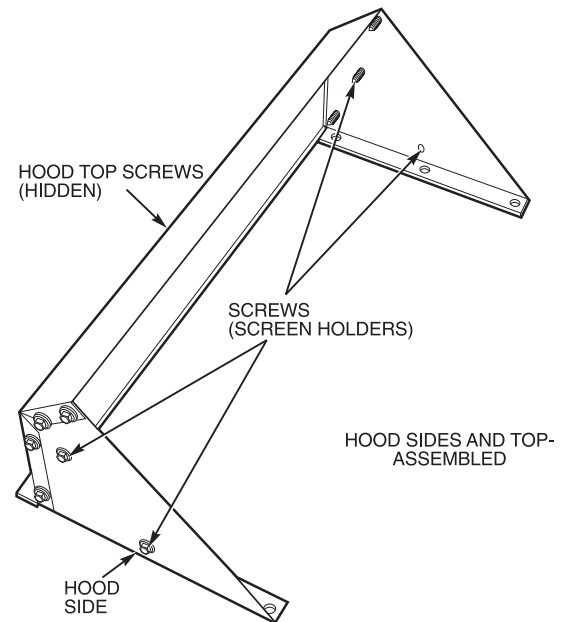


Fig. 15 — Outdoor-Air Hood Details

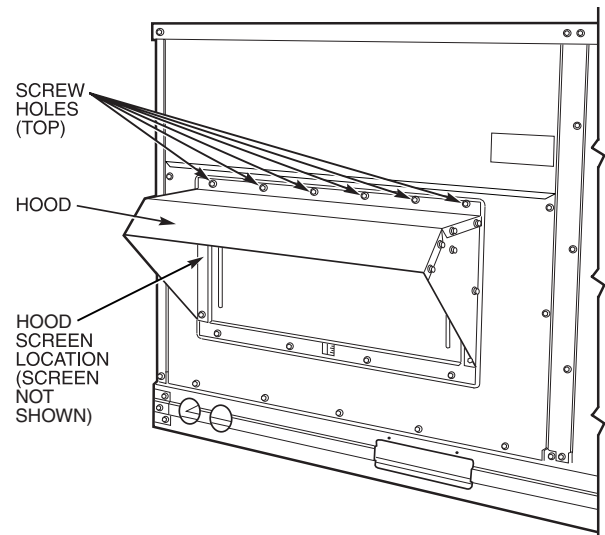


Fig. 16 — Damper with Hood Attached

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. 14. Slide blade vertically until it is in the appropriate position determined by Fig. 17. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screens. Secure screens to hood using the screws. See Fig. 16.
10. Replace filter access panel. Ensure filter access panel slides along the tracks and is securely engaged.

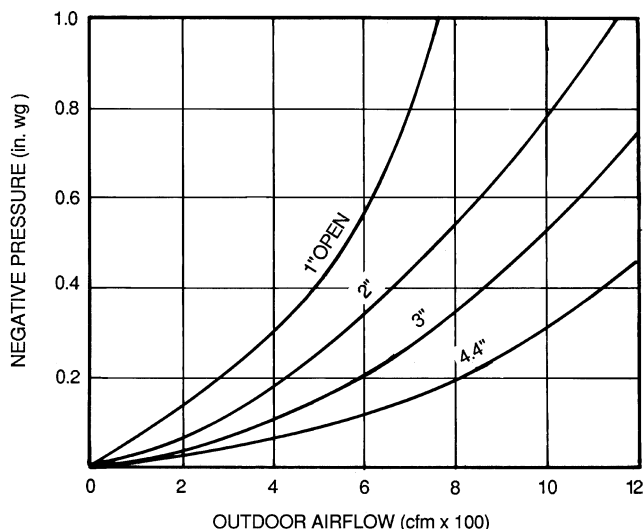


Fig. 17 — Position Setting

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

NOTE: Horizontal discharge block-off plate is shipped with the air hood package. If unit is to be used for vertical discharge application, discard this plate.

Assembly

1. Determine if ventilation air is required in building. If so, determine the minimum amount to be supplied by each unit and record quantity of ventilation air needed for use in Step 8.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove filter access panel. Remove outdoor-air opening panel. Save panels and screws. See Fig. 18. Remove optional economizer and outdoor-air damper hood package from filter section.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 19. Install seal strips on hood top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
4. On 012 and 014 units, install vertical discharge block-off plate on right side over return air duct opening. See Fig. 20.
5.
 - a. Slide economizer into unit and secure with screws. See Fig. 21.

NOTE: Be sure to engage rear economizer flange under tabs at rear of vertical return-air opening.

- b. Remove screw and discard from barometric relief damper. See Fig. 25.

6. To convert to horizontal discharge application:
 - a. Rotate the economizer 90 degrees until the economizer motor faces the condenser section (see Fig. 22).
 - b. Rotate the barometric relief damper hinge 90 degrees. Barometric relief damper should open vertically to operate properly.
 - c. Install horizontal discharge block-off plate over the opening on the access panel. (Block-off plate **MUST** be installed before installing hood assembly.) See Fig. 23.
7. Insert economizer plug into economizer harness. Remove tape from barometric relief damper. See Fig. 21.
8. If ventilation air is not required, proceed to Step 9. If ventilation air is required, determine the minimum position setting for required airflow. See Fig. 24. Adjust minimum position setting by loosening the screws on the position setting bracket. See Fig. 25. Slide bracket until the top screw is in the position determined by Fig. 24. Tighten screws.
9. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 26. Make sure OAT terminals are positioned up.
10. Replace outdoor-air opening panel using screws from Step 2. Replace filter access panel. Ensure the filter access panel slides along the tracks and is securely engaged.
11. Fasten hood top and side plate assembly to outdoor-air opening panel with screws provided.
12. Place knob supplied with economizer on OAT. See Fig. 26. Set OAT for 3° F below indoor room thermostat setting. If accessory enthalpy control (EC) is used in place of OAT, see instructions shipped with EC for installation and adjustment. See Fig. 26.
13. Connect OAT per Fig. 27.
14. Slide outdoor-air inlet screens into screen track on hood side plate. While holding screens in place, fasten screen retainer to hood using screws provided.

NOTE: Refer to Fig. 28 for Durablade economizer barometric relief damper characteristics.

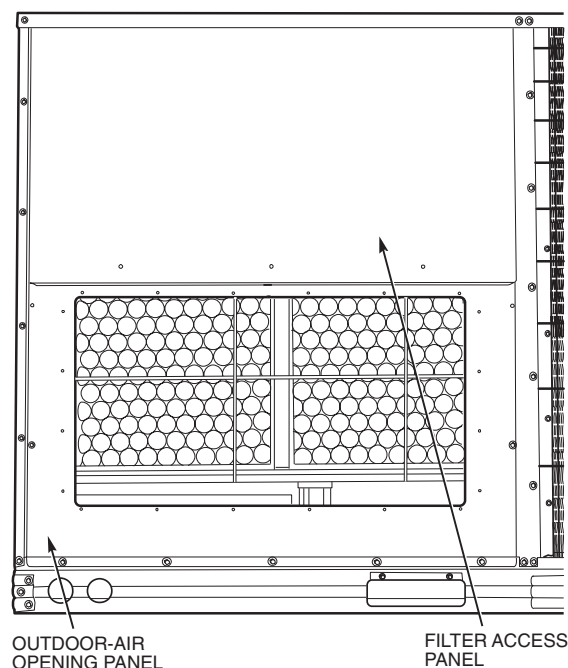
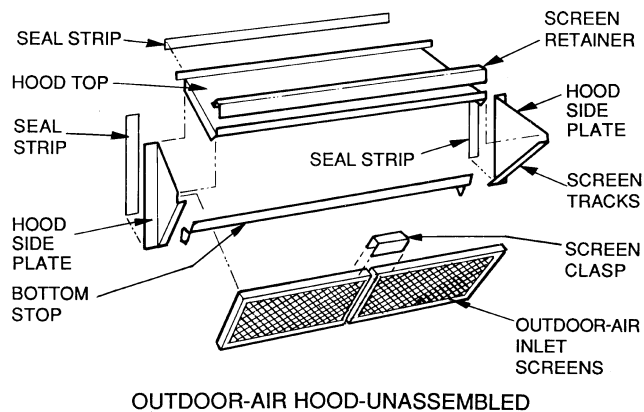
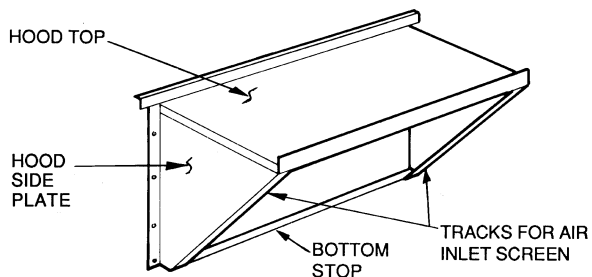


Fig. 18 — Access Panel Locations



OUTDOOR-AIR HOOD-UNASSEMBLED



HOOD SIDES AND TOP-ASSEMBLED

HOOD SIDES AND TOP-ASSEMBLED

Fig. 19 — Outdoor-Air Hood Details

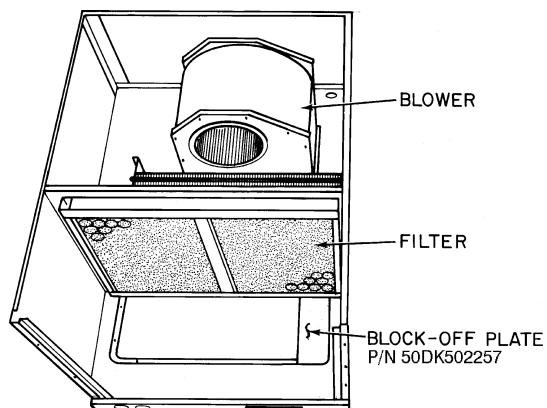


**Fig. 20 — Vertical Discharge Block-Off Plate
(Sizes 120,150 only)**

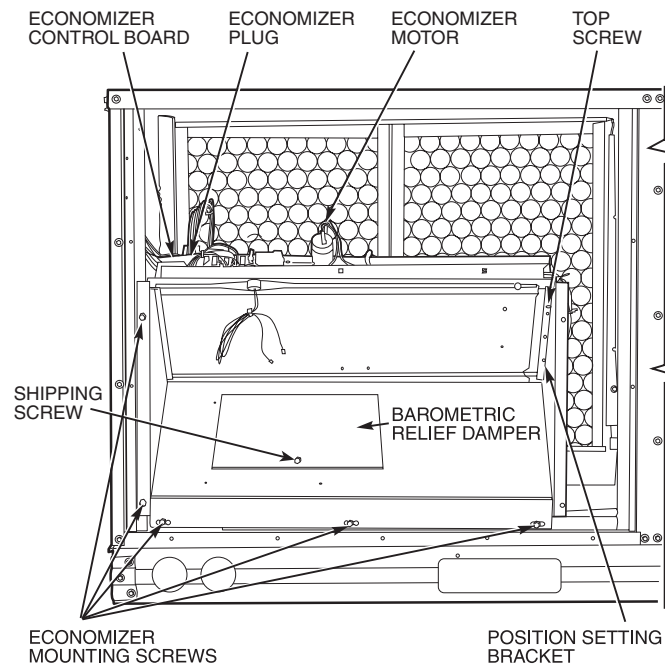


Fig. 21 — Durable Economizer Installed in Unit

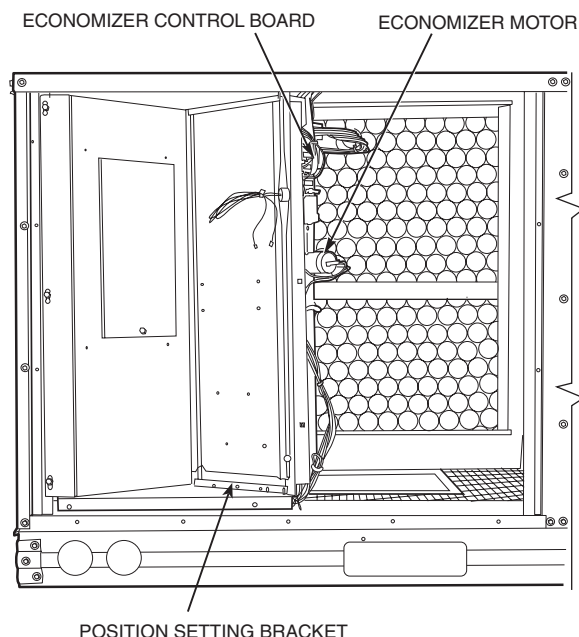


**Fig. 22 — Horizontal Durablade Economizer
Installation (90 Degree Rotation)**

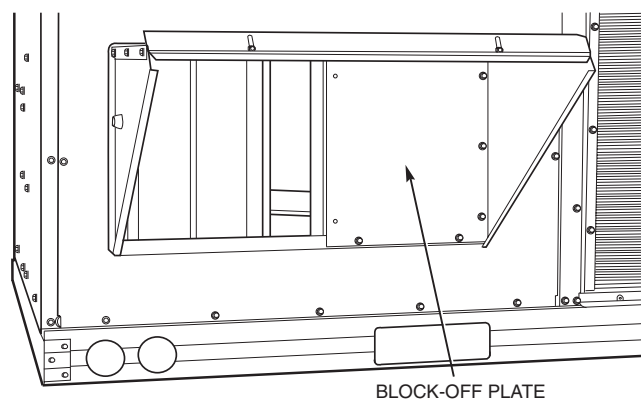
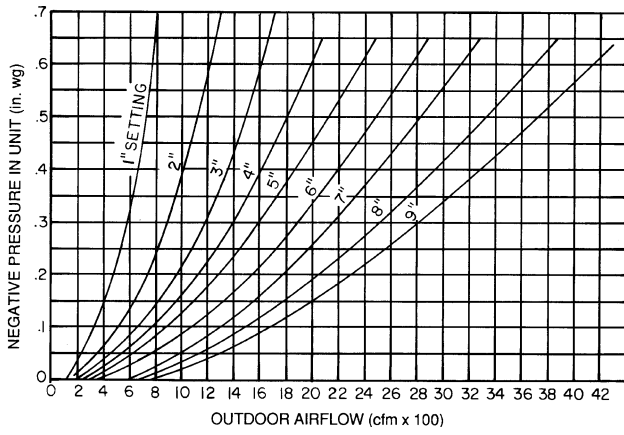


Fig. 23 — Horizontal Discharge Block-Off Plate



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

Fig. 24 — Durablade Economizer Damper Minimum Position Setting

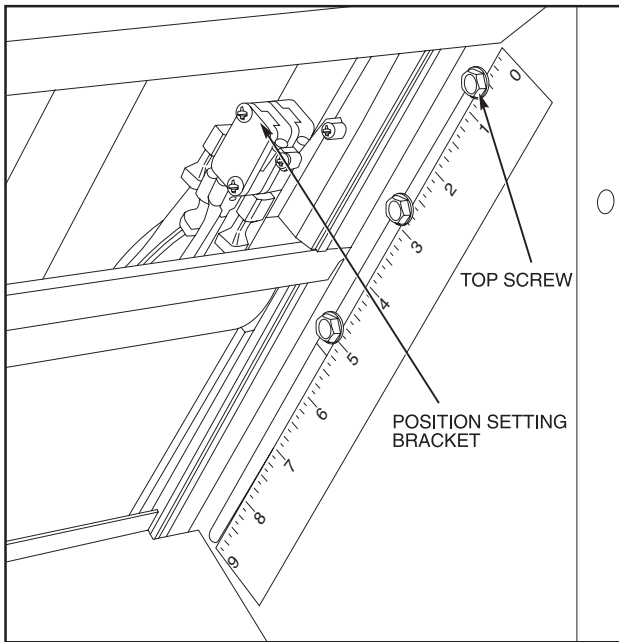


Fig. 25 — Durablade Economizer Minimum Position Damper Setting

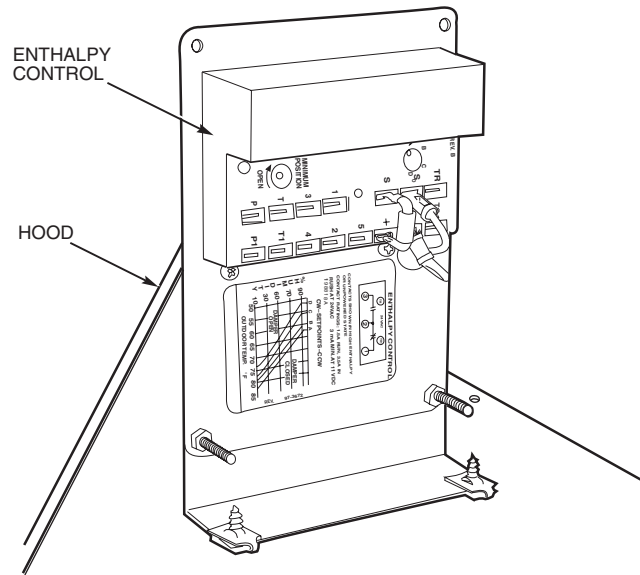
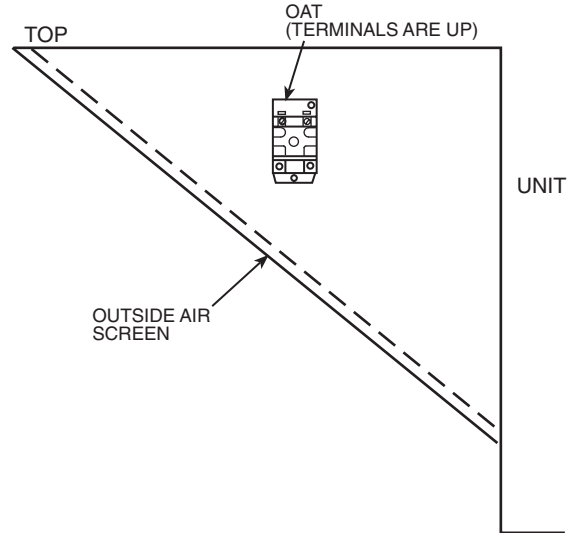
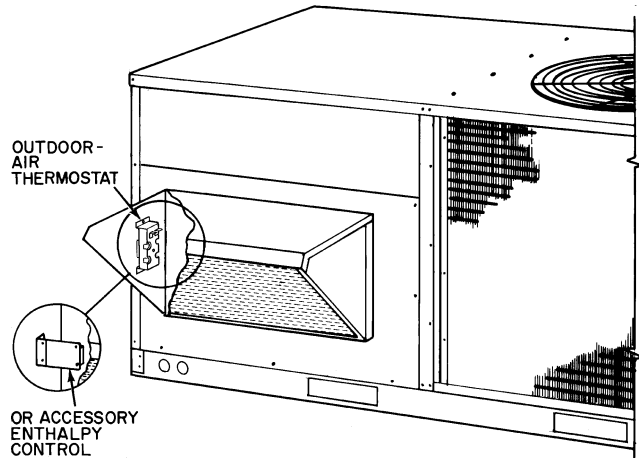


Fig. 26 — Outdoor-Air Thermostat/ Enthalpy Control Installation

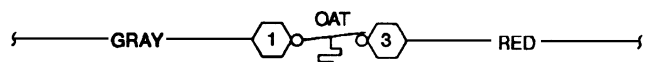


Fig. 27 — Wiring Connections for Outdoor-Air Thermostat

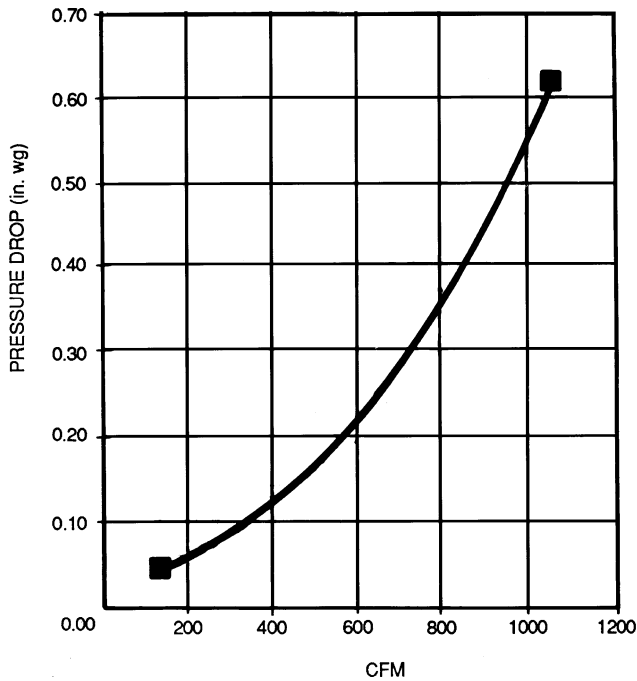


Fig. 28 — Durablade Economizer Barometric Relief Damper Characteristics

OPTIONAL ECONOMIZER — See Fig. 29 for EconoMi\$er component locations.

1. To remove the existing unit filter access panel, raise the panel and swing the bottom outward. The panel is now disengaged from the track and can be removed. Remove the indoor coil access panel and discard. See Fig. 30.

NOTE: If installing an optional Power Exhaust Assembly, refer to the EconoMi\$er Power Exhaust Installation Instructions, then proceed to Step 6 below. Controller should be mounted in vertical position as shown in Fig. 29.

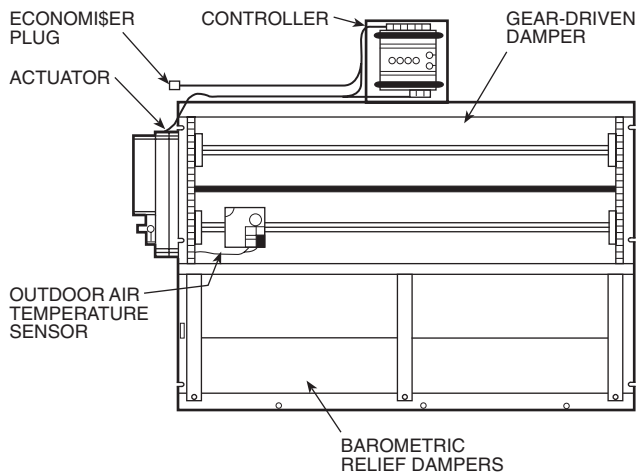


Fig. 29 — 7½ to 12½ Ton EconoMi\$er Component Locations

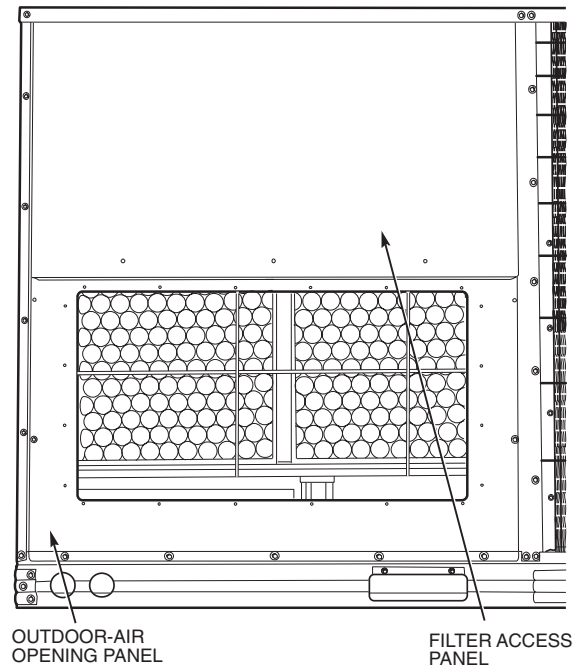


Fig. 30 — Typical Access Panel Locations

2. To assemble the hood assembly remove the EconoMi\$er hood from its packaging. Locate the outdoor air opening panel. See Fig. 31.
3. Install the ¾ x ¾ in. seal strip on the exhaust air hood top panel. Install the ⅛ x ⅞ in. seal strip on the exhaust air hood side panels and bottom brackets. Assemble the exhaust air hood to the outdoor air opening panel as shown in Fig. 31, using the screws provided. *Do not attach hood assembly to unit at this time.*
4. Install the ⅛ x ⅞ in. seal strip on the outdoor air hood top and side panels. Assemble the outdoor air hood to the outdoor air opening panel as shown in Fig. 32, using the screws provided. *Do not attach completed hood (Fig. 33) assembly to the unit at this time.*

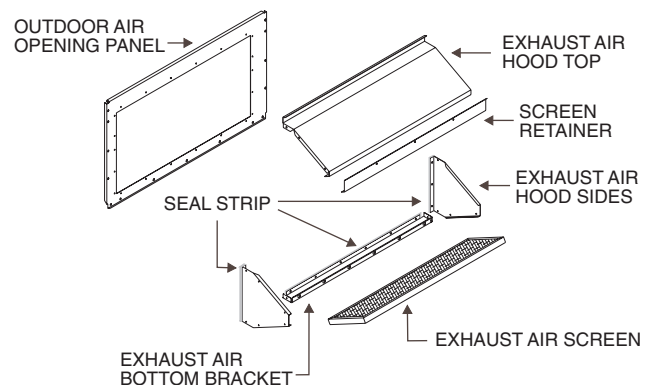


Fig. 31 — Exhaust Air Hood Assembly

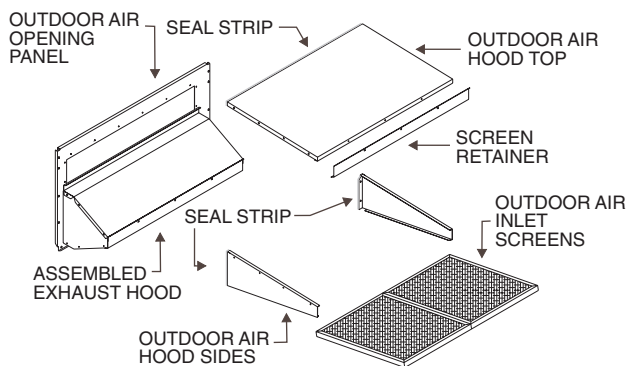


Fig. 32 — Outdoor Air Hood Assembly

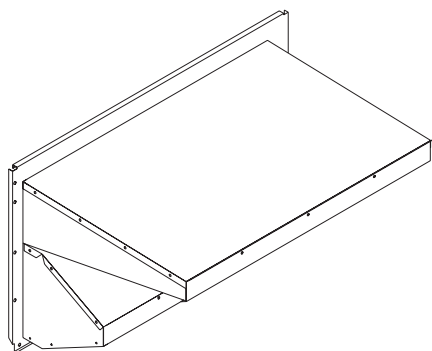


Fig. 33 — Completed Hood Assembly

5. Slide the outdoor air inlet screens into the screen track on the hood side panels. While holding the screens in place, fasten the screen retainer to the hood using the screws provided. Repeat the process for the barometric exhaust air screen. *Do not attach hood assembly to unit at this time.*
6. For 10 and 12½ ton units, install the return air block-off plate over the return air duct opening. See Fig. 34.

NOTE: For 7½ and 8½ ton units, remove the factory-installed block-off plate. See Fig. 34.

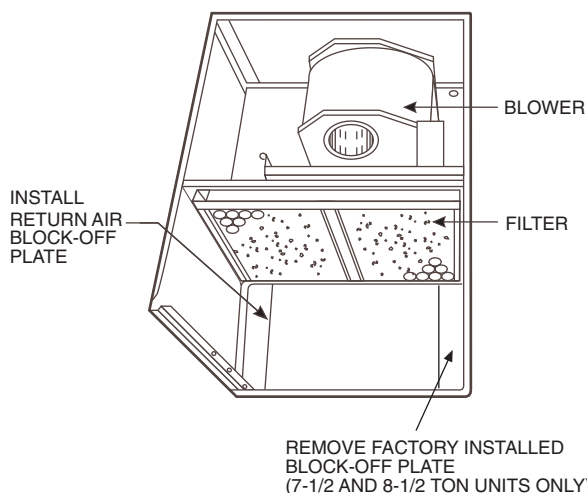


Fig. 34 — Return Air Block-Off Plate Installation (10 and 12½ Ton Units Only)

7. Slide the EconoMiSer assembly into the rooftop unit. See Fig. 35 and 36.

NOTE: Be sure to engage rear EconoMiSer flange under tabs in return air opening of the unit base. See Fig. 35.

8. Install the outdoor air block-off plate, then secure the EconoMiSer with the screws provided. See Fig. 36.
9. Remove and discard the jumper plug from the unit wiring harness located in the upper left corner and insert the EconoMiSer plug into the unit wiring harness. Refer to wiring diagram Fig. 37 and 38.
10. Install the complete hood assembly on the unit and secure using the screws provided.
11. Remove the indoor fan motor access panel.
12. Mount the supply air temperature sensor to the lower left portion of the indoor blower housing with the two (2) screws provided (see Fig. 39). Connect the violet and pink wires to the corresponding connections on the supply air temperature sensor. Replace the indoor fan motor access panel.

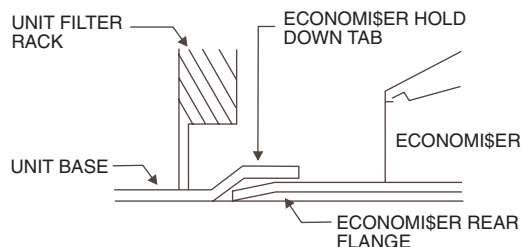


Fig. 35 — Rear EconoMiSer Flange Installation

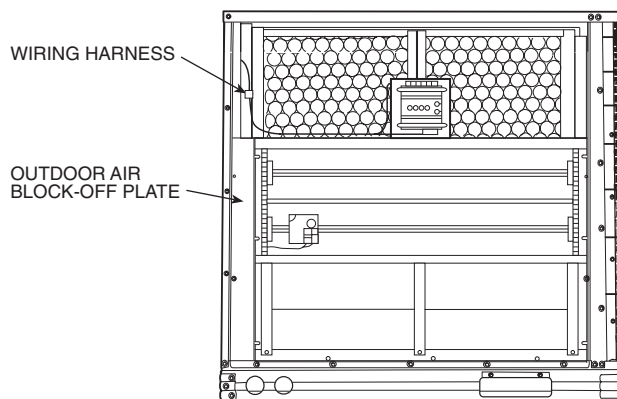
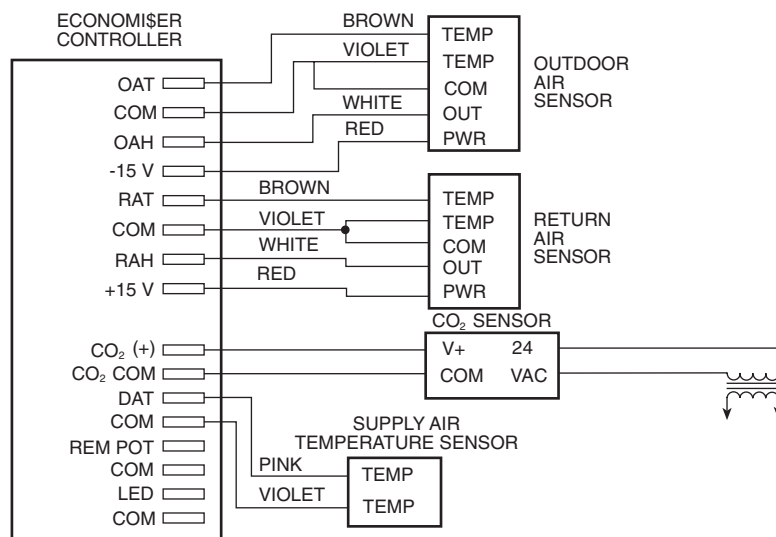
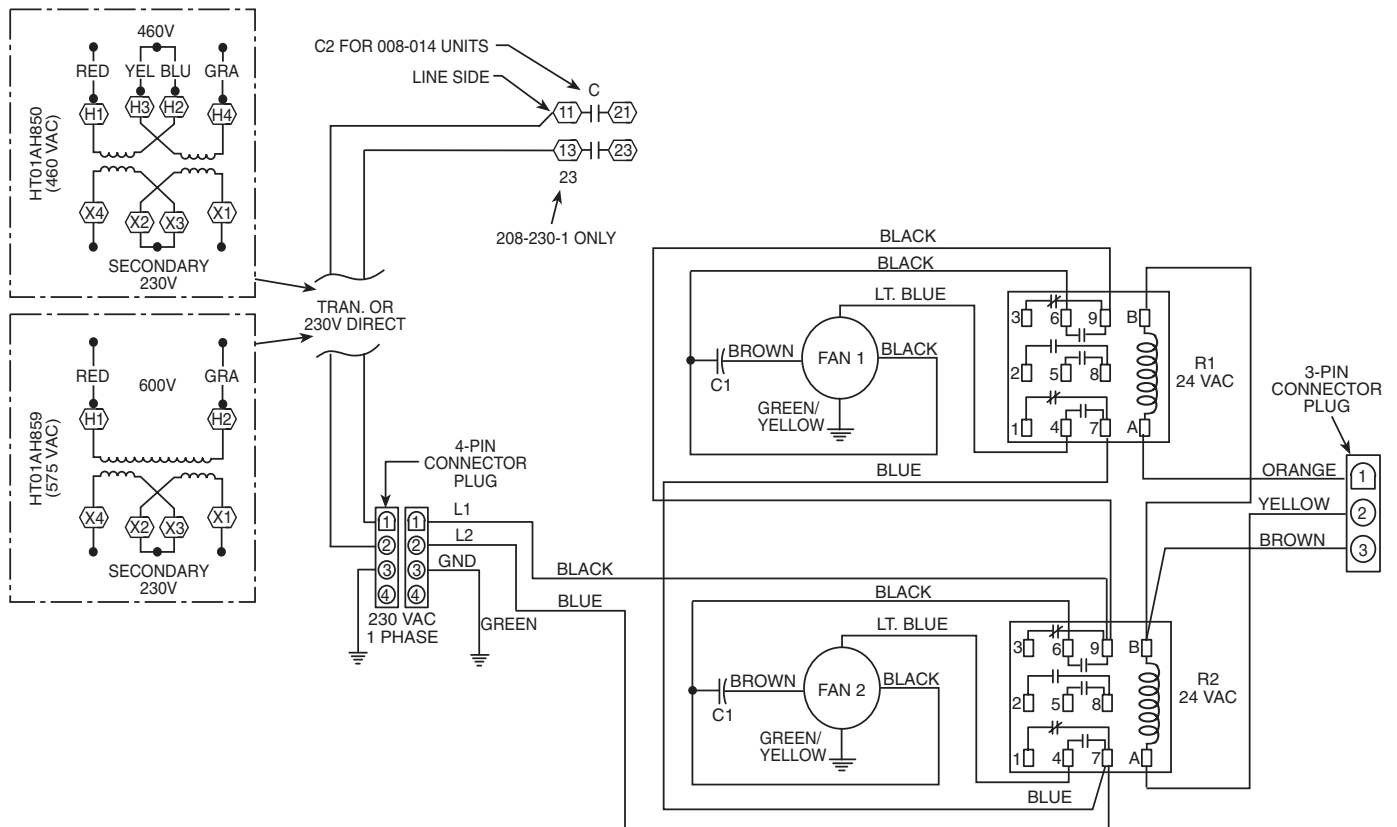


Fig. 36 — EconoMiSer Installed in 7½ to 12½ Ton Unit



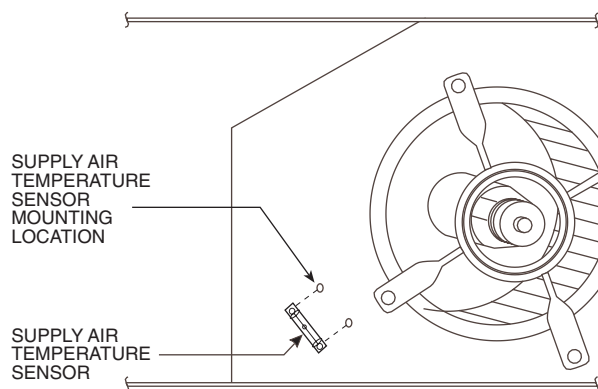


Fig. 39 — Supply Air Sensor Placement

CO₂ Control Set Up — If a CO₂ sensor is not being used, proceed to the next section. If a CO₂ sensor is being used, perform the following:

1. Determine the value at which you want the minimum position of the dampers to begin opening to allow a greater amount of outdoor air to enter. The range is 800 to 1,400 ppm.
2. Locate the CO₂ SP (PPM) potentiometer and adjust to the desired set point. See Fig. 40.

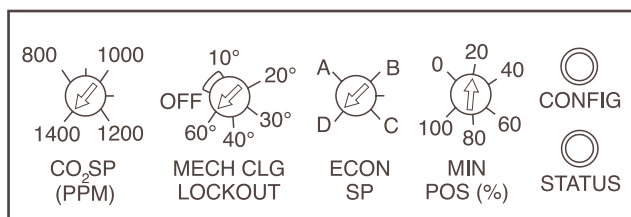


Fig. 40 — EconoMi\$er Control Adjustment Potentiometers (Factory Settings)

Mechanical Cooling Lockout — Determine the outdoor-air temperature at which you want the mechanical cooling (compressors) to be disabled. Locate the mechanical cooling lockout (MECH CLG LOCKOUT) potentiometer. To disable this feature, turn the potentiometer counterclockwise (CCW) to the OFF position. Otherwise, set the value between 10 and 60 F. Mechanical cooling will not operate when the outdoor air temperature is below this value. See Fig. 40.

Dry Bulb Changeover Set Up — Determine the dry bulb changeover set point from Table 3. The settings are A, B, C and D. Locate the ECON SP potentiometer and set the dry bulb changeover set point. See Fig. 40. When the OAT is above this set point, the damper is limited to minimum position setting.

Table 3 — Changeover Set Points

SETTINGS	A	B	C	D
Dry Bulb (°F)	73	69	66	63
Single Enthalpy* (Btu/lb)	27	25	24	22
Differential Temperature* (°F, Not Adjustable)	2	2	2	2
Differential Enthalpy* (Btu/lb, Not Adjustable)	1	1	1	1

*Field-installed accessory.

If a potentiometer fails, its setting will default to the values in Table 4.

Table 4 — Default Potentiometer Settings

POTENTIOMETER	DEFAULT SETTING
CO ₂ SP (PPM)	1,000
MECH CLG LOCKOUT	47°
ECON SP	D
MIN POS (%)	20

Ventilation Air (Minimum Position Set up) — If ventilation air is not required, proceed to Step 5. If ventilation air is required, perform the following:

1. The indoor fan must be on to set the ventilation air. Either put the thermostat in the continuous fan mode or jumper the R and G terminals at the rooftop unit connection board.
2. Locate the minimum position (MIN POS) potentiometer. Turn the potentiometer full CCW to fully close the outdoor air dampers. Turn the potentiometer gradually clockwise (CW) to the desired position. See Fig. 40.
3. Replace the filter access panel. See Fig. 30. Ensure the filter access panel slides along the tracks and is securely engaged.
4. Calculate the minimum airflow across the EconoMi\$er.
 - a. Calculate % of outside air using the following formula.

$$\% \text{ Outdoor air through EconoMi$er} = \frac{\text{Mixture Temp} - \text{Return Air Temp}}{\text{Outdoor Temp} - \text{Return Air Temp}}$$
 - b. Divide total CFM by percentage outdoor air, this gives outdoor air volume in CFM.
5. Turn on base unit power.

NOTE: The EconoMi\$er begins operation three minutes after power up.

⚠ WARNING

Personal Injury Hazard. Avoid possible injury by keeping fingers away from damper blades.

6. See Fig. 41 for barometric relief damper characteristics.

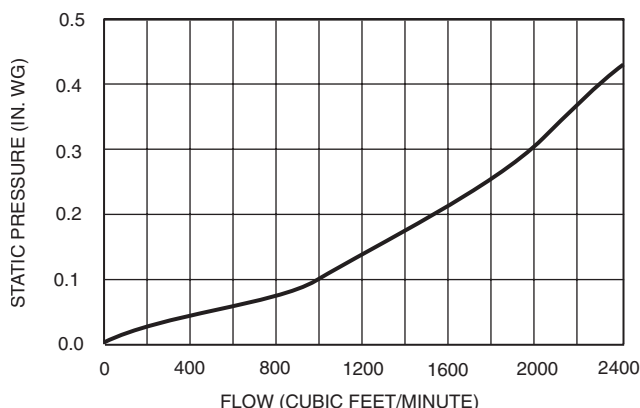


Fig. 41 — 7¹/₂ to 12¹/₂ Ton Barometric Relief Capacity

Step 9 — Adjust Evaporator-Fan Speed —

Adjust evaporator-fan speed to meet jobsite requirement.

Table 5 shows fan rpm at motor pulley settings, Table 6 shows motor efficiencies and Table 7 gives accessory static pressure drops. Table 8 shows motor performance. Refer to Tables 9-20 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 and install lockout tag.
2. Loosen belt by loosening fan motor mounting plate nuts (see Fig. 42 and 43).
3. Loosen movable pulley flange setscrew (see Fig. 44).
4. Screw movable flange toward fixed flange to increase fan speed and away from fixed flange to decrease fan speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.
5. Set movable flange at nearest flat 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. 42 and 43):

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 8 to 10 lbs of force) and tighten mounting nuts (see Fig. 42). *Units 012,014* — Slide motor mounting plate downward to tighten belt tension. Secure motor mounting plate nuts. See Fig. 43.
3. Adjust bolt and nut on mounting plate to secure motor in fixed position.

Realign 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.

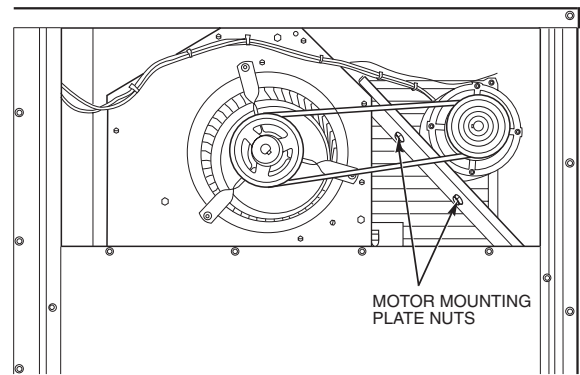


Fig. 42 — Typical Belt-Drive Motor Mounting for Sizes 008,009

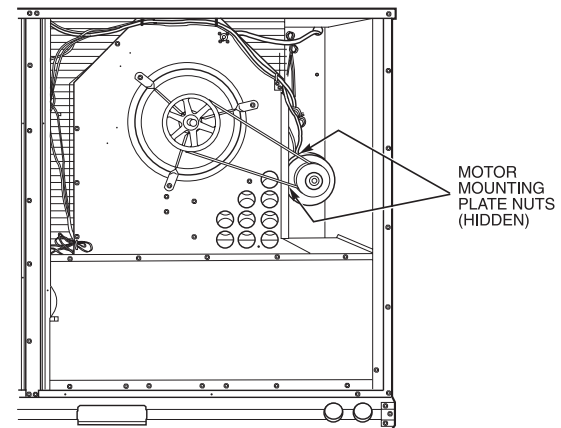


Fig. 43 — Typical Belt-Drive Motor Mounting for Sizes 012,014

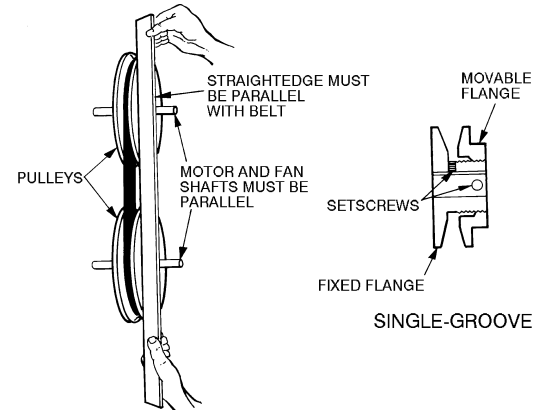


Fig. 44 — Evaporator-Fan Pulley Adjustment

Table 5 — Fan Rpm at Motor Pulley Settings*

UNIT 48TJ	MOTOR PULLEY TURNS OPEN												
	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6
008††	840	815	790	765	740	715	690	665	635	615	590	—	—
008 II	935	910	885	860	835	810	785	760	735	710	685	—	—
008**	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
009††	935	910	885	860	835	810	785	760	735	710	685	—	—
009**	1080	1025	1007	988	970	952	933	915	897	878	860	—	—
012††	935	910	885	860	835	810	785	760	735	710	685	—	—
012†	1085	1060	1035	1010	985	960	935	910	885	860	835	—	—
012**	1130	1112	1087	1062	1037	1012	987	962	937	912	887	862	830
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 fan rpm shown.

†Indicates alternate motor and drive package.

**Indicates high-static motor and drive package.

††Indicates standard motor and drive package.

II Indicates alternate drive package only.

Table 6 — Evaporator-Fan Motor Efficiency

UNIT 48TJ	MOTOR EFFICIENCY (%)
008-012	80
014	87

NOTE: All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.

Table 7 — Economizer Static Pressure Drop (in. wg).

COMPONENT	CFM									
	2200	2500	3000	3500	4000	4500	5000	5500	6000	6250
Durablade Economizer	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09
EconoMi\$er	—	—	0.125	0.18	0.27	0.34	0.40	—	—	—

LEGEND

FIOP — Factory-Installed Option

*The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.

Table 8 — Motor Data

UNIT 48TJ	EVAPORATOR-FAN MOTOR	UNIT VOLTAGE	MAXIMUM ACCEPTABLE CONTINUOUS BHP*	MAXIMUM ACCEPTABLE OPERATING WATTS	MAXIMUM AMP DRAW
008	Standard, Alternate	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	High Static	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
009	Standard	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	High Static	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
012	Standard	208/230	2.40	2120	6.7
		460			3.0
		575			3.0
	Alternate	208/230	2.90	2615	8.6
		460			3.9
		575			3.9
	High Static	208/230	5.25	4400	17.3
		460			8.5
		575			8.5
014	Standard	208/230	3.70	3313	12.2
		460			5.5
		575			5.5
	Alternate	208/230	5.25	4400	17.3
		460			8.5
		575			8.5

LEGEND

BHP — Brake Horsepower

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

NOTES:

1. All indoor-fan motors 5 hp and larger meet the minimum efficiency requirements as established by the Energy Policy Act of 1992 (EPACT) effective October 24, 1997.
2. High-static motor not available on single-phase units.

Table 9 — Fan Performance, 48TJ008 Standard Motor and Drive and Alternate Drive — Vertical Discharge Units

48TJ008 (7½ TONS) — STANDARD MOTOR AND DRIVE AND ALTERNATE DRIVE (BELT DRIVE)*															
Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	514	0.55	562	593	0.76	723	662	0.99	907	724	1.22	1097	781	1.78	1318
2300	521	0.57	577	600	0.79	747	668	1.02	932	730	1.26	1131	786	1.50	1335
2400	536	0.63	623	613	0.85	795	680	1.09	989	741	1.34	1199	796	1.59	1413
2500	551	0.69	669	626	0.93	859	693	1.17	1056	753	1.43	1275	808	1.69	1499
2550	559	0.72	692	634	0.97	891	700	1.21	1089	759	1.48	1318	814	1.74	1543
2600	567	0.75	716	641	1.00	916	706	1.25	1123	764	1.52	1353	819	1.79	1587
2700	582	0.83	779	655	1.08	981	719	1.34	1199	776	1.61	1430	831	1.89	1674
2800	598	0.90	835	670	1.17	1056	732	1.43	1275	789	1.71	1517	842	2.00	1770
2900	614	0.98	899	684	1.25	1123	745	1.53	1361	802	1.81	1604	854	2.11	1866
3000	630	1.07	973	699	1.35	1207	759	1.63	1447	815	1.92	1700	866	2.23	1971
3100	646	1.16	1047	714	1.45	1292	773	1.74	1543	828	2.04	1805	878	2.35	2076
3200	662	1.26	1131	729	1.55	1378	787	1.86	1648	841	2.16	1910	891	2.48	2188
3300	679	1.36	1216	744	1.66	1473	801	1.98	1753	854	2.29	2023	904	2.61	2300
3400	695	1.47	1310	759	1.78	1578	816	2.10	1858	867	2.42	2136	917	2.75	2420
3500	712	1.59	1413	774	1.90	1683	830	2.23	1971	881	2.56	2257	930	2.90	2546
3600	729	1.71	1517	790	2.03	1796	845	2.37	2093	895	2.71	2386	943	3.05	2670
3700	745	1.84	1630	805	2.17	1919	860	2.52	2223	909	2.87	2521	956	3.22	2807
3750	754	1.91	1691	813	2.24	1980	868	2.59	2283	917	2.95	2587	963	3.30	2870

48TJ008 (7½ TONS) — STANDARD MOTOR AND DRIVE AND ALTERNATE DRIVE (BELT DRIVE)* (cont)									
Airflow (Cfm)	External Static Pressure (in. wg)								
	1.2			1.4			1.6		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	841	1.81	1604	902	2.25	1989	939	2.60	2292
2300	843	1.83	1621	905	2.28	2015	943	2.62	2309
2400	849	1.88	1665	910	2.31	2041	952	2.74	2411
2500	859	1.96	1735	912	2.31	2050	963	2.81	2470
2550	864	2.01	1779	915	2.34	2067	968	2.81	2479
2600	869	2.06	1823	918	2.37	2093	973	2.81	2487
2700	880	2.17	1919	927	2.47	2180	976	2.84	2495
2800	892	2.29	2023	938	2.58	2275	983	2.92	2562
2900	903	2.42	2136	949	2.71	2386	993	3.03	2653
3000	915	2.54	2240	961	2.85	2504	1003	3.17	2767
3100	926	2.67	2352	972	3.00	2629	1015	3.32	2886
3200	938	2.81	2470	983	3.14	2743	1026	3.47	3002
3300	950	2.95	2587	995	3.30	2870	—	—	—
3400	963	3.10	2710	1007	3.45	2987	—	—	—
3500	976	3.25	2831	—	—	—	—	—	—
3600	988	3.41	2956	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Standard drive range is 590 to 840 rpm. Alternate drive range is 685 to 935 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates alternate or field-supplied drive is required.
2. indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 2.40 and the maximum continuous watts are 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 10 — Fan Performance, 48TJ008 High-Static Motor — Vertical Discharge Units

48TJ008 (7½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	514	0.55	562	593	0.76	723	662	0.99	907	724	1.22	1097	781	1.48	1318	841	1.81	1604
2300	521	0.57	577	600	0.79	747	668	1.02	932	730	1.26	1131	786	1.50	1335	843	1.83	1621
2400	536	0.63	623	613	0.85	795	680	1.09	989	741	1.34	1199	796	1.59	1413	849	1.88	1665
2500	551	0.69	689	626	0.93	859	693	1.17	1056	753	1.43	1275	808	1.69	1499	859	1.96	1735
2550	559	0.72	692	634	0.97	891	700	1.21	1089	759	1.48	1318	814	1.74	1543	864	2.01	1779
2600	567	0.75	716	641	1.00	916	706	1.25	1123	764	1.52	1353	819	1.79	1587	869	2.06	1823
2700	582	0.83	779	655	1.08	981	719	1.34	1199	776	1.61	1430	831	1.89	1674	880	2.17	1919
2800	598	0.90	835	670	1.17	1056	732	1.43	1275	789	1.71	1517	842	2.00	1770	892	2.29	2023
2900	614	0.98	899	684	1.25	1123	745	1.53	1361	802	1.81	1604	854	2.11	1866	903	2.42	2136
3000	630	1.07	973	699	1.35	1207	759	1.63	1447	815	1.92	1700	866	2.23	1971	915	2.54	2240
3100	646	1.16	1047	714	1.45	1292	773	1.74	1543	828	2.04	1805	878	2.35	2076	926	2.67	2352
3200	662	1.26	1131	729	1.55	1378	787	1.86	1648	841	2.16	1910	891	2.48	2188	938	2.81	2470
3300	697	1.36	1216	744	1.66	1473	801	1.98	1753	854	2.29	2023	904	2.61	2300	950	2.95	2587
3400	695	1.47	1310	759	1.79	1578	816	2.10	1858	867	2.42	2136	917	2.75	2420	963	3.10	2710
3500	712	1.59	1413	774	1.90	1683	830	2.23	1971	881	2.56	2257	930	2.90	2546	976	3.25	2831
3600	729	1.71	1517	780	2.03	1796	845	2.37	2093	895	2.71	2386	943	3.05	2670	988	3.41	2956
3700	745	1.84	1630	805	2.17	1919	860	2.52	2223	909	2.87	2521	956	3.22	2807	1019	3.90	3431
3750	754	1.91	1691	813	2.24	1980	868	2.59	2283	917	2.95	2587	963	3.30	2870	1026	4.00	3517

48TJ008 (7½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	902	2.25	1989	939	2.60	2292	979	2.94	2589	1015	3.29	2892
2300	905	2.28	2015	943	2.62	2309	983	2.96	2609	1020	3.31	2914
2400	910	2.31	2041	952	2.74	2411	992	3.10	2729	1029	3.46	3048
2500	912	2.31	2050	963	2.81	2470	1004	3.18	2798	1041	3.55	3126
2550	915	2.34	2067	968	2.81	2479	1009	3.18	2798	1047	3.55	3126
2600	918	2.37	2093	973	2.81	2487	1014	3.18	2798	1052	3.55	3126
2700	927	2.47	2180	976	2.84	2495	1017	3.21	2828	1055	3.59	3159
2800	938	2.58	2275	983	2.92	2562	1024	3.30	2908	1063	3.69	3248
2900	949	2.71	2386	993	3.03	2653	1035	3.43	3017	1074	3.83	3370
3000	961	2.85	2504	1003	3.17	2767	1045	3.59	3157	1084	4.01	3526
3100	972	3.00	2629	1015	3.32	2886	1058	3.76	3306	1097	4.20	3693
3200	983	3.14	2743	1026	3.47	3002	1069	3.83	3456	—	—	—
3300	995	3.30	2870	1043	3.80	3341	—	—	—	—	—	—
3400	1007	3.45	2987	1056	3.97	3493	—	—	—	—	—	—
3500	1030	3.82	3362	—	—	—	—	—	—	—	—	—
3600	1043	4.01	3528	—	—	—	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 3.7 and the maximum continuous watts are 3313. 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 11 — Fan Performance, 48TJ009 Standard Motor — Vertical Discharge Units

48TJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	559	0.72	692	634	0.97	891	700	1.21	1089	759	1.48	1318	814	1.74	1543
2600	567	0.75	716	641	1.00	916	706	1.25	1123	764	1.52	1353	819	1.79	1587
2700	582	0.83	779	655	1.08	981	719	1.34	1199	776	1.61	1430	831	1.89	1674
2800	598	0.90	835	670	1.17	1056	732	1.43	1275	789	1.71	1517	842	2.00	1770
2900	614	0.98	899	684	1.25	1123	745	1.53	1361	802	1.81	1604	854	2.11	1866
3000	630	1.07	973	690	1.35	1207	759	1.63	1447	815	1.92	1700	866	2.23	1971
3100	646	1.16	1047	714	1.45	1292	773	1.74	1543	828	2.04	1805	878	2.35	2076
3200	662	1.26	1131	729	1.55	1378	787	1.86	1648	841	2.16	1910	891	2.48	2188
3300	679	1.36	1216	744	1.66	1473	801	1.98	1753	854	2.29	2023	904	2.61	2300
3400	695	1.47	1310	759	1.78	1578	816	2.10	1858	867	2.42	2136	917	2.75	2420
3500	712	1.59	1413	774	1.90	1683	830	2.23	1971	881	2.56	2257	930	2.90	2546
3600	729	1.71	1517	790	2.03	1796	845	2.37	2093	895	2.71	2386	943	3.05	2670
3700	745	1.84	1630	805	2.17	1919	860	2.52	2223	909	2.87	2521	956	3.22	2807
3750	754	1.91	1691	813	2.24	1980	868	2.59	2283	917	2.95	2587	963	3.30	2870
3800	762	1.98	1753	821	2.31	2041	875	2.66	2343	924	3.03	2653	970	3.38	2933
3900	779	2.12	1875	836	2.46	2171	890	2.82	2479	938	3.19	2783	—	—	—
4000	796	2.27	2006	852	2.61	2300	905	2.98	2612	953	3.37	2925	—	—	—
4100	813	2.42	2136	868	2.78	2445	920	3.15	2751	—	—	—	—	—	—
4200	830	2.59	2283	884	2.95	2587	935	3.33	2894	—	—	—	—	—	—
4250	839	2.68	2360	890	3.04	2661	—	—	—	—	—	—	—	—	—

48TJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)								
	1.2			1.4			1.6		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	864	2.01	1779	915	2.34	2067	968	2.81	2479
2600	869	2.06	1823	918	2.37	2093	973	2.81	2487
2700	880	2.17	1919	927	2.47	2180	976	2.84	2495
2800	892	2.29	2023	938	2.58	2275	983	2.92	2562
2900	903	2.42	2136	949	2.71	2386	993	3.03	2653
3000	915	2.54	2240	961	2.85	2504	1003	3.17	2767
3100	926	2.67	2352	972	3.00	2629	1016	3.32	2886
3200	938	2.81	2470	983	3.14	2743	1026	3.47	3002
3300	950	2.95	2587	995	3.30	2870	—	—	—
3400	963	3.10	2710	1007	3.45	2987	—	—	—
3500	976	3.25	2831	—	—	—	—	—	—
3600	988	3.41	2956	—	—	—	—	—	—
3700	—	—	—	—	—	—	—	—	—
3750	—	—	—	—	—	—	—	—	—
3800	—	—	—	—	—	—	—	—	—
3900	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FLOP — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 685 to 935 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Field** indicates field-supplied drive is required.
2. **Field** indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FLOP static pressure information.
4. Maximum continuous bhp is 2.4 and the maximum continuous watts are 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 12 — Fan Performance, 48TJ009 High-Static Motor — Vertical Discharge Units

48TJ009 (8½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	559	0.72	692	634	0.97	891	700	1.21	1089	759	1.48	1318	814	1.74	1543
2600	567	0.75	716	641	1.00	916	706	1.25	1123	764	1.52	1353	819	1.79	1587
2700	582	0.83	779	655	1.08	981	719	1.34	1199	776	1.61	1430	831	1.89	1674
2800	598	0.90	835	670	1.17	1056	732	1.43	1275	789	1.71	1517	842	2.00	1770
2900	614	0.98	899	684	1.25	1123	745	1.53	1361	802	1.81	1604	854	2.11	1866
3000	630	1.07	973	690	1.35	1207	759	1.63	1447	816	1.92	1700	866	2.23	1971
3100	646	1.16	1047	714	1.45	1292	773	1.74	1543	828	2.04	1805	878	2.35	2076
3200	662	1.26	1131	729	1.55	1378	787	1.86	1648	841	2.18	1910	891	2.48	2188
3300	679	1.36	1216	744	1.66	1473	801	1.98	1753	854	2.29	2023	904	2.61	2300
3400	695	1.47	1310	759	1.76	1578	816	2.10	1858	867	2.42	2136	917	2.75	2420
3500	712	1.59	1413	744	1.90	1683	830	2.23	1971	881	2.56	2257	930	2.90	2546
3600	729	1.71	1517	790	2.03	1796	845	2.37	2093	895	2.71	2386	943	3.05	2670
3700	745	1.84	1630	805	2.17	1919	860	2.52	2223	909	2.87	2521	956	3.22	2807
3750	754	1.91	1691	813	2.24	1980	868	2.59	2283	917	2.95	2587	963	3.30	2870
3800	762	1.98	1753	821	2.31	2041	875	2.66	2343	924	3.03	2653	970	3.38	2933
3900	779	2.12	1875	836	2.46	2171	890	2.82	2479	938	3.19	2783	981	3.65	3209
4000	796	2.27	2006	852	2.61	2300	905	2.98	2612	953	3.37	2925	996	3.85	3390
4100	813	2.42	2136	868	2.78	2445	920	3.15	2751	974	3.74	3294	—	—	—
4200	830	2.59	2283	884	2.95	2587	935	3.33	2894	990	3.96	3482	—	—	—
4250	839	2.68	2360	890	3.04	2661	965	3.88	3412	—	—	—	—	—	—

48TJ009 (8½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	864	2.01	1779	915	2.34	2067	968	2.81	2479	991	3.02	2654	1012	3.21	2827
2600	869	2.06	1823	918	2.37	2093	973	2.81	2487	996	3.02	2654	1017	3.21	2827
2700	880	2.17	1919	927	2.47	2180	976	2.84	2495	999	3.05	2682	1021	3.25	2857
2800	892	2.29	2023	938	2.58	2275	983	2.92	2562	1006	3.13	2758	1028	3.34	2938
2900	903	2.42	2136	949	2.71	2386	993	3.03	2653	1017	3.25	2862	1038	3.46	3048
3000	915	2.54	2240	961	2.85	2504	1003	3.17	2767	1027	3.40	2994	1049	3.62	3189
3100	926	2.67	2352	972	3.00	2629	1016	3.32	2886	1040	3.65	3136	1062	3.80	3340
3200	938	2.81	2470	983	3.14	2743	1026	3.47	3002	1050	3.72	3277	1073	3.97	3491
3300	950	2.95	2587	995	3.30	2870	1022	3.58	3146	1046	3.84	3377	1069	4.09	3597
3400	963	3.10	2710	1007	3.45	2987	1034	3.74	3289	1059	4.01	3530	—	—	—
3500	976	3.25	2831	1007	3.56	3137	1034	3.86	3399	1058	4.15	3648	—	—	—
3600	988	3.41	2956	1019	3.74	3292	1047	4.05	3566	—	—	—	—	—	—
3700	992	3.59	3161	1023	3.94	3467	—	—	—	—	—	—	—	—	—
3750	999	3.68	3240	1030	4.04	3554	—	—	—	—	—	—	—	—	—
3800	1006	3.77	3318	1038	4.14	3640	—	—	—	—	—	—	—	—	—
3900	1017	4.07	3580	—	—	—	—	—	—	—	—	—	—	—	—
4000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. **■** indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 3.7 and the maximum continuous watts are 3313. 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 13 — Fan Performance, 48TJ012 — Vertical Discharge Units

48TJ012 (10 TONS)*																		
Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	592	0.76	723	661	0.93	859	722	1.09	989	779	1.26	1131	829	1.42	1267	880	1.58	1404
3100	607	0.83	779	676	1.01	924	734	1.17	1056	791	1.34	1199	840	1.51	1344	890	1.68	1491
3200	622	0.90	835	690	1.09	989	746	1.25	1123	803	1.43	1275	852	1.60	1422	900	1.77	1569
3300	638	0.98	899	705	1.17	1056	759	1.33	1190	815	1.52	1353	864	1.70	1508	910	1.88	1665
3400	653	1.06	965	719	1.26	1131	772	1.43	1275	826	1.62	1439	876	1.81	1604	921	1.98	1753
3500	669	1.15	1039	733	1.35	1207	786	1.53	1361	838	1.72	1526	888	1.91	1691	933	2.10	1858
3600	684	1.24	1114	747	1.44	1284	800	1.64	1456	850	1.82	1613	900	2.03	1796	945	2.22	2014
3700	700	1.33	1190	760	1.54	1370	814	1.75	1552	863	1.92	1700	912	2.14	1892	957	2.34	2117
3800	715	1.43	1275	774	1.64	1456	828	1.86	1648	875	2.04	1805	924	2.26	1997	969	2.47	2230
3900	731	1.54	1370	787	1.74	1543	843	1.98	1753	888	2.16	1910	936	2.38	2151	981	2.60	2344
4000	747	1.64	1456	801	1.85	1639	857	2.10	1858	902	2.30	2032	948	2.51	2265	993	2.74	2469
4100	763	1.76	1560	816	1.97	1744	872	2.23	1971	916	2.44	2203	960	2.64	2380	1005	2.88	2596
4200	778	1.88	1665	831	2.10	1884	886	2.36	2084	929	2.58	2326	972	2.78	2505	1016	3.03	2735
4300	794	2.00	1770	846	2.23	1971	900	2.50	2256	943	2.73	2460	985	2.93	2642	1028	3.17	2866
4400	810	2.13	1884	861	2.37	2093	913	2.64	2380	958	2.89	2605	999	3.09	2791	1040	3.32	3010
4500	826	2.27	2006	876	2.52	2273	927	2.78	2505	973	3.04	2744	1012	3.26	2952	—	—	—
4600	842	2.41	2177	892	2.67	2406	940	2.92	2633	987	3.21	2904	—	—	—	—	—	—
4700	858	2.55	2300	907	2.83	2551	954	3.08	2782	1002	3.38	3068	—	—	—	—	—	—
4800	874	2.70	2433	922	2.99	2698	968	3.24	2933	—	—	—	—	—	—	—	—	—
4900	890	2.86	2578	938	3.16	2857	—	—	—	—	—	—	—	—	—	—	—	—
5000	906	3.03	2735	953	3.33	3020	—	—	—	—	—	—	—	—	—	—	—	—

48TJ012 (10 TONS)* (cont)												
Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	924	1.73	1534	970	1.89	1736	1019	2.00	1828	1066	2.30	2082
3100	935	1.84	1695	977	2.00	1828	1026	2.17	1971	1070	2.44	2203
3200	946	1.95	1786	987	2.11	1920	1029	2.28	2065	1075	2.51	2265
3300	957	2.06	1878	998	2.23	2022	1037	2.40	2169	1082	2.58	2326
3400	967	2.17	1971	1009	2.35	2125	1047	2.53	2282	1087	2.70	2433
3500	976	2.29	2074	1020	2.48	2238	1058	2.66	2397	1095	2.84	2560
3600	986	2.41	2177	1030	2.61	2353	1069	2.80	2523	1106	2.98	2688
3700	998	2.54	2291	1039	2.74	2469	1081	2.94	2651	1117	3.13	2829
3800	1010	2.67	2406	1049	2.87	2587	1091	3.08	2782	1128	3.29	2981
3900	1022	2.81	2533	1060	3.02	2726	1100	3.23	2923	—	—	—
4000	1034	2.96	2670	1072	3.17	2866	1110	3.38	3068	—	—	—
4100	1046	3.11	2810	1084	3.32	3010	—	—	—	—	—	—
4200	1058	3.26	2952	—	—	—	—	—	—	—	—	—
4300	—	—	—	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Standard drive range is 685 to 935 rpm. Alternate motor drive range is 835 to 1085 rpm. High-static motor drive range is 830 to 1130 rpm. All other rpms require a field-supplied drive.

NOTES:

- 1. Boldface** indicates optional high-static motor and drive are required.
- Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.

- Maximum continuous bhp is 2.4 for the standard motor, 2.9 for the alternate motor and 5.25 for the high-static motor. Maximum continuous watts are 2120 for the standard motor, 2615 for the alternate motor and 4400 for the high-static 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
- Interpolation is permissible. Do not extrapolate.

Table 14 — Fan Performance, 48TJ014 — Vertical Discharge Units

48TJ014 (12½ TONS)*

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3750	737	1.41	1300	798	1.64	1486	854	1.84	1658	909	2.12	1893	961	2.35	2097	1014	2.61	2325
3800	745	1.46	1340	805	1.69	1531	861	1.89	1700	915	2.17	1940	967	2.41	2149	1019	2.67	2378
3900	761	1.56	1423	820	1.80	1624	875	2.01	1802	928	2.29	2044	979	2.55	2272	1029	2.80	2494
4000	777	1.67	1514	836	1.92	1725	889	2.14	1914	941	2.40	2140	991	2.68	2387	1040	2.94	2620
4100	793	1.79	1615	851	2.05	1836	904	2.27	2027	955	2.52	2246	1004	2.82	2512	1052	3.08	2746
4200	810	1.91	1717	867	2.18	1948	918	2.41	2149	968	2.65	2361	1017	2.96	2638	1064	3.23	2882
4300	826	2.04	1828	883	2.32	2070	933	2.55	2272	982	2.79	2485	1030	3.11	2773	1076	3.40	3037
4400	842	2.17	1940	898	2.46	2193	948	2.70	2405	996	2.93	2611	1043	3.25	2901	1088	3.56	3184
4500	859	2.31	2061	914	2.60	2316	962	2.85	2539	1010	3.09	2755	1056	3.40	3037	1101	3.73	3341
4600	876	2.45	2184	930	2.76	2459	977	3.01	2683	1024	3.26	2910	1070	3.55	3175	1114	3.90	3498
4700	892	2.60	2316	945	2.91	2593	992	3.18	2837	1039	3.43	3065	1083	3.71	3322	1126	4.07	3655
4800	909	2.77	2468	961	3.07	2737	1008	3.36	3001	1053	3.61	3230	1097	3.88	3479	1140	4.25	3822
4900	926	2.93	2611	977	3.24	2891	1024	3.54	3166	1068	3.80	3405	1111	4.06	3646	1153	4.41	3971
5000	942	3.11	2773	993	3.41	3047	1039	3.73	3341	1080	3.99	3581	1125	4.25	3822	1166	4.59	4139
5100	959	3.29	2937	1009	3.60	3221	1055	3.92	3516	1097	4.19	3767	1139	4.46	4018	1180	4.78	4316
5200	976	3.47	3101	1025	3.78	3387	1071	4.12	3702	1112	4.40	3962	1153	4.67	4214	1194	4.98	4503
5300	993	3.67	3285	1041	3.98	3572	1086	4.33	3897	1127	4.61	4158	1168	4.90	4428	1208	5.19	4698
5400	1010	3.87	3470	1057	4.18	3757	1102	4.54	4093	1142	4.84	4372	1182	5.13	4642	—	—	—
5500	1027	4.07	3655	1073	4.39	3953	1118	4.76	4298	1157	5.07	4586	—	—	—	—	—	—
5600	1043	4.29	3860	1090	4.61	4158	1133	4.99	4512	—	—	—	—	—	—	—	—	—
5700	1060	4.51	4065	1106	4.83	4363	1149	5.22	4726	—	—	—	—	—	—	—	—	—
5800	1077	4.74	4279	1122	5.07	4586	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4.98	4503	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	5.22	4726	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48TJ014 (12½ TONS)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3750	1065	2.87	2557	1113	3.12	2783	1158	3.36	2997	1197	3.56	3180
3800	1070	2.94	2620	1118	3.19	2846	1163	3.44	3074	1203	3.65	3267
3900	1079	3.07	2737	1128	3.34	2983	1173	3.60	3221	1214	3.83	3433
4000	1089	3.22	2873	1137	3.49	3120	1183	3.76	3368	1225	4.00	3590
4100	1100	3.36	3001	1147	3.65	3267	1193	3.93	3525	1236	4.19	3767
4200	1110	3.51	3138	1157	3.81	3414	1202	4.09	3674	1245	4.38	3943
4300	1121	3.67	3285	1167	3.97	3562	1212	4.27	3841	1255	4.56	4111
4400	1133	3.84	3442	1178	4.14	3720	1222	4.44	3999	1265	4.74	4279
4500	1144	4.00	3590	1188	4.31	3878	1232	4.62	4167	1274	4.93	4456
4600	1157	4.19	3767	1199	4.49	4046	1242	4.81	4344	1284	5.13	4642
4700	1169	4.38	3943	1210	4.68	4223	1252	5.00	4521	—	—	—
4800	1181	4.58	4130	1222	4.87	4400	1263	5.20	4707	—	—	—
4900	1194	4.77	4307	1234	5.09	4605	—	—	—	—	—	—
5000	1207	4.97	4493	—	—	—	—	—	—	—	—	—
5100	1220	5.18	4689	—	—	—	—	—	—	—	—	—
5200	—	—	—	—	—	—	—	—	—	—	—	—
5300	—	—	—	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—
6250	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard drive range is 860 to 1080 rpm. Alternate motor drive range is 900 to 1260 rpm. All other rpms require a field-supplied drive.

NOTES:

- Boldface** indicates alternate motor and drive are required.
- Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOP static pressure information.

- Maximum continuous bhp is 3.70 for the standard motor and 5.25 for the alternate motor. Maximum continuous watts are 3313 for the standard motor and 4400 for the 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
- Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
- Interpolation is permissible. Do not extrapolate.

Table 15 — Fan Performance, 48TJ008 Standard Motor and Drive and Alternate Drive — Horizontal Discharge Units

48TJ008 (7½ TONS) — STANDARD MOTOR AND DRIVE AND ALTERNATE DRIVE (BELT DRIVE)*																		
Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			0.9			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	507	0.53	547	586	0.73	700	658	0.97	891	722	1.22	1097	752	1.34	1199	783	1.46	1301
2300	513	0.55	562	592	0.76	723	663	1.00	916	727	1.26	1131	756	1.38	1224	786	1.49	1327
2400	528	0.60	600	606	0.83	779	674	1.06	965	738	1.34	1199	766	1.46	1301	795	1.58	1404
2500	542	0.66	646	619	0.90	835	686	1.13	1022	748	1.41	1258	777	1.55	1370	806	1.68	1491
2550	550	0.69	669	627	0.94	867	692	1.17	1056	754	1.45	1292	783	1.60	1413	812	1.74	1543
2600	557	0.72	692	634	0.97	891	698	1.21	1089	759	1.49	1327	787	1.64	1456	816	1.79	1587
2700	573	0.79	747	648	1.05	956	711	1.29	1156	770	1.58	1404	798	1.73	1534	827	1.88	1665
2800	588	0.86	803	662	1.13	1022	723	1.38	1233	782	1.66	1473	809	1.82	1613	837	1.98	1753
2900	604	0.94	867	676	1.21	1089	737	1.48	1318	794	1.76	1560	821	1.92	1700	848	2.08	1840
3000	620	1.02	932	690	1.30	1165	750	1.58	1404	806	1.86	1648	832	2.02	1788	849	2.18	1927
3100	636	1.11	1006	704	1.39	1241	764	1.69	1499	818	1.97	1744	844	2.13	1884	870	2.29	2023
3200	652	1.21	1089	718	1.49	1327	778	1.80	1595	831	2.09	1849	856	2.25	1980	882	2.40	2119
3300	668	1.31	1173	732	1.59	1413	793	1.92	1700	844	2.21	1954	869	2.37	2093	894	2.53	2232
3400	684	1.41	1258	747	1.70	1508	807	2.04	1805	857	2.35	2076	882	2.51	2206	907	2.66	2343
3500	701	1.53	1361	762	1.82	1613	821	2.16	1910	871	2.48	2188	895	2.64	2326	919	2.80	2462
3600	717	1.65	1465	777	1.94	1718	835	2.29	2023	885	2.63	2317	908	2.79	2453	932	2.95	2587
3700	733	1.77	1569	792	2.07	1831	849	2.42	2136	899	2.78	2445	922	2.95	2579	945	3.11	2718
3750	742	1.84	1630	800	2.14	1892	856	2.49	2197	907	2.86	2512	929	3.03	2653	952	3.20	2719

48TJ008 (7½ TONS) — STANDARD MOTOR AND DRIVE AND ALTERNATE DRIVE (BELT DRIVE)* (cont)									
Airflow (Cfm)	External Static Pressure (in. wg)								
	1.2			1.4			1.6		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	843	1.81	1604	908	2.25	1989	955	2.59	2283
2300	846	1.84	1630	910	2.25	2015	959	2.61	2300
2400	853	1.88	1665	912	2.31	2041	967	2.68	2360
2500	859	1.94	1718	919	2.37	2093	971	2.73	2403
2550	864	1.99	1761	920	2.39	2110	974	2.76	2428
2600	868	2.04	1805	921	2.41	2136	976	2.78	2445
2700	878	2.16	1910	928	2.45	2162	983	2.88	2529
2800	889	2.29	2023	937	2.57	2266	986	2.91	2554
2900	900	2.41	2128	947	2.70	2377	993	3.01	2637
3000	910	2.52	2223	958	2.85	2504	1002	3.15	2751
3100	920	2.64	2326	968	2.99	2620	1012	3.30	2870
3200	931	2.76	2428	979	3.13	2735	1023	3.47	3002
3300	942	2.89	2537	989	3.26	2839	1034	3.63	3121
3400	954	3.02	2645	1000	3.40	2948	1044	3.79	3237
3500	966	3.15	2751	1011	3.55	3062	1054	3.94	3340
3600	978	3.30	2870	1022	3.69	3165	1065	4.10	3445
3700	990	3.45	2987	1034	3.84	3272	1076	4.26	3544
3750	997	3.54	3055	1040	3.93	3333	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Standard drive range is 590 to 840 rpm. Alternate drive range is 685 to 935 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates high-static motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 2.4 and maximum continuous watts are 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 16 — Fan Performance, 48TJ008 High-Static Motor — Horizontal Discharge Units

48TJ008 (7½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	507	0.53	547	586	0.73	700	658	0.97	891	722	1.22	1097	783	1.46	1301	843	1.81	1604
2300	513	0.55	562	592	0.76	723	663	1.00	916	727	1.26	1131	786	1.49	1327	846	1.84	1630
2400	528	0.60	600	606	0.83	779	674	1.06	965	738	1.34	1199	795	1.58	1404	853	1.88	1665
2500	542	0.66	646	619	0.90	835	686	1.13	1022	748	1.41	1258	806	1.68	1491	859	1.94	1718
2550	550	0.69	669	627	0.94	867	692	1.17	1056	754	1.45	1292	812	1.74	1543	864	1.99	1761
2600	557	0.72	692	634	0.97	891	698	1.21	1089	759	1.49	1327	816	1.79	1587	868	2.04	1805
2700	573	0.79	747	649	1.05	956	711	1.29	1156	770	1.58	1404	827	1.88	1665	878	2.16	1910
2800	588	0.86	803	662	1.13	1022	723	1.38	1233	782	1.66	1473	837	1.98	1753	889	2.29	2023
2900	604	0.94	867	676	1.21	1089	737	1.48	1318	794	1.76	1560	848	2.08	1840	900	2.41	2128
3000	620	1.02	932	690	1.30	1165	750	1.58	1404	806	1.86	1648	849	2.18	1927	910	2.52	2223
3100	636	1.11	1006	704	1.39	1241	764	1.69	1499	818	1.97	1744	870	2.29	2023	920	2.64	2326
3200	652	1.21	1089	718	1.49	1327	778	1.80	1595	831	2.09	1849	882	2.40	2119	931	2.76	2428
3300	668	1.31	1173	732	1.59	1413	793	1.92	1700	844	2.21	1954	894	2.53	2232	942	2.89	2537
3400	684	1.41	1258	747	1.70	1508	807	2.04	1805	857	2.35	2076	907	2.66	2343	954	3.02	2645
3500	701	1.53	1361	762	1.82	1613	821	2.16	1010	871	2.48	2188	919	2.80	2462	966	3.15	2751
3600	717	1.65	1465	777	1.94	1718	835	2.29	2023	885	2.63	2317	932	2.95	2587	978	3.30	2870
3700	733	1.77	1569	792	2.07	1831	849	2.42	2136	899	2.78	2445	945	3.11	2718	990	3.45	2987
3750	742	1.84	1630	800	2.14	1892	856	2.49	2197	907	2.86	2512	952	3.20	2719	997	3.54	3055

48TJ008 (7½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2250	908	2.25	1989	955	2.59	2283	991	2.89	2543	1023	3.19	2805
2300	910	2.25	2015	959	2.61	2300	995	2.91	2563	1028	3.21	2827
2400	912	2.31	2041	967	2.68	2360	1003	2.99	2631	1036	3.30	2902
2500	919	2.37	2093	971	2.73	2403	1007	3.05	2681	1041	3.36	2956
2550	920	2.39	2110	974	2.76	2428	1010	3.08	2710	1044	3.40	2989
2600	921	2.41	2136	976	2.78	2445	1012	3.10	2730	1046	3.42	3011
2700	928	2.45	2162	983	2.88	2529	1020	3.21	2828	1053	3.54	3119
2800	937	2.57	2266	986	2.91	2554	1023	3.25	2857	1057	3.58	3151
2900	947	2.70	2377	993	3.01	2637	1030	3.36	2955	1064	3.70	3260
3000	958	2.85	2504	1002	3.15	2751	1039	3.51	3093	1074	3.88	3411
3100	968	2.99	2620	1012	3.30	2870	1050	3.68	3240	1084	4.06	3574
3200	979	3.13	2735	1023	3.47	3002	1061	3.87	3407	—	—	—
3300	989	3.26	2839	1034	3.63	3121	1072	4.05	3564	—	—	—
3400	1000	3.40	2948	1044	3.79	3237	—	—	—	—	—	—
3500	1011	3.55	3062	1054	3.94	3340	—	—	—	—	—	—
3600	1022	3.69	3165	1065	4.10	3445	—	—	—	—	—	—
3700	1034	3.84	3272	—	—	—	—	—	—	—	—	—
3750	1040	3.93	3333	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOP static pressure information.
4. Maximum continuous bhp is 3.7 and the maximum continuous watts are 3313. 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 17 — Fan Performance, 48TJ009 Standard Motor — Horizontal Discharge Units

48TJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			0.9			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	550	0.69	669	627	0.94	867	692	1.17	1056	754	1.45	1292	783	1.60	1413	812	1.74	1543
2600	557	0.72	692	634	0.97	891	698	1.21	1089	759	1.49	1327	787	1.64	1456	816	1.79	1587
2700	573	0.79	747	648	1.05	956	711	1.29	1156	770	1.58	1404	798	1.73	1534	827	1.88	1665
2800	588	0.86	803	662	1.13	1022	723	1.38	1233	782	1.66	1473	809	1.82	1613	837	1.98	1753
2900	604	0.94	867	676	1.21	1089	737	1.48	1318	794	1.76	1560	821	1.92	1700	848	2.08	1840
3000	620	1.02	932	690	1.30	1165	750	1.58	1404	806	1.86	1648	832	2.02	1788	849	2.18	1927
3100	636	1.11	1006	704	1.39	1241	764	1.69	1499	818	1.97	1744	844	2.13	1884	870	2.29	2023
3200	652	1.21	1089	718	1.49	1327	778	1.80	1595	831	2.09	1849	856	2.25	1980	882	2.40	2119
3300	668	1.31	1173	732	1.59	1413	793	1.92	1700	844	2.21	1954	869	2.37	2093	894	2.53	2232
3400	684	1.41	1258	747	1.70	1508	807	2.04	1805	857	2.35	2076	882	2.51	2206	907	2.66	2343
3500	701	1.53	1361	762	1.82	1613	821	2.16	1910	871	2.48	2188	895	2.64	2326	919	2.80	2462
3600	717	1.65	1465	777	1.94	1718	835	2.29	2023	885	2.63	2317	908	2.79	2453	932	2.95	2587
3700	733	1.77	1569	792	2.07	1831	849	2.42	2136	899	2.78	2445	922	2.95	2579	945	3.11	2718
3750	742	1.84	1630	800	2.14	1892	856	2.49	2197	907	2.86	2512	929	3.03	2653	952	3.20	2719
3800	750	1.90	1683	807	2.21	1954	863	2.56	2257	914	2.93	2571	936	3.11	2847	958	3.28	2854
3900	767	2.04	1805	822	2.35	2076	877	2.71	2386	928	3.09	2702	950	3.27	2979	972	3.45	2987
4000	783	2.18	1927	838	2.50	2206	891	2.86	2512	942	3.26	2839	964	3.45	3187	986	3.63	3121
4100	800	2.34	2067	854	2.66	2343	905	3.02	2645	956	3.43	2971	978	3.62	3244	1000	3.81	3251
4200	817	2.49	2197	869	2.82	2479	920	3.19	2783	970	3.60	3099	992	3.80	3258	1015	4.00	3380
4250	826	2.58	2275	877	2.91	2554	928	3.28	2854	977	3.69	3165	999	3.90	3306	1022	4.10	3445

48TJ009 (8½ TONS) — STANDARD MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)								
	1.2			1.4			1.6		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	864	1.99	1761	920	2.39	2110	974	2.76	2428
2600	868	2.04	1805	921	2.41	2136	976	2.78	2445
2700	878	2.16	1910	928	2.45	2162	983	2.88	2529
2800	889	2.29	2023	937	2.57	2266	986	2.91	2554
2900	900	2.41	2128	947	2.70	2377	993	3.01	2637
3000	910	2.52	2223	958	2.85	2504	1002	3.15	2751
3100	920	2.64	2326	968	2.99	2620	1012	3.30	2870
3200	931	2.76	2428	979	3.13	2735	1023	3.47	3002
3300	942	2.89	2537	989	3.26	2839	1034	3.63	3121
3400	954	3.02	2645	1000	3.40	2948	1044	3.79	3237
3500	966	3.15	2751	1011	3.55	3062	1054	3.94	3340
3600	978	3.30	2870	1022	3.69	3165	1065	4.10	3445
3700	990	3.45	2987	1034	3.84	3272	1076	4.26	3544
3750	997	3.54	3055	1040	3.93	3333	1082	5.27	3609
3800	1003	3.62	3114	1045	4.01	3387	1087	4.43	3643
3900	1015	3.80	3244	1057	4.18	3495	1098	4.60	3733
4000	1028	3.99	3373	1070	4.36	3603	1110	4.78	3820
4100	1042	4.18	3495	1082	4.56	3713	1122	4.97	3902
4200	1055	4.38	3614	1095	4.76	3811	1134	5.16	3971
4250	1062	4.49	3676	1102	4.87	3860	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 685 to 935 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 2.4 and the maximum continuous watts are 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 18 — Fan Performance, 48TJ009 High-Static Motor — Horizontal Discharge Units

48TJ009 (8½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)*

Airflow (Cfm)	External Static Pressure (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	550	0.69	669	627	0.94	867	692	1.17	1056	754	1.45	1292	812	1.74	1543
2600	557	0.72	692	634	0.97	891	698	1.21	1089	759	1.49	1327	816	1.79	1587
2700	573	0.79	747	648	1.05	956	711	1.29	1156	770	1.59	1404	827	1.88	1665
2800	688	0.86	803	662	1.13	1022	723	1.38	1233	782	1.68	1473	837	1.98	1753
2900	604	0.94	867	676	1.21	1089	737	1.48	1318	794	1.76	1560	848	2.08	1840
3000	620	1.02	932	690	1.30	1165	750	1.58	1404	806	1.86	1648	849	2.18	1927
3100	636	1.11	1006	704	1.39	1241	764	1.69	1499	818	1.97	1744	870	2.29	2023
3200	652	1.21	1089	718	1.49	1327	778	1.80	1595	831	2.09	1849	882	2.40	2119
3300	668	1.31	1173	732	1.59	1413	793	1.92	1700	844	2.21	1954	894	2.53	2232
3400	684	1.41	1258	747	1.70	1508	807	2.04	1805	857	2.35	2076	907	2.66	2343
3500	701	1.53	1361	762	1.82	1613	821	2.16	1910	871	2.48	2188	919	2.80	2462
3600	717	1.65	1465	777	1.94	1718	835	2.29	2023	885	2.36	2317	932	2.95	2587
3700	733	1.77	1569	792	2.07	1831	849	2.42	2136	899	2.78	2445	945	3.11	2718
3750	742	1.84	1630	800	2.14	1892	856	2.49	2197	907	2.86	2512	952	3.20	2719
3800	750	1.90	1683	807	2.21	1954	863	2.56	2257	914	2.93	2571	958	3.28	2854
3900	767	2.04	1805	822	2.35	2076	877	2.71	2386	928	3.09	2702	972	3.45	2987
4000	783	2.18	1927	838	2.50	2206	891	2.86	2512	942	3.26	2839	986	3.63	3121
4100	800	2.34	2067	854	2.66	2343	905	3.02	2645	956	3.43	2971	1000	3.81	3251
4200	817	2.49	2197	869	2.82	2479	920	3.19	2783	970	3.60	3099	1015	4.00	3380
4250	826	2.58	2275	877	2.91	2554	928	3.28	2854	977	3.69	3165	1022	4.10	3445

48TJ009 (8½ TONS) — HIGH-STATIC MOTOR (BELT DRIVE)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
2550	864	1.99	1761	920	2.39	2110	974	2.76	2428	1005	3.04	2672	1034	3.31	2910
2600	868	2.04	1805	921	2.41	2136	976	2.78	2445	1008	3.06	2691	1037	3.33	2931
2700	878	2.16	1910	928	2.45	2162	983	2.88	2529	1015	3.17	2788	1044	3.45	3036
2800	889	2.92	2023	937	2.57	2266	986	2.91	2554	1018	3.20	2817	1047	3.49	3068
2900	900	2.41	2128	947	2.70	2377	993	3.01	2637	1025	3.31	2914	1055	3.61	3174
3000	910	2.52	2223	958	2.85	2504	1002	3.15	2751	1034	3.47	3049	1064	3.77	3321
3100	920	2.64	2326	968	2.99	2620	1012	3.30	2870	1045	3.63	3195	1075	3.95	3479
3200	931	2.76	2428	979	3.13	2735	1023	3.47	3002	1056	3.82	3359	1087	4.16	3659
3300	942	2.89	2537	989	3.26	2839	1034	3.63	3121	1067	3.99	3514	—	—	—
3400	954	3.02	2645	1000	3.40	2948	1044	3.79	3237	1078	4.17	3669	—	—	—
3500	966	3.15	2751	1011	3.55	3062	1054	3.94	3340	—	—	—	—	—	—
3600	978	3.30	2870	1022	3.69	3165	1065	4.10	3445	—	—	—	—	—	—
3700	990	3.45	2987	1034	3.84	3272	—	—	—	—	—	—	—	—	—
3750	997	3.54	3055	1040	3.93	3333	—	—	—	—	—	—	—	—	—
3800	1003	3.62	3114	1045	4.01	3387	—	—	—	—	—	—	—	—	—
3900	1015	3.80	3244	1057	4.18	3495	—	—	—	—	—	—	—	—	—
4000	1028	3.99	3373	—	—	—	—	—	—	—	—	—	—	—	—
4100	1042	4.28	3495	—	—	—	—	—	—	—	—	—	—	—	—
4200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Motor drive range is 860 to 1080 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates field-supplied motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 3.7 and the maximum continuous watts are 3313. 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 19 — Fan Performance, 48TJ012 — Horizontal Discharge Units

48TJ012 (10 TONS)*																		
Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	552	0.68	661	632	0.87	810	701	1.05	956	761	1.22	1097	816	1.36	1216	871	1.54	1370
3100	565	0.74	708	644	0.93	859	711	1.12	1014	772	1.31	1173	825	1.45	1292	879	1.63	1447
3200	578	0.81	763	656	1.00	916	723	1.20	1081	782	1.39	1241	835	1.55	1378	887	1.71	1517
3300	591	0.88	818	668	1.08	973	734	1.28	1148	793	1.47	1310	845	1.65	1465	895	1.80	1595
3400	605	0.96	883	680	1.16	1047	745	1.36	1216	803	1.56	1387	856	1.75	1552	904	1.91	1691
3500	619	1.04	948	691	1.23	1106	755	1.44	1284	813	1.65	1465	867	1.86	1648	914	2.03	1796
3600	633	1.13	1022	703	1.31	1173	766	1.52	1353	824	1.74	1543	877	1.97	1744	924	2.15	1901
3700	648	1.23	1106	714	1.39	1241	777	1.61	1430	835	1.85	1639	887	2.07	1831	935	2.28	2015
3800	662	1.33	1190	726	1.51	1310	789	1.72	1526	846	1.95	1726	897	2.18	1927	946	2.40	2169
3900	677	1.44	1284	738	1.61	1387	801	1.82	1613	857	2.06	1823	908	2.29	2023	956	2.53	2282
4000	692	1.55	1378	750	1.73	1473	813	1.94	1718	868	2.17	1919	918	2.40	2119	967	2.66	2397
4100	707	1.67	1482	762	1.84	1560	825	2.05	1814	878	2.28	2015	929	2.53	2282	977	2.78	2505
4200	722	1.80	1595	775	1.97	1656	837	2.16	1910	889	2.40	2119	941	2.66	2397	987	2.91	2624
4300	737	1.94	1718	787	2.09	1761	848	2.27	2006	900	2.52	2273	952	2.80	2523	999	3.04	2744
4400	752	2.08	1840	800	2.21	1875	860	2.39	2110	912	2.66	2397	962	2.93	2642	1008	3.19	2885
4500	768	2.24	1980	814	2.35	1989	871	2.51	2265	924	2.80	2523	973	3.07	2772	1019	3.34	3029
4600	783	2.40	2119	827	2.50	2121	883	2.64	2380	937	2.95	2661	983	3.21	2904	—	—	—
4700	799	2.56	2309	841	2.64	2291	894	2.77	2496	949	3.10	2800	994	3.36	3049	—	—	—
4800	814	2.74	2469	855	2.80	2424	906	2.91	2624	961	3.26	2952	—	—	—	—	—	—
4900	—	—	—	868	2.90	2578	918	3.05	2754	972	3.40	3088	—	—	—	—	—	—
5000	—	—	—	883	3.10	2735	931	3.21	2904	—	—	—	—	—	—	—	—	—

48TJ012 (10 TONS)* (cont)												
Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3000	918	1.67	1482	967	1.89	1736	1010	2.09	1903	1063	2.46	2221
3100	928	1.78	1478	973	1.94	1778	1018	2.17	1971	1070	2.51	2265
3200	937	1.90	1745	981	2.04	1861	1026	2.26	2048	1075	2.57	2318
3300	946	2.00	1828	991	2.16	1963	1032	2.32	2099	1080	2.64	2380
3400	953	2.10	1912	1000	2.29	2074	1041	2.44	2203	1083	2.65	2389
3500	961	2.20	1997	1009	2.41	2177	1051	2.57	2318	1090	2.74	2469
3600	970	2.32	2099	1017	2.53	2282	1061	2.72	2451	1099	2.88	2596
3700	980	2.45	2212	1024	2.64	2380	1069	2.87	2587	1109	3.03	2735
3800	989	2.58	2326	1033	2.76	2487	1077	2.99	2698	1118	3.20	2895
3900	1000	2.73	2460	1042	2.91	2624	1085	3.12	2819	1127	3.36	3049
4000	1010	2.87	2587	1052	3.06	2763	1093	3.24	2933	—	—	—
4100	1021	3.02	2726	1062	3.22	2914	1102	3.41	3097	—	—	—
4200	1032	3.17	2866	1072	3.38	2971	—	—	—	—	—	—
4300	1042	3.32	3010	—	—	—	—	—	—	—	—	—
4400	—	—	—	—	—	—	—	—	—	—	—	—
4500	—	—	—	—	—	—	—	—	—	—	—	—
4600	—	—	—	—	—	—	—	—	—	—	—	—
4700	—	—	—	—	—	—	—	—	—	—	—	—
4800	—	—	—	—	—	—	—	—	—	—	—	—
4900	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOF — Factory-Installed Option
Watts — Input Watts to Motor

*Standard motor drive range is 695 to 935 rpm. Alternate motor drive range is 835 to 1085 rpm. High-static motor drive range is 830 to 1130 rpm. All other rpms require a field-supplied drive.

NOTES:

1. **Boldface** indicates field-supplied drive is required.
2. indicates optional high-static motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOF static pressure information.
4. Maximum continuous bhp is 2.4 for the standard motor, 2.9 for the alternate motor and 5.25 for the high-static motor. Maximum continuous watts are 2120 for the standard motor, 2615 for the alternate motor and 4400 for the high-static 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

Table 20 — Fan Performance, 48TJ014 — Horizontal Discharge Units

48TJ014 (12½ TONS)*

Airflow (Cfm)	External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3750	684	1.24	1162	755	1.48	1353	816	1.70	1540	875	1.94	1738	933	2.23	1988	989	2.49	2219
3800	691	1.28	1194	761	1.52	1390	822	1.75	1582	880	1.98	1776	937	2.28	2035	993	2.55	2272
3900	705	1.37	1267	773	1.62	1473	834	1.86	1674	891	2.08	1862	947	2.39	2131	1002	2.66	2370
4000	720	1.47	1349	786	1.71	1548	847	1.97	1768	902	2.19	1957	957	2.50	2228	1011	2.79	2485
4100	734	1.56	1423	800	1.82	1641	860	2.09	1871	914	2.31	2061	967	2.60	2316	1021	2.91	2593
4200	749	1.66	1506	813	1.92	1725	873	2.21	1974	926	2.44	2175	978	2.71	2414	1030	3.04	2710
4300	764	1.77	1598	826	2.04	1828	886	2.33	2079	938	2.57	2290	989	2.83	2521	1040	3.18	2837
4400	779	1.88	1691	840	2.16	1931	899	2.46	2193	951	2.71	2414	1000	2.96	2638	1050	3.31	2955
4500	793	1.99	1785	854	2.28	2035	912	2.59	2307	963	2.86	2548	1012	3.09	2755	1061	3.43	3065
4600	808	2.11	1888	868	2.42	2158	925	2.73	2459	975	3.00	2674	1024	3.25	2901	1071	3.56	3184
4700	822	2.24	2000	882	2.56	2281	937	2.86	2548	988	3.16	2819	1036	3.42	3056	1082	3.70	3313
4800	837	2.37	2114	896	2.71	2414	950	3.00	2674	1001	3.32	2964	1048	3.59	3212	1093	3.86	3461
4900	852	2.51	2237	910	2.86	2548	963	3.15	2810	1014	3.48	3111	1060	3.76	3368	1105	4.02	3609
5000	867	2.65	2361	924	3.01	2683	977	3.30	2946	1027	3.65	3267	1073	3.94	3535	1117	4.20	3776
5100	882	2.79	2485	938	3.17	2828	990	3.46	3092	1040	3.82	3424	1085	4.12	3702	1129	4.40	3962
5200	896	2.95	2629	952	3.33	2973	1003	3.63	3248	1053	4.00	3590	1098	4.30	3869	1141	4.60	4148
5300	911	3.11	2773	967	3.50	3129	1017	3.80	3405	1066	4.18	3757	1111	4.50	4055	1153	4.80	4335
5400	926	3.27	2919	981	3.68	3294	1030	3.98	3572	1079	4.35	3916	1124	4.70	4270	1166	5.01	4531
5500	940	3.44	3074	995	3.86	3461	1044	4.17	3748	1092	4.54	4093	1137	4.91	4437	1178	5.22	4726
5600	955	3.62	3239	1010	4.04	3627	1058	4.38	3943	1105	4.73	4270	1150	5.12	4633	—	—	—
5700	970	3.80	3405	1024	4.23	3804	1072	4.59	4139	1118	4.93	4456	—	—	—	—	—	—
5800	985	3.99	3581	1039	4.42	3981	1086	4.80	4335	1131	5.14	4652	—	—	—	—	—	—
5900	1000	4.18	3757	1053	4.62	4167	1100	5.02	4540	—	—	—	—	—	—	—	—	—
6000	1015	4.39	3953	1068	4.83	4363	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4.59	4139	1083	5.04	4558	—	—	—	—	—	—	—	—	—	—	—	—
6250	1062	5.02	4560	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

48TJ014 (12½ TONS)* (cont)

Airflow (Cfm)	External Static Pressure (in. wg)											
	1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
3750	1041	2.75	2445	1086	2.98	2634	1122	3.16	2819	1146	3.28	2928
3800	1046	2.81	2503	1092	3.05	2719	1129	3.25	2901	1156	3.39	3028
3900	1055	2.94	2620	1102	3.20	2855	1143	3.42	3056	1174	3.59	3212
4000	1064	3.07	2737	1112	3.34	2983	1155	3.59	3212	1190	3.80	3405
4100	1072	3.20	2855	1121	3.49	3120	1165	3.76	3368	1203	3.99	3581
4200	1081	3.34	2983	1130	3.64	3258	1175	3.92	3516	1215	4.18	3757
4300	1090	3.48	3111	1139	3.79	3396	1185	4.08	3664	1226	4.36	3925
4400	1100	3.63	3248	1148	3.94	3535	1194	4.25	3822	1236	4.54	4093
4500	1109	3.78	3387	1157	4.09	3674	1203	4.42	3981	1246	4.72	4260
4600	1119	3.93	3525	1166	4.26	3832	1212	4.58	4130	1255	4.91	4437
4700	1129	4.09	3674	1175	4.43	3990	1221	4.76	4298	1264	5.09	4605
4800	1139	4.24	3813	1185	4.60	4148	1230	4.93	4456	—	—	—
4900	1150	4.38	3943	1194	4.77	4307	1239	5.12	4633	—	—	—
5000	1161	4.54	4093	1204	4.95	4475	—	—	—	—	—	—
5100	1172	4.71	4251	1214	5.13	4642	—	—	—	—	—	—
5200	1183	4.91	4419	—	—	—	—	—	—	—	—	—
5300	1194	5.08	4596	—	—	—	—	—	—	—	—	—
5400	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—
5600	—	—	—	—	—	—	—	—	—	—	—	—
5700	—	—	—	—	—	—	—	—	—	—	—	—
5800	—	—	—	—	—	—	—	—	—	—	—	—
5900	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—
6100	—	—	—	—	—	—	—	—	—	—	—	—
6250	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower Input to Fan
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard motor drive range is 860 to 1080 rpm. Alternate motor drive range is 900 to 1260 rpm. All other rpms require a field-supplied drive.

NOTES:

- 1. Boldface** indicates field-supplied drive is required.
- 2.** indicates alternate motor and drive are required.

3. Values include losses for filters, unit casing, and wet coils. See Table 7 for accessory/FIOP static pressure information.
4. Maximum continuous bhp is 3.7 for the standard motor, and 5.25 for the alternate motor. The maximum continuous watts are 3313 for the standard motor and 4400 for the 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. See Evaporator-Fan Motor Performance, Table 8, for additional information.
5. Use of a field-supplied motor may affect wire sizing. Contact your Carrier representative for details.
6. Interpolation is permissible. Do not extrapolate.

START-UP

Unit Preparation — Make sure that unit has been installed in accordance with these installation instructions and applicable codes. Make sure that Start-Up Checklist, located on back page of this booklet, has been completed and filled out.

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 hold-down 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. Ensure wiring does not come into direct contact with refrigerant tubing.

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.

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

Compressor Rotation — On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit and install lockout tag.
3. Reverse any two of the unit power leads.
4. Reapply power to unit. Reenergize compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit will make an elevated level of noise and will not provide cooling.

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, indoor and outdoor fans start on closure of contactors.

Check unit charge. Refer to Checking and Adjustment Refrigerant Charge section, page 36. Unit must operate a minimum of 15 minutes before adjusting charge.

Reset thermostat at a position above room temperature. Compressor and outdoor fans 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 21 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.

ADJUST GAS INPUT — The gas input to the unit is determined by measuring the gas flow at the meter or by measuring the manifold pressure. Manifold pressure should be 3.5 in. wg.

NOTE: Unit uses a 2 stage gas valve. There is no need to adjust the "Low Fire" manifold pressure.

Measure Gas Flow (Natural Gas Units) — Minor adjustment to the gas flow can be made by changing the manifold pressure. The manifold pressure must be 3.5 in. wg. Normal manifold pressure is 3.5 in. wg in high fire, W1 and W2 inputs to gas valve.

Proceed as follows:

1. Turn off gas supply to unit.
2. Remove pipe plug on manifold then connect manometer at this point. Turn on gas to unit. Ensure gas valve is in high fire operation.

Observe manifold pressure and proceed as follows to adjust gas input:

1. Remove cover screw over regulator adjustment screw on gas valve. Ensure gas valve is operating in high fire mode.
2. Turn regulator adjustment screw clockwise to increase gas input, or turn regulator adjustment screw counter-clockwise to decrease input. High fire manifold pressure must be 3.5 in. wg.

WARNING

Unsafe operation of the unit may result if manifold pressure is outside 3.4 to 3.6 in. wg range. Personal injury or unit damage may result.

3. Replace cover screw cap on gas valve.
4. Turn off gas supply to unit. Remove manometer from pressure tap and replace pipe plug on gas valve. Turn on gas to unit and check for leaks.

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, purging heat exchangers.

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

Table 21 — Altitude Compensation*

ELEVATION (Ft)	125,000, 180,000, AND 224,000 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.

Integrated Gas Controller (IGC) Operation

NOTE: The default value for the evaporator-fan motor ON and OFF delay is 45 seconds. The Integrated Gas 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 (light-emitting diode) 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 on the next cycle. 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.

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 motors, compressor no. 1, and both condenser fans 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 motors (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 DURABLADE 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.

COOLING UNITS WITH ECONOMIZER — When the OAT is above the ECON SP set point and the room thermostat calls for Stage 1 cooling (R to G + Y1), the indoor fan motor (IFM) is energized and the EconoMi\$er damper modulates to minimum position. The compressor contactor is energized to start the compressor and outdoor-fan motor (OFM). After the thermostat is satisfied, the damper modulates to the fully closed position when the IFM is deenergized.

When the OAT is below the ECON SP setting and the room thermostat calls for Stage 1 cooling (R to G + Y1), the EconoMi\$er modulates to the minimum position when the IFM is energized. The EconoMi\$er provides Stage 1 of cooling by modulating the return and outdoor air dampers to maintain a 55 F supply air set point. If the supply-air temperature (SAT) is greater than 57 F, the EconoMi\$er modulates open, allowing a greater amount of outdoor air to enter the unit. If the SAT drops below 53 F, the outdoor air damper modulates closed to reduce the amount of outdoor air. When the SAT is between 53 and 57 F, the EconoMi\$er maintains its position.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, and the OAT is above the MECH CLG LOCKOUT set point, the EconoMi\$er integrates free cooling with mechanical cooling. This is accomplished by the strategies below.

NOTE: Compressors have a two-minute Minimum On, Minimum Off, and accomplished by the strategies below.

1. If Y1 is energized, and the room thermostat calls for Y2 (2-stage thermostat), the compressor and OFM are energized. The position of the EconoMi\$er damper is maintained at its current value.
2. If Y1 is energized for more than 20 minutes, and Y2 is not energized (whether or not a 2-stage thermostat is used), the compressor and OFM are energized. The position of the EconoMi\$er damper is maintained at its current value.
3. If Y1 is energized, and compressor no. 1 is already energized (see Step 2) and the room thermostat calls for Y2, compressor no. 1 continues to operate. If Y2 remains energized for more than 20 minutes, compressor no. 2 is energized.

NOTE: Compressor no. 2 cannot be energized unless there is a signal for Y2 from the space thermostat.

4. If compressor no. 2 is energized, and the Y2 signal from the thermostat is satisfied, compressors 1 and 2 are deenergized. Re-asserting Y2 will start compressor no. 1 and (after a 20-minute interstage delay) compressor no. 2.
5. If compressor no. 1 is energized and the thermostat is satisfied, compressor no. 1, the OFM, and IFM are deenergized and the EconoMi\$er modulates closed.

When the OAT is below the MECH CLG LOCKOUT set point, the compressors remain off.

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 or more frequently as operating conditions require.

EVAPORATOR COIL — Clean coil as required. Inspect coil at beginning of heating and cooling seasons.

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 sections on pages 12 and 15 for more details.
3. Remove filters from unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, back-flush toward return-air section to remove foreign material. Caution should be taken as to not overflow the evaporator drain condensate pan.
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. 45. To hold top panel open, place coil corner post between top panel and center post. See Fig. 46.
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. 47.
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.

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.

BELTS — Adjust belt tension and pulley alignment at least twice a year or more frequently as operating conditions require. Refer to Step 9 — Adjust Evaporator for Fan Speed for procedures.

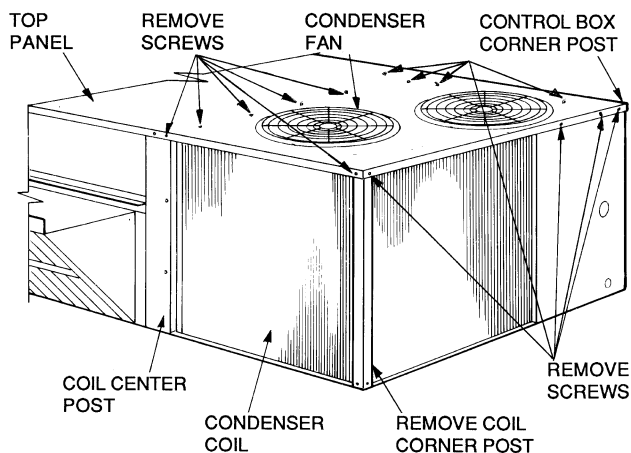


Fig. 45 — Cleaning Condenser Coil

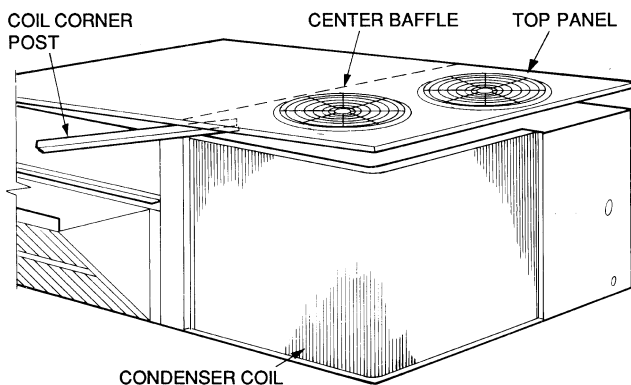


Fig. 46 — Propping Up Top Panel

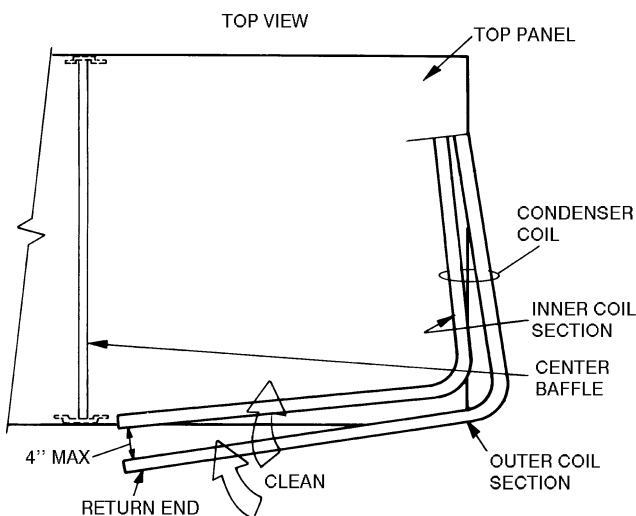


Fig. 47 — Separating Coil Sections

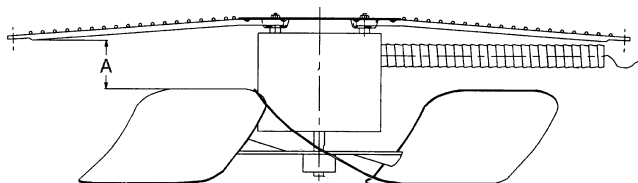
Lubrication

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. 48)

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. 48.
4. Tighten setscrews and replace condenser-fan assembly.



48TJ UNIT VOLTAGE	FAN HEIGHT "A" (in.)
208/230 V	2.75
460 V and 575 V	3.50

Fig. 48 — Condenser-Fan Adjustment

Blower Belt Adjustment — Inspect blower belt for wear, proper belt tension, and pulley alignment as conditions require or at the beginning of each heating and air conditioning season.

Refer to Step 9 — Adjust Evaporator Fan Speed on page 19 for adjustment and alignment procedures.

Manual Outdoor-Air Damper — If outdoor-air damper blade is required, see Manual Outdoor-Air Damper section on page 11.

Economizer Adjustment — Refer to Optional Economizer sections on pages 12 and 15.

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

Checking and Adjustment Refrigerant Charge

The refrigerant system is fully charged with R-22 refrigerant, tested, and factory-sealed. Unit must operate in Cooling mode a minimum of 10 minutes before checking charge.

NOTE: Adjustment of the refrigerant charge is not required unless the unit is suspected of not having the proper R-22 charge.

A superheat charging chart is attached to the outside of the service access panel. The chart includes the required suction line temperature at given suction line pressures and outdoor ambient temperatures.

An accurate superheat, thermocouple- or thermistor-type thermometer, and a gage manifold are required when using the superheat charging method for evaluating the unit charge. *Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.*

⚠ CAUTION

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

Proceed as follows:

1. Remove caps from low- and high-pressure Schrader valve fittings.
2. Using hoses with valve core depressors, attach low- and high-pressure gage hoses to low- and high-pressure service fittings, respectively.
3. Start unit in Cooling mode and let unit run until system pressure stabilize.
4. Measure and record the following:
 - a. Outdoor ambient-air temperature (F db).
 - b. Evaporator inlet-air temperature (F wb).
 - c. Suction-tube temperature (F) at low-side service fitting.
 - d. Suction (low-side) pressure (psig).
5. Using "Cooling Charging Charts" compare outdoor-air temperature (F db) with the suction line pressure (psig) to determine desired system operating suction line temperature. See Fig. 49-52.
6. Compare measured suction-tube temperature with desired suction-tube temperature. Using a tolerance of $\pm 3^{\circ}\text{F}$, add refrigerant if measured temperature is more than 3°F higher than proper suction-tube temperature, or remove refrigerant if actual temperature is more than 3°F lower than required suction-tube temperature.

TO USE COOLING CHARGING CHART — This method is to be used in Cooling mode only. 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 recover some of the charge. Recheck the suction pressure as charge is adjusted. Example (Fig. 52, Circuit 2):

Outdoor Temperature.....85 F
 Suction Pressure.....74 psig
 Suction Temperature should be.....56 F
 (Suction temperature may vary $\pm 5\text{ F}$.)

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.

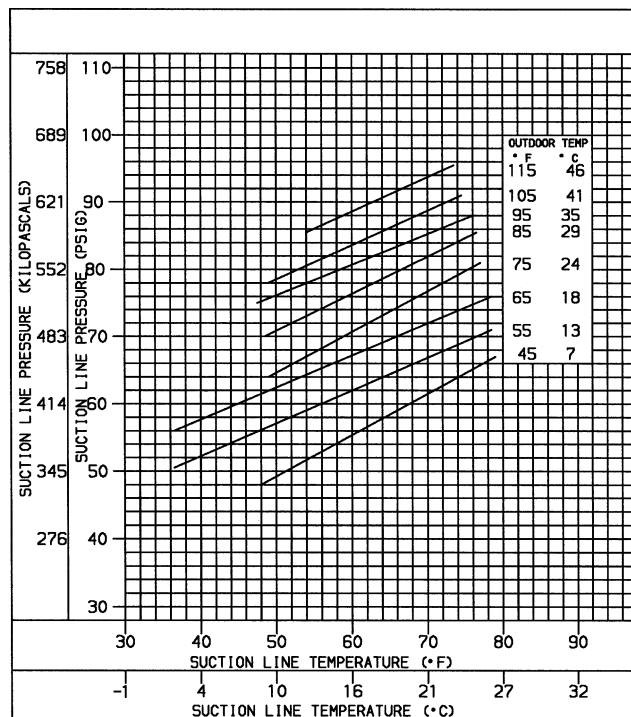


Fig. 49 — Cooling Charging Chart; 48TJ008

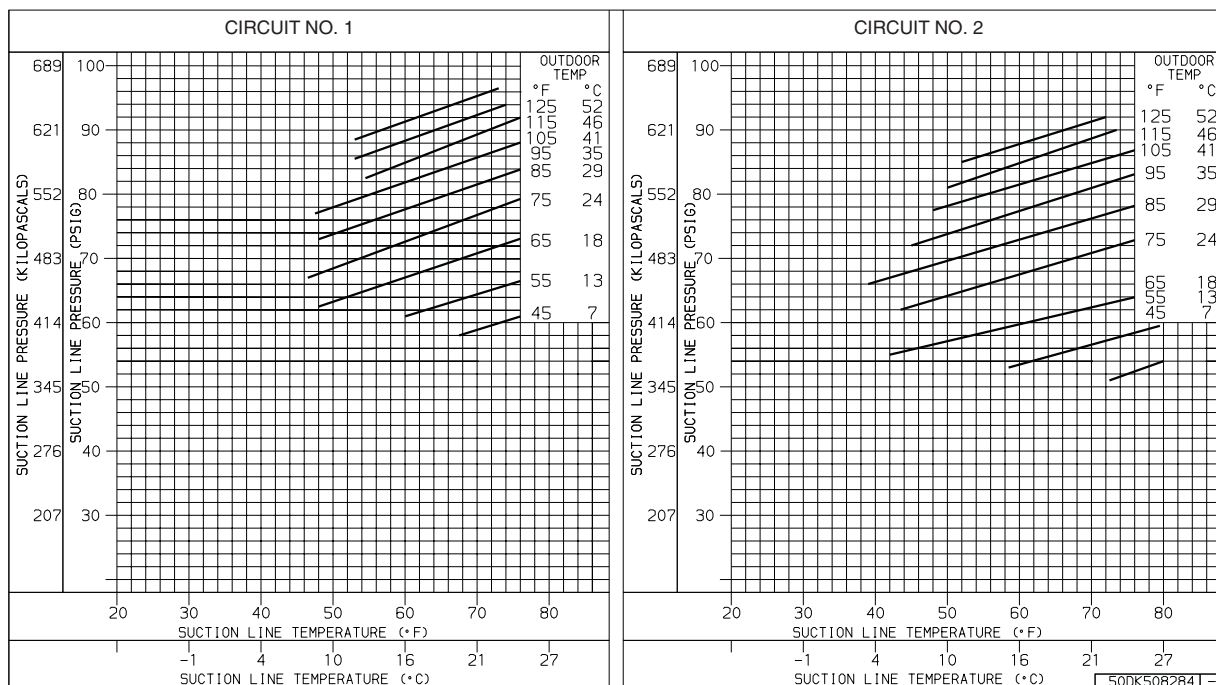


Fig. 50 — Cooling Charging Chart; 48TJ009

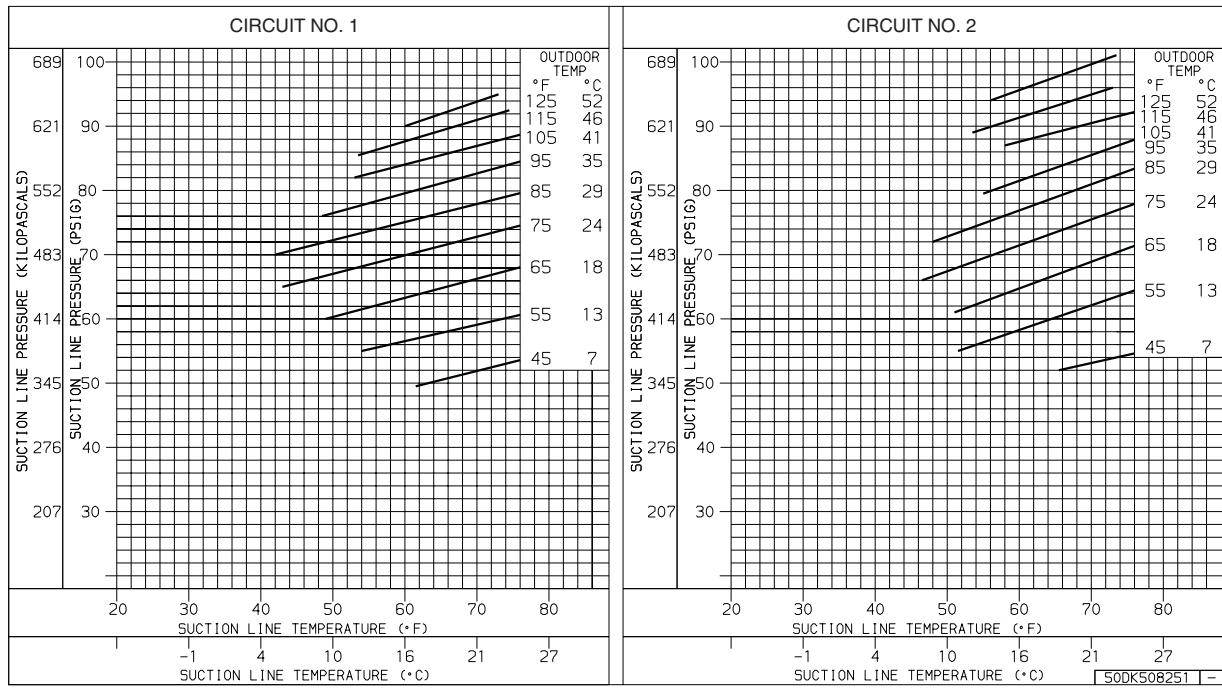


Fig. 51 — Cooling Charging Chart; 48TJ012

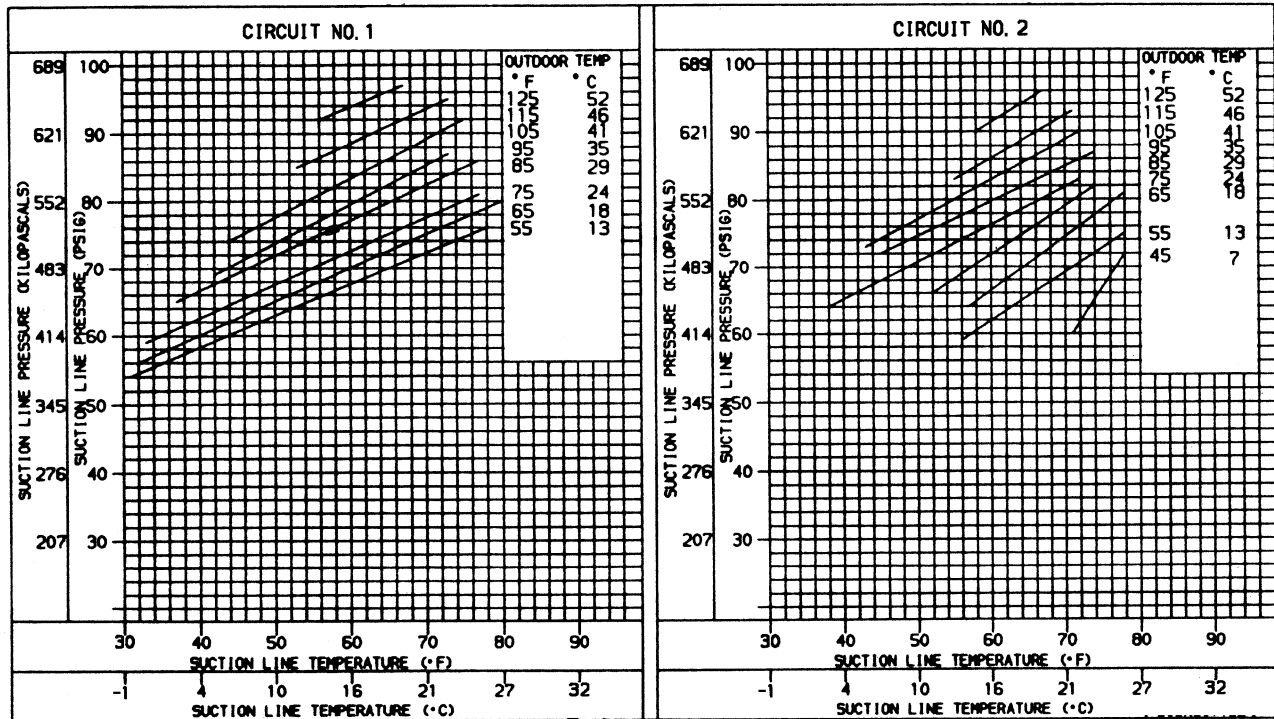


Fig. 52 — Cooling Charging Chart; 48TJ014

Combustion-Air Blower — Clean seasonally 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. 53).
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 set-screws.
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. Verify operation of limit by temporarily blocking return air until limit trips.

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. 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 33. 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 22 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 22 — 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 23-27 for additional information.

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

⚠ CAUTION

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

REMOVAL AND REPLACEMENT OF GAS TRAIN (Fig. 53 and 54)

1. Shut off manual gas valve.
2. Shut off power to unit and install lockout tag.
3. Slide out burner section side panel (not shown).
4. Disconnect gas piping at unit gas valve using backup wrench on the flats of the valve body where the gas pipe enters the gas valve. See Fig. 51.
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. 54).
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. 55.
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.

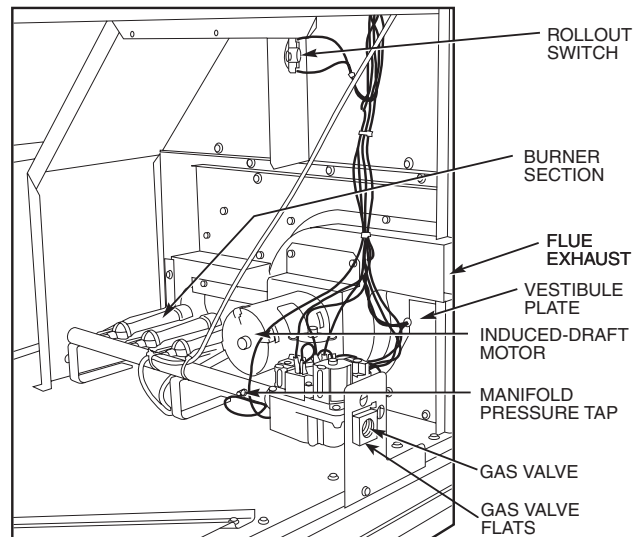


Fig. 53 — Burner Section Details

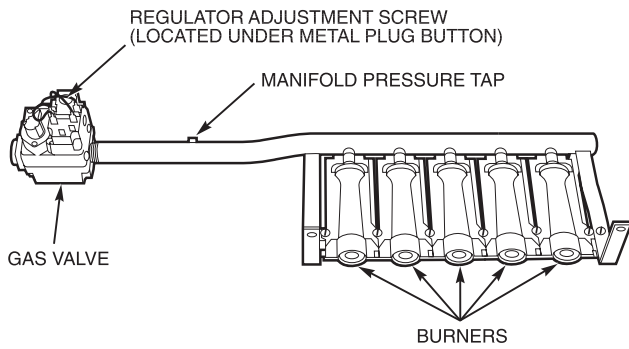
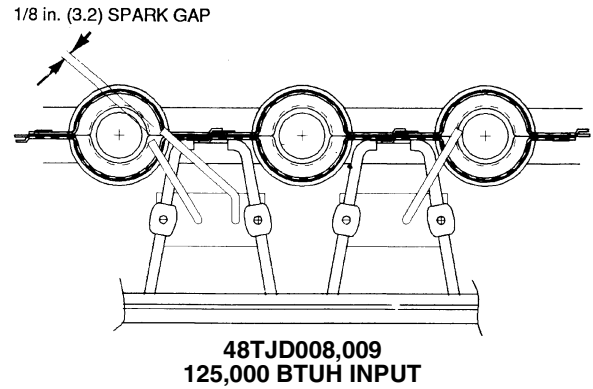
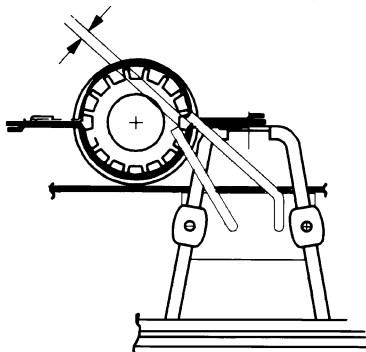


Fig. 54 — Burner Tray Details

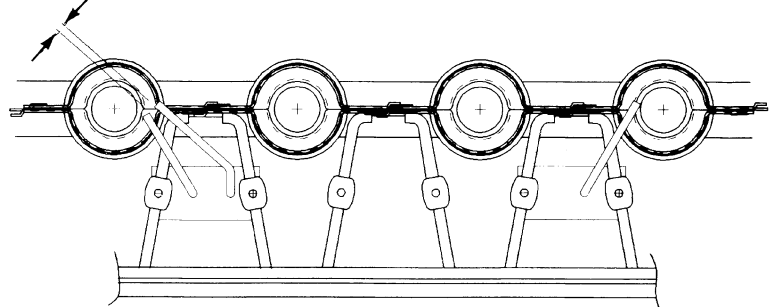


SPARK GAP .125 in. (3.2) TO .140 in. (3.6)



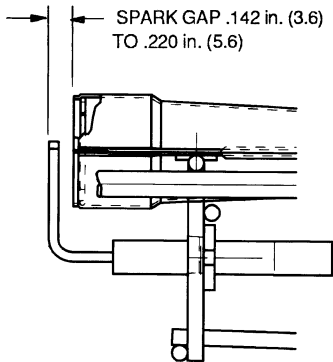
NOTE: Dimensions in () are millimeters.

1/8 in. (3.2) SPARK GAP

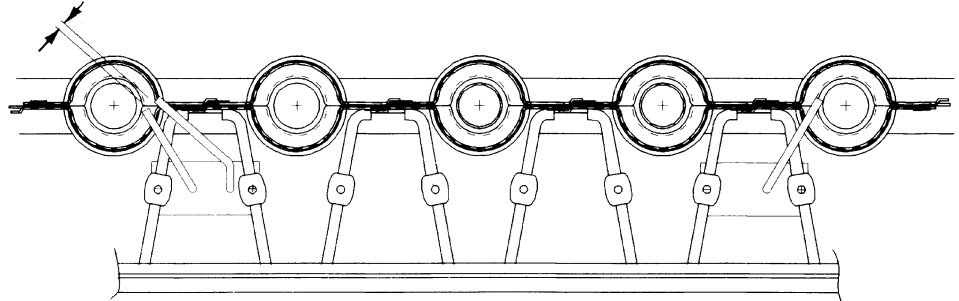


**48TJD012, 48TJE008,009
120,000-180,000 BTUH INPUT**

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



1/8 in. (3.2) SPARK GAP



**48TJD014, 48TJE012, 48TJF008,009 48TJE014, 48TJF012
180,000-224,000 BTUH INPUT
200,000-250,000 BTUH INPUT**

Fig. 55 — Spark Gap Adjustment

TROUBLESHOOTING

Table 23 — LED Troubleshooting — Error Code

SYMPTOM	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.
Fan ON/OFF delay modified (LED/FLASH)	High limit switch opens during heat exchanger warm-up period before fan-on delay expires. Limit switch opens within three minutes after blower-off delay timing in Heating mode.	Ensure unit is fired on rate and temperature rise is correct. Ensure unit's external static pressure is within application guidelines.
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 faults. (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.

⚠ 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.

IMPORTANT: Refer to Heating troubleshooting chart for additional troubleshooting analysis.

LEGEND

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

Table 24 — 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.	Recover 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 makes excessive noise (48TJ014 scroll only).	Compressor rotating in wrong direction.	Reverse the 3-phase power leads as described on page 33.
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.	Recover 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.	Recover 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.	Recover 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 25 — Heating Service Troubleshooting

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 wirenut 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. Clock 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.

Table 26 — EconoMi\$er Troubleshooting

PROBLEM	POTENTIAL CAUSE	REMEDY
Damper Does Not Open	Indoor (Evaporator) Fan is Off	Check to ensure that 24 vac is present at Terminal C1 (Common Power) on the IFC (Indoor Evaporator Fan Contactor) or that 24 vac is present at the IFO (Indoor Evaporator Fan On) terminal. Check whether 24 vac is present at PL 6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram). Check proper thermostat connection to G on the connection board.
	No Power to EconoMi\$er Controller	Check to ensure that 24 vac is present across Terminals 24 VAC and 24 V COM on the EconoMi\$er control. If 24 vac is not present, check wiring (see unit label diagram). If 24 vac is present, STATUS light should be on constantly.
	No Power to G Terminal	If IFM is on, check to ensure 24 vac is present on G Terminal of the EconoMi\$er controller. If 24 vac is not present, check wiring (see unit label diagram).
	Controller Fault	If STATUS light is flashing one flash, the EconoMi\$er controller is experiencing a fault condition. Cycle power to the controller. If condition continues, replace the EconoMi\$er controller.
	Thermostat Fault	If STATUS light is flashing two flashes, the EconoMi\$er controller believes the thermostat is wired incorrectly. Check wiring between the thermostat and the connection board in the electrical panel. The fault condition is caused by Y2 being energized before Y1.
	Actuator Fault	Check the wiring between the EconoMi\$er controller and the actuator. Hold CONFIG button between 3 and 10 seconds to verify the actuator's operation. (This process takes 3 minutes to complete.)
EconoMi\$er Operation Limited to Minimum Position	Minimum Position Set Incorrectly	Verify that the MIN POS (%) is set greater than zero. Adjust MIN POS (%) to 100% to verify operation, and then set to correct setting.
	EconoMi\$er Changeover Set Point Set Too High or Too Low	Set at correct value. See Table 3.
	Supply Air Temperature Sensor Faulty	If STATUS light is flashing 4 flashes, Supply Air Temperature Sensor is faulty. Check wiring or replace sensor.
	Outdoor Air Temperature Sensor Faulty	If STATUS light is flashing 5 flashes, Outdoor Air Temperature Sensor is faulty. Check wiring or replace sensor.
Damper Position Less than Minimum Position Set Point	Supply Air Low Limit Strategy Controlling	The supply-air temperature is less than 45 F, causing the minimum position to be decreased. Refer to the Start-Up instructions. Verify correct setting of MIN POS (%). If correct, EconoMi\$er is operating correctly.
Damper Does Not Return to Minimum Position	CO ₂ Ventilation Strategy Controlling	If a CO ₂ sensor is being used, and the damper position is greater than minimum position, the ventilation control strategy is controlling. Refer to The Start-Up instructions. EconoMi\$er is operating correctly.
Damper Does Not Close on Power Loss	Damper Travel is Restricted	Check to ensure the damper is not blocked.

LEGEND

IFM — Indoor Fan Motor
PL — Plug

Table 27 — Durablade 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

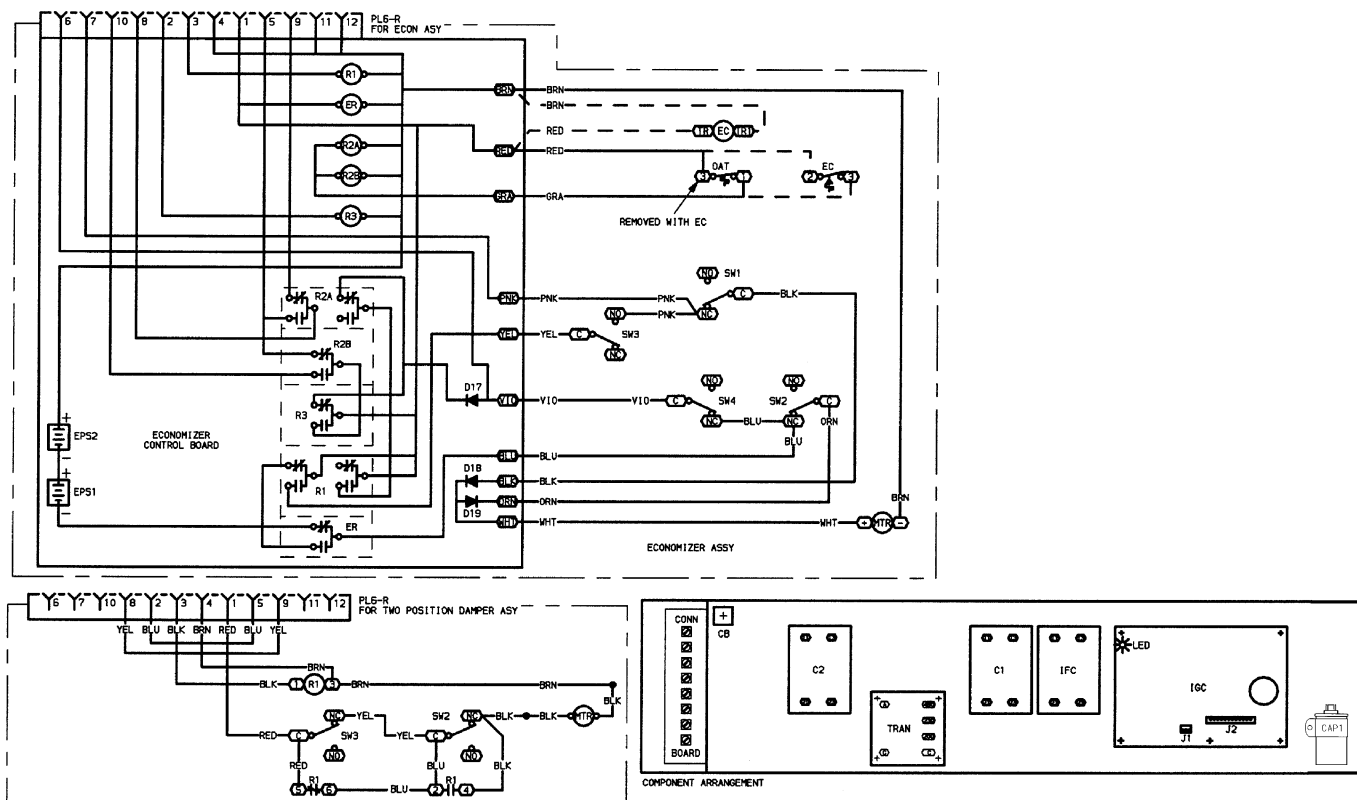


Fig. 56 — Durablade Economizer Two Position Damper Schematic and Component Arrangement

LEGEND AND NOTES FOR FIG. 56 AND 57

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

AHA — Adjustable Heat Anticipator
BR — Burner Relay
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
COMP — Compressor Motor
CR — Control Relay
D — Diode
EC — Enthalpy Control
EPS — Economizer Pressure Switch
EQUIP — Equipment
ER — Economizer Relay
FPT — Freeze-Protection Thermostat
GND — Ground
GVR — Gas Valve Relay
HPS — High-Pressure Switch
HS — Hall Effect Sensor
I — Ignitor
IDM — Induced-Draft Motor
IFC — Indoor (Evaporator) Fan Contactor
IFM — Indoor (Evaporator) Fan Motor
IGC — Integrated Gas Unit Controller
LED — Light-Emitting Diode
LPS — Low-Pressure/Loss-of-Charge Switch
LS — Limit Switch
MGV — Main Gas Valve
MTR — Motor
OAT — Outdoor-Air Thermostat

OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
PL — Plug Assembly
QT — Quadruple Terminal
R — Relay
RS — Rollout Switch
SAT — Supply-Air Thermostat
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:

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single phasing conditions.
3. Thermostat: HH07AT170, 172, 174 and P272-2783 Subbase: HH93AZ176, 178 and P272-1882, 1883
4. Set heat anticipator for first stage at 0.14 amp, second stage at 0.2 amp.
5. Use copper conductors only.
6. 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.
7. 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.

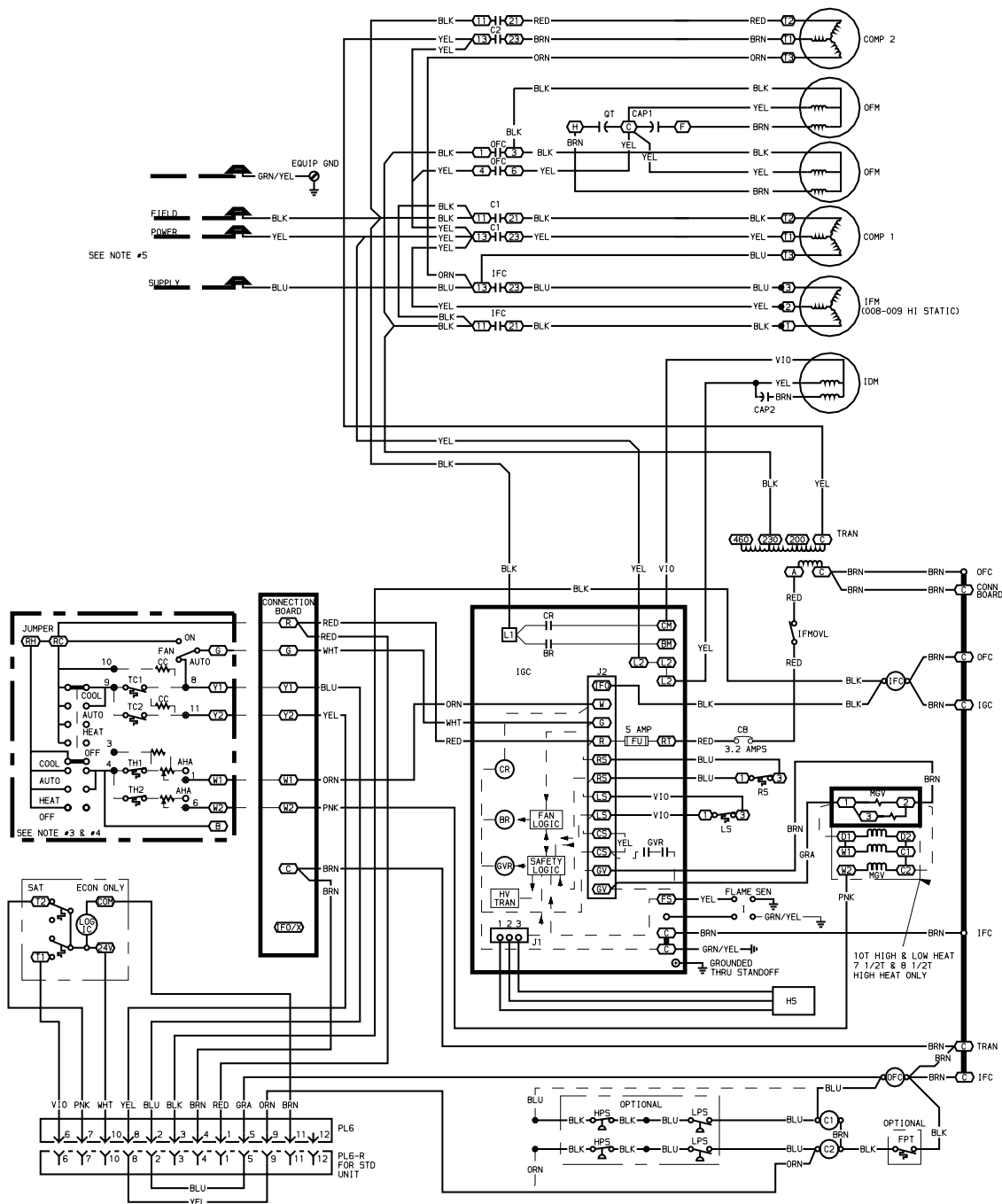


Fig. 57 — Typical Unit Wiring Schematic

START-UP CHECKLIST
(Remove and Store in Job File)

I. PRELIMINARY INFORMATION

MODEL NO.: _____ SERIAL NO.: _____
DATE: _____ TECHNICIAN: _____
UNIT NO.: _____ JOB LOCATION: _____
JOB NAME: _____

II. PRE-START-UP (insert checkmark in box as each item is completed)

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE SHIPPING TIE DOWN BANDS ON COMPRESSOR (SIZE 014 ONLY) PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT INDOOR-AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEELS AND PROPELLERS FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ ENSURE BELT TENSION AND BLOWER PULLEYS ARE PROPERLY ALIGNED.

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L3	_____
INDOOR-FAN AMPS	L1	_____	L2	_____	L3	_____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	_____	DB	
RETURN-AIR TEMPERATURE	_____	DB	_____ WB
COOLING SUPPLY AIR	_____	DB	_____ WB
GAS HEAT SUPPLY AIR	_____	DB	

PRESSURES

GAS INLET PRESSURE	_____	IN. WG	
GAS MANIFOLD PRESSURE	_____	IN. WG (HI FIRE)	_____ IN. WG (LO FIRE)
REFRIGERANT SUCTION PRESSURE	_____	PSIG — CIRCUIT NO. 1	_____ PSIG — CIRCUIT NO. 2
REFRIGERANT TEMP. (SUCTION) PRESSURE	_____	CIRCUIT NO. 1	_____ CIRCUIT NO. 2
REFRIGERANT DISCHARGE	_____	PSIG — CIRCUIT NO. 1	_____ PSIG — CIRCUIT NO. 2
DISCHARGE TEMPERATURE	_____	°F/C — CIRCUIT NO. 1	_____ °F/C — CIRCUIT NO. 2

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING TABLES
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR ROTATING IN CORRECT DIRECTION (48TJ014 ONLY)