

Single-Package Rooftop Heating/Cooling Units

Installation, Start-Up and Service Instructions

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SAFETY CONSIDERATIONS

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

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

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

⚠ WARNING



Disconnect gas piping from unit when leak testing at pressure greater than 1/2 psig. Pressures greater than 1/2 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 1/2 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 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.

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

These units are designed for a minimum continuous return-air temperature of 55 F (dry bulb), or an intermittent operation down to 45 F (dry bulb), such as when used with a night set-back thermostat.

Step 1 — Provide Unit Support

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

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

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

SLAB MOUNT (Horizontal Units Only) — Provide a level concrete slab that extends a minimum of 6 in. beyond unit cabinet. Install a gravel apron in front of condenser coil air inlet to prevent grass and foliage from obstructing airflow.

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

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

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

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

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

Step 3 — Install External Trap for Condensate Drain — All units must have an external trap added for condensate drainage. A $\frac{3}{4}$ -in. NPT connection is located on the side of the unit. Use a trap at least 4-in. deep and protect against freeze-up.

If drain line is run to a drain, pitch line away from unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection. See Fig. 4 for more details.

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. 5 for additional information. Operating weight is shown in Table 1 and Fig. 5.

Lifting holes are provided in base rails as shown in Fig. 5 and 6. Refer to rigging instructions on unit.

⚠ CAUTION

All panels must be in place when rigging.

POSITIONING — Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. See Fig. 6.

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.

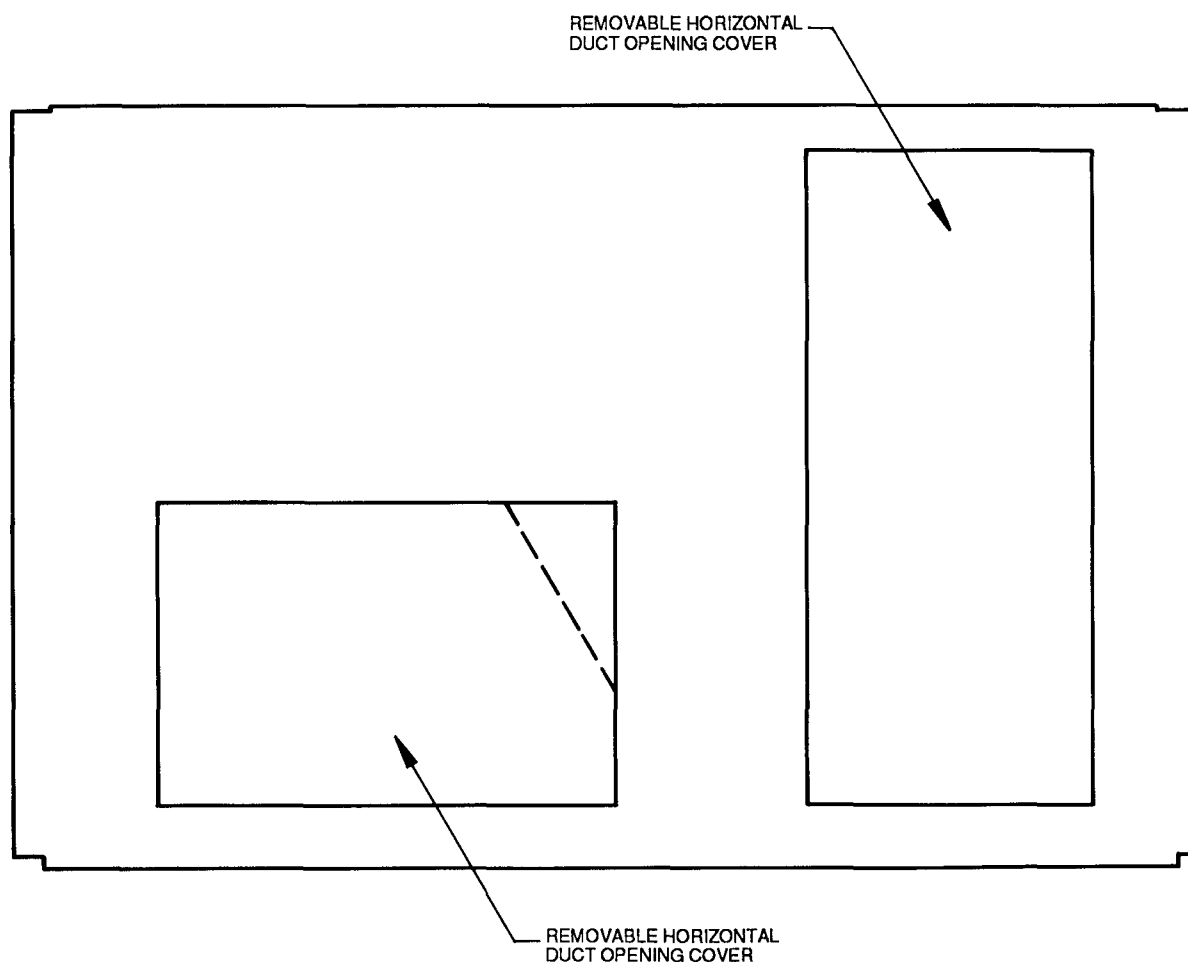


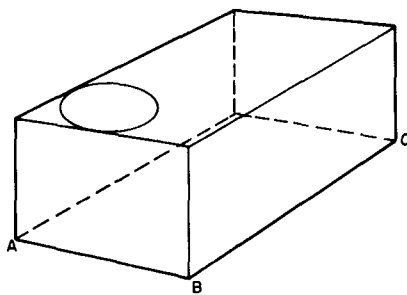
Fig. 1 — Horizontal Conversion Panels

NOTES:

- 1 Roof curb accessory is shipped unassembled
- 2 Insulated panels
- 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 ft on each side.
- 7  Direction of airflow

UNIT SIZE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG ACY
48LJF008,009 48LJD008-014 48LJE008-012	¾" [19] NPT	1 [25] NPT	¾" [19] NPT	50DJ901551

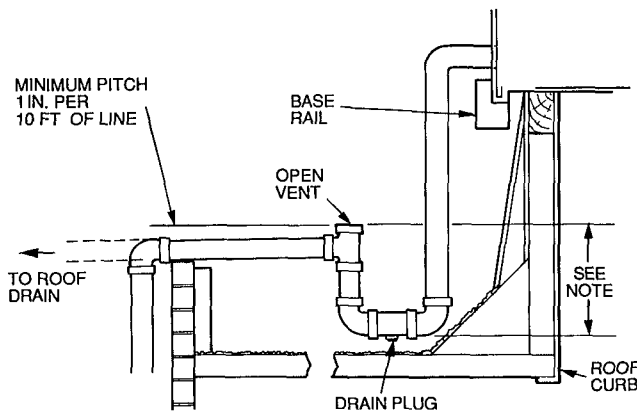




MAXIMUM ALLOWABLE
DIFFERENCE (in.)

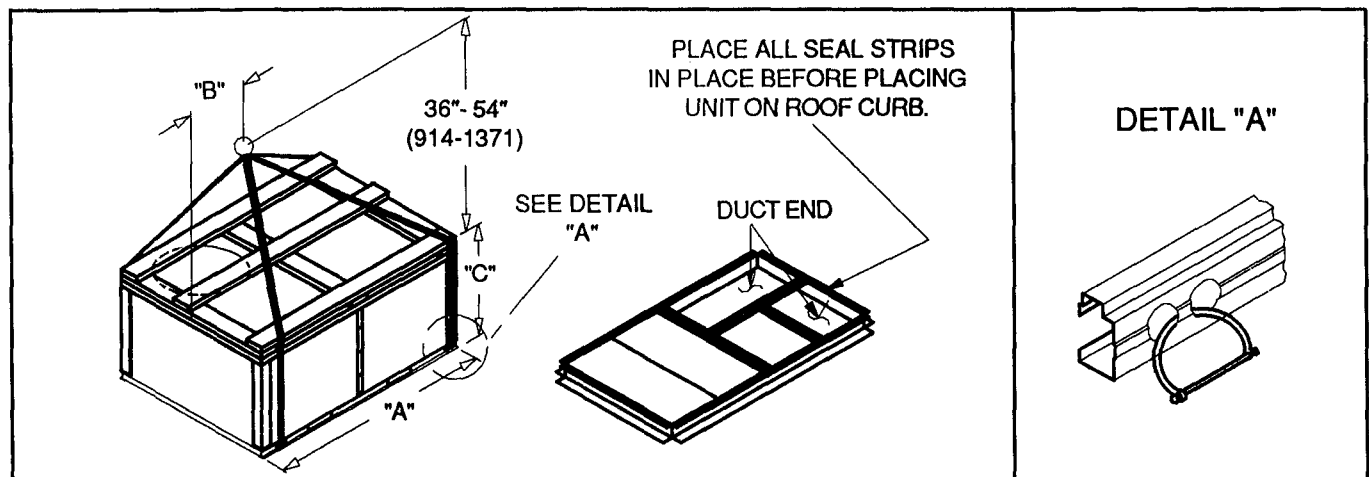
A-B	B-C	A-C
0.5	1.0	1.0

Fig. 3 — Unit Leveling Tolerances



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

Fig. 4 — External Trap Condensate Drain



NOTES:

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

CAUTION

All panels must be in place when rigging.

Position unit on roof curb so that the following clearances are maintained: 1/4-in. clearance between roof curb and base rails on each side and front of unit; 1 5/32-in. clearance between roof curb and rear of unit. (See Fig. 2, section C-C.)

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

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

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

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

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

Step 5 — Install Flue Hood — Flue hood and screen are 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. 7.

UNIT	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
48LJD/LJE/LJF008	870	395	87.38	2219	40.25	1022	41.31	1050
48LJD/LJE/LJF009	880	399	87.38	2219	40.25	1022	41.31	1050
48LJD/LJE012	1035	469	87.38	2219	40.25	1022	49.31	1253
48LJD014	1050	476	87.38	2219	40.25	1022	49.31	1253

Fig. 5 — Rigging Details

Table 1 — Physical Data

BASE UNIT 48		LJD/LJE/LJF008	LJD/LJE/LJF009	LJD/LJE012	LJD014
NOMINAL CAPACITY (tons)		7½	8½	10	12½
OPERATING WEIGHT (lb)					
Unit		870	880	1035	1050
Economizer		44	44	44	44
Roof Curb		143	143	143	143
COMPRESSOR			Hermetic		
Quantity		2	2	2	2
Oil (oz) (each compressor)		55	55	70	65
REFRIGERANT TYPE		R-22			
Operating Charge (lb-oz)					
Circuit 1		7-0	7-0	9-7	10-1
Circuit 2		5-12	6-2	8-6	9-3
CONDENSER FAN			Propeller Type		
Quantity...Diameter (in.)		1 .26	1 .26	1..26	1...26
Nominal Cfm		6500	6500	7000	7200
Motor Hp...Rpm		¾..1100	¾ 1100	¾..1100	¾ ..1100
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		2 ..17	2...17	2...17	2...17
Total Face Area (sq ft)		18.0	20.5	25.0	25.0
EVAPORATOR FAN			Centrifugal Type		
Size (in.)		15 x 15	15 x 15	15 x 15	15 x 15
Type Drive	Std	Belt	Belt	Belt	Belt
	Alt	Belt	—	Belt	—
Nominal Cfm		3000	3400	4000	5000
Maximum Continuous Bhp	Std	2.4	2.4	2.4	4.2
	Alt	—	—	2.9	—
Motor Frame	Std	56	56	56	56
	Alt	—	—	56	—
Fan Rpm Range	Std	590-840	690-935	690-935	860-1080
	Alt	690-935	—	840-1085	—
Motor Bearing Type	Std	Ball	Ball	Ball	Ball
	Alt	2100	2100	2100	2100
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	Std	2.4/3.4	2.8/3.8	2.8/3.8	4.0/5.0
	Alt	2.8/3.8	—	3.4/4.4	—
Fan Pulley Pitch Diameter (in.)	Std	7.0	7.0	7.0	8.0
	Alt	7.0	—	7.0	—
Belt — Type...Length (in.)	Std	A .48	A. 48	A..48	A 51
	Alt	A..48	—	A..48	—
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
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	50	50	50	45
	Alt	50	—	50	—
Movable Pulley Maximum Full Turns from Closed Position	Std	5	5	5	5
	Alt	5	—	5	—
Factory Setting — Full Turns Open	Std	5	5	5	5
	Alt	5	—	5	—
Factory Speed Setting (rpm)	Std	590	690	690	860
	Alt	690	—	840	—
Fan Shaft Diameter at Pulley (in.)		1	1	1	1
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double-Wavy Fins, Acutrol™ Feed Device			
Rows...Fins/in.		3..15	3...15	3 ..15	4 15
Total Face Area (sq ft)		8.0	8.0	10.0	11.1
FURNACE SECTION					
Burner Orifice Diameter (in. ...drill size)					
Natural Gas — Std		120 .31	120 .31	.120...31	.120 ..31
Liquid Propane — Alt		096 41	.096 41	096 .41	096 41
Thermostat Heat Anticipator Setting (amps)					
208/230/460-v					
Stage 1		1.0	1.0	1.0	1.0
Stage 2		0.6	0.6	0.6	0.6
Gas Input	Stage 1	125,000/120,000/180,000	125,000/120,000/180,000	120,000/180,000	180,000
	Stage 2	180,000/220,000	180,000/220,000	180,000/225,000	225,000
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	35-65
Manifold Pressure (in. wg)					
Natural Gas — Std		3.5	3.5	3.5	3.5
Liquid Propane — Alt		3.5	3.5	3.5	3.5
Field Gas Connection Size (in.)		5/75/.75	.5/.75/.75	.75/ .75	.75
HIGH-PRESSURE SWITCH (psig)*			625		
Standard Compressor Internal Relief			428		
Cutout			320		
Reset (Auto.)					
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH*					
(Liquid Line) (psig)					
Cutout			7 ± 3		
Reset (Auto.)			22 ± 7		
FREEZE PROTECTION THERMOSTAT*					
Opens (F)			30 ± 5		
Closes (F)			45 ± 5		
OUTSIDE-AIR INLET SCREENS			Cleanable		
Quantity...Size (in.)			1 20 x 25 x 1		
			1.. 16 x 25 x 1		
RETURN-AIR FILTERS			Throwaway		
Quantity...Size (in.)		4 16 x 20 x 2	4 .16 x 20 x 2	4 20 x 20 x 2	4 .20 x 20 x 2

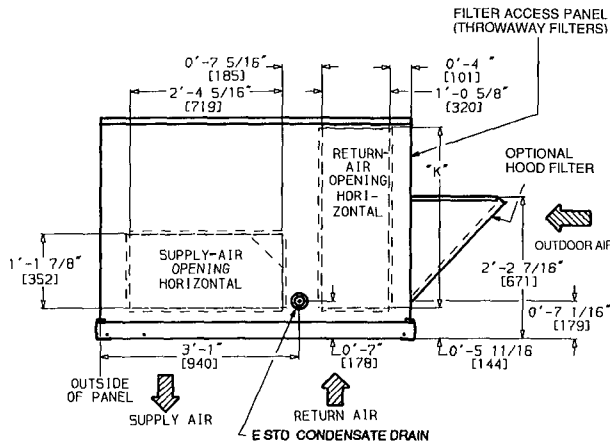
LEGEND

Bhp — Brake Horsepower

*Indicates a FIOP (Factory-installed option) that requires a control kit

UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		"H"		"J"		"K"		"L"	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm	Ft.-in.	mm
48LJE/LJD/LJF008	870	395	44	20	189	86	161	73	239	109	280	127	2-0 ⁷ / ₈	632	3-5 ¹ / ₈	1050	2-9 ¹ / ₈	856	2-2 ¹ / ₈	663
48LJE/LJD/LJF009	880	399	44	20	191	87	163	74	242	110	284	129	1-2 ⁷ / ₈	378	3-5 ¹ / ₈	1050	2-9 ¹ / ₈	856	2-2 ¹ / ₈	663
48LJE/LJD012	1035	469	44	20	225	102	192	87	285	129	333	151	1-2 ⁷ / ₈	378	4-1 ¹ / ₈	1253	3-0 ³ / ₈	924	2-10 ¹ / ₈	866
48LJD014	1050	476	44	20	228	103	195	88	289	131	338	153	1-2 ⁷ / ₈	378	4-1 ¹ / ₈	1253	3-0 ³ / ₈	924	2-10 ¹ / ₈	866

CONNECTION SIZES	
A	1 ³ / ₈ " Dia [35] Field Power Supply Hole
B	2 ¹ / ₂ " Dia [64] Power Supply Knockout
C	1 ³ / ₈ " Dia [44] Pressure Gage Hose Opening
D	7/8" Dia [22] Field Control Wiring Hole
E	3/4"-14 NPT Condensate Drain
F	1/2"-14 NPT Gas Connection 48LJD008,009 3/4"-14 NPT Gas Connection 48LJE008,009,012, 48LJD012,014, 48LJF008,009
G	2" Dia [51] Power Supply Knockout



RIGHT SIDE

NOTES:

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

1 Dimensions in [] are in millimeters

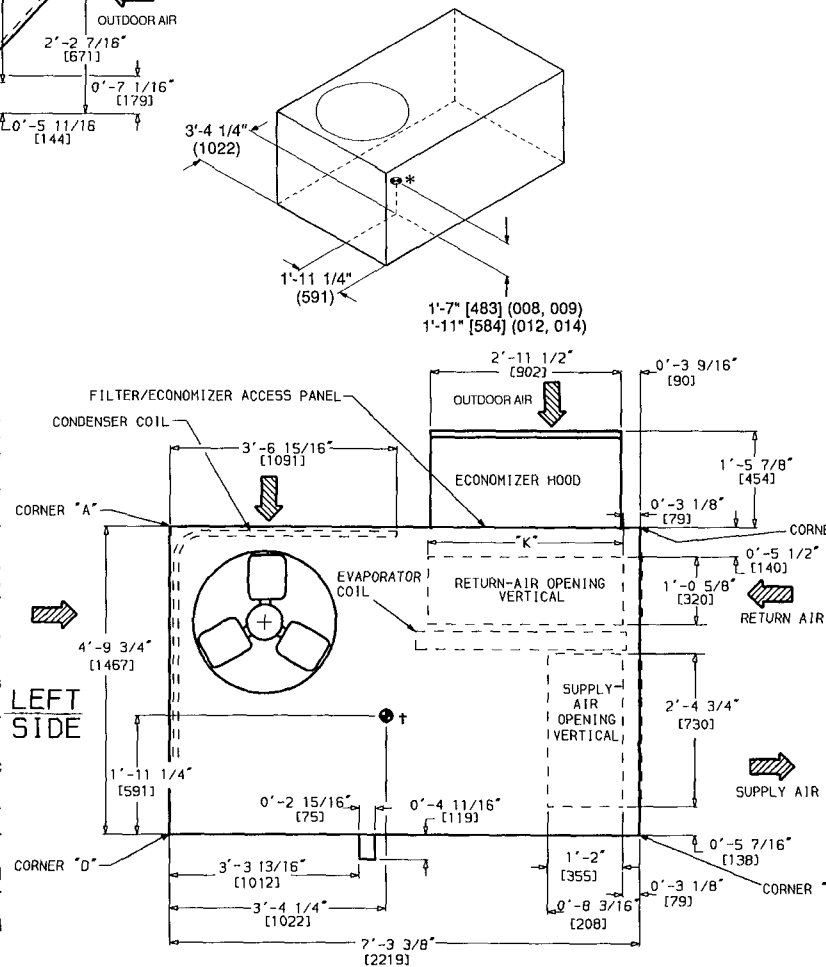
2 Center of gravity

3 Direction of airflow

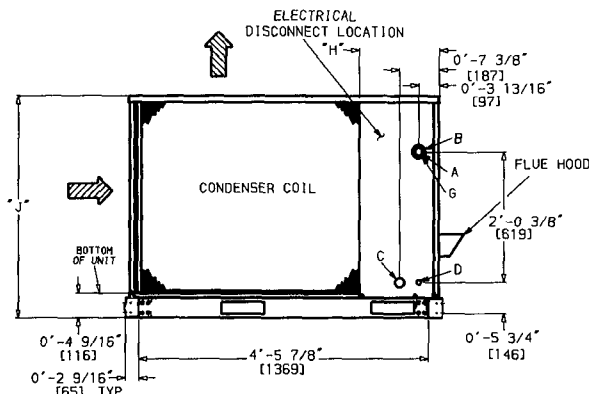
4 On vertical discharge units, ductwork to be attached to accessory roof curb only. For horizontal discharge units, field-supplied flanges should be attached to horizontal discharge openings and all ductwork should be attached to the flanges. Minimum clearances are as follows (local codes or jurisdiction may prevail):

NOTE: When installing these units, use the maximum clearance stated for your application

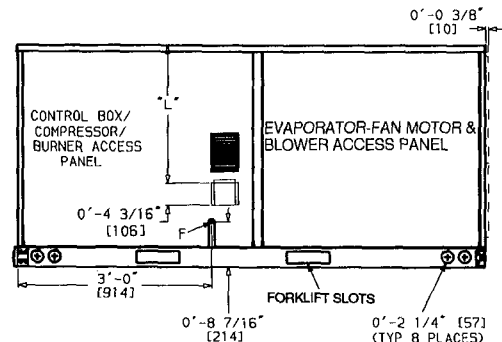
- a Between unit, flue side and combustible surfaces, 48 inches. (Minimum clearance to combustibles, flue side, is 18 in. for units with accessory flue discharge deflector.)
 - b Bottom to combustible surfaces (when not using curb), 0 in. for LJD, LJE units and 1 in. for LJF units.
 - c Condenser coil, for proper airflow, 36 in. one side, 12 in. the other. The side getting the greater clearance is optional.
 - d Overhead, 60 in. to assure proper condenser fan operation.
 - e Horizontal supply and return end, 0 inches.
 - f Between units, control box side, 42 in. per NEC (National Electrical Code).
 - g Between unit and ungrounded surfaces, control box side, 36 in. per NEC.
 - h Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC.
- 6 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.
- 7 Units may be installed on combustible floors made from wood or class A, B, or C roof covering material.



FRONT



LEFT SIDE



FRONT

Fig. 6 – Base Unit Dimensions

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

Gas pressure at unit gas connection must not be less than 4.0 in. wg or greater than 13.0 in. wg while unit is operating.

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

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

See Fig. 8 for typical pipe guide and locations of external manual gas shutoff valve.

Step 7 — Make Electrical Connections

⚠ WARNING

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

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

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

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

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

Install conduit through side panel openings indicated in Fig. 6. Route power lines through connector to terminal connections as shown in Fig. 9.

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

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

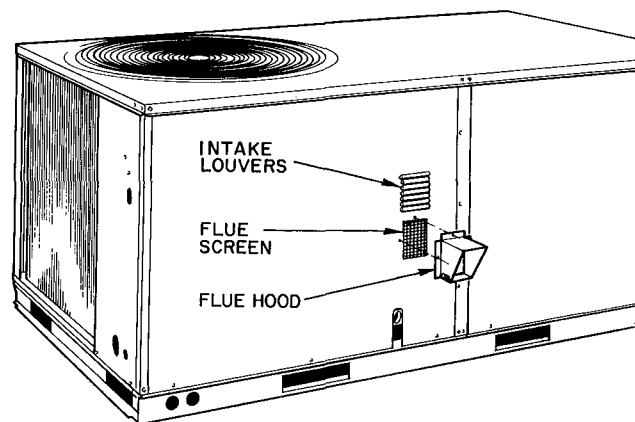
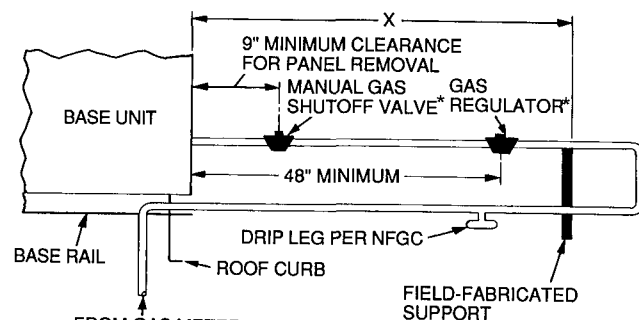


Fig. 7 — Flue Hood Details



LEGEND
 NFGC — National Fuel Gas Code
 *Field supplied
 NOTE: Follow all local codes.

SPACING OF SUPPORTS

STEEL PIPE NOMINAL DIAMETER (in.)	X DIMENSION (feet)
1/2	6
3/4 or 1	8
1 1/4 or larger	10

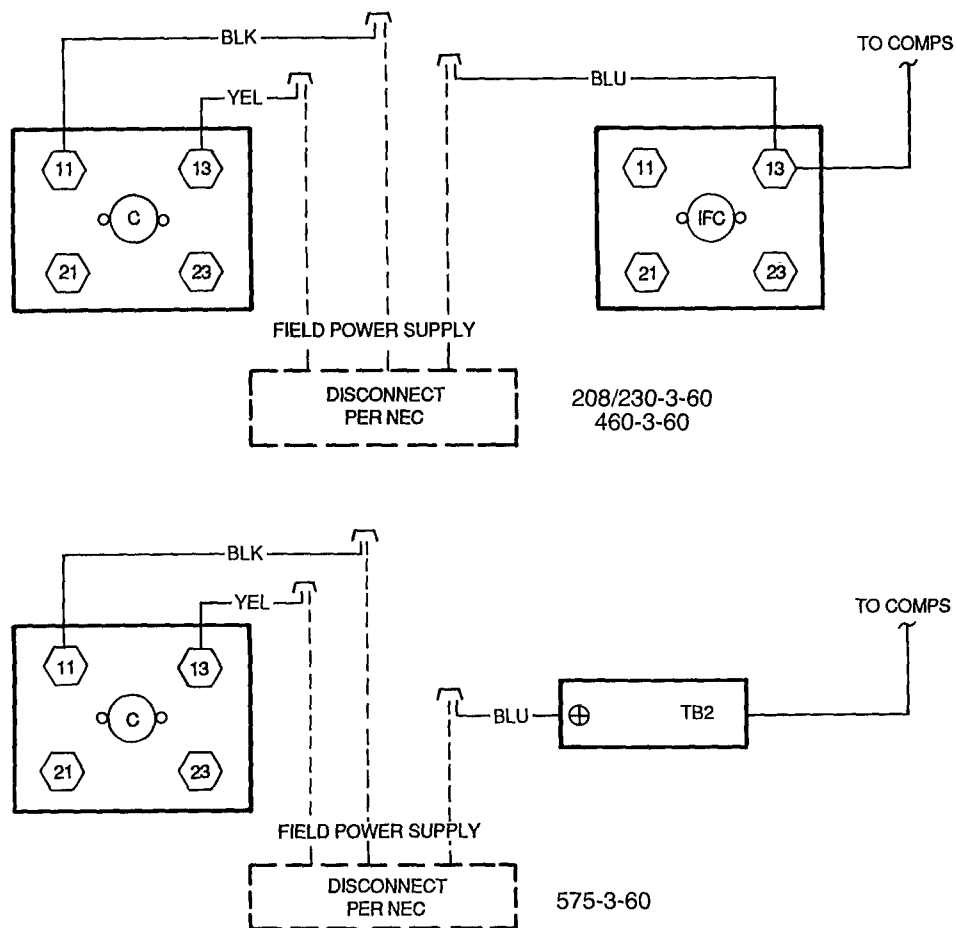
Fig. 8 — Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)

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 subbase terminals to low-voltage connections on unit (shown in Fig. 10) as described in Steps 1 - 4 below.

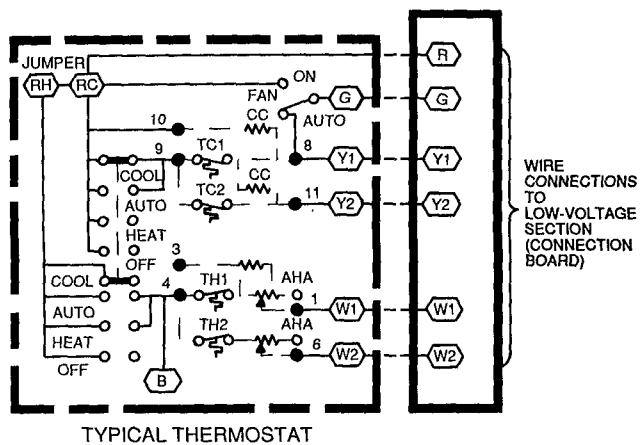
1. If unit is mounted on roof curb and accessory thru-the-curb service plate connection is used, route wire through connection plate.
2. Pass control wires through the hole provided on unit (see connection D in Connection Sizes table in Fig. 6).
3. Feed wires through the raceway built into the corner post to the 24-v barrier located on the left side of the control box. See Fig. 11. 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 1.0 amp for the first stage and 0.6 amp for second-stage heating.



- LEGEND**
- C** — Contactor
COMPS — Compressors
IFC — Indoor (Evaporator) Fan Coil Unit
NEC — National Electrical Code
TB — Terminal Block
- ⊕ — Terminal Block Connection
 — Splice Connection (Factory Supplied)
 - - - Field Wiring
 — — — Factory Wiring

Fig. 9 — Power Wiring Connections



- LEGEND**
- AHA** — Adjustable Heat Anticipator
CC — Cooling Compensator
TC — Thermostat-Cooling
TH — Thermostat-Heating
 - - - Field Wiring
 — — — Factory Wiring

Fig. 10 — Low-Voltage Connections

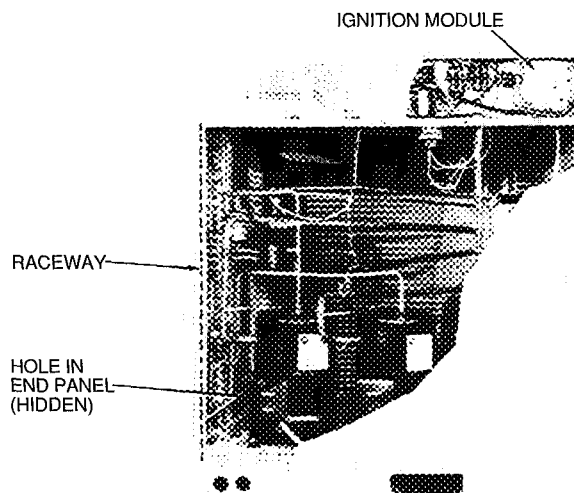


Fig. 11 — Field Control Wiring Raceway

Table 2 — Electrical Data

UNIT	NOMINAL V-PH-HZ	IFM TYPE	VOLTAGE RANGE		COMPR (each)		OFM	IFM	COMBUSTION FAN MOTOR	POWER SUPPLY		DISCONNECT SIZE*	
			Min	Max	RLA	LRA	FLA	FLA	FLA	MCA	MOCP†	FLA	LRA
48LJD/LJE/LJF 008 (7½ Tons)	208/230-3-60	Std	187	254	13.7	82	3.0	5.8	.57	39.6/39.6	45/45	42/42	223/223
		Alt								39.6/39.6	45/45	42/42	223/223
	460-3-60	Std	414	508	6.9	41	1.5	2.6	.30	19.6	25	21	112
		Alt								19.6	25	21	112
	575-3-60	Std	518	632	4.9	30	1.5	2.6	.30	14.3	20	15	84
		Alt								14.3	20	15	84
48LJD/LJE/LJF 009 (8½ Tons)	208/230-3-60	Std	187	254	16.2	84	3.0	5.8	.57	45.3/45.3	50/50	47/47	227/227
	460-3-60		414	508	8.0	42	1.5	2.6	.30	22.1	25	23	114
	575-3-60		518	632	6.1	33	1.5	2.6	.30	17.0	20	18	90
48LJD/LJE 012 (10 Tons)	208/230-3-60	Std	187	254	19.2	105	3.0	5.8	.57	52.0/52.0	60/60	54/54	269/269
		Alt						7.5		53.7/53.7	60/60	56/56	288/288
	460-3-60	Std	414	508	9.6	55	1.5	2.6	.30	25.7	30	27	140
		Alt						3.4		26.5	30	28	149
	575-3-60	Std	518	632	8.3	45	1.5	2.6	.30	22.0	25	22	114
		Alt						3.4		22.6	25	24	121
48LJD 014 (12½ Tons)	208/230-3-60	Std	187	254	22.3	142	3.0	12.0	.57	65.2/65.2	80/80	69/69	386/386
	460-3-60		414	508	10.4	72	1.5	5.4	.30	30.3	35	32	195
	575-3-60		518	632	9.6	58.5	1.5	5.4	.30	27.1	35	28	158

IMPORTANT: Optional, alternate evaporator-fan motor and drive are not available for 48LJ009,014 units. The 48LJ008 units have an alternate drive, but do not have an alternate motor. Contact your local Carrier representative for more information about field-installed motors.

LEGEND

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

*Used to determine minimum disconnect size per NEC.

†Fuse or HACR circuit breaker



NOTES:

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

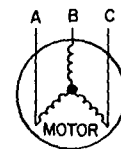
2 Unbalanced 3-Phase Supply Voltage

Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the % 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

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

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

$$= 457$$

NOTE: The 575-v units are CSA only.

Determine maximum deviation from average voltage.

(AB) 457 - 452 = 5 v

(BC) 464 - 457 = 7 v

(AC) 457 - 455 = 2 v

Maximum deviation is 7 v

Determine % voltage imbalance

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

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

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

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

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

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove and save evaporator coil access panel and screws. See Fig. 12.
3. Separate hood and screen from basepan by removing the screws and brackets securing them. Save all screws and discard brackets.
4. Replace evaporator coil access panel.
5. Place hood on front of evaporator coil access panel. See Fig. 13 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 14.

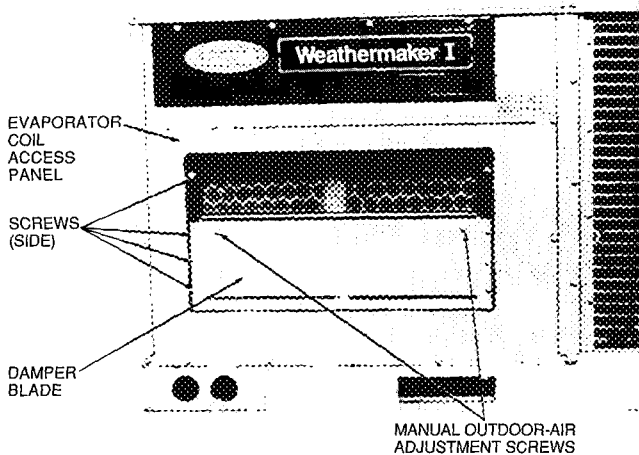


Fig. 12 – Damper Panel with Manual Outdoor-Air Damper Installed

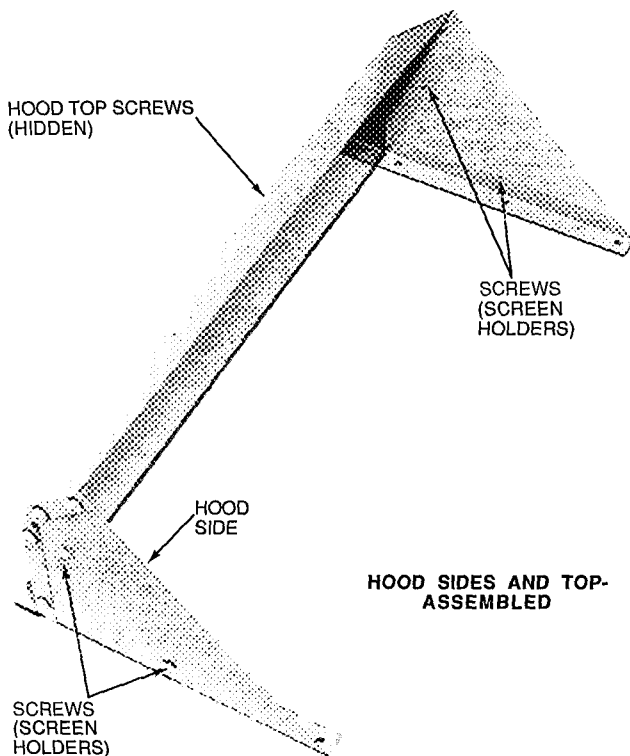


Fig. 13 – Outdoor-Air Hood Details

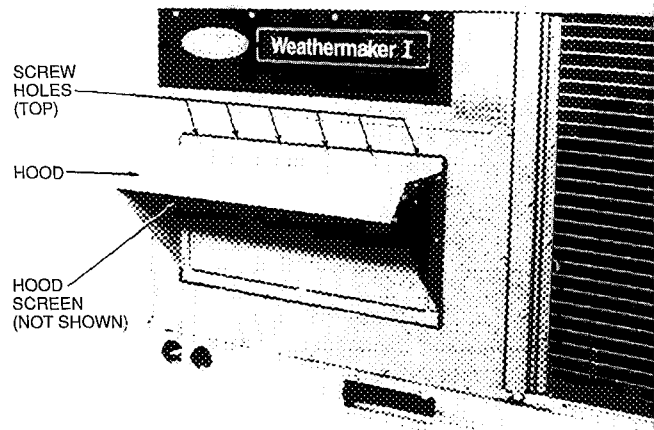


Fig. 14 – Damper with Hood Attached

6. Remove and save 8 screws (4 on each side) from sides of the manual outdoor-air damper.
7. Align screw holes on hood with screw holes on side of manual outdoor-air damper. See Fig. 13 and 14. Secure hood with 8 screws from Step 6.
8. Adjust minimum position setting of the damper blade by adjusting the manual outdoor air adjustment screws on the front of the damper blade. See Fig. 12. Slide blade vertically until it is in the appropriate position determined by Fig. 15. Tighten screws.
9. Remove and save screws currently on sides of hood. Insert screen. Secure screen to hood using the screws. See Fig. 14.

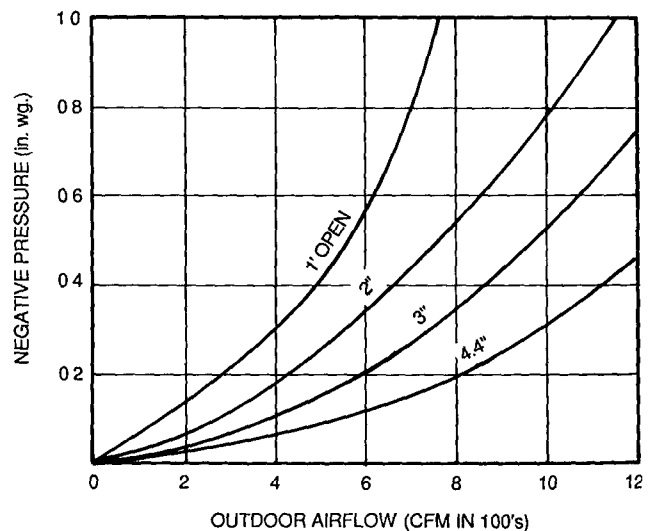


Fig. 15 – Position Setting

TWO-POSITION DAMPER — The outdoor-air hood and screen are attached to the basepan at the bottom of the unit.

Assembly:

1. Determine quantity of ventilation air required for building. Record amount of air for use in Step 9.
2. Remove and save evaporator coil access panel and screws. See Fig. 16.
3. Separate hood and screen from basepan by removing the screws and brackets securing the hood. Save screws and discard brackets.
4. Insert two-position damper plug from wiring harness, supplied with the unit, into the wiring harness, supplied with the two-position damper.
5. Replace evaporator coil access panel.

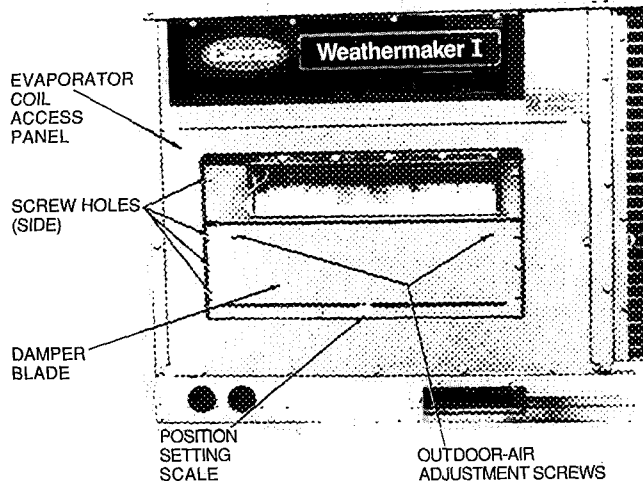


Fig. 16 — Damper Panel with Two-Position Damper Installed

6. Place hood on front of evaporator coil access panel. See Fig. 13 for hood details. Secure top of hood with the 6 screws removed in Step 3. See Fig. 14.
7. Remove and save 8 screws (4 on each side) from sides of the two-position damper.
8. Align screw holes on hood with screw holes on side of two-position damper. See Fig. 13 and 14. Secure hood with 8 screws from Step 7.
9. Determine two-position damper setting by using Fig. 15. Set the damper panel position using the air adjustment screws. See Fig. 16. Tighten screws.
10. Remove and save screws currently on sides of hood. Insert screen. Secure screen to hood using the screws. See Fig. 14.

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

Assembly:

1. Determine quantity of ventilation air required for building. Record amount of air for use in Step 9.

2. Remove evaporator coil access panel (see Fig. 17). Save panel and screws.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 18. Install seal strips on hood top and sides. Put aside screen retainer and screws for later assembly. *Do not attach hood to unit at this time.*
4. On 48LJ012,014 units, install vertical discharge block-off plate over duct openings. See Fig. 19.
5. The block-off panel should be removed from the evaporator coil access panel and discarded. Save screws. See Fig. 17.
6. Remove screws securing barometric relief damper, if desired. See Fig. 20 and 21.

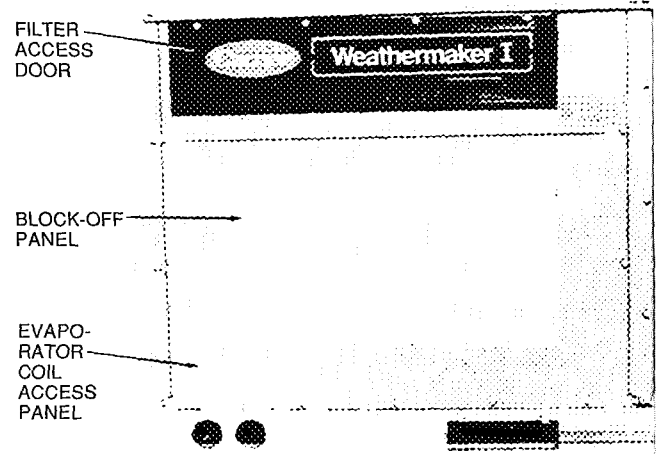


Fig. 17 — Access Panel Location

7. To convert to horizontal discharge application:
 - a. Remove filters from filter track.

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

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

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

8. Insert economizer plug from the wiring harness (supplied with the unit) into the wiring harness plug (supplied with the economizer). See Fig. 20 and 21.

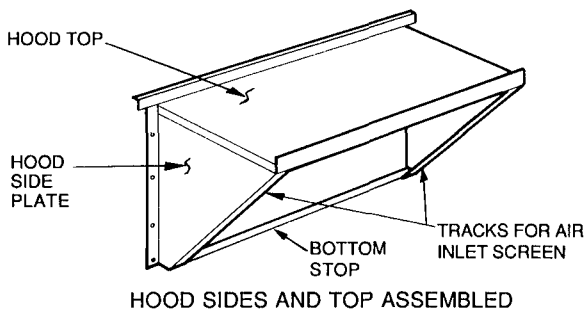
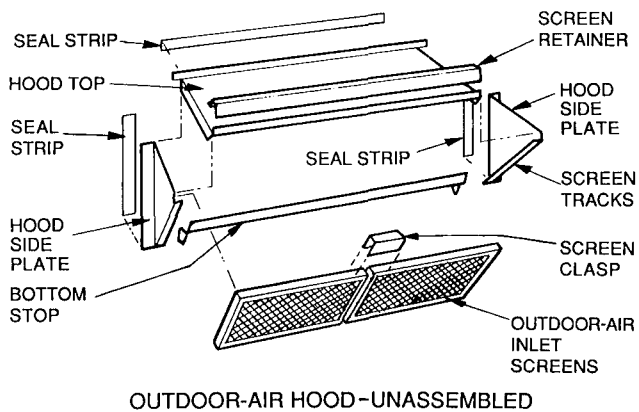


Fig. 18 – Outdoor-Air Hood Details

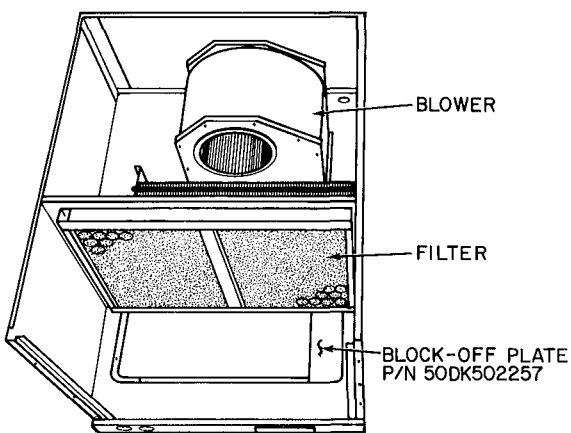


Fig. 19 – Vertical Discharge Block-Off Plate (Sizes 012,014 only)

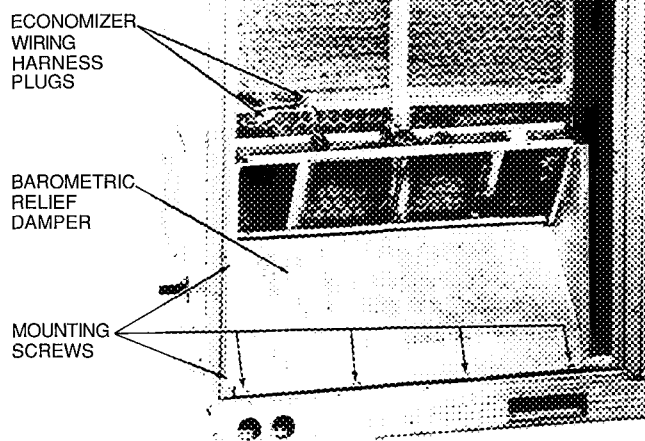


Fig. 20 – Economizer Installed in Unit

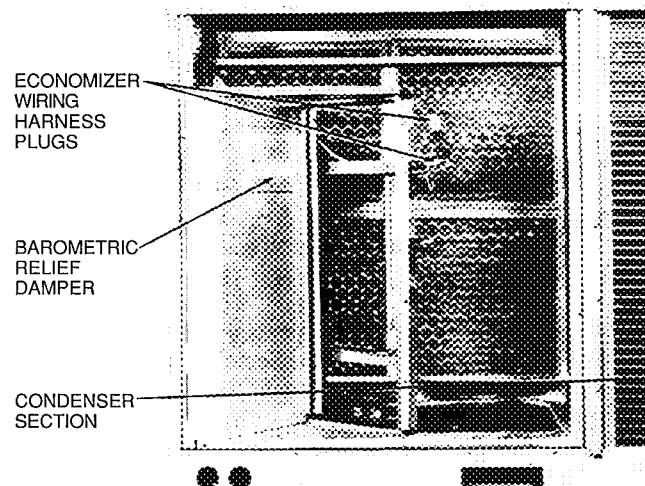


Fig. 21 – Horizontal Economizer Installation (90 Degree Rotation)

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

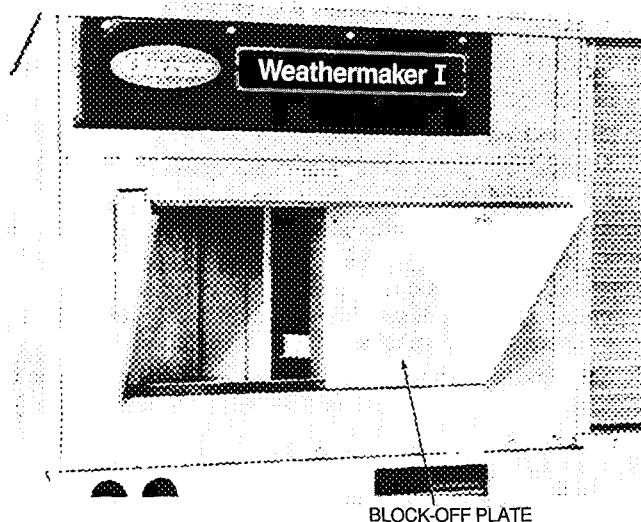
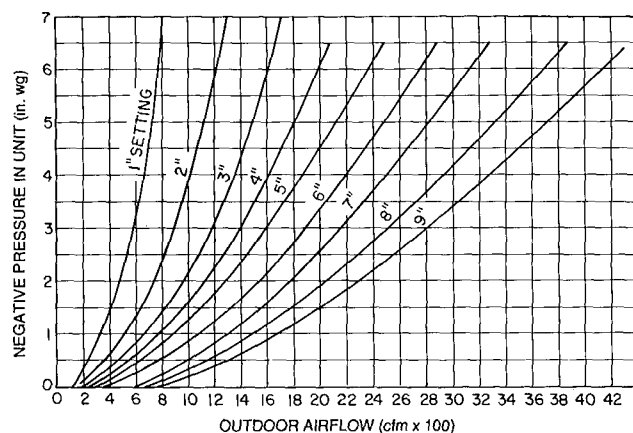


Fig. 22 — Horizontal Discharge Block-Off Plate



Example:

Given —

Negative Pressure 0.1 inch wg
Outdoor Air 1100 cfm

Determine —

Setting = 6

Fig. 23 — Economizer Damper Minimum Position Setting

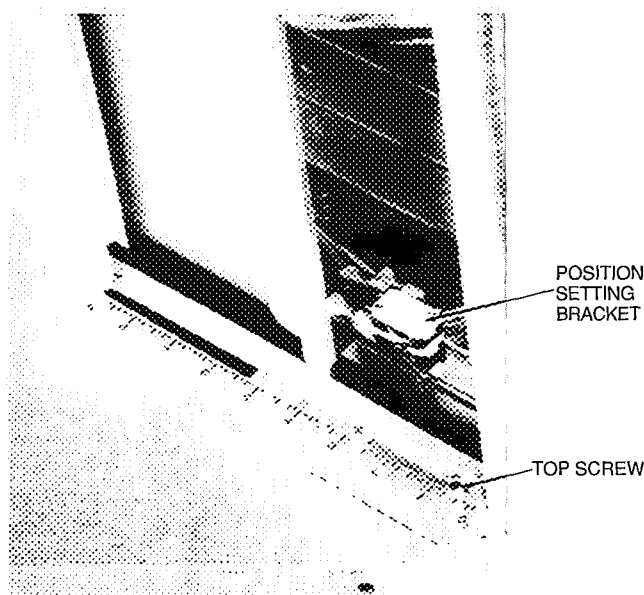


Fig. 24 — Minimum Position Damper Setting

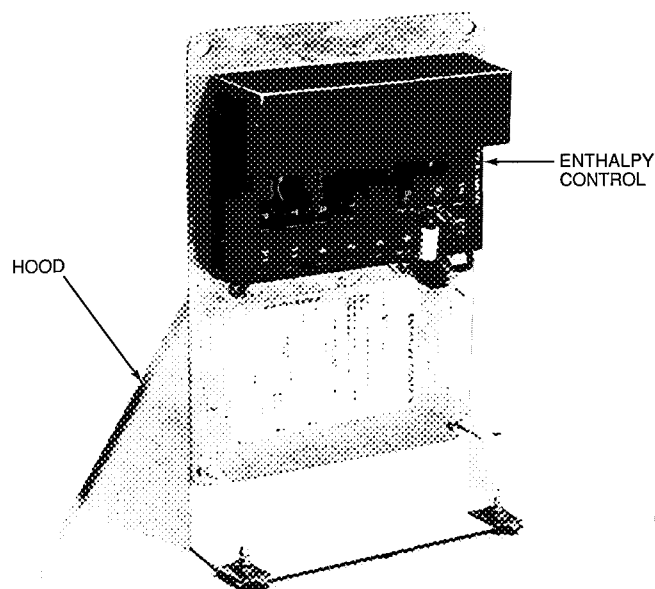
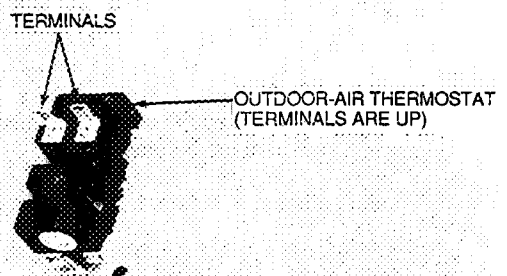
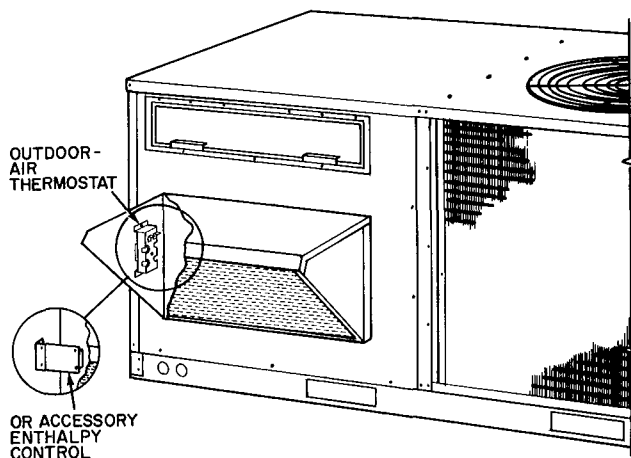


Fig. 25 — Outdoor-Air Thermostat/Enthalpy Control Installation

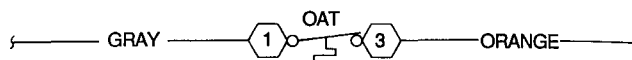


Fig. 26 — Wiring Connections for Outdoor-Air Thermostat

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

For units with electric heating, required minimum cfm is 2250 for 48LJ008; 2550 for 48LJ009; and 3000 for 48LJ012 and 014 with the following exceptions:

UNIT	UNIT VOLTAGE	HEATER KW	UNIT CONFIG-ATION	REQUIRED MINIMUM CFM
48LJ012 and 014	208/230	42.4	Horizontal	3200
	208/230	50.0	Horizontal	3200
	460	50.0	Horizontal or Vertical	3200
48LJ008-014	575	18.0	Horizontal or Vertical	2800
		36.0	Horizontal or Vertical	2350

Table 3 shows fan rpm at motor pulley settings, Table 4 shows motor efficiencies and Table 5 gives accessory static pressure drops. Refer to Tables 6-13 to determine fan speed settings. Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speed:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting plate nuts (see Fig. 27 and 28).
3. Loosen movable pulley flange setscrew (see Fig. 29).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew (see Table 1 for speed change for each full turn of pulley flange).

To align fan and motor pulleys:

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

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

1. Loosen fan motor mounting plate nuts.
2. *Units 008,009* — Slide motor mounting plate away from fan scroll for proper belt tension (1/2-in. deflection with one finger) and tighten mounting nuts (see Fig. 27).
Units 012,014 — Slide motor mounting plate downward to tighten belt tension. Secure motor mounting plate nuts. See Fig. 28.
3. Adjust bolt and nut on mounting plate to secure motor in fixed position.

Table 3 – Fan Rpm At Motor Pulley Settings

UNIT	MOTOR PULLEY TURNS OPEN										
	0	½	1	1½	2	2½	3	3½	4	4½	5
48LJD/LJE/LJF 008	840	815	790	765	740	715	690	665	640	615	590
48LJD/LJE/LJF 008*	935	910	890	865	840	815	790	765	740	715	690
48LJD/LJE009	935	910	890	865	840	815	790	765	740	715	690
48LJD/LJE012	935	910	890	865	840	815	790	765	740	715	690
48LJD/LJE012*	1085	1060	1035	1010	985	960	935	910	890	865	840
48LJD014	1080	1060	1035	1015	990	970	950	930	905	885	860

*Indicates alternate evaporator-fan motor and drive

Table 4 – Evaporator-Fan Motor Efficiency

MOTOR	EFFICIENCY (%)
48LJD/LJE008-012	80
48LJD014	85
48LJF008-009	80

NOTE: Convert bhp to Watts using the following formula:

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

**Table 5 – Economizer Static Pressure Drop (in. wg)
– 48LJD008-014; LJE008-012; LJF008,009**

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

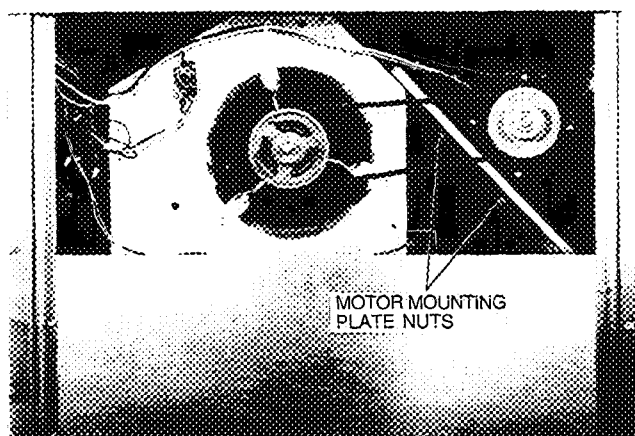


Fig. 27 – Typical Belt-Drive Motor Mounting for Sizes 008,009

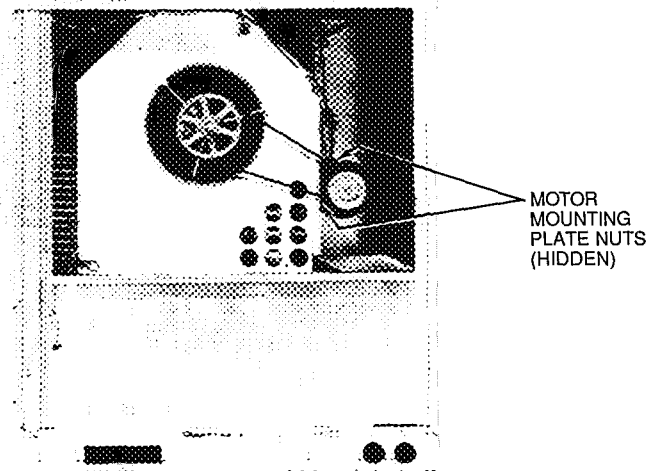


Fig. 28 – Typical Belt-Drive Motor Mounting for Sizes 012,014

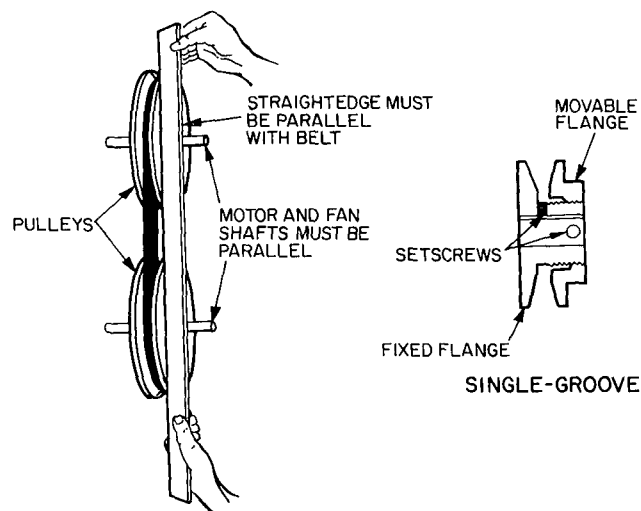


Fig. 29 – Evaporator-Fan Pulley Adjustment

Table 6 – Fan Performance, 48LJD,LJE,LJF008 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	499	0.50	580	0.70	652	0.94	717	1.17	779	1.43	839	1.78	905	2.21	951	2.57
2250	507	0.53	586	0.73	658	0.97	722	1.22	783	1.46	843	1.81	908	2.25	955	2.59
2300	513	0.55	592	0.76	663	1.00	727	1.26	786	1.49	846	1.84	910	2.28	959	2.61
2400	528	0.60	606	0.83	674	1.06	738	1.34	795	1.58	853	1.88	912	2.31	967	2.68
2500	542	0.66	619	0.90	686	1.13	748	1.41	806	1.68	859	1.94	919	2.37	971	2.73
2550	550	0.69	627	0.94	692	1.17	754	1.45	812	1.74	864	1.99	920	2.39	974	2.76
2600	557	0.72	634	0.97	698	1.21	759	1.49	816	1.79	868	2.04	921	2.37	976	2.78
2700	573	0.79	648	1.05	711	1.29	770	1.58	827	1.88	878	2.16	928	2.45	983	2.88
2800	588	0.86	662	1.13	723	1.38	782	1.66	837	1.98	889	2.29	937	2.57	986	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	848	2.08	900	2.41	947	2.70	993	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	859	2.18	910	2.52	958	2.85	1002	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	870	2.29	920	2.64	968	2.99	1012	3.20
3200	652	1.21	718	1.49	778	1.80	831	2.09	882	2.40	931	2.76	979	3.13	1023	3.47
3300	668	1.31	732	1.59	793	1.92	844	2.21	894	2.53	942	2.89	989	3.26	1034	3.63
3400	684	1.41	747	1.70	807	2.04	857	2.35	907	2.66	954	3.02	1000	3.40	1044	3.79
3500	701	1.53	762	1.82	821	2.16	871	2.48	919	2.80	966	3.15	1011	3.55	1054	3.94
3600	717	1.65	777	1.94	835	2.29	885	2.63	932	2.95	978	3.30	1022	3.69	1065	4.10
3700	733	1.77	792	2.07	849	2.42	899	2.78	945	3.11	990	3.45	1034	3.84	1076	4.26
3750	742	1.84	800	2.14	856	2.49	907	2.86	952	3.20	997	3.54	1040	3.93	1082	4.27
3800	750	1.90	807	2.21	863	2.56	914	2.93	958	3.28	1003	3.62	1045	4.01	1087	4.42
3900	767	2.04	822	2.35	877	2.71	928	3.09	972	3.45	1015	3.80	1057	4.18	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.25	986	3.63	1028	3.99	1070	4.36	1110	4.78
4100	800	2.34	854	2.66	905	3.02	956	3.43	1000	3.81	1042	4.18	1082	4.56	1122	4.97
4200	817	2.49	869	2.82	920	3.19	970	3.60	1015	4.00	1055	4.38	1095	4.76	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.69	1022	4.10	1062	4.49	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1029	4.20	1069	4.59	1108	4.98	1147	5.38

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 Shading indicates alternate drive required. (See Note 7)
- 2 **Boldface** indicates field-supplied drive required (See Note 7)
- 3 **Shading** indicates field-supplied motor and drive required
- 4 *Maximum usable bhp is 2.4* Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized

- 5 with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
- 6 Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 7 Values include losses for filters, unit casing, and wet coils.
- 8 Standard motor drive range: 590 to 840 rpm. Alternate drive range: 690 to 935 rpm. All other rpms require field-supplied drive.

Table 7 – Fan Performance, 48LJD,LJE,LJF009 – Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	499	0.50	580	0.70	652	0.94	717	1.17	779	1.43	839	1.78	905	2.21	951	2.57
2250	507	0.53	586	0.73	658	0.97	722	1.22	783	1.46	843	1.81	908	2.25	955	2.59
2300	513	0.55	592	0.76	663	1.00	727	1.26	786	1.49	846	1.84	910	2.28	959	2.61
2400	528	0.60	606	0.83	674	1.06	738	1.34	795	1.58	853	1.88	912	2.31	967	2.68
2500	542	0.66	619	0.90	686	1.13	748	1.41	806	1.68	859	1.94	919	2.37	971	2.73
2550	550	0.69	627	0.94	692	1.17	754	1.45	812	1.74	864	1.99	920	2.39	974	2.76
2600	557	0.72	634	0.97	698	1.21	759	1.49	816	1.79	868	2.04	921	2.37	976	2.78
2700	573	0.79	648	1.05	711	1.29	770	1.58	827	1.88	878	2.16	928	2.45	983	2.88
2800	588	0.86	662	1.13	723	1.38	782	1.66	837	1.98	889	2.29	937	2.57	986	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	848	2.08	900	2.41	947	2.70	993	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	859	2.18	910	2.52	958	2.85	1002	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	870	2.29	920	2.64	968	2.99	1012	3.20
3200	652	1.21	718	1.49	778	1.80	831	2.09	882	2.40	931	2.76	979	3.13	1023	3.47
3300	668	1.31	732	1.59	793	1.92	844	2.21	894	2.53	942	2.89	989	3.26	1034	3.63
3400	684	1.41	747	1.70	807	2.04	857	2.35	907	2.66	954	3.02	1000	3.40	1044	3.79
3500	701	1.53	762	1.82	821	2.16	871	2.48	919	2.80	966	3.15	1011	3.55	1054	3.94
3600	717	1.65	777	1.94	835	2.29	885	2.63	932	2.95	978	3.30	1022	3.69	1065	4.10
3700	733	1.77	792	2.07	849	2.42	899	2.78	945	3.11	990	3.45	1034	3.84	1076	4.26
3750	742	1.84	800	2.14	856	2.49	907	2.86	952	3.20	997	3.54	1040	3.93	1082	4.27
3800	750	1.90	807	2.21	863	2.56	914	2.93	958	3.28	1003	3.62	1045	4.01	1087	4.42
3900	767	2.04	822	2.35	877	2.71	928	3.09	972	3.45	1015	3.80	1057	4.18	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.25	986	3.63	1028	3.99	1070	4.36	1110	4.78
4100	800	2.34	854	2.66	905	3.02	956	3.43	1000	3.81	1042	4.18	1082	4.56	1122	4.97
4200	817	2.49	869	2.82	920	3.19	970	3.60	1015	4.00	1055	4.38	1095	4.76	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.69	1022	4.10	1062	4.49	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1029	4.20	1069	4.59	1108	4.98	1147	5.38

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 Shading indicates field-supplied motor required (See Note 7)
- 2 **Boldface** indicates field-supplied drive required (See Note 7.)
- 3 **Shading** indicates field-supplied motor and drive required
- 4 *Maximum usable bhp is 2.4* Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized

- 5 with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
- 6 Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 7 Values include losses for filters, unit casing, and wet coils.
- 8 Standard motor drive range: 690 to 935 rpm. All other rpms require field-supplied drive.

Table 8 — Fan Performance, 48LJD/LJE012 — Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	552	0.68	632	0.87	701	1.05	761	1.22	816	1.36	871	1.54	918	1.67	967	1.89	1010	2.09	1063	2.46
3100	565	0.74	644	0.93	711	1.12	772	1.31	825	1.45	879	1.63	928	1.78	973	1.94	1018	2.17	1070	2.51
3200	578	0.81	656	1.00	723	1.20	782	1.39	835	1.55	887	1.71	937	1.90	981	2.04	1026	2.26	1075	2.57
3300	591	0.88	668	1.08	734	1.28	793	1.47	845	1.65	895	1.80	946	2.00	991	2.16	1032	2.32	1080	2.64
3400	605	0.96	680	1.16	745	1.36	803	1.56	856	1.75	904	1.91	953	2.10	1000	2.29	1041	2.44	1083	2.65
3500	619	1.04	691	1.23	755	1.44	813	1.65	867	1.86	914	2.03	961	2.20	1009	2.41	1051	2.57	1096	2.74
3600	633	1.13	703	1.31	766	1.52	824	1.74	877	1.97	924	2.15	970	2.32	1017	2.53	1060	2.72	1099	2.88
3700	648	1.23	714	1.39	777	1.61	835	1.85	887	2.07	935	2.28	980	2.45	1024	2.64	1069	2.87	1109	3.03
3800	662	1.33	726	1.51	789	1.72	846	1.95	897	2.18	946	2.40	989	2.58	1033	2.76	1077	2.99	1118	3.20
3900	677	1.44	738	1.61	801	1.82	857	2.06	908	2.29	956	2.53	1000	2.73	1042	2.91	1085	3.12	1127	3.36
4000	692	1.55	750	1.73	813	1.94	868	2.17	918	2.40	967	2.66	1010	2.87	1052	3.06	1093	3.24	—	—
4100	707	1.67	762	1.84	825	2.05	878	2.28	929	2.53	977	2.78	1021	3.02	1062	3.22	1102	3.41	—	—
4200	722	1.80	775	1.97	837	2.16	889	2.40	941	2.66	989	2.91	1032	3.17	1072	3.38	—	—	—	—
4300	737	1.94	787	2.09	848	2.27	900	2.52	952	2.80	999	3.04	1042	3.32	—	—	—	—	—	—
4400	752	2.08	800	2.21	860	2.39	912	2.66	962	2.92	1009	3.19	—	—	—	—	—	—	—	—
4500	768	2.24	814	2.35	871	2.51	924	2.80	973	3.07	1019	3.34	—	—	—	—	—	—	—	—
4600	783	2.40	827	2.50	883	2.64	937	2.95	983	3.21	—	—	—	—	—	—	—	—	—	—
4700	799	2.56	841	2.64	894	2.77	949	3.10	994	3.36	—	—	—	—	—	—	—	—	—	—
4800	814	2.74	855	2.80	906	2.91	961	3.26	—	—	—	—	—	—	—	—	—	—	—	—
4900	830	2.92	868	2.95	918	3.05	972	3.40	—	—	—	—	—	—	—	—	—	—	—	—
5000	—	—	883	3.10	931	3.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Shading** indicates alternate motor and drive required (See Note 7)
2. **Boldface** indicates field-supplied drive required
3. **Shading** indicates field-supplied motor and drive required
4. Maximum usable bhp is 2.4 with standard motor; 2.9 with alternate motor. Extensive motor and electrical testing on these units ensures that the full

- horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
5. Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
6. Values include losses for filters, unit casing, and wet coils
7. Standard motor drive range: 690 to 935 rpm. Alternate motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive

Table 9 — Fan Performance, 48LJD014 — Horizontal Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	677	1.20	748	1.43	810	1.65	869	1.89	928	2.17	984	2.43	1036	2.68	1080	2.90	1114	3.07	1135	3.17
3800	691	1.28	761	1.52	822	1.75	880	1.98	937	2.28	993	2.55	1046	2.81	1092	3.05	1129	3.25	1156	3.39
3900	705	1.37	773	1.62	834	1.86	891	2.08	947	2.39	1002	2.66	1055	2.94	1102	3.20	1143	3.42	1174	3.59
4000	720	1.47	786	1.71	847	1.97	902	2.19	957	2.50	1011	2.79	1064	3.07	1112	3.34	1155	3.59	1190	3.80
4100	734	1.56	800	1.82	860	2.09	914	2.31	967	2.60	1021	2.91	1072	3.20	1121	3.49	1165	3.76	1203	3.99
4200	749	1.66	813	1.92	873	2.21	926	2.44	978	2.71	1030	3.04	1081	3.34	1130	3.64	1175	3.92	1215	4.18
4300	764	1.77	826	2.04	886	2.33	938	2.57	989	2.83	1040	3.18	1090	3.48	1139	3.79	1185	4.08	1226	4.36
4400	778	1.88	840	2.16	899	2.46	951	2.71	1000	2.96	1050	3.31	1100	3.63	1148	3.94	1194	4.25	1236	4.54
4500	793	1.99	854	2.28	912	2.59	963	2.86	1012	3.09	1061	3.43	1109	3.78	1157	4.09	1203	4.42	1246	4.72
4600	808	2.11	868	2.42	925	2.73	975	3.00	1024	3.25	1071	3.56	1119	3.93	1166	4.26	1212	4.58	1255	4.91
4700	822	2.24	882	2.56	937	2.86	988	3.16	1036	3.42	1082	3.70	1129	4.09	1175	4.42	1221	4.76	1264	5.09
4800	837	2.37	896	2.71	950	3.00	1001	3.32	1048	3.59	1093	3.86	1139	4.24	1185	4.60	1230	4.93	1273	5.28
4900	852	2.51	910	2.86	963	3.15	1014	3.48	1060	3.76	1105	4.02	1150	4.38	1194	4.77	1239	5.12	1282	5.47
5000	867	2.65	924	3.01	977	3.30	1027	3.65	1073	3.94	1117	4.20	1161	4.54	1204	4.95	1246	5.31	1291	5.66
5100	882	2.79	938	3.17	990	3.46	1040	3.82	1085	4.12	1129	4.48	1172	4.71	1214	5.13	1257	5.51	—	—
5200	896	2.95	952	3.33	1003	3.63	1053	4.00	1096	4.30	1141	4.60	1183	4.89	1225	5.29	1267	5.70	—	—
5300	911	3.11	967	3.50	1017	3.80	1066	4.18	1111	4.50	1153	4.80	1194	5.09	1236	5.47	—	—	—	—
5400	926	3.27	981	3.68	1030	3.98	1079	4.35	1124	4.70	1166	5.01	1206	5.29	1247	5.65	—	—	—	—
5500	940	3.44	995	3.86	1044	4.17	1092	4.54	1137	4.91	1178	5.22	1218	5.52	—	—	—	—	—	—
5600	955	3.62	1010	4.04	1058	4.38	1105	4.73	1150	5.12	1190	5.44	1230	5.75	—	—	—	—	—	—
5700	970	3.80	1024	4.23	1072	4.59	1118	4.93	1163	5.34	1203	5.67	—	—	—	—	—	—	—	—
5800	985	3.99	1039	4.42	1086	4.80	1131	5.14	1176	5.56	—	—	—	—	—	—	—	—	—	—
5900	1000	4.18	1053	4.62	1100	5.02	1144	5.36	—	—	—	—	—	—	—	—	—	—	—	—
6000	1015	4.39	1068	4.83	1114	5.25	1158	5.58	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4.59	1083	5.04	1128	5.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4.81	1097	5.26	1142	5.71	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	1061	5.03	1112	5.49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied drive required (See Note 6.)
2. **Shading** indicates field-supplied motor and drive required
3. Maximum usable bhp is 4.2. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown

- will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected
4. Values include losses for filters, unit casing, and wet coils
5. Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
6. Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

Table 10 – Fan Performance, 48LJD,LJE,LJF008 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	506	0.52	586	0.72	656	0.95	718	1.18	776	1.43	838	1.78	898	2.21	935	2.58
2250	514	0.55	593	0.76	662	0.99	724	1.22	781	1.78	841	1.81	902	2.25	939	2.69
2300	521	0.57	600	0.79	668	1.02	730	1.26	786	1.50	843	1.83	905	2.28	943	2.62
2400	536	0.63	613	0.85	680	1.09	741	1.34	796	1.59	849	1.88	910	2.31	952	2.74
2500	551	0.69	626	0.93	693	1.17	753	1.43	808	1.69	859	1.96	912	2.31	963	2.84
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	969	2.88
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.91
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	975	2.94
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	936	2.58	983	3.02
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	943	2.71	993	3.09
3000	630	1.07	699	1.35	759	1.63	815	1.92	866	2.23	915	2.54	961	2.85	1003	3.17
3100	646	1.16	714	1.45	773	1.74	828	2.04	878	2.35	926	2.67	972	3.00	1015	3.22
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1026	3.27
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.28	—	—
3400	695	1.47	759	1.78	816	2.10	867	2.42	917	2.75	963	3.10	1007	3.45	—	—
3500	712	1.59	774	1.90	830	2.23	881	2.56	930	2.90	976	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	989	3.41	—	—	—	—
3700	745	1.84	805	2.17	860	2.52	909	2.87	956	3.22	—	—	—	—	—	—
3750	754	1.91	813	2.24	868	2.59	917	2.95	963	3.30	—	—	—	—	—	—
3800	762	1.98	821	2.31	875	2.66	924	3.03	970	3.38	—	—	—	—	—	—
3900	779	2.12	836	2.46	890	2.82	938	3.19	—	—	—	—	—	—	—	—
4000	796	2.27	852	2.61	905	2.98	953	3.37	—	—	—	—	—	—	—	—
4100	813	2.42	868	2.78	920	3.15	—	—	—	—	—	—	—	—	—	—
4200	830	2.59	884	2.95	935	3.33	—	—	—	—	—	—	—	—	—	—
4250	839	2.68	892	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.76	900	3.13	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Shading** indicates alternate drive required (See Note 7)
2. **Boldface** indicates field-supplied drive required (See Note 7)
3. **Shading** indicates field-supplied motor and drive required.
4. **Maximum usable bhp is 2.4** Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized

5. with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
7. Values include losses for filters, unit casing, and wet coils.
8. Standard motor drive range: 590 to 840 rpm. Alternate drive range: 690 to 935 rpm. All other rpms require field-supplied drive

Table 11 – Fan Performance, 48LJD,LJE,LJF009 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)															
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
2200	506	0.52	586	0.72	656	0.95	718	1.18	776	1.43	838	1.78	898	2.21	935	2.58
2250	514	0.55	593	0.76	662	0.99	724	1.22	781	1.78	841	1.81	902	2.25	939	2.69
2300	521	0.57	600	0.79	668	1.02	730	1.26	786	1.50	843	1.83	905	2.28	943	2.62
2400	536	0.63	613	0.85	680	1.09	741	1.34	796	1.59	849	1.88	910	2.31	952	2.74
2500	551	0.69	626	0.93	693	1.17	753	1.43	808	1.69	859	1.96	912	2.31	963	2.84
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	969	2.88
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.91
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	975	2.94
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	936	2.58	983	3.02
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	943	2.71	993	3.09
3000	630	1.07	699	1.35	759	1.63	815	1.92	866	2.23	915	2.54	961	2.85	1003	3.17
3100	646	1.16	714	1.45	773	1.74	828	2.04	878	2.35	926	2.67	972	3.00	1015	3.22
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1026	3.27
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.28	—	—
3400	695	1.47	759	1.78	816	2.10	867	2.42	917	2.75	963	3.10	1007	3.45	—	—
3500	712	1.59	774	1.90	830	2.23	881	2.56	930	2.90	976	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	989	3.41	—	—	—	—
3700	745	1.84	805	2.17	860	2.52	909	2.87	956	3.22	—	—	—	—	—	—
3750	754	1.91	813	2.24	868	2.59	917	2.95	963	3.30	—	—	—	—	—	—
3800	762	1.98	821	2.31	875	2.66	924	3.03	970	3.38	—	—	—	—	—	—
3900	779	2.12	836	2.46	890	2.82	938	3.19	—	—	—	—	—	—	—	—
4000	796	2.27	852	2.61	905	2.98	953	3.37	—	—	—	—	—	—	—	—
4100	813	2.42	868	2.78	920	3.15	—	—	—	—	—	—	—	—	—	—
4200	830	2.59	884	2.95	935	3.33	—	—	—	—	—	—	—	—	—	—
4250	839	2.68	892	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.76	900	3.13	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Shading** indicates field-supplied motor required (See Note 7.)
2. **Boldface** indicates field-supplied drive required (See Note 7)
3. **Shading** indicates field-supplied motor and drive required
4. **Maximum usable bhp is 2.4** Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized

5. with confidence. Using your fan motors up to the horsepower ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
7. Values include losses for filters, unit casing, and wet coils.
8. Standard motor drive range: 690 to 935 rpm. All other rpms require field-supplied drive

Table 12 – Fan Performance, 48LJD/LJE012 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3000	592	0.76	661	0.93	722	1.09	779	1.26	829	1.42	880	1.58	924	1.73	970	1.89	1019	2.00	1066	2.30
3100	607	0.83	676	1.01	734	1.17	791	1.34	840	1.51	890	1.68	935	1.84	977	2.00	1026	2.17	1070	2.44
3200	622	0.90	690	1.09	746	1.25	803	1.43	852	1.60	900	1.77	946	1.95	987	2.11	1029	2.28	1075	2.51
3300	638	0.98	705	1.17	759	1.33	815	1.52	864	1.70	910	1.88	957	2.06	998	2.23	1037	2.40	1082	2.58
3400	653	1.06	719	1.26	772	1.43	826	1.62	876	1.81	921	1.98	967	2.17	1009	2.35	1047	2.53	1087	2.70
3500	669	1.15	733	1.35	786	1.53	838	1.72	888	1.91	933	2.10	976	2.29	1020	2.48	1058	2.66	1095	2.84
3600	684	1.24	747	1.44	800	1.64	850	1.82	900	2.03	945	2.22	986	2.41	1030	2.61	1069	2.80	1106	2.98
3700	700	1.33	760	1.54	814	1.75	863	1.92	912	2.14	957	2.34	998	2.54	1039	2.74	1081	2.94	1117	3.13
3800	715	1.43	774	1.64	828	1.86	875	2.04	924	2.26	969	2.47	1010	2.67	1049	2.87	1091	3.08	1128	3.29
3900	731	1.54	787	1.74	843	1.98	888	2.16	936	2.38	981	2.60	1022	2.81	1060	3.02	1100	3.23	—	—
4000	747	1.64	801	1.85	857	2.10	902	2.30	948	2.51	993	2.74	1034	2.96	1072	3.17	1110	3.38	—	—
4100	763	1.76	816	1.97	872	2.23	916	2.44	960	2.64	1005	2.88	1046	3.11	1084	3.32	—	—	—	—
4200	778	1.88	831	2.10	886	2.36	929	2.58	972	2.78	1016	3.03	1058	3.26	—	—	—	—	—	—
4300	794	2.00	846	2.23	900	2.50	943	2.73	985	2.93	1028	3.17	—	—	—	—	—	—	—	—
4400	810	2.13	861	2.37	913	2.64	958	2.89	999	3.09	1040	3.32	—	—	—	—	—	—	—	—
4500	826	2.27	876	2.52	927	2.78	973	3.04	1012	3.26	—	—	—	—	—	—	—	—	—	—
4600	842	2.41	892	2.67	940	2.92	987	3.21	—	—	—	—	—	—	—	—	—	—	—	—
4700	858	2.55	907	2.83	954	3.08	1002	3.38	—	—	—	—	—	—	—	—	—	—	—	—
4800	874	2.70	922	2.99	968	3.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4900	890	2.86	938	3.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	906	3.03	953	3.33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 Shading indicates alternate motor and drive required (See Note 7)
- 2 Boldface indicates field-supplied drive required (See Note 7)
- 3 Shading indicates field-supplied motor and drive required
- 4 Maximum usable bhp is 2.4 with standard motor; 2.9 with alternate motor. Extensive motor and electrical testing on these units ensures that the full

- 5 Use of field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6 Values include losses for filters, unit casing, and wet coils.
- 7 Standard motor drive range: 690 to 935 rpm. Alternate motor drive range: 840 to 1085 rpm. All other rpms require field-supplied drive.

Table 13 – Fan Performance, 48LJD014 – Vertical Discharge Units

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
3700	729	1.36	790	1.58	847	1.79	902	2.06	955	2.29	1008	2.55	1060	2.80	1108	3.05	1152	3.27	1190	3.46
3800	745	1.46	805	1.69	861	1.89	915	2.17	967	2.41	1019	2.67	1070	2.94	1118	3.19	1163	3.44	1203	3.65
3900	761	1.56	820	1.80	875	2.01	928	2.29	979	2.55	1029	2.80	1079	3.07	1128	3.34	1173	3.60	1214	3.83
4000	777	1.67	836	1.92	889	2.14	941	2.40	991	2.68	1040	2.94	1089	3.22	1137	3.49	1183	3.76	1225	4.00
4100	793	1.79	851	2.05	904	2.27	955	2.52	1004	2.82	1052	3.08	1100	3.36	1147	3.65	1193	3.93	1236	4.19
4200	810	1.91	867	2.18	918	2.41	968	2.65	1017	2.96	1064	3.23	1110	3.51	1157	3.81	1202	4.09	1245	4.38
4300	826	2.04	883	2.32	933	2.55	982	2.79	1030	3.11	1076	3.40	1121	3.67	1167	3.97	1212	4.27	1255	4.56
4400	842	2.17	898	2.46	948	2.70	996	2.93	1043	3.25	1088	3.56	1133	3.84	1178	4.14	1222	4.44	1265	4.74
4500	859	2.31	914	2.60	962	2.85	1010	3.09	1056	3.40	1101	3.73	1144	4.00	1188	4.31	1232	4.62	1274	4.93
4600	876	2.45	930	2.76	977	3.01	1024	3.26	1070	3.55	1114	3.90	1157	4.19	1199	4.49	1242	4.81	1284	5.13
4700	892	2.60	945	2.91	992	3.18	1039	3.43	1083	3.71	1126	4.07	1169	4.38	1210	4.68	1252	5.00	1294	5.33
4800	909	2.77	961	3.07	1008	3.36	1053	3.61	1097	3.88	1140	4.25	1181	4.58	1222	4.87	1263	5.20	—	—
4900	926	2.93	977	3.24	1024	3.54	1068	3.80	1111	4.06	1153	4.41	1194	4.77	1234	5.09	1274	5.40	—	—
5000	942	3.11	993	3.41	1039	3.73	1083	3.99	1125	4.25	1166	4.59	1207	4.97	1247	5.30	1286	5.62	—	—
5100	959	3.29	1009	3.60	1055	3.92	1097	4.19	1139	4.46	1180	4.76	1220	5.18	1259	5.52	—	—	—	—
5200	976	3.47	1025	3.78	1071	4.12	1112	4.40	1153	4.67	1194	4.98	1233	5.38	1272	5.74	—	—	—	—
5300	993	3.67	1041	3.98	1086	4.33	1127	4.61	1168	4.90	1208	5.19	1246	5.58	—	—	—	—	—	—
5400	1010	3.87	1057	4.18	1102	4.54	1142	4.84	1182	5.13	1221	5.41	—	—	—	—	—	—	—	—
5500	1027	4.07	1073	4.39	1118	4.76	1157	5.07	1197	5.36	1235	5.64	—	—	—	—	—	—	—	—
5600	1043	4.29	1090	4.61	1133	4.99	1173	5.31	1211	5.61	—	—	—	—	—	—	—	—	—	—
5700	1060	4.51	1106	4.83	1149	5.22	1189	5.55	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4.74	1122	5.07	1165	5.45	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4.98	1139	5.31	1181	5.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	5.22	1155	5.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	5.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5.74	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

- 1 Boldface indicates field-supplied drive required (See Note 6.)
- 2 Shading indicates field-supplied motor and drive required
- 3 Maximum usable bhp is 4.2. Extensive motor and electrical testing on these units ensures that the full horsepower range of the motor can be utilized with confidence. Using your fan motors up to the horsepower ratings shown

- 4 Values include losses for filters, unit casing, and wet coils.
- 5 Use of a field-supplied motor may affect wire sizing. Contact Carrier representative to verify.
- 6 Motor drive range: 860 to 1080 rpm. All other rpms require field-supplied drive.

START-UP

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

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

Return-Air Filters — Make sure correct filters are installed in filter tracks (see Table 1). Do not operate unit without return-air filters.

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

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

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

Refrigerant Service Ports — Each refrigerant system has 3 Schrader-type service gage ports: one on the suction line, one on the liquid line, and one on the compressor discharge line. Be sure that caps on the ports are tight. One Schrader-type valve is located under both the high-pressure switch and the low-pressure switch.

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

Check unit charge. Refer to Service, Refrigerant Charge section, page 22.

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

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

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

TO CHECK ignition of main burners and heating controls, move thermostat dial 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).

Heating

1. Purge gas supply line of air by opening union ahead of gas valve. If gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and open manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO. or ON position. Set heating temperature lever above room temperature.
4. The induced-draft motor will start.
5. After a call for heating, the main burners should light within 4 seconds. If the burners do not light, then there

is a 60-second delay before another 4-second try. If the burners still do not light, the time delay is repeated. If the burners do not light on the eleventh attempt, there is a lockout. To recover, break the 24-v power to W1.

6. The evaporator fan will turn on 20 to 40 seconds after a call for heating.
7. The evaporator fan will turn off 30 to 90 seconds after the thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate and in Table 1.

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.

Operating Sequence

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), and compressor contactor no. 1 (C1) are energized and evaporator-fan motor, compressor no. 1, and condenser fan start. The condenser-fan motor runs continuously while unit is cooling. For units with 2 stages of 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.

HEATING, UNITS WITHOUT ECONOMIZER — When thermostat calls for heating, terminal W1 is energized, induced-draft relay (IDR) and time delay relay (TDR) are energized and burner ignition sequence begins. The IFC is energized in 20 to 40 seconds and the IFM starts. On units equipped for 2 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 is deenergized, the IFM stops after a 60-120 second time-off delay.

COOLING, UNITS WITH ECONOMIZER — When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and the condenser-fan motor. The evaporator-fan motor 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 condenser-fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling 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.

HEATING, UNITS WITH ECONOMIZER — When the room thermostat calls for heat through terminal W1, IDR is energized to start induced-draft motor. The main burner ignites. The evaporator-fan motor is energized 45 seconds after heating begins and the economizer damper moves to the minimum position. On units equipped with 2 stages of heat, when additional heat is needed W2 and high fire solenoid on MGVS are energized. When 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.

SERVICE

⚠ CAUTION

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

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

EVAPORATOR COIL

1. Turn unit power off. Remove evaporator coil access panel.
2. If economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. Refer to Accessory Economizer Installation Instructions or Optional Economizer section on page 11 for more details.
3. Slide filters out of unit.
4. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return-air section to remove foreign material.
5. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

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

2-Row Coils — Clean coil as follows:

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

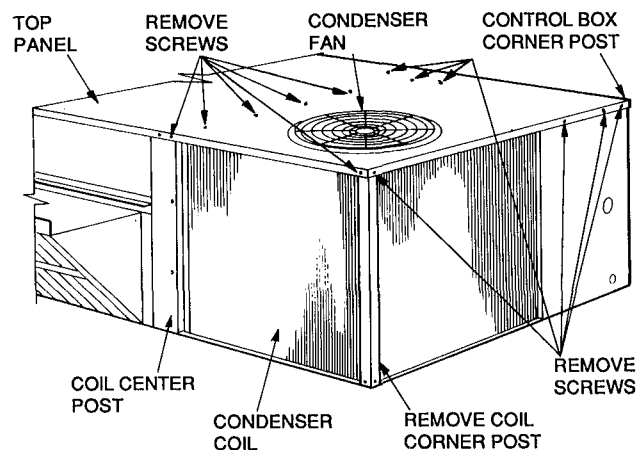


Fig. 30 — Cleaning Condenser Coil

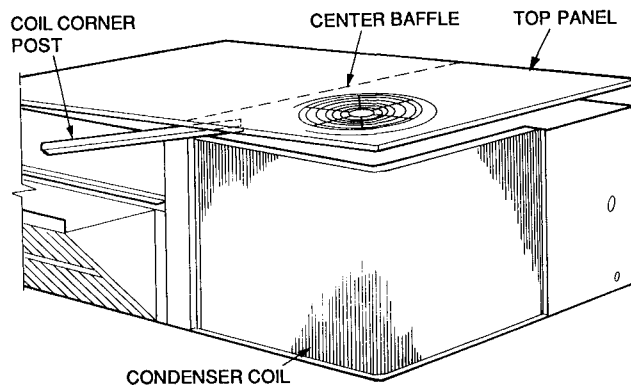


Fig. 31 — Propping Up Top Panel

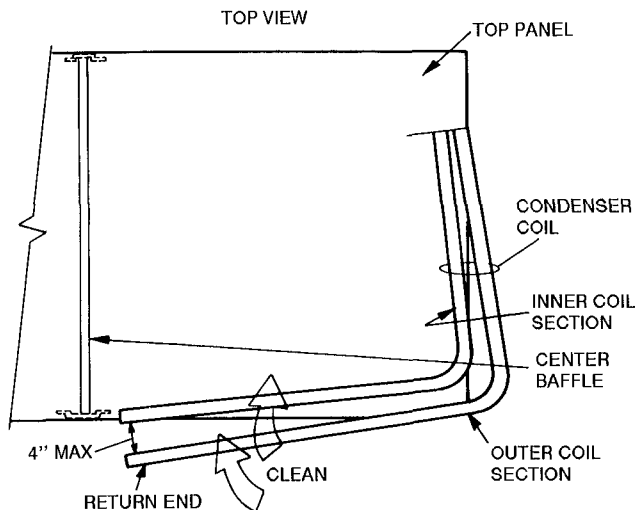


Fig. 32 — Separating Coil Sections

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

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

Lubrication

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

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

Condenser-Fan Adjustment (Fig. 33)

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

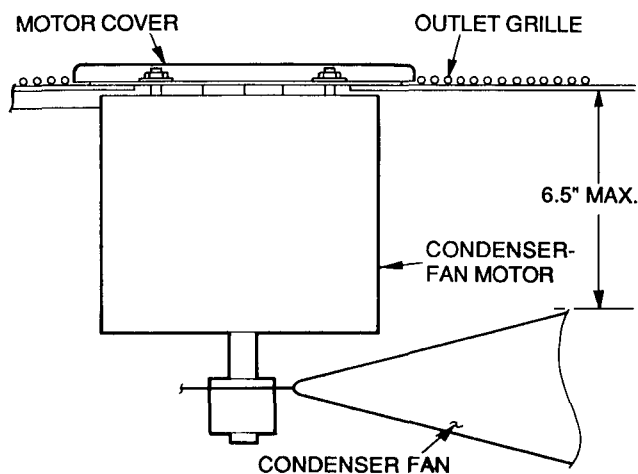


Fig. 33 — Condenser-Fan Adjustment

Two-Position Damper — Refer to Two-Position Damper section on page 10.

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 section on page 11.

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

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

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

LOW CHARGE COOLING — Using Cooling Charging Charts, Fig. 34 - 37, vary refrigerant until the conditions of the appropriate chart are met. Note the charging charts are different from the type normally used. The charts are based on charging the units to the correct superheat for the various operating conditions. Accurate pressure gage and temperature sensing device are required. Connect the pressure gage to the service port on the suction line. Mount the temperature sensing device on the suction line and insulate it so that outdoor ambient temperature does not affect the reading. Indoor-air cfm must be within the normal operating range of the unit.

TO USE COOLING CHARGING CHART — Take the outdoor ambient temperature and read the suction pressure gage. Refer to appropriate chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully reclaim some of the charge. Recheck the suction pressure as charge is adjusted. Example (Fig. 34):

Outdoor Temperature	85 F
Suction Pressure	70 psig
Suction Temperature should be	42 F
(Suction temperature may vary ± 5 F.)	

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

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 on following page.
2. Remove the 3 screws holding the blower housing to the flue cover.
3. Remove the flue cover to inspect the heat exchanger.
4. Clean all surfaces as required using a wire brush.

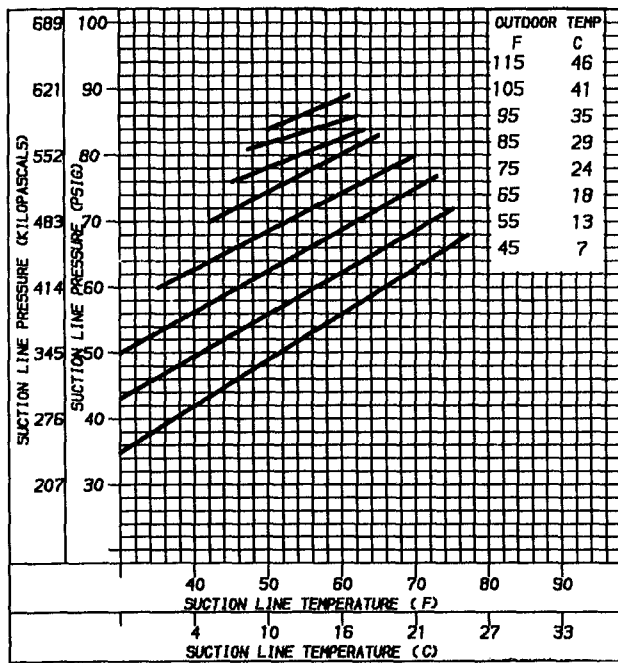


Fig. 34 – Cooling Charging Chart, 48LJ008

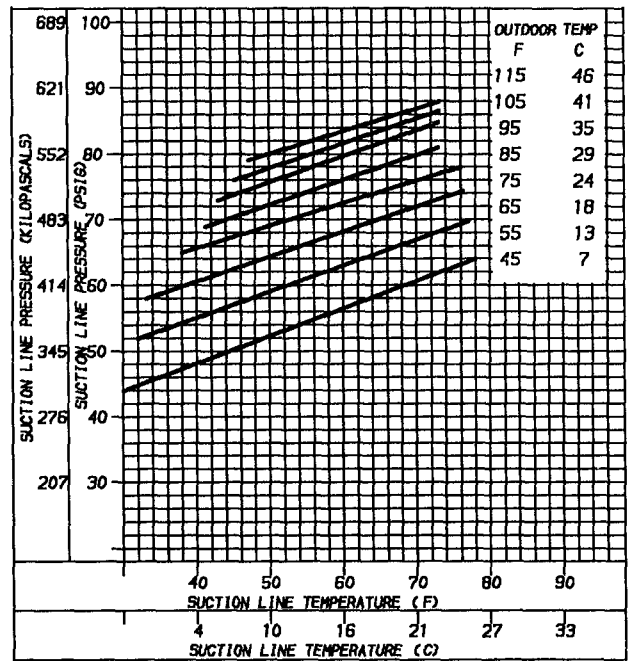


Fig. 36 – Cooling Charging Chart, 48LJ012

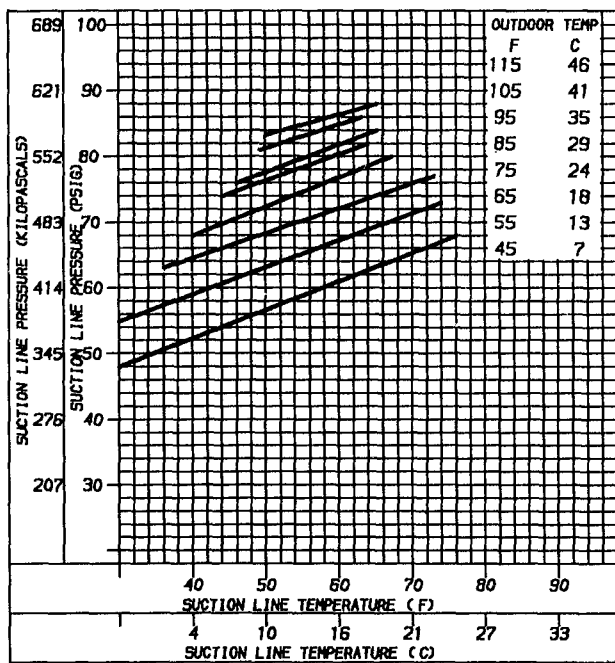


Fig. 35 – Cooling Charging Chart; 48LJ009

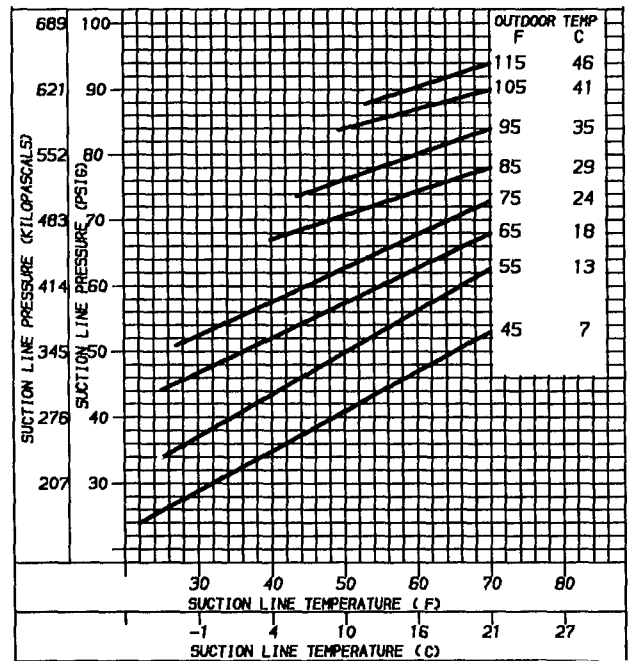


Fig. 37 – Cooling Charging Chart; 48LJ014

Combustion-Air Blower — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

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

1. Slide burner access panel out.

2. Remove wires and pressure tubing connected to pressure switch and mark each wire.
3. Remove the 2 screws which hold the heat shield in place, and remove heat shield.
4. Remove the 7 screws that attach induced-draft motor mounting plate to blower housing (Fig. 38).

5. Remove the 2 wires attached to the motor and remove motor and blower assembly from unit. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 6 and 7.
6. To remove blower from the motor shaft, remove 2 set-screws.
7. 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.
8. To reinstall, reverse the procedure outlined above.

Limit Switch — Remove blower access panel (Fig. 6). Limit switch is located on the fan deck.

Burner Ignition — Unit is equipped with a direct spark ignition 100% lockout system. Ignition module is located in the control box (Fig. 11). Module contains a self-diagnostic LED (light-emitting diode). During servicing refer to module nameplate for LED interpretation.

If lockout occurs, unit may be reset by momentarily interrupting power supply to unit, or turning selector switch to OFF position at the thermostat.

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

⚠ CAUTION

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

REMOVAL OF GAS TRAIN (Fig. 38 and 39)

1. Shut off manual gas valve.
2. Shut off power to unit.
3. Remove compressor access panel (not shown).
4. Slide out burner section side panel (not shown).
5. Remove wires and pressure tubing connected to pressure switch and mark each wire.
6. Remove heat shield.
7. Disconnect gas piping at unit gas valve.
8. Remove wires connected to gas valve. Mark each wire.
9. Remove ignitor and sensor wires at the power pack.
10. Remove the 2 screws that attach the burner rack to the vestibule plate.
11. Remove the gas bracket.
12. Slide the burner tray out of the unit (Fig. 39).

REPLACEMENT OF GAS TRAIN (Fig. 38 and 39)

1. Slide the burner tray into the unit.
2. Attach burner rack to vestibule plate with 2 screws.
3. Replace gas valve bracket.
4. Replace heat shield.
5. Reconnect wires and pressure tubing to pressure switch.
6. Reconnect the ignitor and sensor wires to the power pack.

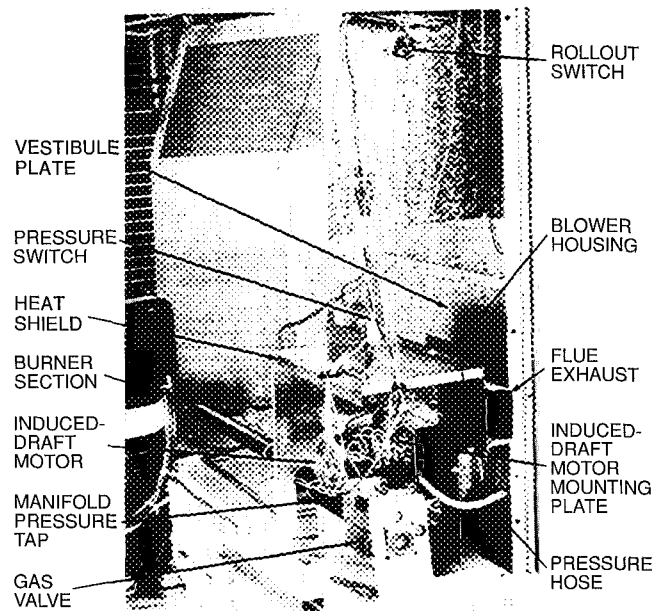


Fig. 38 — Burner Section Details

7. Reconnect wires to gas valve.
8. Connect gas piping to the gas valve.
9. Reinstall the burner section side panel.
10. Replace compressor access panel.
11. Restore power to unit.
12. Turn on main gas valve.

CLEANING AND ADJUSTMENT

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

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

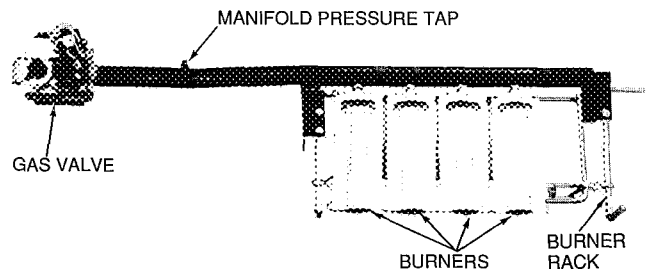


Fig. 39 — Burner Tray Details

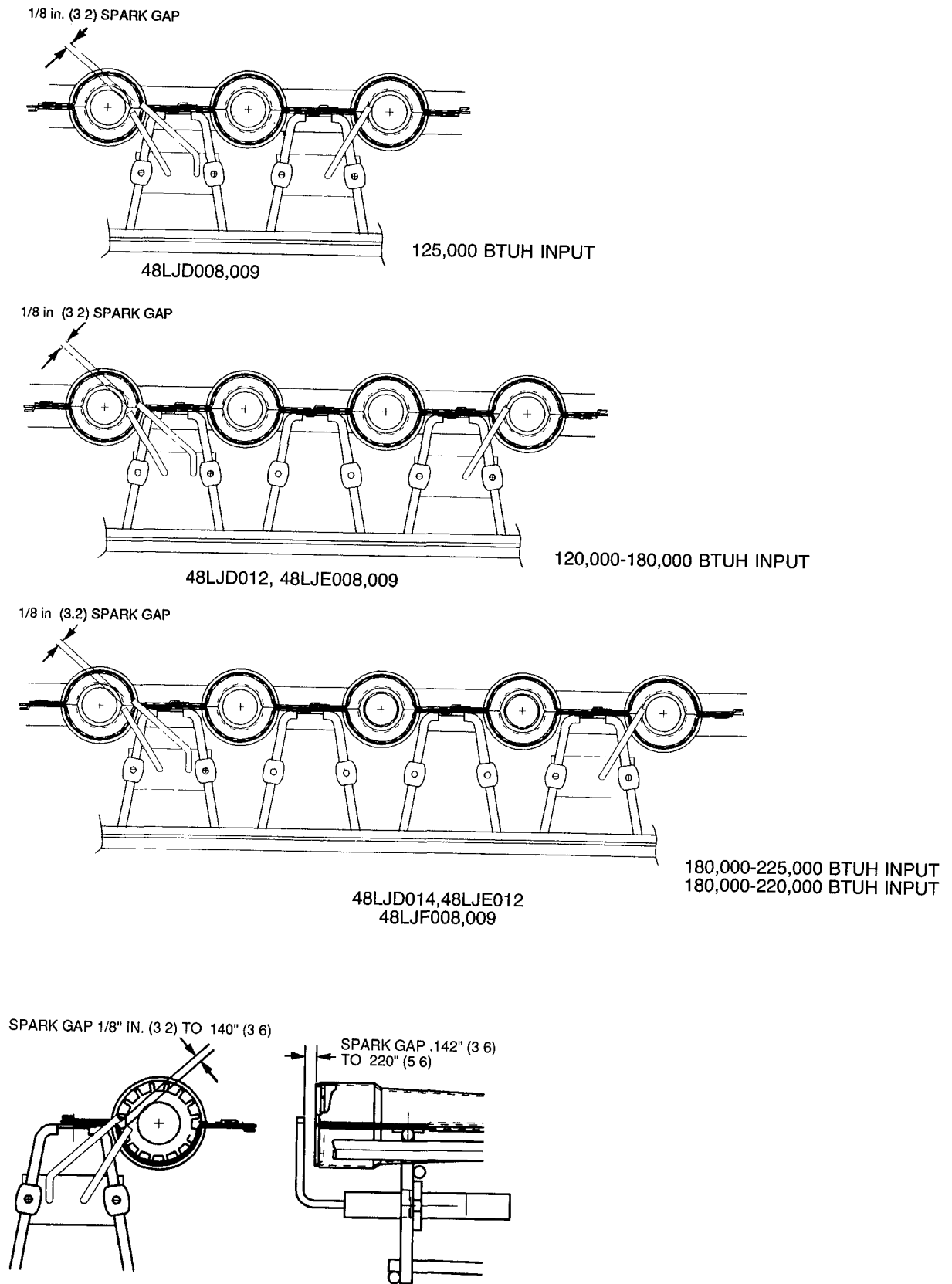


Fig. 40 — Spark Gap Adjustment

**LEGEND AND NOTES FOR FIG. 41 – Typical Wiring Schematic and
Fig. 42 – Typical Component Arrangement**

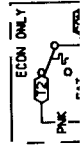
AHA	— Adjustable Heat Anticipator
C	— Contactor, Compressor
CAP	— Capacitor
CC	— Cooling Compensator
CH	— Crankcase Heater
COMP	— Compressor Motor
D	— Diode
EC	— Enthalpy Control
ECON	— Economizer
EPS	— Emergency Power Supply
EQUIP	— Equipment
ER	— Economizer Relay
FPT	— Freeze-Up Protection Thermostat
GND	— Ground
HPS	— High-Pressure Switch
HR	— Holding Relay
I	— Ignitor
ICP	— Ignitor Control Pack
IDM	— Induced-Draft Motor
IDR	— Induced-Draft Relay
IFC	— Indoor-Fan Contactor
IFM	— Indoor-Fan Motor
LPS	— Low-Pressure Switch
LS	— Limit Switch
MGV	— Main Gas Valve
MTR	— Motor
OAT	— Outdoor-Air Thermostat
OFM	— Outdoor-Fan Motor
P	— Plug
PL	— Plug Assembly
PS	— Pressure Switch
QT	— Quadruple Terminal

R	— Relay
RS	— Rollout Switch
SAT	— Supply-Air Thermostat
SEN	— Sensor
SW1	— Switch Fully Open
SW2	— Switch Fully Closed
SW3	— Switch Min. Vent Position
SW4	— Switch Max. Vent Position
TC	— Thermostat-Cooling
TDR	— Time-Delay Relay
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.

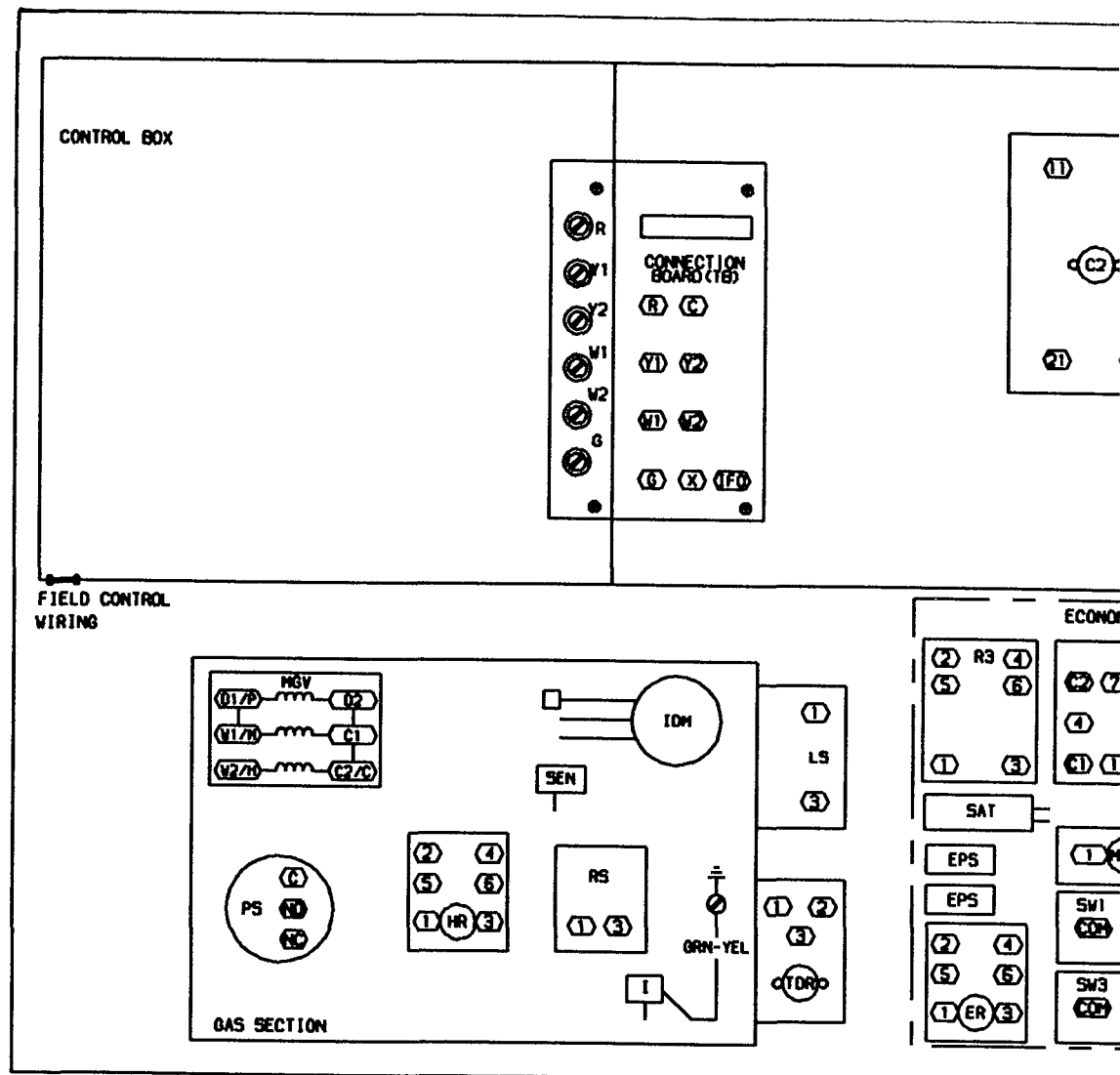
NOTES

- 1 If any of the original wire must be replaced, use type 90 C wire or its equivalent
- 2 The numbers indicate the line location of contacts, a bracket over 2 numbers designates single-pole, double-throw contacts
- 3 An underlined number signifies a normally closed contact. A normally open contact is designated by a number that is not underlined

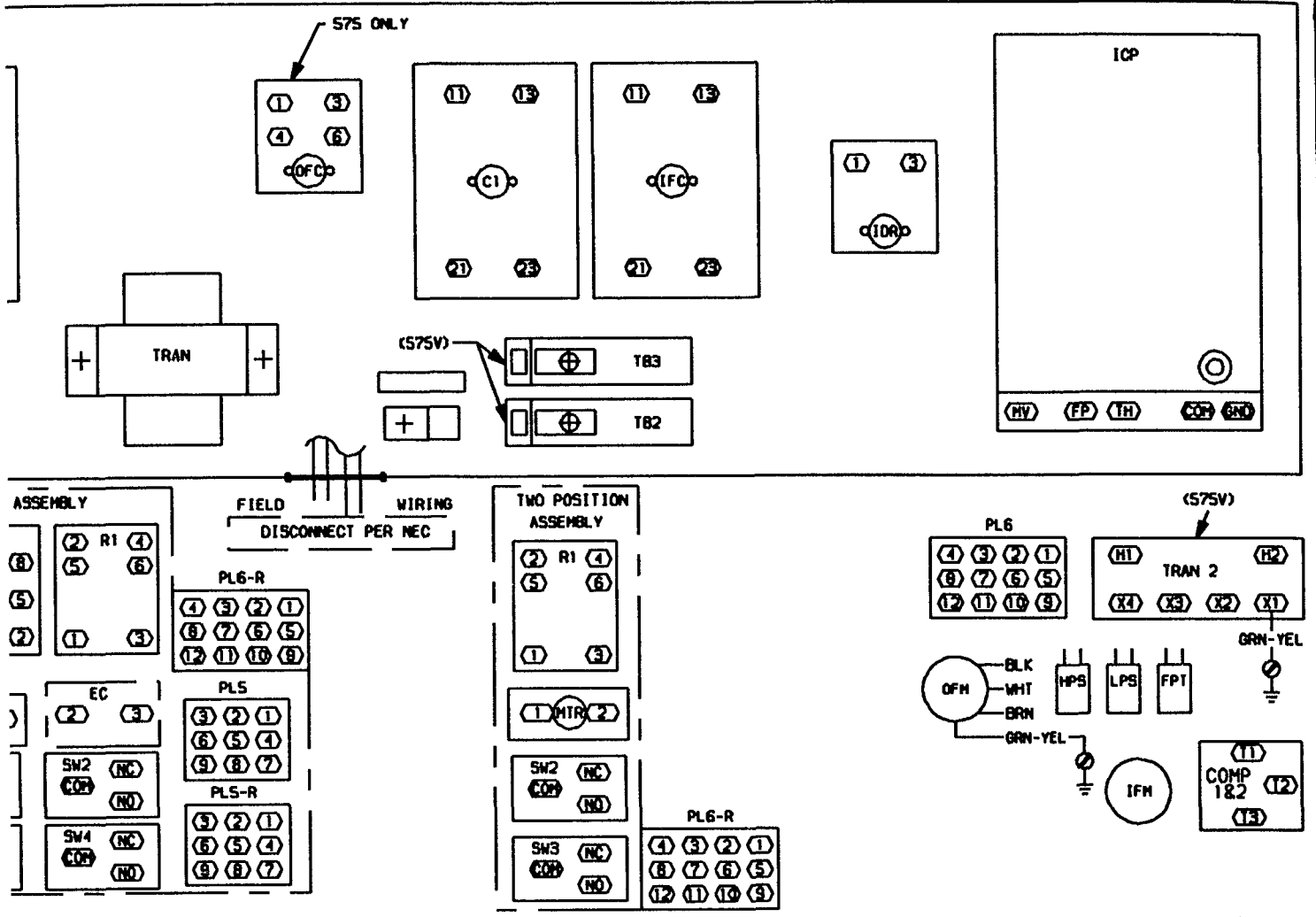
- 4 Three phase motors are protected under primary single-phasing conditions
- 5 Set heat anticipator at 1 amp.
- 6 Use only copper conductors.
- 7 Thermostats: HH07AT170, 172, 174, and P272-2783
Subbases: HH93AZ176, 178, and P272-1882, 1883



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Fig



2 — Typical Wiring Schematic