

Single-Package Rooftop Heating/Cooling Units

Installation, Start-Up and Service Instructions

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SAFETY CONSIDERATIONS

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

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

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

⚠ WARNING



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

⚠ WARNING

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

INSTALLATION

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

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

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.

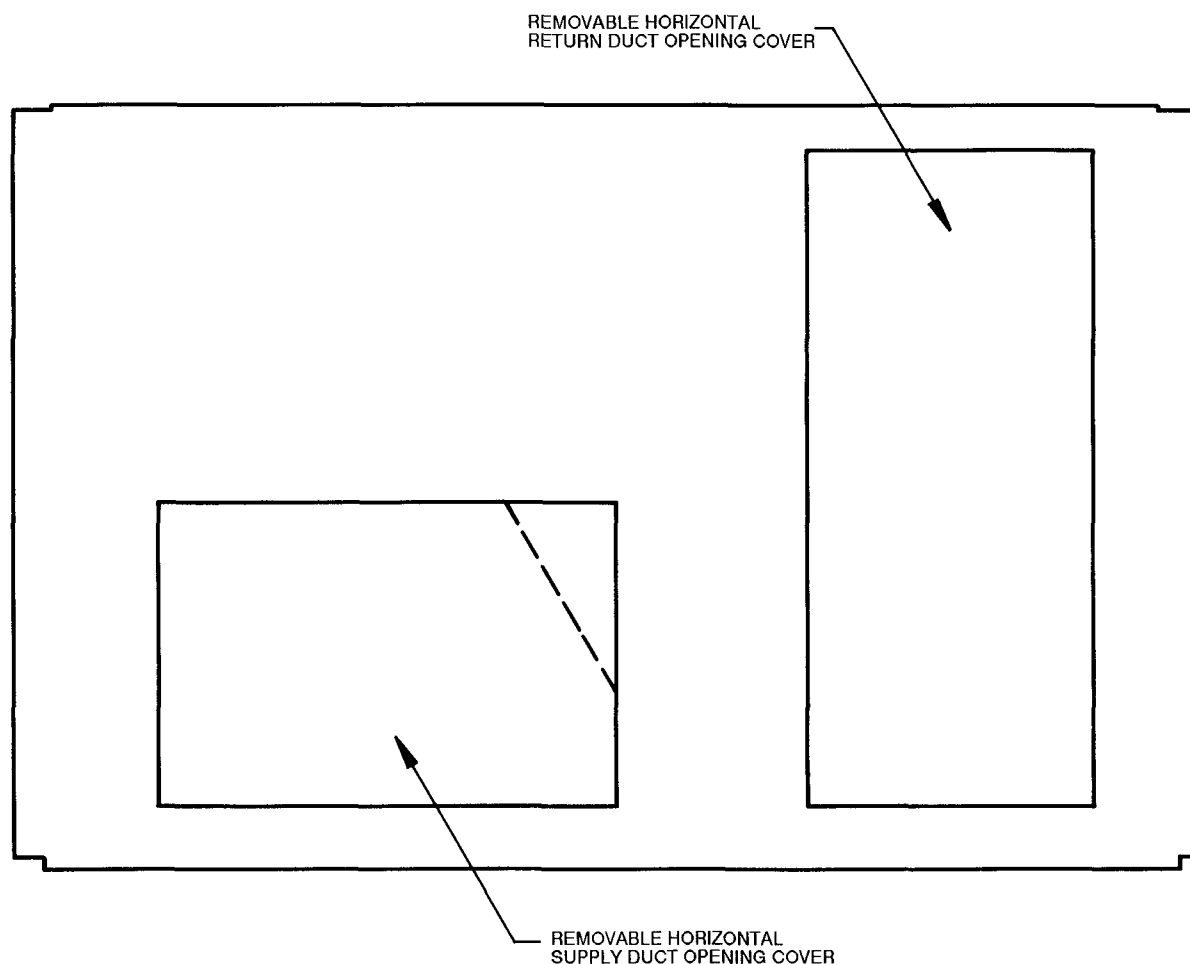


Fig. 1 — Horizontal Conversion Panels

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ901371	1'-2" [356]	48LJF008-012 48LJD/LJE008-014
50DJ901381	2'-0" [610]	

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.

SERVICE PLATE SIZES

UNIT SIZE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG ACY
48LJF008-012 48LJD/LJE008-014	3/4" [19] NPT	1 [25] NPT	3/4" [19] NPT	50DJ901551

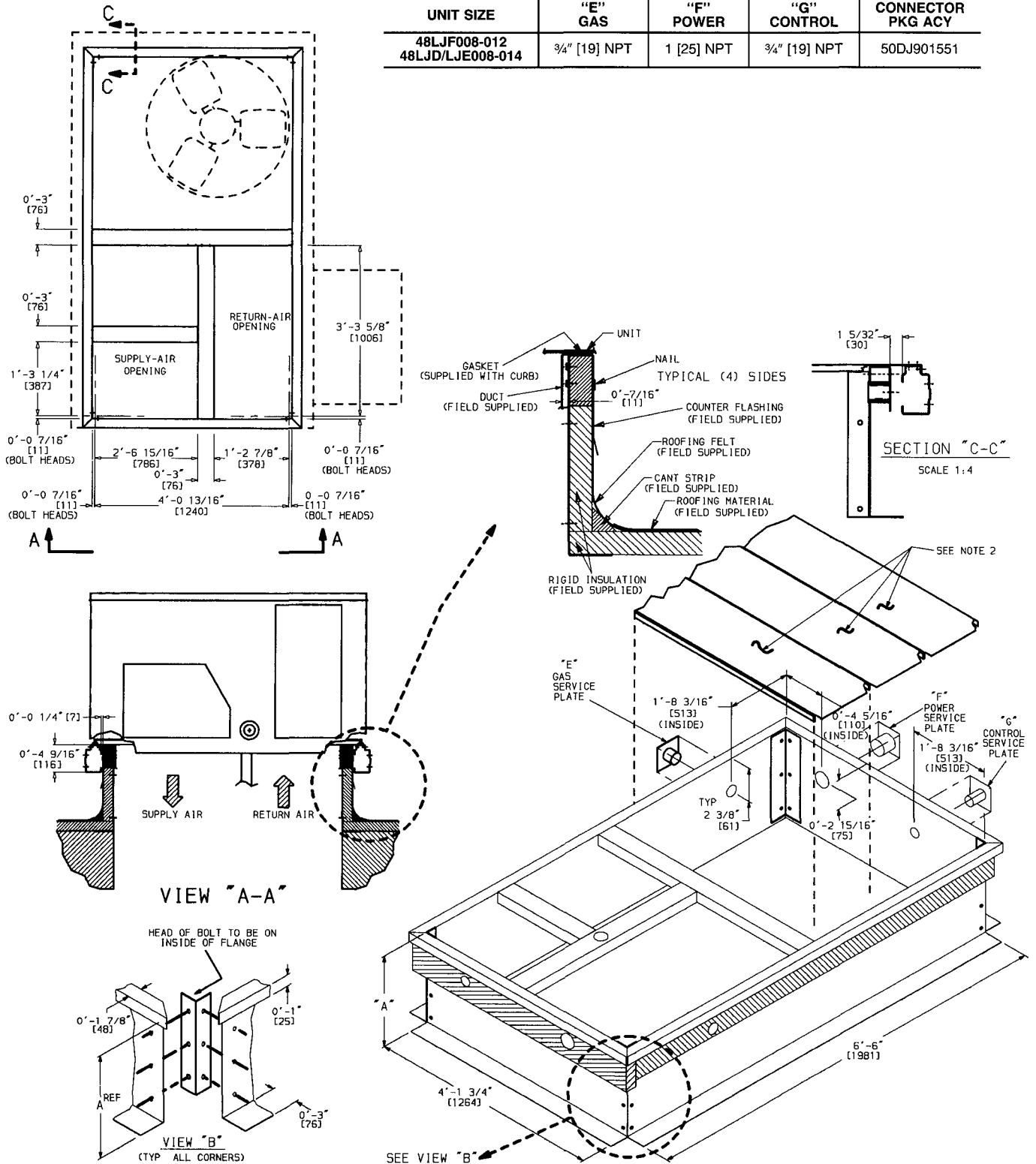
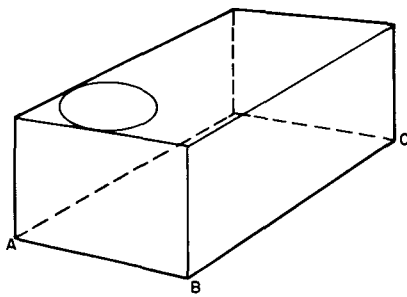


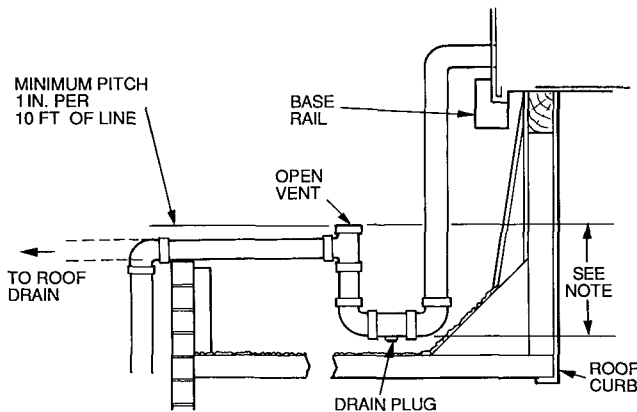
Fig. 2 — Roof Curb Details



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

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 5/8-in. clearance between roof curb and rear of unit. (See Fig. 2, section C-C.)

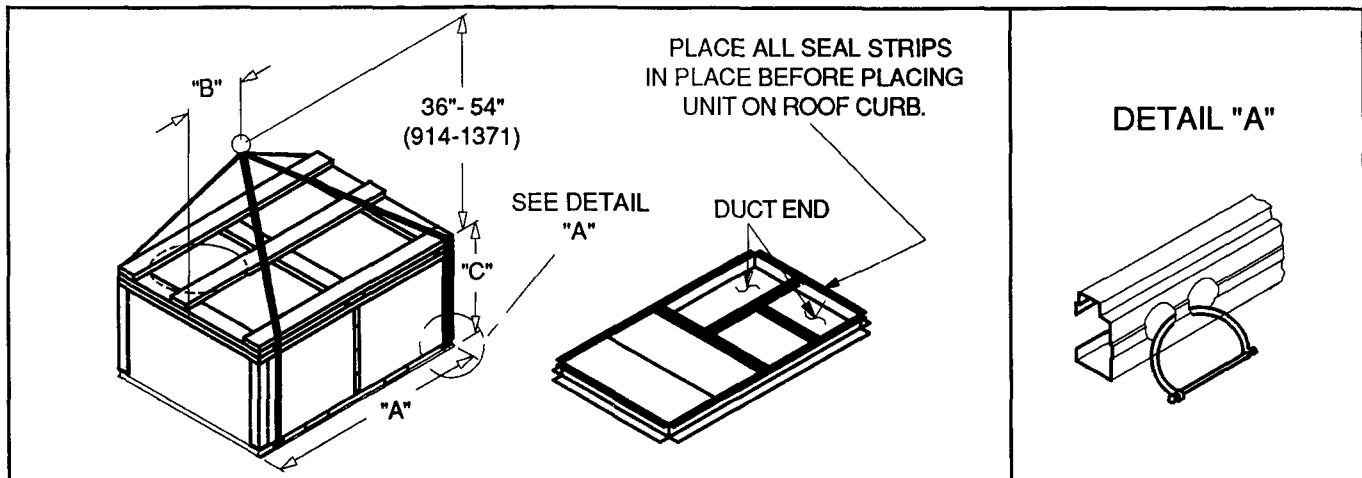
Locate mechanical draft system flue assembly at least 48 in. from any opening through which combustion products could enter the building, and at least 48 in. from an adjacent building or combustible material. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above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

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.



NOTES:

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

CAUTION

All panels must be in place when rigging

UNIT	MAX WEIGHT	DIMENSIONS					
	lb	kg	"A"		"B"		"C"
			in.	mm	in.	mm	in.
48LJD/LJE/LJF008	870	395	87.38	2219	40.25	1022	41.31
48LJD/LJE/LJF009	880	399	87.38	2219	40.25	1022	41.31
48LJD/LJE/LJF012	1035	469	87.38	2219	40.25	1022	49.31
48LJD/LJE014	1050	476	87.38	2219	40.25	1022	49.31

Fig. 5 – Rigging Details

Table 1 – Physical Data

BASE UNIT 48		LJD/LJE/LJF008	LJD/LJE/LJF009	LJD/LJE/LJF012	LJD/LJE014
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		Belt	Belt	Belt	Belt
Nominal Cfm		3000	3400	4000	5000
Maximum Continuous Bhp		2 4	2 4	2 4	4.2
Motor Frame		56	56	56	56
Fan Rpm Range		590-840	690-935	690-935	860-1080
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)		2.4/3 4	2.8/3 8	2 8/3 8	4.0/5.0
Fan Pulley Pitch Diameter (in.)		7 0	7 0	7 0	8 0
Belt — Type...Length (in.)		A 48	A ..48	A 48	A 51
Pulley Center Line Distance (in.)		16.75-19 25	16 75-19 25	15 85-17 50	15 85-17 50
Speed Change per Full Turn of Movable Pulley Flange (rpm)		50	50	50	45
Movable Pulley Maximum Full Turns from Closed Position		5	5	5	5
Factory Setting — Full Turns Open		5	5	5	5
Factory Speed Setting (rpm)		590	690	690	860
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/ 129 30	120 31/ 129...30
Liquid Propane — Alt		096 41	.096 41	096 41/ 096 41/ 102 38	096 41/ 102 38
Thermostat Heat Anticipator Setting (amps)					
208/230/460-v Stage 1		14	14	14	14
Stage 2		.20	.20	.20	.20
Gas Input		125,000/120,000/180,000	125,000/120,000/180,000	120,000/180,000/200,000	180,000/200,000
Efficiency (Steady State) (%)		—/180,000/220,000	—/180,000/220,000	180,000/225,000/250,000	225,000/250,000
Temperature Rise Range		80	80	80	80
Manifold Pressure (in. wg)		20-50/35-65/45-75	20-50/35-65/45-75	35-65/35-65/40-70	35-65/40-70
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	75/ 75
HIGH-PRESSURE SWITCH (psig)*					
Standard Compressor Internal Relief		625			
Cutout		428			
Reset (Auto.)		320			
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					
Quantity...Size (in.)		Cleanable 1...20 x 25 x 1 1...16 x 25 x 1			
RETURN-AIR FILTERS					
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/LJD/LJF012	1035	469	44	20	225	102	192	87	285	129	333	151	1-2 ⁷ / ₈	378	4-1 ¹ / ₈	1253	3-0 ⁷ / ₈	924	2-10 ¹ / ₈	866
48LJD/LJE014	1050	476	44	20	228	103	195	88	289	131	338	153	1-2 ⁷ / ₈	378	4-1 ¹ / ₈	1253	3-0 ⁷ / ₈	924	2-10 ¹ / ₈	866

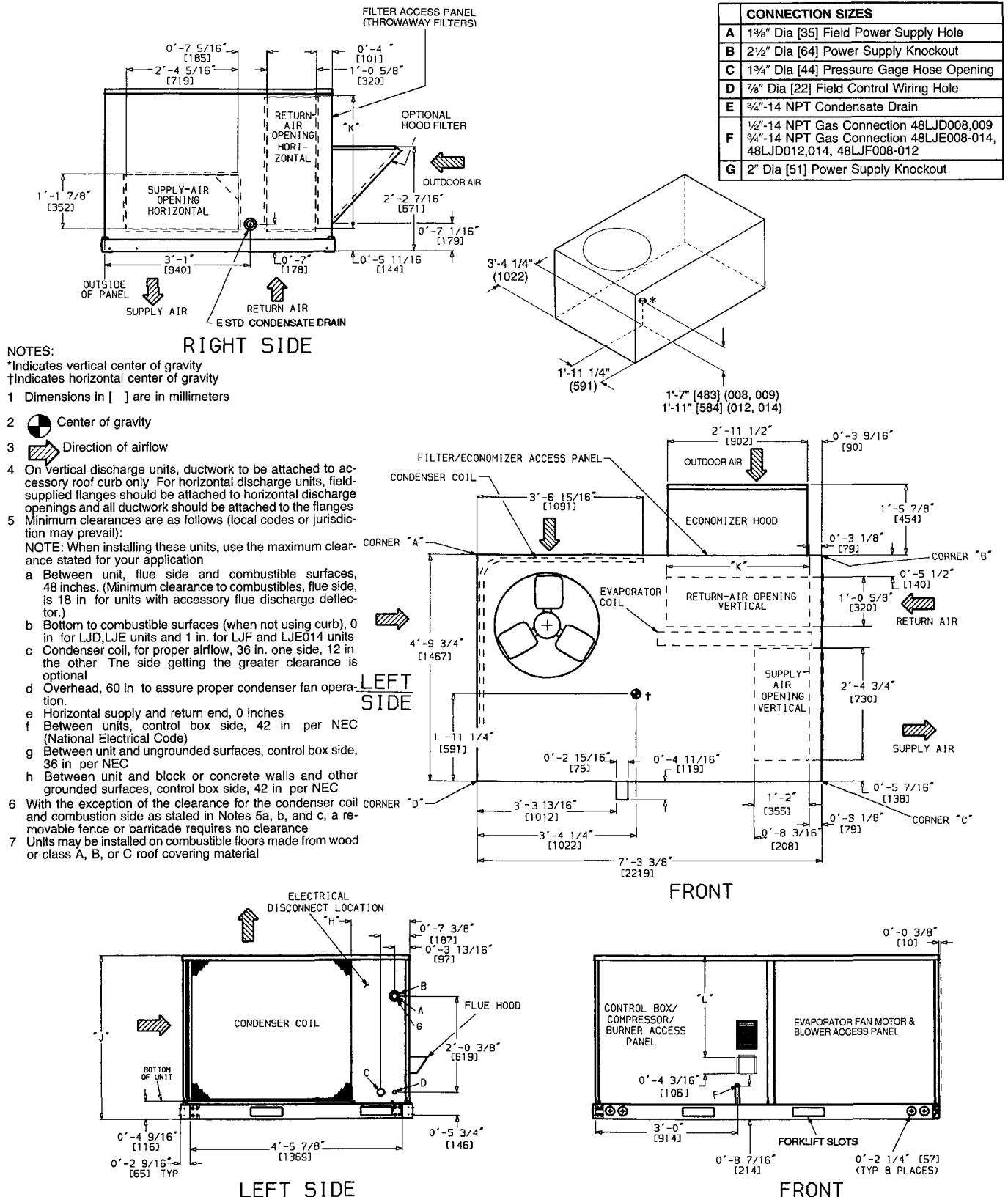


Fig. 6 – Base Unit Dimensions

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.

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

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

Support gas piping as shown in the table in Fig. 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.

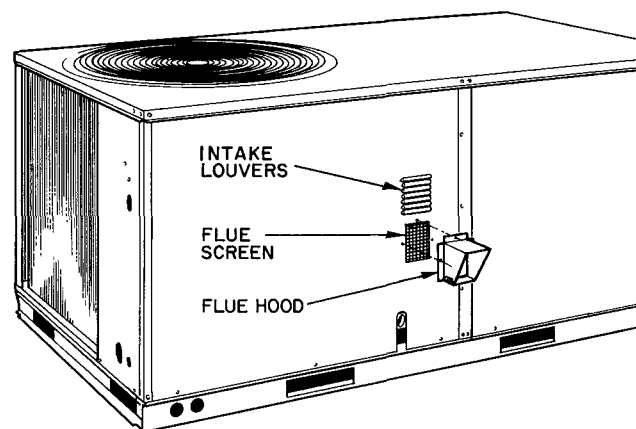
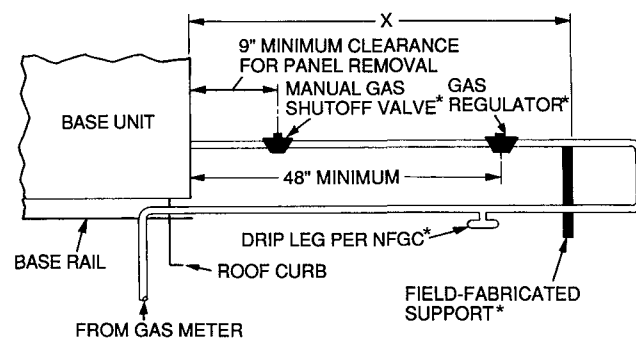


Fig. 7 — Flue Hood Details



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 .14 amp for the first stage and .20 amp for second-stage heating.

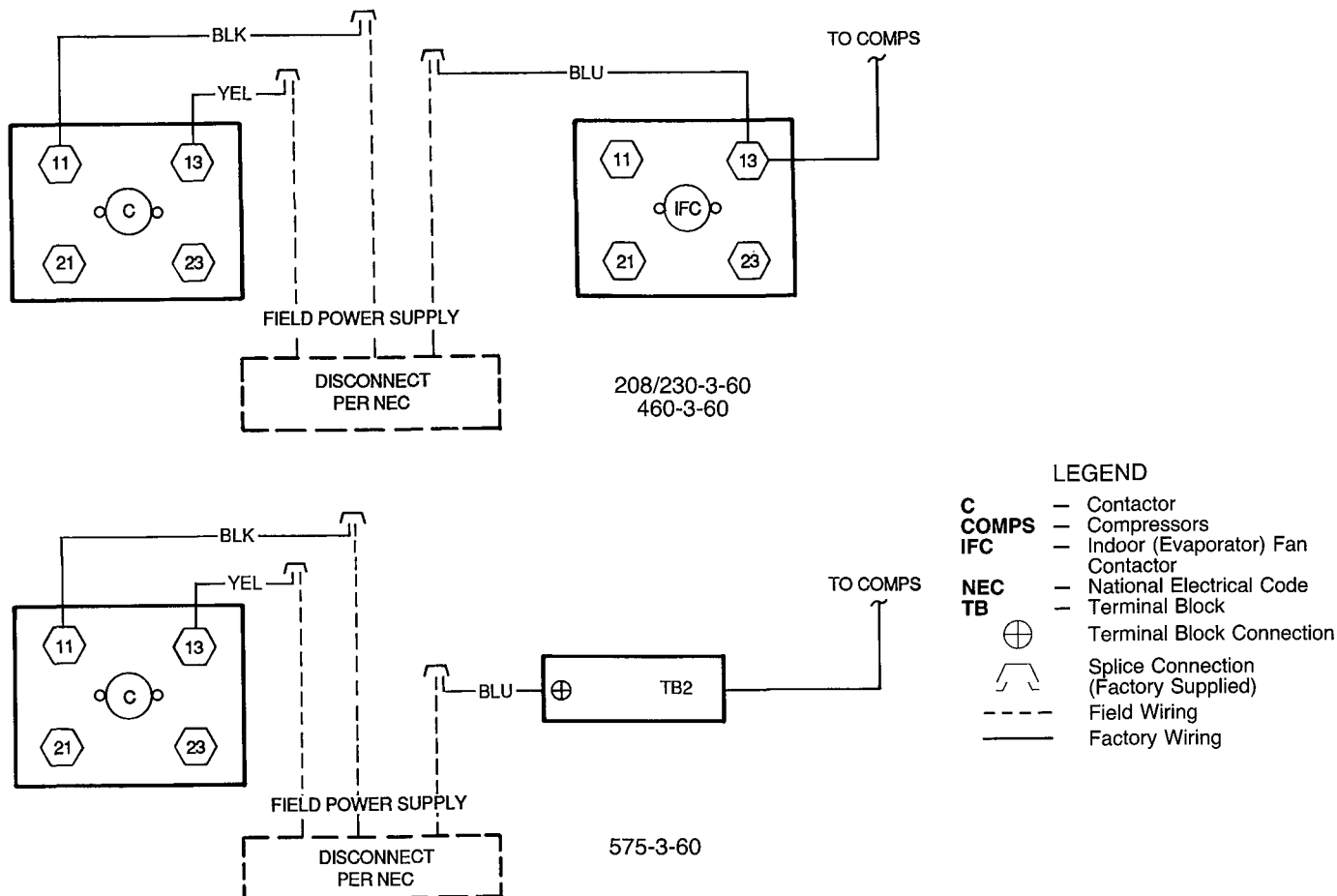
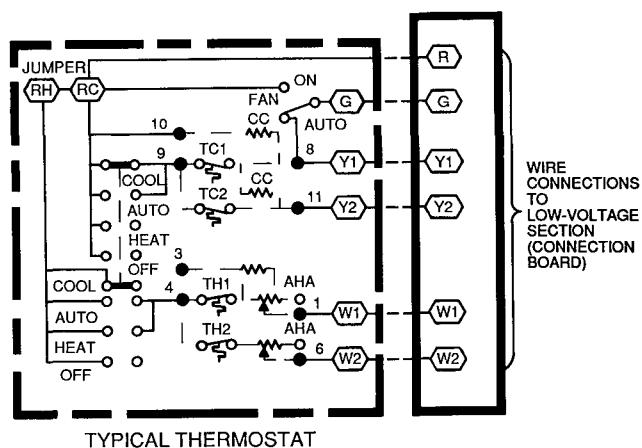


Fig. 9 – Power Wiring Connections



LEGEND

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

Fig. 10 – Low-Voltage Connections

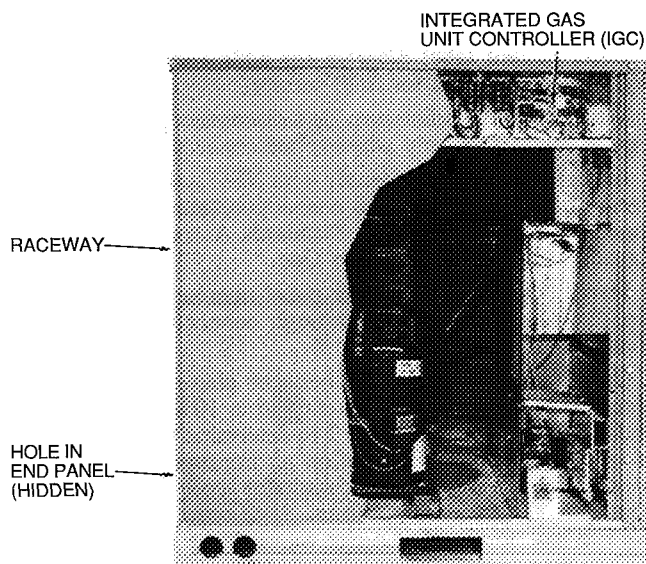


Fig. 11 – Field Control Wiring Raceway

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/LJF 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/LJE 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 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



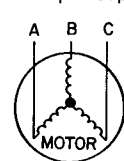
NOTES:

- 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.
- Unbalanced 3-Phase Supply Voltage**
Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

% Voltage Imbalance

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

Example: Supply voltage is 460-3-60



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

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

NOTE: The 575-v units are CSA only.

Determine maximum deviation from average voltage

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

Maximum deviation is 7 v

Determine percent voltage imbalance

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

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

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

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

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

Assembly:

1. Determine quantity of ventilation required for building. Record amount for use in Step 8.
2. Remove and save evaporator coil access panel and screws. See Fig. 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.

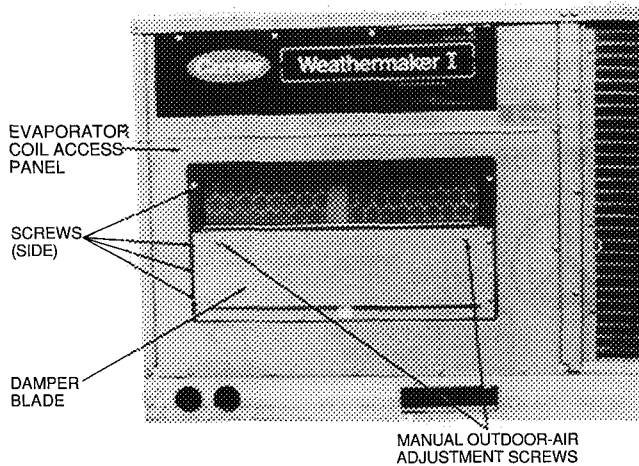


Fig. 12 – Damper Panel with Manual Outdoor-Air Damper Installed

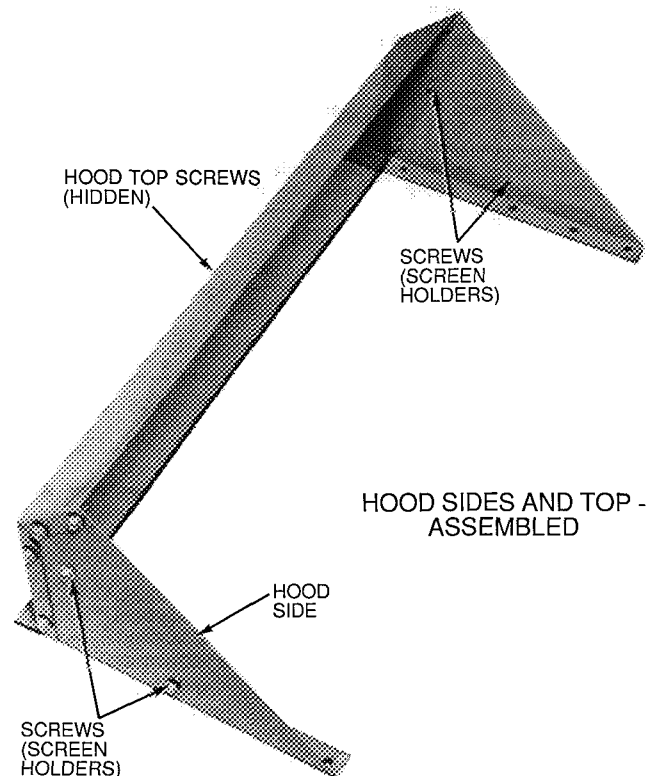


Fig. 13 – Outdoor-Air Hood Details

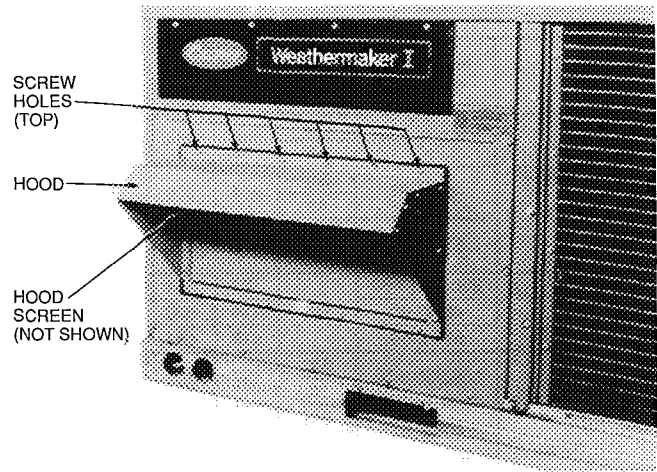


Fig. 14 – Damper with Hood Attached

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.

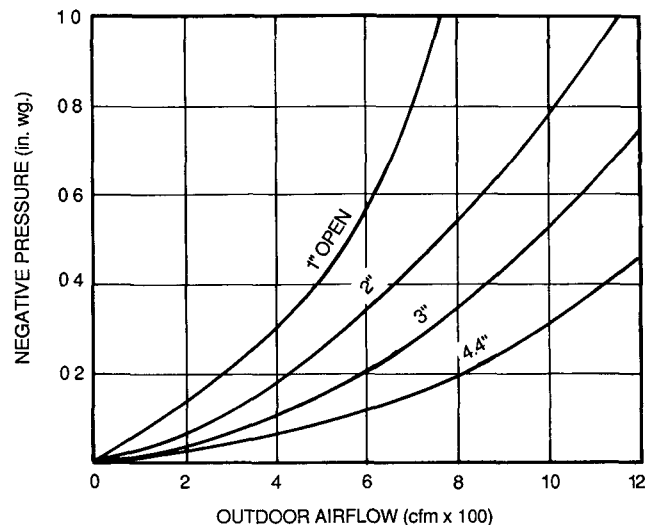


Fig. 15 – Position Setting

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.

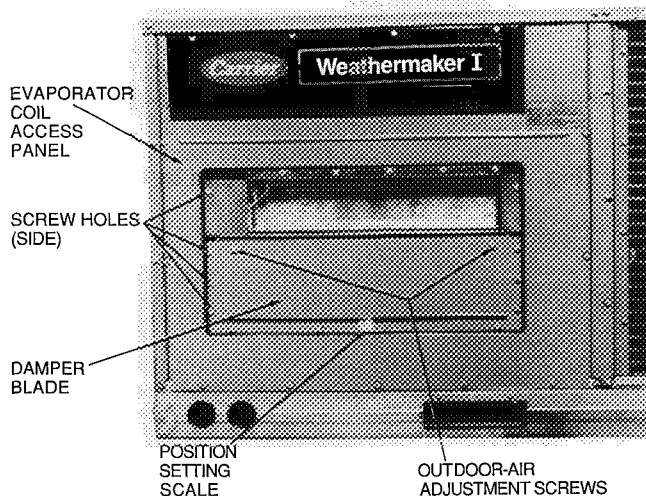


Fig. 16 — Damper Panel with Two-Position Damper Installed

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.

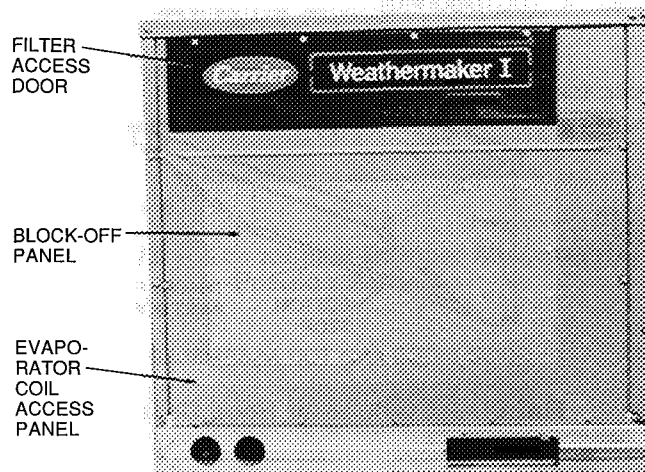


Fig. 17 — Access Panel Location

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.

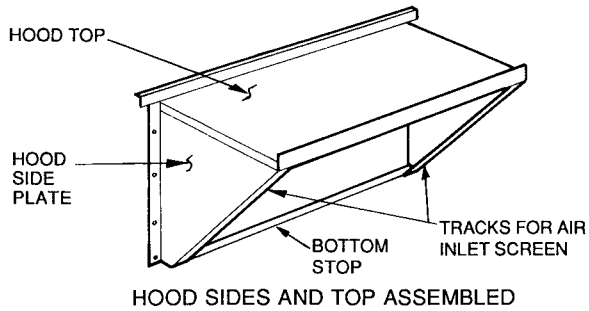
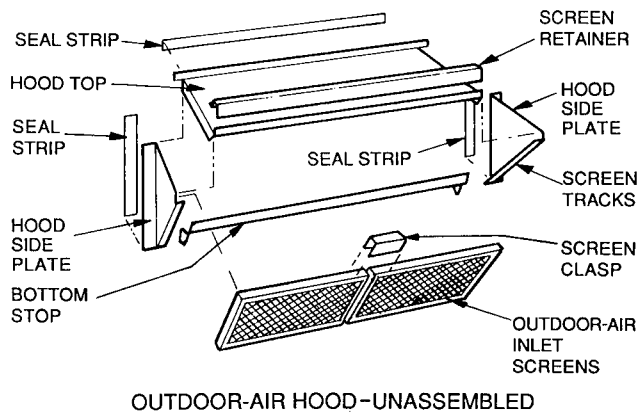


Fig. 18 – Outdoor-Air Hood Details

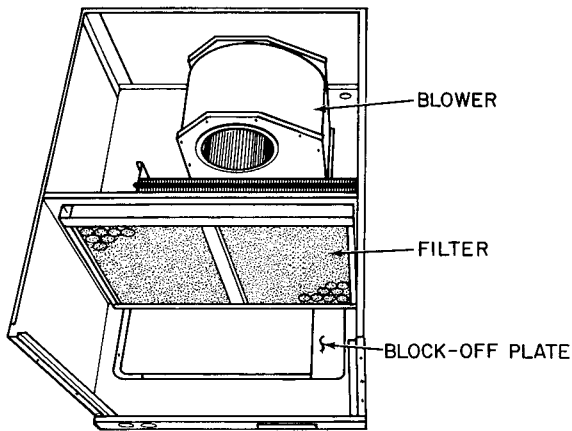


**Fig. 19 – Vertical Discharge Block-Off Plate
(Sizes 012,014 only)**

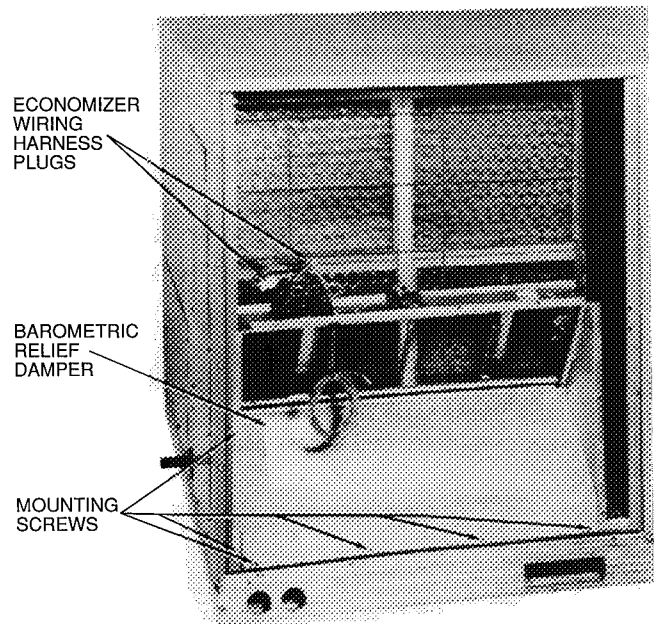


Fig. 20 – Economizer Installed in Unit

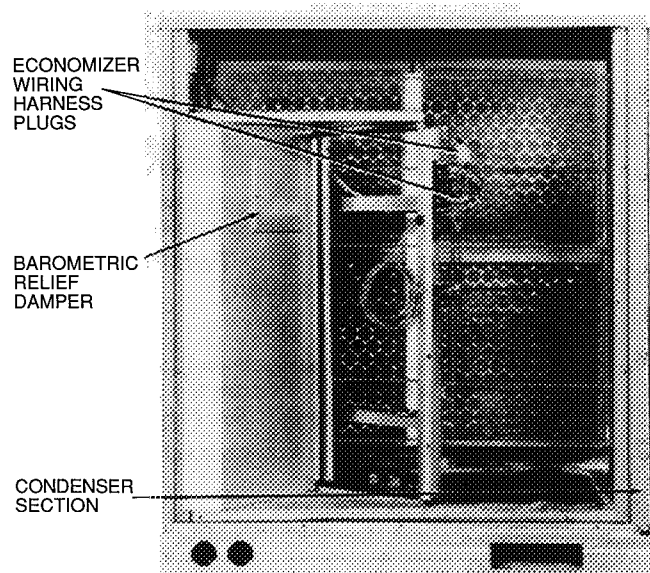


**Fig. 21 – Horizontal Economizer Installation
(90 Degree Rotation)**

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.

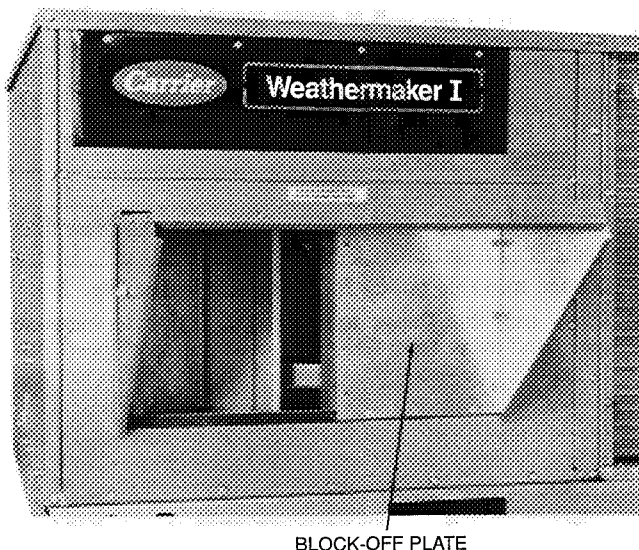
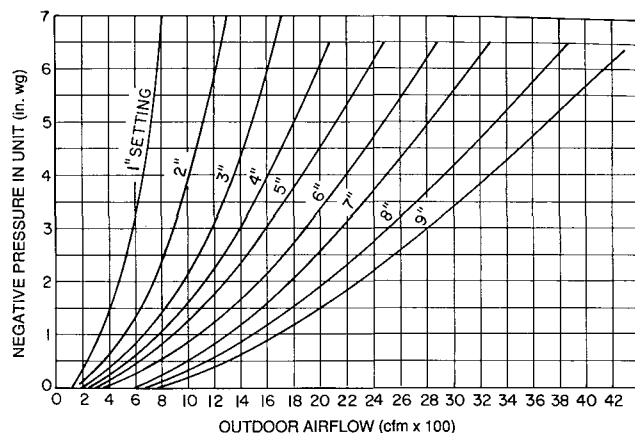


Fig. 22 — Horizontal Discharge Block-Off Plate



Example:

Given —

Negative Pressure 0.1 in. wg
Outdoor Air 1100 cfm

Determine —

Setting = 6

Fig. 23 — Economizer Damper Minimum Position Setting

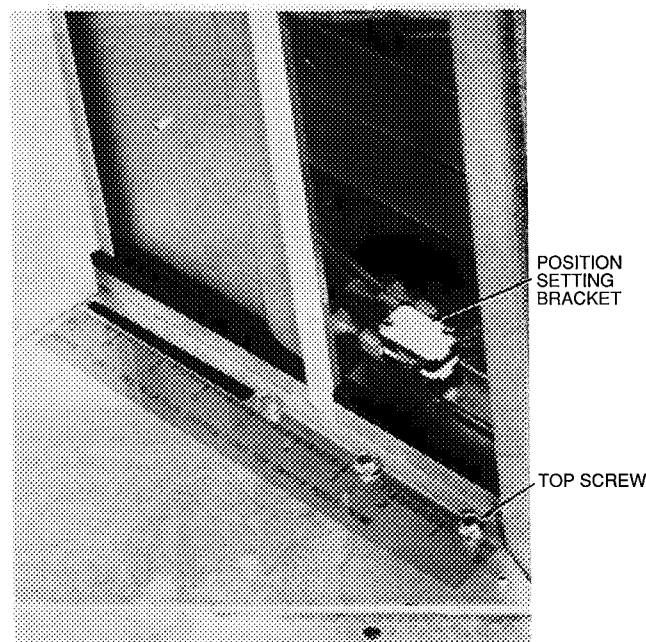


Fig. 24 — Minimum Position Damper Setting

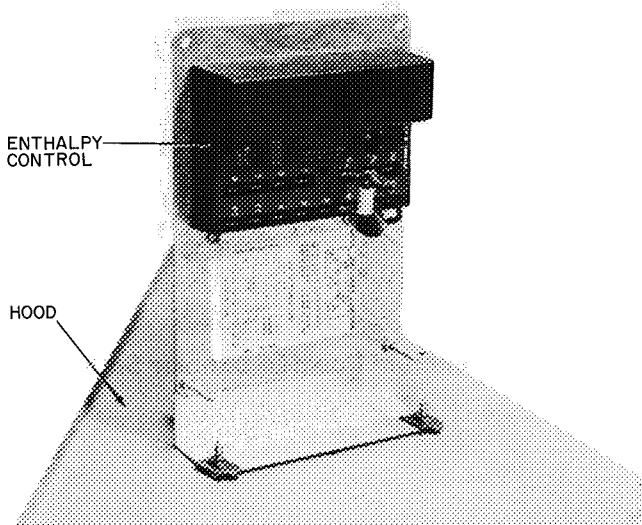
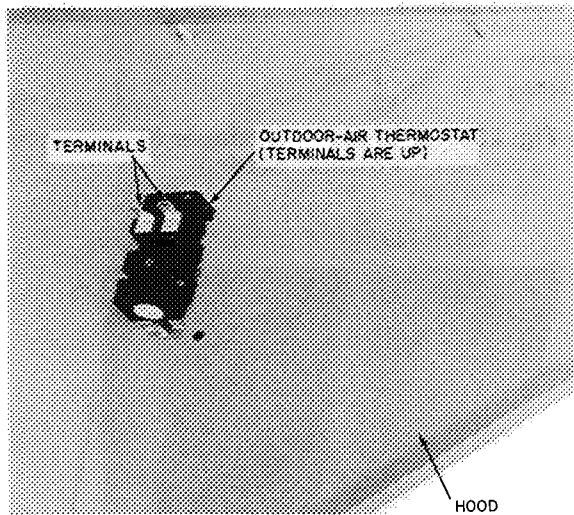
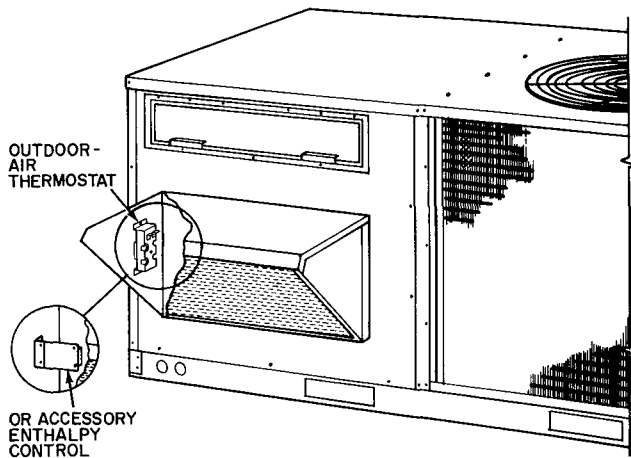


Fig. 25 — Outdoor-Air Thermostat/ Enthalpy Control Installation



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		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/LJE/LFJ012	935	910	890	865	840	815	790	765	740	715	690
48LJD/LJE/LJF012†	1085	1060	1035	1010	985	960	935	910	890	865	840
48LJD/LJE014	1080	1060	1035	1015	990	970	950	930	905	885	860

*Indicates alternate drive

†Indicates alternate evaporator-fan motor and drive.

Table 4 – Evaporator-Fan Motor Efficiency

MOTOR	EFFICIENCY (%)
48LJD/LJE008-012	80
48LJD/LJE014	85
48LJF008-012	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; LJE008-014; LJF008-012**

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

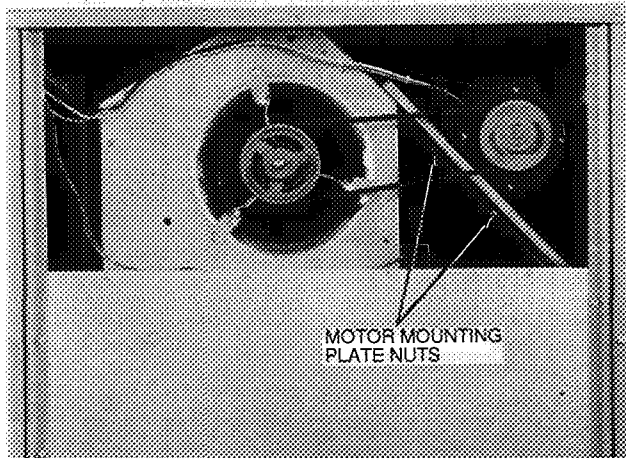


Fig. 27 – Typical Belt-Drive Motor Mounting for Sizes 008,009

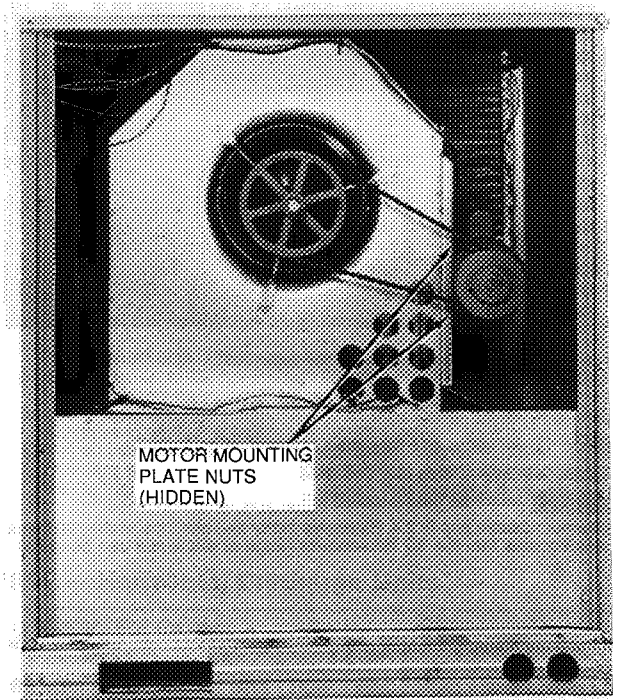


Fig. 28 – Typical Belt-Drive Motor Mounting for Sizes 012,014

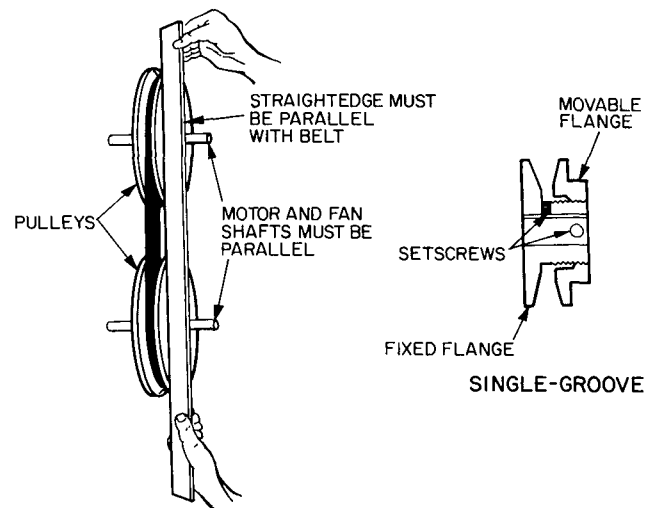


Fig. 29 – Evaporator-Fan Pulley Adjustment

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	2.65
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	2.75
2600	557	0.72	634	0.97	698	1.21	759	1.49	816	1.79	868	2.04	921	2.37	975	2.73
2700	573	0.79	648	1.05	711	1.29	770	1.58	827	1.88	878	2.16	928	2.45	983	2.86
2800	588	0.86	662	1.13	723	1.38	782	1.66	837	1.98	889	2.29	937	2.57	995	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	848	2.08	900	2.41	947	2.70	1003	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	859	2.18	910	2.52	958	2.83	1012	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	870	2.29	920	2.64	968	2.96	1019	3.30
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	2.88	989	3.28	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	858	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	2.55	914	2.93	959	3.28	1003	3.62	1045	4.01	1087	4.43
3900	767	2.04	822	2.35	877	2.71	929	3.09	972	3.45	1015	3.80	1057	4.16	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.26	985	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	4.79	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.68	1022	4.10	1062	4.48	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1029	4.20	1069	4.58	1109	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. 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: 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	2.65
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	2.75
2600	557	0.72	634	0.97	698	1.21	759	1.49	816	1.79	868	2.04	921	2.37	975	2.73
2700	573	0.79	648	1.05	711	1.29	770	1.58	827	1.88	878	2.16	928	2.45	983	2.86
2800	588	0.86	662	1.13	723	1.38	782	1.66	837	1.98	889	2.29	937	2.57	995	2.91
2900	604	0.94	676	1.21	737	1.48	794	1.76	848	2.08	900	2.41	947	2.70	1003	3.01
3000	620	1.02	690	1.30	750	1.58	806	1.86	859	2.18	910	2.52	958	2.83	1012	3.15
3100	636	1.11	704	1.39	764	1.69	818	1.97	870	2.29	920	2.64	968	2.96	1019	3.30
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	2.88	989	3.28	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	858	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	2.55	914	2.93	959	3.28	1003	3.62	1045	4.01	1087	4.43
3900	767	2.04	822	2.35	877	2.71	929	3.09	972	3.45	1015	3.80	1057	4.16	1098	4.60
4000	783	2.18	838	2.50	891	2.86	942	3.26	985	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	4.79	1134	5.16
4250	826	2.58	877	2.91	928	3.28	977	3.68	1022	4.10	1062	4.48	1102	4.87	1140	5.27
4300	834	2.66	885	3.00	935	3.37	984	3.78	1029	4.20	1069	4.58	1109	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. 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. All other rpms require field-supplied drive

Table 8 — Fan Performance, 48LJD/LJE/LJF012 — 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	1008	2.41	1051	2.57	1090	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	2.98
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	3.09
3800	662	1.33	726	1.51	789	1.72	846	1.95	897	2.18	946	2.40	989	2.58	1033	2.78	1077	2.99	1118	3.20
3900	677	1.44	738	1.61	801	1.82	857	2.06	908	2.29	958	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	987	2.91	1030	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	963	2.93	1008	3.18	—	—	—	—	—	—	—	—
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	798	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, 48LJD/LJE014 — 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	4.40	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	4.68	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	4.43	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	5.29
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	4.96	1248	5.31	1291	5.68
5100	882	2.79	938	3.17	990	3.46	1040	3.82	1085	4.12	1129	4.40	1172	4.71	1214	5.15	1257	5.51	—	—
5200	896	2.95	952	3.33	1003	3.63	1053	4.00	1098	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	5.08	1236	5.47	—	—	—	—
5400	926	3.27	981	3.68	1030	3.98	1079	4.36	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	1179	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	4.38	1068	4.83	1114	5.25	1158	5.58	—	—	—	—	—	—	—	—	—	—	—	—
6100	1030	4.59	1083	5.04	1128	5.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1046	4.81	1097	5.26	1143	5.71	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	1061	5.03	1112	5.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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
6. 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	2.60
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	2.81
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	966	2.81
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.81
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	976	2.84
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	936	2.58	983	2.92
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	949	2.71	993	3.03
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	3.32
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1025	3.47
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.30	—	—
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	975	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	988	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	2.45	890	2.82	938	3.18	—	—	—	—	—	—	—	—
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	2.66	892	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.75	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	2.60
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	2.81
2550	559	0.72	634	0.97	700	1.21	759	1.48	814	1.74	864	2.01	915	2.34	966	2.81
2600	567	0.75	641	1.00	706	1.25	764	1.52	819	1.79	869	2.06	918	2.37	973	2.81
2700	582	0.83	655	1.08	719	1.34	776	1.61	831	1.89	880	2.17	927	2.47	976	2.84
2800	598	0.90	670	1.17	732	1.43	789	1.71	842	2.00	892	2.29	936	2.58	983	2.92
2900	614	0.98	684	1.25	745	1.53	802	1.81	854	2.11	903	2.42	949	2.71	993	3.03
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	3.32
3200	662	1.26	729	1.55	787	1.86	841	2.16	891	2.48	938	2.81	983	3.14	1025	3.47
3300	679	1.36	744	1.66	801	1.98	854	2.29	904	2.61	950	2.95	995	3.30	—	—
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	975	3.25	—	—	—	—
3600	729	1.71	790	2.03	845	2.37	895	2.71	943	3.05	988	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	2.45	890	2.82	938	3.18	—	—	—	—	—	—	—	—
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	2.66	892	3.04	—	—	—	—	—	—	—	—	—	—	—	—
4300	847	2.75	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/LJE/LJF012 – 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	3.12
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	1063	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	2.95	1075	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	1056	3.26	—	—	—	—	—	—
4300	794	2.00	846	2.23	900	2.50	943	2.73	986	2.93	1029	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	1014	3.28	—	—	—	—	—	—	—	—	—	—
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	2.85	936	3.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5000	906	3.00	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

- 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 13 – Fan Performance, 48LJD/LJE014 – 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	1213	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	4.56	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	1082	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	4.78	1220	5.16	1259	5.52	—	—	—	—
5200	976	3.47	1025	3.78	1071	4.12	1112	4.39	1153	4.67	1194	4.98	1233	5.38	1272	5.74	—	—	—	—
5300	993	3.67	1041	3.98	1086	4.23	1127	4.61	1168	4.90	1208	5.19	1246	5.56	—	—	—	—	—	—
5400	1010	3.87	1057	4.18	1102	4.34	1142	4.64	1182	5.13	1221	5.41	—	—	—	—	—	—	—	—
5500	1027	4.07	1073	4.39	1118	4.56	1157	5.07	1197	5.36	1236	5.64	—	—	—	—	—	—	—	—
5600	1043	4.29	1090	4.61	1133	4.79	1173	5.31	1211	5.61	—	—	—	—	—	—	—	—	—	—
5700	1060	4.51	1106	4.83	1149	5.02	1189	5.55	—	—	—	—	—	—	—	—	—	—	—	—
5800	1077	4.74	1122	5.07	1165	5.26	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5900	1094	4.98	1139	5.31	1181	5.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	1111	5.22	1155	5.55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6100	1128	5.48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6200	1145	5.73	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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

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. 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).

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

Heating

1. Purge gas supply line of air by opening union ahead of gas valve. When gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and open manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO. or ON position. Set heating temperature lever above room temperature.
4. The induced-draft motor will start.

5. After a call for heating, the main burners should light within 5 seconds. If the burners do not light, then there is a 22-second delay before another 5-second try. If the burners still do not light, the time delay is repeated. If the burners do not light within 15 minutes, there is a lockout. To reset the control, break the 24 v power to W1.

6. The evaporator-fan motor will turn on 45 seconds after the burners are ignited.

7. The evaporator-fan motor will turn off 45 seconds after the thermostat temperature is satisfied.

8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate and in Table 1.

NOTE: The default value for the evaporator-fan motor ON and OFF delay is 45 seconds. The Integrated Gas Unit Controller (IGC) modifies this value when abnormal limit switch cycles occur. Based upon unit operating conditions, the ON delay can be reduced to 0 seconds and the OFF delay can be extended to 180 seconds.

When one flash of the LED is observed, the evaporator-fan ON/OFF delay has been modified. If the limit switch trips at the start of the heating cycle during the evaporator ON delay, the time period of the ON delay for the next cycle will be 5 seconds less than the time at which the switch tripped. (Example: If the limit switch trips at 30 seconds, the evaporator-fan ON delay for the next cycle will occur at 25 seconds.) To prevent short-cycling, a 5 second reduction will only occur if a minimum of 10 minutes has elapsed since the last call for heating.

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

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

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

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

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

Operating Sequence

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

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

fan selector switch is in the ON position, the evaporator motor will run continuously.

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

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

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

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

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

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

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

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

SERVICE

⚠ CAUTION

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

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

EVAPORATOR COIL

1. Turn unit power off. Remove evaporator coil access panel.
2. If economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. Refer to Accessory Economizer Installation Instructions or Optional Economizer section on page 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.

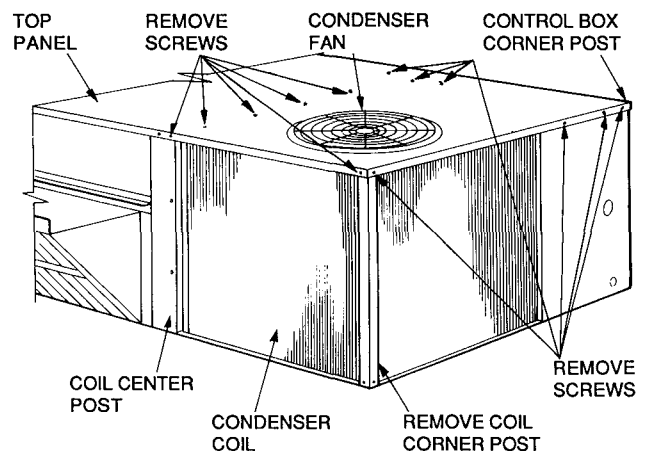


Fig. 30 — Cleaning Condenser Coil

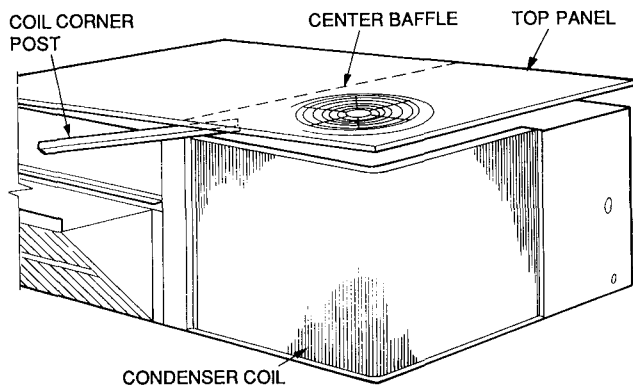


Fig. 31 — Propping Up Top Panel

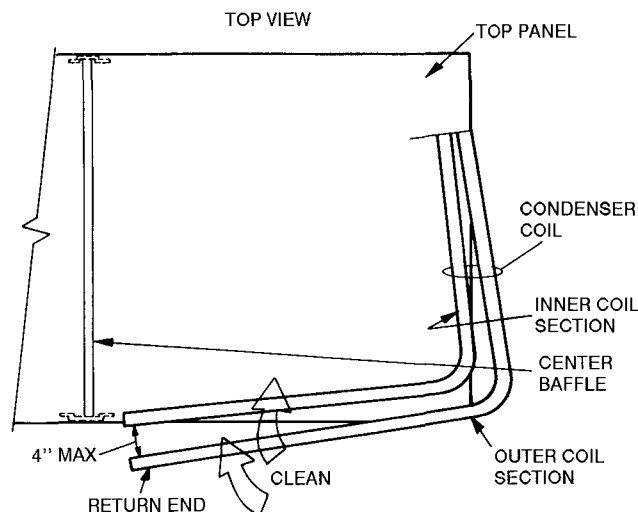


Fig. 32 — Separating Coil Sections

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.

Two-Position Damper — Refer to Two-Position Damper section on page 11.

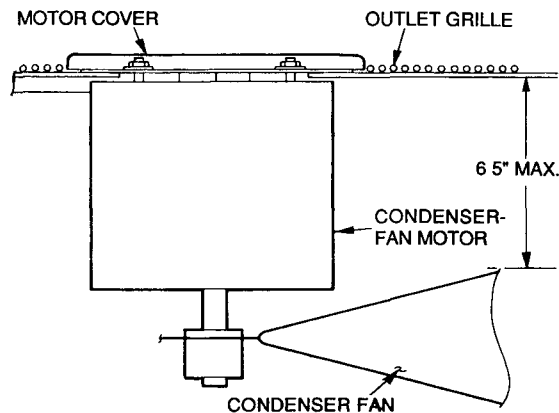


Fig. 33 — Condenser-Fan Adjustment

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

Economizer Adjustment — Refer to Optional Economizer section on page 11.

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to Carrier GTAC 2-5 Charging, Recovery, Recycling, and Reclamation training manual and the following procedures.

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

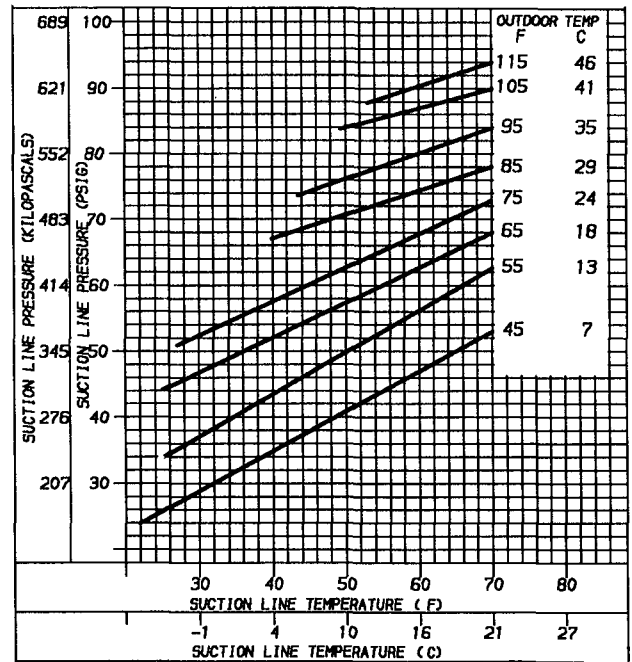
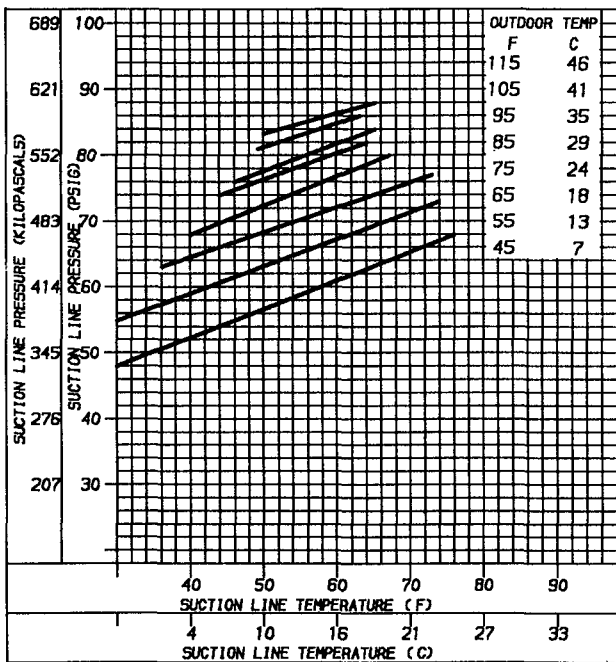
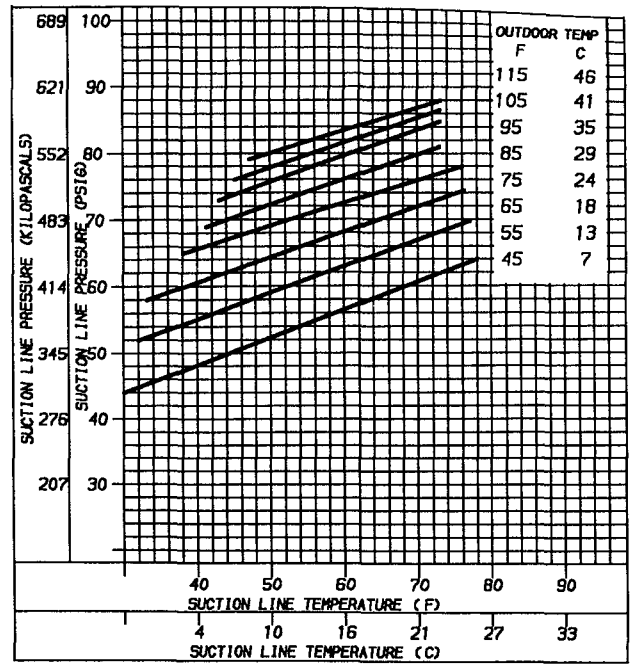
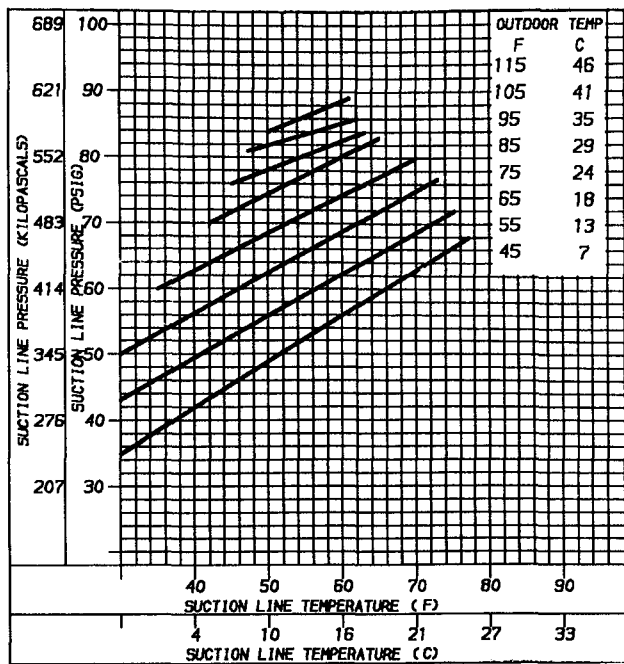
NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

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

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

Outdoor Temperature	85 F
Suction Pressure	70 psig
Suction Temperature should be	42 F
(Suction temperature may vary $\pm$ 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 below.
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.

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 the 2 screws which hold the heat shield in place, and remove heat shield.
3. Remove the 7 screws that attach induced-draft motor mounting plate to blower housing (Fig. 38).
4. Slide the motor and blower wheel assembly out of the blower housing. The blower wheel can be cleaned at this point. If additional cleaning is required, continue with Steps 5 and 6.
5. To remove blower from the motor shaft, remove 2 set-screws.
6. 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.
7. 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. Integrated Gas Unit Controller (IGC) is located in the control box (Fig. 11). Module contains a self-diagnostic LED (light-emitting diode). A single LED on the IGC provides a visual display of operational or sequential problems when the power supply is interrupted. When a break in power occurs, the module will be reset (resulting in a loss of fault history) and the indoor (evaporator) fan ON/OFF times will be reset. For additional information, refer to the Start-Up, Heating section on page 20. The LED error code can be observed through the viewport. See Fig. 11. During servicing refer to the label on the control box cover or Table 14 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 14 — 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 15-18 for additional information.

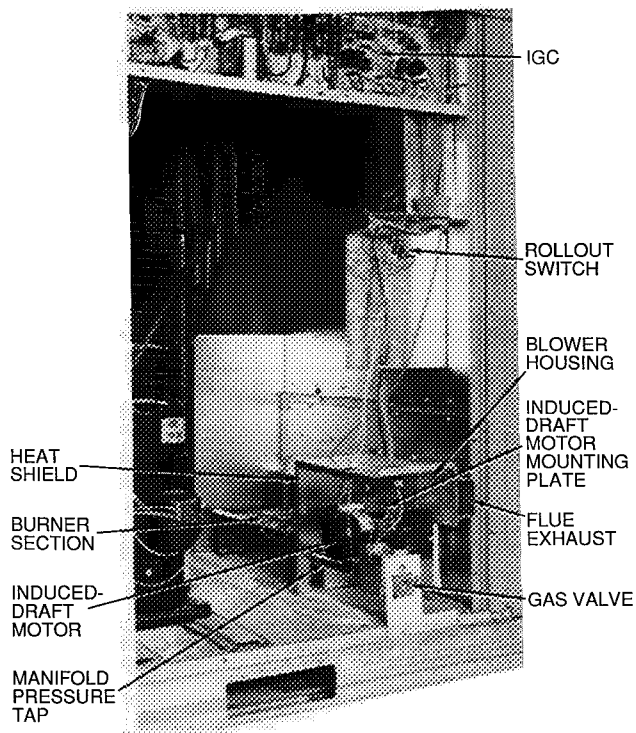
Main Burners — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames and adjust if necessary.

⚠ CAUTION

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

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

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



IGC — Integrated Gas Unit Controller

Fig. 38 — Burner Section Details

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described in Removal and Replacement of Gas Train section, page 24.
2. Inspect burners; if dirty, remove burners from rack.
3. Using a soft brush clean burners and cross-over port as required.
4. Adjust spark gap. See Fig. 40.
5. Reinstall burners on rack.
6. Reinstall burner rack as described in Removal and Replacement of Gas Train section, page 24.

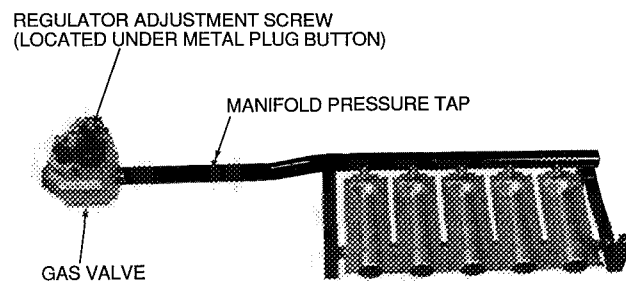
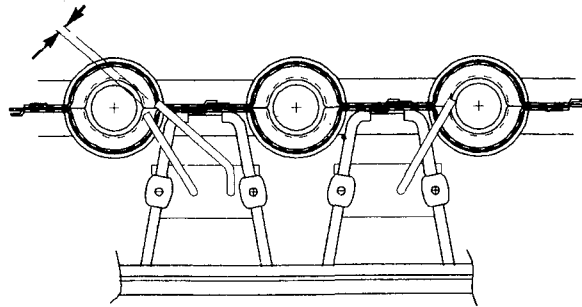


Fig. 39 — Burner Tray Details

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

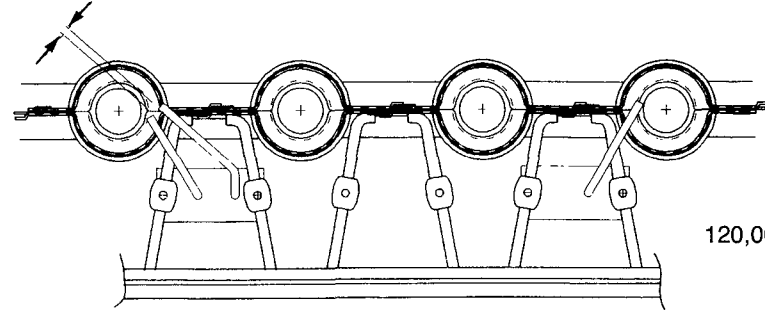
1/8 in (3.2) SPARK GAP



125,000 BTUH INPUT

48LJD008,009

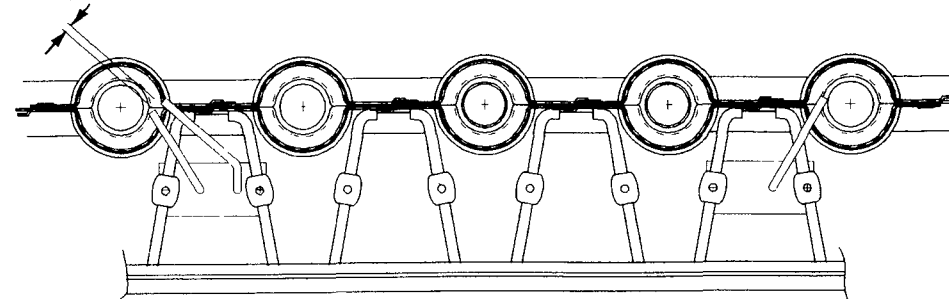
1/8 in (3.2) SPARK GAP



120,000-180,000 BTUH INPUT

48LJD012, 48LJE008,009

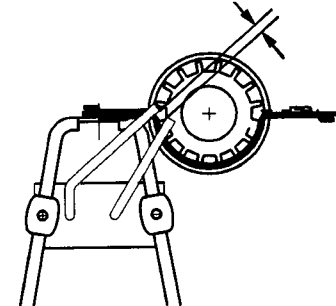
1/8 in (3.2) SPARK GAP



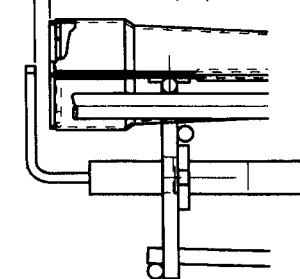
48LJD014; 48LJE012
48LJF008,009
48LJE014; 48LJF012

180,000-225,000 BTUH INPUT
180,000-220,000 BTUH INPUT
200,000-250,000 BTUH INPUT

SPARK GAP 1/8 in (3.2) TO 1/4 in (3.6)



SPARK GAP 1/4 in (3.6) TO 1/2 in (5.6)



NOTE: Dimensions in () are millimeters.

Fig. 40 – Spark Gap Adjustment

TROUBLESHOOTING

Table 15 — LED Error Code Service Analysis

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

IGC — Integrated Gas Unit Controller

LED — Light-Emitting Diode

IMPORTANT: Refer to Table 16 — Heating Service Analysis for additional troubleshooting information

Table 16 – Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners will not ignite.	Misaligned spark electrodes	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool down period before resetting
	Miswired or loose connections	Check all wiring and wire nut connections.
	Burned-out heat anticipator in thermostat.	Replace thermostat.
	Broken thermostat wires.	Run continuity check Replace wires, if necessary
Inadequate heating.	Dirty air filter	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. 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.

GR — Ground

Table 17 – Cooling Service Troubleshooting

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

Table 18 – Economizer Troubleshooting

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (evaporator) fan not on.	Check wiring between G on connection board and indoor (evaporator) fan contactor
	No power to economizer motor	1. Check that SW3 is making proper contact with the damper blade 2. Check continuity across R1 coil. If not connected, replace relay R1. 3. Check diode D1. If diode is not functioning properly, replace. 4. Check wiring in economizer relay pack (see unit label diagram)
	Economizer motor failure.	If there is 24 vac power at the motor terminals, but motor is not operating, replace 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 set point above outdoor temperature or humidity level. If switch does not close, replace OAT or EC.
	Check wiring of economizer relay packs	1. Check continuity across relay R2 coil. If not connected, replace R2 relay. 2. Check continuity across relay R3 coil. If not connected, replace R3 relay.
	Check SAT	If supply-air temperature is over 57 F, switch T2 should be closed. If not, replace SAT.
Damper does not close.	Incorrect wiring or wiring defect	1. Check switch 2 and 4. If non-operational, replace. 2. Check diode D2. If diode is not functioning properly, replace. 3. Check wiring on economizer and on economizer relay pack (see unit label diagram)
	Check SAT	If supply-air temperature is below 52 F, switch T1 should be closed. If not, replace SAT.
	Economizer motor failure	If there is 24 vac power at the motor terminals, but motor is not operating, replace motor.

EC — Enthalpy Control
OAT — Outdoor-Air Thermostat
SAT — Supply-Air Thermostat
SW — Switch

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

IMPORTANT: Refer to unit wiring label for actual wiring schematic

AHA — Adjustable Heat Anticipator
C — Contactor, Compressor
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 Protection Thermostat
GND — Ground
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 Switch
LS — Limit Switch
MGV — Main Gas Valve
MTR — Motor
NEC — National Electrical Code
OAT — Outdoor-Air Thermostat
OFM — Outdoor (Condenser) Fan Motor
P — Plug
PL — Plug Assembly
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
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. Number(s) indicates the line location of contacts, a bracket over (2) numbers signifies single-pole, double-throw contacts. An underlined number signifies a normally closed contact. Plain numbers (no lines) signify a normally open contact.
3. Three-phase motors are protected under primary single phasing conditions.
4. Thermostat: HH07AT170, 172, 174 and P272-2783
Subbase: HH93AZ176, 178 and P272-1882, 1883
5. Set heat anticipator for first stage at 0.14 amp, second stage at 0.20 amp.
6. Use copper conductors only

