

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 apply.

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

⚠ WARNING



Disconnect gas piping from unit when leak testing at pressure greater than 1/2 psig. Pressures greater than 1/2 psig will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 1/2 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 1/2 psig or less, a unit connected to such piping must be isolated by manually closing the gas valve(s).

⚠ WARNING

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

INSTALLATION

Unit is shipped in the vertical discharge configuration. To convert to horizontal discharge application, remove duct opening covers. Using the same screws, install covers on duct openings in basepan of unit with insulation-side down. Seals around openings must be tight.

IMPORTANT: An external filter kit **MUST** be used or the filters **MUST** be field-installed external to the unit on horizontal discharge applications with accessory economizer or two-position damper. Otherwise, the economizer or two-position damper 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.

NOTE: Any combination of supply and return discharges is permissible, i.e., vertical supply combined with horizontal return.

Step 1 — Provide Unit Support

ROOF CURB — Assemble and install accessory roof curb in accordance with instructions shipped with curb. See Fig. 1. Install insulation, cant strips, roofing and counter flashing as shown. *Ductwork must be attached to curbs, not to the unit.* 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 can be set on roof curb.

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

Curb should be level. Unit leveling tolerances are shown in Fig. 2. 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.

ROOF CURB ACCESSORY	"A"	UNIT SIZE
50DJ900771	1'-2" [356]	48HJE/HJF 004
50DJ900781	2'-0" [610]	48HJD/HJE 005-007

NOTES:

1. Roof curb accessory is shipped un-assembled.
2. Insulated panels
3. Dimensions in [] are in millimeters.
4. Roof curb: galvanized steel.
5. Attach ductwork to curb. (Flanges of duct rest on curb.)
6. Service clearance 4 ft on each side
7.  Direction of airflow.

UNIT SIZE	"B"	"C"	"D" ALT DRAIN HOLE	"E" GAS	"F" POWER	"G" CONTROL	CONNECTOR PKG. ACC.
48HJE/HJF 004 48HJD/HJE 005-007	1-9 1/4" [551]	1-4" [406]	1-3/4" [45]	3/4" [19] NPT	3/4" [19] NPT	3/4" [19] NPT	50DJ900791

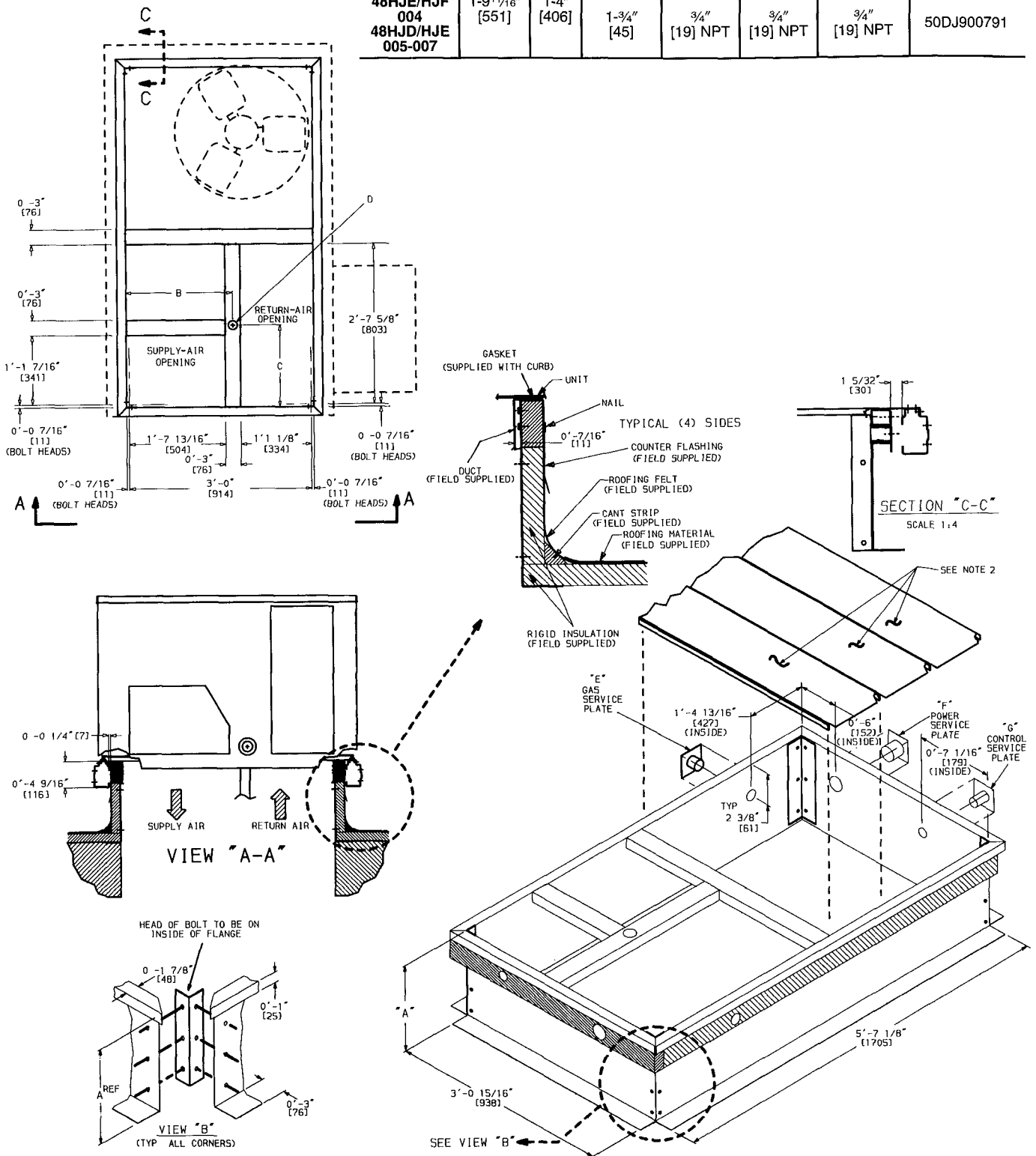


Fig. 1 — Roof Curb Details

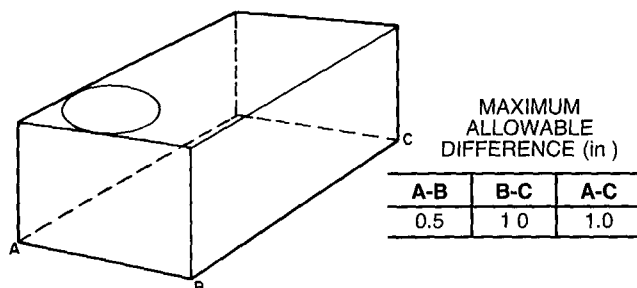


Fig. 2 — Unit Leveling Tolerances

Step 2 — Field Fabricate Ductwork — Secure all ducts to roof curb and building structure on vertical discharge units. *Do not connect ductwork to unit.* For horizontal applications, field-supplied flanges should be attached to horizontal discharge openings and all ductwork should be 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 — Determine Location Of Drain Connection For Internally-Trapped Condensate Drain

Units have internally-trapped condensate drains. The condensate may be drained through a drain in the bottom of the condensate pan. A drain plug is shipped installed in the basepan drain connection. See Fig. 3. If condensate is to be drained through the bottom of unit, the factory-installed drain plug must be relocated to the end drain connection before the unit is placed on the roof curb. The piping for the condensate can be completed after the unit is in place. Unit discharge connections do not determine the location of drain connections. Either drain connection may be used with either vertical or horizontal discharge units.

NOTE: Before installing unit, be sure drain plug is tight.

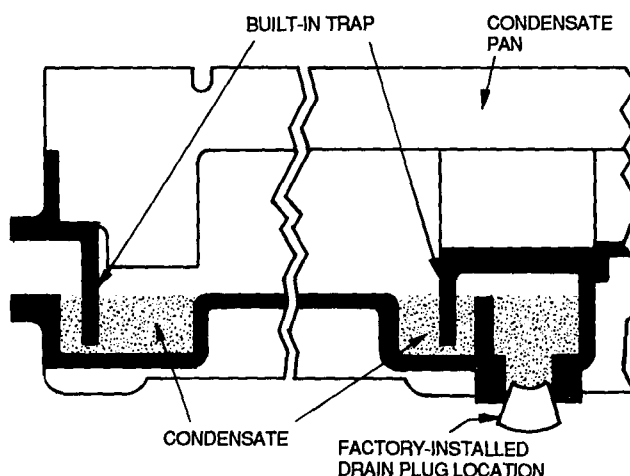
IMPORTANT: The condensate pan is internally trapped. An external trap is not required and should not be installed. If an external trap is attached, water may leak into building.

Step 4 — Rig and Place Unit — Inspect unit for transportation damage, and 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, and rollers may be used to move unit across a roof. Level by using unit frame as a reference. See Table 1 and Fig. 4 for additional information. Operating weight is shown in Table 1 and Fig. 4.

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

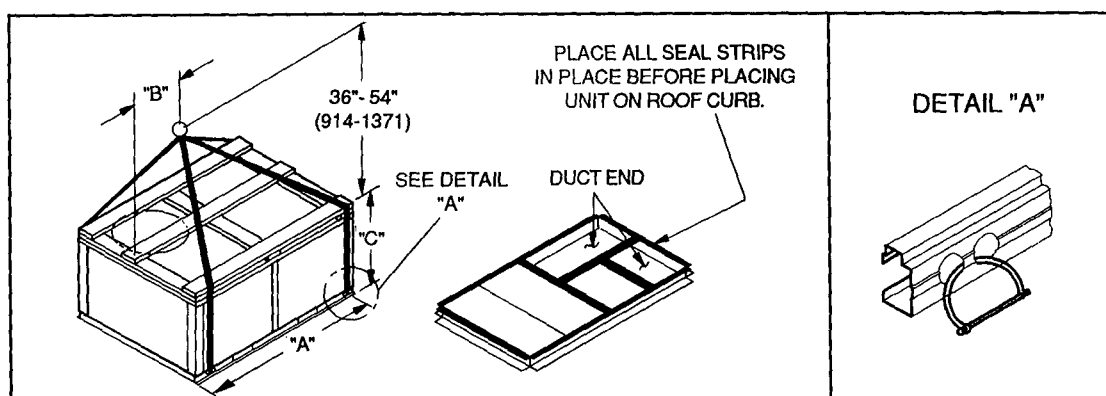
⚠ CAUTION

All panels must be in place when rigging.



NOTE: Drain plug is shown in factory-installed position

Fig. 3 — Internally-Trapped Condensate Drain



NOTES:

1. Dimensions in () are 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 unit operating weights with accessory economizer.

⚠ CAUTION

All panels must be in place when rigging.

UNIT	MAX WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	Lb	Kg	in.	mm	in.	mm	in.	mm
48HJE/HJF004	530	240	73.69	1872	35.50	902	33.31	847
48HJD/HJE005	540	245	73.69	1872	35.50	902	33.31	847
48HJD/HJE006	560	254	73.69	1872	35.50	902	33.31	847
48HJD/HJE007	615	279	73.69	1872	35.50	902	33.31	847

Fig. 4 — Rigging Details

Table 1 — Physical Data

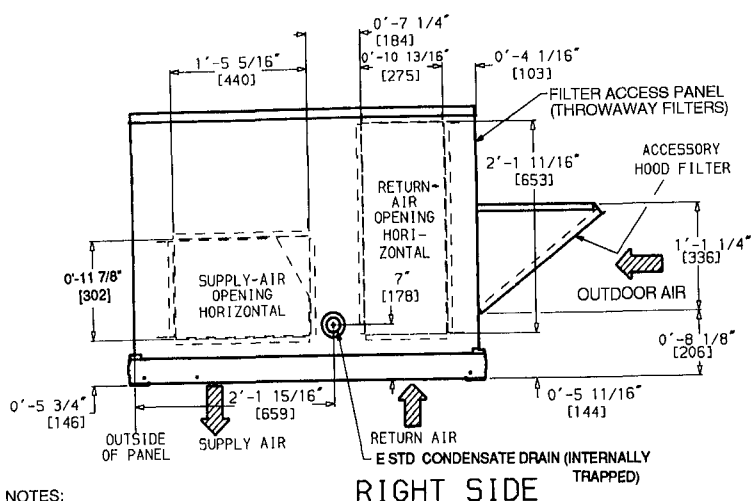
BASE UNIT 48		HJE/HJF004	HJD/HJE005	HJD/HJE006	HJD/HJE007
NOMINAL CAPACITY		3	4	5	6
OPERATING WEIGHT (lb)					
Unit		530	540	560	615
With Economizer		564	574	594	649
Roof Curb		115	115	115	115
COMPRESSOR		Advanced Reciprocating	Scroll		Reciprocating
Quantity		1	1	1	1
Oil (oz)		45	52	75	65
REFRIGERANT TYPE			R-22		
Operating Charge (lb-oz)		5-2	7-8	8-8	9-12
CONDENSER FAN			Propeller		
Quantity...Diameter (in.)		1.. 26	1.. 26	1.. 26	1.. 26
Nominal Cfm		4600	4100	4100	4100
Motor Hp...Rpm		1/3 ..850	1/3 ..850	1/3 .. 850	1/3 .. 850
CONDENSER COIL		Enhanced Copper Tubes, Aluminum Lanced Fins			
Rows...Fins/in.		1.. 17	2...17	2.. 17	2...17
Total Face Area (sq ft)		12.25	12.25	12.25	12.25
EVAPORATOR FAN			Centrifugal		
Size (in.)		10 x 10	10 x 10	10 x 10	10 x 10
Type Drive		Belt	Belt	Belt	Belt
		Std	Alt	Std	Alt
Nominal Cfm		1200	1600	2000	2400
Maximum Continuous Bhp		0.66	1.20	1.70	2.40
		Std	Alt	Std	Alt
Motor Frame		48	48	56	56
		Std	Alt	Std	Alt
Nominal Rpm High/Low		—	—	—	—
		Std	Alt	Std	Alt
Fan Rpm Range		860/ 845	1080/ 970	—	—
		Std	Alt	Std	Alt
		558-1326	970-1310	920-1300	1120-1585
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100	2100
Motor Pulley Pitch Diameter		2.4/3.4	1.9/2.9	2.4/3.4	2.4/3.4
A/B (in.)		3.7	3.5	4.5	3.7
Fan Pulley Pitch Diameter (in.)		A.. 31	A.. 31	A.. 40	A.. 40
Belt — Type...Length (in.)		10.0-12.4	10.0-12.4	14.7-15.5	14.7-15.5
Pulley Center Line Distance (in.)		42*	68	77	93
Speed Change Per Full Turn of Movable Pulley Flange (rpm)		5	5	5	5
Movable Pulley Maximum Full Turns from Closed Position		3	3	3	3
Factory Setting — Full Turns Open		966	1106	1150	1400
Factory Speed Setting (rpm)		5/8	5/8	5/8	5/8
Fan Shaft Diameter at Pulley (in.)					
EVAPORATOR COIL		Enhanced Copper Tubes, Aluminum Double Wavy Fins, Acutrol™ Feed Device			
Rows...Fins/in.		2...15	2.. 15	3...15	4.. 15
Total Face Area (sq ft)		4.17	5.5	5.5	5.5
FURNACE SECTION					
Burner Orifice Diameter (in. ...drill size)†					
Natural Gas — Std		.113 .33	113. 33	113.. 33	.113 .33
Liquid Propane — Alt		.089 .43	089 .43	089 .43	.089 .43
Thermostat Heat Anticipator Setting (amps)					
208/230/460 v					
First Stage		1.0	1.0	1.0	1.0
Second Stage		0.6	0.6	0.6	0.6
Gas Input					
Second Stage		74,000/115,000	74,000/115,000	74,000/115,000	74,000/115,000
First Stage		50,000/ 82,000	50,000/ 82,000	50,000/ 82,000	50,000/ 82,000
Efficiency (Steady State) (%)		81/81	81/81	81/81	81/81
Temperature Rise Range		25-55/55-85	25-55/35-65	25-55/35-65	25-55/35-65
Manifold Pressure (in. wg)					
Natural Gas — Std		3.5	3.5	3.5	3.5
Liquid Propane — Alt		3.5	3.5	3.5	3.5
Maximum Static Pressure (in. wg)		.75	.75	.75	.75
Field Gas Connection Size (in.)		1/2	1/2	1/2	1/2
HIGH-PRESSURE SWITCH (psig)				428	
Cutout				320	
Reset (Auto.)					
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid Line) (psig)				7 ± 3	
Cutout				22 ± 5	
Reset (Auto.)					
FREEZE PROTECTION THERMOSTAT				30	
Opens (F)				45	
Closes (F)					
OUTDOOR-AIR INLET SCREENS				Cleanable	
Quantity...Size (in.)				1...20 x 24 x 1	
RETURN-AIR FILTERS				Throwaway	
Quantity...Size (in.)				2...16 x 25 x 2	

LEGEND

Bhp — Brake Horsepower

*As standard from factory.

†48HJD005-007 and 48HJE004 (74,000 Btuh) units have 2 burners
48HJE005-007 and 48HJF004 (115,000 Btuh) units have 3 burners.



NOTES:

1 Dimensions in [] are in millimeters

2 Center of Gravity

3 Direction of airflow

4 On vertical discharge units, ductwork to be attached to accessory roof curb only. On horizontal discharge units, field-supplied flanges should be attached to horizontal discharge openings, and all ductwork should be attached to the flanges.

5 Minimum clearances are as follows: (local codes or jurisdiction may prevail):

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

a Between unit, flue side and combustible surfaces, 36 inches (Minimum clearance to combustibles is 18 in. for units with accessory flue discharge deflector.)

b Bottom to combustible surfaces (when not using curb), 0 in. for HJD and HJE units, and 1 in. for HJF units

c Condenser coil, for proper airflow, 36-in. one side, 12 in. the other. The side getting the greater clearance is optional.

d Overhead, 60 in. to assure proper condenser fan operation

e Horizontal supply and return end, zero inches

f Between units, control box side, 42 in. per NEC (National Electrical Code)

g Between unit and ungrounded surfaces, control box side, 36 in. per NEC

h Between unit and block or concrete walls and other grounded surfaces, control box side, 42 in. per NEC

6 With the exception of the clearance for the condenser coil and combustion side, as stated in notes 5a, b and c, a removable fence or barricade requires no clearance

7 Units may be installed on combustible floors made from wood or Class A, B, or C roof covering material

	Connection Sizes
A	1 3/8" Dia [35] Field Power Supply Hole
B	2" Dia [51] Power Supply Knockout
C	1 3/4" Dia [44] Charging-Port Hole
D	3/8" Dia [22] Field Control Wiring Hole
E	3/4"-14 NPT Condensate Drain
F	1/2"-14 NPT Gas Connection
G	2 1/8" Dia [64] Power Supply Knockout

UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER WEIGHT (A)		CORNER WEIGHT (B)	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg
48HJE/HJF004	530	240	34	15.4	104	47.2	97	44.0
48HJD/HJE005	540	245	34	15.4	106	48.1	98	44.5
48HJD/HJE006	560	254	34	15.4	110	49.9	102	46.3
48HJD/HJE007	615	279	34	15.4	120	54.4	112	50.8

UNIT	CORNER WEIGHT (C)		CORNER WEIGHT (D)	
	Lb	Kg	Lb	Kg
48HJE/HJF004	159	72.1	171	77.6
48HJD/HJE005	162	73.5	174	78.9
48HJD/HJE006	168	76.2	180	81.6
48HJD/HJE007	185	83.9	198	89.8

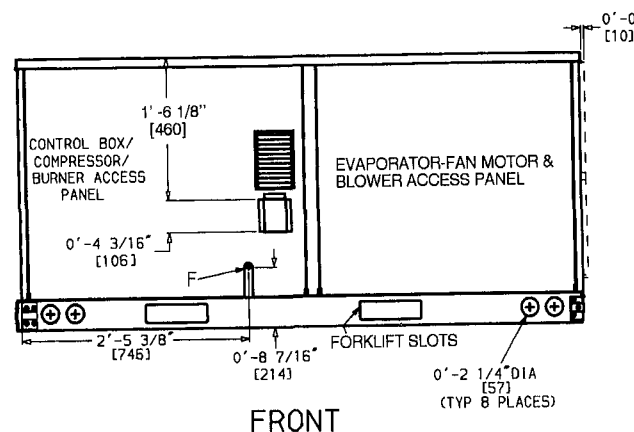
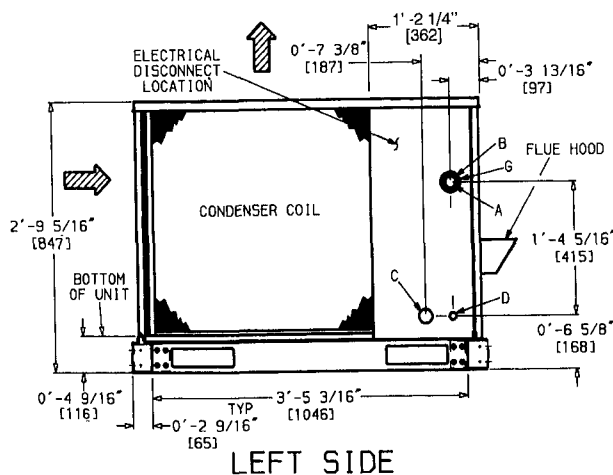
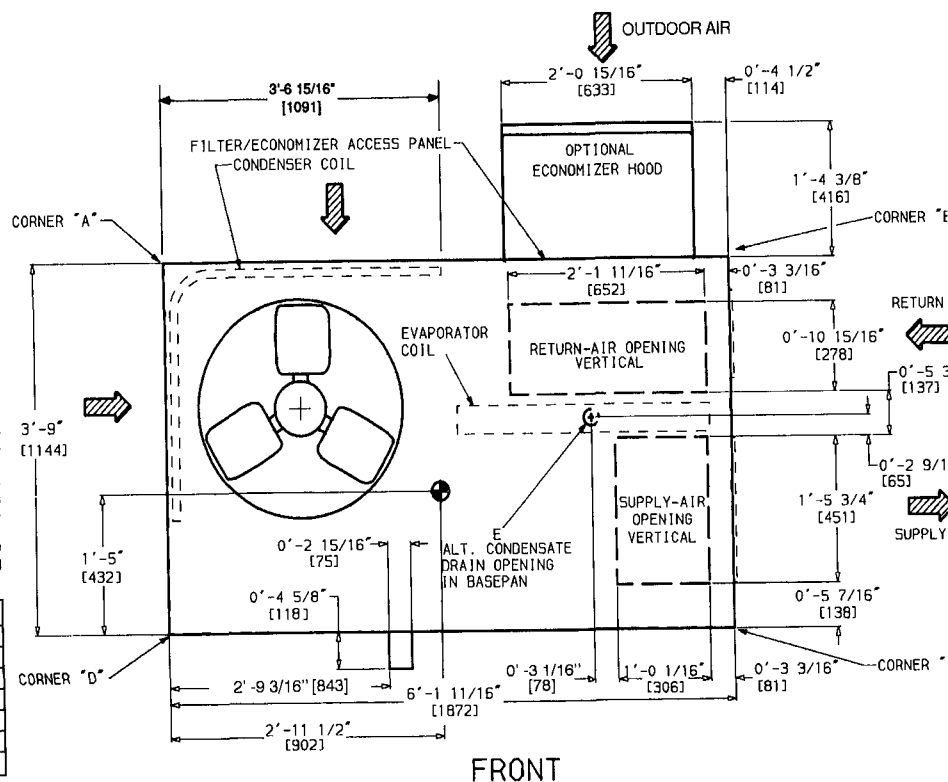


Fig. 5 — Base Unit Dimensions

POSITIONING — Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow and service access. See Fig. 5. A properly positioned unit will have the following clearances between unit and roof curb: ¼-in. clearance between roof curb and base rails on each side and front of unit; 1½-in. clearance between roof curb and rear of unit. (See Fig. 1, section C-C).

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 such 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.

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. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

Flue gas can deteriorate building materials. Orient unit such 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.

Flue vent discharge must have a minimum horizontal clearance of 4 ft from electric and gas meters, gas regulators and gas relief equipment.

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

Step 5 — Install Flue Hood — Flue hood and screen are shipped screwed to the burner compartment access panel. Remove from shipping location and, using screws provided, install flue hood and screen in location shown in Fig. 5 and 6.

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

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

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

Support gas piping as shown in the table in Fig. 7. For example, a ¾-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. 7 for typical pipe guide and locations of external manual gas shutoff valve.

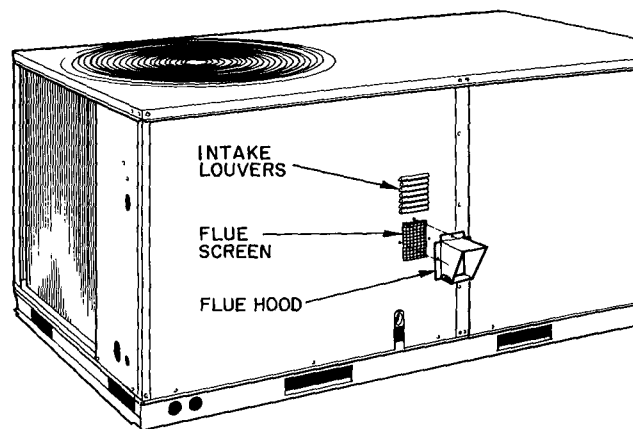
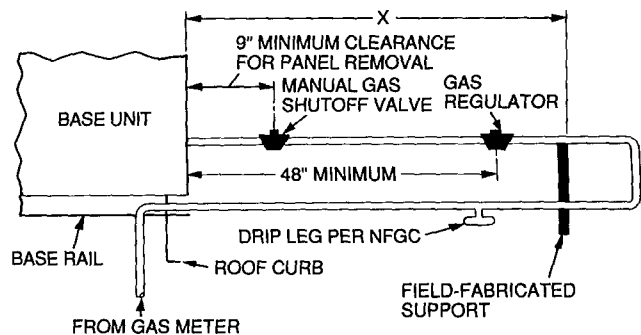


Fig. 6 — Flue Hood Details



LEGEND

*Field Supplied

NFGC — National Fuel Gas Code
NOTE: Follow all local codes.

SPACING OF SUPPORTS

STEEL PIPE NOMINAL DIAMETER (in.)	X DIMENSION (ft)
½	6
¾ or 1	8
1¼ or larger	10

Fig. 7 — Gas Piping Guide (With Accessory Thru-the-Curb Service Connections)

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) 70-1987 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 orange wire on the transformer and connecting it to the 200-v red wire from the transformer. The end of the orange wire must then be insulated.

Refer to unit label diagram for additional information. Pigtailed are provided for field service. Use factory-supplied splices or UL (Underwriters' Laboratories) approved copper/aluminum connector.

When installing units, provide a disconnect per NEC.

All field wiring must comply with NEC and local requirements.

Install conduit through side panel openings indicated in Fig. 5. Route power lines through connector to terminal connections as shown in Fig. 8.

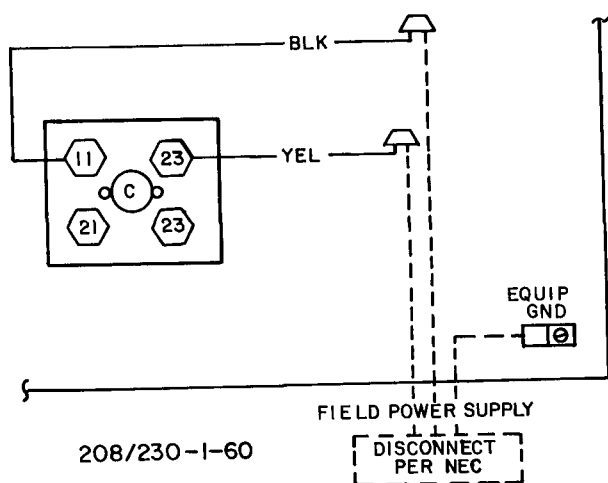
Voltage to compressor terminals during operation must be within voltage range indicated on unit nameplate (also see Table 2). On 3-phase units, voltages between phases must be balanced within 2% and the current within 10%. Use the formula shown in Table 2, Note 2 to determine the percent voltage imbalance. 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.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through connector on unit to low-voltage connections (shown in Fig. 9.).

Connect thermostat wires to matching screw terminals of low voltage connection board. See Fig. 9.

NOTE: For wire runs up 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 feet, 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.



LEGEND	
C	— Contactor
COMP	— Compressor
EQUIP	— Equipment
GND	— Ground
IFC	— Indoor (Evaporator) Fan Contactor
NEC	— National Electrical Code

Pass the control wires through the hole provided in the corner post; then 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. 10. The raceway provides the UL required clearance between high- and low-voltage wiring.

HEAT ANTICIPATOR SETTINGS — Set heat anticipator settings at 1.0 amp.

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

OPTIONAL OUTDOOR-AIR DAMPER — Optional outdoor air damper hood is packaged and shipped strapped to the air filter tracks in the filter section. See Fig. 11.

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

Assembly

1. Remove evaporator coil access panel. Save panel and screws. See Fig. 11.
2. Assemble outdoor-air hood top and side plates as shown in Fig. 12. Install seal strips on hood top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
3. Remove block-off panel from evaporator coil access panel and discard. Save screws. See Fig. 11.
4. Adjust ventilation-air setting of the outdoor damper blade by adjusting the screws on the ventilation-air bracket to the position determined by Fig. 13. Tighten screws (Fig. 14).
5. Fasten hood top and side plate assembly (Fig. 15) to unit with screws saved from Step 3.
6. Slide outdoor-air inlet screen into screen track on hood side plate. While holding screen in place, fasten screen retainer to hood using screws provided (Fig. 15).

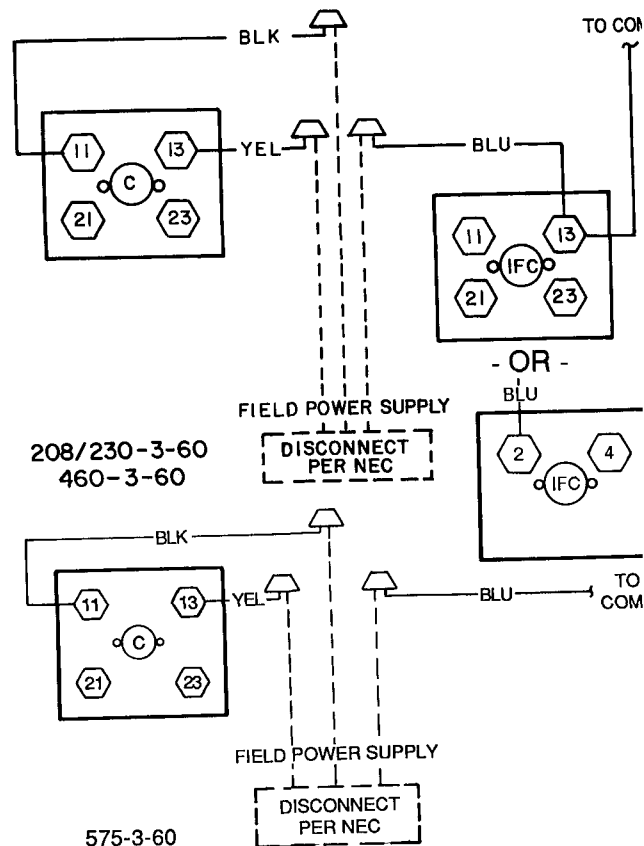


Fig. 8 — Power Wiring Connections

Table 2 – Electrical Data

UNIT	NOMINAL VOLTS-PH-HZ	IFM TYPE	VOLTAGE RANGE		COMPR		OFM	IFM	COMBUSTION FAN MOTOR	POWER SUPPLY		MINIMUM UNIT DISCONNECT SIZE	
			Min	Max	RLA	LRA	FLA	FLA	FLA	MCA	MOCP*	FLA	LRA
48HJE/HJF 004 (3 Tons)	208/230-1-60	Std Alt	187	254	16.2	96.0	1.9	3.8 2.8	.57	26.0/26.0 25.0/25.0	35/35 35/35	25/25 24/24	108/108 108/108
	208/230-3-60	Std Alt	187	254	10.2	75.0	1.9	3.8 2.8	.57	18.5/18.5 17.5/17.5	25/25 20/20	18/18 17/17	87/ 87 87/ 87
	460-3-60	Std Alt	414	508	4.3	40.0	1.0	1.6 1.5	.30	8.5 8.4	15 15	8 8	45 45
	575-3-60	Std Alt	518	632	3.7	31.0	1.9	3.8 2.8	.57	6.9 6.5	15 15	7 6	36 36
48HJD/HJE 005 (4 Tons)	208/230-1-60	Std Alt	187	254	23.7	129.0	1.9	5.7 3.8	.57	37.2/37.2 35.3/35.3	45/45 45/45	36/36 34/34	146/146 143/143
	208/230-3-60	Std Alt	187	254	13.5	99.0	1.9	5.7 3.8	.57	24.5/24.5 22.6/22.6	30/30 30/30	24/24 22/22	116/116 113/113
	460-3-60	Std Alt	414	508	7.4	49.5	1.0	2.8 1.9	.30	13.0 12.1	15 15	13 12	58 56
	575-3-60	Std Alt	518	632	5.8	40.0	1.9	5.7 3.8	.57	10.3 9.5	15 15	10 9	47 45
48HJD/HJE 006 (5 Tons)	208/230-1-60	Std	187	254	28.8	169.0	1.9	8.8	.57	46.7/46.7	60/60	45/45	218/218
	208/230-3-60	Std	187	254	17.3	123.0	1.9	4.0	.57	27.5/27.5	35/35	27/27	154/154
	460-3-60	Std	414	508	9.0	62.0	1.0	1.8	.30	14.1	20	14	82
	575-3-60	Std	518	632	7.1	50.0	1.9	8.8	.57	13.2	15	13	69
48HJD/HJE 007 (6 Tons)	208/230-3-60	Std	187	254	21.9	142.0	1.9	5.8	.57	35.1/35.1	45/45	34/34	188/188
	460-3-60	Std	414	508	10.4	72.0	1.0	2.6	.30	16.6	20	16	94
	575-3-60	Std	518	632	9.6	58.5	1.9	11.0	.57	17.2	20	17	81

LEGEND

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

*Fuse or HACR circuit breaker.

NOTES:

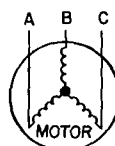
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. CSA units may be fuse or circuit breaker.

2. Unbalanced 3-Phase Supply Voltage

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

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

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: 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.

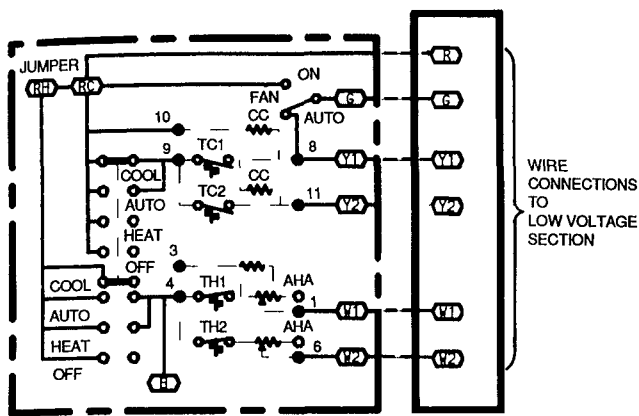
Determine percent voltage imbalance

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

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

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





TYPICAL THERMOSTAT

LEGEND

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

Fig. 9 — Low-Voltage Connections With or Without Economizer or Two-Position Damper

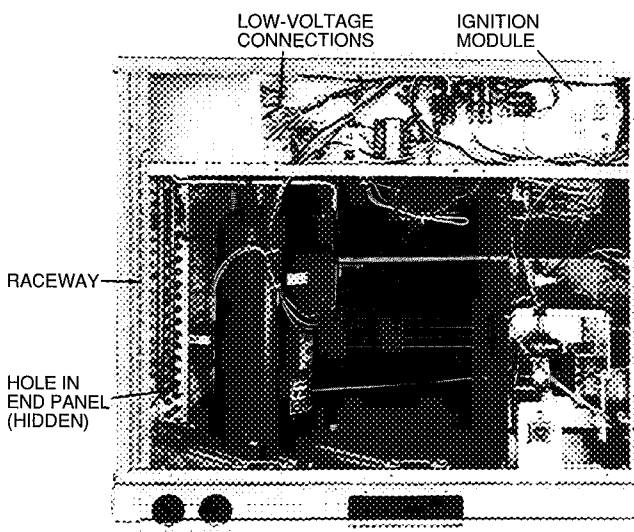


Fig. 10 — Field Control Wiring Raceway

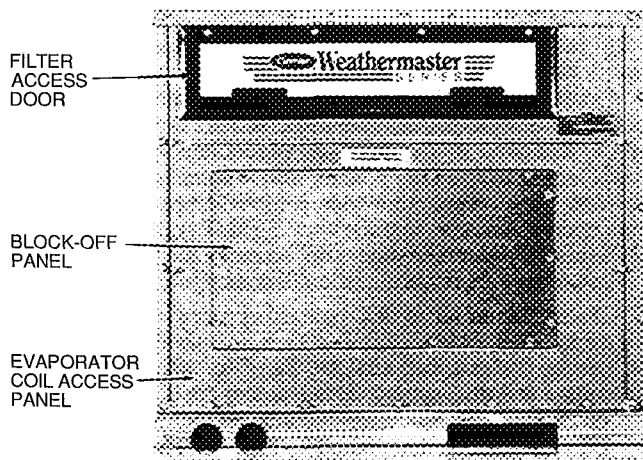
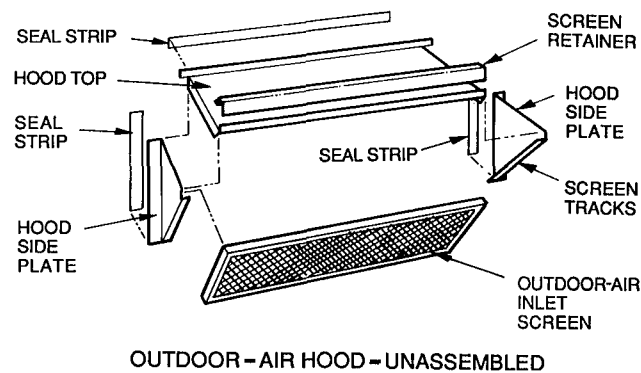
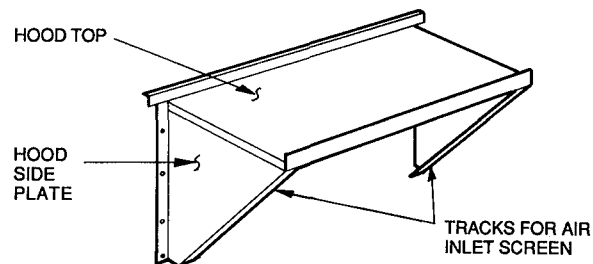


Fig. 11 — Access Panel Location

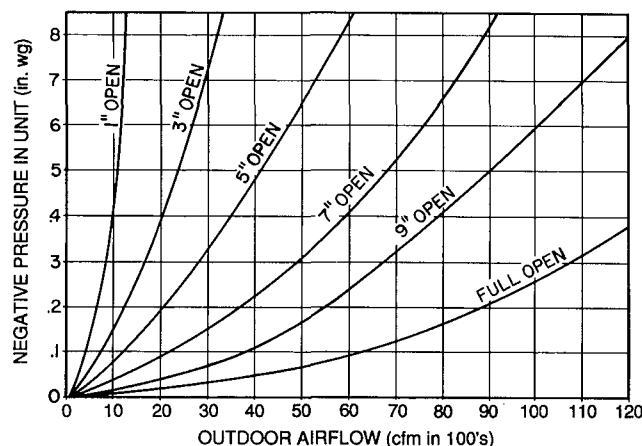


OUTDOOR-AIR HOOD - UNASSEMBLED



HOOD SIDES AND TOP - ASSEMBLED

Fig. 12 — Outdoor-Air Hood Details



EXAMPLE:
 Given — Negative Pressure 0.2 in. wg
 Outdoor Air 2000 cfm
 Determine — Setting = 5 in

Fig. 13 — Outdoor-Air Intake Position Setting

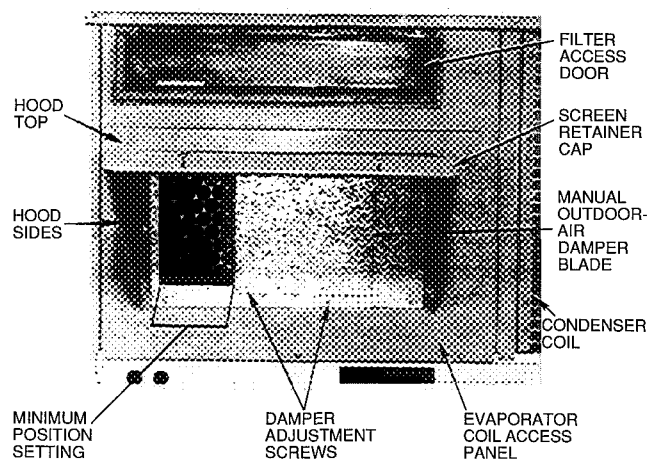


Fig. 14 — Manual Outdoor-Air Damper

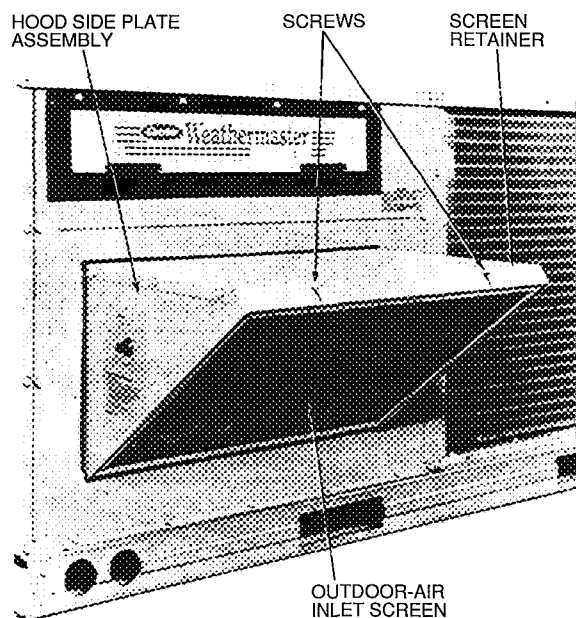


Fig. 15 – Outdoor-Air Hood Assembled to Base Unit

OPTIONAL ECONOMIZER/TWO-POSITION DAMPER
— The economizer/two-position damper hood assembly is packaged and shipped in the filter section. Damper blades and control boards are installed at the factory and the economizer is shipped in the vertical discharge position.

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

Assembly

1. Determine if ventilation air is required in building. If so, determine minimum amount to be supplied by each unit and record quantity of ventilation air needed for use in Step 8.
2. Remove evaporator coil access panel. Save panel and screws. See Fig. 11.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 12. Install seal strips on hood top and sides. Put aside screen retainer and retainer screw for later assembly. *Do not attach hood to unit at this time.*
4. Remove block-off panel from evaporator coil access panel and discard. Save screws. See Fig. 11.
5. Slide economizer into unit and secure with screws. See Fig. 16.

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

6. To convert to horizontal discharge application:
 - a. Rotate economizer 90 degrees until the economizer motor faces the condenser section (see Fig. 17).
 - b. Rotate the barometric relief damper cover 90 degrees.
 - c. Install horizontal discharge block-off plate over the opening on the access panel. (Block-off plate **MUST** be installed before installing hood assembly).

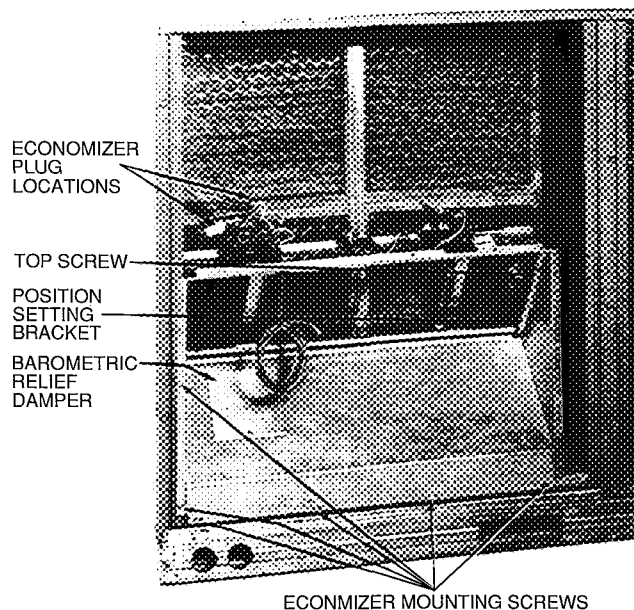


Fig. 16 – Economizer Installed in Unit

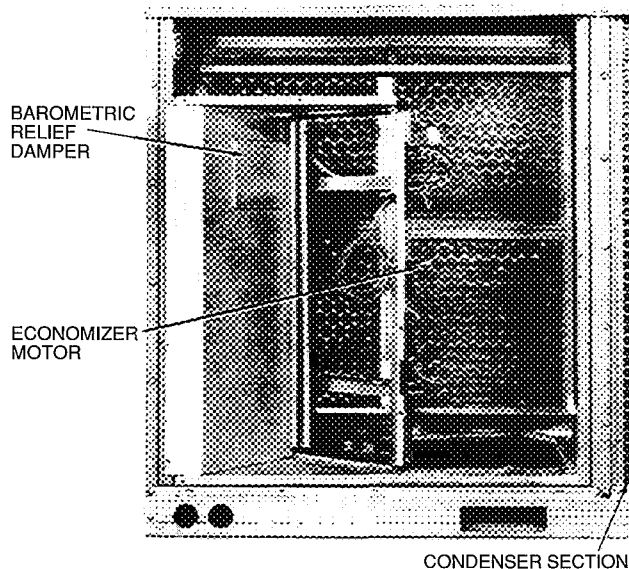
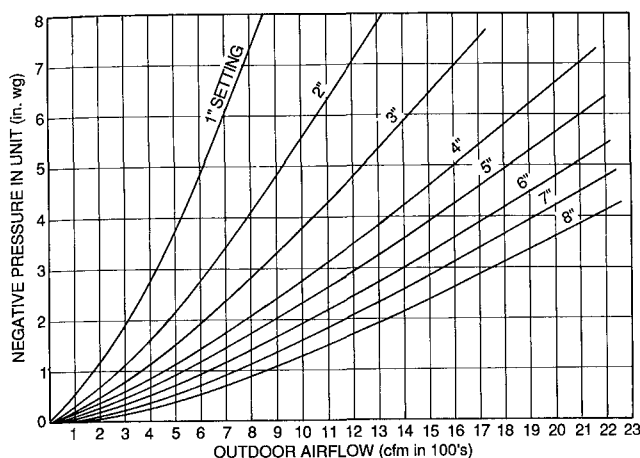


Fig. 17 – Horizontal Economizer Installation

IMPORTANT: An external filter kit **MUST** be used or the filters **MUST** be field-installed outside the unit on horizontal discharge applications with economizer. Otherwise, the economizer will have to 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.

7. Insert economizer plug into economizer harness. Remove tape from barometric relief damper. See Fig. 16.
8. If ventilation air is not required, proceed to Step 9. If ventilation air is required, determine minimum position setting for required airflow. See Fig. 18. Adjust minimum position setting by adjusting the screws on the position setting bracket. Slide bracket until the top screw is in the position determined by Fig. 18. Tighten screws.



EXAMPLE:
 Given Negative Pressure 0.2 in. wg
 Outdoor Air 900 cfm
 Determine — Setting = 5 in.

Fig. 18 — Economizer Minimum Position Setting

9. Remove tape from Outdoor Air Thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 19. Make sure OAT terminals are positioned up.
10. Replace evaporator coil access panel with screws saved from Step 2.
11. Fasten hood top and side plate assembly (Fig. 12) to unit with screws saved from Step 4.
12. Place knob supplied with economizer on OAT. See Fig. 19. Set for 3° F below indoor room thermostat setting. If accessory enthalpy control (EC) is used in place of OAT, see instructions shipped with EC for installation and adjustment. See Fig. 19.
13. Connect OAT per Fig. 20.
14. Slide outdoor-air inlet screen into screen track on hood side plates. While holding screen in place, fasten screen retainer to hood using screws provided.

NOTE: Refer to Fig. 21 for economizer/two-position damper barometric relief damper characteristics.

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

The 48HJE/HJF004 units have interchangeable evaporator fan and fan motor pulleys. Units are shipped from the factory with the variable pulley on the evaporator fan motor. This variable pulley can be switched with the fixed pulley on the evaporator fan to provide even higher evaporator fan rpms. Table 3 shows fan rpm at motor pulley settings as shipped from the factory. Table 4 shows fan rpm at fan pulley settings once pulleys have been switched. Table 5 shows fan rpm at motor pulley settings for the 48HJD/HJE005-007 units. Table 6 shows maximum amp draw of belt-drive motor. Table 7 shows motor nominal horsepower for standard and alternate evaporator-fan motors. Refer to Tables 8-19 to determine fan speed settings.

DIRECT DRIVE MOTORS — The evaporator-fan motor factory speed setting is shown on label diagram affixed to base unit. If other than factory setting is desired, refer to label diagram for motor reconnection.

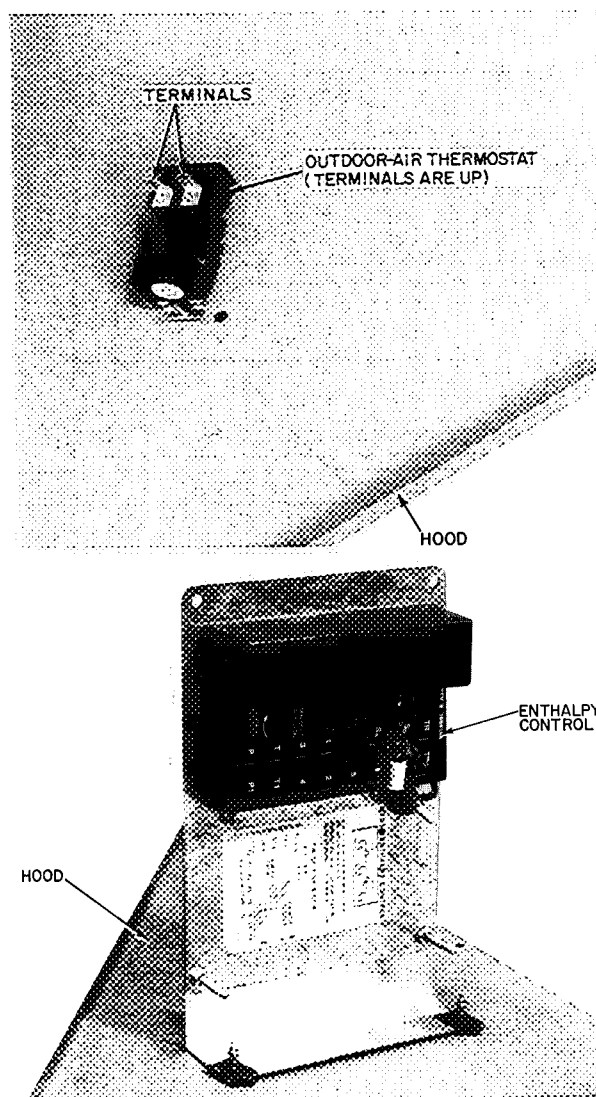
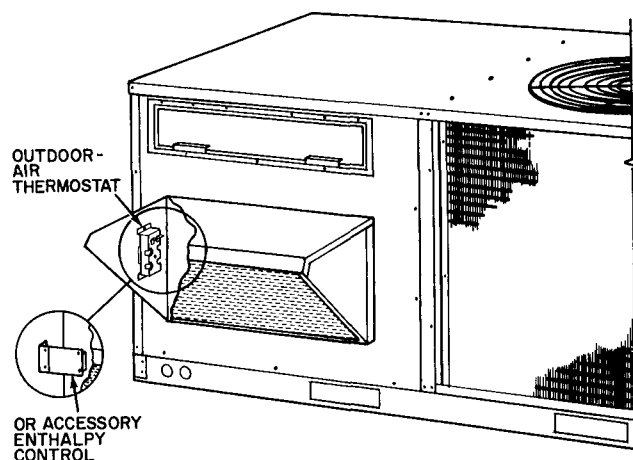


Fig. 19 — Outdoor-Air Thermostat/Enthalpy Control Installation

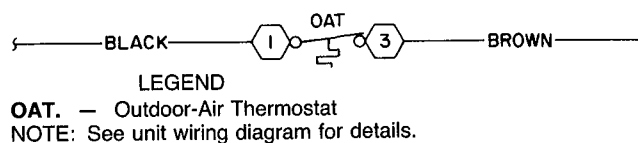


Fig. 20 — Wiring Connections for Outdoor-Air Thermostat

BELT DRIVE MOTORS — Fan motor pulleys are factory set for speed shown in Table 1. Check pulley alignment and belt tension prior to start-up.

NOTE: Before adjusting fan speed, make sure the new fan speed will provide an air temperature rise range as shown in Table 1.

To change fan speed:

1. Shut off unit power supply.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 22.
3. Loosen movable pulley flange setscrew (see Fig. 23).
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.

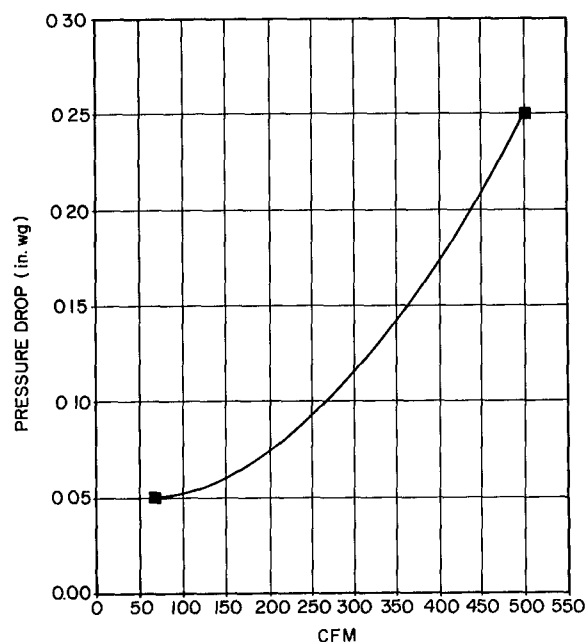


Fig. 21 — Economizer/Two-Position Damper Barometric Relief Damper Characteristics

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, loosen fan pulley setscrews and slide fan pulley along fan shaft. Make angular alignment by loosening motor from mounting.

To adjust belt tension:

1. Loosen fan motor mounting nuts.
2. Slide motor mounting plate away from fan scroll for proper belt tension ($\frac{1}{2}$ -in. deflection with one finger) and tighten mounting nuts. Tension can be applied using $\frac{1}{2}$ -in. drive ratchet engaged into $\frac{1}{2}$ -in. square hole on motor mounting plate.
3. Adjust lock bolt and nut on mounting plate to secure motor in fixed position.

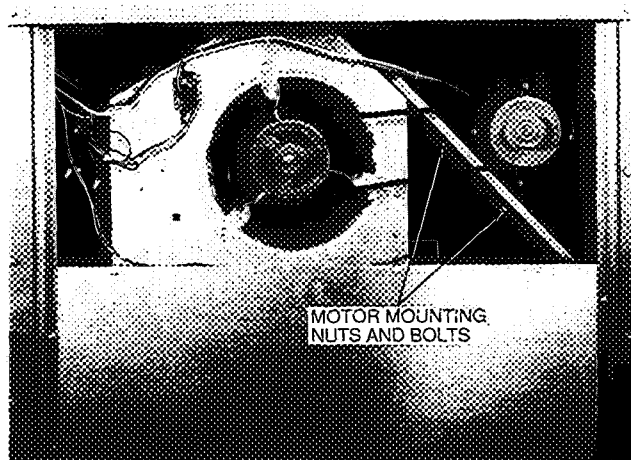


Fig. 22 — Belt-Drive Motor Mounting

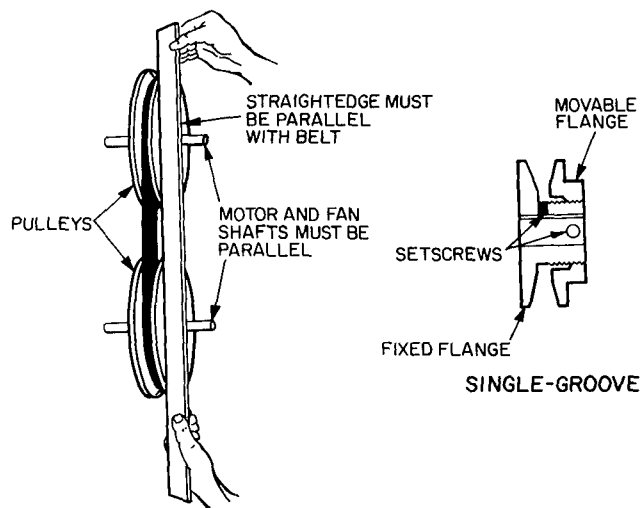


Fig. 23 — Evaporator-Fan Pulley Adjustment

Table 3 – Fan Rpm at Motor Pulley Settings, 48HJ004 – Variable Motor Pulley

UNIT 48	MOTOR/DRIVE	MOTOR PULLEY TURNS OPEN										
		0	½	1	1½	2	2½	3	3½	4	4½	5
HJE/HJF004	Std	790	767	744	721	697	674	651	628	604	581	558

Table 4 – Fan Rpm at Fan Pulley Settings, 48HJ004 – Variable Fan Pulley

UNIT 48	MOTOR/DRIVE	FAN PULLEY TURNS OPEN										
		0	½	1	1½	2	2½	3	3½	4	4½	5
HJE/HJF004	Std	936	964	994	1026	1061	1097	1136	1179	1224	1273	1326

Table 5 – Fan Rpm at Motor Pulley Settings, 48HJD/HJE005-007

UNIT 48	MOTOR/DRIVE	MOTOR PULLEY TURNS OPEN										
		0	½	1	1½	2	2½	3	3½	4	4½	5
HJD/HJE005	Std	1310	1276	1242	1208	1174	1140	1106	1072	1038	1004	970
HJD/HJE006	Std	1300	1265	1230	1190	1150	1110	1075	1035	1000	960	920
HJD/HJE007	Std	1585	1540	1490	1445	1400	1350	1305	1260	1210	1165	1120

Table 6 – Maximum Amp Draw of Belt Drive Motor

UNIT 48	PHASE	BHP	UNIT VOLTAGE	AMPS
HJE/HJF004	Single	0.66	208/230	4.2
	Three	0.66	208/230	4.2
			460	1.8
HJD/HJE005	Single	1.00	208/230	6.3
	Three	1.00	208/230	6.3
			460	3.1
HJD/HJE006	Single	1.70	208/230	9.7
	Three	1.70	208/230	4.4
			460	2.0
HJD/HJE007	Three	2.40	208/230	6.4
			460	2.9
			575	12.1

BHP — Brake Horsepower

Table 7 – Motor Nominal Horsepower

UNIT 48	MOTOR	NOMINAL HORSEPOWER
HJE/HJF004	Std	0.60
	Alt	0.30
HJD/HJE005	Std	0.90
	Alt	0.75
HJD/HJE006	Std	1.50
	Alt	—
HJD/HJE007	Std	2.00
	Alt	—

**Table 8 — Fan Performance, 48HJE/HJF004 — Vertical Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.10		0.20		0.30		0.40		0.50		0.60		0.70		0.80		0.85		0.90	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	581	0.12	673	0.18	736	0.22	805	0.25	865	0.29	911	0.34	957	0.39	988	0.43	1039	0.45	1061	0.47
950	619	0.15	691	0.20	750	0.23	821	0.27	885	0.32	925	0.36	977	0.41	1018	0.46	1052	0.48	1070	0.50
1000	644	0.19	709	0.22	782	0.28	835	0.30	900	0.35	937	0.38	992	0.44	1039	0.49	1061	0.51	1083	0.55
1050	656	0.21	727	0.24	786	0.29	851	0.32	914	0.37	950	0.41	1005	0.46	1055	0.52	1081	0.56	1089	0.57
1100	687	0.22	746	0.26	806	0.30	867	0.35	929	0.40	964	0.40	1013	0.49	1068	0.55	1092	0.58	1093	0.61
1150	704	0.26	770	0.30	826	0.32	885	0.38	944	0.43	979	0.47	1031	0.52	1089	0.61	1100	0.63	1112	0.66
1200	733	0.26	785	0.32	843	0.35	903	0.41	960	0.47	994	0.50	1045	0.56	1098	0.64	1109	0.64	1142	0.68
1250	740	0.28	805	0.35	869	0.39	922	0.45	977	0.50	1011	0.54	1060	0.59	1105	0.66	1138	0.70	—	—
1300	754	0.29	826	0.38	891	0.43	942	0.48	991	0.53	1047	0.60	1075	0.64	1122	0.70	—	—	—	—
1350	780	0.31	846	0.41	914	0.47	963	0.52	1013	0.58	1063	0.64	1092	0.68	1141	0.73	—	—	—	—
1400	810	0.35	868	0.45	937	0.51	984	0.57	1032	0.62	1067	0.67	1110	0.73	—	—	—	—	—	—
1450	829	0.39	889	0.49	961	0.56	1006	0.61	1052	0.67	1088	0.72	1129	0.78	—	—	—	—	—	—
1500	841	0.42	911	0.53	985	0.61	1029	0.66	1073	0.72	1109	0.77	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 4.)
2. *Maximum usable bhp is 0.66.* Extensive motor and electrical testing on the Weathermaster® 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.
3. Values include losses for filters, unit casing and wet coils.
4. Standard motor drive range: 558 to 1326 rpm. All other rpms require field-supplied drive. In order to achieve rpms over 790, reversal of the evaporator-fan and fan motor pulleys in the field will be necessary. See Tables 3 and 4.

**Table 9 — Fan Performance, 48HJE/HJF004 — Vertical Discharge Units;
Alternate Motor (Direct)**

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
900	0.46	0.17	0.48	0.19	0.49	0.21	0.51	0.25
1000	0.44	0.20	0.45	0.22	0.47	0.23	0.48	0.27
1100	0.40	0.21	0.42	0.24	0.44	0.25	0.45	0.29
1200	0.32	0.23	0.37	0.25	0.38	0.27	0.40	0.31
1300	0.28	0.24	0.32	0.26	0.32	0.29	0.34	0.32
1400	0.22	0.26	0.25	0.28	0.26	0.30	0.28	0.33
1500	0.16	0.27	0.18	0.33	0.20	0.31	0.21	0.34

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing and wet coils.

**Table 10 — Fan Performance 48HJD/HJE005 — Vertical Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		0.2		0.3		0.4		0.6		0.7		0.8		1.0		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1200	701	0.22	758	0.28	834	0.35	914	0.42	1012	0.56	1056	0.59	1098	0.62	1180	0.68	1255	0.76
1300	747	0.27	800	0.34	865	0.41	945	0.52	1050	0.62	1090	0.63	1132	0.68	1212	0.72	1280	0.78
1400	792	0.33	847	0.40	901	0.47	960	0.56	1091	0.67	1130	0.70	1165	0.72	1242	0.82	1310	0.89
1500	836	0.39	897	0.46	947	0.55	1000	0.61	1132	0.72	1170	0.75	1205	0.82	1275	0.91	1330	0.98
1600	881	0.47	945	0.54	983	0.62	1065	0.67	1172	0.77	1207	0.86	1238	0.92	1310	1.05	1350	1.08
1700	925	0.55	981	0.61	1020	0.68	1103	0.72	1202	0.88	1243	0.98	1270	1.05	1350	1.16	1372	1.19
1800	964	0.63	1024	0.72	1084	0.75	1140	0.82	1230	0.97	1268	1.07	1300	1.15	1350	1.25	1400	1.35
1900	1011	0.73	1068	0.79	1120	0.82	1172	0.91	1256	1.18	1310	1.13	1325	1.22	1380	1.37	1435	1.48
2000	1058	0.81	1100	0.85	1160	0.90	1237	1.20	1286	1.25	1320	1.31	1400	1.38	1445	1.57	1500	1.65

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 4)
2. **Shaded** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 1.2.* Extensive motor and electrical testing on the Weathermaster® 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. Standard motor drive range: 970 to 1310 rpm. All other rpms require field-supplied drive.

**Table 11 — Fan Performance, 48HJD/HJE005 — Vertical Discharge Units;
Alternate Motor (Direct)**

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
1200	0.53	0.44	0.58	0.48	0.72	0.56	0.84	0.65
1300	0.44	0.48	0.50	0.50	0.64	0.60	0.75	0.68
1400	0.35	0.50	0.42	0.54	0.56	0.63	0.67	0.69
1500	0.25	0.53	0.33	0.58	0.47	0.65	0.58	0.72
1600	0.16	0.57	0.24	0.60	0.38	0.68	0.50	0.74
1700	0.09	0.58	0.15	0.63	0.30	0.69	0.40	0.76
1800	0.00	0.61	0.06	0.65	0.22	0.71	0.32	0.78
1900	—	—	—	—	0.12	0.73	0.24	0.79
2000	—	—	—	—	0.03	0.74	0.15	0.81

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing and wet coils.

**Table 12 — Fan Performance, 48HJD/HJE006 — Vertical Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		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	Rpm	Bhp
1500	729	0.36	788	0.42	896	0.56	981	0.69	1070	0.85	1144	1.01	1226	1.19	1356	1.46	—	—
1550	749	0.39	807	0.46	913	0.60	997	0.73	1085	0.89	1158	1.06	1231	1.23	1331	1.46	—	—
1600	770	0.42	826	0.49	930	0.64	1015	0.78	1098	0.94	1173	1.11	1242	1.28	1324	1.49	—	—
1650	790	0.46	845	0.53	947	0.68	1033	0.82	1111	0.98	1188	1.16	1255	1.34	1326	1.53	—	—
1700	811	0.50	864	0.57	964	0.72	1051	0.88	1124	1.03	1203	1.21	1270	1.39	1335	1.58	—	—
1750	831	0.54	883	0.62	982	0.77	1068	0.93	1138	1.08	1218	1.27	1285	1.45	1347	1.64	—	—
1800	852	0.58	903	0.66	999	0.82	1085	0.98	1155	1.13	1231	1.32	1300	1.52	—	—	—	—
1850	872	0.63	922	0.71	1017	0.87	1102	1.04	1173	1.20	1243	1.37	1315	1.58	—	—	—	—
1900	893	0.68	942	0.76	1035	0.92	1119	1.10	1191	1.26	1256	1.43	1329	1.64	—	—	—	—
1950	914	0.73	962	0.81	1052	0.98	1136	1.16	1209	1.33	1270	1.50	—	—	—	—	—	—
2000	935	0.78	982	0.87	1070	1.04	1153	1.22	1227	1.40	1287	1.57	—	—	—	—	—	—
2050	956	0.84	1002	0.92	1089	1.10	1170	1.28	1243	1.47	1305	1.64	—	—	—	—	—	—
2100	977	0.89	1022	0.99	1107	1.17	1187	1.35	1260	1.54	—	—	—	—	—	—	—	—
2150	998	0.96	1043	1.05	1125	1.23	1205	1.42	1277	1.62	—	—	—	—	—	—	—	—
2200	1019	1.02	1063	1.12	1144	1.30	1222	1.49	1294	1.70	—	—	—	—	—	—	—	—
2250	1040	1.09	1083	1.18	1163	1.37	1240	1.57	—	—	—	—	—	—	—	—	—	—
2300	1061	1.16	1104	1.26	1182	1.45	1258	1.65	—	—	—	—	—	—	—	—	—	—
2350	1082	1.23	1124	1.33	1201	1.53	—	—	—	—	—	—	—	—	—	—	—	—
2400	1103	1.30	1145	1.41	1220	1.61	—	—	—	—	—	—	—	—	—	—	—	—
2450	1124	1.38	1165	1.49	1239	1.70	—	—	—	—	—	—	—	—	—	—	—	—
2500	1145	1.46	1186	1.57	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 6.)
2. **Shading** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 1.7.* Extensive motor and electrical testing on the Weathermaster® 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 over 3.0 hp may affect wire sizing. Contact Carrier representative to verify.
6. Motor drive range: 920 to 1300 rpm. All other rpms require field-supplied drive

**Table 13 — Fan Performance, 48HJD/HJE007 — Vertical Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		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	Rpm	Bhp
1800	978	0.66	1063	0.82	1147	0.97	1248	1.20	1322	1.33	1395	1.46	1475	1.56	1542	1.71	1609	1.86
1900	1023	0.78	1097	0.91	1175	1.11	1266	1.29	1356	1.47	1430	1.58	1504	1.69	1556	1.82	1655	2.08
2000	1068	0.90	1132	1.01	1218	1.23	1303	1.41	1397	1.52	1465	1.67	1532	1.82	1588	1.97	1657	2.17
2100	1115	1.00	1180	1.17	1261	1.35	1340	1.53	1428	1.66	1489	1.80	1567	1.99	1626	2.16	1684	2.34
2200	1159	1.15	1214	1.28	1310	1.52	1375	1.63	1459	1.80	1528	1.95	1603	2.17	1666	2.37	—	—
2300	1202	1.29	1248	1.38	1358	1.69	1410	1.72	1488	1.93	1561	2.13	1637	2.35	—	—	—	—
2400	1237	1.41	1292	1.55	1392	1.81	1474	1.90	1532	2.14	1584	2.28	—	—	—	—	—	—
2500	1272	1.53	1335	1.71	1427	1.94	1518	2.16	1575	2.35	—	—	—	—	—	—	—	—
2600	1320	1.68	1368	1.81	1458	2.06	—	—	—	—	—	—	—	—	—	—	—	—
2700	1361	1.82	1400	1.91	1490	2.19	—	—	—	—	—	—	—	—	—	—	—	—
2800	1402	1.95	1439	2.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2900	1446	2.16	1477	2.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3000	1489	2.36	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required (See Note 5)
2. **Shading** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 2.4.* Extensive motor and drive testing on the Weathermaster 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. Motor drive range: 1120 to 1585 rpm. All other rpms require field-supplied drive.

**Table 14 — Fan Performance, 48HJE/HJF004 — Horizontal Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
900	—	—	—	—	—	—	777	0.22	831	0.25	885	0.27	923	0.32	960	0.35	995	0.38	1068	0.42
950	—	—	—	—	728	0.17	783	0.25	837	0.27	890	0.29	931	0.34	971	0.38	1000	0.41	1071	0.44
1000	—	—	—	—	738	0.19	800	0.26	848	0.29	895	0.31	936	0.35	977	0.39	1020	0.44	1076	0.48
1050	—	—	—	—	748	0.21	808	0.27	855	0.30	902	0.33	949	0.38	995	0.42	1045	0.47	1081	0.50
1100	—	—	—	—	758	0.23	812	0.29	863	0.32	914	0.35	960	0.39	1005	0.43	1052	0.49	1091	0.52
1150	—	—	—	—	766	0.26	821	0.30	874	0.34	926	0.38	970	0.42	1013	0.45	1066	0.50	1106	0.56
1200	—	—	710	0.23	780	0.28	840	0.32	889	0.36	938	0.40	988	0.45	1038	0.50	1076	0.53	1110	0.59
1250	—	—	731	0.25	795	0.30	850	0.32	900	0.39	950	0.43	998	0.48	1045	0.52	1085	0.56	1135	0.62
1300	—	—	752	0.27	808	0.32	868	0.37	916	0.41	963	0.45	1012	0.51	1061	0.56	1094	0.61	1141	0.65
1350	—	—	759	0.29	828	0.35	878	0.39	922	0.44	966	0.48	1015	0.53	1064	0.58	1104	0.65	1145	0.68
1400	725	0.29	776	0.31	845	0.38	891	0.42	937	0.47	983	0.51	1027	0.56	1071	0.60	1108	0.67	1149	0.70
1450	748	0.32	795	0.35	853	0.40	902	0.45	951	0.50	999	0.55	1040	0.60	1081	0.64	1112	0.68	1152	0.72
1500	755	0.33	816	0.38	870	0.43	924	0.48	969	0.53	1014	0.58	1056	0.63	1097	0.68	1117	0.70	1155	0.74

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required (See Note 4)
2. *Maximum usable bhp is 0.66.* Extensive motor and electrical testing on the Weathermaster® 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.
3. Values include losses for filters, unit casing and wet coils.
4. Standard motor drive range: 558 to 1326 rpm. All other rpms require field-supplied drive. In order to achieve rpms over 790, reversal of the evaporator-fan and fan motor pulleys in the field will be necessary. See Tables 3 and 4.

**Table 15 — Fan Performance, 48HJE/HJF004 — Horizontal Discharge Units;
Alternate Motor (Direct)**

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
900	0.53	0.17	0.55	0.19	0.63	0.21	0.64	0.25
1000	0.48	0.20	0.51	0.22	0.57	0.23	0.60	0.27
1100	0.43	0.21	0.45	0.24	0.52	0.25	0.54	0.29
1200	0.36	0.23	0.40	0.25	0.47	0.27	0.47	0.31
1300	0.28	0.24	0.32	0.26	0.38	0.29	0.41	0.32
1400	0.20	0.26	0.24	0.28	0.31	0.30	0.32	0.33
1500	0.11	0.27	0.14	0.33	0.21	0.31	0.22	0.34

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing and wet coils.

**Table 16 — Fan Performance, 50HJ005 — Horizontal Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (In. wg)																	
	0.1		0.2		0.3		0.4		0.6		0.7		0.8		1.0		1.2	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1300	701	0.22	758	0.28	834	0.35	914	0.42	1012	0.56	1056	0.59	1098	0.62	1180	0.68	1255	0.76
1400	747	0.27	800	0.34	865	0.41	945	0.52	1050	0.62	1090	0.63	1132	0.68	1212	0.72	1280	0.78
1500	792	0.33	847	0.40	901	0.47	960	0.56	1091	0.67	1130	0.70	1165	0.72	1242	0.82	1310	0.89
1600	836	0.39	897	0.46	947	0.55	1000	0.61	1132	0.72	1170	0.75	1205	0.82	1275	0.91	1330	0.98
1700	881	0.47	945	0.54	983	0.62	1065	0.67	1172	0.77	1207	0.86	1238	0.92	1310	1.05	1350	1.08
1800	925	0.55	981	0.61	1020	0.68	1103	0.72	1202	0.88	1243	0.98	1270	1.05	1350	1.16	1372	1.19
1900	964	0.63	1024	0.72	1084	0.75	1140	0.82	1230	0.97	1268	1.07	1300	1.15				
2000	1011	0.73	1068	0.79	1120	0.82	1172	0.91	1256	1.18	1310	1.13						
2100	1058	0.81	1100	0.85	1160	0.90	1237	1.20										

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 4.)
2.  indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 1.2* Extensive motor and drive testing on the Weathermaster® 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. Standard motor drive range: 970 to 1310 rpm. All other rpms require field-supplied drive

**Table 17 — Fan Performance, 48HJD/HJE005 — Horizontal Discharge Units;
Alternate Motor (Direct)**

AIRFLOW (Cfm)	LOW SPEED				HIGH SPEED			
	208		230, 460, 575		208		230, 460, 575	
	ESP	Bhp	ESP	Bhp	ESP	Bhp	ESP	Bhp
1200	0.78	0.44	0.85	0.48	0.92	0.56	1.01	0.65
1300	0.70	0.48	0.76	0.50	0.84	0.60	0.94	0.68
1400	0.62	0.50	0.68	0.54	0.78	0.63	0.87	0.69
1500	0.52	0.53	0.59	0.58	0.69	0.65	0.78	0.72
1600	0.44	0.57	0.50	0.60	0.61	0.68	0.70	0.74
1700	0.34	0.58	0.40	0.63	0.53	0.69	0.62	0.76
1800	0.22	0.61	0.30	0.65	0.45	0.71	0.54	0.78
1900	0.10	0.63	0.20	0.68	0.37	0.73	0.48	0.79
2000	—	—	0.09	0.69	0.29	0.74	0.39	0.81

LEGEND

Bhp — Brake Horsepower

ESP — External Static Pressure

NOTE: Values include losses for filters, unit casing and wet coils

**Table 18 — Fan Performance, 48HJD/HJE006 — Horizontal Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																			
	0.1		0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8	
	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp	Rpm	Bhp
1500	730	0.34	789	0.40	896	0.53	990	0.67	1072	0.83	1153	1.00	1221	1.17	1256	1.30	1243	1.32	1174	1.22
1600	770	0.40	826	0.46	931	0.61	1020	0.75	1101	0.91	1178	1.09	1252	1.27	1311	1.45	1340	1.58	1330	1.61
1700	811	0.47	865	0.54	966	0.69	1051	0.84	1133	1.01	1205	1.18	1278	1.37	1345	1.57	1387	1.76	1372	1.86
1800	852	0.55	905	0.62	1002	0.78	1084	0.93	1163	1.10	1235	1.29	1303	1.48	1371	1.69	1433	1.90	1460	2.09
1900	894	0.64	945	0.72	1037	0.88	1119	1.04	1194	1.21	1266	1.40	1330	1.59	1396	1.81	1458	2.03	1514	2.24
2000	936	0.74	984	0.82	1072	0.98	1154	1.16	1226	1.33	1297	1.53	1362	1.73	1422	1.94	1485	2.15	1544	2.40
2100	978	0.85	1024	0.93	1108	1.10	1190	1.29	1259	1.47	1327	1.66	1398	1.87	1452	2.08	1516	2.31	1569	2.55
2200	1021	0.97	1064	1.05	1145	1.22	1225	1.43	1294	1.62	1359	1.81	1423	2.02	1482	2.24	1539	2.46	1595	2.71
2300	1064	1.10	1104	1.18	1183	1.36	1260	1.57	1330	1.78	1392	1.97	1454	2.18	1515	2.40	1569	2.64	1622	2.88
2400	1107	1.24	1145	1.32	1222	1.52	1296	1.73	1365	1.94	1426	2.15	1485	2.36	1544	2.59	1601	2.84	1652	3.07
2500	1150	1.39	1186	1.48	1262	1.68	1331	1.89	1400	2.12	1461	2.34	1518	2.55	1575	2.78	1631	3.03	1684	3.28

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 6)
2. **Shading** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 1.7.* Extensive motor and electrical testing on the Weathermaster® 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 over 3.0 hp may affect wire sizing. Contact Carrier representative to verify.
6. Motor drive range: 920 to 1300 rpm. All other rpms require field-supplied drive.

**Table 19 — Fan Performance, 48HJD/HJE007 — Horizontal Discharge Units;
Standard Motor and Drive (Belt)**

AIRFLOW (Cfm)	EXTERNAL STATIC PRESSURE (in. wg)																	
	0.1		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	Rpm	Bhp
1800	885	0.63	942	0.73	1047	0.90	1139	1.05	1193	1.14	1276	1.30	1341	1.40	1413	1.55	1474	1.58
1900	928	0.73	982	0.83	1084	1.02	1160	1.11	1223	1.24	1301	1.38	1374	1.53	1437	1.62	1490	1.67
2000	971	0.84	1022	0.94	1121	1.12	1188	1.22	1254	1.36	1329	1.44	1396	1.66	1468	1.68	1509	1.77
2100	1015	0.97	1063	1.10	1140	1.18	1196	1.27	1272	1.45	1354	1.58	1413	1.75	1465	1.73	1529	1.92
2200	1060	1.10	1104	1.20	1159	1.23	1229	1.41	1306	1.53	1363	1.70	1434	1.81	1487	1.85	1554	2.07
2300	1104	1.25	1130	1.27	1196	1.37	1264	1.56	1340	1.66	1397	1.86	1465	1.88	1520	2.07	1576	2.24
2400	1138	1.30	1174	1.37	1245	1.57	1305	1.63	1373	1.84	1440	1.95	1502	2.06	1552	2.24	1604	2.42
2500	1183	1.43	1201	1.50	1284	1.65	1338	1.75	1402	1.99	1469	2.04	1524	2.24	1585	2.42	1638	2.60
2600	1210	1.58	1243	1.67	1312	1.76	1366	1.96	1435	2.10	1494	2.19	1552	2.41	1616	2.63	1671	2.80
2700	1254	1.76	1285	1.80	1354	1.95	1403	2.14	1474	2.21	1536	2.46	1594	2.61	1646	2.83	—	—
2800	1274	1.82	1304	1.85	1374	2.12	1459	2.25	1514	2.42	1576	2.66	1624	2.85	—	—	—	—
2900	1318	1.95	1345	2.05	1412	2.32	1496	2.45	1529	2.61	1603	2.87	—	—	—	—	—	—
3000	1362	2.20	1378	2.30	1451	2.40	1534	2.66	1580	2.81	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower

NOTES:

1. **Boldface** indicates field-supplied motor and drive required. (See Note 5)
2. **Shading** indicates field-supplied motor and drive required.
3. *Maximum usable bhp is 2.4.* Extensive motor and electrical testing on the Weathermaster 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. Motor drive range: 1120 to 1585 rpm. All other rpms require field-supplied drive.

PRE-START-UP

▲ WARNING

Failure to observe the following warnings could result in serious personal injury:

1. Follow recognized safety practices and wear protective goggles when checking or servicing refrigerant system.
2. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
3. Do not remove compressor terminal cover until all electrical sources are disconnected.
4. Relieve all pressure from system before touching or disturbing anything inside terminal box if refrigerant leak is suspected around compressor terminals.
5. Never attempt to repair soldered connection while refrigerant system is under pressure.
6. Do not use torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
 - a. Shut off electrical power and then gas to unit.
 - b. Reclaim refrigerant to relieve all pressure from system using both high- and low-pressure ports.
 - c. Cut component connection tubing with tubing cutter and remove component from unit.
 - d. Carefully unsweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Make the following inspections:
 - a. Inspect for shipping and handling damages such as broken lines, loose parts, disconnected wires, etc.
 - b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch or liquid-soap solution.
 - c. Inspect all field- and factory-wiring connections. Be sure that connections are completed and tight.
 - d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
 - a. Make sure that condenser-fan blade is correctly positioned in fan orifice. Refer to Condenser-Fan Adjustment section on page 23 for more details.
 - b. Make sure that air filter(s) is in place.
 - c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
 - d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP

IMPORTANT: Energize crankcase heater (48HJE/HJF004 only) 24 hours prior to base unit start-up to remove entrapped refrigerant from oil. Heater is energized as long as there is power to the unit.

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

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

Outdoor-Air Inlet Screens — Outdoor-air inlet screen(s) must be in place before operating unit.

Compressor Mounting — Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.

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

Refrigerant Service Ports — Each unit system has 3 Schrader type service 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.

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

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

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

1. Note that the evaporator and condenser fans are probably also rotating in the wrong direction.
2. Turn off power to the unit.
3. Reverse any two of the unit power leads.
4. Reapply power to the compressor.

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

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

Cooling — Set space thermostat to OFF position. 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 cooling effects at a setting above room temperature. Check unit charge. Refer to Refrigerant Charge section on page 23.

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

TO SHUT OFF UNIT — Set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting. Units are equipped with Cycle-LOC™ protection device. Unit shuts down on any safety trip, and indicator light on thermostat comes on. Check reason for all safety trips.

Compressor restart is accomplished by manual reset at the thermostat by turning the selector switch to OFF and then to ON positions.

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

TO CHECK ignition of main burners and heating controls, move thermostat dial above room temperature and verify that the burners light and evaporator fan is energized. Check heating effect, then lower the thermostat setting below the room temperature and verify that the burners and evaporator fan turn off.

Heating

1. Purge gas supply line of air by opening the union ahead of the gas valve. If gas odor is detected, tighten union and wait 5 minutes before proceeding.
2. Turn on electrical supply and manual gas valve.
3. Set system switch selector at HEAT position and fan switch at AUTO. or ON position. Set heating temperature lever above room temperature.
4. The induced draft motor will start.
5. After a call for heating, the main burners should light within 4 seconds. If the burner does not light, then there is a 60 second delay before another 4-second try. If the burner still does not light, the time delay is repeated. If the burner does not light on the eleventh attempt, there is a lockout. To reset, break the 24-v power to W1.
6. The evaporator fan will turn on in 20 to 40 seconds after a call for heating.
7. The evaporator fan will turn off in 30 to 90 seconds after thermostat temperature is satisfied.
8. Adjust airflow to obtain a temperature rise within the range specified on the unit nameplate.

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

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

Ventilation (Continuous Fan) — Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation.

Operating Sequence

COOLING MODE WITH ECONOMIZER — When the outdoor ambient temperature is above the outdoor-air thermostat (OAT) or enthalpy control (EC) setting and the thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) is energized, the economizer damper blade opens to the minimum position and the compressor is energized to control space temperature.

If the outdoor ambient temperature is below the OAT setting and the thermostat calls for cooling, the IFC is energized, the evaporator fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with outdoor air. The damper blade repositions for 5 seconds and then stops for 30 seconds. During this time, the discharge-air thermistor sends a signal to the economizer board to determine if further adjustment is required. Refer to Fig. 24 for the resistance of the discharge-air thermistor at various temperatures.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, the second stage cooling thermostat closes Y2 and the compressor starts.

As conditioned space temperature approaches the thermostat's cooling set point, the mechanical cooling stage cycles off. After mechanical cooling shuts off, the economizer modulates to the minimum position.

HEATING MODE WITH ECONOMIZER — Upon a call for heat through W1, the induced draft relay is energized to start the induced draft motor. The main burner lights. After a 20 to 40 second time delay, the IFC energizes to start the evaporator fan, and the economizer damper blade opens to the minimum position. If the two-position damper is used, the outdoor-air damper opens to the minimum position whenever the evaporator fan runs. When additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve is energized.

After W1 is deenergized, the evaporator fan motor continues to run for 30 to 90 seconds.

As space temperature approaches the heating temperature setpoint, heating stage cycles off.

COOLING MODE WITHOUT ECONOMIZER — Operation is the same as with economizer, except mechanical cooling is used instead of economizer and there is no damper blade.

HEATING MODE WITHOUT ECONOMIZER — Operation is the same as with economizer or two damper position, except there are no dampers or damper blades.

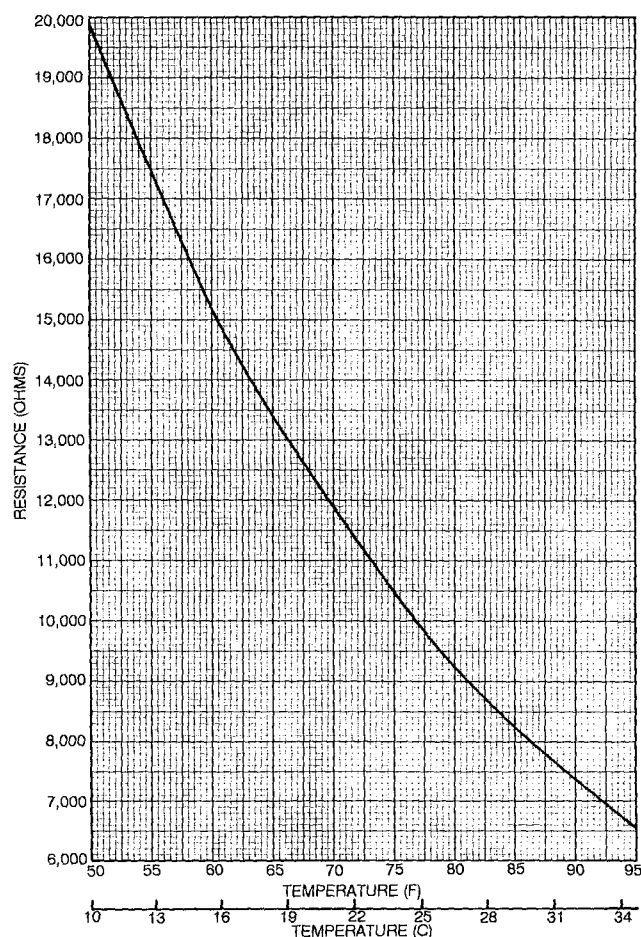


Fig. 24 — Discharge-Air Thermistor Resistance vs Temperature

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 heating and cooling season and as operating conditions require.

EVAPORATOR COIL

1. Turn unit power off. Remove evaporator coil access panel.
2. If accessory economizer is installed, remove economizer by disconnecting Molex plug and removing economizer mounting screws. See Fig. 16 and 17.
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. Flush condensate pan after completion.
5. Reinstall economizer and filters.
6. Reconnect wiring.
7. Replace access panels.

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

One Row Coils — Wash coil with commercial coil cleaner. It is not necessary to remove top panel.

2-Row Coils — Clean coil as follows:

1. Turn off unit power.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. See Fig. 25. To hold top panel open, place coil corner post between top panel and center post. See Fig. 26.
4. Remove device 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. 27.
5. 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.
6. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Secure the sections together.
7. Install the coil corner post, coil center post and replace all screws.

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

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

OUTDOOR-AIR INLET SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use disposable filters in place of screens.

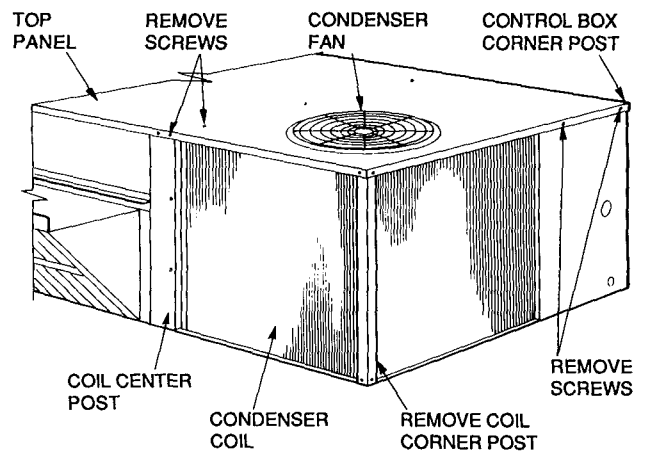


Fig. 25 — Cleaning Condenser Coil

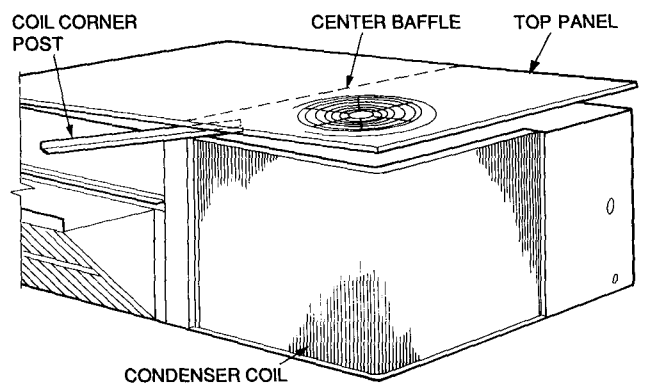


Fig. 26 — Propping Up Top Panel

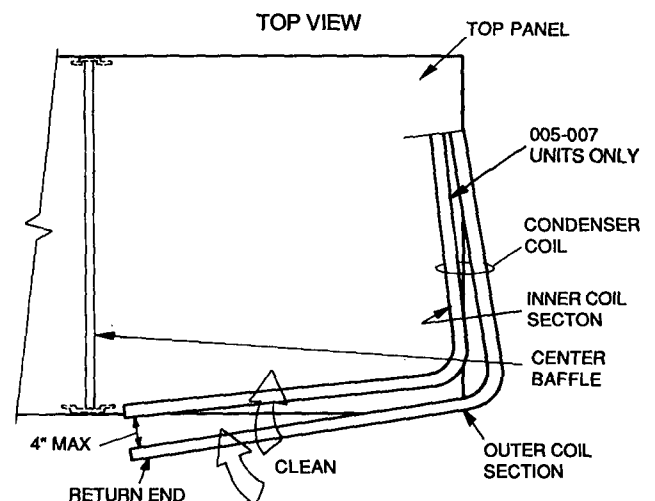


Fig. 27 — Separating Coil Sections

Lubrication

COMPRESSORS — Each compressor is charged with 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. 28) — Shut off unit power supply. Remove condenser-fan assembly (grille, motor, motor cover and fan) and loosen fan hub setscrews. Adjust fan height as shown in Fig. 28. Tighten setscrews and replace condenser-fan assembly.

Manual Outdoor-Air Damper — If outdoor-air damper blade adjustment is required, see Optional Outdoor-Air Damper section on page 7.

Economizer Adjustment — Refer to Optional Economizer/Two-Position Damper section on page 10.

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

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

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

LOW CHARGE COOLING — Using Cooling Charging Charts, Fig. 29-32, vary refrigerant until the conditions of the charts are met. Note the charging charts are different from type normally used. 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 CHARTS — Take the outdoor ambient temperature and read the suction pressure gage. Refer to charts 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.

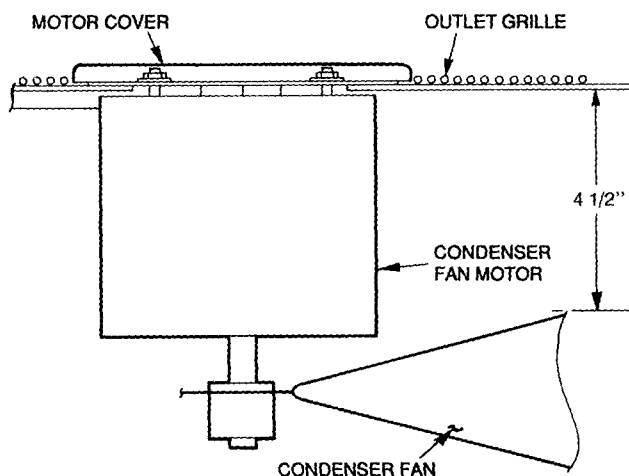


Fig. 28 — Condenser-Fan Adjustment

Example: (Fig. 31)

Outdoor Temperature 85 F

Suction Pressure 70 psig

Suction Temperature should be 50 F
(Suction Temperature may vary $\pm 5^\circ$ F.)

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

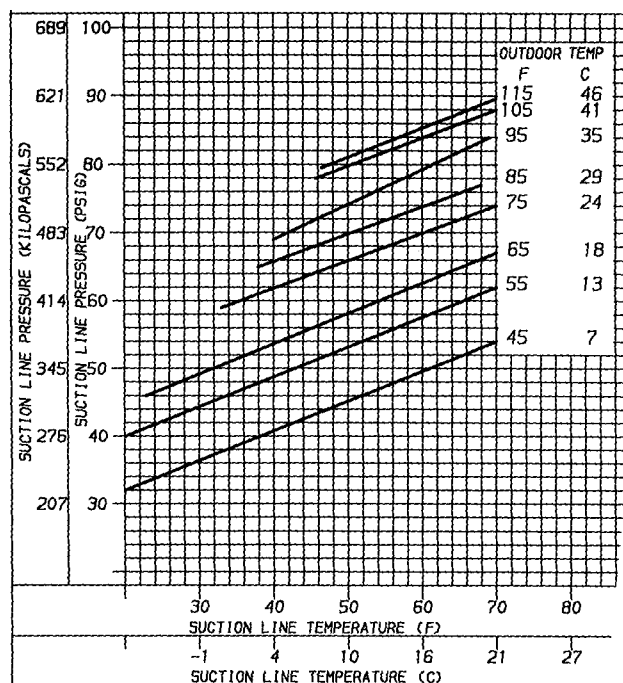


Fig. 29 — Cooling Charging Chart, 48HJ004

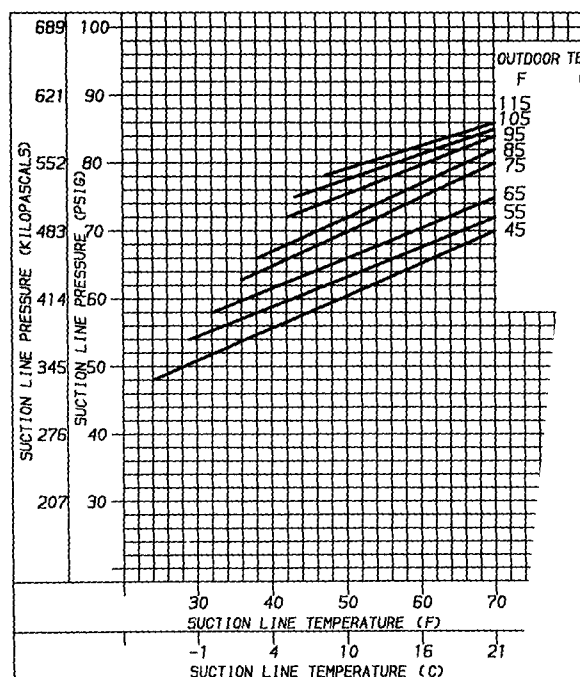


Fig. 30 — Cooling Charging Chart, 48

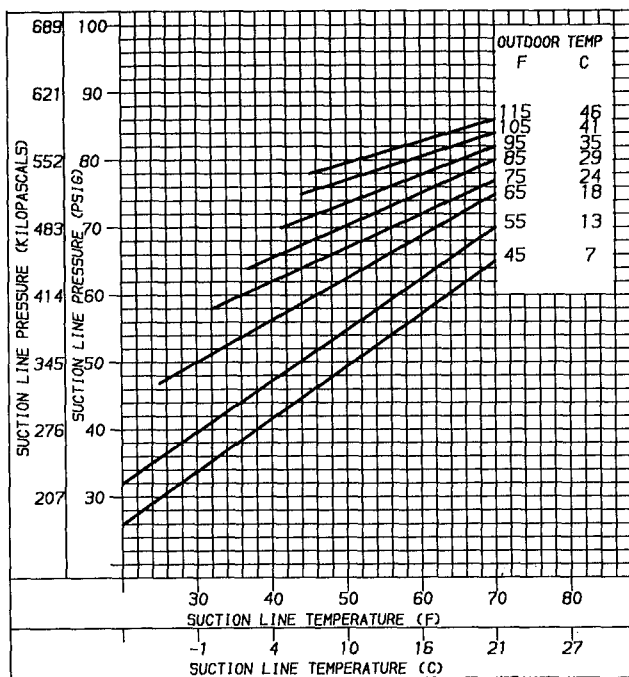


Fig. 31 – Cooling Charging Chart, 48HJ006

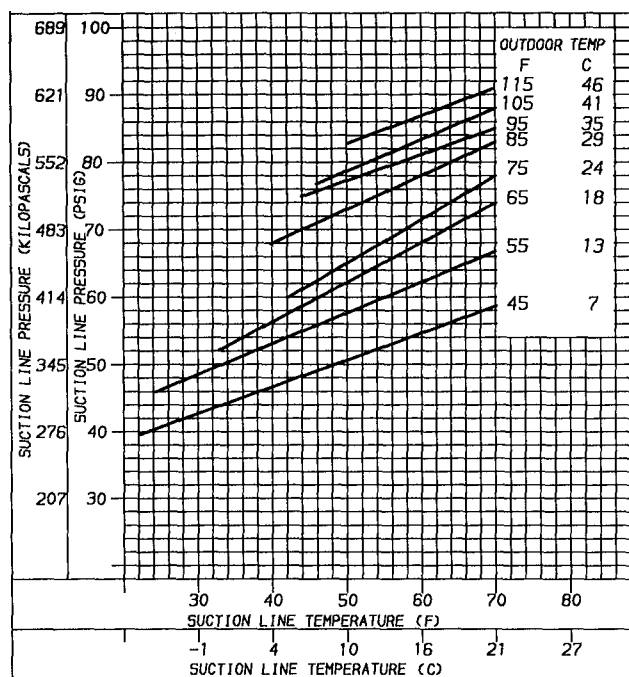


Fig. 32 – Cooling Charging Chart, 48HJ007

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 ensure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bimonthly to determine proper cleaning frequency.

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

1. Slide burner access panel out.
2. Remove wires connected to pressure switch. Mark each wire.
3. Remove the 2 screws which hold the heat shield in place, and remove heat shield.
4. Remove the 7 screws that attach induced-draft motor mounting plate to blower housing (Fig. 33).
5. Remove the 2 wires attached to the motor and remove assembly from unit.
6. To remove blower, remove 2 setscrews.
7. To remove motor, remove 4 screws that hold blower housing to mounting plate. Remove the motor cooling fan by removing one setscrew. Then remove nuts that hold motor to mounting plate.
8. To reinstall, reverse the procedure outlined above.

Limit Switch — Remove blower access panel (Fig. 5). Limit switch is located on the fan deck.

Burner Ignition — Unit is equipped with a direct spark ignition 100% lockout system. Ignition module is located in the control box (Fig. 10). Module contains a self-diagnostic LED (light-emitting diode). During servicing, refer to module nameplate for LED interpretation.

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

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

CAUTION

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

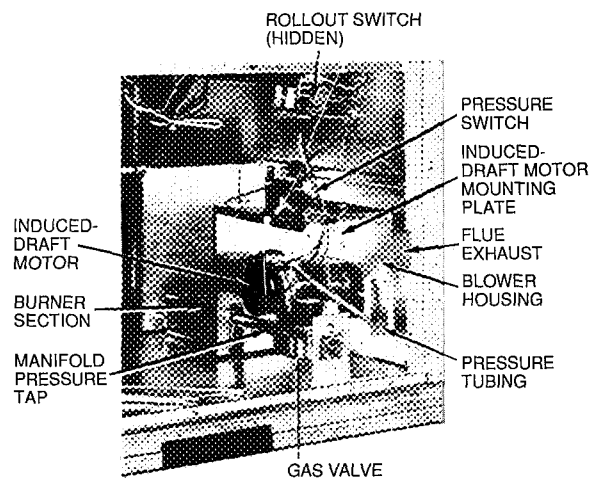


Fig. 33 – Burner Section Details

REMOVAL OF GAS TRAIN (See Fig. 33 and 34)

1. Shut off manual gas valve.
2. Shut off power to unit.
3. Remove compressor access panel.
4. Slide out burner compartment side panel.
5. Remove wires and pressure tubing connected to pressure switch. Mark each wire.
6. Remove heat shield.
7. Disconnect gas piping at unit gas valve.
8. Remove wires connected to gas valve. Mark each wire.
9. Remove ignitor and sensor wires at the power pack.
10. Remove the two screws that attach the burner rack to the vestibule plate.
11. Remove the gas valve bracket.
12. Slide the burner tray out of the unit. (Fig. 34)

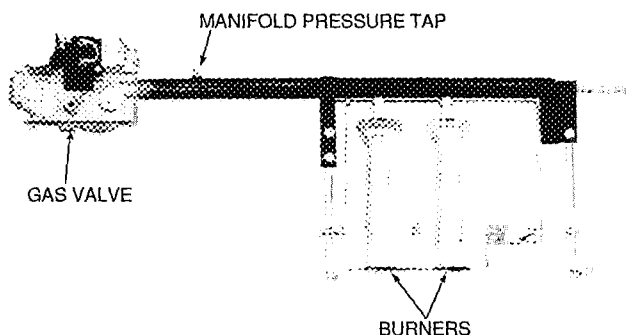


Fig. 34 - Burner Tray Details

REPLACEMENT OF GAS TRAIN (Fig. 33 and 34)

1. Slide the burner tray into the unit.
2. Attach burner rack to vestibule plate with two screws.
3. Replace gas valve bracket.
4. Replace heat shield.
5. Reconnect wires and pressure tubing to pressure switch.
6. Reconnect the ignitor and sensor wires to the power pack.
7. Reconnect wires to gas valve and rollout switch.
8. Connect gas piping to the gas valve.
9. Reinstall the burner compartment side panel
10. Replace compressor access panel.
11. Restore power to unit.
12. Turn on main gas valve.

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described above.
2. Inspect burners and, 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. 35.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

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

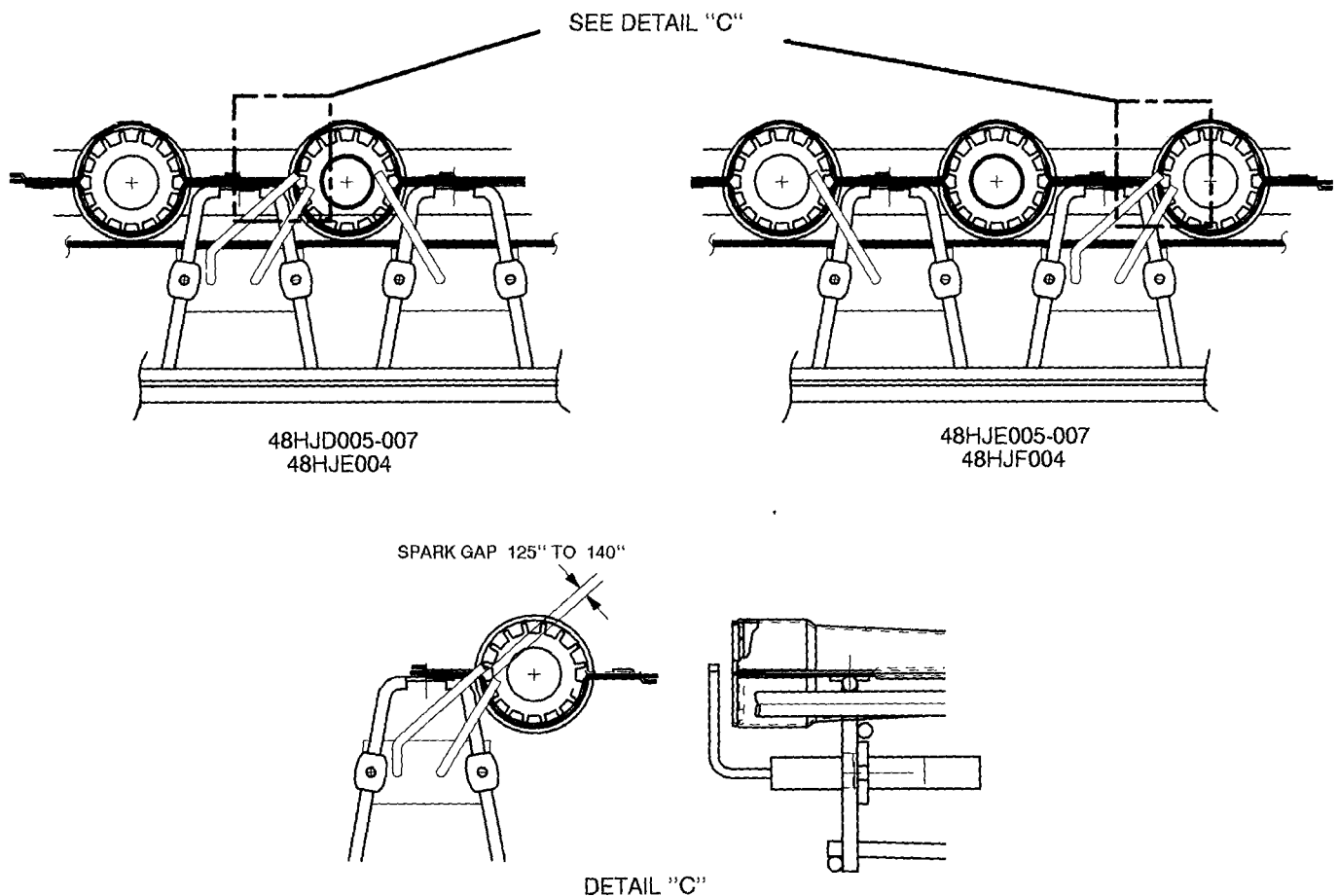


Fig. 35 - Spark Adjustment

LEGEND FOR FIG 36 AND 37

AHA	— Adjustable Heat Anticipator
AWG	— American Wire Gage
BAT.	— Battery
C	— Contactor, Compressor
CAP	— Capacitor
CB	— Circuit Breaker
CC	— Cooling Compensator
CH	— Crankcase Heater
CLO	— Compressor Lockout
COM	— Common
COMP	— Compressor Motor
DAT	— Discharge Air Thermistor
EC	— Enthalpy Control
ECON	— Economizer
EMFC.L	— Energy Management Fully Closed (Two-Position Damper)
EMC/EMFC	— Energy Management Closed (Economizer)
EMO/EMFO	— Energy Management Open
EPS	— Emergency Power Supply
EQUIP	— Equipment
FP	— Flame Prove
FPT	— Freeze Protection Thermostat
FU	— Fuse
GND	— Ground
HPS	— High-Pressure Switch
HR	— Holding Relay
I	— Ignitor
ICP	— Ignitor Control Pack
IDM	— Induced Draft Motor
IDR	— Induced Draft Relay
IFC	— Indoor (Evaporator) Fan Contactor
IFM	— Indoor (Evaporator) Fan Motor
L	— Light
LO	— Low
LPS	— Low-Pressure/Loss-of-charge Switch
LS	— Limit Switch
MGV	— Main Gas Valve
MTR	— Motor
MV	— Main Valve
NC	— Normally Closed
NEC	— National Electrical Code
NO	— Normally Open
OAT	— Outdoor Air Thermostat
OFC	— Outdoor (Condenser) Fan Contactor
OFM	— Outdoor (Condenser) Fan Motor
P	— Plug
PS	— Pressure Switch

PL	— Plug Assembly
QT	— Quadruple Terminal
R	— Relay
RES	— Resistor
RS	— Rollout Switch
SC	— Safety Circuit
SEN	— Sensor
STAT	— Thermostat
SW	— Switch
SW1	— Switch, Fully Open
SW2	— Switch, Fully Closed
SW3	— Switch, Minimum Vent Position
SW4	— Switch, Maximum Vent Position
TB	— Terminal Block
TC	— Thermostat-Cooling
TDR	— Time Delay Relay
TG	— Time Guard® Device
TRAN	— Transformer
	Circuit Board Run
	Field Splice
	Marked Wire
	Terminal (Marked)
	Terminal (Unmarked)
	Terminal Block
	Terminal Econ 2-Position Board
	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 FOR FIG. 36

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single phasing conditions.
3. Set thermostat heat anticipator at 1 amp.

VOLTAGE RATING	CB Mfg. Pt. No. Potter & Brumfield	MUST TRIP AMPS
24 V	W28X-1024-3.2	3.2

4. Use copper, copper clad aluminum or aluminum conductors.

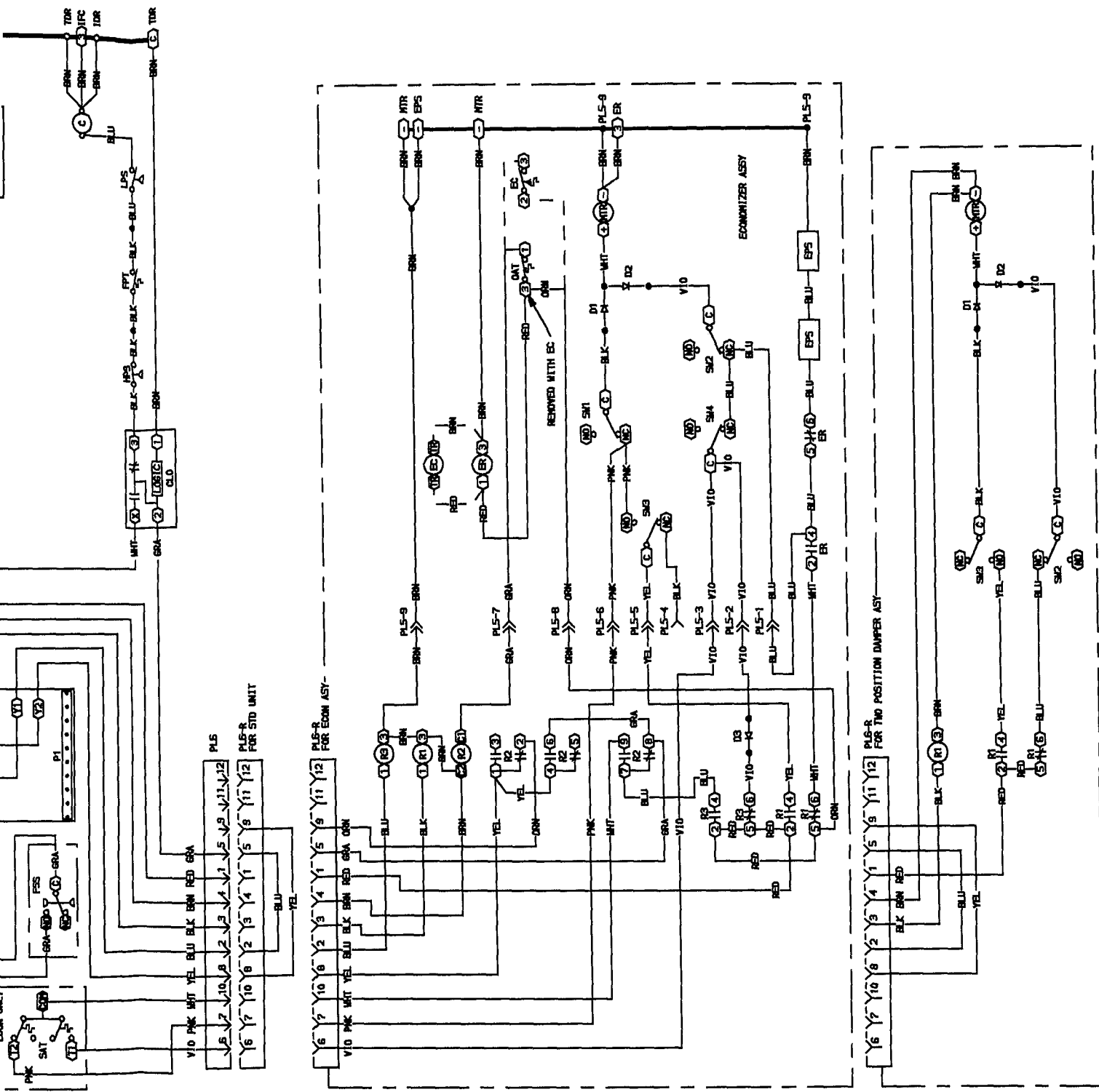


Fig. 36 - Typical Wiring Schematic

