Installation Instructions
PAE Series
575 Volt – 3 Phase
PACKAGE AIR CONDITIONERS

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513 01 2501 00 6-05-07

Printed in U.S.A.

Key: PAE

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.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the furnace and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability,or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death.

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag. Ensure electrical service to rooftop unit agrees with voltage and amperage listed on the unit rating plate.

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. (See Fig. 1.)

Step 1 —Provide Unit Support

Roof Curb

Assemble and install accessory roof curb in accordance with instructions shipped with curb. Install insulation, cant strips, roofing felt, and counter flashing as shown. *Ductwork must be attached to curb, not to the unit.* If electric control power or gas service is to be routed through the basepan, attach the accessory thru-the-bottom service connections to the basepan in accordance with the accessory installation instructions. Connections must be installed before unit is set on roof curb.

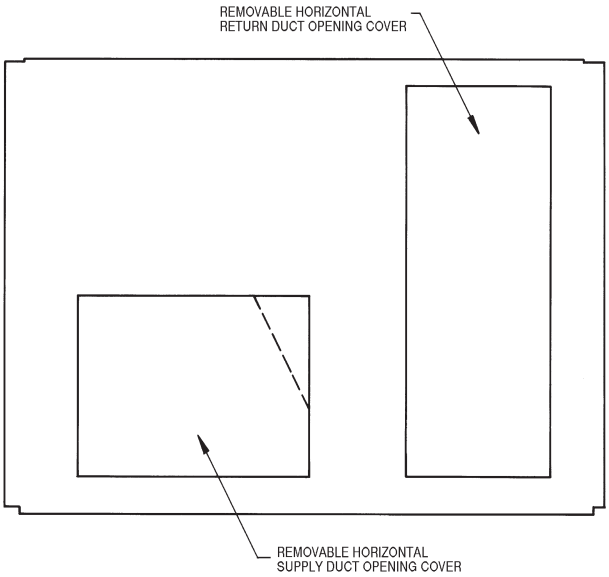


Fig. 1 – Horizontal Conversion Panels

IMPORTANT: The gasketing of the unit to the roof curb is critical for a watertight seal. Install gasket supplied with the roof curb. 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.

Alternate Unit Support

When the curb or adapter cannot be used, support unit with sleeper rails using unit curb or adapter support area. If sleeper rails cannot be used, support the long sides of the unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

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 isolation 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 pressure (a negative condition) shall not exceed 0.35 in. wg with economizer or 0.45 in. wg without economizer.

Step 3 —Install External Trap for Condensate Drain

Condensate drain connections are located on the bottom and side of the unit. Unit discharge connections do not determine the use of drain connections; either drain connection can be used with vertical or horizontal applications.

When using the standard side drain connection, ensure the plug (Red) in the alternate bottom connection is tight before installing the unit.

To use the bottom drain connection for a roof curb installation, relocate the factory-installed plug (Red) from the bottom connection to the side connection. The center drain plug looks like a star connection, however it can be removed with a $^1/_2$-in. socket drive extension. (See Fig. 3.) The piping for the condensate drain and external trap can be completed after the unit is in place.

All units must have an external trap for condensate drainage. Install a trap 4-in. deep and protect against freeze-up. If drain line is installed downstream from the external trap, pitch the line away from the unit at 1 in. per 10 ft of run. Do not use a pipe size smaller than the unit connection ($^3/_4$ in.). (See Fig. 4.)

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. 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. 6. Refer to rigging instructions on unit.

⚠ WARNING

PERSONAL INJURY AND PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal injury, death and property damage.

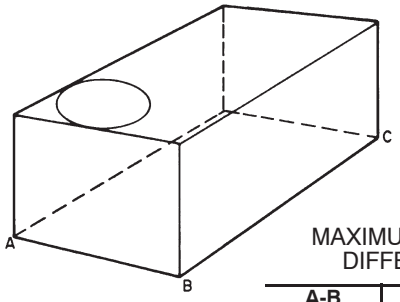
All panels must be in place when rigging and lifting.

Positioning

Maintain clearance around and above unit to provide minimum distance from combustible materials, proper airflow, and service access. (See Fig. 6 and unit dimensions page.)

Position unit on roof curb so that the following clearances are maintained: $^1/_4$ in. clearance between the roof curb and the base rail inside the front and rear, 0.0 in. clearance between the roof curb and the base rail inside on the duct end of the unit.

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

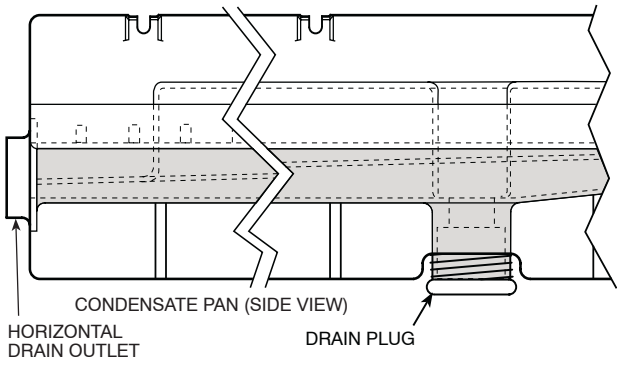


MAXIMUM ALLOWABLE DIFFERENCE (in.)

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

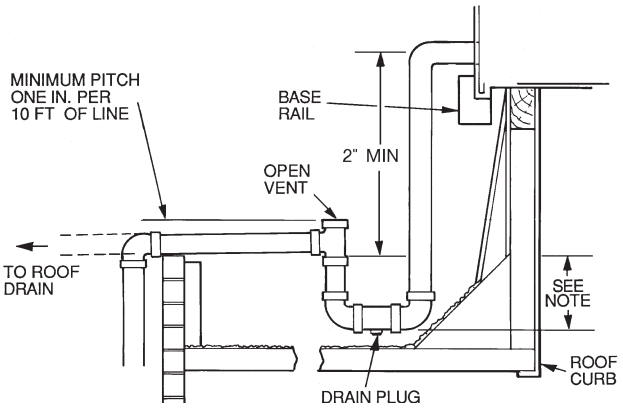
C06110

Fig. 2 – Unit Leveling Tolerances



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

Fig. 3 – Condensate Drain Connection

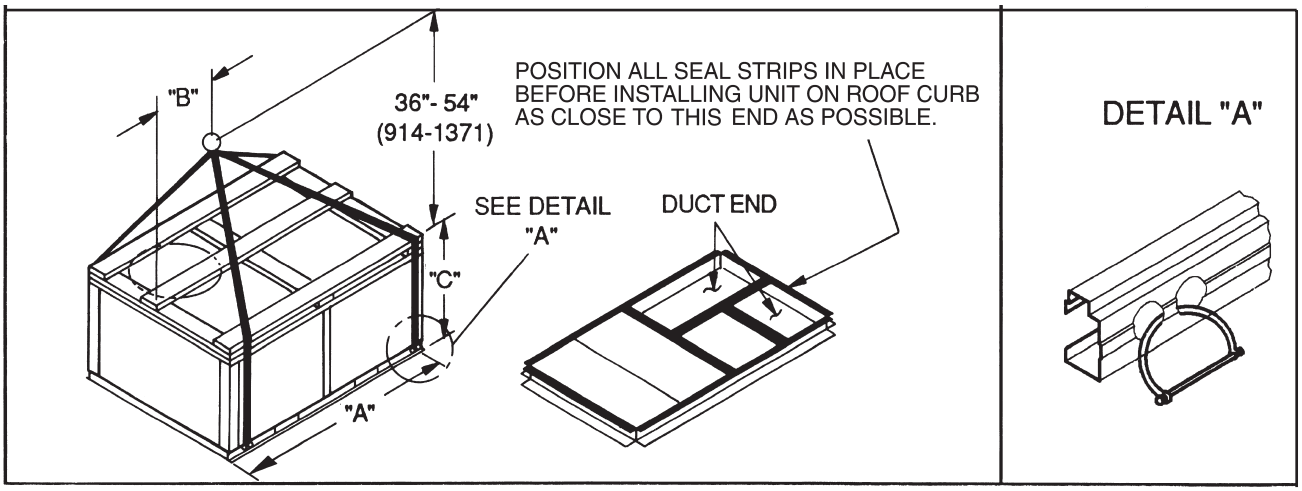


NOTE: Trap should be deep enough to offset maximum unit static difference. A 4-in. trap is recommended.

Fig. 4 – Condensate Drain Piping Details

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

After unit is in position, remove polyethylene shipping wrapper and top crating.



NOTES:
1. Place unit on curb as close as possible to the duct end.
2. Dimension in ( ) is in millimeters.
3. 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.

Fig. 5 – Rigging Details

UNIT PAE	OPERATING WEIGHT		DIMENSIONS					
			"A"		"B"		"C"	
	lb	kg	in.	mm	in.	mm	in.	mm
036	530	240	73.69	1872	35.50	902	33.31	847
048	540	245	73.69	1872	35.50	902	33.31	847
060	560	254	73.69	1872	35.50	902	33.31	847

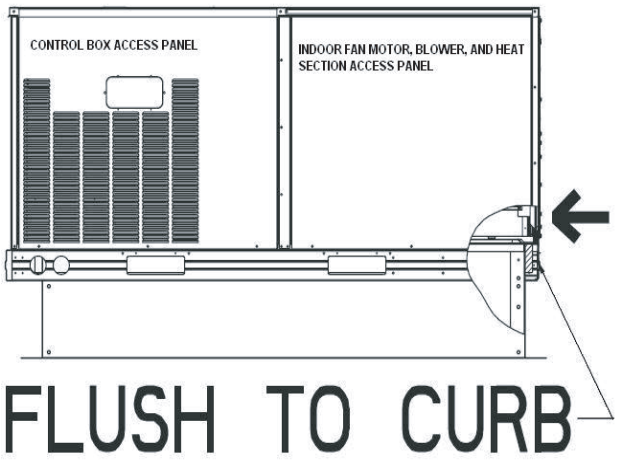


Fig. 6 – Roof Curb Alignment

⚠ WARNING

PERSONAL INJURY AND PROPERTY DAMAGE HAZARD

Failure to follow this warning could result in personal injury, death and property damage.

All panels must be in place when rigging and lifting.

Unit PAE	STD. UNIT WEIGHT LB	KG	(A) CORNER WEIGHT LB	KG	(B) CORNER WEIGHT LB	KG	(C) CORNER WEIGHT LB	KG	(D) CORNER WEIGHT LB	KG	"J" FT - IN.	MM
036	435	197	124	56.2	106	48.1	95	43.1	110	49.9	2'-9 5/16"	846.5
048	445	202	127	57.6	108	49.0	97	44.0	113	51.3		
060	465	211	133	60.3	113	51.3	101	45.8	118	53.5		

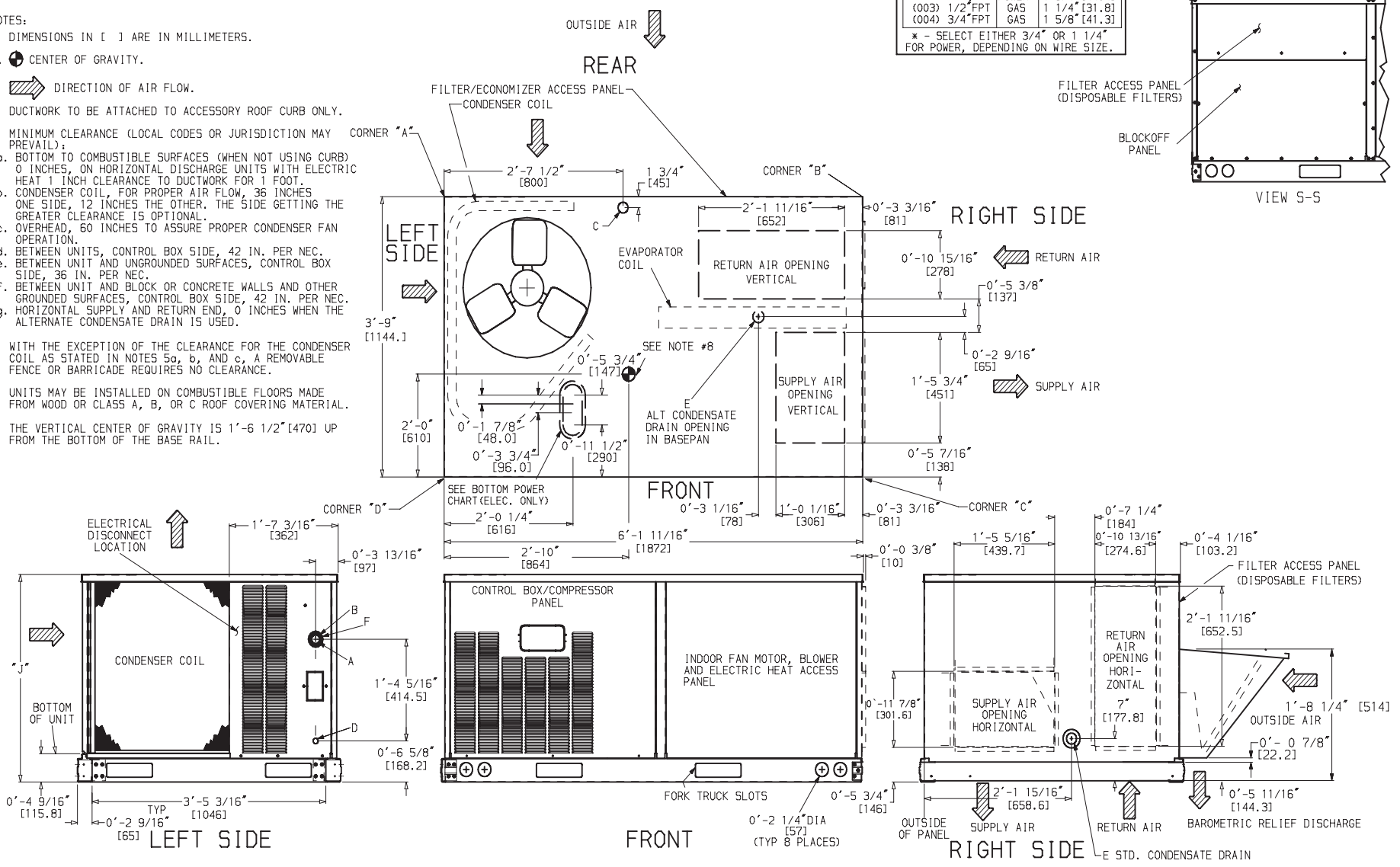
BOTTOM POWER CHART:
THESE HOLES REQ'D FOR USE WITH ACCESSORY PACKAGE
AXB035PKA

THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
1/2"	ACC.	7/8" [22.2]
1/2"	24V	7/8" [22.2]
3/4" (001,003)	POWER*	1 1/8" [28.4]
1 1/4" (002,004)	POWER*	1 3/4" [44.4]
(003) 1/2" FPT	GAS	1 1/4" [31.8]
(004) 3/4" FPT	GAS	1 5/8" [41.3]

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

	CONNECTION SIZES
A	1 3/8" DIA. [35] FIELD POWER SUPPLY HOLE
B	2" DIA. [51] POWER SUPPLY KNOCK-OUT
C	1 3/4" DIA. [44] CHARGING PORT HOLE
D	7/8" DIA. [22] FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	2 1/2" DIA. [64] POWER SUPPLY KNOCK-OUT

NOTES:
1. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY.
3. DIRECTION OF AIR FLOW.
4. DUCTWORK TO BE ATTACHED TO ACCESSORY ROOF CURB ONLY.
5. MINIMUM CLEARANCE (LOCAL CODES OR JURISDICTION MAY PREVAIL):
   a. BOTTOM TO COMBUSTIBLE SURFACES (WHEN NOT USING CURB) 0 INCHES, ON HORIZONTAL DISCHARGE UNITS WITH ELECTRIC HEAT 1 INCH CLEARANCE TO DUCTWORK FOR 1 FOOT.
   b. CONDENSER COIL, FOR PROPER AIR FLOW, 36 INCHES ONE SIDE, 12 INCHES THE OTHER. THE SIDE GETTING THE GREATER CLEARANCE IS OPTIONAL.
   c. OVERHEAD, 60 INCHES TO ASSURE PROPER CONDENSER FAN OPERATION.
   d. BETWEEN UNITS, CONTROL BOX SIDE, 42 IN. PER NEC.
   e. BETWEEN UNIT AND UNGROUNDED SURFACES, CONTROL BOX SIDE, 36 IN. PER NEC.
   f. BETWEEN UNIT AND BLOCK OR CONCRETE WALLS AND OTHER GROUNDED SURFACES, CONTROL BOX SIDE, 42 IN. PER NEC.
   g. HORIZONTAL SUPPLY AND RETURN END, 0 INCHES WHEN THE ALTERNATE CONDENSATE DRAIN IS USED.
6. WITH THE EXCEPTION OF THE CLEARANCE FOR THE CONDENSER COIL 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.
8. THE VERTICAL CENTER OF GRAVITY IS 1'-6 1/2" [470] UP FROM THE BOTTOM OF THE BASE RAIL.



VIEW S-S

Step 5 —Make Electrical Connections

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death,

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.*

Field Power Supply

All units are factory wired for the voltage shown on the nameplate.

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

When installing units, provide a disconnect per NEC.

All field wiring must comply with NEC and local requirements.

Install field wiring as follows:

1. Install conduit through side panel openings. For units without electric heat, install conduit between disconnect and control box.
2. Install power lines to terminal connections as shown in Fig. 8.
3. For units with electric heat, refer to Accessory Electric Heat Installation Instructions.

During operation, voltage to compressor terminals must bewithin 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 percentage of voltage imbalance. Operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components. Such operation invalidates any applicable warranty.

NOTE: If accessory thru-the-bottom connections and roof curb are used, refer to the Thru-the-Bottom Accessory Installation Instructions for information on wiring the unit.

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.

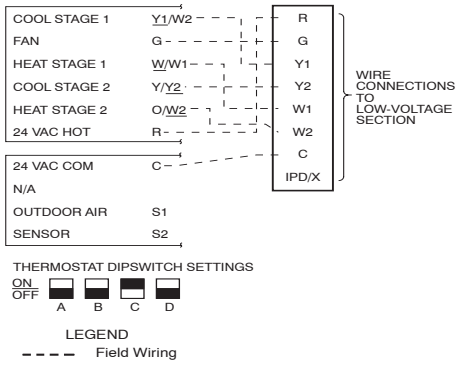
Route thermostat cable or equivalent single leads of colored wire from subbase terminals through connector on unit to low-voltage connections (shown in Fig. 7).

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gauge) insulated wire (35°C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35°C minimum). For over 75 ft, use no. 14 AWG insulated wire (35°C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

1. Connect thermostat wires to screw terminals of low voltage terminal board.
2. Pass the control wires through the hole provided in the control box.
3. Some models may be equipped with a raceway built into the corner post on the left side of control box (See Fig. 9.) This raceway provides the required clearance between high-voltage and low voltage wiring. For models without a raceway, ensure to provide the NEC required clearance between high-voltage and low-voltage wiring.

Heat Anticipator Settings

Set heat anticipator settings at 0.8 amp for first stage and 0.3 for second stage heating.



NOTE: Underlined letter indicates active thermostat output when configured for A/C operation.

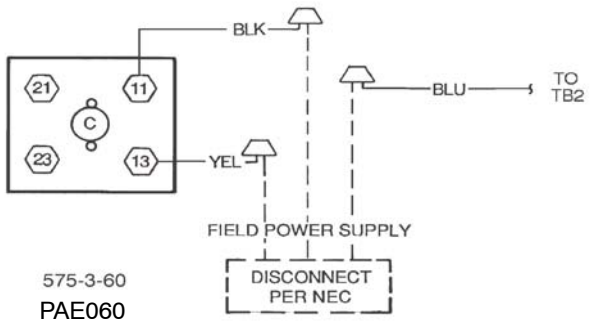
Fig. 7 – Low-Voltage connections With or Without Economizer or Two-Position Damper

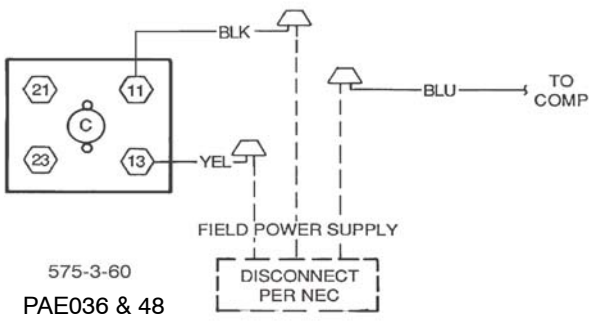
Table 1—Physical Data PAE

BASE UNIT PAE 575V-3PH-60Hz		036	048	060
NOMINAL CAPACITY		3	4	5
OPERATING WEIGHT (lb)		435	445	465
COMPRESSOR			Scroll	
Quantity		1	1	1
Oil (oz)		42	53	50
REFRIGERANT TYPE			R-22	
Expansion Device			Fixed Orifice Metering Device	
Operating Charge (lb-oz)				
Standard Unit		5-8	10-2	10-0
CONDENSER FAN			Propeller	
Quantity...Diameter (in.)		1...22	1...22	1...22
Nominal Cfm		3500	3500	4100
Motor Hp...Rpm		1/8...825	1/8...825	1/4...1100
Watts Input (Total)		180	180	320
CONDENSER COIL			Enhanced Copper Tubes, Aluminum Lanced Fins	
Rows...Fins/in.		1...17	2...17	2...17
Total Face Area (sq ft)		14.6	16.5	16.5
EVAPORATOR COIL			Enhanced Copper Tubes, Aluminum Double-Wavy Fins	
Rows...Fins/in.		2...15	2...15	4...15
Total Face Area (sq ft)		5.5	5.5	5.5
EVAPORATOR FAN			Centrifugal Type, Belt Drive	
Quantity...Size (in.)		1...10 x 10	1...10 x 10	1...10 x 10
Nominal Cfm		1200	1600	2000
Maximum Continuous Bhp	Std	1.20	1.20	1.30/2.40*
Motor Frame Size	Std	48	48	56
Fan Rpm Range	Std	680-1044	770-1185	1035-1460
Motor Bearing Type		Ball	Ball	Ball
Maximum Fan Rpm		2100	2100	2100
Motor Pulley Pitch Diameter A/B (in.)	Std	1.9/2.9	1.9/2.9	2.4/3.4
Nominal Motor Shaft Diameter (in.)	Std	1/2	1/2	5/8
Fan Pulley Pitch Diameter (in.)	Std	4.5	4.0	4.0
Belt — Type...Length (in.)	Std	1...A...36	1...A...36	1....4...40
Pulley Center Line Distance (in.)		10.0-12.4	10.0-12.4	14.7-15.5
Speed Change per Full Turn of Movable Pulley Flange (rpm)	Std	65	70	75
Movable Pulley Maximum Full Turns from Closed Position	Std	5	5	6
Factory Setting — Full Turns Open	Std	3	3	3
Factory Speed Setting (rpm)	Std	826	936	1248
Fan Shaft Diameter at Pulley (in.)		5/8	5/8	5/8
HIGH-PRESSURE SWITCH (psig)				
Standard Compressor Internal Relief			450 ± 50	
Cutout / Reset (Auto.)			428 / 320	
LOSS-OF-CHARGE/LOW-PRESSURE SWITCH (Liquid LIne) (psig)				
Cutout / Reset (Auto.)			7 ± 3 / 22 ± 5	
FREEZE PROTECTION THERMOSTAT				
Opens (F) / Closes (F)			30 / 45	
OUTDOOR-AIR INLET SCREENS			Cleanable. Screen quantity and size varies with option selected.	
RETURN-AIR FILTERS			Throwaway	
Quantity...Size (in.)			2...16 x 25 x 2	

LEGEND

BHp — Brake Horsepower





LEGEND

C	— Contactor
COMP	— Compressor
IFC	— Indoor (Evaporator) Fan Contactor
NEC	— National Electrical Code
TB	— Terminal Block

Fig. 8 = Power Wiring Connections

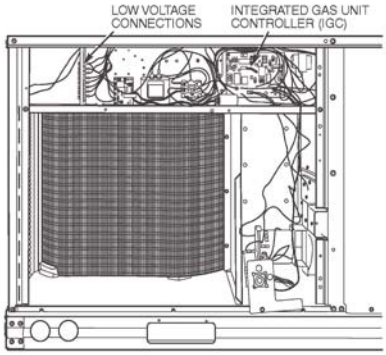


Fig. 9 – Field Control Wiring Raceway

Table 2 — Electrical Data - PAE036-060

UNIT PAE	NOMINAL V-PH-Hz	IFM TYPE	VOLTAGE RANGE		COMPRESSOR (each)			OUTDOOR FAN		IFM FLA	POWER SUPPLY *		DISCONNECT SIZE	
			Min	Max	QTY	RLA	LRA	QTY	FLA		MCA	MOCP**	FLA	LRA
036	575-3-60	STD	518	632	1	4.2	31	1	0.4	1.9	7.3	20	7	36
048	575-3-60	STD	518	632	1	6.4	40	1	0.4	1.9	10.3	15	10	45
060	575-3-60	STD	518	632	1	7.1	50	1	0.6	2.0	11.5	15	11	63

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

NOTES:
* The values listed in this table do not include power exhaust. See power exhaust table for power exhaust requirements.
** Fuse or HACR breaker

Table 3 – PAE Fan Rpm at Motor Pulley Setting With Standard Motor*

UNIT PAE	MOTOR PULLEY TURNS OPEN												
	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
036	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
048	1455	1423	1392	1360	1328	1297	1265	1233	1202	1170	1138	1107	1075
060	1685	1589	1557	1525	1493	1460	1428	1396	1364	1332	1300	–	–

*Approximate fan rpm shown (standard motor/drive).

Table 4 – Evaporator-Fan Motor Data — Standard Motor

UNIT PAE	UNIT PHASE	MAXIMUM CONTINUOUS BHP*	MAXIMUM OPERATING WATTS*	UNIT VOLTAGE	MAXIMUM AMP DRAW
036	Three	1.20	1000	575	2.2
048	Three	1.20	1000	575	2.2
060	Three	2.40	2120	575	3.0

LEGEND

Bhp — Brake Horsepower

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

Table 5 – Accessory Electric Heaters Static Pressure Drop (in. wg) — PAE036-60

COMPONENT	CFM									
	600	900	1200	1400	1600	1800	2000	2200	2400	2600
1 Heater Module	0.03	0.05	0.07	0.09	0.09	0.10	0.11	0.11	0.12	0.13
2 Heater Modules	0.14	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.18

LEGEND

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

Table 6 — Evaporator-Fan Motor Efficiency

MOTOR PAE	EFFICIENCY
036 & 48	75
060	84

NOTE: Convert watts to bhp using the following formula:

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

GENERAL FAN PERFORMANCE NOTES

1. Values include losses for filters, unit casing, and wet coils. See Table 5 for accessory static pressure information.
2. Extensive motor and electrical testing on these units ensures that the full range of the motor can be utilized with confidence. Using the fan motors up to the ratings shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected. See Table 4 on this page for additional information.
3. Use of a field-supplied motor may affect wire sizing.
4. Interpolation is permissible. Do not extrapolate.
5. Performance includes clean filter and wet coil.

Table 7 – Fan Performance PAE036 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**566**	**0.14**	**142**	690	0.23	228	791	0.32	320	879	0.42	418	957	0.52	522
1000	**598**	**0.17**	**173**	718	0.27	267	817	0.37	366	903	0.47	471	981	0.58	581
1100	**632**	**0.21**	**210**	748	0.31	311	844	0.42	418	929	0.53	530	1006	0.65	646
1200	**666**	**0.25**	**252**	778	0.36	361	873	0.48	476	956	0.60	594	1031	0.72	718
1300	701	0.30	300	809	0.42	418	902	0.54	540	983	0.67	665	**1057**	**0.80**	**796**
1400	737	0.36	355	842	0.48	481	932	0.61	610	1012	0.75	744	**1085**	**0.89**	**881**
1500	774	0.42	417	875	0.55	551	962	0.69	689	1041	0.83	830	**1112**	**0.98**	**974**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1029	0.63	630	**1095**	**0.75**	**742**	**1157**	**0.86**	**859**	**1216**	**0.99**	**980**	**1272**	**1.11**	**1105**
1000	**1052**	**0.70**	**695**	**1118**	**0.82**	**814**	**1179**	**0.94**	**937**	**1237**	**1.07**	**1064**	**1293**	**1.20**	**1195**
1100	**1076**	**0.77**	**767**	**1141**	**0.90**	**892**	**1202**	**1.03**	**1021**	**1260**	**1.16**	**1154**	—	—	—
1200	**1100**	**0.85**	**845**	**1165**	**0.98**	**977**	**1225**	**1.12**	**1112**	—	—	—	—	—	—
1300	**1126**	**0.94**	**930**	**1189**	**1.07**	**1069**	—	—	—	—	—	—	—	—	—
1400	**1152**	**1.03**	**1023**	**1215**	**1.17**	**1168**	—	—	—	—	—	—	—	—	—
1500	**1179**	**1.13**	**1123**	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Table 8 – Fan Performance PAE048 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**666**	**0.25**	**252**	778	0.36	361	873	0.48	476	956	0.60	594	1031	0.72	718
1300	**701**	**0.30**	**300**	809	0.42	418	902	0.54	540	983	0.67	665	1057	0.80	796
1400	**737**	**0.36**	**355**	842	0.48	481	932	0.61	610	1012	0.75	744	1085	0.89	881
1500	774	0.42	417	875	0.55	551	962	0.69	689	1041	0.83	830	1112	0.98	974
1600	811	0.49	487	909	0.63	629	994	0.78	774	1071	0.93	923	1141	1.08	1076
1700	849	0.57	565	943	0.72	715	1026	0.87	869	1101	1.03	1025	1170	1.19	1185
1800	887	0.65	651	978	0.81	810	1059	0.98	972	1133	1.14	1136	—	—	—
1900	926	0.75	746	1014	0.92	914	1092	1.09	1084	—	—	—	—	—	—
2000	965	0.86	852	1050	1.03	1028	—	—	—	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1100	0.85	845	1165	0.98	977	**1225**	**1.12**	**1112**	—	—	—	—	—	—
1300	1126	0.94	930	**1189**	**1.07**	**1069**	—	—	—	—	—	—	—	—	—
1400	1152	1.03	1023	**1215**	**1.17**	**1168**	—	—	—	—	—	—	—	—	—
1500	1179	1.13	1123	—	—	—	—	—	—	—	—	—	—	—	—
1600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

Table 9 – Fan Performance PAE060 — Vertical Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**790**	**0.40**	**353**	**897**	**0.53**	**471**	**991**	**0.68**	**600**	1075	0.83	739	1152	1.00	888
1600	**828**	**0.46**	**412**	**931**	**0.60**	**536**	**1022**	**0.75**	**670**	1104	0.92	813	1180	1.09	966
1700	**866**	**0.54**	**478**	**966**	**0.68**	**608**	1054	0.84	747	1134	1.01	895	1208	1.19	1053
1800	**905**	**0.62**	**551**	**1001**	**0.77**	**687**	1087	0.94	832	1165	1.11	985	1238	1.29	1148
1900	**944**	**0.71**	**633**	1037	0.87	774	1120	1.04	925	1197	1.22	1084	1268	1.41	1251
2000	**983**	**0.81**	**723**	1073	0.98	870	1154	1.16	1026	1229	1.34	1190	1299	1.53	1362
2100	**1023**	**0.92**	**821**	1110	1.10	975	1189	1.28	1137	1262	1.47	1306	1330	1.67	1483
2200	1063	1.05	929	1147	1.23	1089	1224	1.41	1256	1295	1.61	1431	1362	1.82	1614
2300	1104	1.18	1046	1185	1.37	1212	1260	1.56	1386	1329	1.76	1567	1395	1.98	1754
2400	1145	1.32	1174	1223	1.52	1346	1296	1.72	1526	1364	1.93	1712	1428	2.15	1905
2500	1185	1.48	1311	1262	1.68	1490	1333	1.89	1676	1399	2.10	1868	**1462**	**2.33**	**2067**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1224	1.18	1045	1291	1.36	1212	1354	1.56	1387	1414	1.77	1570	**1472**	**1.98**	**1761**
1600	1250	1.27	1128	1316	1.46	1299	1379	1.66	1478	1438	1.87	1664	**1495**	**2.09**	**1858**
1700	1278	1.37	1219	1343	1.57	1394	1405	1.77	1576	**1463**	**1.99**	**1766**	**1520**	**2.21**	**1964**
1800	1306	1.48	1318	1370	1.69	1497	1431	1.90	1683	**1489**	**2.11**	**1877**	**1545**	**2.34**	**2078**
1900	1335	1.61	1426	1398	1.81	1609	1458	2.03	1799	**1515**	**2.25**	**1997**	—	—	—
2000	1364	1.74	1542	1427	1.95	1730	**1486**	**2.17**	**1925**	**1542**	**2.39**	**2126**	—	—	—
2100	1395	1.88	1668	1456	2.09	1860	**1514**	**2.32**	**2060**	—	—	—	—	—	—
2200	1426	2.03	1804	**1486**	**2.25**	**2001**	—	—	—	—	—	—	—	—	—
2300	1457	2.19	1949	—	—	—	—	—	—	—	—	—	—	—	—
2400	**1489**	**2.37**	**2106**	—	—	—	—	—	—	—	—	—	—	—	—
2500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

Table 10 – Fan Performance PAE036 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	**554**	**0.14**	**134**	681	0.22	222	783	0.32	316	870	0.42	416	947	0.53	523
1000	**583**	**0.16**	**163**	707	0.26	257	808	0.36	358	894	0.47	465	971	0.58	578
1100	**612**	**0.20**	**195**	735	0.30	298	834	0.41	406	919	0.52	519	995	0.64	638
1200	**643**	**0.23**	**233**	762	0.35	344	860	0.46	459	944	0.58	579	1020	0.71	705
1300	**674**	**0.28**	**276**	791	0.40	395	887	0.52	517	970	0.65	645	**1045**	**0.78**	**777**
1400	706	0.33	324	820	0.45	451	914	0.59	582	997	0.72	717	**1071**	**0.86**	**857**
1500	738	0.38	379	849	0.52	515	942	0.66	653	1024	0.80	796	**1097**	**0.95**	**942**

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
900	1017	0.64	635	**1082**	**0.76**	**753**	**1143**	**0.88**	**876**	**1200**	**1.01**	**1004**	**1254**	**1.14**	**1136**
1000	1041	0.70	696	**1105**	**0.82**	**820**	**1166**	**0.95**	**948**	**1223**	**1.09**	**1081**	—	—	—
1100	**1065**	**0.77**	**763**	**1129**	**0.90**	**892**	**1189**	**1.03**	**1026**	**1245**	**1.17**	**1165**	—	—	—
1200	**1089**	**0.84**	**835**	**1153**	**0.98**	**971**	**1212**	**1.12**	**1111**	—	—	—	—	—	—
1300	**1114**	**0.92**	**915**	**1177**	**1.06**	**1056**	—	—	—	—	—	—	—	—	—
1400	**1139**	**1.01**	**1000**	**1202**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	**1164**	**1.10**	**1093**	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 680 to 1044 rpm. All other rpms require field-supplied drive.

Table 11 – Fan Performance PAE048 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	**643**	**0.23**	**233**	**762**	**0.35**	**344**	860	0.46	459	944	0.58	579	1020	0.71	705
1300	**674**	**0.28**	**276**	791	0.40	395	887	0.52	517	970	0.65	645	1045	0.78	777
1400	**706**	**0.33**	**324**	820	0.45	451	914	0.59	582	997	0.72	717	1071	0.86	857
1500	**738**	**0.38**	**379**	849	0.52	515	942	0.66	653	1024	0.80	796	1097	0.95	942
1600	771	0.44	440	879	0.59	584	971	0.74	731	1051	0.89	881	1124	1.04	1035
1700	804	0.51	507	910	0.66	661	1000	0.82	816	1079	0.98	974	1151	1.14	1136
1800	837	0.59	582	941	0.75	745	1029	0.91	909	1107	1.08	1075	—	—	—
1900	871	0.67	665	972	0.84	837	1059	1.02	1010	1136	1.19	1184	—	—	—
2000	906	0.76	756	1004	0.94	938	1089	1.12	1119	—	—	—	—	—	—

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1200	1089	0.84	835	1153	0.98	971	**1212**	**1.12**	**1111**	—	—	—	—	—	—
1300	1114	0.92	915	1177	1.06	1056	—	—	—	—	—	—	—	—	—
1400	1139	1.01	1000	**1202**	**1.15**	**1149**	—	—	—	—	—	—	—	—	—
1500	1164	1.10	1093	—	—	—	—	—	—	—	—	—	—	—	—
1600	**1190**	**1.20**	**1193**	—	—	—	—	—	—	—	—	—	—	—	—
1700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1800	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 1.20.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 770 to 1185 rpm. All other rpms require field-supplied drive.

Table 12 – Fan Performance PAE060 — Horizontal Discharge Units; Standard Motor (Belt Drive)*

AIRFLOW CFM	EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	**724**	**0.33**	**295**	**837**	**0.45**	**402**	**937**	**0.59**	**524**	**1028**	**0.74**	**660**	1111	0.91	808
1600	**757**	**0.39**	**343**	**866**	**0.51**	**455**	**962**	**0.65**	**580**	1050	0.81	719	1132	0.98	870
1700	**790**	**0.45**	**398**	**894**	**0.58**	**514**	**988**	**0.72**	**643**	1074	0.88	784	1154	1.06	938
1800	**823**	**0.52**	**458**	**924**	**0.65**	**579**	**1015**	**0.80**	**712**	1099	0.96	857	1177	1.14	1013
1900	**857**	**0.59**	**525**	**955**	**0.73**	**650**	1043	0.89	787	1125	1.05	936	1201	1.23	1096
2000	**892**	**0.67**	**599**	**986**	**0.82**	**729**	1072	0.98	870	1151	1.15	1022	1226	1.33	1185
2100	**927**	**0.77**	**680**	**1017**	**0.92**	**815**	1101	1.08	960	1178	1.26	1116	1251	1.44	1283
2200	**962**	**0.87**	**769**	1050	1.02	909	1131	1.19	1059	1206	1.37	1218	1277	1.56	1389
2300	**997**	**0.97**	**865**	1082	1.14	1010	1161	1.31	1165	1235	1.50	1329	1304	1.69	1503
2400	**1033**	**1.09**	**970**	1115	1.26	1120	1192	1.44	1279	1264	1.63	1448	1332	1.83	1625
2500	1069	1.22	1084	1149	1.39	1239	1223	1.58	1403	1293	1.77	1576	1360	1.98	1757

AIRFLOW CFM	EXTERNAL STTIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
1500	1188	1.09	970	1261	1.29	1143	1330	1.49	1327	1395	1.71	1523	1457	1.95	1729
1600	1208	1.16	1033	1279	1.36	1208	1347	1.57	1394	1412	1.79	1590	**1474**	**2.02**	**1797**
1700	1229	1.24	1103	1299	1.44	1280	1366	1.65	1468	1429	1.88	1665	**1490**	**2.11**	**1873**
1800	1250	1.33	1181	1319	1.53	1360	1385	1.74	1549	1448	1.97	1748	**1508**	**2.20**	**1957**
1900	1273	1.43	1266	1341	1.63	1447	1405	1.84	1638	**1467**	**2.07**	**1839**	**1527**	**2.31**	**2050**
2000	1296	1.53	1359	1363	1.74	1542	1427	1.95	1736	**1488**	**2.18**	**1939**	—	—	—
2100	1320	1.64	1459	1386	1.85	1646	1448	2.07	1842	**1508**	**2.30**	**2047**	—	—	—
2200	1345	1.77	1568	1409	1.98	1758	**1471**	**2.20**	**1956**	—	—	—	—	—	—
2300	1371	1.90	1686	1434	2.11	1878	**1494**	**2.34**	**2080**	—	—	—	—	—	—
2400	1397	2.04	1812	1459	2.26	2008	—	—	—	—	—	—	—	—	—
2500	1424	2.19	1948	—	—	—	—	—	—	—	—	—	—	—	—

NOTES:
1. **Bold cells** indicate field-supplied drive is required.
2. Maximum continuous bhp is 2.40.
3. See general fan performance notes.

LEGEND
Bhp — Brake Horsepower
Watts — Input Watts to Motor
*Motor drive range: 1035 to 1460 rpm. All other rpms require field-supplied drive.

PRE-START-UP

⚠ WARNING

FIRE, EXPLOSION, ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury, death, and/or property damage.

1. Follow recognized safety practices and wear protective goggles when checking or servicing a refrigerant system.
2. Do not operate the compressor or provide any electric power to the unit unless the compressor terminal cover is in place and secured.
3. Do not remove the compressor terminal cover until all electrical sources are disconnected and tagged with lockout tags.
4. Relieve all pressure from the system before touching or disturbing anything inside the terminal box if a refrigerant leak is suspected around the compressor terminals. Use accepted methods to recover the refrigerant.
5. Never attempt to repair a soldered connection while the refrigerant system is under pressure.
6. Do not use a torch to remove any component. The system contains oil and refrigerant under pressure. To remove a component, wear protective goggles and proceed as follows:
   a. Shut off electrical power to the unit and tag disconnect.
   b. Recover refrigerant to relieve all pressure from the system using both high-pressure and low-pressure ports.
   c. Cut component connection tubing with a tubing cutter, and remove the component from the unit.
   d. Carefully unsweat the remaining tubing stubs when necessary. Oil can ignite when exposed to a 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, or 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-wiring and factory-wiring connections. Be sure that connections are completed and tight. Be sure that wires are not in contact with refrigerant tubing or sharp edges.
   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 are correctly positioned in fan orifice. See Condenser-Fan Adjustment section 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

Step 1 —Unit Preparation

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

Step 2 —Return-Air Filters

Make sure the correct filters are installed in the unit (See Table 1). Do not operate the unit without return-air filters.

Step 3 —Outdoor-Air Inlet Screens

Outdoor-air inlet screen(s) must be in place before operating the unit.

Step 4 —Compressor Mounting

Compressors are internally spring mounted. Do not loosen or remove the compressor holddown bolts.

Step 5 —Internal Wiring

Check all electrical connections in unit control boxes; tighten them as required.

Step 6 —Refrigerant Service Ports

Each unit system has 4 Schrader-type service ports: one on the suction line, one on the liquid line, and 2 on the compressor discharge line. Be sure that caps on the ports are tight.

Step 7 —High Flow Valves

Two high flow refrigerant valves are located on the hot gas tube coming out of the compressor and the suction tubes. Large black plastic caps distinguish these valves with O-rings located inside the caps. No field access to these valves is available at this time. Ensure the plastic caps are in place and tight or the possibility of refrigerant leakage could occur.

Step 8 —Compressor Rotation

Be certain that the compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect the service gauges 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 indoor fan (5 ton units only) is probably also rotating in the wrong direction.
2. Turn off power to the unit and tag disconnect.
3. Reverse any two of the unit power leads.
4. Turn on power to the unit and energize 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 makes more noise and does not provide cooling.

Step 9 —Cooling

Set the space thermostat to the OFF position. Set the system selector switch at COOL position and the fan switch at AUTO position. Adjust the thermostat to a setting below room temperature. The compressor starts when contactor closes.

Check cooling effects at a setting below room temperature. Check the unit charge. Refer to Refrigerant Charge section.

Reset the thermostat at a position above room temperature. The compressor will shut off.

To Shut Off Unit - Set the system selector switch at OFF position. Resetting the thermostat at a position above room temperature shuts off the unit temporarily until the space

temperature exceeds the thermostat setting. Units are equipped with a anti-cycle protection device. The unit shuts down on any safety trip and remains off; an indicator light on the thermostat comes on. Check the reason for the safety trip.

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

Step 10 —Heating

To start unit, turn on main power supply.

Set system selector switch at HEAT position and set thermostat at a setting above room temperature. Set fan at AUTO position.

First stage of thermostat energizes the first-stage electric heater elements; second stage energizes second-stage electric heater elements, if installed. Check heating effects at air supply grille(s).

If electric heaters do not energize, reset limit switch (located on evaporator-fan scroll) by pressing button located between terminals on the switch.

TO SHUT OFF UNIT - Set system selector switch at OFF position. Resetting thermostat at a position below room temperature temporarily shuts unit off until space temperature falls below thermostat setting.

Step 11 —Safety Relief

A soft solder joint at the suction line fitting provides pressure relief under abnormal temperature and pressure conditions.

Step 12 —Ventilation (Continuous Fan)

Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation.

Step 13 —Operating Sequence

Cooling - Units Without Economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC), reversing valve solenoid (RVS) and compressor contactor are energized and indoor-fan motor, compressor, and outdoor fan starts. The outdoor fan motor runs continuously while unit is cooling.

Heating - Units Without Economizer

When the thermostat calls for heating, terminal W1 will be energized with 24v. The IFC and heater contactor no. 1 (HC1) are energized.

SERVICE

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death.

When sevicing unit, shut off all electrical power to unit and install lockout tag.

Step 1 —Cleaning

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

Evaporator Coil

1. Turn unit power off, tag disconnect. Remove evaporator coil access panel.
2. If economizer or two-position damper is installed, remove economizer by disconnecting Molex plug and removing mounting screws.
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, back-flush 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 Coil

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 and tag disconnect.
2. Remove top panel screws on condenser end of unit.
3. Remove condenser coil corner post. (See Fig. 10.) To hold top panel open, place coil corner post between top panel and center post. (See Fig. 11.)

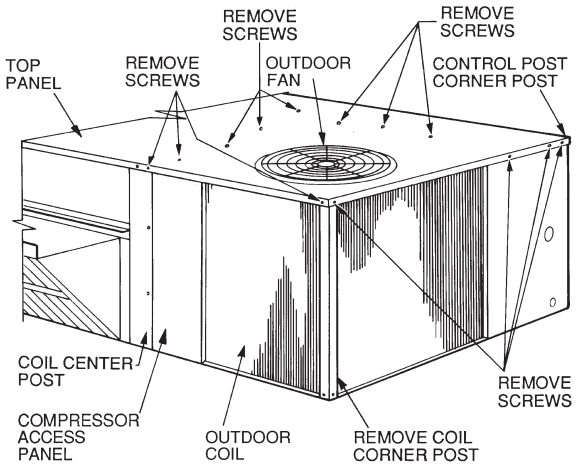


Fig. 10 – Cleaning Condenser Coil

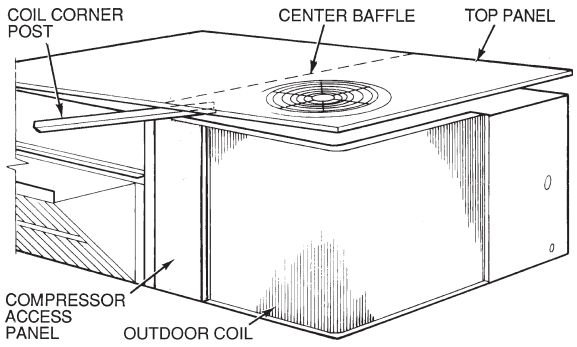


Fig. 11 – Propping Up Top Panel

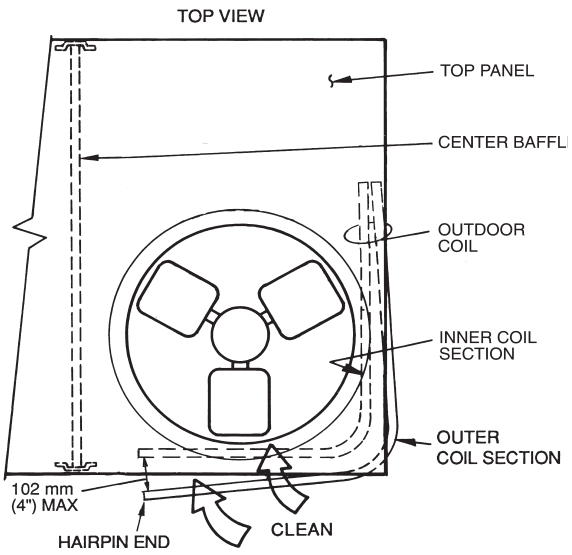


Fig. 12 – Separating Coil Sections

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. 12.)
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. Secure the sections together. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Install the coil corner and center posts. Replace all screws.

Condensate Drain

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

Filters

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

Outdoor-Air Inlet Screen

Clean the screen with steam or hot water and a mild detergent. Do not use disposable filters in place of screens.

Step 2 —Lubrication

Compressor

The compressor is charged with the correct amount of oil at the factory.

Fan Motor Bearings

Fan motor bearings are permanently lubricated. No further lubrication is required. No lubrication of condenser-fan or evaporator-fan motors is required.

Evaporator Fan Belt Adjustment

Inspect evaporator fan belt for wear, proper belt tension, and pulley alignment as conditions require or at the beginning of each heating and air conditioning season.

Step 3 —Refrigerant Charge

Amount of refrigerant charge is listed on unit nameplate (also refer to Table 1). Refer to HVAC Servicing Procedures literature available at your local distributor and the following procedures.

Unit panels must be in place when unit is operating during charging procedure. Unit must operate a minimum of 10 minutes before checking or adjusting refrigerant charge.

No Charge

Use standard evacuating techniques. After evacuating system to 500 microns, weigh in the specified amount of refrigerant. (Refer to Table 1 and unit information plate.)

Low Charge Cooling

Using Cooling Charging Charts, Fig. 13-15, 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 gauge 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. An accurate superheat, thermocouple-type or thermistor-type thermometer, and a gauge manifold are required when using the superheat charging method for evaluating the unit charge. Do not use mercury or small dial-type thermometers because they are not adequate for this type of measurement.

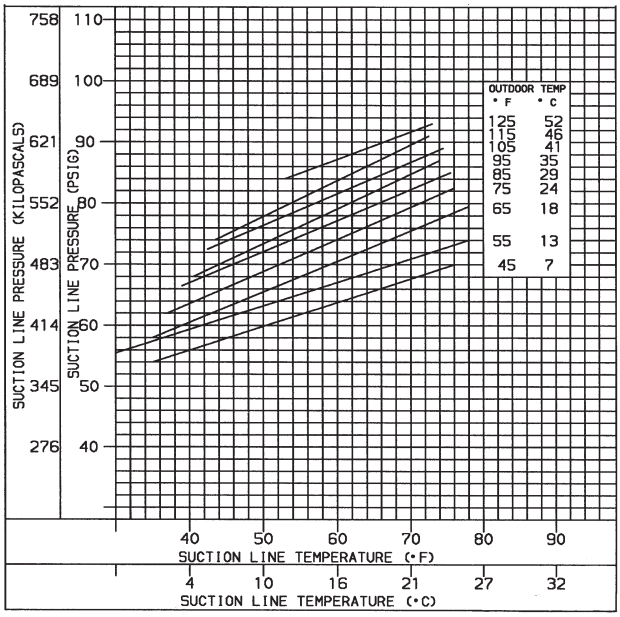


Fig. 13 – Cooling Charging Chart, Standard PAE036

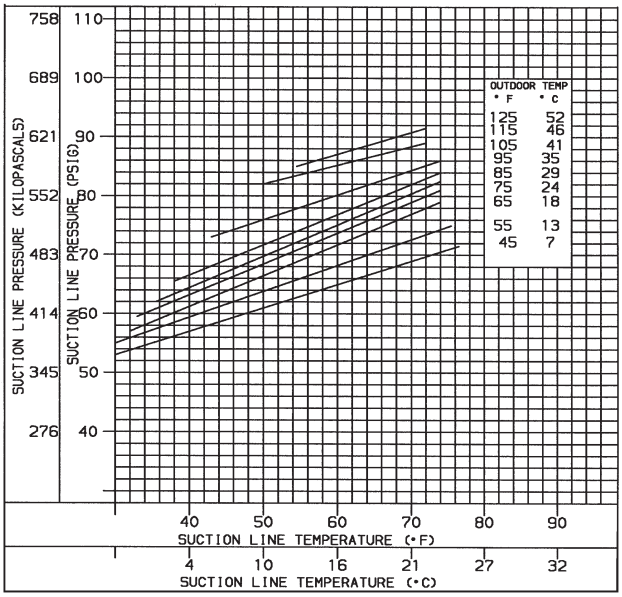


Fig. 14 – Cooling Charging Chart, Standard PAE048

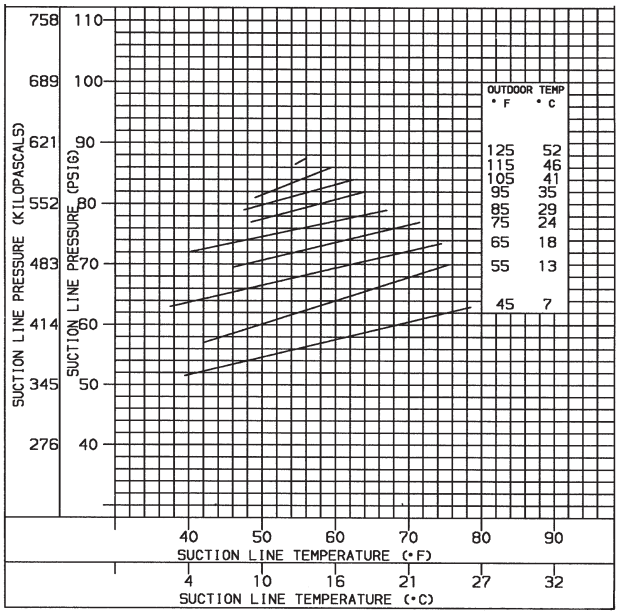


Fig. 15 – Cooling Charging Chart, Standard PAE060

NOTE: When using the charging charts, it is important that only the subcooling/reheat dehumidification coil liquid line solenoid valve be energized. The subcooling/reheat dehumidification coil liquid line solenoid valve MUST be energized to use the charging charts and the outdoor motor speed controller jumpered to run the fan at full speed.

The charts reference a liquid pressure (psig) and temperature at a point between the condenser coil and the subcooling/reheat dehumidification coil. A tap is provided on the unit to measure liquid pressure entering the subcooling/reheat dehumidification coil.

To Use Cooling Charging Chart, Standard Unit

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 recover some of the charge. Recheck the suction pressure as charge is adjusted.

Example:

Outdoor Temperature ..... 75°F

Suction Pressure ..... 70 psig

Suction Temperature should be ..... 48°F

(Suction temperature may vary ± 5°F.)

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

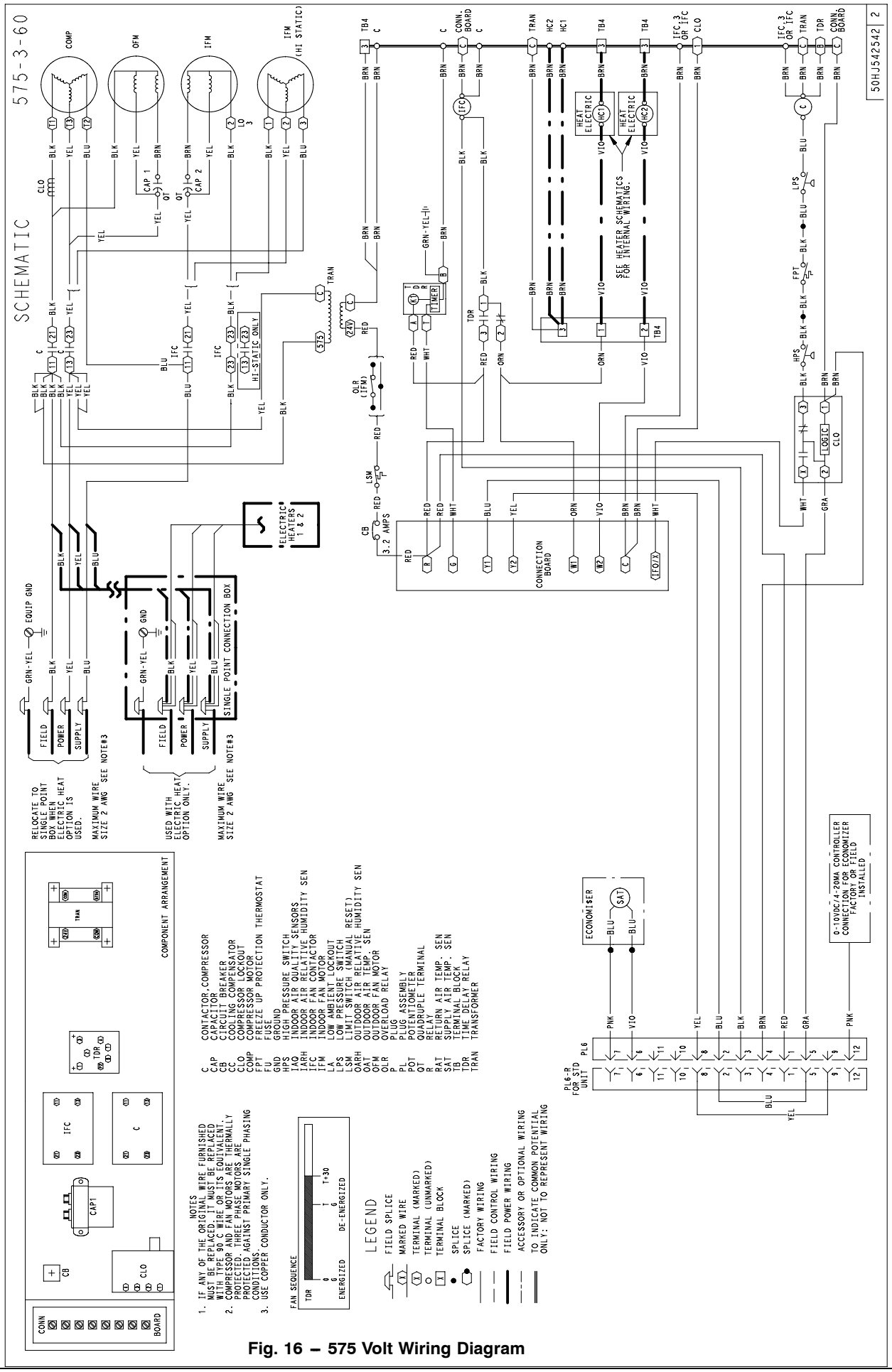


Fig. 16 – 575 Volt Wiring Diagram

Table – 13 Cooling Service Analysis

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, start relay.	Determine cause and replace.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective run/start capacitor, overload, or start relay.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor or capacitor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor Operates Continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Leaking valves in compressor.	Replace compressor.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Compressor valves leaking.	Replace compressor.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High heat load.	Check for source and eliminate.
	Compressor valves leaking.	Replace compressor.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Outdoor ambient below 25 F.	Install low-ambient kit.
Evaporator Fan Will Not Shut Off.	Time off delay not finished.	Wait for 30-second off delay.

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

I. PRELIMINARY INFORMATION

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

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

- ☐ VERIFY THAT JOBSITE VOLTAGE AGREES WITH VOLTAGE LISTED ON RATING PLATE
- ☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ REMOVE ALL SHIPPING HOLDDOWN BOLTS AND BRACKETS PER INSTALLATION INSTRUCTIONS
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT RETURN (INDOOR) AIR FILTERS ARE CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEELS AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND SETSCREW TIGHTNESS
- ☐ CHECK TO ENSURE THAT ELECTRICAL WIRING IS NOT IN CONTACT WITH REFRIGERANT LINES OR SHARP METAL EDGES
- ☐ CHECK PULLEY ALIGNMENT AND BELT TENSION PER INSTALLATION INSTRUCTIONS

III. START-UP

ELECTRICAL

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

TEMPERATURES

OUTDOOR-AIR TEMPERATURE		DB	
RETURN-AIR TEMPERATURE		DB	WB
COOLING SUPPLY AIR		DB	WB

PRESSURES (Cooling Mode)

REFRIGERANT SUCTION		PSIG	F
REFRIGERANT DISCHARGE		PSIG	F

- ☐ VERIFY THAT 3-PHASE FAN MOTOR AND BLOWER ARE ROTATING IN CORRECT DIRECTION. IF THEY ARE NOT ROTATING IN CORRECT DIRECTION, LOCKING COLLAR MUST BE RE-TIGHTENED AFTER CORRECTING DIRECTION OF ROTATION
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS

GENERAL

- ☐ SET ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO MATCH JOB REQUIREMENTS (IF EQUIPPED)