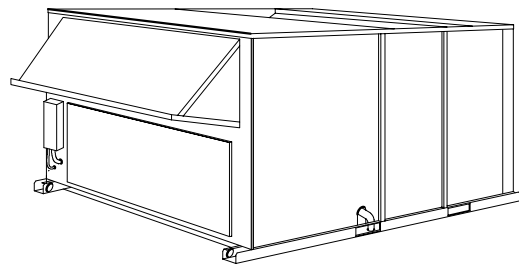


Installation **Instructions**

- **Safety Labeling & Rules**
- **Installation Requirements**
- **Location / Clearances**
- **Wiring**
- **Air Distribution**
- **Ductwork Connections**
- **Start-Up**
- **Maintenance**
- **Hoisting / Rigging**



Models

Three Phase
208-230, 460, & 575 Volt

PAS300H000B	PAE300H000A
PAS300L000B	PAE300L000A
PAS300S000B	PAE300S000A

COMBINATION PACKAGE
ELECTRIC COOLING UNITS

Table of Contents

Safety Labeling and Signal Words	2
Unit Dimensions	4
Safe Installation Requirements	5
Location And Set-up	6
Access Panels	6
Clearances	6-7
Installation	8
Ground Level Installation	8
Rooftop Installation	8
Hoisting	8
Unit Duct Connection	9
Condensate Drain	9
Electrical Wiring	10
Line Voltage Wiring	10
Converting 230V Units to 208V	11
Field Installed Equipment	11
Low Voltage Wiring	11
Low Voltage Wiring With Economizer Option	11
Thermostat	11
Heat Anticipator	11
Final Check	11
Make Outdoor-Air Inlet Adjustments	11
Install Outdoor-Air Hood	12
Air Distribution System	13
Ductwork	13
Ductwork Connections	13
Field Fabricate Ductwork	13
Filters	13
Circulating Blower	14
Determining Blower Speed	14
Circulating Blower Performance Data	16
Adjustable Belt Drive Blower	17
Belt Tension Adjustment	18

Start-up Procedure	19
Blower and Phasing Check	19
Cooling Checks	19
Operation And Maintenance Instructions	20
Starting the Unit After Shutdown	20
Cooling	20
Thermostat Fan Switch Operation	20
Monthly Maintenance and Inspection Checks	20
Air Filters (Factory Installed)	20
Disposable Replacement Filters	20
Condenser Coil	20
Condensate Drain	20
Annual Maintenance and Inspection	20
Circulating Air Blower	20
Evaporator Fan Service and Replacement (25 Ton)	21
Heating Checks When Accessory Electric Heat is Installed	21
Turning Off the Unit	21
Heating	21
Cooling	21
Troubleshooting	22
Trouble Shooting	22
Start-Up Checklist	23
Typical Wiring Diagrams	24
PAS300H	24
PAS300L	25
PAS300S	26
PAE300H,L,S	27

Safety Labeling and Signal Words

Danger, Warning and Caution

The signal words **DANGER**, **WARNING** and **CAUTION** are used to identify levels of hazard seriousness. The signal word **DANGER** is only used on product labels to signify an immediate hazard. The signal words **WARNING** and **CAUTION** will be used on product labels and throughout this manual and other manuals that may apply to the product.

Signal Words

DANGER – Immediate hazards which **WILL** result in severe personal injury or death.

WARNING – Hazards or unsafe practices which **COULD** result in severe personal injury or death.

CAUTION – Hazards or unsafe practices which **MAY** result in minor personal injury or product or property damage.

Signal Words in Manuals

The signal word **WARNING** is used throughout this manual in the following manner:

WARNING

The signal word **CAUTION** is used throughout this manual in the following manner:

CAUTION

Product Labeling

Signal words are used in combination with colors and/or pictures on product labels. Following are examples of product labels with explanations of the colors used.

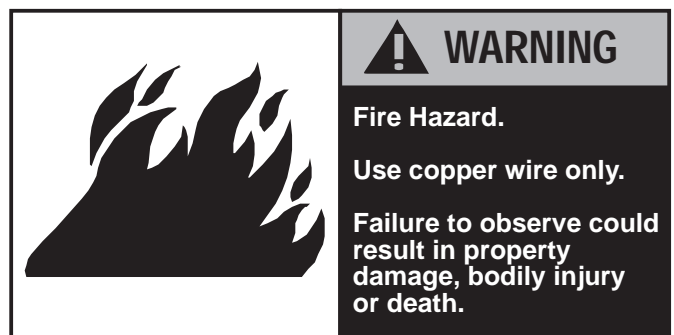
Danger Label

White lettering on a black background except the word **DANGER** which is white with a red background.



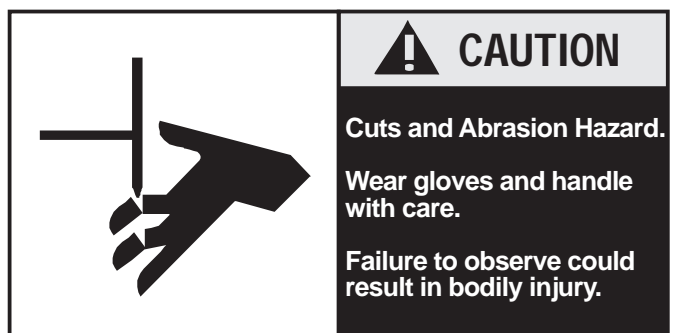
Warning Label

White lettering on a black background except the word **WARNING** which is black with an orange background.



Caution Label

White lettering on a black background except the word **CAUTION** which is black with a yellow background.



BASE UNIT DIMENSIONS - PAS300

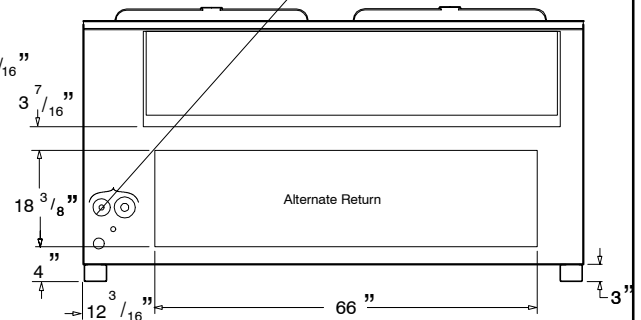
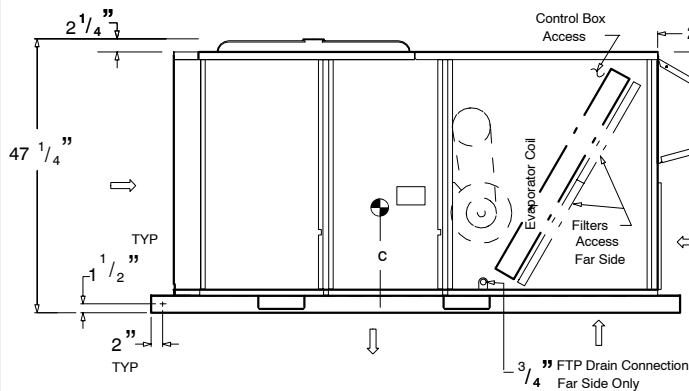
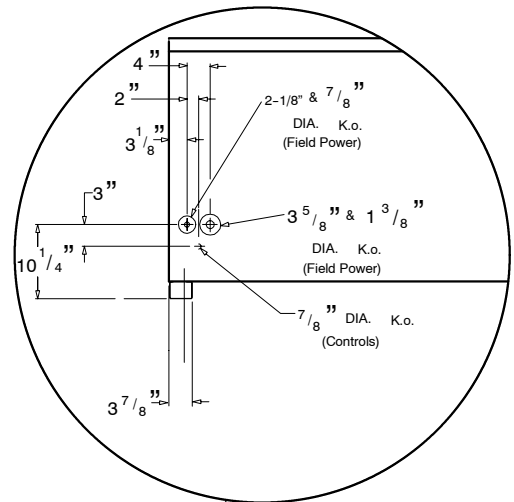
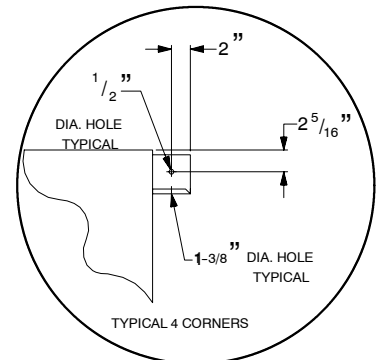
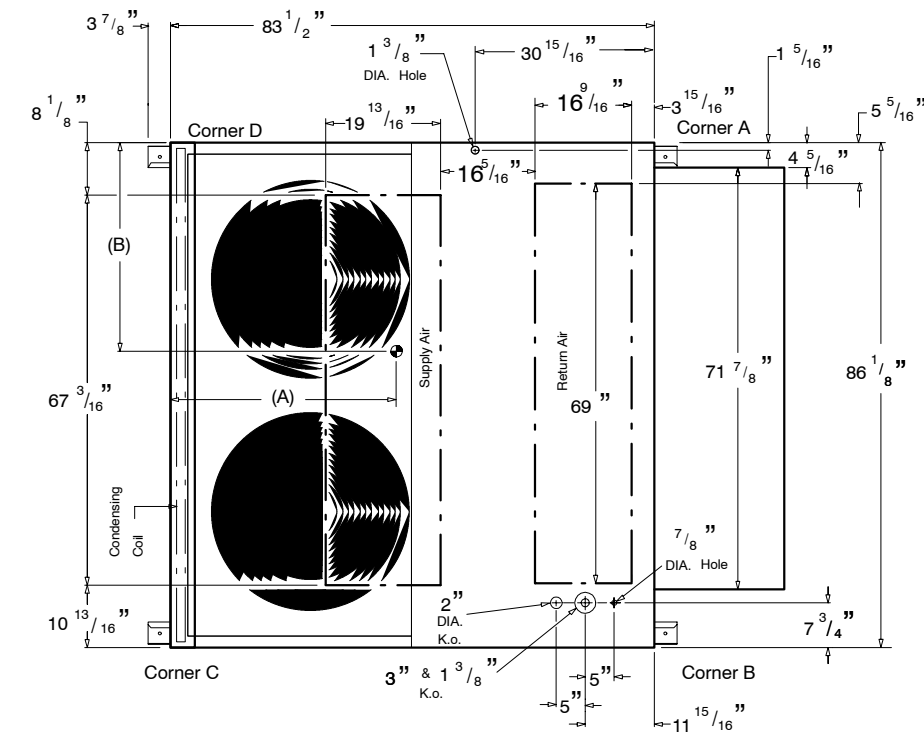
Unit Size	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim A		Dim B		Dim C	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm	inches	mm	inches	mm
PAS300	1850	839	419	190	421	191	503	228	507	230	38	963	43	1090	20	508

NOTES:

1. Dimensions in () are in millimeters.

2. Center of Gravity.

3. Direction of Airflow




38-11-38

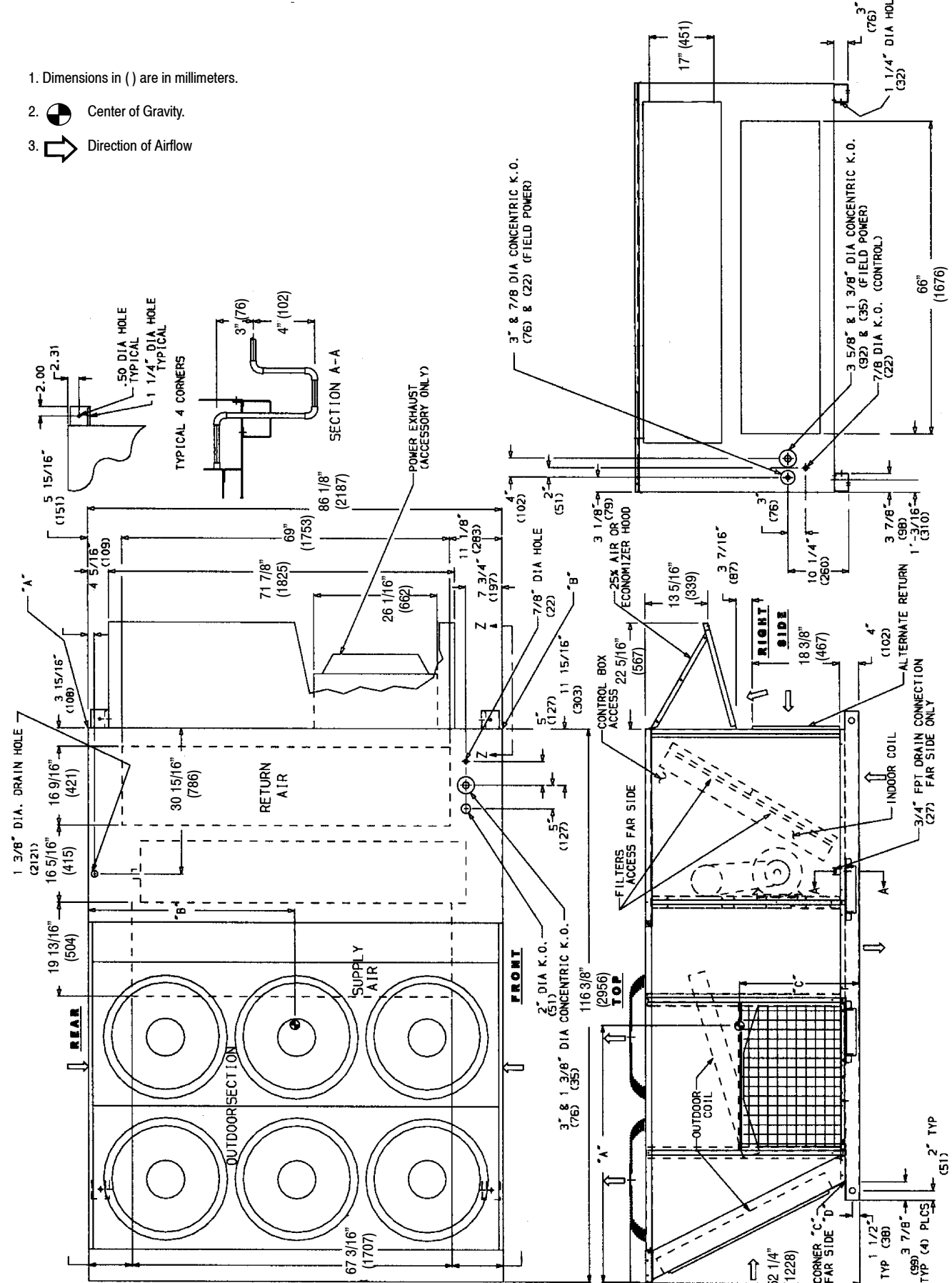
PAE300 UNIT DIMENSIONS

Unit Size	Total Weight		Corner A		Corner B		Corner C		Corner D		Dim A		Dim B		Dim C	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	inches	mm	inches	mm	inches	mm
PAE300	2120	964	497	226	490	223	530	241	553	251	54	1372	43	1099	25	641

1. Dimensions in () are in millimeters.

2.  Center of Gravity.

3.  Direction of Airflow



Safe Installation Requirements

WARNING

FIRE AND EXPLOSION HAZARD

Improper adjustment, alteration, service, maintenance or installation can cause serious injury, death and/or property damage.

Installation or repairs made by unqualified persons could result in hazards to you and others. Installation **MUST** conform with local codes or, in the absence of local codes, with codes of all governmental authorities having jurisdiction.

The information contained in this manual is intended for use by a qualified service agency that is experienced in such work, is familiar with all precautions and safety procedures required in such work, and is equipped with the proper tools and test instruments.

- Installation **MUST** conform to the most current version of the following standards or a superseding standard.

In the United States:

- National Electrical Code ANSI/NFPA 70

In Canada:

- CSA C.22.1 – Canadian Electrical Code Part 1.
- Seal supply and return air ducts.

NOTE: It is the personal responsibility and obligation of the customer to contact a qualified installer to ensure that the installation is adequate and conforms to governing codes and ordinances.

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

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

Location And Set-up

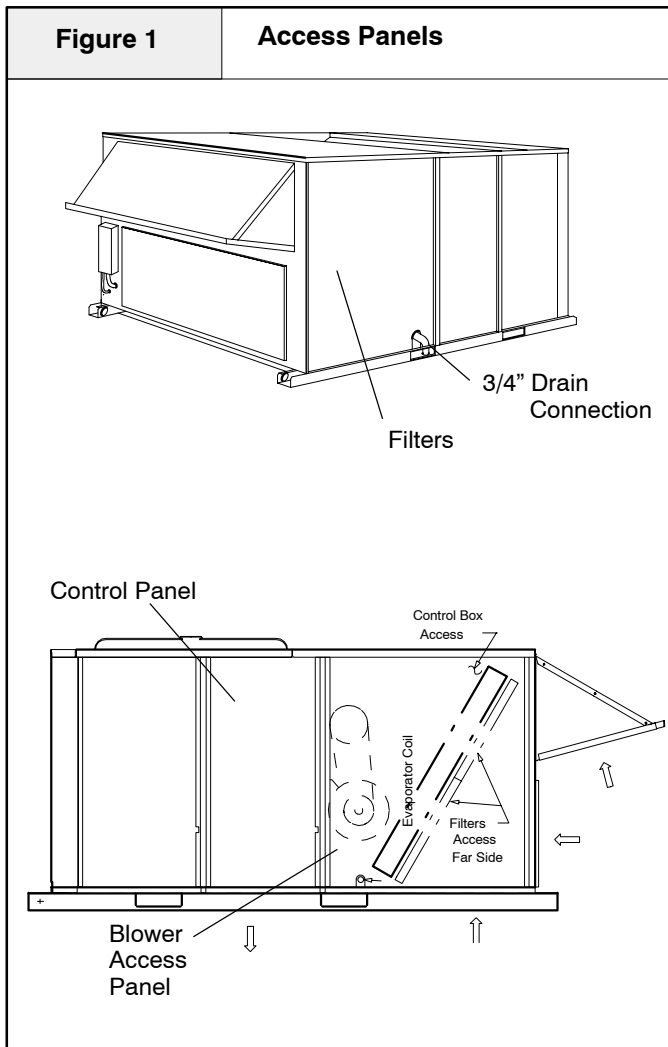
The unit is designed for outdoor installation **ONLY**. The unit may be installed on a level concrete mounting base (or other adequate platform) at ground level or on a flat rooftop with an adequate platform. If using as a downflow model, use a roof curb. Typical installations are shown in **Figure 2**.

Access Panels

CAUTION

Unit will **NOT** operate properly without all access panels in place. Access panels are shown in **Figure 1**.

Unit **MUST NOT** be moved unless all access panels are in place.



Clearances

The location **MUST** allow for minimum clearances and should not be adjacent to an area where the unit's operating sound level might be objectionable.

Minimum clearances, as specified in **Figure 2**, **MUST** be maintained to provide adequate fire protection and room for service personnel. In addition, local codes **MUST** be observed.

Do **NOT** install the unit in a location that will permit discharged air from the condenser to recirculate to the condenser inlet.

CAUTION

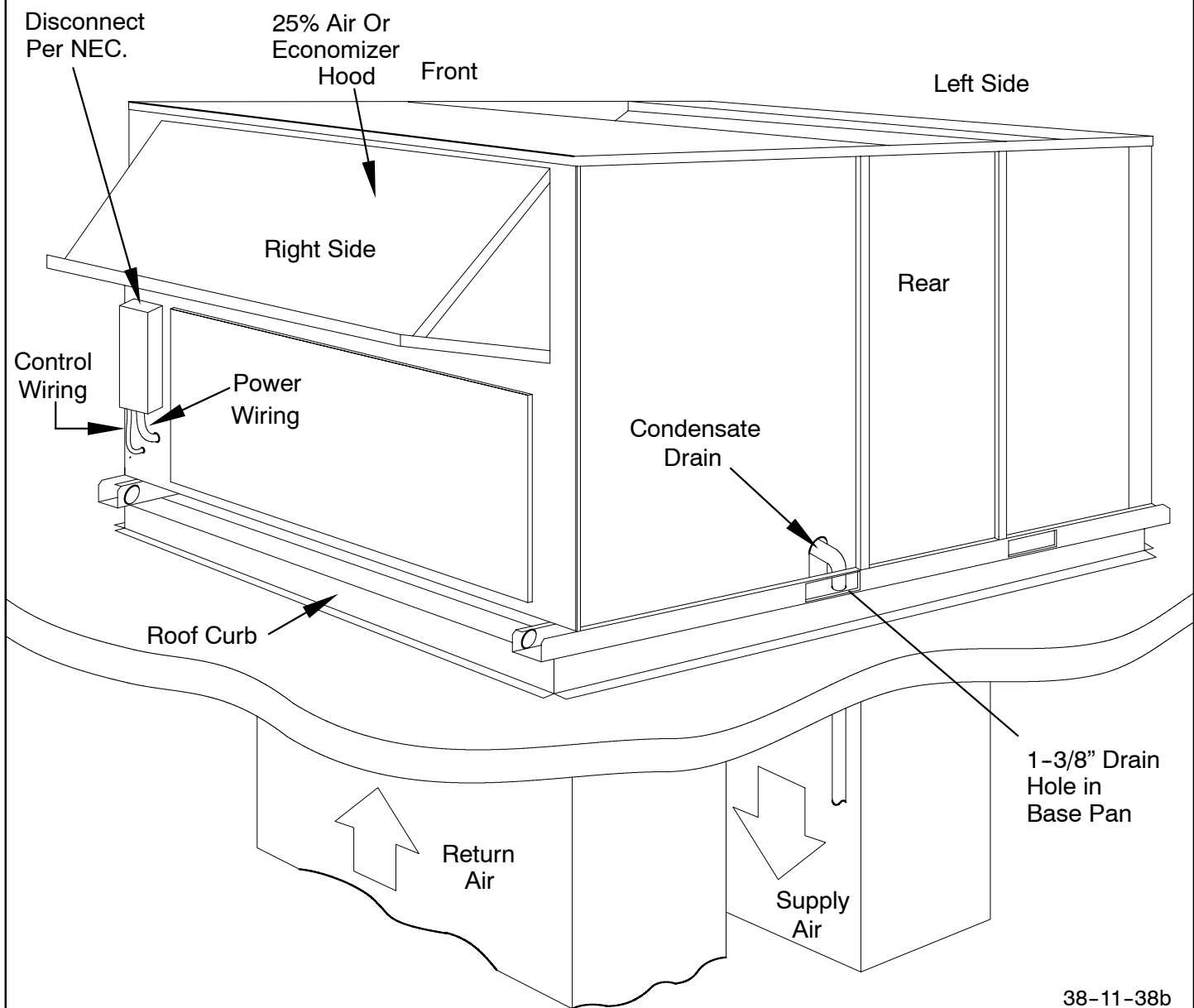
Do **NOT** operate unit in a corrosive atmosphere containing chlorine, fluorine, or any other corrosive chemicals.

⚠ WARNING

DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE HAZARD.

Failure to follow safety warnings could result in serious injury, death, or property damage.

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, supply duct will require 90 degree elbow.

Figure 2**TYPICAL INSTALLATIONS & CLEARANCES**

38-11-38b

CLEARANCES

1. Ductwork to be attached to accessory roof curb only.
2. Minimum clearance:
 - Rear: 7'-0" (2134) for coil removal. This dimension can be reduced to 4'-0" (1219) if conditions permit coil removal from the top.
 - Left side: 4'-0" (1219) for proper condenser coil airflow.
 - Front: 4'-0" (1219) for control box access.
 - Right Side: 4'-0" (1219) for proper operation of damper and power exhaust if so equipped.
 - Top: 6'-0" (1829) to assure proper condenser fan operation.
 - Local Codes jurisdiction may prevail.
3. With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note #2, a removeable fence or barricade requires no clearance.
4. Dimensions are from outside of corner post. Allow 0-5/16" (8) on each side for top cover drip edge.
5. Units with electric heat require a 1 inch clearance for the first 24 inches of ductwork.
6. Outlet grilles must not lie directly below unit discharge.

Installation

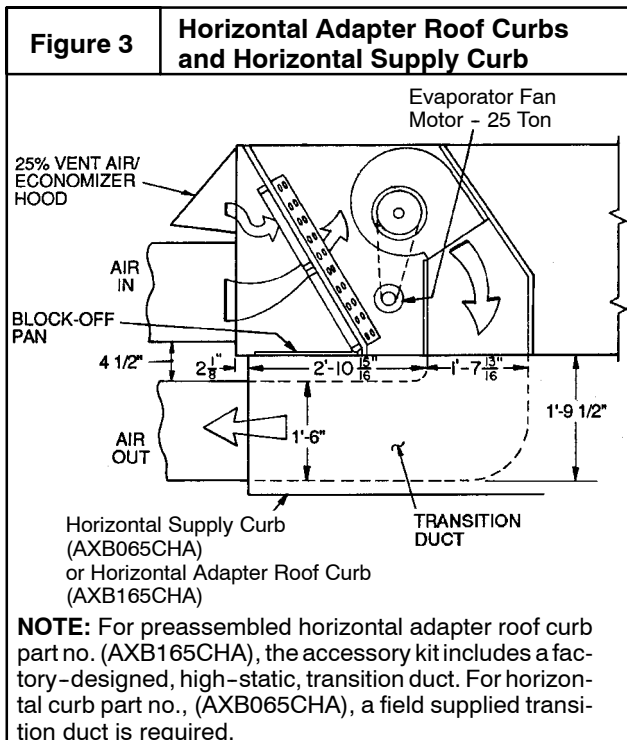
NOTE:

Unit will **NOT** operate properly unless it is installed level front to rear and side to side.

The slope **MUST NOT** be greater than $\frac{1}{16}$ " per foot (10mm per meter). For side to side leveling, the control box side **MUST** always be higher.

Ground Level Installation

ROOF CURB: Assemble and install accessory horizontal adapter roof curb in accordance with instructions shipped with accessory. See Figure 3. Ductwork can be installed to horizontal adapter roof curb before unit is set in place. Adapter roof curb should be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is $\pm \frac{1}{16}$ " per linear foot in any direction. Refer to Accessory Horizontal Adapter Roof Curb Installation Instructions for additional information as required. When accessory horizontal adapter roof curb is used, unit may be installed on class A, B, or C roof covering material.



IMPORTANT: The gasketing of the unit to the roof curb or adapter roof curb is critical for a watertight seal. Improperly applied gasket can also result in air leaks and poor unit performance.

ALTERNATE UNIT SUPPORT: When the curb or adapter cannot be used, install unit on a noncombustible surface. Support unit with sleepers, using unit curb support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Rooftop Installation

- The unit **MUST** be situated to provide safe access for servicing.

- The existing roof structure **MUST** be adequate to support the weight of the unit or the roof **MUST** be reinforced.

Check the weight of the unit in relation to the roof structure and local building codes or ordinances and reinforce roof structure if necessary. See page 3 for unit weights and corner weights.

- Support for the unit **MUST** be level and strong enough to carry unit weight. The support may consist of a platform or a combination of platform and roof beams or curb.

The platform may be constructed of pressure treated wood and may be covered with Class A, B or C roof covering.

- Platform **MUST** allow for proper condensate trap installation and drainage. See associated text for more information about condensate drainage.

NOTE: MAKE SURE DOWNFLOW SUPPLY AND RETURN AIR DUCTS ARE FREE OF OBSTRUCTIONS BEFORE INSTALLING UNIT ON ROOF CURB OR ANY DOWNFLOW APPLICATION. Remove all forklift supports, covers, cardboard, etc., from the downflow return and supply air ducts.

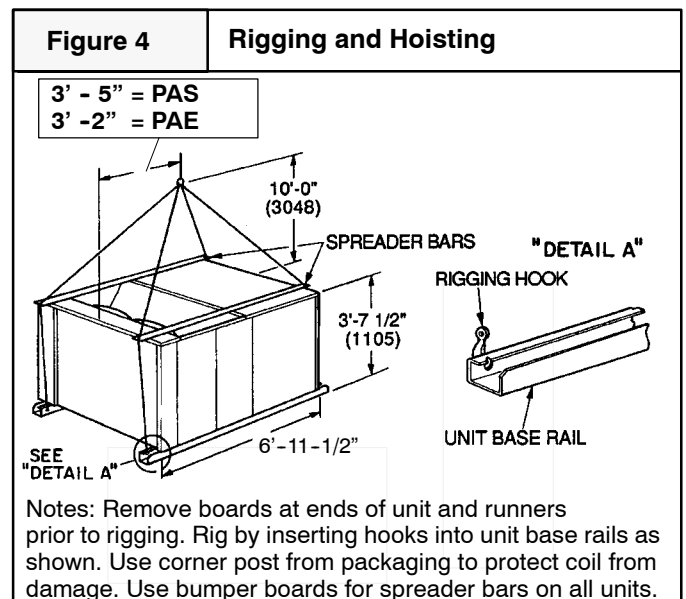
Hoisting

NOTE: All access panels **MUST** be secured in place before hoisting.

The unit should be hoisted with two lifting slings. Attach the slings to rigging shackles that have been hooked through holes in the base rail. See **Figure 4**.

Two spreader bars **MUST** be placed on top of the unit to protect the unit from damage from the pressure exerted by the slings. Make sure that all equipment is adequate to handle the weight of the unit and that the slings will not allow the unit to shift. See **Figure 4**.

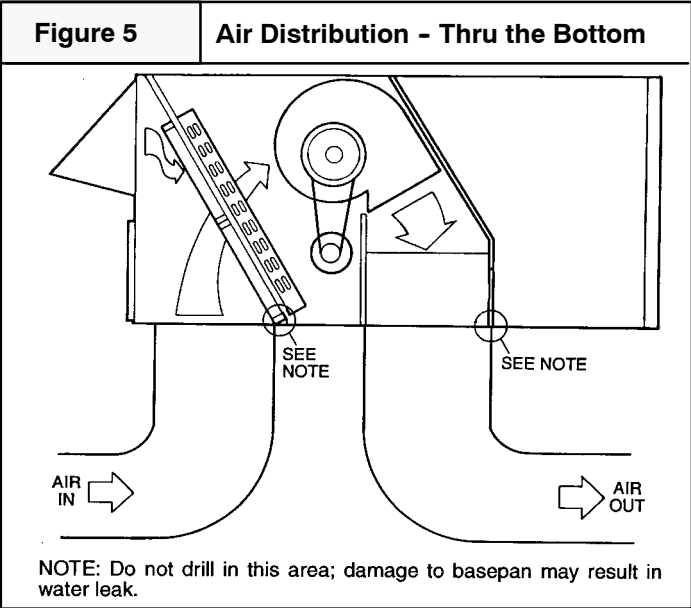
Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright and do not drop. Spreader bars are not required if top crating is left on unit.



Unit Duct Connections

These units are shipped ready for downflow operation but are adaptable to horizontal use. To convert to horizontal operation, refer to Ground Level Installation Section of this manual.

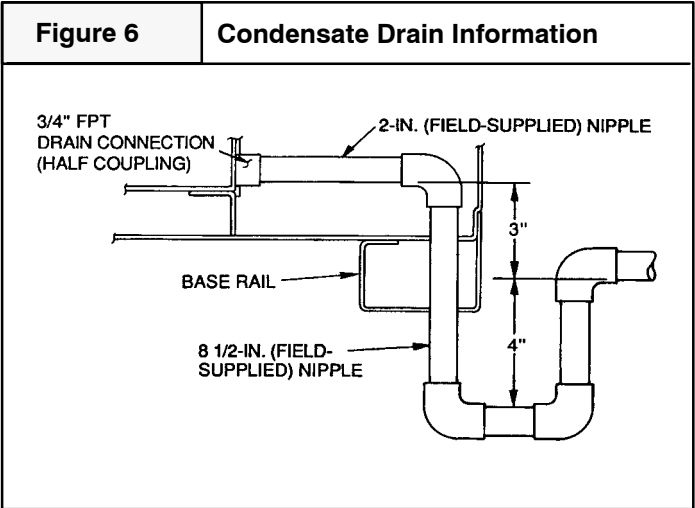
Attach all ductwork to roofcurb and roofcurb basepans. Refer to installation instructions shipped with accessory roof curb for more information.



Condensate Drain

The condensate drain outlet is a 3/4 -in. threaded female connection located inside the evaporator section.

The circulating blower and the condenser fan create a negative pressure on the condensate drain line that will prevent the condensate from draining properly without a trap. To combat this negative pressure, a field supplied condensate trap that will allow a standing column of water of at least 4" **MUST** be installed. Bottom of outlet from trap **MUST** be at least 3" below bottom of outlet from unit. An 8-1/2" x 3/4" diameter and 2" x 3/4" pipe nipple, couple to standard 3/4" diameter elbows, provide a straight path down through hole in unit base rails. **See Figure 6.** A 3/4" drain line **MUST** be installed if required by local codes or if location of unit requires it. Run the drain line to an open drain or other suitable disposal point.



Electrical Wiring

⚠ WARNING

ELECTRICAL SHOCK HAZARD.

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

Shut off electric power at unit disconnect or service panel before making any electrical connections.

Unit **MUST** be grounded to electrical service panel.

NOTE: All electrical work **MUST** conform with the requirements of local codes and ordinances and in the United States the National Electrical Code ANSI/NFPA70 (current edition) and in Canada CSA C.22.1 - Canadian Electrical Code Part 1 (or current edition). Provide line voltage power supply from a separate protected circuit with a disconnect switch (when required) located within sight of the unit. Supply voltage, amperage, wire, fuse and disconnect switch sizes **MUST** conform with specifications on the unit rating plate.

Wiring **MUST** be protected from possible mechanical damage and **MUST NOT** interfere with removal of access panels, filters, etc.

All exposed wiring or connections **MUST** be made with weatherproof cable or wire unless installed in conduit.

Field Power Supply - Unit is factory wired for voltage shown on nameplate.

When installing units, provide a disconnect per NEC (National Electrical code) of adequate size.

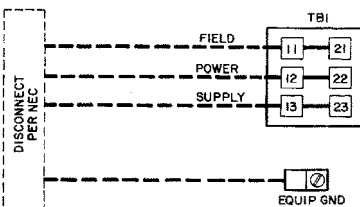
For access to high and low voltage connections, remove the control box access panel. (see **Figure 1**).

Line Voltage Wiring

Route power ground lines through control box end panel or unit basepan and to connections as shown on unit wiring diagram.

Do **NOT** complete line voltage connections until unit is permanently grounded. All line voltage connections and the ground connection **MUST** be made with copper wire.

Figure 7 Typical Wiring Connections

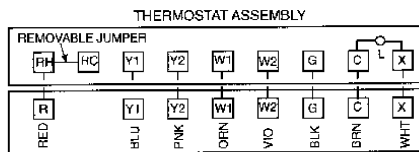


NOTE: The maximum wire size for TBI is 2/0.

LEGEND

EQUIP — Equipment
GND — Ground
NEC — National Electrical Code
TB — Terminal Block

Field Power Wiring Connections



Field Control Thermostat Wiring



CAUTION

RISK OF REDUCED COMPRESSOR LIFE

Failure to follow these Caution may result in premature compressor failure.

The correct power phasing is critical in the operation of the scroll compressors. An incorrect phasing will cause the compressor to rotate in the wrong direction

Converting 230V Units to 208V

Field wiring must confirm to temperature limitations for type 'T' wire. All field wiring must comply with NEC and local requirements.

Transformer # 1 is wired for 230-v unit. IF 208/230-v unit is to be run with 208-v power supply, the transformer must be rewired as follows:

1. Remove cap from red (208 v) wire.
2. Remove cap from orange (230 v) spliced wire.
3. Replace orange wire with red wire.
4. Recap both wires.

IMPORTANT: BE CERTAIN UNUSED WIRES ARE CAPPED. Failure to do so may damage the transformers.

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3 phase units, voltages between phases must be balanced within 2%.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

Field Installed Equipment

All wiring done in the field between the unit and other devices, or between separate devices that are field installed and located, **MUST** not exceed the temperature limitations for type T wire and **MUST** be installed according to the manufacturer's instructions for the devices.

Low Voltage Wiring

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum), for 50-75 ft. runs, 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 at the thermostat and will require a junction box and splice at the thermostat.

Low Voltage Wiring With Economizer Option

The economizer electrical harness taps into **Y1** and **Y2** on the low voltage terminal board. Low voltage wires from the thermostat are connected to **Y1** and **Y2** with or without an economizer.

Thermostat

The thermostat **MUST** be a field supplied 2 stage cooling, 2 stage heating thermostat.

The location of the thermostat has an important effect on the operation of the unit. **FOLLOW THE INSTRUCTIONS INCLUDED WITH THE THERMOSTAT FOR CORRECT LOCATION, MOUNTING AND WIRING.**

Heat Anticipator

Unit Size	Unit Voltages	kW*	Stage 1	Stage 2
25 Ton	208/230-3-60	26 / 34	.40	.66
		42 / 56	.66	.40
		56 / 75	.66	.66
	460-3-60	32	.40	.40
		55	.40	.66
		80	.66	.66

* Heater kW is based on heater voltage of 240v, and 480v.

Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

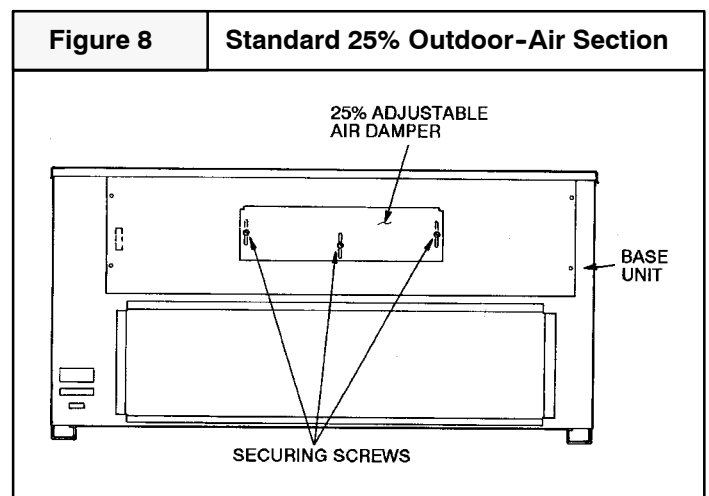
Final Check

Make a final wiring check to be sure system is correctly wired. Inspect field installed wiring and the routing to ensure that rubbing or chafing due to vibration will not occur.

Make Outdoor-Air Inlet Adjustments

All units have a manual outdoor-air damper to provide ventilation air.

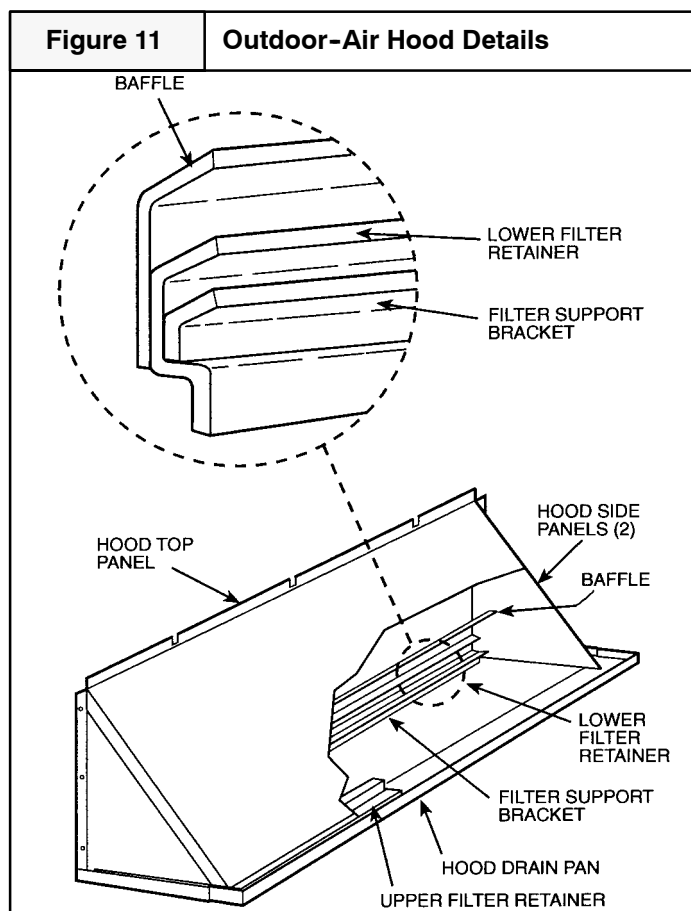
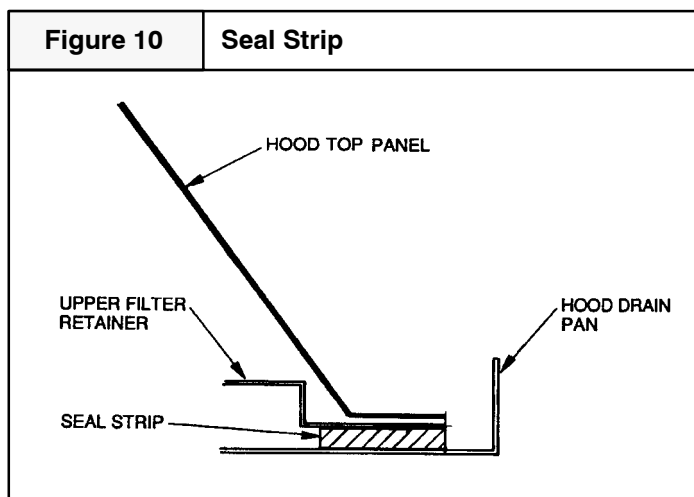
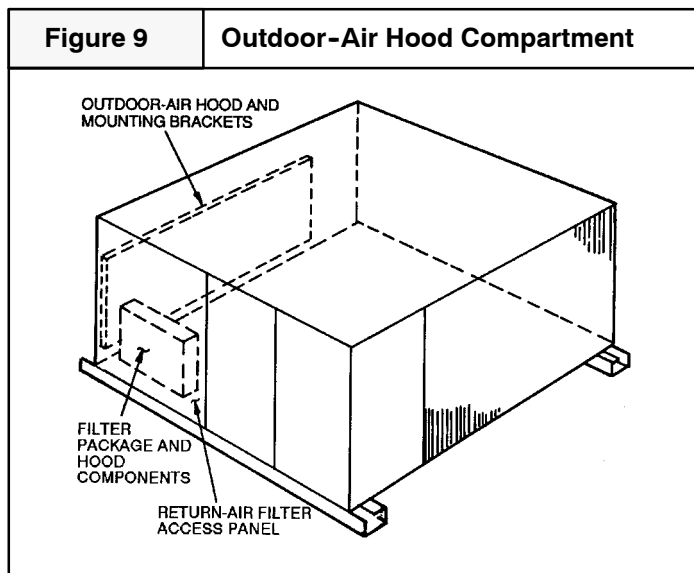
Damper can be reset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move damper to desired setting, then retighten screws to secure damper. **See Figure 8.**



Install Outdoor-Air Hood

NOTE: The hood top panel, upper and lower filter retainers, hood drain pan, baffle and filter support bracket are secured opposite the condenser end of the unit. The screens, hood side panels, remaining section of filter support bracket, seal strip, and hardware are in a package located inside the return-air filter access panel. **See Figure 9.**

1. Attach seal strip to upper filter retainer. **See Figure 10.**
2. Assemble hood top panel, side panels, upper filter retainer, and drain pan. **See Figure 11.**



3. Secure lower filter retainer and support bracket to unit. **See Figure 11.** Leave screws loose.
4. Slide baffle behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for top panel of base unit located above outdoor-air inlet opening, and remove screws for hood side panels located on the sides of the outdoor-air inlet opening.
6. Match notches in hood top panel to unit top panel screws. Insert hood flange between top panel flange and unit. Tighten screws.
7. Hold hood side panel flanges flat against unit, and install screws removed in Step 5.
8. Insert outdoor-air inlet screens and spacer in channel created by lower filter retainer and filter support bracket.
9. Attach remaining section of filter support bracket.

Air Distribution System

Ductwork

NOTE: The total heat loss from the structure as expressed in total Btu/hr **MUST** be calculated by manufacturer's method or in accordance with "A.S.H.R.A.E. Guide" or "Manual N - Load Calculations" published by the Air Conditioning Contractors of America or in Canada H.R.A.I. "Manual N". The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures, steady state efficiency times input.

Ductwork, supply registers, and return air grilles **MUST** be designed and sized to handle the greater of the units heating or cooling air volume requirements. If the unit is connected to an existing system, the ductwork **MUST** be checked to make sure it is adequate. Extra runs or larger duct sizes may have to be installed. **Use only non-combustible type insulation on supply plenum or supply ductwork within 6 feet of unit.**

Maximum recommended velocity in trunk ducts is 1000 feet per minute (5.08 m/s). Velocity in branches should not exceed 800 feet per minute (4.06 m/s).

Ductwork installed outdoors should have a minimum of 2" (50.8mm) of fiberglass insulation and a weatherproof vapor barrier. It should also be protected against damage. Caulk and flashing, or other means adequate to provide a permanent weather seal should be used.

Ductwork installed in attics or other areas exposed to outside temperatures should be installed with a minimum of 2" (50.8mm) fiberglass insulation and have an indoor type vapor barrier.

Ductwork Connections

The use of flexible, **non-combustible** connectors between main trunk ducts and supply and return air plenums is recommended to minimize vibration transmission. Attach all ductwork to roof curb and roof curb basepans.

Field Fabricate Ductwork

⚠ WARNING

DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE HAZARD.

Failure to follow safety warnings could result in serious injury, death, or property damage.

For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, supply duct will require 90 degree elbow.

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

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

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

FOR PAE300 UNITS WITH ELECTRIC HEAT: A one inch clearance is required for the first 24 inches of ductwork.

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

Filters

NOTE:

Do NOT operate the unit without all filters in place.

All air **MUST** pass through a filter before entering the unit. Electronic air cleaner, optional filter racks, or other accessible filter arrangements **MUST** be installed in the return air ductwork.

NOTE: If the unit has an economizer or any other type of outdoor air damper, disposable filters **MUST** be used in the internal filter racks.

For all units: 4 filters 20" x 20" x 2"

4 filters 16" x 20" x 2"

Circulating Blower

Determining Blower Speed

1. From the system design, determine the external static pressure (ESP) for the supply ducts, return ducts and registers, diffusers, grilles, dampers, heaters and special filters (if any).
2. If unit is to be set up in cooling mode, add .08" W.C. (20 Pa) for wet coil operation to the total ESP determined in Step 1.
3. For static additions due to installation of an economizer or manual air dampers, add .05 inches to ESP.
4. From the system design, determine the desired airflow in CFM (L/s). See **Figure 12** for CFM to L/s conversion table.
5. To determine the blower speed necessary to obtain the desired CFM (L/s), see the Circulating Blower Performance Data for the unit located on the pages that immediately follow.
6. Determine the blower RPM's needed to obtain the desired CFM (L/s).
7. Compare required RPM to unit's factory setting for blower RPM (see Blower Performance Tables). If different from the RPM your installation requires, the blower speed will need to be changed.
8. Following the circulating Blower Performance Data table is a table that shows how many turns open the adjustable blower motor pulley needs to be to obtain the required RPM.
9. To change the blower speed, see pages 17 and 18 .

Figure 12		Metric Conversions: Cubic Feet per Minute (CFM) to Liters per Second (L/s); Inches of Water Column (In. W.C.) to Pascals (Pa)													
CFM	L/s	CFM	L/s	CFM	L/s	In. W.C.	Pa	In. W.C.	Pa	In. W.C.	Pa	In. W.C.	Pa	In. W.C.	Pa
6000	2831	8050	3799	10100	4767	0.01	2	0.51	127	1.01	251	1.51	376	2.01	501
6050	2855	8100	3823	10150	4790	0.02	5	0.52	130	1.02	254	1.52	379	2.02	503
6100	2879	8150	3846	10200	4814	0.03	7	0.53	132	1.03	257	1.53	381	2.03	506
6150	2902	8200	3870	10250	4837	0.04	10	0.54	135	1.04	259	1.54	384	2.04	508
6200	2926	8250	3894	10300	4861	0.05	12	0.55	137	1.05	262	1.55	386	2.05	511
6250	2949	8300	3917	10350	4885	0.06	15	0.56	139	1.06	264	1.56	389	2.06	513
6300	2973	8350	3941	10400	4908	0.07	17	0.57	142	1.07	267	1.57	391	2.07	516
6350	2997	8400	3964	10450	4932	0.08	20	0.58	144	1.08	269	1.58	394	2.08	518
6400	3020	8450	3988	10500	4955	0.09	22	0.59	147	1.09	271	1.59	396	2.09	521
6450	3044	8500	4012	10550	4979	0.10	25	0.60	149	1.10	274	1.60	399	2.10	523
6500	3067	8550	4035	10600	5003	0.11	27	0.61	152	1.11	276	1.61	401	2.11	526
6550	3091	8600	4059	10650	5026	0.12	30	0.62	154	1.12	279	1.62	404	2.12	528
6600	3115	8650	4082	10700	5049	0.13	32	0.63	157	1.13	281	1.63	406	2.13	531
6650	3138	8700	4106	10750	5073	0.14	35	0.64	159	1.14	284	1.64	408	2.14	533
6700	3162	8750	4130	10800	5097	0.15	37	0.65	162	1.15	286	1.65	411	2.15	536
6750	3185	8800	4153	10850	5121	0.16	40	0.66	164	1.16	289	1.66	413	2.16	538
6800	3209	8850	4177	10900	5144	0.17	42	0.67	167	1.17	291	1.67	416	2.17	541
6850	3233	8900	4200	10950	5168	0.18	45	0.68	169	1.18	294	1.68	418	2.18	543
6900	3256	8950	4224	11000	5191	0.19	47	0.69	172	1.19	296	1.69	421	2.19	545
6950	3280	9000	4248	11050	5215	0.20	50	0.70	174	1.20	299	1.70	423	2.20	548
7000	3303	9050	4271	11100	5239	0.21	52	0.71	177	1.21	301	1.71	426	2.21	550
7050	3327	9100	4281	11150	5262	0.22	55	0.72	179	1.22	304	1.72	428	2.22	553
7100	3350	9150	4318	11200	5286	0.23	57	0.73	182	1.23	306	1.73	431	2.23	555
7150	3374	9200	4342	11250	5309	0.24	60	0.74	184	1.24	309	1.74	433	2.24	558
7200	3398	9250	4366	11300	5333	0.25	62	0.75	187	1.25	311	1.75	436	2.25	560
7250	3421	9300	4389	11350	5357	0.26	65	0.76	189	1.26	314	1.76	438	2.26	563
7300	3445	9350	4413	11400	5380	0.27	67	0.77	192	1.27	316	1.77	441	2.27	565
7350	3468	9400	4436	11450	5404	0.28	70	0.78	194	1.28	319	1.78	443	2.28	568
7400	3492	9450	4460	11500	5427	0.29	72	0.79	197	1.29	321	1.79	446	2.29	570
7450	3516	9500	4484	11550	5451	0.30	75	0.80	199	1.30	324	1.80	448	2.30	573
7500	3539	9550	4507	11600	5475	0.31	77	0.81	202	1.31	326	1.81	451	2.31	575
7550	3563	9600	4531	11650	5498	0.32	80	0.82	204	1.32	329	1.82	453	2.32	578
7600	3587	9650	4554	11700	5521	0.33	82	0.83	207	1.33	331	1.83	456	2.33	580
7650	3610	9700	4578	11750	5545	0.34	85	0.84	209	1.34	334	1.84	458	2.34	583
7700	3634	9750	4601	11800	5569	0.35	87	0.85	212	1.35	336	1.85	461	2.35	585
7750	3658	9800	4625	11850	5596	0.36	90	0.86	214	1.36	339	1.86	463	2.36	588
7800	3681	9850	4649	11900	5616	0.37	92	0.87	217	1.37	341	1.87	466	2.37	590
7850	3705	9900	4672	11950	5640	0.38	95	0.88	219	1.38	344	1.88	468	2.38	593
7900	3728	9950	4696	12000	5663	0.39	97	0.89	222	1.39	346	1.89	471	2.39	595
7950	3752	10000	4719	12050	5687	0.40	100	0.90	224	1.40	349	1.90	473	2.40	598
8000	3776	10050	4743	12100	5711	0.41	102	0.91	227	1.41	351	1.91	476	2.41	600
						0.42	105	0.92	229	1.42	354	1.92	478	2.42	603
						0.43	107	0.93	232	1.43	356	1.93	481	2.43	605
						0.44	110	0.94	234	1.44	359	1.94	483	2.44	608
						0.45	112	0.95	237	1.45	361	1.95	486	2.45	610
						0.46	115	0.96	239	1.46	364	1.96	488	2.46	613
						0.47	117	0.97	242	1.47	366	1.97	491	2.47	615
						0.48	120	0.98	244	1.48	369	1.98	493	2.48	618
						0.49	122	0.99	247	1.49	371	1.99	496	2.49	620
						0.50	125	1.00	249	1.50	374	2.00	498	2.50	623

Performance Data

CIRCULATING BLOWER PERFORMANCE - PAS/E300 (10.0 HP Standard Motor)																		
CFM	External Static Pressure in Inches Water Column - Dry coil With Filter																	
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
7000	845	2693	909	2979	969	3272	1028	3574	1083	3883	1137	4200	1189	4524	1239	4854	1288	5191
7500	896	3156	956	3450	1014	3752	1069	4060	1123	4375	1174	4698	1224	5026	1272	5362	1320	5703
8000	948	3667	1005	3969	1060	4278	1112	4593	1163	4915	1213	5243	1261	5577	1307	5917	1353	6263
8500	1001	4226	1054	4537	1106	4853	1156	5175	1205	5504	1253	5838	1299	6177	1344	6523	1388	6873
9000	1053	4836	1104	5155	1154	5478	1202	5808	1248	6142	1294	6483	1338	6828	1382	7179	1424	7534
9500	1106	5498	1155	5824	1202	6155	1248	6492	1293	6833	1336	7179	1379	7530	1421	7887	1462	8247
10000	1159	6214	1206	6547	1251	6886	1295	7229	1338	7577	1380	7929	1421	8286	1461	8648	1501	9014
10500	1213	6984	1257	7325	1300	7671	1342	8020	1384	8375	1424	8733	1464	9096	1503	9464	1541	9835
11000	1266	7810	1309	8159	1350	8511	1391	8868	1431	9229	1470	9594	1508	9963	1546	10336	-	-
11250	1293	8245	1334	8597	1375	8953	1415	9313	1454	9677	1493	10045	1530	10417	-	-	-	-

NOTES:

1. Maximum total motor watts is 9510 for standard 10.0 HP.
2. Maximum blower wheel speed is 1550 rpm.
3. Motor drive ranges is 1066 - 1283 rpm.
4. Airflow data based on dry coil with filters. Deduct 0.08 inches for wet coil performance.

AIR QUANTITY UNITS		
Unit Size	Minimum CFM	Maximum CFM
PAS/E300	7,000	11,250

EVAPORATOR MOTOR EFFICIENCY	
Unit Size	Motor Efficiency (%)
PAS/E300 -10 HP	89.5

OUTDOOR SOUND POWER										
UNIT	SOUND RATING (60Hz)	A - Weighted (db)	OCTAVE BANDS							
			63	125	250	500	1000	2000	4000	8000
PAS/E300	9.4 Bels	94.1	98.7	92.3	93.8	90.9	89.6	85.9	80.3	74.3

Bels - Sound Levels (1 bel = 10 decibels).

FAN RPM AT MOTOR PULLEY SETTINGS *													
UNIT	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
PAS/E300	**	**	1283	1269	1247	1225	1203	1182	1160	1138	1116	1095	1066

* Approximate fan rpm shown.

** Due to belt and pulley size, pulley cannot be set to this number of turns open.

EVAPORATOR FAN MOTOR PERFORMANCE					
UNIT	Unit Voltage	Maximum Acceptable Continuous BHP*	Maximum Acceptable Continuous BkW*	Maximum Acceptable Operating Watts	Maximum Amp Draw
PAS/E300	208/230	10.20	7.61	9510	28.0
	460	11.80	8.80	11000	14.6

Bhp - Brake Horsepower.

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

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

Adjustable Belt Drive Blower

⚠ WARNING

PERSONAL INJURY HAZARD.

Failure to do so could result in personal injury.

Use extreme care during the following procedures and obey Safety Information.

The following safety rules **MUST** always be followed when working near belt drive.

Always Turn The Power Off

Turn electric power to the unit **OFF** before you begin working on it.

Always Wear Protective Clothing

NEVER wear loose or bulky clothes, such as neckties, exposed shirttails, loose sleeves, or lab coats around belt drives. Wear gloves while inspecting sheaves to avoid nicks, burrs, or sharply worn pulley edges.

The blower speed is changed by adjusting the variable speed pulley mounted on the blower motor.

NOTE for 25 Ton: A 3-1/2" bolt and threaded plate are included in the installer's packet. They can be added to the motor support channel below the motor mounting plate to aid in raising the fan motor.

If the blower speed needed is different than the speed of the blower as shipped, follow the steps below to change the blower speed. Before changing the blower speed, read the above safety rules first.

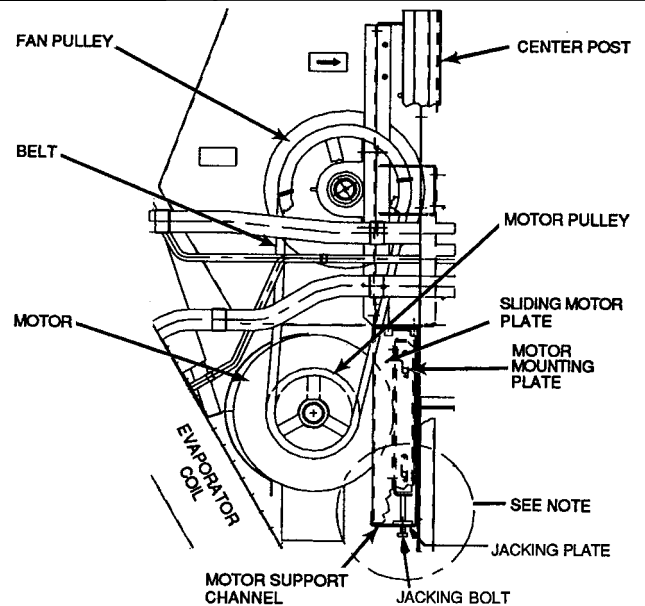
1. Turn electric power **OFF**.
2. Remove the side blower access panel (see **Figure 1**).
3. **25 Ton Only** - Loosen nuts on the 2 carriage bolts in the motor mounting base. Install jacking bolt and plate under motor base (bolt and plate are shipped in installer's packet). Using bolt and plate, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts. See **Figure 13**.
4. Loosen movable-pulley flange setscrew. See page 16 for air quantity limits.
5. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. In-

creasing fan speed increases load on motor. Do not exceed maximum speed specified in the performance data listed in this instruction.

6. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table on page 16 for speed change for each full turn of pulley flange.)
7. Replace and tighten belts. See Belt Tension Adjustment section on page 18.

Figure 13

25 Ton Evaporator Fan Motor Adjustment



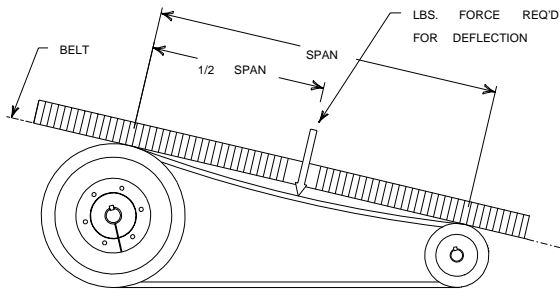
NOTE: A 3-1/2" jacking bolt (1171103) and threaded jacking plate (1171400) are included in the unit's base pan. They should be added to the motor support channel below the motor mounting plate to aid in raising the motor.

Belt Tension Adjustment

Figure 14

Checking Tension and Deflection

PAS/E300 - 3/8" deflection with 8-10 lbs. of force.



1. Turn motor adjustment bolt clockwise until the belt has enough tension at the proper deflection. Use one of the commercially available belt tension gauges to set the correct tension at the proper deflection (see **Figure 14 & 15**).
2. Use a straight-edge (angle iron, straight piece of board or anything with a good straight surface or edge) to check the alignment of the blower pulley with blower motor pulley (see **Figure 15**).

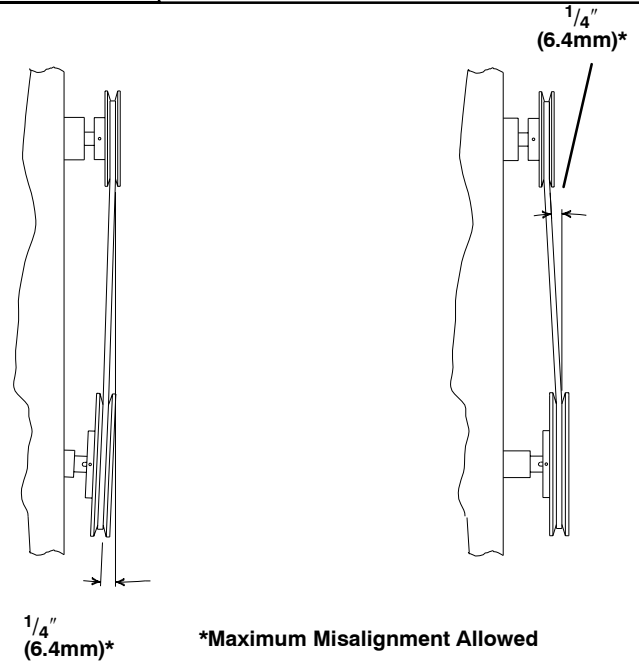
It may be necessary to back the tension off the belt temporarily and tighten one of the motor mount bolts before it is possible to adjust the angle of the blower motor.

3. Tighten all blower motor mount bolts.
4. Ensure that all bolts, nuts and screws are tightened and ensure that all tools, gloves, etc. are removed from unit.
5. Replace side blower access panel before Start-up.

6. During Start-up, listen for any unusual noises or vibrations.
7. Shut down the unit after it runs for a while and check the bearings and motor. If they feel hot, the belt tension may be too tight, bearings may be misaligned or not lubricated correctly, etc.
8. It is a good idea to retension a new belt after a run-in period of about 24 hours. A run-in period of overnight or during a lunch break is better than no run-in period at all.

Figure 15

Checking Pulley Alignment



***Maximum Misalignment Allowed**

Start-up Procedure



WARNING

ELECTRICAL SHOCK, FIRE AND/OR EXPLOSION HAZARD.

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

Use extreme care during all of the following checks and procedures. Make sure Electric Power is turned OFF as instructed in appropriate steps.

Check the unit's operation as outlined in the following instructions.

Blower and Phasing Check

1. Shut **OFF** electric power at unit disconnect.
2. Check to see that clean, properly sized air filters are installed.
3. Check to see that everything inside the unit is clear and ready to operate safely. Ensure that there are no objects in, on or around the motor, belt or blower wheel.
4. Set thermostat Heat-Cool selector to **OFF**.
5. Set thermostat fan switch to **AUTO**.



WARNING

MOVING PARTS HAZARD.

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

Do NOT put hands or any other object in, on or around the motor, belt or blower wheel. Ensure that there are no objects in, on or around the motor, belt or blower wheel before turning electric power on.

6. Turn **ON** electric power. Nothing should start running. If any unusual arcing, odors or noises are encountered, shut **OFF** electric power immediately and check for wiring errors.

NOTE: The circulation blower motor and compressor(s) are three phase and are factory synchronized for proper rotation. *Even if the circulation blower motor comes on and air seems to be circulating, it is possible that the blower motor rotation is incorrect due to improper phasing.* The scroll compressor(s) (if equipped) will run backwards under this condition and be damaged. It is therefore necessary to check for proper rotation.

NOTE: Do NOT operate the unit with the compressor(s) running until proper blower rotation has been confirmed by running the following test.

7. Set thermostat fan switch to **ON**. The circulating air blower should come **ON**.

8. Shut **OFF** electric power at unit disconnect and visually observe the direction of the blower rotation as it slows down. Do **NOT** put hands or any other object in, on or around the belt, motor or blower wheel.



CAUTION

RISK OF REDUCED EQUIPMENT LIFE

Failure to follow this Caution could result in premature equipment failure.

If blower rotation is incorrect, shut electric power **OFF** at unit disconnect and reverse any two supply wires at field connections **ONLY**. Do **NOT** reverse the blower and/or compressor leads or rewire any internal wiring. After rewiring is done, repeat blower rotation check to ensure that blower rotation is now correct.

9. If blower rotation is correct, reset thermostat fan switch to **AUTO**. The circulating air blower should go **OFF**. Nothing should be running.
10. Shut **OFF** electric power at unit disconnect.

Cooling Checks



CAUTION

RISK OF REDUCED EQUIPMENT LIFE

Failure to follow this Caution could result in premature equipment failure.

Do NOT operate the unit with the compressor(s) running until proper blower rotation has been confirmed during the Blower and Phasing Check in the previous section. If the phasing is incorrect, the scroll compressor(s) (if equipped) will run backwards and they will be damaged.

1. Be sure that electric power is **OFF**.
2. To check cooling Stage 1, place jumper wires across low voltage terminal board terminals **R** to **G**, **R** to **Y1**.
3. Turn electric power **ON**. Check to see that the following occurs:
 - a. Compressor 1 - **ON**
 - b. Condenser fan motor(s) - **ON**
 - c. Circulation air blower - **ON** with correct rotation and adequate airflow from ductwork.
4. Shut **OFF** electric power at unit disconnect.
5. To check cooling Stage 2, remove jumper wires from **Y1** and place it on **Y2**.

NOTE: Allow 5 minutes between Steps 4 and 6.

6. Turn **ON** electric power. Check to see that the following occurs:
 - a. Compressors 1 & 2 - **ON**
 - b. Condenser fan motor(s) - **ON**
 - c. Circulation air blower - **ON**
7. Shut **OFF** electric power at unit disconnect.
8. Remove jumpers from low voltage terminal board.
9. Replace all service access panels.

Operation And Maintenance Instructions

⚠ WARNING

ELECTRICAL SHOCK HAZARD.

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

Turn off electric power supply at disconnect switch or service panel before removing any access or service panel from unit.

Starting the Unit After Shutdown

Cooling

CAUTION

To prevent possible damage to the compressor(s), do NOT operate on cooling when outdoor temperature is below 35°F (2°C).

1. Turn **ON** electric power.
2. Set thermostat to desired temperature and set system switch to **COOL**. The unit will come on and operate automatically under control of the thermostat.

Close all doors and windows. The unit may run continuously for several hours or longer on the initial run because of residual heat and moisture in the building. This is normal for any air conditioning system.

Thermostat Fan Switch Operation

The circulating air blower will run continuously with the fan selector switch in the **ON** position. When the fan selector switch is in the **AUTO** position, the blower will run during each heating or cooling cycle.

Monthly Maintenance and Inspection Checks

Air Filters (Factory Installed)

CAUTION

Do NOT operate unit without all air filters installed in the unit.

Dirty filters are the most common cause of compressor failures and inadequate heating and cooling performance. Inspect filters at least monthly and replace or clean as required.

Install filters so that the arrows on the side point in the direction of air flow.

Filter racks are accessible through the filter access panel.

Disposable Replacement Filters

For all units: 4 filters 20" x 20" x 2"
4 filters 16" x 20" x 2"

Condenser Coil

Keep the condenser inlet and outlet area clean and free of leaves, grass clippings and other debris. Grass should be kept short in front of the condenser inlet. Shrubby **MUST** be trimmed back so it is no closer than 30 inches (762 mm) to condenser coil.

Condensate Drain

Check for condensate drainage. Clean as required.

Annual Maintenance and Inspection

⚠ WARNING

ELECTRICAL SHOCK HAZARD.

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

Turn off electric power supply at disconnect switch or service panel before removing any access or service panel from unit.

The annual inspection should include cleaning as required to ensure efficient operation of the unit.

The condenser and evaporator fan motors have permanently sealed bearings, so no field lubrication is necessary.

For 25 ton units, lubricate bearings at least every 6 months with suitable bearing grease. Extended grease line is provided for far side fan bearing (opposite drive side).

Evaporator-fan motor protection - A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

Circulating Air Blower

Visually inspect the blower wheel for accumulations of dirt or lint. Clean the compartment and the blower wheel. If accumulation is excessive on blower wheel or does not remove easily, it will be necessary to remove the blower assembly.

Evaporator Fan Service and Replacements - 25 Ton

The 25 ton units use a fan motor mounting system that features a slide-out motor mounting plate. To replace or service the motor, slide out the bracket.

1. Remove the evaporator-fan access panel and the heating control access panel.
2. Remove the center post (located between the evaporator fan and heating control access panels) and all screws securing it.
3. Loosen nuts on the two carriage bolts in the motor mounting base.
4. Using jacking bolt under motor base, raise motor to top of slide and remove belt. Secure motor in the position by tightening the nuts on the carriage bolts.
5. Remove the belt drive.
6. Remove jacking bolt and tapped jacking bolt plate.
7. Remove the 2 screws that secure the motor mounting plate to the motor support channel.
8. Remove the 3 screws from the end of the motor support channel that interfere with the motor slide path.
9. Slide out the motor and motor mounting plate.
10. Disconnect wiring connections and remove the 4 mounting bolts.
11. Remove the motor.
12. To install the new motor, reverse steps 1 - 11.

Heating Checks When Accessory Electric Heater is installed

1. To start unit, turn on main power supply.
2. Set thermostat at HEAT position and a setting above room temperature, and set fan at AUTO position. Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed HC2 is energized through W2.
3. If unit does not energize, reset limit switch (located on evaporator-fan scroll) by pressing button located between terminals on the switch.

Turning Off the Unit

Heating

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

Cooling

1. Set thermostat selector to **OFF** and fan switch to **AUTO**.
2. To shut the unit down completely, shut **OFF** electric power supply at disconnect switch or service panel.

TROUBLESHOOTING - Cooling Service

PROBLEM	CAUSE	REMEDY
Compressor and condenser fans 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 fans run.	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 overload.	Determine cause and replace.
	Compressor locked out.	Determine cause for safety trip and reset lockout.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker.
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 overload.	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.
	Air in system	Recover refrigerant, evacuate system, and recharge.
	Condensor coil dirty or restricted.	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Remove excess refrigerant.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	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.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High heat load.	Check for source and eliminate.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	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.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Insufficient evaporator airflow	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.

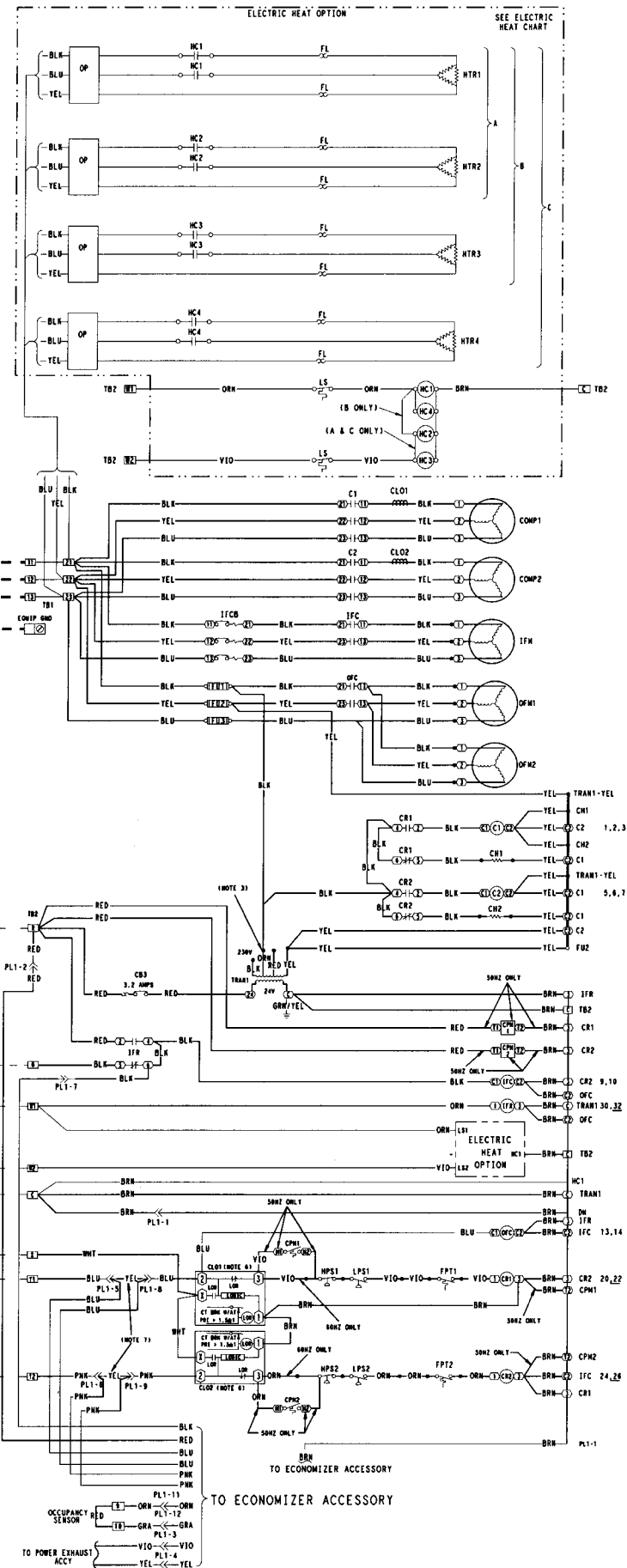
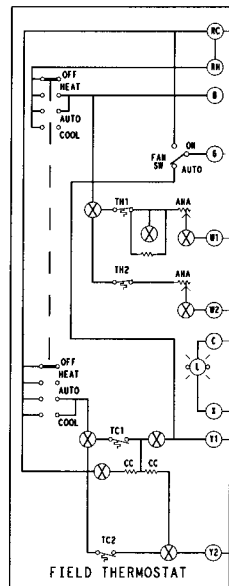
START-UP CHECKLIST

I. START-UP CHECKLIST (Remove and store in job file)				
Model No:		Serial No:		
Date:		Technician:		
Unit No:		Job Location:		
		Job Name:		
II. PRE-START-UP (Insert Checkmark in box as each item is completed)				
<input type="checkbox"/> Verify that all packing materials have been removed from unit.				
<input type="checkbox"/> Verify installation of indoor fan motor adjustment bolt and plate. (20 ton only)				
<input type="checkbox"/> Verify that condensate connection is installed per installation instructions.				
<input type="checkbox"/> Check all electrical connections and terminals for tightness.				
<input type="checkbox"/> Check that indoor-air filters are clean and in place.				
<input type="checkbox"/> Verify that unit installation is level.				
<input type="checkbox"/> Check fan wheels and propellers for location in housing/orifice and setscrew tightness.				
<input type="checkbox"/> Ensure belt tension is correct and blower pulleys are properly aligned.				
III. START-UP				
ELECTRICAL				
Supply Voltage		L1-L2	L2-L3	L3-L1
Compressor AMPS		L1	L2	L3
Compressor AMPS		L1	L2	L3
Indoor-Fan AMPS		L1	L2	L3
TEMPERATURES and PRESSURES				
Outdoor-Air Temperature		°DB		
Return-Air Temperature		°DB		°WB
Cooling Supply air		°DB		°WB
Refrigerant Suction Pressure		PSIG-Circuit # 1		PSIG-Circuit # 2
Refrigerant Temp. (Suction) Pressure		Circuit # 1		Circuit # 2
Refrigerant Discharge		PSIG-Circuit # 1		PSIG-Circuit # 2
Discharge Temperature		°F/C-Circuit # 1		°F/C-Circuit # 2
<input type="checkbox"/> Verify that 3-phase scroll compressor rotating in correct direction on select models.				

PAS300H

ELECTRIC HEAT		
	208/240V AMPS	200/230V KW
A	71.3/82.3	25.7/34.2
B	117/135	42.2/56.1
C	156/180	56.2/74.8

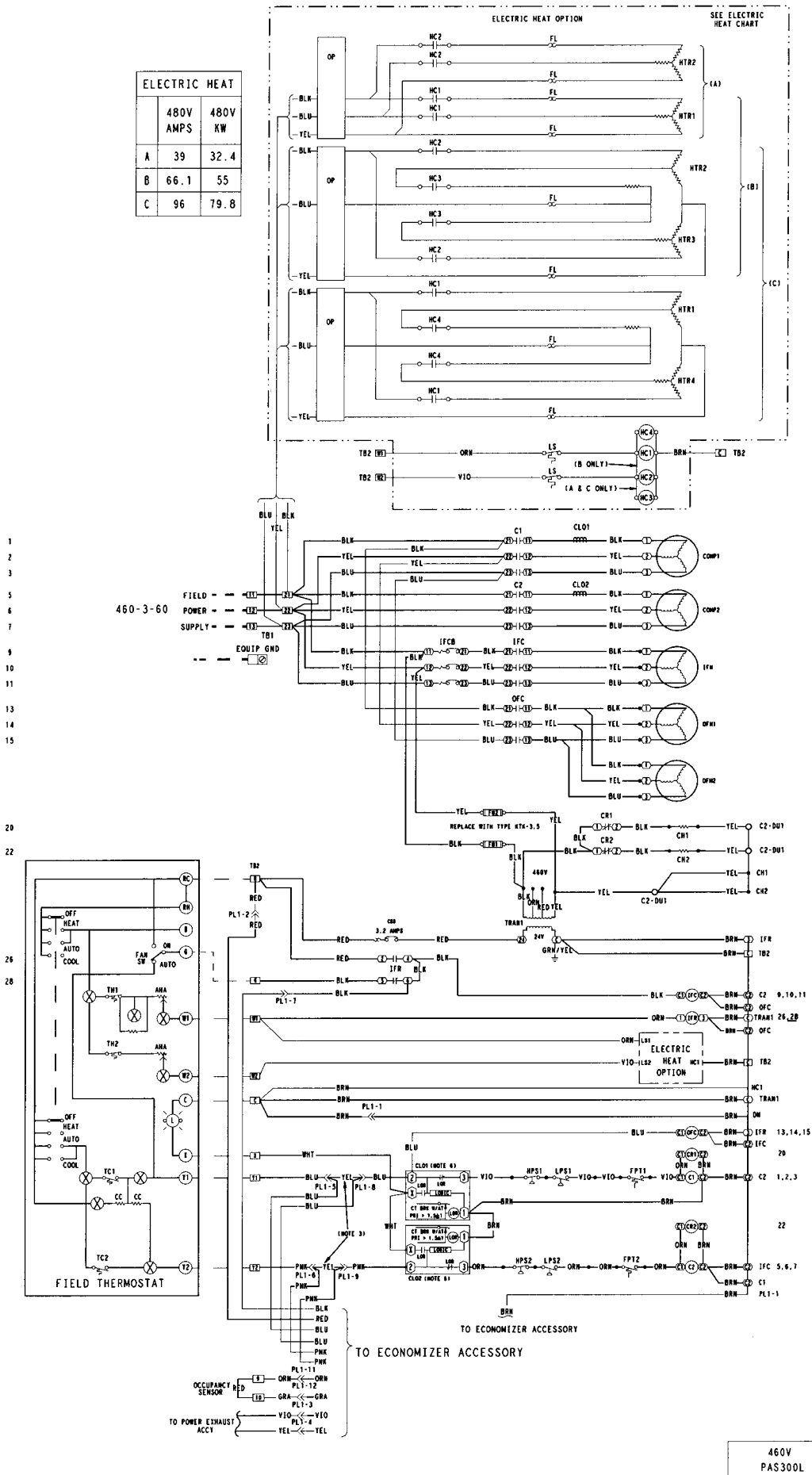
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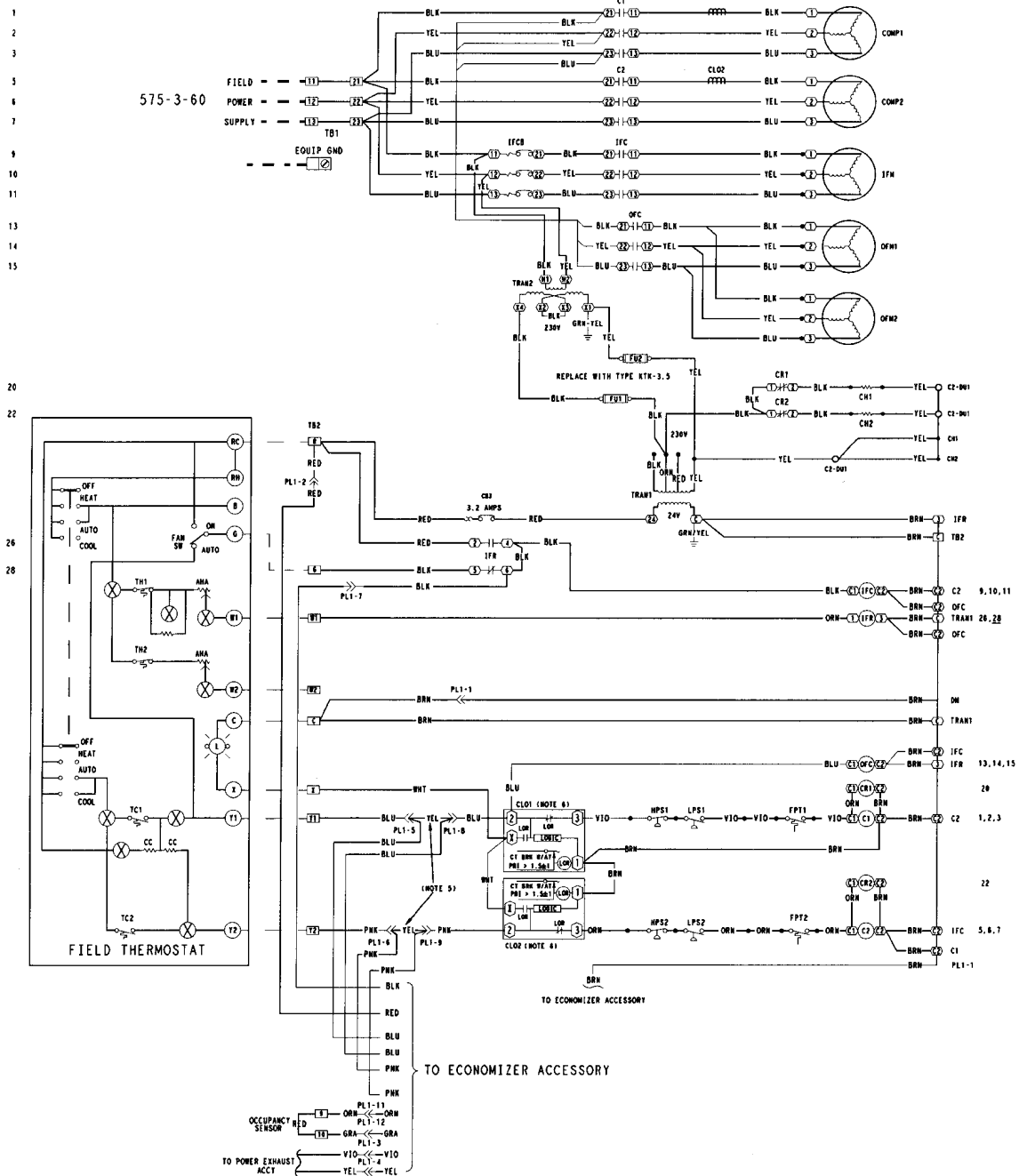
208/230-3-60V
PAS300H

PAS300L

ELECTRIC HEAT		
	480V AMPS	480V KW
A	39	32.4
B	66.1	55
C	96	79.8



PAS300S



575V
PAS300S

PAE300H,L,S

