

Installation Instructions

DIRECT DRIVE BLOWER

PA95/PAPC
PA55/PAPA SERIES

SINGLE PACKAGE AIR CONDITIONERS ELECTRIC COOL / ELECTRIC HEAT (OPTIONAL)



TABLE OF CONTENTS

1. Safety Labeling and Signal Words	2	6. Air Distribution System	9
Danger, Warning and Caution	2	Ductwork	9
2. Safe Installation Requirements	2	Ductwork Insulation	9
3. Locating The Unit	2	Ductwork Connections	9
Clearances	2	Filters	9
Dimensions	2	7. Start-up Procedures	10
Minimum Clearances to Combustible Construction	3	Final Electrical Check	10
Installation	3	Circulating Air Blower	10
Installing Duct Collars	3	Determining Blower Speed	10
Condensate Drain	4	Speed Taps	10
4. Electrical Wiring	4	Cooling and Auxiliary Electric Strip Heat	10
Ground Connections	4	Check Before Starting	10
Line Voltage Wiring	4	Circulating Air Blower	11
Unit Disconnect	4	Cooling	11
Converting 230V Units to 208V	4	Auxiliary Heating	11
Low Voltage Wiring	4	Temperature Rise Check	11
Thermostat Connections	5	Sequence of Operation	11
Field Installed Equipment	5	Cooling Mode: Energized (R.G.Y1) De-energized (NA)	11
5. Electric Heat Installation	6	8. Operation	11
General Information	6	Scroll Anti-Cycle Timer (Where Applicable)	11
Adjusting Thermostat Anticipator	6	Turning The Unit Off	12
Limit Controls	6	Thermostat Fan Switch Operation	12
Time Delay Operation	6	Adjusting Room Temperatures	12
Staging	6	13. Maintenance	12
Install Heater	6	Monthly Maintenance and Inspection Checks	12
Heater Wiring	6	Air Filters	12
Grounding	6	Cooling Season Checks (Monthly)	12
Installing Wiring	7	Condenser Coil	12
Unit Disconnect Breaker	8	Condensate Drain	12
Rain Shield Installation	8	Annual Maintenance and Inspection	12
		Condenser Fan Motor	12
		Circulating Air Blower	12

1. 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.

2. Safe Installation Requirements

WARNING

Installation or repairs made by unqualified persons can result in hazards to you and others. Installation **MUST** conform with local building codes or, in the absence of local codes, with the National Electrical Code NFPA70-1990 or current edition.

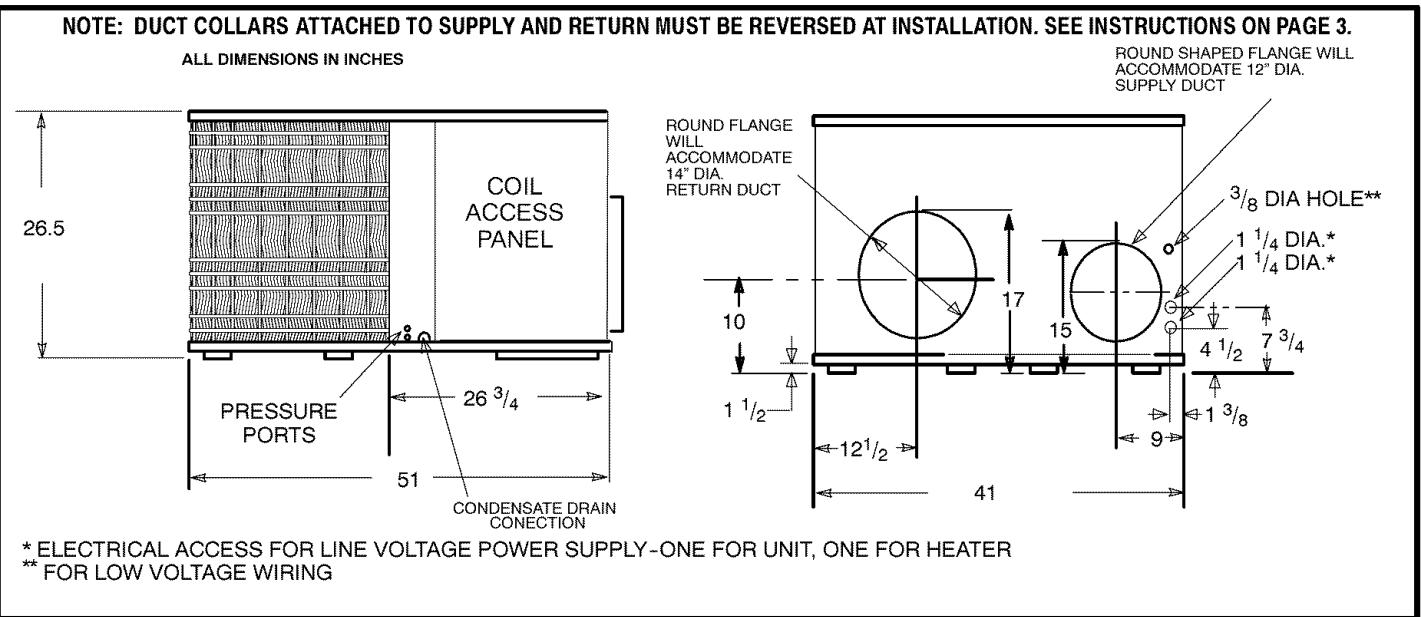
The information contained in this manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments.

Failure to carefully read and follow all instructions in this manual can result in unit malfunction, property damage, personal injury and/or death.

- Seal supply and return air ducts.
- Check to see that filters are installed correctly and are the proper type and size.

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.

Dimensions



CAUTION

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

3. Locating & Installing The Unit

The unit is designed for outdoor installation only. Place the unit on a platform at ground level. The unit may be installed on a concrete slab of 48" (1219mm) x 48" (1219mm) dimensions. Cement blocks on a 3" sand footing will also work. The slab or blocks **SHOULD NOT** be in contact with any part of the structure. Check local codes covering zoning, noise, platforms, etc..

If practical avoid locating next to fresh air intakes, vent or bedroom windows. Noise may carry into the openings and disturb people inside.

Avoid installations under roof overhangs without guttering. Water draining from the roof onto the unit could produce excessive noise, and may cause ice to build up on coil or fan.

Placement of the unit should be in a well drained area or the unit **MUST** be supported high enough so runoff will not enter the unit.

Do not locate unit where heat, lint or exhaust fumes will be discharged on unit (as from dryer vents.)

Clearances

Minimum clearances, as specified in **FIGURE 1**, **MUST** be maintained from adjacent structures to provide adequate air circulation and room for service personnel.

While minimum clearances are acceptable for safety reasons, they may not allow adequate air circulation around the unit for proper operation. Whenever possible, it is desirable to allow additional clearance, especially around the condenser inlet and discharge openings.

Do NOT install the unit in a recessed or confined area that will permit discharged air from the condenser to recirculate to the condenser inlet.

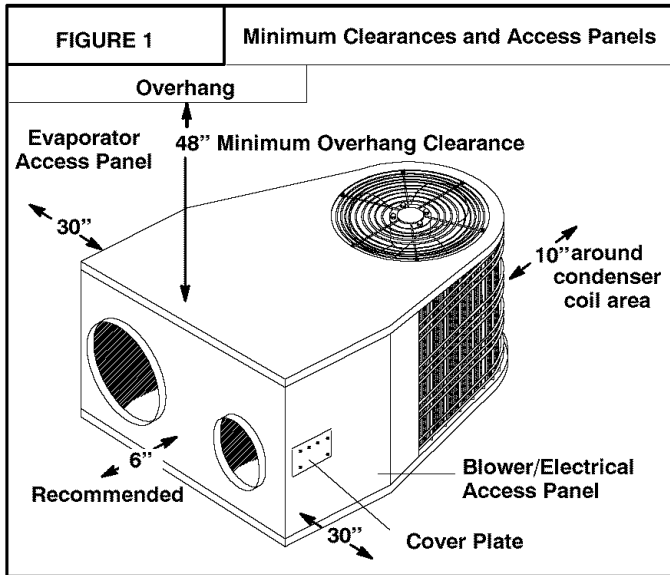
Minimum Clearances to Combustible Construction

SERVICE ACCESS CLEARANCES

- Blower Access Panel Side 30" (762mm)
- Electrical Access Panel Side 30" (762mm)

OPERATIONAL CLEARANCES

- Combustible Base
 - (Wood or Class A, B or C roof covering material) 0"
- Supply and Return Air Ducts 0"
- Duct Connection Side 0"
- Clearance between Overhang and Top of Unit 48" (1219mm)
- Clearance around Condenser Coil area to wall or shrubs 10"

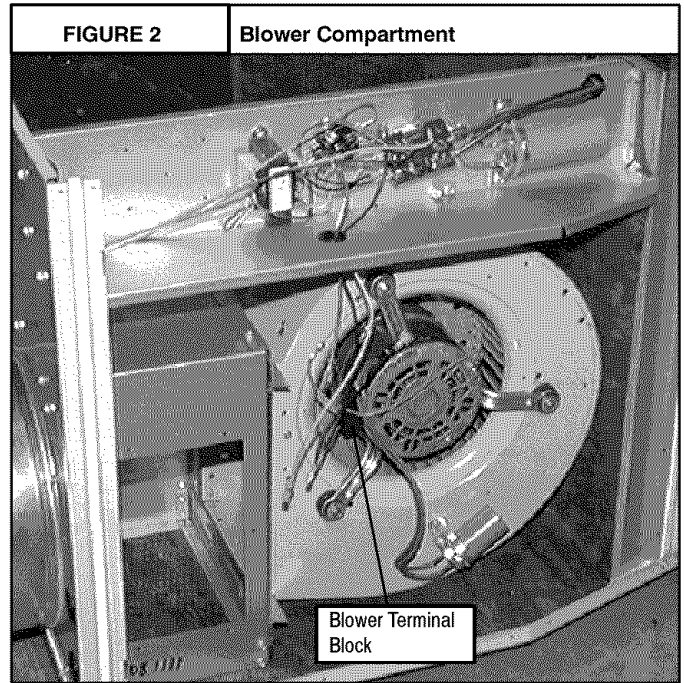


Installation

CAUTION

The unit must be installed as level as possible, with a maximum slope no greater than 1/8" per foot (10mm per meter). For side to side leveling, the condensate drain side of the unit **MUST** always be lower to provide proper drainage.

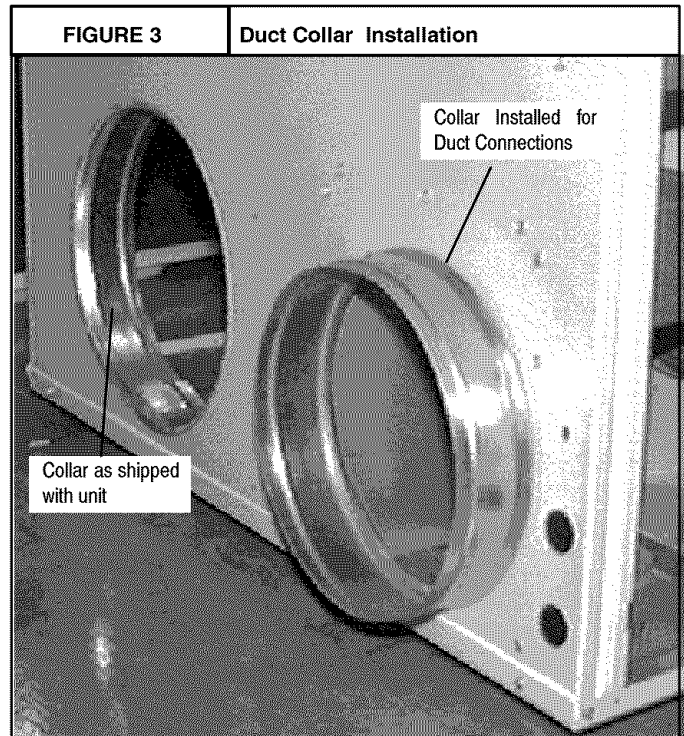
- The unit **MUST** be situated in such a way as to provide safe access for servicing.
- The platform may be made of either concrete or pressure treated wood and **MUST** be level and strong enough to support the unit's weight.
- Position platform separate from the building's foundation.
- Install in a well-drained area, with the top surface of the platform high enough above grade level to allow installation of a condensate drain trap. See **FIGURE 4**



Installing Duct Collars

Duct collars are supplied with the unit and are attached to the supply and return openings with the flanges to the inside and must be reversed before unit's installation.

1. Remove the screws from the collars and reverse them so the flange is to the outside.
2. Make sure when pushing the collars into place that the "V" flange of the collars seats into the supply and return holes securely.
3. Re-install screw in each collar so it goes through both of the holes in the collar end. It does not matter how the ends of the collar overlap in order to accomplish this.

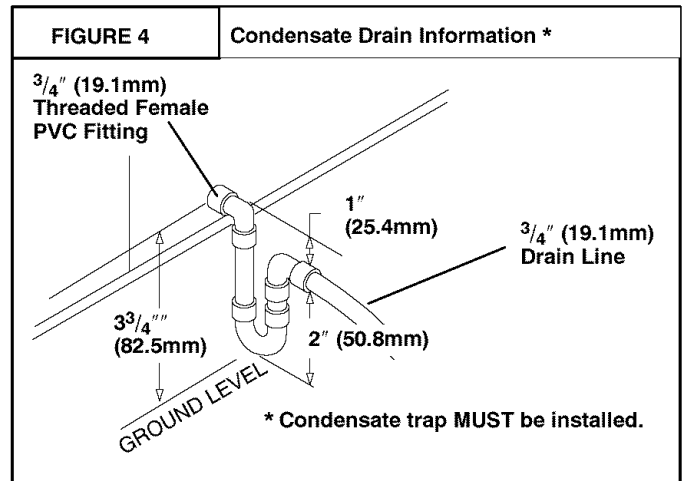


Condensate Drain

The condensate drain outlet is a 3/4" (19.1mm) threaded female PVC connection located at the bottom of the unit to the left of the evaporator access panel.

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 2" (50.8mm) **MUST** be installed. The outlet of the trap must be at least 1" below the unit drain connection. **Install the trap as near to the unit as possible for proper drainage.**

A 3/4" (19.1mm) 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.



4. Electrical Wiring

WARNING

Electrical shock hazard.

Disconnect power at fuse box or service panel before making any electrical connections.

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

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

NOTE: All electrical work **MUST** conform with the requirements of local codes and ordinances and in the United States with National Electrical Code ANSI/NFPA 70-1990 (or current edition). Provide line voltage power supply from a separate fused circuit with a disconnect switch (when required) located within sight of the unit. Supply voltage, amperage, fuse and disconnect switch sizes **MUST** conform with local codes and ordinances.

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

All exposed line voltage connections **MUST** be made through liquid tight conduit to prevent water from entering the unit through the electrical access..

Ground Connections

A ground lug is installed on the control plate (or electric heat mounting plate) for the ground connection. Use a copper conductor of the appropriate size from the unit to a grounded connection in the electrical service panel or to a properly driven and electrically grounded ground rod.

Line Voltage Wiring

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.

Connections for line voltage are made on the unit electrical control plate (see **FIGURE 7**). For access, remove the Blower/Electrical access panel.

Refer to applicable wiring diagram and **FIGURE 6**. Complete the line service connections to the contactor 'L' terminals on the electrical control plate. Check all screw terminals to ensure they are tight.

NOTE: If an Electric Heat Accessory is installed, refer to the Electric Heat Accessory *section of this manual* to determine line voltage connections. The Electric Heat Accessory mounts inside the unit in the heater box. Field supplied line voltage wires for the Electric Heat Accessory (separate from the field supplied line voltage wires to the unit) connect to the appropriate circuit breaker (if used) in the Electric Heat Accessory.

Unit Disconnect

A Disconnect Switch Kit is available that installs inside the unit or a separate circuit breaker may be installed to control the unit. Refer to instructions following heater installation section.

Converting 230V Units to 208V

To convert 230V units to 208V:

1. Turn electric power **OFF**.
2. Remove the blower/electrical access panel.
3. Locate the 24V control transformer.
4. Remove wire from the terminal labeled "240V" on the 24V control transformer and reconnect it to the 208V terminal of the 24V control transformer.
5. Replace the electrical/compressor access panel.

Low Voltage Wiring

For access, remove the electrical control/blower access panel.

Refer to the connection wiring diagram for the applicable model and to the instructions included with the thermostat.

Route low voltage wires through the port located on the rear panel and up to the control box.

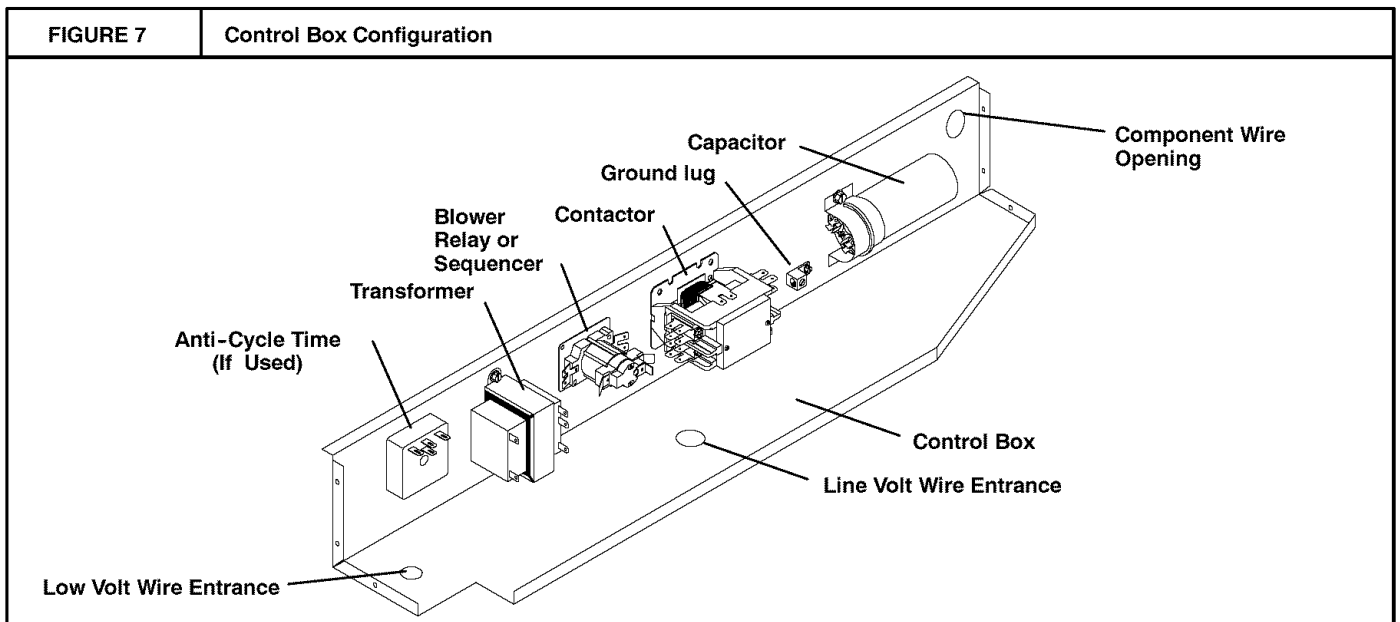
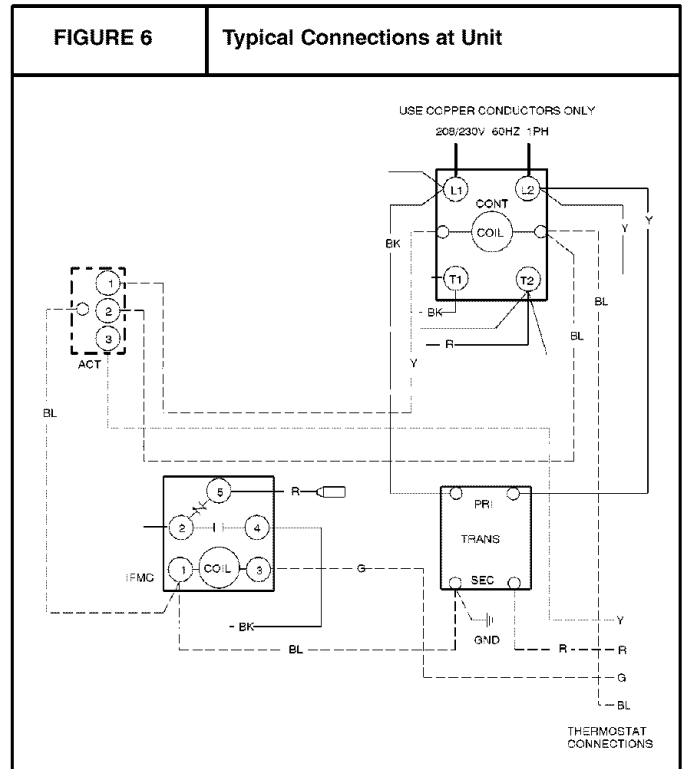
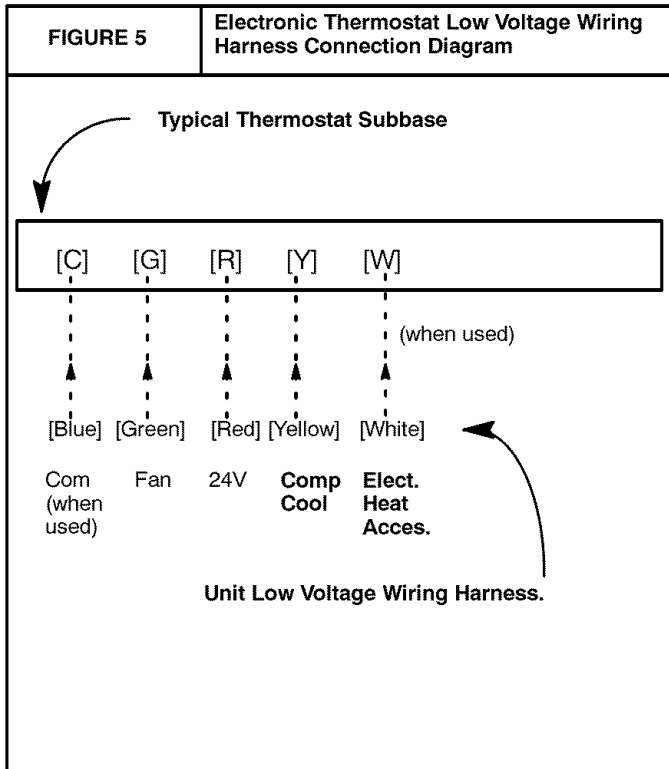
NOTE: If an Electric Heat Accessory is installed, see the Electric Heat Accessory *Installation Section of this manual* for low voltage connections.

Thermostat Connections

The location of the thermostat has an important effect on the operation of the unit. See the thermostat instructions for proper connection. See **FIGURE 5** for Low Voltage Wire Harness Connections

Field Installed Equipment

Wiring to be done in the field between the unit and other devices, or between separate devices which 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.



5. Electric Heat Installation

General Information

Adjusting Thermostat Anticipator

Set the heat anticipator of the thermostat to the proper value. See instructions provided with the thermostat before making this adjustment.

Model Number	Anticipator Setting
AMMK05AHB/A	.18
AMMK07AHB/A	.36
AMMK10AHB/A	.36
AMMK15AHB/A	.36
AMMK20AHB/A	.54

Limit Controls

The limit controls are mounted on the face of the heater and are wired into the supply wires to each element. If there is not enough air flow through the heater, the limit will open and break the power circuit. The limit will reset when the electric accessory cools down.

Time Delay Operation

The heater elements are switched **ON** and **OFF** through one or more controls which operate through the low voltage thermostat circuit.

These controls consist of a number of time delays depending on the specific heater model. An electric heat accessory has 1, 2 or 3 of these controls. The first time delay is activated when the thermostat contacts close. Approximately 1 to 20 seconds later the indoor blower and the first heater bank are energized. Approximately 70 seconds after the first heater bank is energized the remaining time delays and heater banks are energized.

Staging

Some electric utilities require staging on electric heaters larger than 6 kilowatts. Therefore, the heater elements are turned on in 5 or 10 kW increments under control of the sequencers.

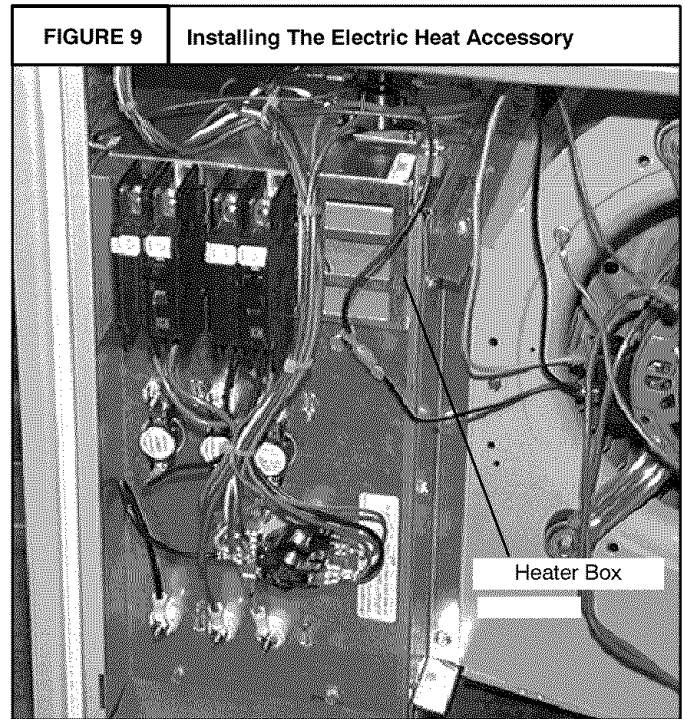
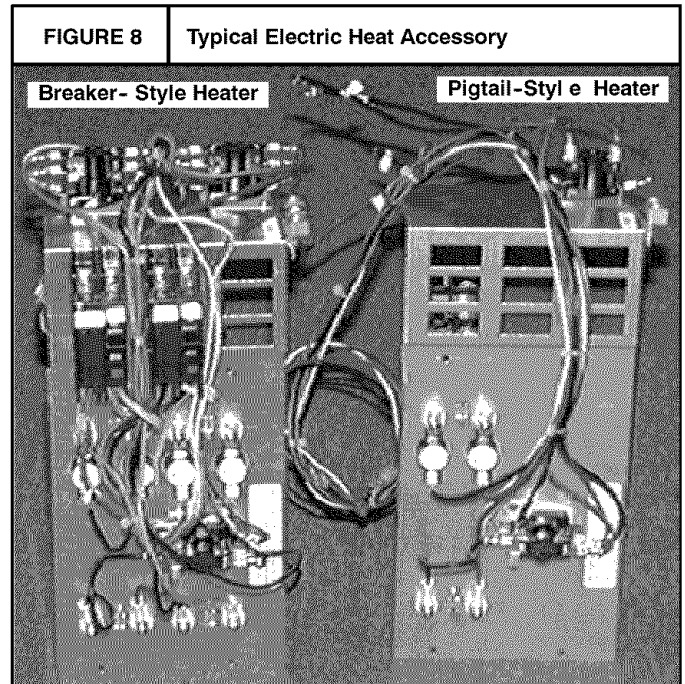
If staging based on heat loss or demand is required, the use of accessory outdoor thermostats is recommended. The heat sequencer wiring is designed to be staged by breaking the 24V "Common" Leg (normally brown or gray). Outdoor thermostats available through your wholesale supplier allow the control of two or four stages of electrical heat.

Some indoor electronic thermostats may provide for multiple stages of electric heat. When this type thermostat is used, it may be necessary to break the 24V "Hot" leg of the sequencer (as fed from the "W" circuit at the thermostat). This will require field modification of the control wiring and should only be done by an experienced controls technician or electrician.

Install Heater

1. Shut **OFF** electric power at unit disconnect switch or service panel.
2. Remove the blower access panel from unit.
NOTE: Installation of field wiring and conduit for heaters to the unit prior to installing the heater will simplify wiring of heaters.
3. From inside the blower compartment, remove the six screws on the heater cover plate and save the screws. Discard the heater cover plate.

The screws will be used later to mount the electric heat accessory and its cover.
4. Remove the cardboard wrapper from the heater's elements.
5. Insert the heater into the heater/blower box. Exercise caution to prevent damage to heater elements.
6. Secure heater to heater/blower box with four of the six screws removed in **Step 3**.



Heater Wiring

Grounding

Permanently ground the electric heat accessory in accordance with local codes and ordinances and in the United States with National Electrical Code ANSI/NFPA70-1990 or current edition. Use a copper conductor of the appropriate size from the electric heat accessory to the ground lug on the circuit breaker panel as shown in **FIGURE 10**.

Installing Wiring

When an electric heat accessory is installed, two separate field power supplies **MUST** be provided - **one or more** for the electric heat accessory and **one** for the unit.

1. Shut **OFF** electric power at unit disconnect or service panel.

2. Install the appropriate field supplied conduit fitting into the heater knockout located in the rear panel of the unit. The knockout is sized 1 1/4" in diameter.
3. Connect field installed copper ground wire(s) to the ground lug(s) on the heater mounting plate. On models with more than one circuit, a separate copper ground wire **MUST** be connected to a separate ground lug for *each* circuit.
4. Route the field supplied line voltage wires for the heater to the line side of the electric heat accessory's circuit breaker(s) or high voltage wiring harness. Leave approximately 8" of excess wire so the breaker or wiring harness may be moved to service. Make line voltage connections to L3-L6 as appropriate. NOTE: If heaters without breakers are used, route field wires to inside of unit and attach to heater wires tagged L3-L6 as appropriate using supplied wire nuts.
5. Connect the black wire with terminal from the heater wire harness to the loose black wire at the unit blower or appropriate speed tap if lower speed is desired in electric heat mode.

NOTE: Check **FIGURE 11** for heater/speed combinations that are unacceptable.

6. Connect the red wire with terminal in the heater wire harness to the loose red wire from the unit sequencer.
7. Connect the white wire from the heater wire harness to the white wire from the thermostat at the field supplied low volt wire harness in the control box.
8. Connect the grey and brown wires from the heater wire harness to the blue wire from the unit 24V common. NOTE: If outdoor thermostats are used for staging electric heat, connect the grey and brown wires according to the thermostat instructions. See "Staging" in *Electrical Wiring* Section of this Manual.

After completing installation of the heater, install the breaker rain shield on the blower access panel according to the following instructions on page 8. If using a pigtail style heater, proceed to Start-Up Procedures for Auxiliary Electric Strip Heat on page 10.

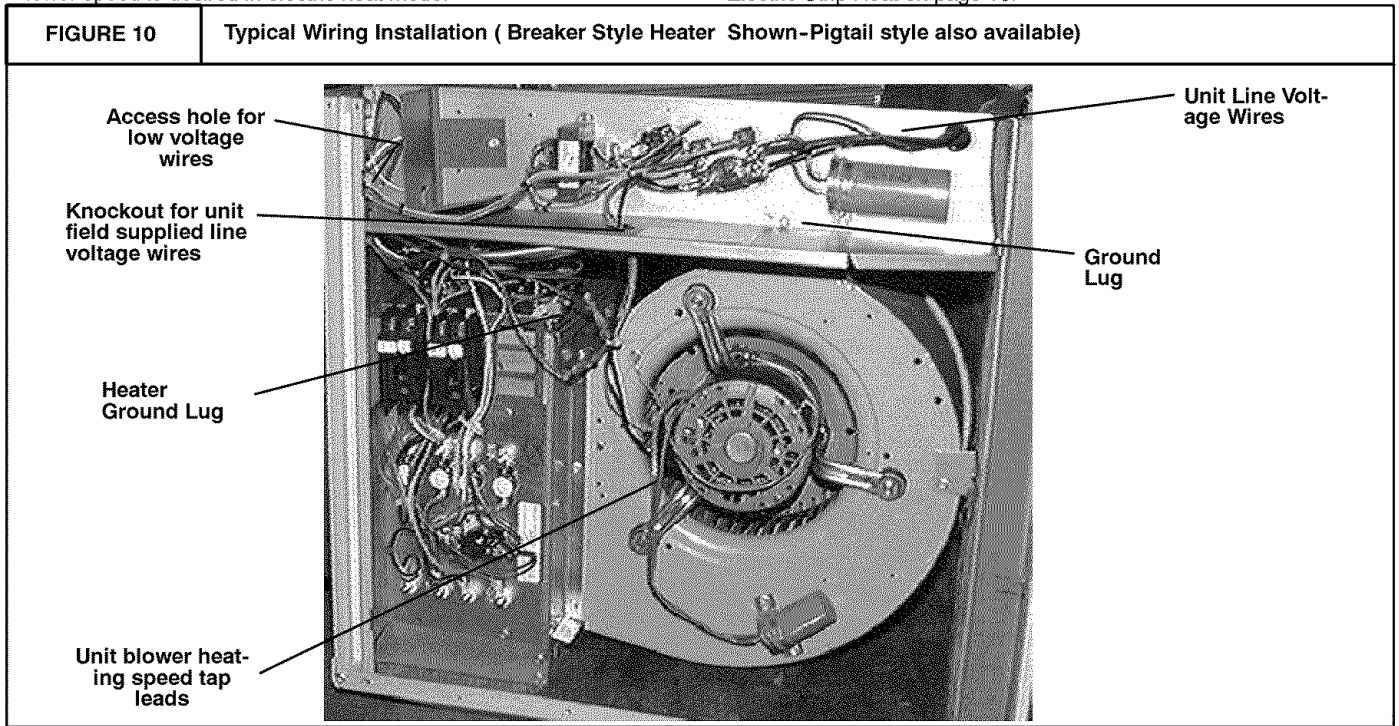


FIGURE 11 Accessory Electric Heater Electrical Data

HEATER MODEL	Used With	Supply Voltage	KW Rating	Nominal Heating BTUH	Supply Circuit No.	Heater Amps	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device (Amps)
AMMK05AHA	2-5 TON	240-1-60	4.8	16,382	L3 - L4	20.0	25.0	30
AMMK05AHB		208-1-60	3.6	12,287	L3 - L4	17.3	21.6	25
AMMK07AHA	2-5 TON	240-1-60	7.5	25,598	L3-L4	31.2	39.1	45
AMMK07AHB		208-1-60	5.6	19,113	L3-L4	26.9	33.6	40
AMMK10AHA	2-5 TON	240-1-60	9.6	32,765	L3 - L4	40.0	50.0	60
AMMK10AHB		208-1-60	7.2	24,574	L5 - L6	34.6	43.3	50
AMMK15AHB	2 1/2-5 TON	240-1-60	14.4	49,147	L3 - L4 L5 - L6	40.0 20.0	50.0 25.0	60 30
		208-1-60	10.8	36,860	L3 - L4 L5 - L6	34.6 17.3	43.3 21.6	50 25
AMMK20AHB	2 1/2-5 TON	240-1-60	19.2	65,530	L3 - L4 L5 - L6	40.0 40.0	50.0 50.0	60 60
		208-1-60	14.4	49,147	L3 - L4 L5 - L6	34.6 34.6	43.3 43.3	50 50

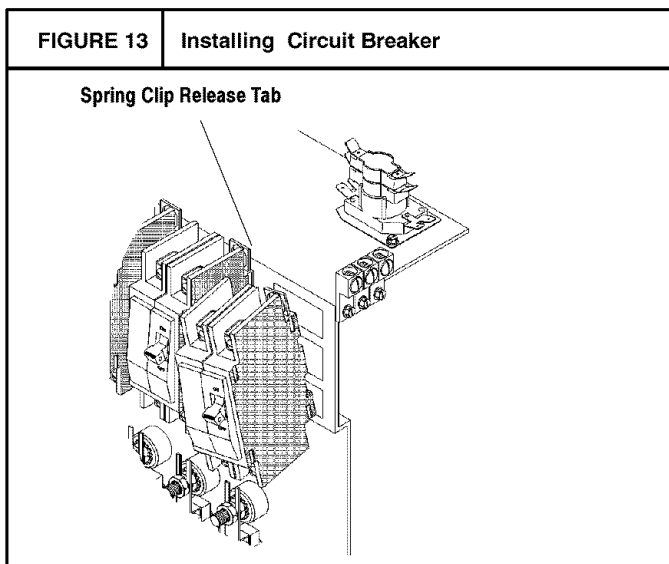
FIGURE 12 Accessory Electric Heater Heating Data

Heater Model	Use With	Supply Voltage	KW Rating	Total Heating BTUH	*Temperature Rise °F @ CFM									
					600	800	1000	1200	1400	1600	1800	2000	2200	
AMMK05AHA	A/C: 2-5 TON	240-1-60	4.8	16,832	25.3	19.0	15.2	12.6	10.8	9.5	8.4	7.6	---	
AMMK05AHB		208-1-60	3.6	12,287	19.0	14.2	11.4	9.5	8.1	7.1	6.3	5.7	---	
AMMK07AHA	A/C: 2-5 TON	240-1-60	7.5	25,598	39.5	29.6	23.7	19.8	16.9	14.8	13.2	11.9	10.8	
AMMK07AHB		208-1-60	5.6	19,113	29.5	22.1	17.7	14.7	12.6	11.1	9.8	8.8	8.0	
AMMK10AHA	A/C: 2-5 TON	240-1-60	9.6	32,765	50.6	37.9	30.3	25.3	21.7	19.0	16.9	15.2	13.8	
AMMK10AHB		208-1-60	7.2	24,574	37.9	28.4	22.8	19.0	16.3	14.2	12.6	11.4	10.3	
AMMK15AHB *	2 1/2-5 TON	240-1-60	14.4	49,147	---	56.9	45.5	37.9	32.5	28.4	25.3	22.8	20.7	
		208-1-60	10.8	36,860	56.9	42.7	34.1	28.4	24.4	21.3	19.0	17.1	15.5	
AMMK20AHB **	2 1/2-5 TON	240-1-60	19.2	65,530	---	---	---	50.6	43.3	37.9	33.7	30.3	27.6	
		208-1-60	14.4	49,147	---	56.9	45.5	37.9	32.5	28.4	25.3	22.8	20.7	

* 15 KW HEATER NOT TO BE OPERATED ON LOW TAP FOR 2 1/2 TON A/C AND HP.

** 20 KW HEATER NOT TO BE OPERATED ON LOW OR MEDIUM LOW TAP FOR 3 AND 3 1/2 A/C AND HP.

Unit Disconnect Breaker



If a separate unit disconnect breaker/switch is required it can be installed inside the unit in the heater accessory or as a single installation by using the Disconnect Switch Kit. A separate power supply circuit must be provided for the unit.

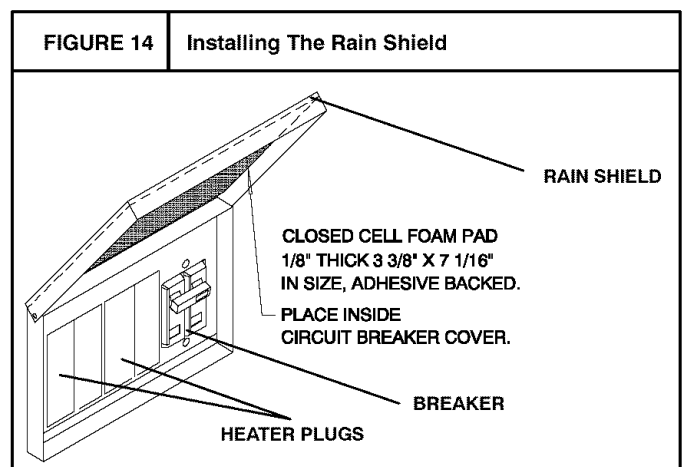
1. To install the circuit breaker or switch, insert the bottom foot of the breaker into lower mounting hole on the heater panel with the breaker at a slight angle out from the panel.
2. Push breaker in towards panel and lift up slightly so breaker fits into the top mounting hole and snaps (locks) in position.

Breakers have a locking spring clip to hold them in position. To remove breaker lift up on the release tab on top of the breaker and pull out and down slightly.

FIGURE 15 Accessory Electric Heater Heating Data

Breaker Amps	Part Number	Application
25	1082008	PA9524, PA5524, PAPA24, PAPC24
30	1082009	PA9530, PA5530, PAPA30, PAPC30
35	1082010	PA5536, PAPA36
40	1082011	PA9536, PAPC36
45	1082012	PA9542, PAPC42
50	1082013	PA5542, PA5548, PAPA42, PAPA48
60	1082014	PA9548, PAPC48
60 Switch	1082042	Fits All - Disconnect Switch Only (No Over Current Protection)
AMM001DSA	DISCONNECT SWITCH KIT (includes 60A switch & rain shield) BREAKER FOR UNIT ONLY. FOR "NO HEAT" or PIGTAIL STYLE HEATER APPLICATION ONLY.	

Rain Shield Installation



1. Remove all screws from the cover plate on Blower/Electrical Access Panel.
2. Install adhesive backed gasket on Blower/Electrical Access Panel.
3. Install lower frame of rain shield with 4 screws.
4. Install rain shield hinged cover with 4 screws.
5. Install circuit breaker filler plates (2 each per unused breaker slot.)
6. Re-install Blower/Electrical Access Panel.

NOTE: VERIFY ALL APPROPRIATE SEALS ARE IN PLACE. SEE FIGURE 14.

6. Air Distribution System

For airflow data (blower performance data, blower speed tap settings, etc.) see the *Technical Data Sheet* attached to the unit.

Ductwork

NOTE: The total heat gain of the structure to be conditioned as expressed in total Btu/hr should be calculated by manufacturer's method or in accordance with "A.S.H.R.A.E. Guide" or "Manual J - Load Calculations" published by the Air Conditioning Contractors of America. The total heat gain calculated should be equal to or less than the cooling 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 unit's 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.

Maximum recommended velocity in trunk ducts is 1000 feet per minute (5.08m/s). Velocity in branches should not exceed 800 feet per minute (4.06m/s). Refer to the *Technical Data Label on the unit* for unit air volume requirements and system sizing recommendations.

NOTE: Ductwork sizing affects temperature rise and cooling temperature differential. Be sure to properly size ductwork to the capacity and airflow characteristics of your unit. Failure to do so can affect limit controls, compressors, motors, and other components and will lead to premature failure of components. This will also adversely affect day to day unit performance.

Flexible Duct Kits are available from your supplier to effect proper sizing and installation to **Mobile Homes and other standard construction.**

Refer to unit rating plate for proper Electric Heat Accessory sizing and see the *Temperature Rise Check* section in the *Electric Heat Accessory Installation Section* of this manual.

Ductwork Insulation

It is recommended that ductwork installed outdoors have a minimum of 2" (51mm) of fiberglass insulation and be covered by a weatherproof vapor barrier that is protected against damage. Caulking and flashings, or other means adequate to provide a permanent weather seal, must be used.

It is recommended that ductwork installed in attics or other areas exposed to outdoor temperatures have a minimum of 2" (51mm) 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.

NOTE: Connect supply and return air plenums to unit in a manner that will allow the top of the unit to be removed without removing plenums. Plenums **MUST** be individually sealed to unit casing. Ducts **MUST** be terminated inside structure.

Filters

All return air **MUST** pass through a field supplied filter before entering the unit. If used, an electronic air cleaner **MUST** be installed in the *return* air ductwork. Minimum recommended filter areas are listed in **FIGURE 16** and are based on a velocity of 300 ft/min (1.2m/s) for disposable filters and 500 ft/min (2.54m/s) for washable high velocity filters.

CAUTION

Do NOT operate the unit without all filters in place.

FIGURE 16 Recommended Filter Sizes

NOTE: Some filters are marked with an arrow to indicate the proper direction of air flow through the filter. The air flow direction will be towards the blower motor. Make sure filter is installed correctly.

Nominal Tons Air Conditioning	Nominal Air Flow Cubic Feet per Minute	Recommended Filter Sizes Sq. In. Surface Area/Nominal Size	
		Disposable Filters	Cleanable Filters
2	700-900	400 or 20 x 25	246 or 15 x 20
2 1/2	900-1100	487 or 20 x 30	301 or 14 x 25
3	1100-1300	576 or 14 x 25 (2Req.)	356 or 16 x 25
3 1/2	1300-1500	665 or 16 x 25 (2Req.)	411 or 20 x 25
4	1500-1700	753 or 20 x 25 (2 Req.)	466 or 20 x 25
5	1900-2100	960 or 20 x 30 (2 Req.)	575 or 24 x 25

WARNING

Electrical shock hazard.

Use extreme care during all of the following checks and procedures.

Make sure electric power is turned OFF as instructed in appropriate steps.

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

Final Electrical 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.
NOTE: Wiring **MUST** be installed so it is protected from possible mechanical damage.

Circulating Air Blower

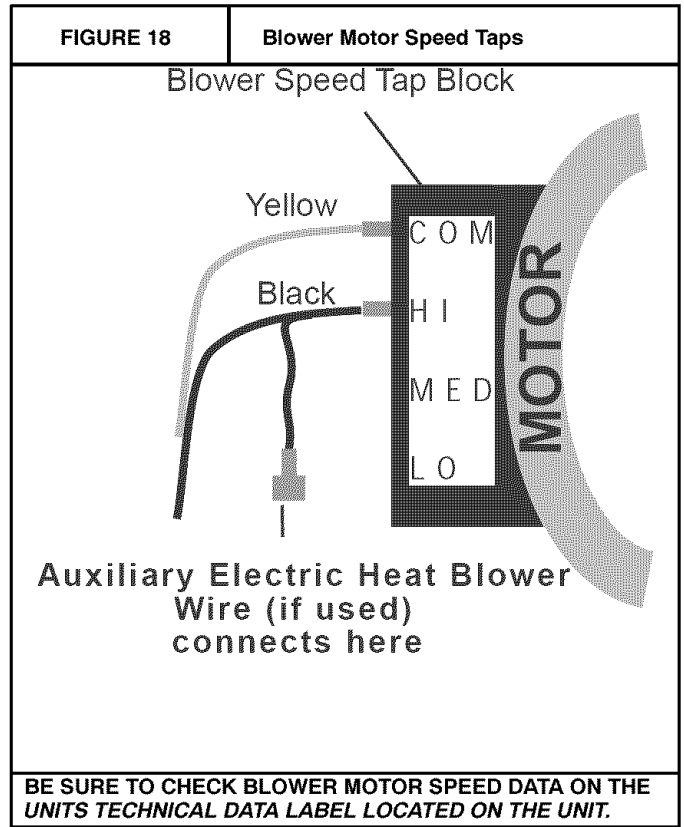
Determining Blower Speed

1. Turn electric power **OFF**.
2. From the system design, determine the total external static pressure (ESP) for the supply ducts, return ducts and registers, diffusers, grilles, dampers, heaters and filters.
3. To your system ESP determined in **Step 2**, add 0.05 In. W.C. for a wet coil.
4. From the system design, determine the desired cooling airflow in cubic feet per minute (CFM).
5. Locate the unit's Blower Performance Data table on the tech data label for the unit's voltage. (The tech data sheet is attached to the evaporator access panel on the unit.) From the table, determine the speed tap required to achieve the desired airflow.
6. See next section, *Speed Taps*, to set the blower motor speed terminal block (speed taps) to the cooling speed determined in the previous steps.

Speed Taps

After determining the required CFM and speed tap data from the tech data sheet, follow the steps below to change speeds if necessary.

FIGURE 17	Blower Speed Tap Settings	
10 SEER 2 TON		MED
10 SEER 2 1/2 TON		MED
10 SEER 3 TON		LOW
10 SEER 3 1/2 TON		MED HI
10 SEER 4 TON		LOW
10 SEER 5 TON		HI
12 SEER 2 TON		MED
12 SEER 2 1/2 TON		MED
12 SEER 3 TON		LOW
12 SEER 3 1/2 TON		MED HI
12 SEER 4 TON		LOW



NOTE: Electric heater blower wire may be attached to any "Appropriate" speed tap **See FIGURE 11 notes**. The **yellow** lead **MUST** always be connected to the speed tap block at the common quick connect terminal. The terminal is identified as **COM**.

Refer to **FIGURE 18** and the appropriate unit wiring diagram included in this manual. Wire the black wire to the required speed tap terminal to achieve required airflow determined in **Step 5**.

Cooling and Auxiliary Electric Strip Heat

On Air Conditioning units with electric heat, the heat strip may be operated on a lower blower speed than cooling (Refer to Heater Chart **FIGURE 11**) See **FIGURE 15** for connection location.

Check Before Starting

1. Check that the blower motor speed terminal block is set to the proper cooling speed. Refer to the unit wiring diagram and the various airflow tables in this manual.
2. Check to see that clean, properly sized field supplied air filters are installed in the return air duct.
3. Inspect the inside of the unit to be sure that all wires are in place and all tools, etc. are removed.
4. Replace all service access panels.

Check the unit's operation as outlined in the following instructions. If any unusual sparking, odors or noises are encountered, shut **OFF** electric power immediately. Recheck for wiring errors, or obstructions in or near blower motors.

Circulating Air Blower

1. Be sure electric power is **OFF**.
2. Set thermostat Heat-Cool selector to **OFF**.

3. Set thermostat fan switch to **AUTO**.
4. Turn electric power **ON**. Nothing should start running.
5. Set thermostat fan switch to **ON**. The circulating air blower should come **ON** after a 30 second delay.
6. Reset thermostat fan switch to **AUTO**. The circulating air blower should go **OFF** after a 30 second delay. Nothing should be running.

Cooling

1. Be sure that electric power is **OFF**.
2. Set thermostat Heat-Cool select to **COOL**.
3. Adjust thermostat setting to below room temperature.
4. Turn electric power **ON**. During power application check the following:
 - a. Contactor - Contacts closing
 - b. Compressor - **ON**
 - c. Condenser fan motor - **ON**
 - d. Circulating air blower - **ON** (after delay)
5. Switch the thermostat to **OFF**, check the following:
 - a. Contactor contacts opening.
 - b. Compressor - **OFF**
 - c. Condenser fan motor - **OFF**
 - d. Circulating blower - **OFF** (after delay)
6. Turn electric power **OFF**

Auxiliary Heating

NOTE: Repeat circulating air blower procedure above if Auxiliary Electric Heat is being installed after unit has been installed and checked out.

Temperature Rise Check

Temperature rise is the difference between the supply and return air temperatures. The temperature rise should be $\pm 2^{\circ}\text{F}$ (1.1°C) of the temperature rise shown in **FIGURE 12**.

NOTE: The temperature rise can be adjusted by changing the heating speed tap at the unit's blower terminal block. Refer to the unit's *Installation Instructions* for airflow information.

8. Operation

WARNING

Electrical shock hazard.

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

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

Scroll Anti-Cycle Timer (Where Applicable)

Single phase units with scroll compressors can be equipped with an anti-cycle device which delays the start of the compressor in the event of a power interruption. This equal-

A temperature rise greater than 60°F (33.3°C) is not recommended. (This applies to electric heat only).

1. To check the temperature rise through the unit, place thermometers in the supply and return air ducts as close to the unit as possible.
2. Open **ALL** registers and duct dampers.
3. Set thermostat Heat-Cool selector to **HEAT**.
4. Set the thermostat temperature setting as high as it will go.
5. Turn electric power **ON**.
6. Operate unit **AT LEAST** 5 minutes, then check temperature rise.

NOTE: The maximum outlet air temperature for all models is 200°F (93.35°C). Maximum temperature rise for electric heat is 60°F (33.35°C).
7. Set thermostat to normal temperature setting.
8. Turn electric power **OFF**.
9. Change blower speed tap if 60°F (33.3°C) Temperature Rise was exceeded and repeat.
10. Be sure to seal all holes in ducts if any were created during this process.

Sequence of Operation

Cooling Mode: Energized (R, G, Y1) De-energized (N/A)

(a) When high and low voltage is initially applied to unit:

(1) On a call for cooling.....:

The compressor and condenser fan will energize. The evaporator blower motor will have a delay on and will energize after 30 seconds.

(2) When the cooling setpoint has been satisfied.....:

The compressor and condenser fan will de-energize immediately. The evaporator blower motor will have a delay off and will de-energize after 30 seconds.

If temperature rise is excessive, verify proper airflow through the unit. If temperature rise is inadequate, check for proper electrical supply to the heater and verify correct airflow.

izes pressure throughout the system and prevents possible reverse rotation of the scroll compressor.

CAUTION

Do NOT operate unit on cooling when the outdoor temperature is below 60°F . This is necessary to prevent possible damage to the compressor.

Turning The Unit Off

1. Set the thermostat selector switch to **OFF** and set the fan switch to **AUTO**. To restart, set thermostat selector switch to **COOL** or **HEAT** and set thermostat to temperature desired.
2. To shut the unit down completely, turn electric high voltage power **OFF**.

Thermostat Fan Switch Operation

With the thermostat fan switch in the **ON** position, the circulating air blower will run continuously at the speed used for cooling.

With the thermostat fan switch in the **AUTO** position, the circulating air blower will only run during each cooling or heating cycle.

9. Maintenance

Monthly Maintenance and Inspection Checks

Air Filters

CAUTION

Do NOT operate unit without air filters.

Inspect filters at least monthly and replace or clean as required. Washable filters may be cleaned by soaking in mild detergent and rinsing with cold water. Replace filters with the arrows on the side pointing in the direction of air flow. Dirty filters are the most common cause of inadequate heating or cooling performance, and of compressor failures.

Cooling Season Checks (Monthly)

Condenser Coil

Keep the condenser inlet and outlet area clean and free of leaves, grass clippings or other debris. Grass should be kept short in front of the condenser air inlet. Shrubbery **MUST** be trimmed back so it is no closer than 30 inches (762mm) to unit panels and 10 inches (254mm) to coil inlet.

The condenser and evaporator coils should be cleaned by using a non-acid type cleaner to avoid removing paint or other type of coating on the coil. Always turn off electrical power to the unit during service and maintenance.

Condensate Drain

Periodic cleaning of the condensate drain & trap may be required. Inspect drainage of condensate after at least 15 minutes of continuous operation in cooling mode during humid conditions.

Annual Maintenance and Inspection

WARNING

Electrical shock hazard.

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

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

The annual inspection **MUST** include lubrication and cleaning as required to ensure efficient operation of the unit. To simplify access, remove all access panels.

Adjusting Room Temperatures

If the temperature in individual rooms is not as desired, balance the system by adjusting the dampers in the branch ducts. Adjust a little at a time and wait a day after each change to judge the effect. Once the dampers are adjusted for normal weather conditions, it is best to leave them that way. Compensate for temporary weather changes by adjusting the thermostat setting.

Condenser Fan Motor

CAUTION

Do NOT use 3 in 1 oil, penetrating oil, WD40 or similar oils to oil motor bearings.

Motors used in this product are considered permanently lubricated for up to 5 years. If oil ports are provided on the motor, oil the condenser fan motor and evaporator blower motor after five years of operation and every five years thereafter.

Use SAE 10W30 motor oil. To oil, remove the hole plugs from the motor end bells and add several drops of oil with a squeeze type, flexible tube oiler. Replace hole plugs after oiling. Do **NOT** over oil.

Clean the surrounding area and the condenser and evaporator coils. Use caution to avoid damage to coil fins. Use a non-acid type of cleaner **ONLY**.

Circulating Air Blower

To access or remove the blower motor use the following steps.

1. Turn electric power **OFF**.
2. Remove the blower access panel.
3. Unplug the wires connected to the speed tap block if necessary, noting the location of each wire for re-installation.
4. Slide entire housing toward you.
5. 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 easily remove, it may be necessary to remove and disassemble the blower assembly for proper cleaning.
6. Oil blower motor if needed.

CAUTION

Do NOT use 3 in 1 oil, penetrating oil, WD40 or similar oils to oil motor bearings.

Oil the blower motor by adding several drops of SAE 10W30 to each motor bearing. The blower motor should be oiled after five years of operation and every five years thereafter.

7. When finished, reassemble in reverse order.