

# Installation Manual



Electric Air Conditioner  
018-060 PA10  
018-060 PA12


PA10  
PA12

**NOTE:** Read the entire instruction manual before starting the installation.

## SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

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

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

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 **WARNING:** Before installing or servicing system, always turn off main power to system. There may be more than 1 disconnect switch. Turn off accessory heater power if applicable. Electrical shock can cause personal injury or death.


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## INSTALLATION RECOMMENDATIONS

**NOTE:** In some cases noise in the living area has been traced to gas pulsations from improper installation of equipment.

1. Locate unit away from windows, patios, decks, and so forth, where unit-operation sound may disturb customer.
2. Ensure that vapor- and liquid-tube diameters are appropriate to capacity of unit.
3. Run refrigerant tubes as directly as possible by avoiding unnecessary turns and bends.
4. Leave some slack between structure and unit to absorb vibration.
5. When passing refrigerant tubes through the wall, seal opening with RTV or other pliable silicon-based caulk. (See Fig. 1.)
6. Avoid direct tubing contact with water pipes, duct work, floor joists, wall studs, floors, and walls.
7. Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap that comes in direct contact with tubing. (See Fig. 1.)
8. Ensure that tubing insulation is pliable and completely surrounds vapor tube.
9. When necessary, use hanger straps which are 1 in. wide and conform to shape of tubing insulation. (See Fig. 1.)
10. Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.

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 **CAUTION:** DO NOT BURY MORE THAN 36 IN. OF REFRIGERANT TUBING IN GROUND. If any section of tubing is buried, there must be a 6-in. vertical rise to valve connections on outdoor unit. If more than recommended length is buried, refrigerant may migrate to cooler buried section during extended periods of unit shutdown, causing refrigerant slugging and possible compressor damage at start-up.

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## INSTALLATION

### PROCEDURE 1—CHECK EQUIPMENT AND JOB SITE

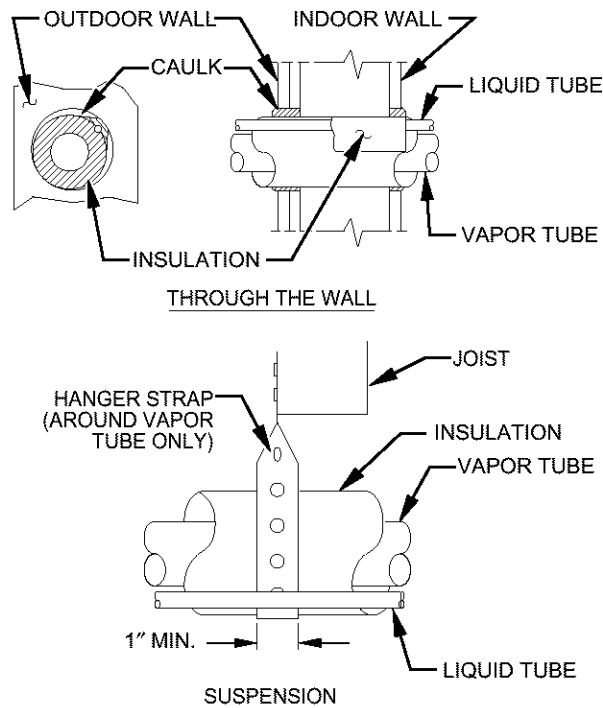
#### A. Unpack Unit

Move to final location. Remove carton taking care not to damage unit.

#### B. Inspect Equipment

File claim with shipping company prior to installation if shipment is damaged or incomplete. Locate unit rating plate on unit control box access panel. It contains information needed to properly install unit. Check rating plate to be sure unit matches job specifications.

**NOTE:** Avoid contact between tubing and structure



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**Fig. 1—Connecting Tubing Installation**

**NOTE:** Check to be certain factory tubing on both indoor and outdoor unit has not been shifted during shipment. Ensure tubes are not rubbing against each other or any sheet metal. Pay close attention to feeder tubes, making sure wires on feeder tubes are secure and tight.

**NOTE:** Check factory wiring and wire connections to ensure terminations are secured properly. Check wire routing to ensure wires are not in contact with tubing, sheet metal, etc.

#### **PROCEDURE 2—INSTALL ON A SOLID, LEVEL MOUNTING PAD**

If conditions or local codes require the unit be attached to pad, tie down bolts should be used and fastened through knockouts provided in unit base pan. Refer to unit mounting pattern in Fig. 2 to determine base pan size and knockout hole location.

Arrange supporting members to adequately support unit and minimize transmission of vibration to building. Consult local codes governing rooftop applications.

**NOTE:** Unit must be level to within  $\pm 2^\circ$  ( $\pm 3/8$  in./ft).

#### **PROCEDURE 3—CLEARANCE REQUIREMENTS**

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 30-in. clearance to service end of unit and 48 in. above unit. For proper airflow, a 6-in. clearance on 1 side of unit and 12 in. on all remaining sides must be maintained. Maintain a distance of 24 in. between units. Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

On rooftop applications, locate unit at least 6 in. above roof surface.

#### **PROCEDURE 4—OPERATING AMBIENT (OUTDOOR TEMPERATURES)**

The minimum outdoor operating ambient in cooling mode is 55°F, and the maximum outdoor operating ambient in cooling mode is 125°F.

#### **PROCEDURE 5—REPLACE INDOOR CHECK-FLO-RATER® PISTON, IF REQUIRED**

Check indoor coil piston to see if it matches the required piston shown on outdoor unit rating plate. If it does not match, replace indoor coil piston with piston shipped with outdoor unit. The piston shipped with outdoor unit is correct for any approved indoor coil combination.

#### **PROCEDURE 6—MAKE REFRIGERANT TUBING CONNECTIONS**

Outdoor units may be connected to indoor sections using accessory tubing package or field-supplied refrigerant grade tubing of correct size and condition. For tubing requirements beyond 50 ft, consult Long-Line Application Guideline which is available at your local distributor. Connect tubing to fittings on outdoor unit vapor and liquid service valves. (See Table 1.)

If refrigerant tubes or indoor coil is exposed to atmospheric conditions for longer than 5 minutes, it must be evacuated to 500 microns to eliminate contamination and moisture in system.

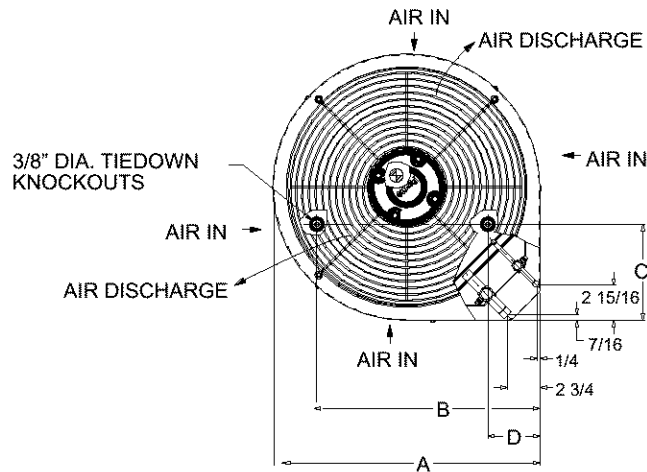
##### **A. Outdoor Unit Connected to Factory Approved Indoor Unit**

Outdoor unit contains correct system refrigerant charge for operation with indoor unit of same size when connected by 15 ft of field-supplied or factory accessory tubing. Check refrigerant charge for maximum efficiency. (See Procedure 11—Check Charge.)

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**⚠ CAUTION:** To avoid valve damage while brazing, service valves must be wrapped with a heat-sink material such as a wet cloth.

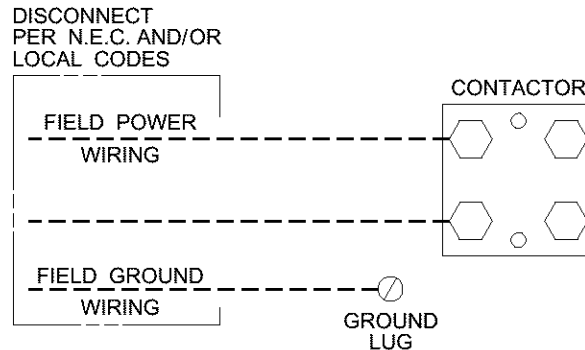
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UNIT SIZE	A	B	C	D
	In.	In.	In.	In.
PA10 060 PA12 024 - 060	30	23-1/2	10	6-1/2
PA10 018 - 048 PA12 018	22-1/2	18-1/2	8-3/16	4-1/16

Fig. 2—Unit Dimensions



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Fig. 3—Line Power Connections

**B. Sweat Connection**

Use refrigerant grade tubing. Service valves are closed from factory and ready for brazing. After wrapping service valve with a wet cloth, braze sweat connections using industry accepted methods and materials. Consult local code requirements. Refrigerant tubing and indoor coil are now ready for leak testing. This check should include all field and factory joints.

**PROCEDURE 7—MAKE ELECTRICAL CONNECTIONS**

**⚠ WARNING:** To avoid personal injury or death, do not supply power to unit with compressor terminal box cover removed.

Be sure field wiring complies with local and national fire, safety, and electrical codes, and voltage to system is within limits shown on unit rating plate. Contact local power company for correction of improper voltage. See unit rating plate for recommended circuit protection device.

**NOTE:** Operation of unit on improper line voltage constitutes abuse and could affect unit reliability. See unit rating plate. Do not install unit in system where voltage or phase imbalance (3 phase) may fluctuate above or below permissible limits.

**NOTE:** Use copper wire only between disconnect switch and unit.

**NOTE:** Install branch circuit disconnect of adequate size per NEC to handle unit starting current. Locate disconnect within sight from and readily accessible from unit, per Section 440-14 of NEC.

**A. Route Ground and Power Wires**

Remove access panel to gain access to unit wiring. Extend wires from disconnect through power wiring hole provided and into unit control box.

**⚠ WARNING:** According to NEC, ANSI/NFPA 70, and local codes, cabinet must have an uninterrupted or unbroken ground to minimize personal injury if an electrical fault should occur. The ground may consist of electrical wire or metal conduit when installed in accordance with existing electrical codes. Failure to follow this warning can result in an electric shock, fire, or death.

**B. Connect Ground and Power Wires**

Connect ground wire to ground connection in control box for safety. Connect power wiring to contactor as shown in Fig. 3.

**Table 1—Refrigerant Connections and Recommended Liquid and Vapor Tube Diameters (In.)**

UNIT SIZE	LIQUID		VAPOR	
	Connect Diameter	Tube Diameter	Connect Diameter	Tube Diameter
018, 024	3/8	3/8	3/8	5/8
030, 036	3/8	3/8	3/8	3/4
042–048	3/8	3/8	7/8	7/8
060	3/8	3/8	7/8	1-1/8

Note: Tube diameters are for lengths up to 60 ft. For tubing lengths greater than 60 ft, consult your local distributor or Long-Line Application Guideline.

### C. Connect Control Wiring

Route 24-v control wires through control wiring grommet and connect leads to control wiring. (See Fig. 5.) Use No. 18 AWG color-coded, insulated (35°C minimum) wire. If thermostat is located more than 100 ft from unit, as measured along the control voltage wires, use No. 16 AWG color coded wire to avoid excessive voltage drop.

Use furnace transformer, fan coil transformer, or accessory transformer for control power, 24-v/40-va minimum.

**NOTE:** Use of available 24-v accessories may exceed the minimum 40-va power requirement. Determine total transformer loading and increase the transformer capacity or split the load with an accessory transformer as required.

#### PROCEDURE 8—COMPRESSOR CRANKCASE HEATER

A crankcase heater is required if refrigerant tubing is longer than 50 ft.

#### PROCEDURE 9—INSTALL ELECTRICAL ACCESSORIES

Refer to the individual instructions packaged with kits or accessories when installing.

#### PROCEDURE 10—START-UP

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#### **⚠ CAUTION:**

- 3-phase scroll compressors are rotation sensitive.
- A flashing LED on phase monitor indicates reverse rotation. (See Fig. 4 and Table 2.)
- This will not allow contactor to be energized.
- Disconnect power to unit and interchange 2 field wiring leads on unit contactor.

1. When equipped with a crankcase heater, energize heater a minimum of 24 hr before starting unit. To energize heater only, set thermostat to OFF mode and close electrical disconnect to outdoor unit.

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#### **⚠ CAUTION: Service valve gage ports are equipped with Schrader valves. To prevent personal injury, wear safety glasses and gloves when handling refrigerant.**

2. Fully back seated (open) liquid and vapor service valves.
3. Unit is shipped with valve stem(s) front seated (closed), and caps installed. Replace stem caps after system is opened to refrigerant flow. Replace caps finger-tight and tighten additional 1/6 turn with wrench.
4. Close electrical disconnects to energize system.
5. Set room thermostat at desired temperature. Be sure set point is below indoor ambient temperature.
6. Set room thermostat at COOL and fan ON or AUTO modes, as desired. Operate unit for 15 minutes. Check system refrigerant charge. See Check Charge section.

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#### **⚠ WARNING: Relieve pressure and recover all refrigerant before system repair or final unit disposal to avoid personal injury or death. Use all service ports and open all flow control devices, including solenoid valves.**

### A. Sequence of Operation

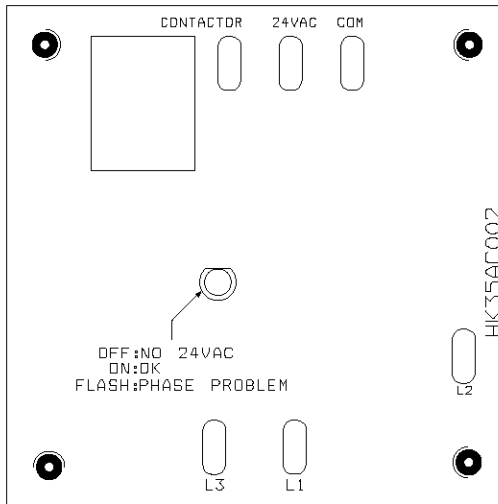
Turn on power to indoor and outdoor units. Transformer is energized.

On a call for cooling, thermostat makes circuits R-Y and R-G. On three phase models with scroll compressors, the units are equipped with a phase monitor to detect if the incoming power is correctly phased for compressor operation. (See Fig. 4 and Table 2.) If the phasing is correct, circuit R-Y energizes contactor, starting outdoor fan motor and compressor circuit. R-G energizes indoor unit blower relay, starting indoor blower motor on high speed.

**NOTE:** If the phasing is incorrect, the contactor will not be energized. To correct the phasing, interchange any two of the three power connections on the field side.

When thermostat is satisfied, its contacts open, de-energizing contactor and blower relay. Compressor and motors stop.

If indoor unit is equipped with an off delay circuit, the indoor blower can run up to an additional 120 sec to increase system efficiency.



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**Fig. 4—3 Phase Monitor Control**

**Table 2—Phase Monitor LED Indicators**

LED	STATUS
OFF	No call for compressor operation
FLASHING	Reversed phase
ON	Normal

**PROCEDURE 11—CHECK CHARGE**

**A. Unit Charge**

Factory charge is shown on unit rating plate. (See Fig. 1.) Charge procedure is shown on wiring/charging label located on unit.

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**⚠ CAUTION: Compressor damage may occur if system is overcharged.**

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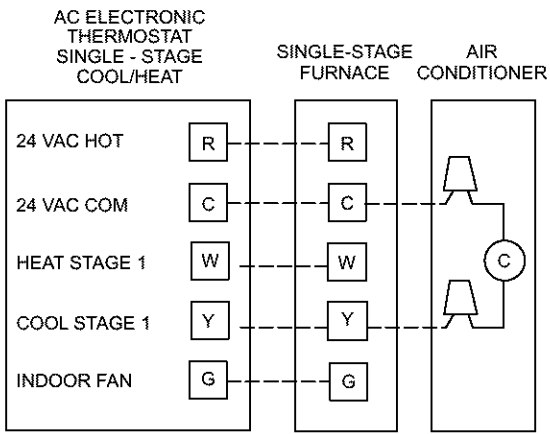
**⚠ CAUTION: Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.**

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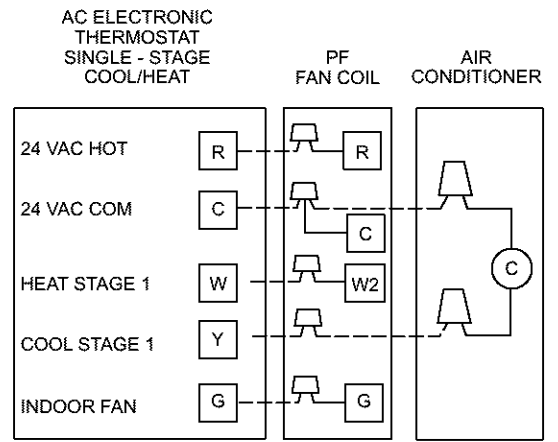
**CARE AND MAINTENANCE**

For continuing high performance, and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your servicing contractor or User's Manual for proper frequency of maintenance. Frequency of maintenance may vary depending upon geographic areas, such as coastal applications.

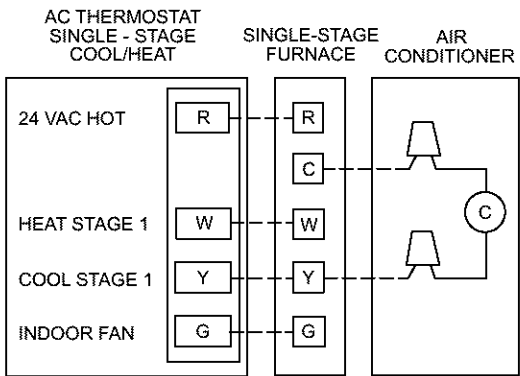
Leave User's Manual with homeowner. Explain system operation and maintenance procedures outlined in manual.



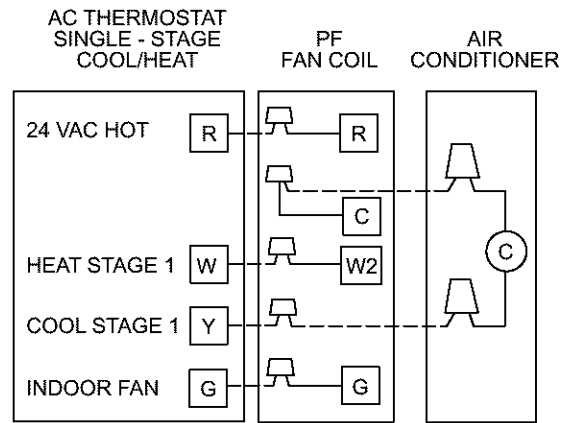
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Fig. 5—Typical 24v Circuit Connections