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## Installation and Start-Up Instructions

**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, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies 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.

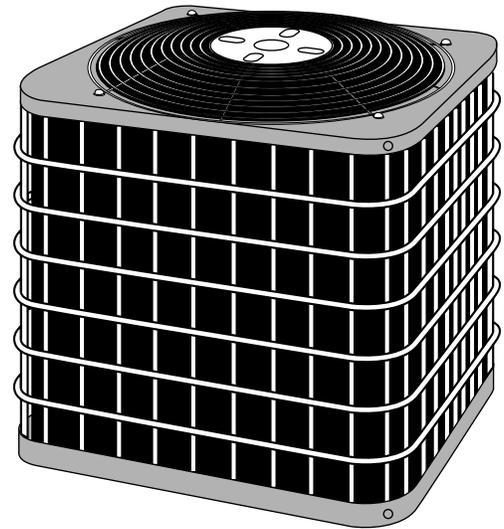
### WARNING

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.

### 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.
2. Ensure that vapor and liquid tube diameters are appropriate to capacity of unit. (See Model Specific Instructions for proper tube sizing.)
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. 2.)
6. Avoid direct tubing contact with water pipes, ductwork, floor joists, wall studs, floors, and walls.



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**Fig. 1—Split-System Air Conditioner**

7. Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap which comes in direct contact with the tubing. (See Fig. 2.)
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. 2.)
10. Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.

When outdoor unit is connected to factory-approved indoor unit, outdoor unit contains system refrigerant charge for operation with factory-approved indoor unit of the same size when connected by 15 ft of field-supplied tubing. For proper unit operation, check refrigerant charge using charging information located on control box cover.

### INSTALLATION

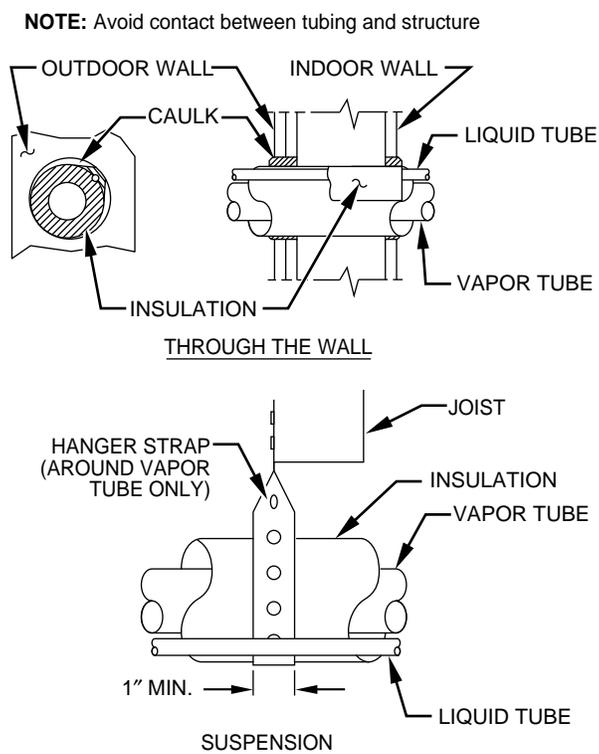
#### Step 1—Check Equipment and Jobsite

**INSPECT EQUIPMENT** — If shipment is damaged or incomplete, file claim with shipping company prior to installation. Locate unit rating plate on unit service panel. It contains information needed to properly install unit. Check rating plate to be sure unit matches job specifications.

#### Step 2—Install on a Solid, Level Mounting Pad

If conditions or local codes require the unit be attached to pad, use tiedown bolts to fasten through knockouts provided in unit base pan. Refer to Fig. 3 for pad dimensions and dimensions needed to mount unit to pad.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.



**Fig. 2—Connecting Tubing Installation**

**Step 3—Clearance Requirements**

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Common clearances are 6 in. on 1 side, 12 in. on 2 sides, and 30 in. on service side of unit. Allow 24 in. between units. Discharge air must be unobstructed and must not recirculate.

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. Place unit above a load-bearing wall and isolate unit and tubing set from structure.

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

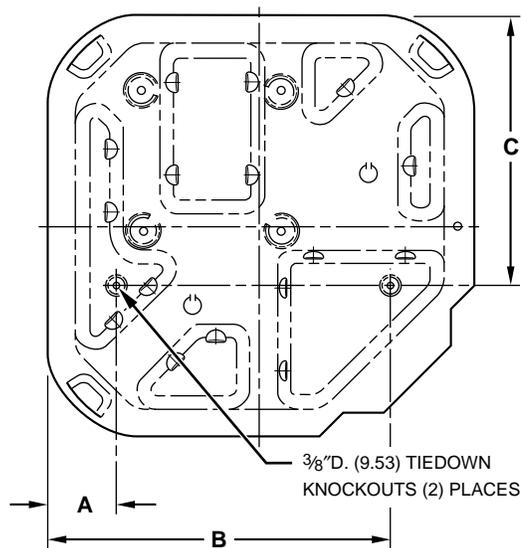
**Step 4—Operating Ambients**

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

**Step 5—Metering Device**

If unit is being installed with piston, 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.

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UNIT SIZE	MIN PAD DIM (IN.)	TIEDOWN KNOCKOUT LOCATIONS		
		A (In.)	B (In.)	C (In.)
38CKC(Q)018, 024	18 X 18	3	15	10-3/16
38CKC(Q)030-042 38CMC018-030	22-1/2 X 22-1/2	3-11/16	18-1/8	14-3/8
38BRC024-060 38CKC(Q)048, 060 38CMC036-060	30 X 30	6-1/2	23-1/2	20

**Fig. 3—Mount Unit to Pad**

**Step 6—Make Tubing Connections**

**⚠ 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.

**⚠ CAUTION**

To prevent compressor damage DO NOT bury more than 36 in. of refrigerant tubing. If ANY tubing is buried, provide 6 in. vertical rise at service valve.

**⚠ CAUTION**

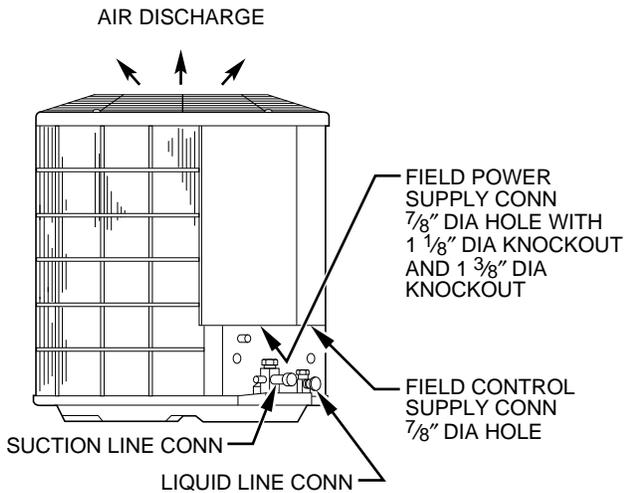
To prevent damage to unit or service valves observe the following:

- Use a brazing shield.
- Wrap service valves with wet cloth or use a heat sink material.

Connect outdoor unit to indoor sections using accessory tubing package or field-supplied tubing of refrigerant grade, correct size, and condition. Refer to Fig. 4 for refrigerant tube dimensions and connections. For tubing requirements beyond 50 ft, consult your local distributor or the Long-Line Application Guideline.

**SWEAT CONNECTION**

1. Consult local code requirements.
2. Connect tubing to fittings on outdoor unit vapor and liquid service valves.
3. Service valves are closed from factory and ready for brazing.



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UNIT SIZE	LIQUID TUBE		VAPOR TUBE	
	Conn Dia	Tube Dia	Conn Dia	Tube Dia
018, 024	3/8	3/8	5/8	5/8
030, 036	3/8	3/8	3/4	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 50 ft. For tubing lengths greater than 50 ft, consult your local distributor.

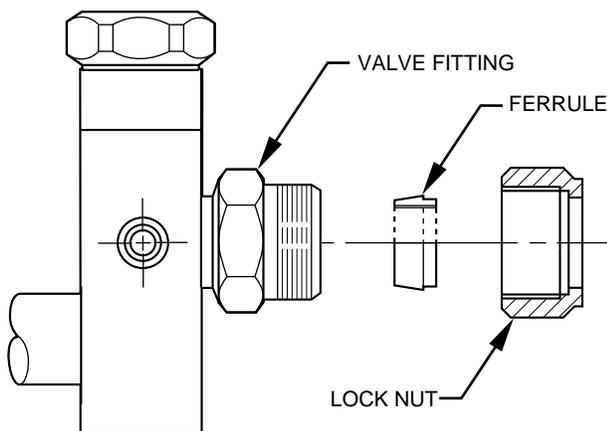
If refrigerant tubing or indoor coil is exposed to atmosphere, it must be evacuated to a minimum of 500 microns to eliminate contamination and moisture in the system.

**Fig. 4—Refrigerant Tube Dimensions/Connections**

4. After wrapping service valve with a wet cloth, tubing set can be brazed to service valve using either silver bearing or non-silver bearing brazing material.
5. Refrigerant tubing and indoor coil are now ready for leak testing. This check should include all field and factory joints.

**MECHANICAL CONNECTION (38CKQ MODELS)**

1. Cut tubing to correct length, deburr, and size as necessary, making sure tube ends are square. If a large burr is evident, ID and OD must be deburred to allow tube to bottom in valve.
2. Remove lock nuts and ferrules from plastic bags taped to service panel. (See Fig. 5.)



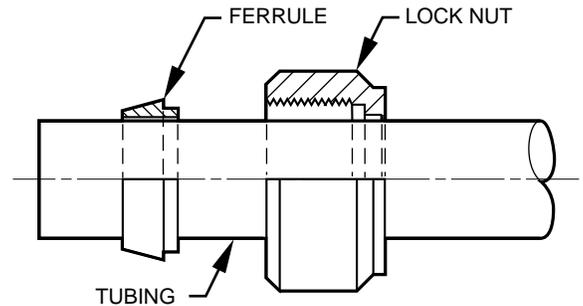
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**Fig. 5—Mechanical Fitting Assembly (38CKQ)**

**CAUTION**

If undersized, damaged, or elliptically shaped tubing is used when making connection, leaks could result.

3. Slide lock nut and ferrule onto each tube. (See Fig. 6.)



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**Fig. 6—Lock Nut/Ferrule Positioning (38CKQ)**

4. Apply a few drops of refrigerant oil to ferrule and valve threads to reduce assembly torque and assist sealing.
5. Insert tube end into service valve until it bottoms.
6. Push ferrule into place and hand tighten nut until an increase in torque is felt.
7. Mark nut and tube and tighten 1-1/2 turns from mark. (See Fig. 7.) Keep tube bottomed in valve while tightening nut.

**NOTE:** A backup wrench on the hex part of the suction valve is required while tightening.

**CAUTION**

The tube end must stay bottomed in the service valve during final assembly to ensure proper seating, sealing, and rigidity.

**MECHANICAL FITTING REPAIR**

To replace damaged ferrule or tubing proceed as follows.

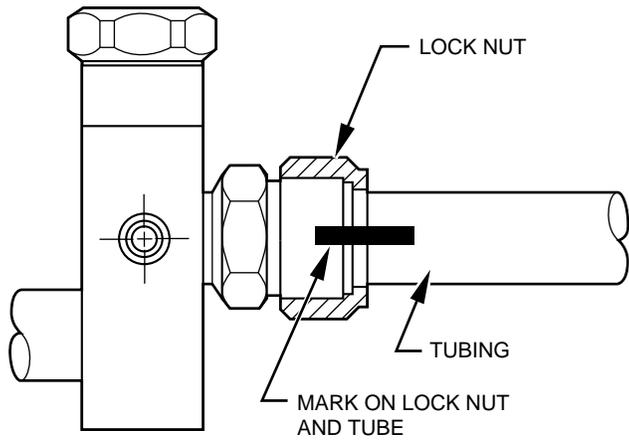
1. Attach gages to service valves.
2. Close liquid service valve and operate unit to pump refrigerant charge into condenser coil.
3. When suction pressure reaches 5 psig, shut unit off. Do not operate unit in a vacuum.
4. Close suction service valve and recover refrigerant in tubing.
5. Back-off locknut and ferrule onto tube.
6. Remove damaged part of tubing using tubing cutter. Repeat installation procedure previously outlined using new ferrule.
7. Evacuate tubing set and indoor coil. Check for leaks.
8. Open service valves or recharge unit. Check refrigerant charge.

**Step 7—Install Solenoid Valve In Liquid Tube (If Required)**

**CAUTION**

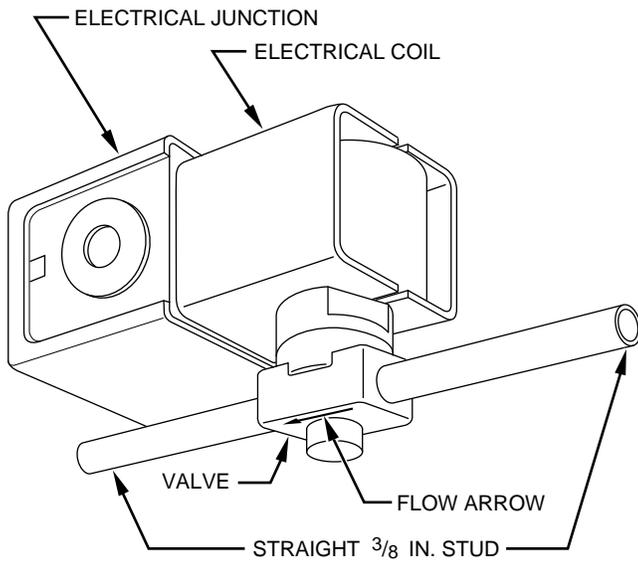
Not all applications require use of a liquid tube solenoid valve. If your unit has been shipped with a liquid tube solenoid valve in the unit, it must be installed for performance enhancement. The liquid tube solenoid valve must be energized during evacuation for complete removal of refrigerant.

Before making liquid tube connections, install factory-supplied solenoid valve on indoor liquid fitting. (See Fig. 8.) Be sure to use flare adapter supplied with the indoor coil when making connections.



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**Fig. 7—Proper Marking of Valve Assembly (38CKQ)**



**NOTE:** System flow direction must match arrow on bottom of body.

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**Fig. 8—Solenoid Valve Installation**

**⚠ CAUTION**

Wiring must comply with local codes and NEC requirements, if a field-supplied control power source is needed when adding solenoid.

1. Remove coil liquid connection cap and discard.
2. Mount solenoid valve on liquid tube, making sure valve flow arrow points toward indoor coil. Mount valve in any position except valve body at top and electric coil at bottom. (See Fig. 8.) Solenoid valve is to be installed a maximum of 2 ft from indoor coil.

**⚠ CAUTION**

Avoid valve damage while brazing by wrapping valve with a heat-sinking material such as a wet cloth.

3. Braze valve onto end of liquid tube using silver bearing or non-silver bearing brazing material. Consult local code requirements.
4. Braze flare adapter onto outlet end of solenoid valve.

5. Wire solenoid coil into system control circuit.

**Step 8—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.

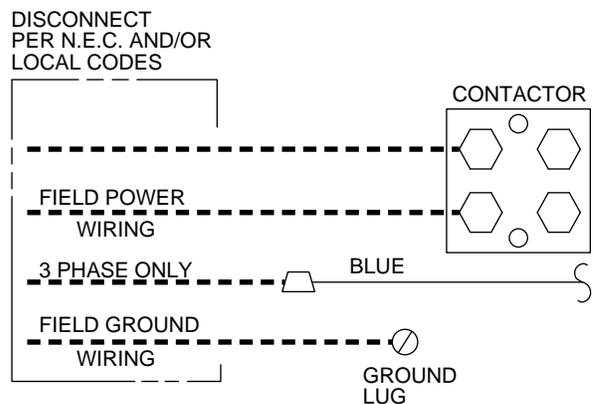
**NOTE:** Install branch circuit disconnect of adequate size per NEC to handle unit starting current. Locate disconnect within sight from and readily accessible from unit, per Section 440-14 of NEC.

**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**

The unit 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.

**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. 9.



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**Fig. 9—Line Power Connections**

**CONNECT CONTROL WIRING** — Route 24-v control wires through control wiring grommet and connect leads to control wiring. (See Fig. 10.)

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.

### Step 9—Compressor Crankcase Heater

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

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

**NOTE:** The Seasonal Energy Efficiency Ratio (SEER) is obtained with crankcase heater de-energized. To de-energize crankcase heater, disconnect black crankcase heater wires at contactor. After disconnecting, make sure wires are isolated from all other electrical connections and components to prevent electrical shorting.

### Step 10—Install Electrical Accessories

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

### Step 11—Start-Up and Check Charge

#### ⚠ CAUTION

To prevent compressor damage or personal injury, observe the following:

- Do not overcharge system with refrigerant.
- Do not operate unit in a vacuum or at negative pressure.
- Do not disable low-pressure switch

In scroll compressor applications:

- Dome temperatures may be hot.
- In 3 phase application, incorrect phasing will cause reverse rotation, resulting in elevated noise levels, equalized pressures, and reduced current draw. Correct by reversing power connection L1 and L2 on contactor.

#### ⚠ CAUTION

To prevent personal injury wear safety glasses, protective clothing, and gloves when handling refrigerant and observe the following:

- Back seating service valves are not equipped with Schrader valves. Fully back seat (counter clockwise) valve stem before removing gage port cap.
- Front seating service valves are equipped with Schrader valves.

#### ⚠ CAUTION

Do not vent refrigerant to atmosphere. Recover during system repair or final unit disposal.

Follow these steps to properly pumpdown a system and avoid negative suction pressure.

1. Fully back seat (open) liquid and vapor tube service valves.
2. 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 with wrench an additional 1/6-turn for front seating valves (female hex stem) or 1/12 turn for back seating valves (male square stem).
3. Close electrical disconnects to energize system.
4. Set room thermostat at desired temperature. Be sure set point is below indoor ambient temperature.
5. Set room thermostat to COOL and fan to FAN or AUTO mode, as desired. Operate unit for 15 minutes. Check system refrigerant charge.
6. Factory charge is shown on unit rating plate. Adjust charge by following procedure shown on charging tables located on unit.

#### 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. 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.

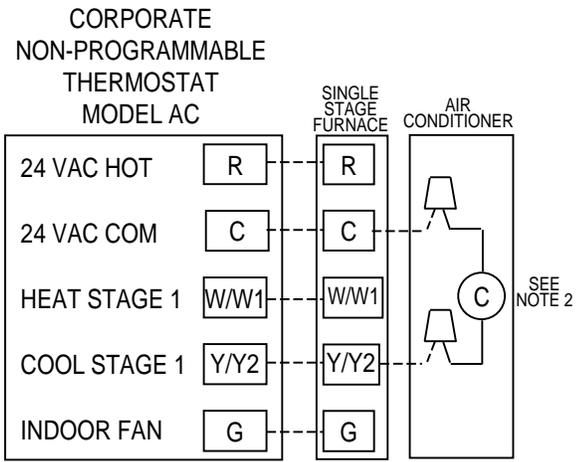
When thermostat is satisfied, its contacts open, de-energizing contactor and blower relay. Compressor and motors stop.

If indoor unit is equipped with a time-delay relay circuit, the indoor blower will run an additional 90 sec to increase system efficiency.

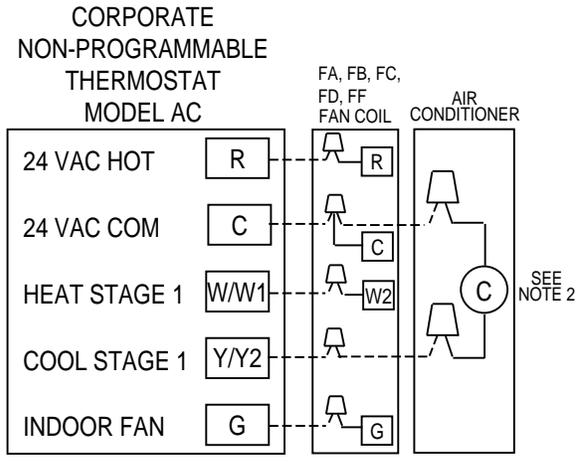
#### CARE AND MAINTENANCE

For continued high performance and to minimize possible equipment failure, periodic maintenance **must** be performed on this equipment.

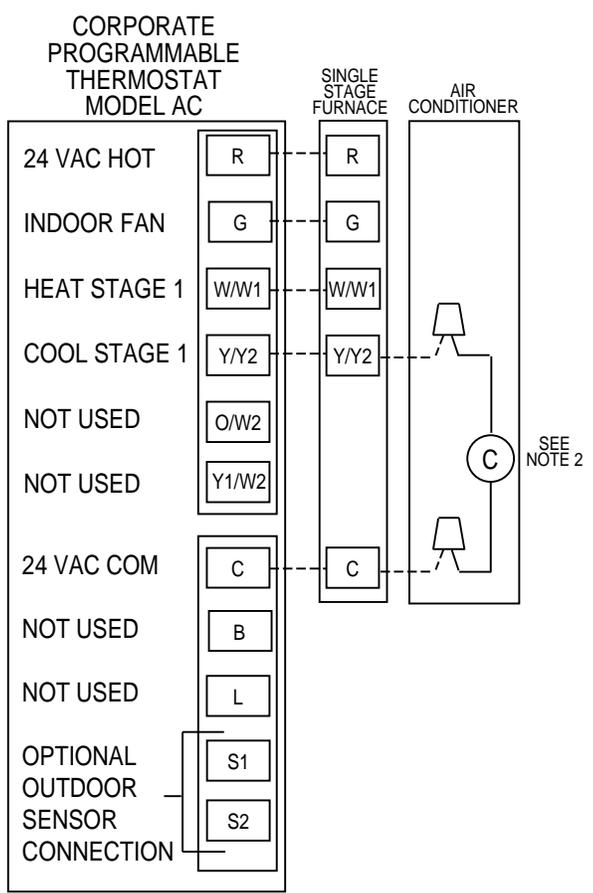
Leave User's Manual with homeowner. Explain system operation and periodic maintenance requirements outlined in manual. Frequency of maintenance may vary depending on geographic areas, such as coastal applications which require more frequent maintenance.



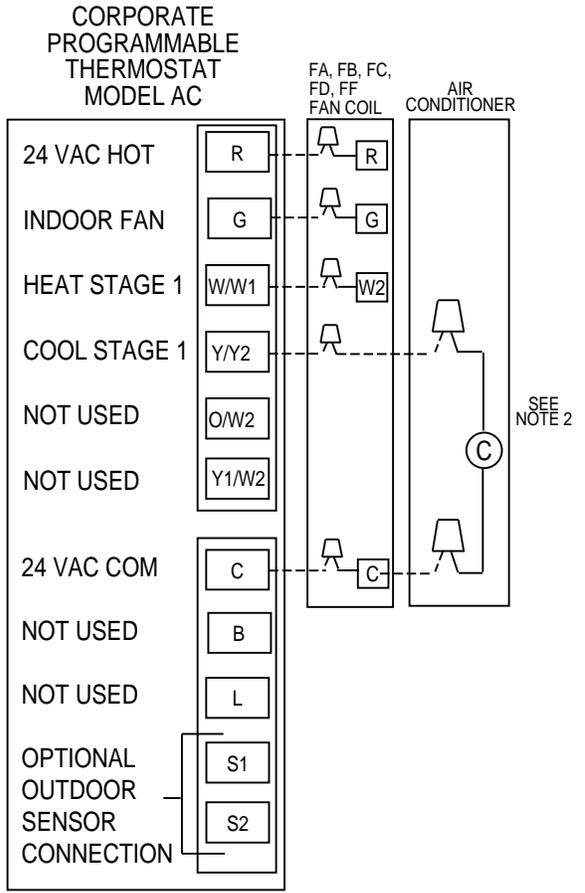
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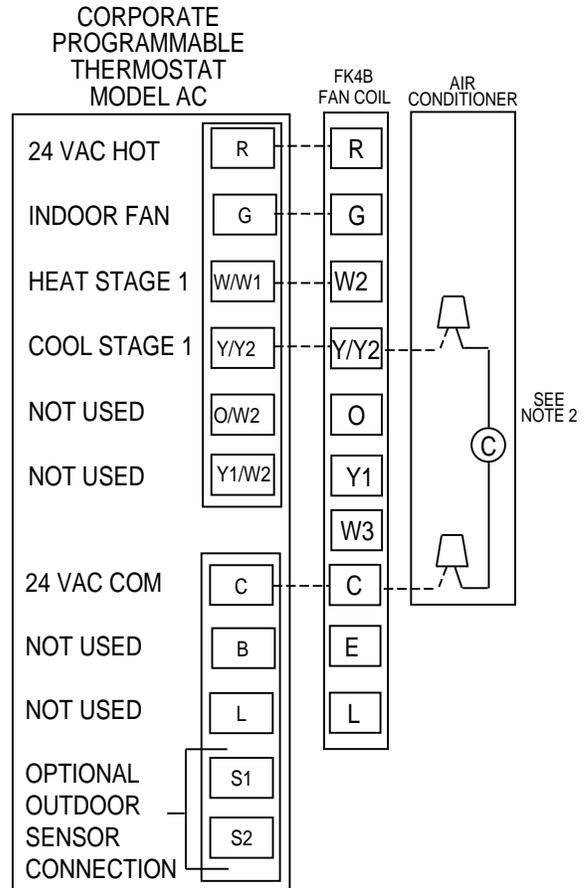
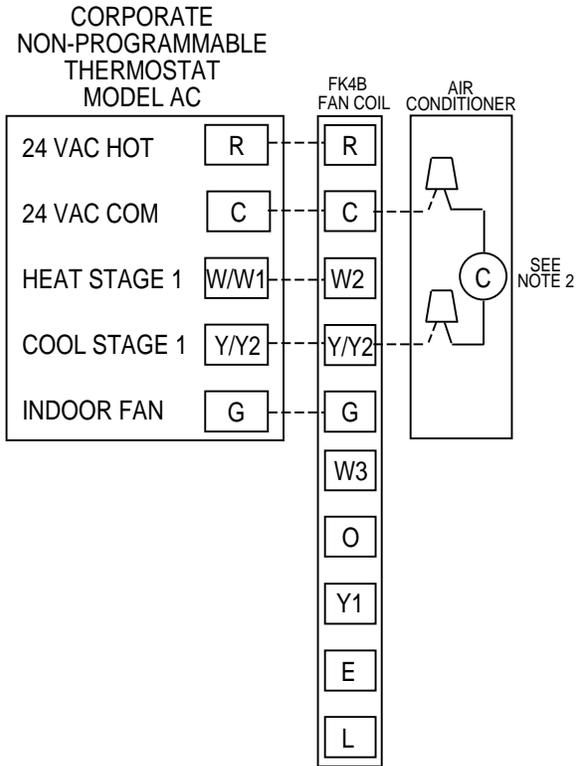


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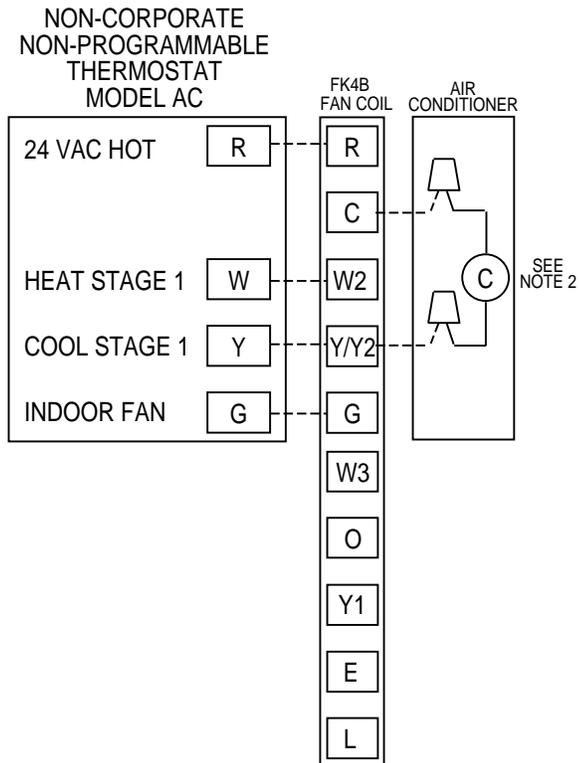
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**Fig. 10—Typical 24-v Circuit Connections**



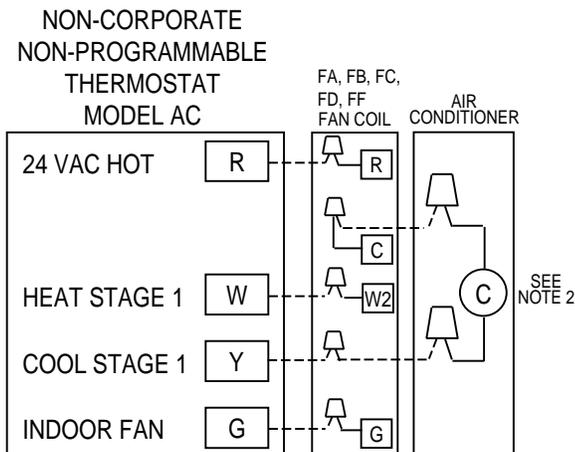
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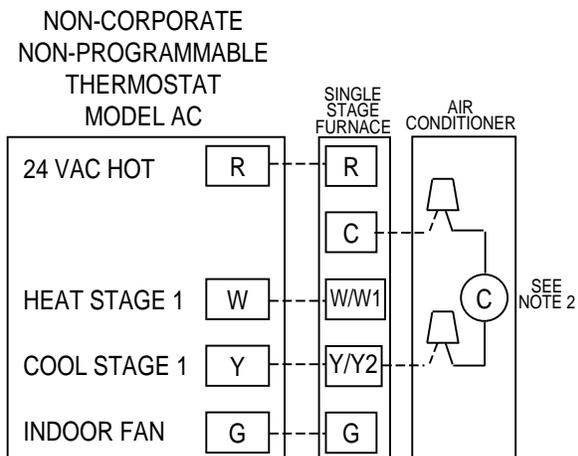


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**Fig. 10—Typical 24-v Circuit Connections (Continued)**



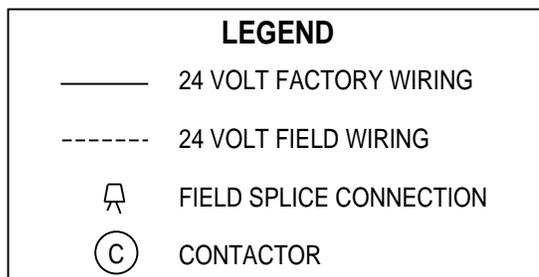
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**NOTES:**

1. CORPORATE THERMOSTAT WIRING DIAGRAMS ARE ONLY ACCURATE FOR MODEL NUMBERS BEGINNING WITH TSTAT \_\_\_\_\_
2. WIRING MUST CONFORM TO NEC OR LOCAL CODE.
3. SOME UNITS ARE EQUIPPED WITH PRESSURE SWITCH(ES), TEMPERATURE SWITCH, OR 5 MINUTE COMPRESSOR CYCLE PROTECTION. CONNECT 24 VOLT FIELD WIRING TO FACTORY PROVIDED STRIPPED LEADS.
4. A LIQUID LINE SOLENOID VALVE IS REQUIRED ON SOME UNITS. SEE SPECIFIC UNIT INSTRUCTIONS.
5. THERMOSTATS ARE FACTORY CONFIGURED WITH 5 MINUTE COMPRESSOR CYCLE PROTECTION AND 4 CYCLES PER HOUR LIMIT. SEE THERMOSTAT INSTRUCTIONS FOR DETAILS.
6. TO STAGE THE ELECTRIC RESISTANCE HEAT, CONSULT OUTDOOR THERMOSTAT INSTALLATION INSTRUCTIONS.



**Fig 10—Typical 24-v Circuit Connections (Continued)**

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