

INSTALLATION and START-UP INSTRUCTIONS

Split System Air Conditioners

Model N2AE

For Use with R-22 Refrigerant



CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in improper unit operation.

Units that do not contain refrigerant, have a nitrogen holding charge.

Prior to operation, the nitrogen holding charge must be evacuated and the unit charged with R-22 refrigerant per these instructions.

Use only R-22 refrigerant when servicing this unit

Do not use R-410A refrigerant in this system.

This unit is factory shipped with the correct amount of POE compressor oil. Additional oil does not need to be added to this unit.

These instructions must be read and understood completely before attempting installation.

Safety Labeling and Signal Words

DANGER, WARNING, CAUTION, and NOTE

The signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTE** 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**, **CAUTION**, and **NOTE** will be used on product labels and throughout this manual and other manuals that may apply to the product.

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.

NOTE – Used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

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

Signal Words on Product Labeling


Signal words are used in combination with colors and/or pictures on product labels.

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) or

International Electrotechnical Commission (IEC) 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.

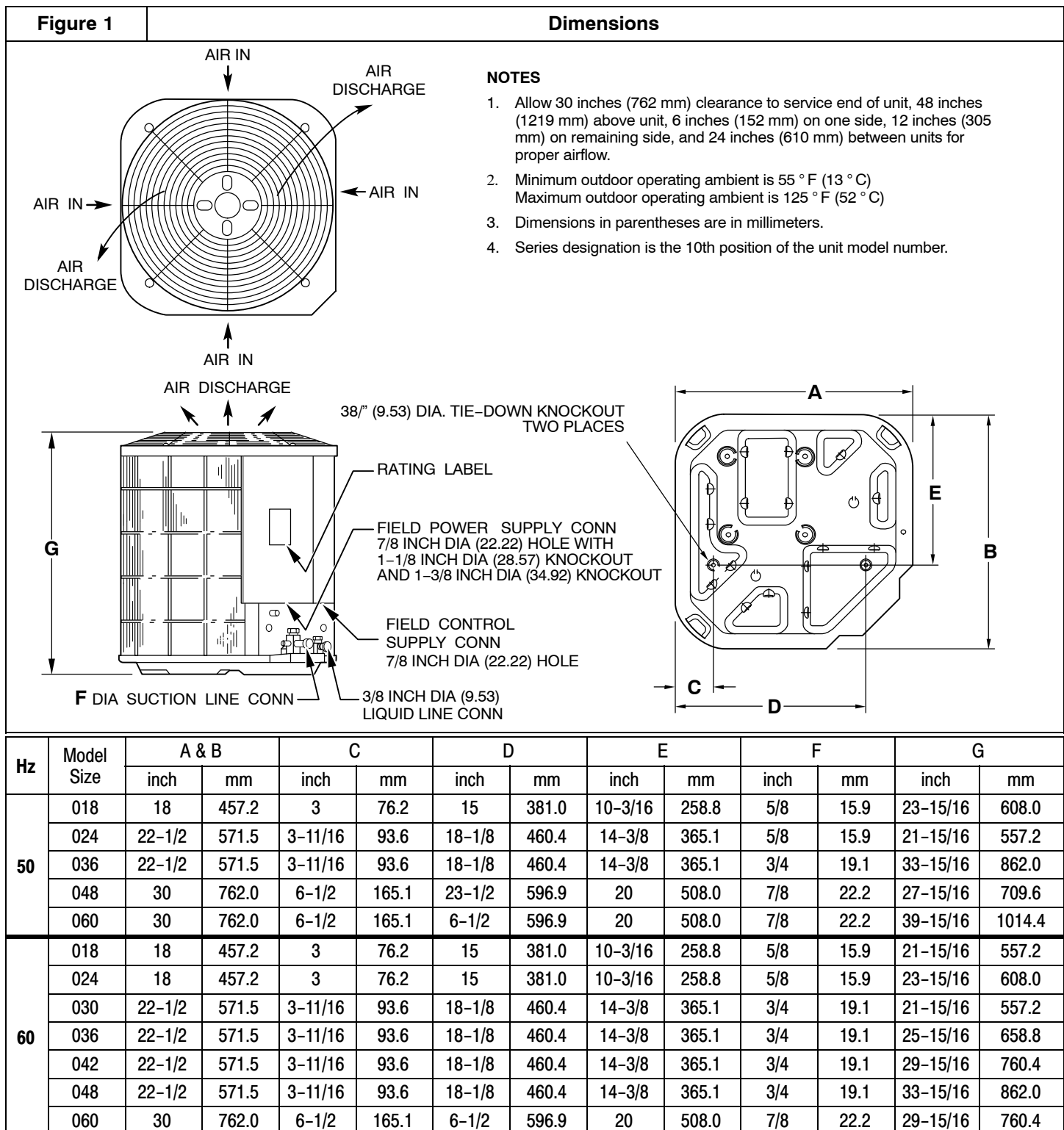


WARNING

ELECTRICAL SHOCK HAZARD

Failure to turn off the main (remote) electrical disconnect device could result in personal injury or death.

Before installing, modifying or servicing system, turn OFF the main (remote) electrical disconnect device. There may be more than one disconnect device.



pattern in Figure 1 to determine base-pan size and knockout-hole location.

On rooftop applications, mount on level platform or frame. Place unit above a load-bearing wall. Arrange supporting members to adequately support unit and minimize transmission of vibration to building. Consult local codes governing rooftop applications.

Roof mounted units exposed to winds above 5 mph (8km/h) may require wind baffles to achieve adequate defrost.

NOTE: Unit must be level to within $\pm 2^\circ$ per compressor manufacturer specifications.

STEP 3 – CLEARANCE REQUIREMENTS

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (610 mm) clearance to service end of unit and 48 in. (1219.2 mm) above unit. For proper airflow, a 6 in. (152.4 mm) clearance on one side of unit and 12 in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (609.6 mm) between units or 18 in. (457.2 mm) if no overhang within 12 ft. (3.66m). Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

On rooftop applications, locate unit 6 inches (152 mm) above roof surface.

NOTE: Unit must be level ± 2 degrees [3/8 inch rise or fall per foot of run (10 mm rise or fall per 305 mm of run)] or compressor may not function properly.

STEP 4 – OPERATING AMBIENT

The minimum outdoor operating ambient is 55 °F (13 °C), and the maximum outdoor operating ambient is 125 °F (52 °C).

STEP 5 – REPLACE INDOOR 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 the outdoor unit. The piston shipped with outdoor unit is correct for any approved indoor coil combination.

STEP 6 – REFRIGERANT TUBING CONNECTIONS

COMPONENT MATCHES

Check to see that the proper system components are in place, especially the indoor coil.

R-22 outdoor units can only be used with R-22 specific indoor coils. If there is a refrigerant mis-match, consult the indoor coil manufacturer to determine if a refrigerant conversion kit is available for the indoor coil.

The outdoor unit is designed for use only with indoor coils that utilize a TXV refrigerant metering device. If any other type of metering device is installed on the indoor coil, consult the indoor coil manufacturer to determine if a TXV conversion kit is available.

The compressors for these units are supplied with Polyol Ester (POE) Oil. If the existing line set and indoor coil has residual mineral oil (MO) there is no concern with percentage of oil mixtures as both are miscible with the R-22. Mixtures of both oils at any percentage will lubricate and return with the R-22.



WARNING

EXPLOSION AND FIRE HAZARD

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

This unit is designed to use ONLY R-22 refrigerant. Use ONLY R-22 when initially charging or servicing this unit.

DO NOT under any circumstances use any refrigerant other than R-22 in this unit.

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 80 feet (24.4 m), or more than 20 feet (6.1 m) vertical differential, consult Long-Line Application Guideline which is available at your local distributor.

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

INSTALLATION RECOMMENDATIONS

1. Locate unit away from windows.
2. Ensure that vapor- and liquid-tube diameters are appropriate to capacity of unit (see Figure 2).
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 Figure 3).
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 Figure 3).
8. Ensure that tubing insulation is pliable and completely surrounds vapor tube.
9. When necessary, use hanger straps which are 1 inch (25.4 mm) wide and conform to shape of tubing insulation (see Figure 3).
10. Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.



CAUTION

UNIT OPERATION HAZARD

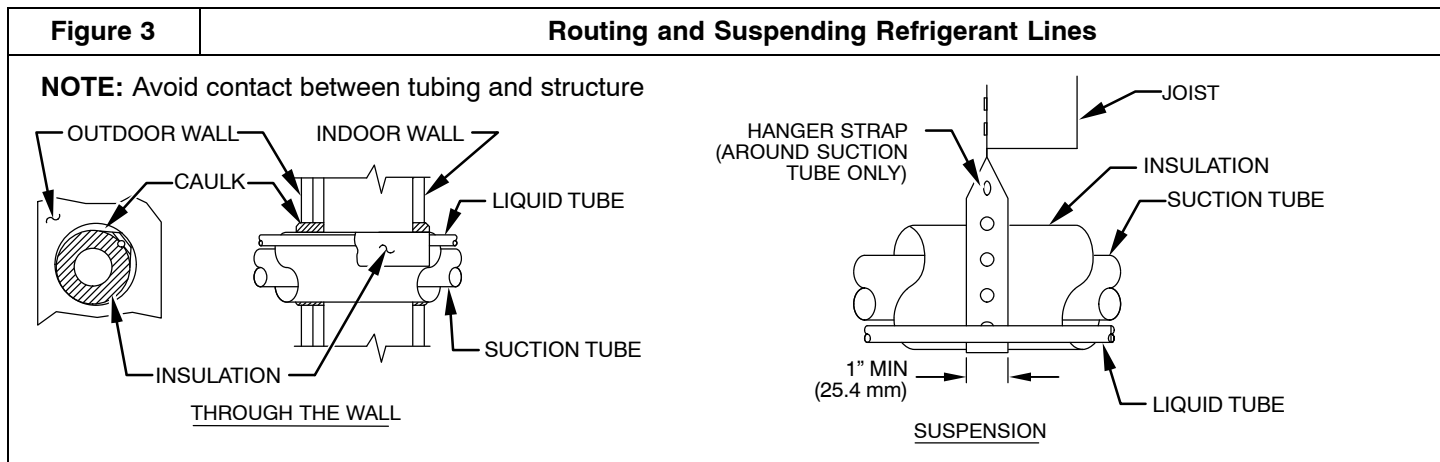
Failure to follow this caution may result in improper product operation.

Do not bury more than 36" (910 mm) of line set underground. Refrigerant may migrate to cooler buried section during extended periods of unit shut-down, causing refrigerant slugging and possible compressor damage at start-up.

If ANY section of the line set is buried underground, provide a minimum 6" (150 mm) vertical rise at the service valve.

Figure 2	Service Valve Fittings inches (mm)		Line Set Tube Diameter, inches (mm) Liquid Tube Always a (9.53) dia.
Model Size	Liquid	Suction	Suction Line Diameter
018 (12 ton), 24 (2 ton)	3/8 (9.53)	5/8 (15.88)	5/8 (15.88)
030 (22 ton)	3/8 (9.53)	3/4 (19.05)	3/4 (19.05)
036 (3 ton)	3/8 (9.53)	3/4 (19.05)	3/4 (19.05)
048 (4 ton)	3/8 (9.53)	7/8 (22.23)	7/8 (22.23)
060 (5 ton)	3/8 (9.53)	7/8 (22.23)	1-1/8 (28.58)

Notes: 1. For tube line sets over 80 feet (24.4 m), consult Long-Line Application Guideline.
2. Do not apply capillary tube indoor coils to these units.



OUTDOOR UNITS CONNECTED TO FACTORY APPROVED INDOOR UNITS

Outdoor unit contains correct system refrigerant charge for operation with indoor unit of same size when connected by 15 feet (4.55 m) of field-supplied or factory-accessory tubing. Check refrigerant charge for maximum efficiency.

REFRIGERANT TUBING

Connect tubing to fittings on outdoor unit vapor and liquid service valves (see Figure 1).

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



WARNING

PERSONAL INJURY AND/OR PROPERTY DAMAGE HAZARD

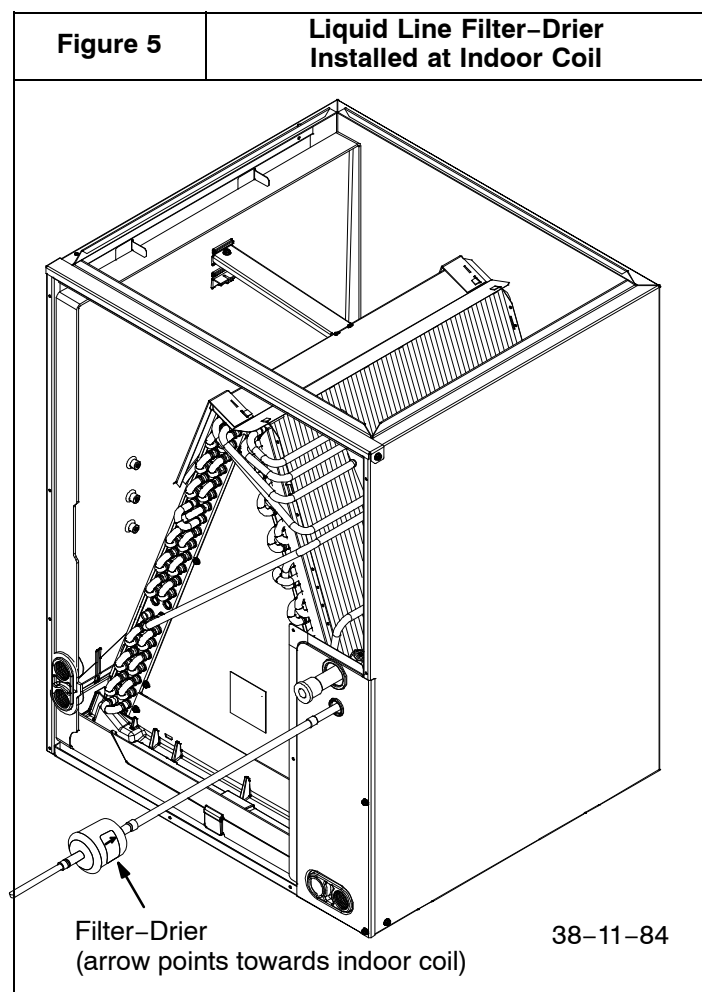
Failure to relieve system pressure could result in personal injury and/or property damage.

Relieve pressure and recover all refrigerant before servicing existing equipment, and before final unit disposal. Use all service ports and open all flow-control devices, including solenoid valves.

LIQUID LINE FILTER-DRIER

NOTE: It is required that an approved filter drier (XH-6 with 25% activated alumina/75% molecular sieve desiccants) be installed in the liquid line due to the POE oil.

Leave the plugs in the tube ends until the filter-drier is installed. The optimal location for the filter-drier is close to the indoor coil. Install the filter-drier with the arrow pointing towards the indoor coil. Refer to Figure 5.



**CAUTION****PRODUCT DAMAGE HAZARD**

Failure to follow this caution may result in product damage.

Use a brazing shield.

Wrap service valves with wet cloth or use a heat sink material.

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.

EVACUATING CONDENSER, LINE SET, AND INDOOR COIL**CAUTION****PRODUCT DAMAGE HAZARD**

Failure to follow this caution may result in product damage.

Never use the outdoor unit compressor as a vacuum pump. Doing so may damage the compressor.

Condenser, line set, and indoor coils should be evacuated using the recommended deep vacuum method of 500 microns. If deep vacuum equipment is not available. The alternate triple evacuation method may be used by following the specified procedure.

If vacuum must be interrupted during the evacuation procedure, always break vacuum with dry nitrogen.

**CAUTION****UNIT OPERATION HAZARD**

Failure to follow this caution may result in improper unit operation.

This unit is filled with a Nitrogen charge. Prior to starting this unit, evacuate to 500 microns and charge with refrigerant listed on rating label. Purge nitrogen before connection to vacuum pump

STEP 7 – MAKE ELECTRICAL CONNECTIONS

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 may fluctuate above or below permissible limits.

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

NOTE: Install branch circuit disconnect per local codes of adequate size to handle unit starting current. Locate disconnect within sight from and readily accessible from unit per local codes.

**WARNING****ELECTRICAL SHOCK HAZARD**

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

Before supplying power to the unit, insure that the terminal box cover is in place on the compressor.

ROUTE GROUND AND POWER WIRES

Remove access panel and control box cover to gain access to unit wiring. Extend wires from disconnect through power wiring hole provided and into unit control box (see Figure 1). Size wires per local codes, but not smaller than minimum wire size shown on unit rating plate.

CONNECT GROUND AND POWER WIRES

Connect ground wire to ground connection in control box for safety. Connect power wiring to contactor as shown in Figure 4 (50 Hz.) or Figure 5 (60 Hz.).

**WARNING****ELECTRICAL SHOCK HAZARD**

Failure to establish uninterrupted or unbroken ground could result in personal injury or death.

According to NEC, IEC, ANSI/NFPA 70, and local codes, the 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. If conduit connection uses reducing washers, a separate ground wire must be used.

Figure 4 50 Hz. Line Power Connections

DISCONNECT PER
NEC, IEC, AND/OR
LOCAL CODES

50 HZ

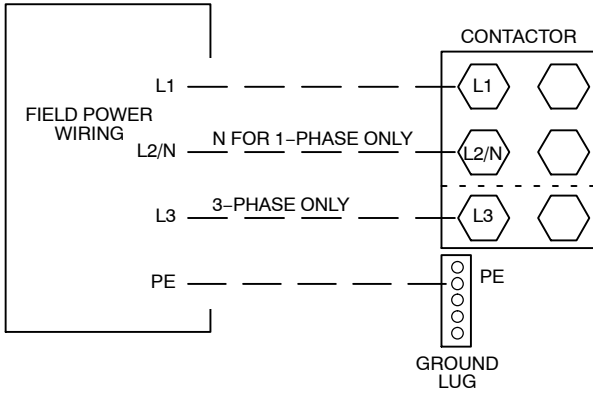


Figure 5 60 Hz. Line Power Connections

DISCONNECT
PER NEC, IEC,
AND/OR
LOCAL CODES

60 HZ

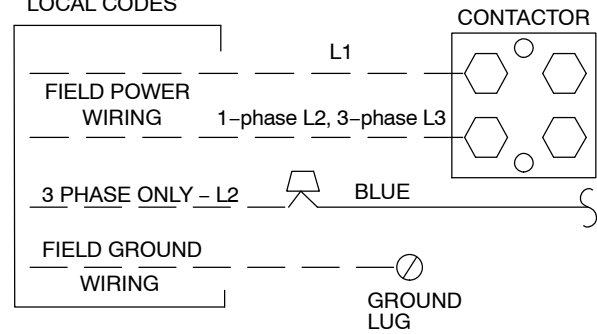
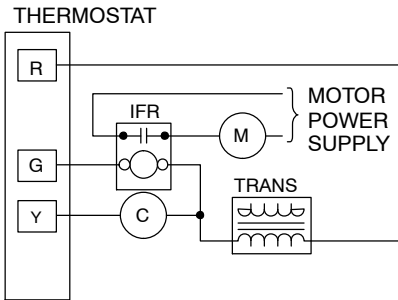
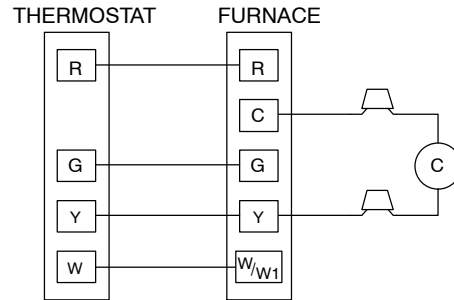


Figure 6

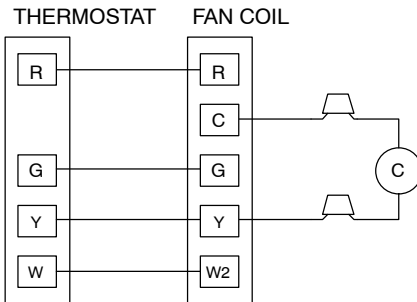
Typical Control Circuit Connections



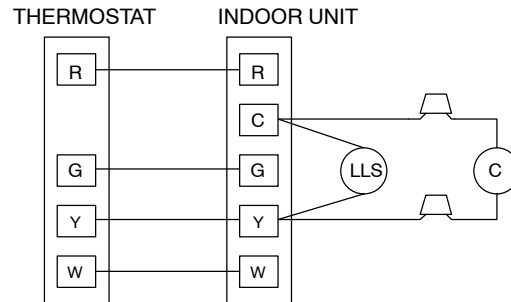
COOLING ONLY



ONE STAGE COOLING + GAS HEATING



ONE STAGE COOLING + ELECTRIC HEAT



ONE STAGE COOLING + HEAT
+ LIQUID LINE SOLENOID

NOTES:

1. Wiring must conform to local codes.
2. LLS required on some units. See specific unit instructions.
3. Transformer required is 24V, 40-VA minimum. A 60-VA or external power supply may be necessary when installing accessories.
4. When installing electronic thermostat, connect transformer common to thermostat C.

LEGEND:

- IFR INDOOR FAN RELAY
- TRANS TRANSFORMER
- (M) INDOOR FAN MOTOR
- (LLS) LIQUID LINE SOLENOID
- (C) COMPRESSOR CONTACTOR

CONNECT CONTROL WIRING

Route 24V control wires through control wiring grommet and connect to brown and blue pigtails supplied in unit splice box (see Figure 6). Use furnace transformer, fan-coil

transformer, or accessory transformer for control power, 24V, 40-VA minimum.

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.

NOTE: Use No. 18 AWG (American Wire Gage) color-coded, insulated (35 °C minimum) wire. If thermostat is located more than 100 feet (30.5 m) from unit as measured along the control voltage wires, use No. 16 AWG color-coded wires to avoid excessive voltage drop.

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

STEP 8 – COMPRESSOR CRANKCASE HEATER

When equipped with a crankcase heater, energize heater a minimum of 24 hours before starting unit. To energize heater only, set thermostat to OFF and close electrical disconnect to outdoor unit. A crankcase heater is required if the refrigerant tubing is longer than 50 feet (15.24 m).

STEP 9 – INSTALL ELECTRICAL ACCESSORIES

Refer to the individual instructions packaged with the kit or accessory when installing.

STEP 10 – START-UP AND CHECK CHARGE



WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury.

Wear safety glasses, protective clothing, and gloves when handling refrigerant.

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

PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in property damage

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.

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

1. Fully back seat (open) liquid and vapor tube service valves.
2. Unit is shipped with valve stem(s) front seated and caps installed. Replace stem caps after system is opened to refrigerant flow (back seated). Replace caps finger-tight and tighten additional 6 turn with wrench.
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 ON 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.

On three phase models with scroll compressors, it is important that the compressor rotate in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.

2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up. This indicates correct rotation.

If the suction pressure does not drop and the discharge pressure does not rise to normal level:

1. Turn off power to the unit.
2. Reverse any two of the unit power leads.
3. Re-apply power to the compressor, verify correct suction and discharge pressures.

CARE AND MAINTENANCE

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

Explain system operation and periodic maintenance requirements with owner. Frequency of maintenance may vary depending on geographic areas, such as coastal applications which require more frequent maintenance.