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Dallas, Texas, USA



**RETAIN THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs and HFCs) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for noncompliance.

⚠ IMPORTANT

This unit must be matched with an indoor coil as specified in Lennox Engineering Handbook. Coils previously charged with HCFC-22 must be flushed.

⚠ WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

INSTALLATION INSTRUCTIONS

Merit® Series 13ACX Units

AIR CONDITIONER
506374-01
07/10
Supersedes 03/10

TP Technical
Publications
Litho U.S.A.

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Shipping and Packing List

Check the unit for shipping damage and listed times below are intact. If damaged, or if parts are missing, immediately contact the last shipping carrier.

- 1 — Assembled outdoor unit
- 1 — Refrigerant flow control kit (Fixed Orifice)
- 1 — Liquid line filter drier

General

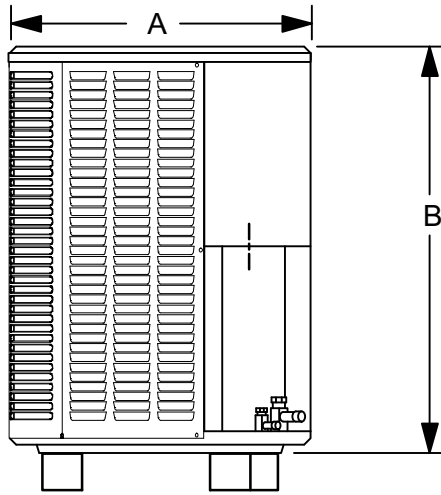
13ACX, which will also be referred to in this instruction as the outdoor unit, uses HFC-410A refrigerant. This outdoor unit must be installed with a matching indoor unit and line set as outlined in the Lennox 13ACX Engineering Handbook.

This outdoor unit is designed for use in systems that use one of the following refrigerant metering devices:

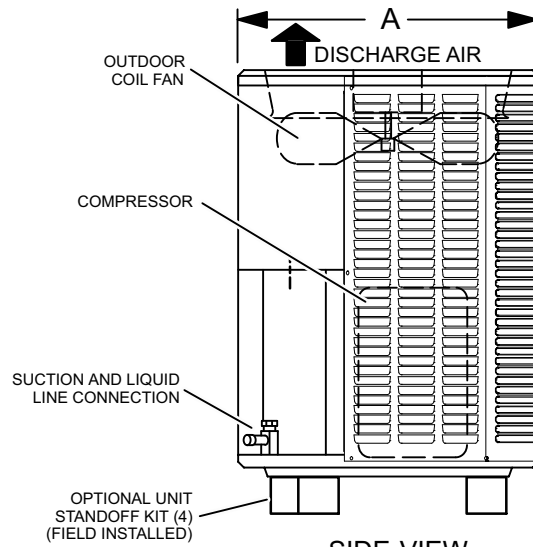
- Thermal expansion valve (TXV)
- Fixed orifice



Unit Dimensions - Inches (mm)



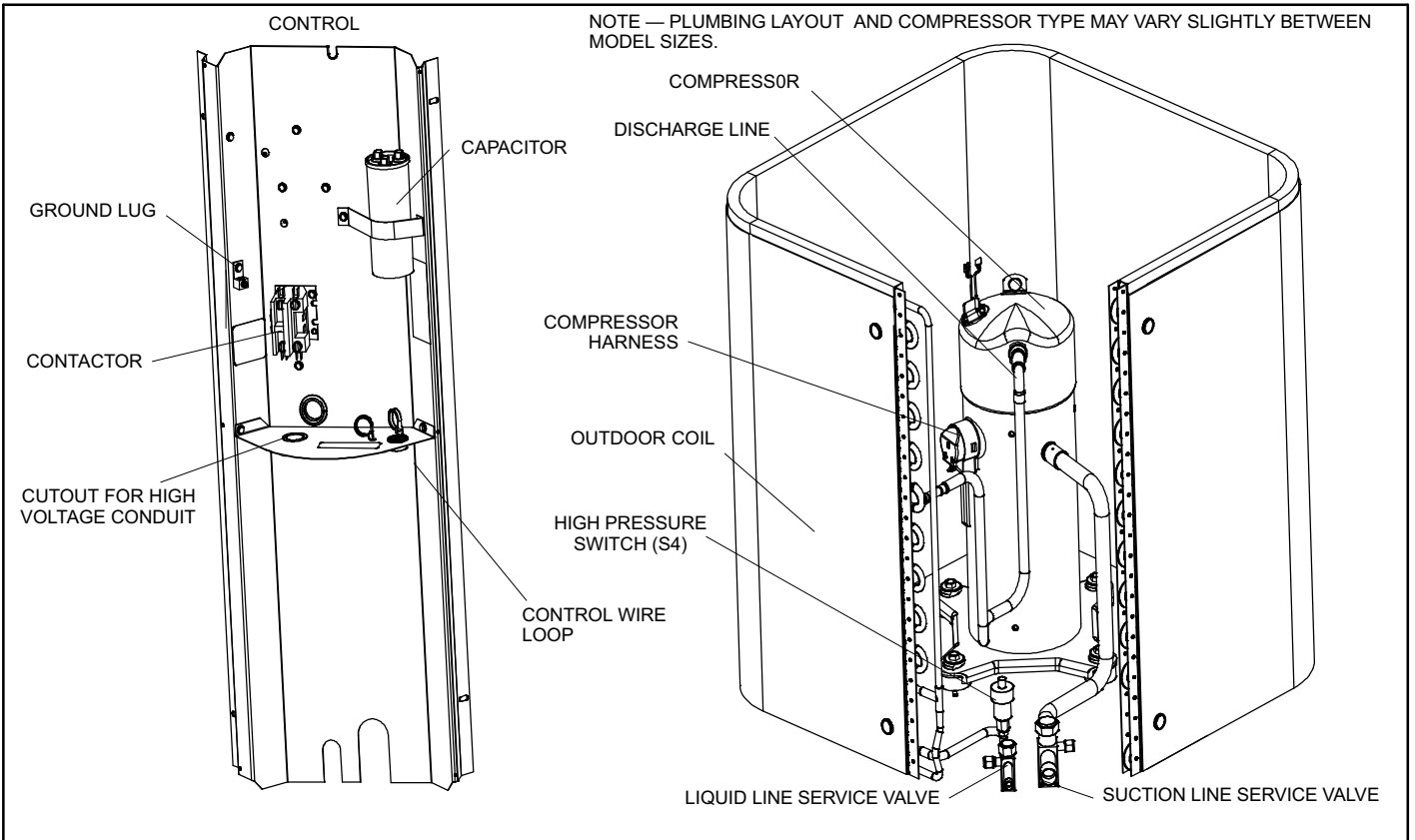
SIDE VIEW



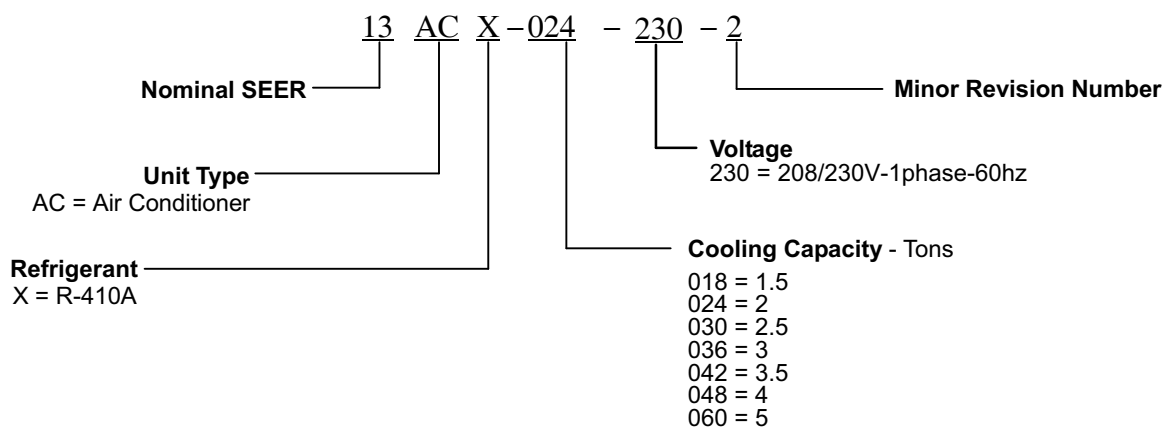
SIDE VIEW

Model Numbers	A	B
-018	24-1/4 (616)	25-1/4 (641)
-024	24-1/4 (616)	25-1/4 (641)
-030	24-1/4 (616)	29-1/4 (743)
-036	24-1/4 (616)	29-1/4 (743)
-042	28-1/4 (724)	29-1/4 (743)
-048	28-1/4 (724)	37-1/4 (925)
-060	28-1/4 (724)	33-1/4 (845)

Typical Unit Parts Arrangement



Model Number Identification



⚠ WARNING

This product and/or the indoor unit it is matched with may contain fiberglass wool.

Disturbing the insulation during installation, maintenance, or repair will expose you to fiberglass wool dust. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)

Fiberglass wool may also cause respiratory, skin, and eye irritation.

To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown below, or contact your supervisor.

Lennox Industries Inc.
P.O. Box 799900
Dallas, TX 75379-9900

⚠ CAUTION

Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working near these areas during installation or while servicing this equipment.

General Information

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities who have jurisdiction before installation.

Operating Gauge Set and Service Valves

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities who have jurisdiction before installation.

TORQUE REQUIREMENTS

When servicing or repairing heating, ventilating, and air conditioning components, ensure the fasteners are appropriately tightened. Table 1 lists torque values for fasteners.

⚠ IMPORTANT

Only use Allen wrenches of sufficient hardness (50Rc - Rockwell Harness Scale minimum). Fully insert the wrench into the valve stem recess.

Service valve stems are factory-torqued (from 9 ft-lbs for small valves, to 25 ft-lbs for large valves) to prevent refrigerant loss during shipping and handling. Using an Allen wrench rated at less than 50Rc risks rounding or breaking off the wrench, or stripping the valve stem recess.

See the Lennox Service and Application Notes #C-08-1 for further details and information.

⚠ IMPORTANT

To prevent stripping of the various caps used, the appropriately sized wrench should be used and fitted snugly over the cap before tightening.

When servicing or repairing HVAC components, ensure the fasteners are appropriately tightened. Table 1 provides torque values for fasteners.

Table 1. Torque Requirements

Parts	Recommended Torque	
Service valve cap	8 ft.- lb.	11 NM
Sheet metal screws	16 in.- lb.	2 NM
Machine screws #10	28 in.- lb.	3 NM
Compressor bolts	90 in.- lb.	10 NM
Gauge port seal cap	8 ft.- lb.	11 NM

USING MANIFOLD GAUGE SET

When checking the system charge, only use a manifold gauge set that features low loss anti-blow back fittings.

Manifold gauge set used with HFC-410A refrigerant systems must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0 - 800 psig on the high side and a low side of 30" vacuum to 250 psig with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psig of pressure with a 4000 psig burst rating.

OPERATING SERVICE VALVES

The liquid and vapor line service valves are used for removing refrigerant, flushing, leak testing, evacuating, checking charge and charging.

Each valve is equipped with a service port which has a factory-installed valve stem. Figure 1 provides information on how to access and operating both angle and ball service valves.

SERVICE VALVES

VARIOUS TYPES

**ANGLE-TYPE SERVICE VALVE
(BACK-SEATED OPENED)**

OPEN TO BOTH INDOOR AND OUTDOOR UNITS

**ANGLE-TYPE SERVICE VALVE
(FRONT-SEATED CLOSED)**

CLOSED TO BOTH INDOOR AND OUTDOOR UNITS

WHEN SERVICE VALVE IS CLOSED, THE SERVICE PORT IS OPEN TO THE LINE SET AND INDOOR UNIT.

WHEN SERVICE VALVE IS OPEN, THE SERVICE PORT IS OPEN TO LINE SET, INDOOR AND OUTDOOR UNIT.

To Access Service Port:

A service port cap protects the service port core from contamination and serves as the primary leak seal.

1. Remove service port cap with an appropriately sized wrench.
2. Connect gauge set to service port.
3. When testing is completed, replace service port cap and tighten as follows:
 - With Torque Wrench: Finger tighten and torque cap per Table 1.
 - Without Torque Wrench: Finger tighten and use an appropriately sized wrench to turn an additional 1/6 turn clockwise.

Operating Angle Type Service Valve:

1. Remove stem cap with an appropriately sized wrench.
2. Use a service wrench with a hex-head extension (3/16" for liquid line valve sizes and 5/16" for vapor line valve sizes) to back the stem out counterclockwise as far as it will go.

Operating Ball Type Service Valve:

1. Remove stem cap with an appropriately sized wrench.
2. Use an appropriately sized wrench to open. To open valve, rotate stem counterclockwise 90°. To close rotate stem clockwise 90°.

Reinstall Stem Cap:

Stem cap protects the valve stem from damage and serves as the primary seal. Replace the stem cap and tighten as follows:

- With Torque Wrench: Finger tighten and then torque cap per Table 1.
- Without Torque Wrench: Finger tighten and use an appropriately sized wrench to turn an additional 1/12 turn clockwise.

NOTE — A label with specific torque requirements may be affixed to the stem cap. If the label is present, use the specified torque.

1/6 TURN

1/6 TURN

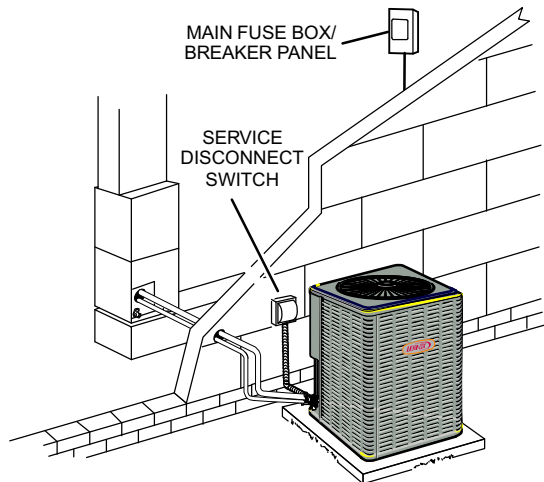
Figure 1. Angle and Ball Service Valves

RECOVERING

REFRIGERANT FROM SYSTEM

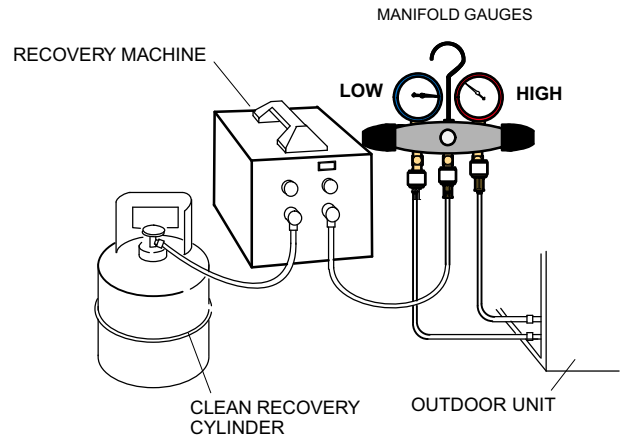
1 DISCONNECT POWER

Disconnect all power to the existing outdoor unit at the service disconnect switch or main fuse box/breaker panel.



2 CONNECT MANIFOLD GAUGE SET

Connect a gauge set, clean recovery cylinder and a recovery machine to the service ports of the existing unit. Use the instructions provided with the recovery machine to make the connections.



3 RECOVERING REFRIGERANT

Remove existing HCFC-22 refrigerant using one of the following procedures:

IMPORTANT — Some system configurations may contain higher than normal refrigerant charge due to either large internal coil volumes, and/or long line sets.

METHOD 1:

Use this method if the existing outdoor unit is not equipped with shut-off valves, or if the unit is not operational and you plan to use the existing HCFC-22 to flush the system.

Remove all HCFC-22 refrigerant from the existing system. Check gauges after shutdown to confirm that the entire system is completely void of refrigerant.

METHOD 2:

Use this method if the existing outdoor unit is equipped with manual shut-off valves, and you plan to use new HCFC-22 refrigerant to flush the system.

The following devices could prevent full system charge recovery into the outdoor unit:

- Outdoor unit's high or low-pressure switches (if applicable) when tripped can cycle the compressor **OFF**.
- Compressor can stop pumping due to tripped internal pressure relief valve.
- Compressor has internal vacuum protection that is designed to unload the scrolls (compressor stops pumping) when the pressure ratio meets a certain value or when the suction pressure is as high as 20 psig. (Compressor suction pressures should never be allowed to go into a vacuum. Prolonged operation at low suction pressures will result in overheating of the scrolls and permanent damage to the scroll tips, drive bearings and internal seals.)

Once the compressor can not pump down to a lower pressure due to one of the above system conditions, shut off the vapor valve. Turn OFF the main power to unit and use a recovery machine to recover any refrigerant left in the indoor coil and line set.

Perform the following task:

- A. Start the existing HCFC-22 system in the cooling mode and close the liquid line valve.
- B. Use the compressor to pump as much of the existing HCFC-22 refrigerant into the outdoor unit until the outdoor system is full. Turn the outdoor unit main power OFF and use a recovery machine to remove the remaining refrigerant from the system.

NOTE — It may be necessary to bypass the low pressure switches (if equipped) to ensure complete refrigerant evacuation.

- C. When the low side system pressures reach 0 psig, close the vapor line valve.
- D. Check gauges after shutdown to confirm that the valves are not allowing refrigerant to flow back into the low side of the system.

New Outdoor Unit Placement

See *Unit Dimensions* on Page 2 for sizing mounting slab, platforms or supports. Refer to Figure 2 for mandatory installation clearance requirements.

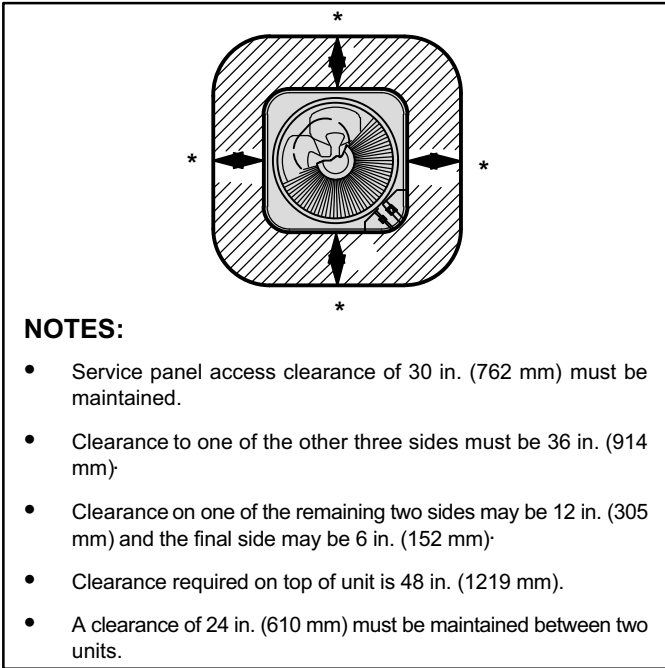


Figure 2. Installation Clearances

POSITIONING CONSIDERATIONS

CAUTION

In order to avoid injury, take proper precaution when lifting heavy objects.

Consider the following when positioning the unit:

- Some localities are adopting sound ordinances based on the unit's sound level registered from the adjacent property, not from the installation property. Install the unit as far as possible from the property line.
- When possible, do not install the unit directly outside a window. Glass has a very high level of sound transmission. For proper placement of unit in relation to a window see the provided illustration in Figure 3.

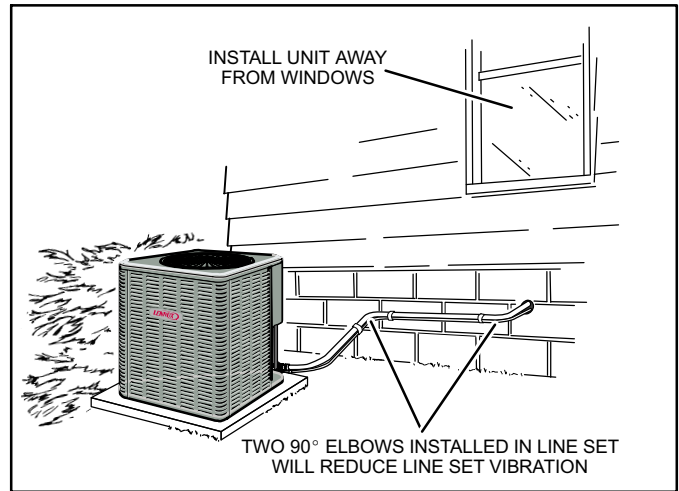


Figure 3. Outside Unit Placement

PLACING OUTDOOR UNIT ON SLAB

When installing a unit at grade level, the top of the slab should be high enough above the grade so that water from higher ground would not collect around the unit as illustrated in Figure 4.

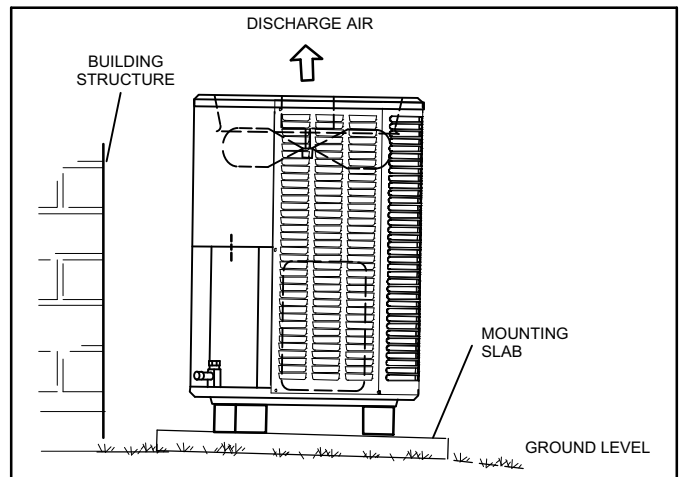


Figure 4. Typical Slab Mounting at Ground Level

Slab may be level or have a slope tolerance away from the building of not more than two degrees, or 2 inches per 5 feet (51 mm per 1524 mm) as illustrated in Figure 4.

INSTALLING OUTDOOR UNIT ON ROOF

Install the unit at a minimum of 4 inches (102 mm) above the surface of the roof. Ensure the weight of the unit is properly distributed over roof joists and rafters. Redwood or steel supports are recommended.

New or Replacement Line Set

This section provides information on installation or replacement of existing line set. If line set is not being installed or replaced then proceed to *Brazing Connections* on Page 9.

If refrigerant lines are routed through a wall, seal and isolate the opening so vibration is not transmitted to the building. Pay close attention to line set isolation during installation of any HVAC system. When properly isolated from building structures (walls, ceilings, floors), the refrigerant lines will not create unnecessary vibration and subsequent sounds.

Also, consider the following when placing and installing a high-efficiency air conditioner:

REFRIGERANT LINE SET

Field refrigerant line set consists of liquid and suction lines from the outdoor unit to the indoor unit coil. Use Lennox L15 (braze, non-flare) series line set, or field-fabricated refrigerant lines that meet the specifications listed below.

Table 2. Refrigerant Line Set

Model	Valve Field Connections		Recommended Line Set		
	Liquid Line	Suction Line	Liquid Line	Suction Line	L15 Line Set
-018 -024 -030	3/8 in. (10 mm)	3/4 in. (19 mm)	3/8 in. (10 mm)	3/4 in. (19 mm)	L15-41 15 ft. - 50 ft. (4.6 m - 15 m)
-036 -042 -048	3/8 in. (10 mm)	7/8 in. (22 mm)	3/8 in. (10 mm)	7/8 in. (22 mm)	L15-65 15 ft. - 50 ft. (4.6 m - 15 m)
-060	3/8 in. (10 mm)	1-1/8 in. (29 mm)	3/8 in. (10 mm)	1-1/8 in. (29 mm)	Field Fabricated

NOTE — Some applications may require a field provided 7/8" to 1-1/8" adapter

NOTE - When installing refrigerant lines longer than 50 feet, contact Lennox Technical Support Product Applications for assistance or Lennox piping manual. To obtain the correct information from Lennox, be sure to communicate the following points:

- Model (13ACX) and size of unit (e.g. -060).
- Line set diameters for the unit being installed as listed in Table 2 and total length of installation.
- Number of elbows and if there is a rise or drop of the piping.

MATCHING WITH NEW OR EXISTING INDOOR COIL AND LINE SET

The RFC1-metering line consisted of a small bore copper line that ran from condenser to evaporator coil. Refrigerant was metered into the evaporator by utilizing temperature/pressure evaporation effects on refrigerant in the small RFC line. The length and bore of the RFC line corresponded to the size of cooling unit.

If the 13ACX is being used with either a new or existing indoor coil which is equipped with a liquid line which served as a metering device (RFC1), the liquid line must be replaced prior to the installation of the 13ACX unit. Typically a liquid line used to meter flow is 1/4" in diameter and copper.

LIQUID LINE FILTER DRIER INSTALLATION

The filter drier (one is shipped with each 13ACX unit) must be field installed in the liquid line between the outdoor unit's liquid line service valve and the indoor coil's metering device (fixed orifice or TXV) as illustrated in Figure 5. This

filter drier must be installed to ensure a clean, moisture-free system. Failure to install the filter drier will void the warranty. A replacement filter drier is available from Lennox. See *Brazing Connections* on Page 9 for special procedures on brazing filter drier connections to the liquid line.

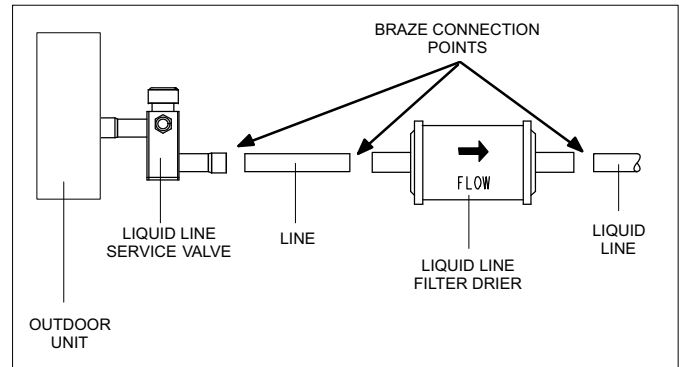


Figure 5. Typical Liquid Line Filter Drier Installation

⚠ CAUTION

Brazing alloys and flux contain materials which are hazardous to your health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas. Wear gloves and protective goggles or face shield to protect against burns. Wash hands with soap and water after handling brazing alloys and flux.

⚠ IMPORTANT

The Environmental Protection Agency (EPA) prohibits the intentional venting of HFC refrigerants during maintenance, service, repair and disposal of appliance. Approved methods of recovery, recycling or reclaiming must be followed.

⚠ IMPORTANT

If this unit is being matched with an approved line set or indoor unit coil which was previously charged with mineral oil, or if it is being matched with a coil which was manufactured before January of 1999, the coil and line set must be flushed prior to installation. Take care to empty all existing traps. Polyol ester (POE) oils are used in Lennox units charged with HFC-410A refrigerant. Residual mineral oil can act as an insulator, preventing proper heat transfer. It can also clog the expansion device, and reduce the system performance and capacity. Failure to properly flush the system per the instructions below will void the warranty.

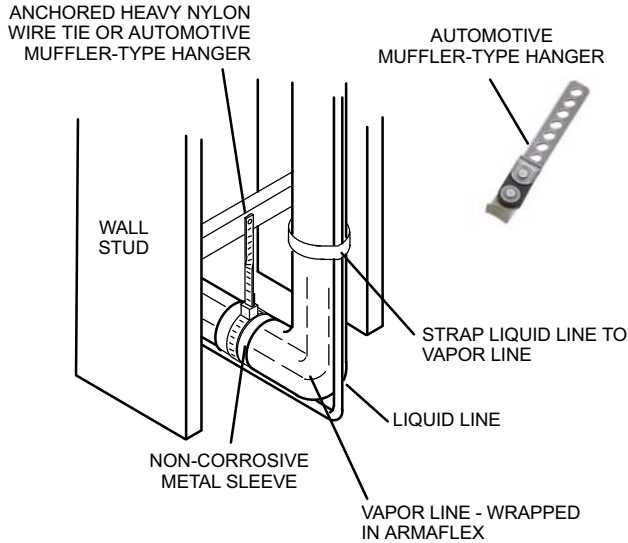
LINE SET

IMPORTANT — Refrigerant lines must not contact structure.

INSTALLATION

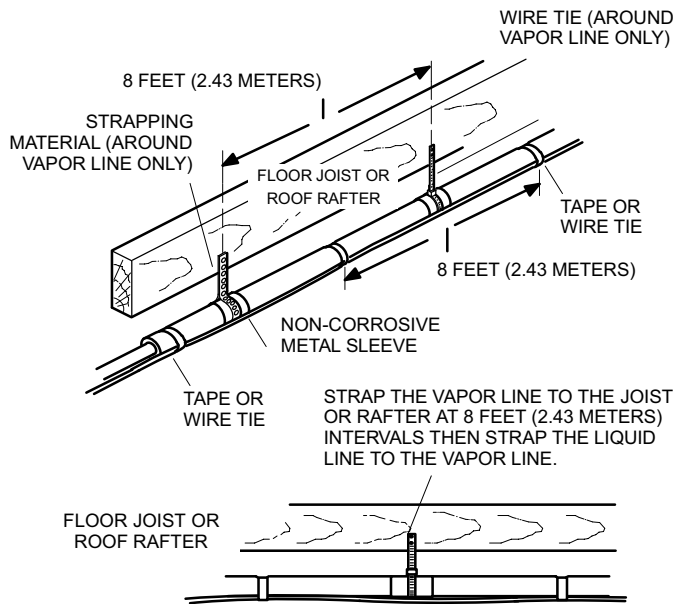
Line Set Isolation — The following illustrations are examples of proper refrigerant line set isolation:

REFRIGERANT LINE SET — TRANSITION FROM VERTICAL TO HORIZONTAL



REFRIGERANT LINE SET — INSTALLING HORIZONTAL RUNS

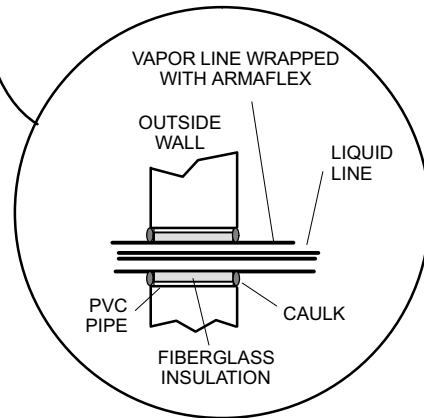
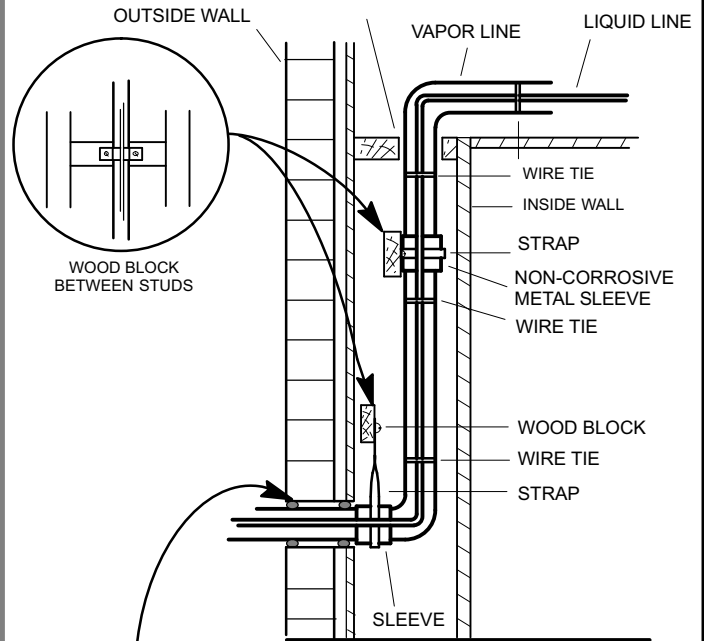
To hang line set from joist or rafter, use either metal strapping material or anchored heavy nylon wire ties.



REFRIGERANT LINE SET — INSTALLING VERTICAL RUNS (NEW CONSTRUCTION SHOWN)

NOTE — Insulate liquid line when it is routed through areas where the surrounding ambient temperature could become higher than the temperature of the liquid line or when pressure drop is equal to or greater than 20 psig.

IMPORTANT — Refrigerant lines must not contact wall



NOTE — Similar installation practices should be used if line set is to be installed on exterior of outside wall.

WARNING — Polyol ester (POE) oils used with HFC-410A refrigerant absorb moisture very quickly. It is very important that the refrigerant system be kept closed as much as possible. **DO NOT** remove line set caps or service valve stub caps until you are ready to make connections.

Figure 6. Line Set Installation

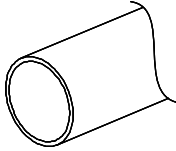
BRAZING

CONNECTIONS

NOTE - Use silver alloy brazing rods with five or six percent minimum silver alloy for copper-to-copper brazing, 45 percent alloy for copper-to-brass and copper-to-steel brazing.

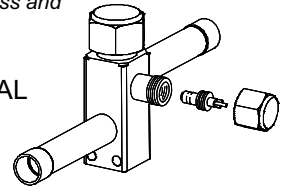
1 CUT AND DEBUR

Cut ends of the refrigerant lines square (free from nicks or dents) and debur the ends. The pipe must remain round and do not pinch end of the line.



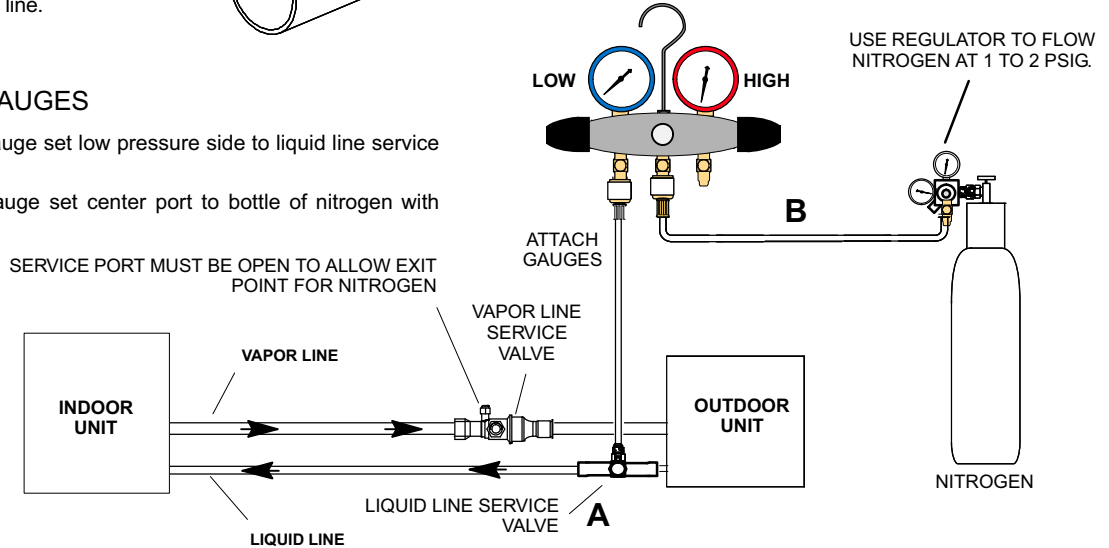
2 CAP AND CORE REMOVAL

Remove service cap and core from both the vapor and liquid line service ports.



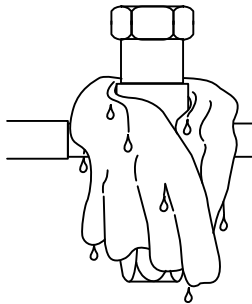
3 ATTACHED GAUGES

- A. Connect gauge set low pressure side to liquid line service valve.
- B. Connect gauge set center port to bottle of nitrogen with regulator.



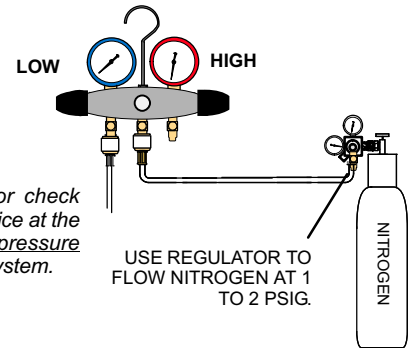
4 WRAP SERVICE VALVE

To protect components during brazing, wrap a wet cloth around the liquid line service valve body and copper tube stub and use another wet cloth underneath the valve body to protect the base paint.



5 FLOW NITROGEN

Flow regulated nitrogen (at 1 to 2 psig) through the refrigeration gauge set into the valve stem port connection on the liquid line service valve and out of the valve stem port connection on the vapor service valve.

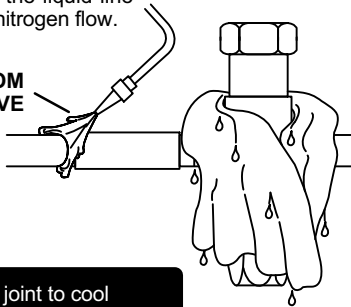


NOTE — The fixed orifice or check expansion valve metering device at the indoor unit will allow low pressure nitrogen to flow through the system.

6 BRAZE LINE SET

Braze the liquid line to the liquid line service valve. Turn off nitrogen flow.

POINT FLAME AWAY FROM SERVICE VALVE



WARNING — Allow braze joint to cool before removing the wet rag from the service valve. (TEMPERATURES ABOVE 250°F CAN DAMAGE VALVE SEALS)

IMPORTANT — Connect gauge set low pressure side to vapor line service valve and repeat procedure starting at paragraph 4 for brazing the liquid line to service port valve.

7 INSTALL SERVICE PORT CAPS ONLY

After all connections have been brazed, disconnect manifold gauge set from service ports, cool down piping with wet rag and remove all wrappings. Do not reinstall cores until after evacuation procedure. Reinstall service port caps if desired to close off refrigerant ports.

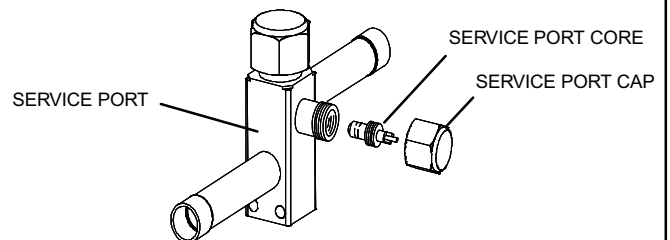
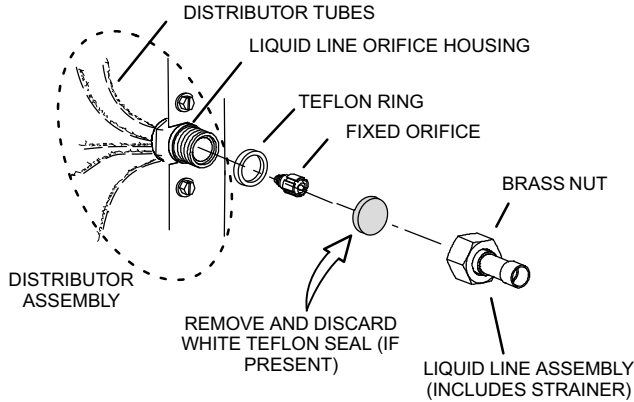


Figure 7. Brazing Connections

FLUSHING

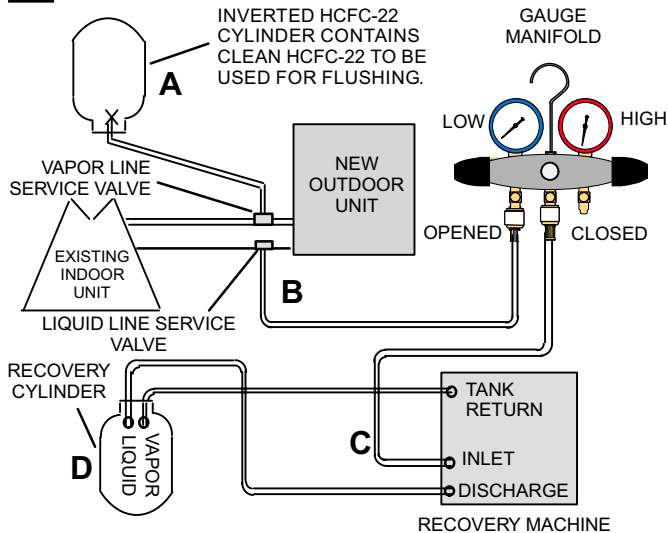
LINE SET AND INDOOR COIL (1 OF 2)

1 TYPICAL FIXED ORIFICE REMOVAL AND REPLACEMENT PROCEDURE (Uncased Coil Shown)



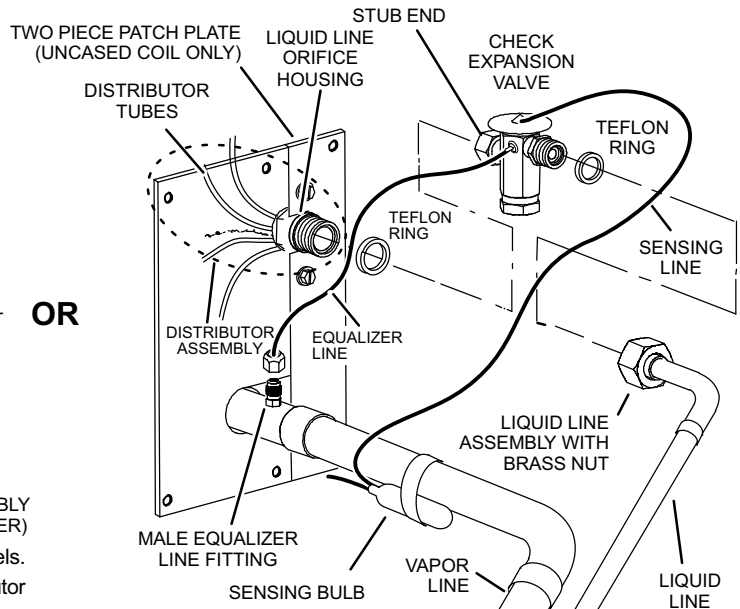
- A. On fully cased coils, remove the coil access and plumbing panels.
- B. Remove any shipping clamps holding the liquid line and distributor assembly.
- C. Using two wrenches, disconnect liquid line from liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.
- D. Remove and discard fixed orifice, valve stem assembly if present and Teflon washer as illustrated above.
- E. Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.
- F. Reverse above order to install.

2 CONNECT GAUGES AND EQUIPMENT FOR FLUSHING PROCEDURE



- A. Inverted HCFC-22 cylinder with clean refrigerant to the vapor service valve.
- B. HCFC-22 gauge set (low side) to the liquid line valve.
- C. HCFC-22 gauge set center port to inlet on the recovery machine with an empty recovery tank to the gauge set.
- D. Connect recovery tank to recovery machines per machine instructions.

TYPICAL CHECK EXPANSION VALVE REMOVAL PROCEDURE (Uncased Coil Shown)



- A. On fully cased coils, remove the coil access and plumbing panels.
- B. Remove any shipping clamps holding the liquid line and distributor assembly.
- C. Disconnect the equalizer line from the check expansion valve equalizer line fitting on the vapor line.
- D. Remove the vapor line sensing bulb.
- E. Disconnect the liquid line from the check expansion valve at the liquid line assembly.
- F. Disconnect the check expansion valve from the liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.
- G. Remove and discard check expansion valve and the two Teflon rings.
- H. Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.

CAUTION —This procedure should not be performed on systems which contain contaminants (Example compressor burn out).

3 FLUSHING LINE SET

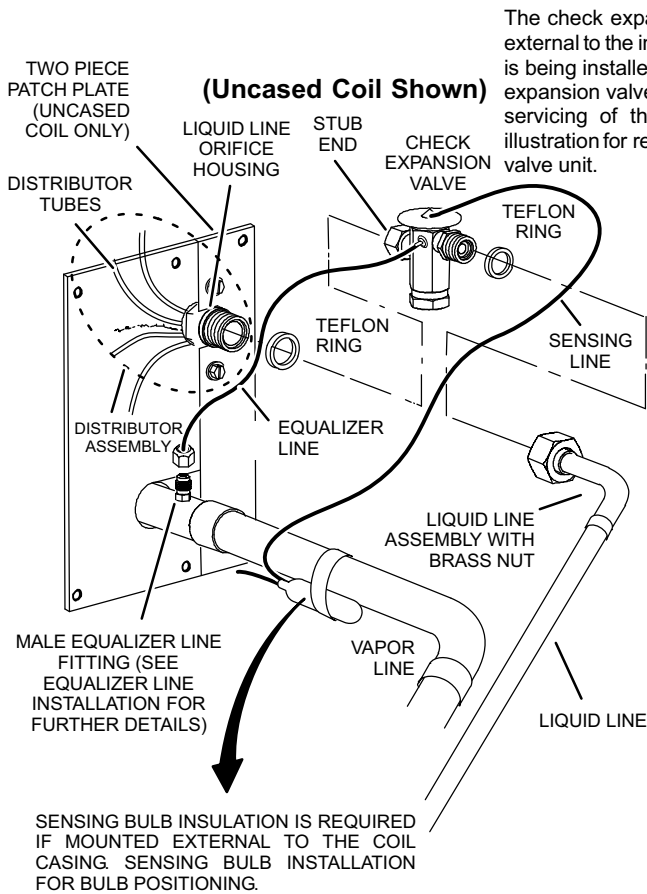
The line set and indoor unit coil must be flushed with at least the same amount of clean refrigerant that previously charged the system. Check the charge in the flushing cylinder before proceeding.

- A. Set the recovery machine for liquid recovery and start the recovery machine. Open the gauge set valves to allow the recovery machine to pull a vacuum on the existing system line set and indoor unit coil.
- B. Invert the cylinder of clean HCFC-22 and open its valve to allow liquid refrigerant to flow into the system through the vapor line valve. Allow the refrigerant to pass from the cylinder and through the line set and the indoor unit coil before it enters the recovery machine.
- C. After all of the liquid refrigerant has been recovered, switch the recovery machine to vapor recovery so that all of the HCFC-22 vapor is recovered. Allow the recovery machine to pull down to 0 the system.
- D. Close the valve on the inverted HCFC-22 drum and the gauge set valves. Pump the remaining refrigerant out of the recovery machine and turn the machine off.

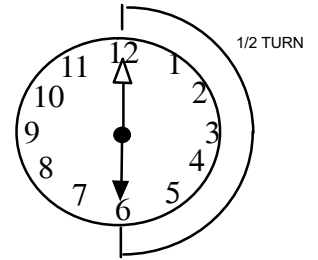
FLUSHING LINE SET AND INDOOR COIL (2 OF 2)

4 TYPICAL CHECK EXPANSION VALVE INSTALLATION PROCEDURE

This outdoor unit is designed for use in systems that use check expansion valve metering device. See the *Lennox 13ACX Engineering Handbook* for approved check expansion valve kit match-ups and application information.



The check expansion valve unit can be installed internal or external to the indoor coil. In applications where an uncased coil is being installed in a field-provided plenum, install the check expansion valve in a manner that will provide access for field servicing of the check expansion valve. Refer to below illustration for reference during installation of check expansion valve unit.



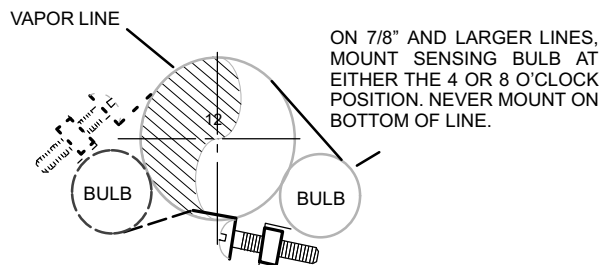
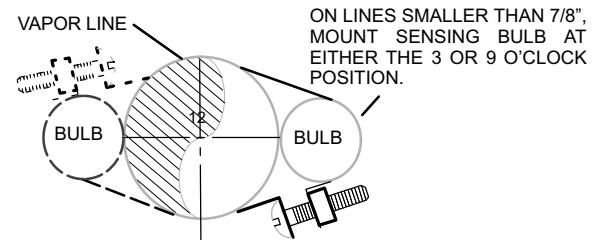
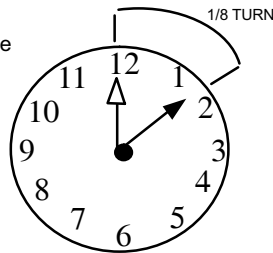
- Remove the field-provided fitting that temporary reconnected the liquid line to the indoor unit's distributor assembly.
- Install one of the provided Teflon rings around the stubbed end of the check expansion valve and lightly lubricate the connector threads and expose surface of the Teflon ring with refrigerant oil.
- Attach the stubbed end of the check expansion valve to the liquid line orifice housing. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above, or 20 ft-lb.
- Place the remaining Teflon washer around the other end of the check expansion valve. Lightly lubricate connector threads and expose surface of the Teflon ring with refrigerant oil.
- Attach the liquid line assembly to the check expansion valve. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above or 20 ft-lb.

SENSING BULB INSTALLATION

- Attach the vapor line sensing bulb in the proper orientation as illustrated to the right using the clamp and screws provided.

NOTE — Confirm proper thermal contact between vapor line and check expansion bulb before insulating the sensing bulb once installed.

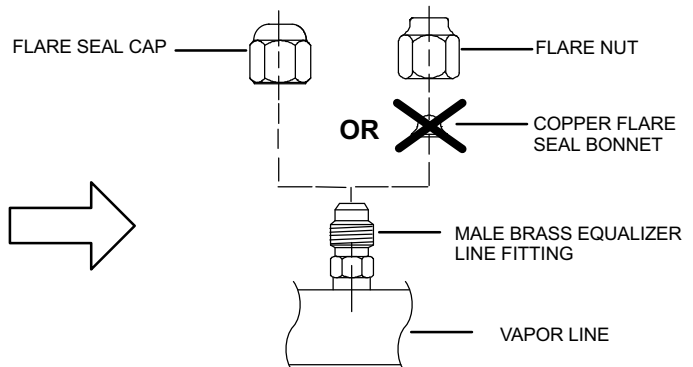
- Connect the equalizer line from the check expansion valve to the equalizer vapor port on the vapor line. Finger tighten the flare nut plus 1/8 turn (7 ft-lbs) as illustrated below.



NOTE — NEVER MOUNT ON BOTTOM OF LINE.

EQUALIZER LINE INSTALLATION

- Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the vapor line as illustrated in the figure to the right.
- Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the vapor line as illustrated in the figure to the right.



LEAK TEST

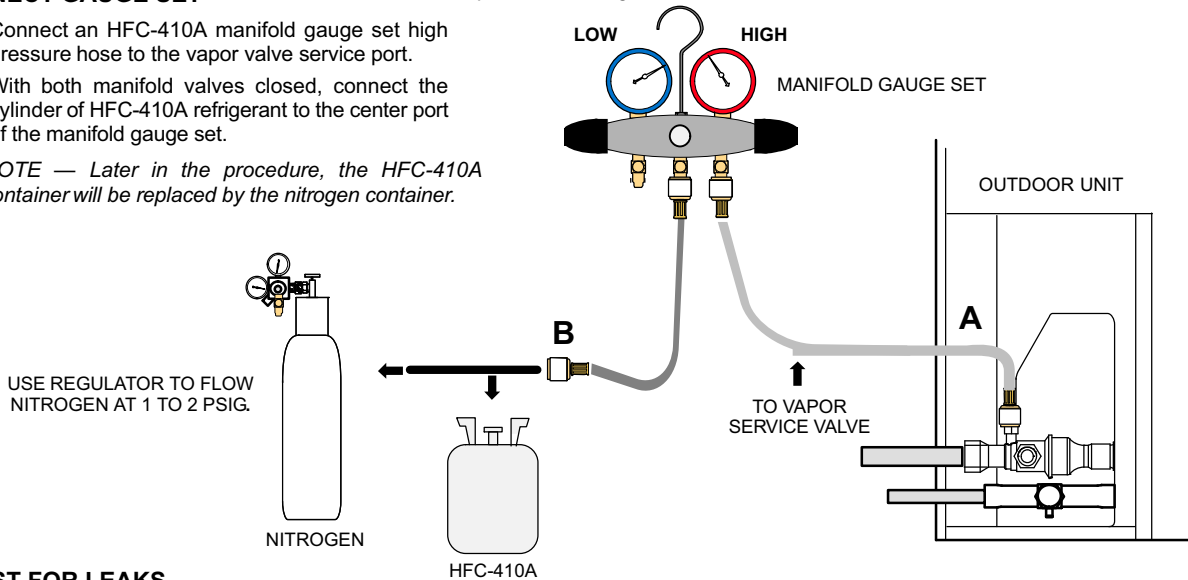
LINE SET AND INDOOR COIL

1 CONNECT GAUGE SET

- A. Connect an HFC-410A manifold gauge set high pressure hose to the vapor valve service port.
- B. With both manifold valves closed, connect the cylinder of HFC-410A refrigerant to the center port of the manifold gauge set.

NOTE — Later in the procedure, the HFC-410A container will be replaced by the nitrogen container.

NOTE — Normally, the high pressure hose is connected to the liquid line port. However, connecting it to the vapor port better protects the manifold gauge set from high pressure damage.



2 TEST FOR LEAKS

After the line set has been connected to the indoor unit and air conditioner, check the line set connections and indoor unit for leaks. Use the following procedure to test for leaks:

- A. With both manifold valves closed, connect the cylinder of HFC-410A refrigerant to the center port of the manifold gauge set. Open the valve on the HFC-410A cylinder (vapor only).
- B. Open the high pressure side of the manifold to allow HFC-410A into the line set and indoor unit. Weigh in a trace amount of HFC-410A. [A trace amount is a maximum of two ounces (57 g) refrigerant or three pounds (31 kPa) pressure]. Close the valve on the HFC-410A cylinder and the valve on the high pressure side of the manifold gauge set. Disconnect the HFC-410A cylinder.
- C. Connect a cylinder of dry nitrogen with a pressure regulating valve to the center port of the manifold gauge set.
- D. Adjust dry nitrogen pressure to 150 psig (1034 kPa). Open the valve on the high side of the manifold gauge set in order to pressurize the line set and the indoor unit.
- E. After a few minutes, open one of the service valve ports and verify that the refrigerant added to the system earlier is measurable with a leak detector.
- F. After leak testing disconnect gauges from service ports.

⚠ WARNING



When using a high pressure gas such as dry nitrogen to pressurize a refrigeration or air conditioning system, use a regulator that can control the pressure down to 1 or 2 psig (6.9 to 13.8 kPa).

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly. Failure to follow this warning may result in personal injury or death.

⚠ WARNING



Fire, Explosion and Personal Safety Hazard.

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

Never use oxygen to pressurize or purge refrigeration lines. Oxygen, when exposed to a spark or open flame, can cause damage by fire and/or an explosion, that could result in personal injury or death.

⚠ IMPORTANT

Leak detector must be capable of sensing HFC refrigerant.

EVACUATING

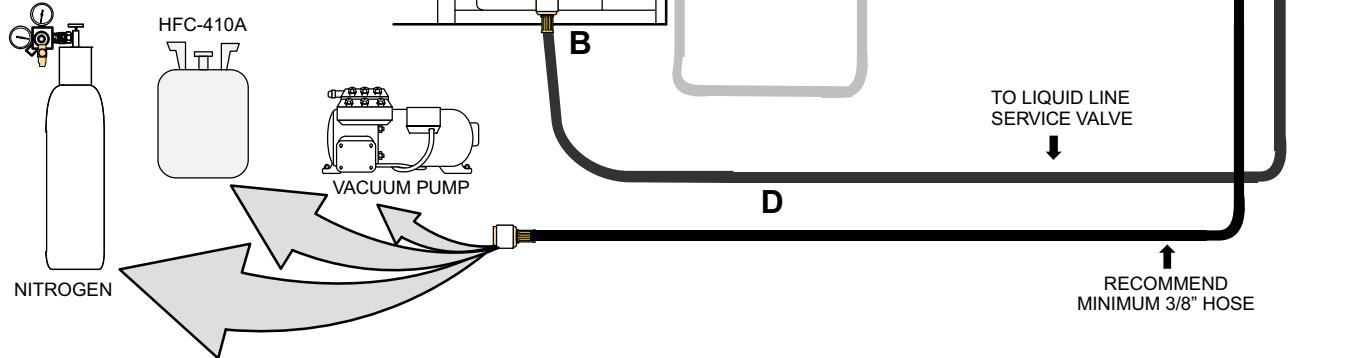
LINE SET AND INDOOR COIL

1 CONNECT GAUGE SET

NOTE — Remove cores from service valves (if not already done).

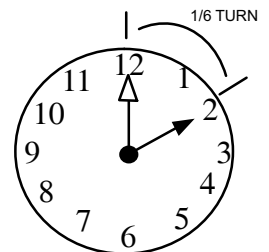
- Connect low side of manifold gauge set with 1/4 SAE in-line tee to vapor line service valve
- Connect high side of manifold gauge set to liquid line service valve
- Connect micron gauge available connector on the 1/4 SAE in-line tee.
- Connect the vacuum pump (with vacuum gauge) to the center port of the manifold gauge set. The center port line will be used later for both the HFC-410A and nitrogen containers.

USE REGULATOR TO FLOW NITROGEN AT 1 TO 2 PSIG.



2 EVACUATE THE SYSTEM

- Open both manifold valves and start the vacuum pump.
- Evacuate the line set and indoor unit to an **absolute pressure** of 23,000 microns (29.01 inches of mercury).
NOTE — During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once. A rapid rise in pressure indicates a relatively large leak. If this occurs, **repeat the leak testing procedure**.
NOTE — The term **absolute pressure** means the total actual pressure within a given volume or system, above the absolute zero of pressure. Absolute pressure in a vacuum is equal to atmospheric pressure minus vacuum pressure.
- When the absolute pressure reaches 23,000 microns (29.01 inches of mercury), close the manifold gauge valves, turn off the vacuum pump and disconnect the manifold gauge center port hose from the vacuum pump. Attach the manifold center port hose to a dry nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose. Open the manifold gauge valves to break the vacuum in the line set and indoor unit. Close the manifold gauge valves.
- Shut off the dry nitrogen cylinder and remove the manifold gauge hose from the cylinder. Open the manifold gauge valves to release the dry nitrogen from the line set and indoor unit.
- Reconnect the manifold gauge to the vacuum pump, turn the pump on, and continue to evacuate the line set and indoor unit until the absolute pressure does not rise above 500 microns (29.9 inches of mercury) within a 20-minute period after shutting off the vacuum pump and closing the manifold gauge valves.
- When the absolute pressure requirement above has been met, disconnect the manifold hose from the vacuum pump and connect it to an upright cylinder of HFC-410A refrigerant. Open the manifold gauge valve 1 to 2 psig in order to release the vacuum in the line set and indoor unit.
- Perform the following:
 - Close manifold gauge valves.
 - Shut off HFC-410A cylinder.
 - Reinstall service valve cores by removing manifold hose from service valve. Quickly install cores with core tool while maintaining a positive system pressure.
 - Replace the stem caps and secure finger tight, then tighten an additional one-sixth (1/6) of a turn as illustrated.



⚠ IMPORTANT

Use a thermocouple or thermistor electronic vacuum gauge that is calibrated in microns. Use an instrument capable of accurately measuring down to 50 microns.

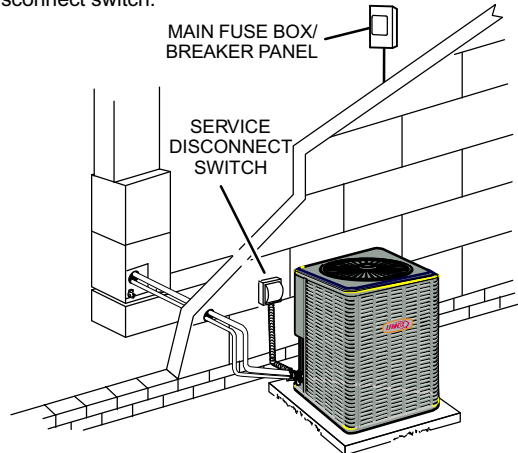
⚠ WARNING

Danger of Equipment Damage. Avoid deep vacuum operation. Do not use compressors to evacuate a system. Extremely low vacuums can cause internal arcing and compressor failure. Damage caused by deep vacuum operation will void warranty.

Evacuating the system of non-condensables is critical for proper operation of the unit. Non-condensables are

SIZE CIRCUIT AND INSTALL SERVICE DISCONNECT SWITCH

Refer to the unit nameplate for minimum circuit ampacity, and maximum fuse or circuit breaker (HACR per NEC). Install power wiring and properly sized disconnect switch.



NOTE — Units are approved for use only with copper conductors. Ground unit at disconnect switch or to an earth ground.

defined as any gas that will not condense under temperatures and pressures present during operation of an air conditioning system. Non-condensables and water suction combine with refrigerant to produce substances that corrode copper piping and compressor parts.

Electrical

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

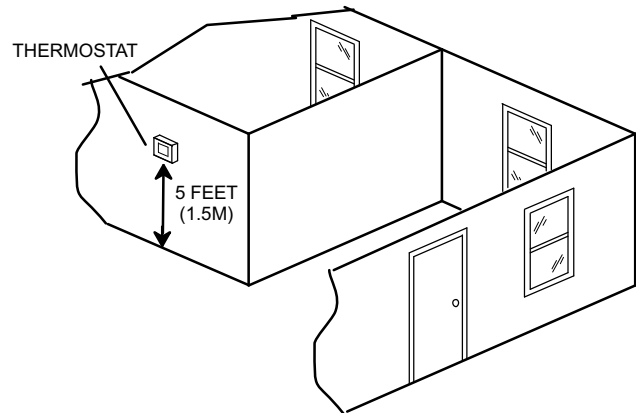
Refer to the furnace or air handler installation instructions for additional wiring application diagrams and refer to unit nameplate for minimum circuit ampacity and maximum overcurrent protection size.

24VAC TRANSFORMER

Use the transformer provided with the furnace or air handler for low-voltage control power (24VAC - 40 VA minimum)

INSTALL THERMOSTAT

Install room thermostat (ordered separately) on an inside wall approximately in the center of the conditioned area and 5 feet (1.5m) from the floor. It should not be installed on an outside wall or where it can be affected by sunlight or drafts.



NOTE — 24VAC, Class II circuit connections are made in the control panel.

⚠ WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

ROUTING HIGH VOLTAGE/ GROUND AND CONTROL WIRING

HIGH VOLTAGE / GROUND WIRES

Any excess high voltage field wiring should be trimmed and secured away from any low voltage field wiring. To facilitate a cutout, a cutout is located in the bottom of the control panel. Connect conduit to the control panel using a proper conduit fitting.

CONTROL WIRING

NOTE — Wire tie provides low voltage control wire strain relief and to maintain separation of field installed low and high voltage circuits.

NOTE — For proper voltages, select thermostat wire (control wires) gauge per Table above.

NOTE — Do not bundle any excess 24VAC control wires inside control panel.

Install low voltage wiring from outdoor to indoor unit and from thermostat to indoor unit as illustrated.

- A.** Run 24VAC control wires through hole with grommet and secure with provided wire tie.
- B.** Make 24VAC thermostat wire connections. Locate the two wires from the contactor and make connection using field provided wire nuts:
 - Yellow to Y1
 - Black to C (common)

WIRE RUN LENGTH	AWG#	INSULATION TYPE
LESS THAN 100' (30 METERS)	18	TEMPERATURE RATING
MORE THAN 100' (30 METERS)	16	35°C MINIMUM.

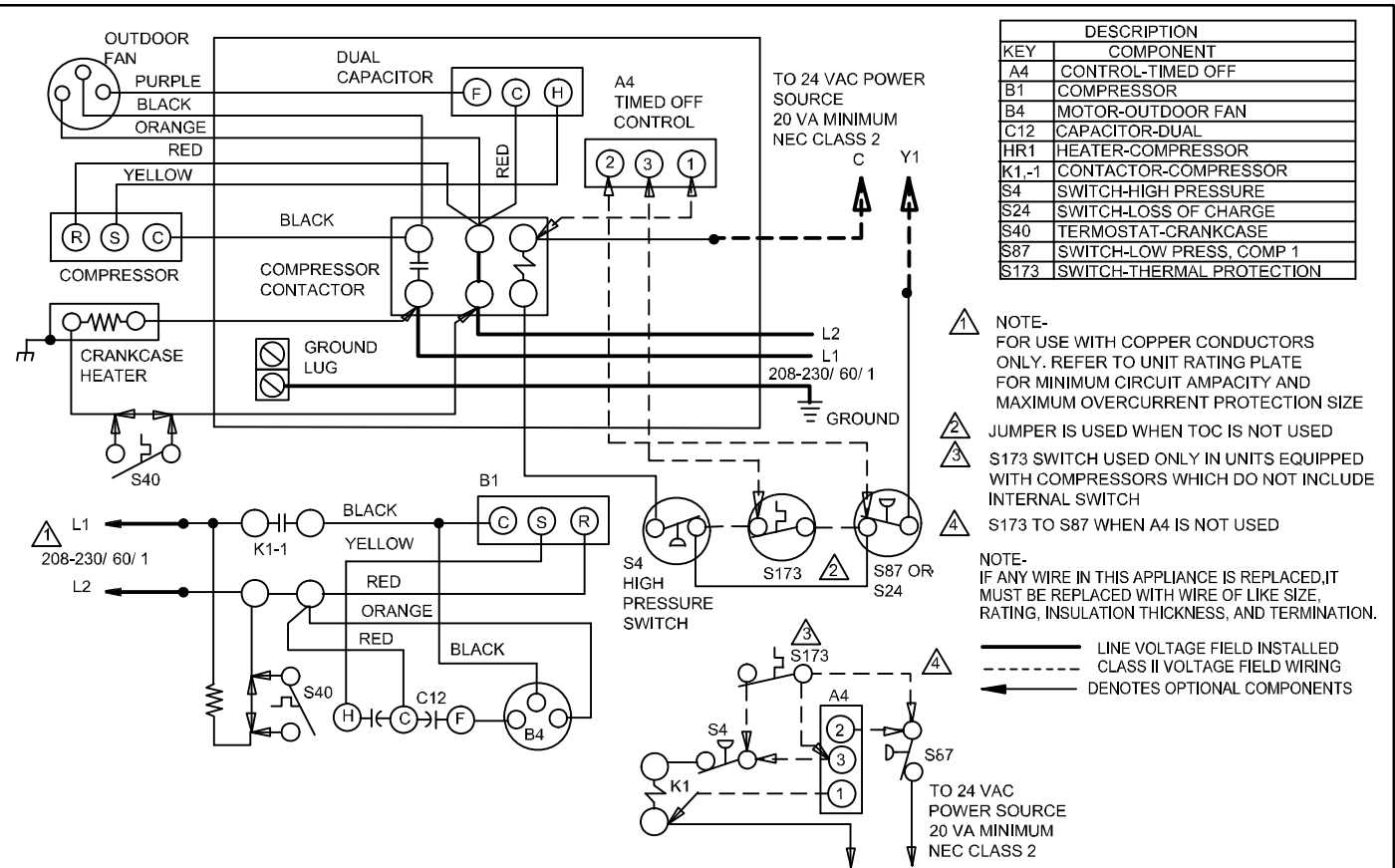
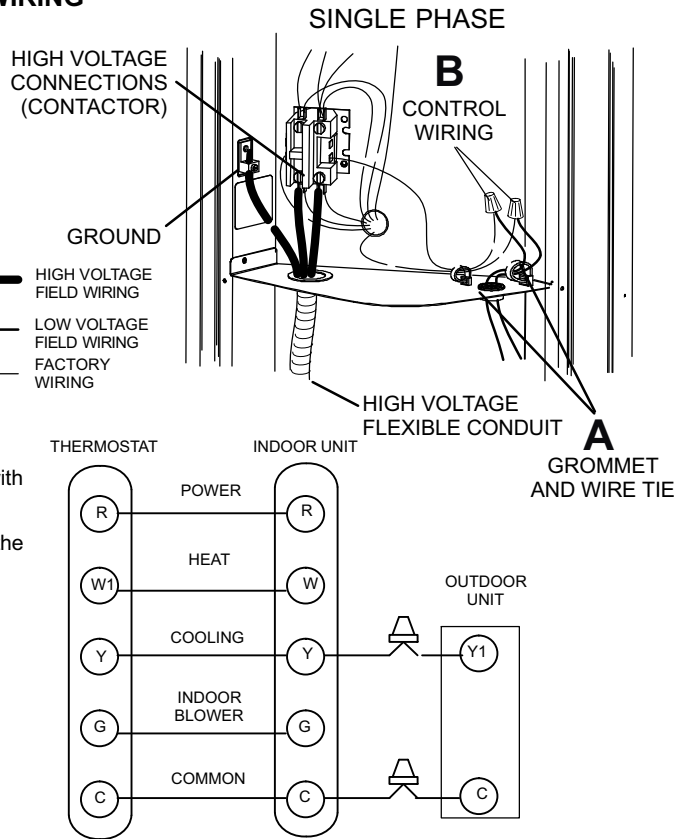
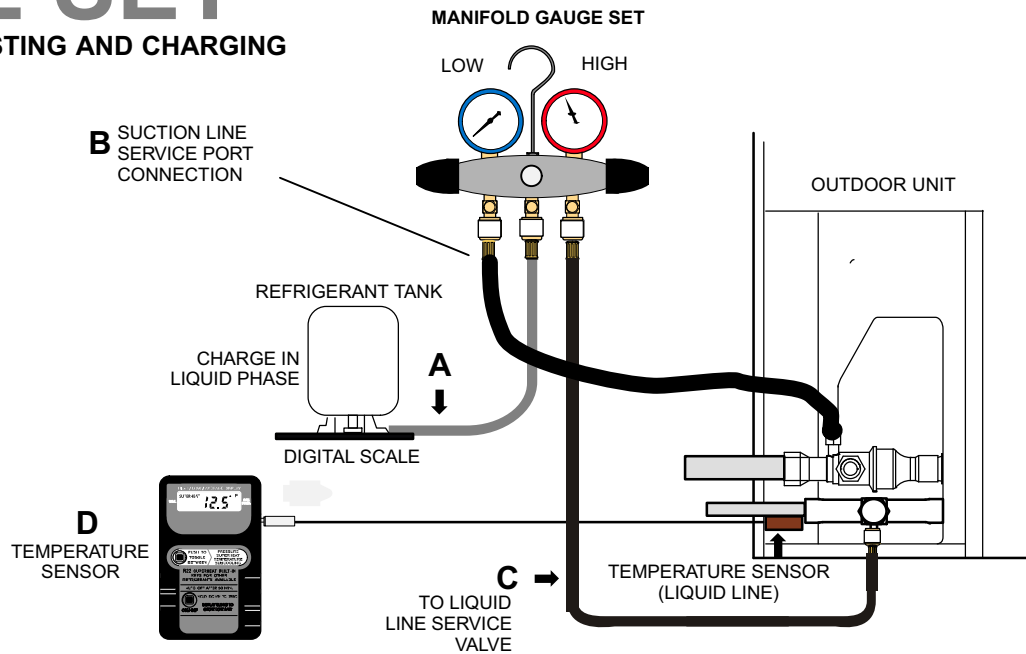


Figure 8. Typical 13ACX Unit Wiring Diagram

GAUGE SET

CONNECTIONS FOR TESTING AND CHARGING



- A. Close manifold gauge set valves and connect the center hose to a cylinder of HFC-410A. Set for liquid phase charging.
- B. Connect the manifold gauge set's low pressure side to the suction line service port.
- C. Connect the manifold gauge set's high pressure side to the liquid line service port.
- D. Position temperature sensor on liquid line near liquid line service port.

Figure 9. Gauge Set Setup and Connections

Servicing Units Delivered Void of Charge

If the outdoor unit is void of refrigerant, clean the system using the procedure described below.

1. Leak check system using procedure outlined on Page 12.
2. Evacuate the system using procedure outlined on Page 13.
3. Use nitrogen to break the vacuum and install a new filter drier in the system.
4. Evacuate the system again using procedure outlined on Page 13.
5. Weigh in refrigerant using procedure outlined under *Start-Up and Charging Procedures*.
6. Monitor the system to determine the amount of moisture remaining in the oil. It may be necessary to replace the filter drier several times to achieve the required dryness level. **If system dryness is not verified, the compressor will fail in the future.**

Unit Start-Up

⚠ IMPORTANT

If unit is equipped with a crankcase heater, it should be energized 24 hours before unit start-up to prevent compressor damage as a result of slugging.

1. Rotate fan to check for binding.

2. Inspect all factory- and field-installed wiring for loose connections.
3. After evacuation is complete, open the liquid line and suction line service valves to release the refrigerant charge (contained in air conditioner) into the system.
4. Replace the stem caps and tighten to the value listed in Table 1.
5. Check voltage supply at the disconnect switch. The voltage must be within the range listed on the unit's nameplate. If not, do not start the equipment until you have consulted with the power company and the voltage condition has been corrected.
6. Set the thermostat for a cooling demand. Turn on power to the indoor handler and close the air conditioner disconnect switch to start the unit.
7. Recheck voltage while the unit is running. Power must be within range shown on the nameplate.
8. Check system for sufficient refrigerate using the procedures that follow.

System Refrigerant

This section outlines procedures for:

1. Connecting gauge set for testing and charging;
2. Checking and adjusting indoor airflow;
3. Adding or removing refrigerant.

ADDING OR REMOVING REFRIGERANT

This system uses HFC-410A refrigerant which operates at much higher pressures than HCFC-22. The pre-installed liquid line filter drier is approved for use with HFC-410A only. Do not replace it with components designed for use with HCFC-22. This unit is NOT approved for use with coils which use capillary tubes or fixed orifices as a refrigerant metering device. Check airflow using the Delta-T (DT) process using the illustration in Figure 10.

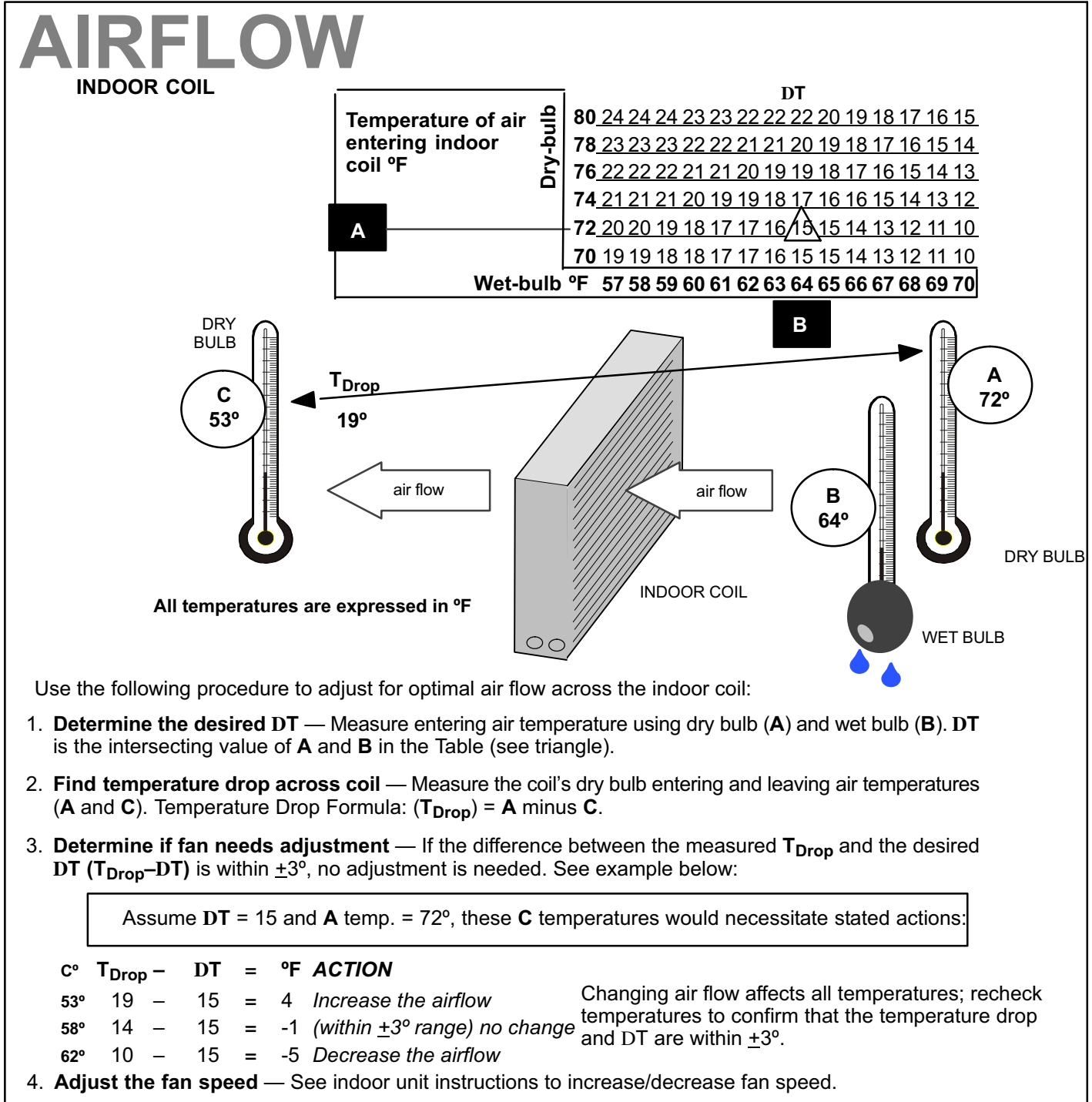


Figure 10. Checking Indoor Airflow over Evaporator Coil using Delta-T (DT) Chart

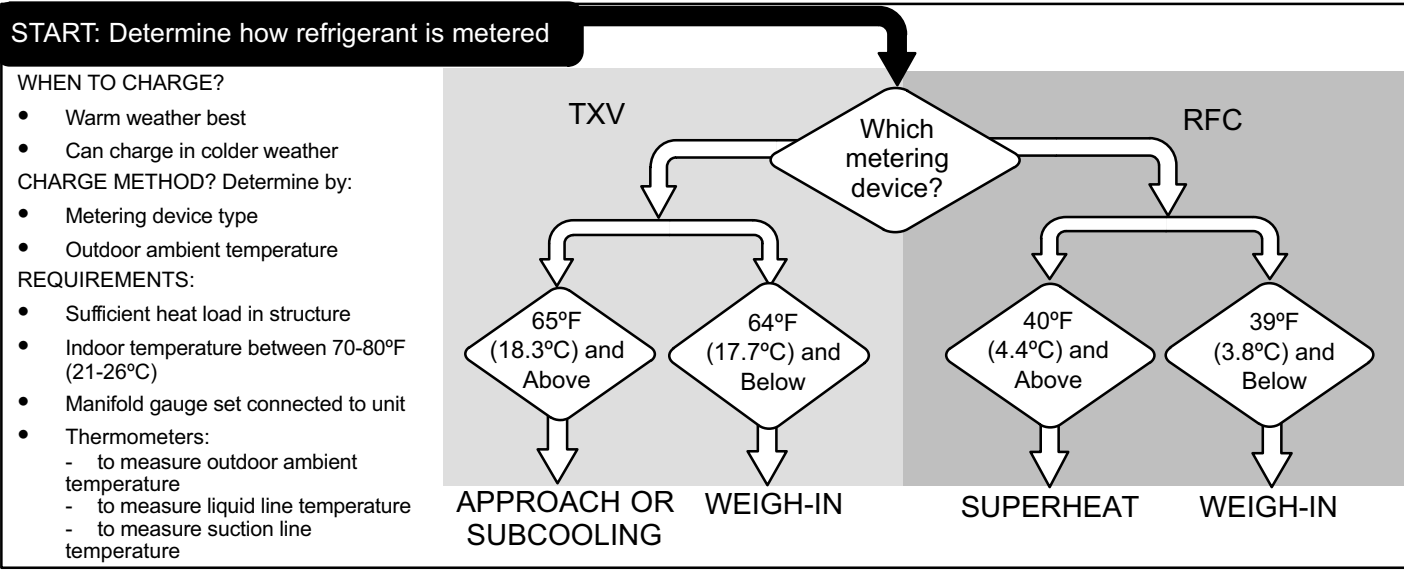


Figure 11. Determining Charge Method

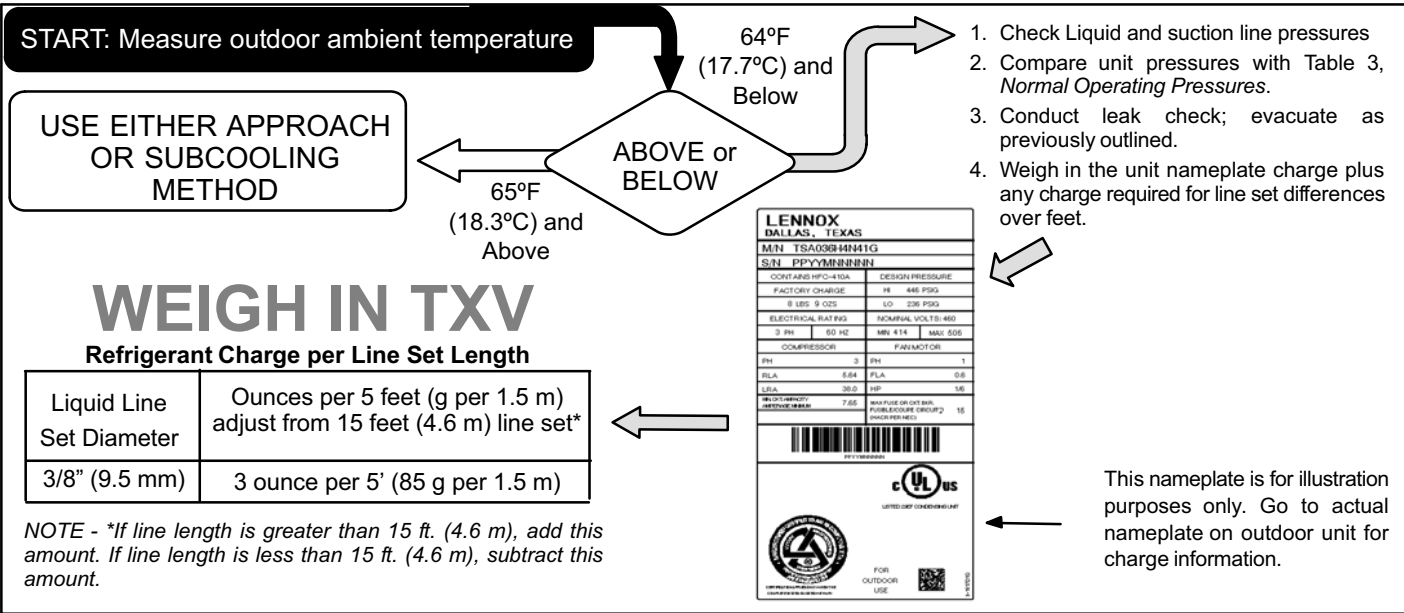


Figure 12. HFC-410A Weigh In TXV Method

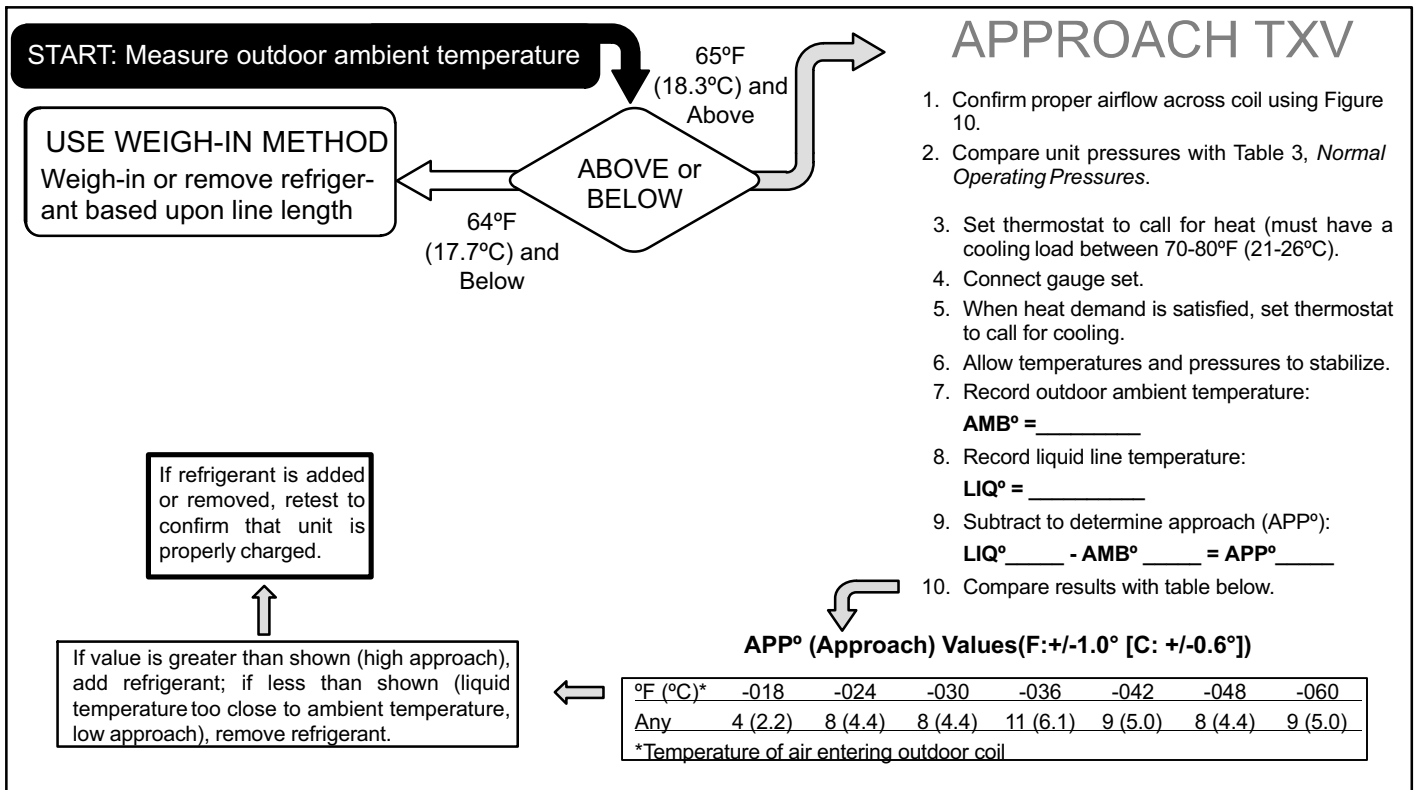


Figure 13. HFC-410A Approach TXV Charge

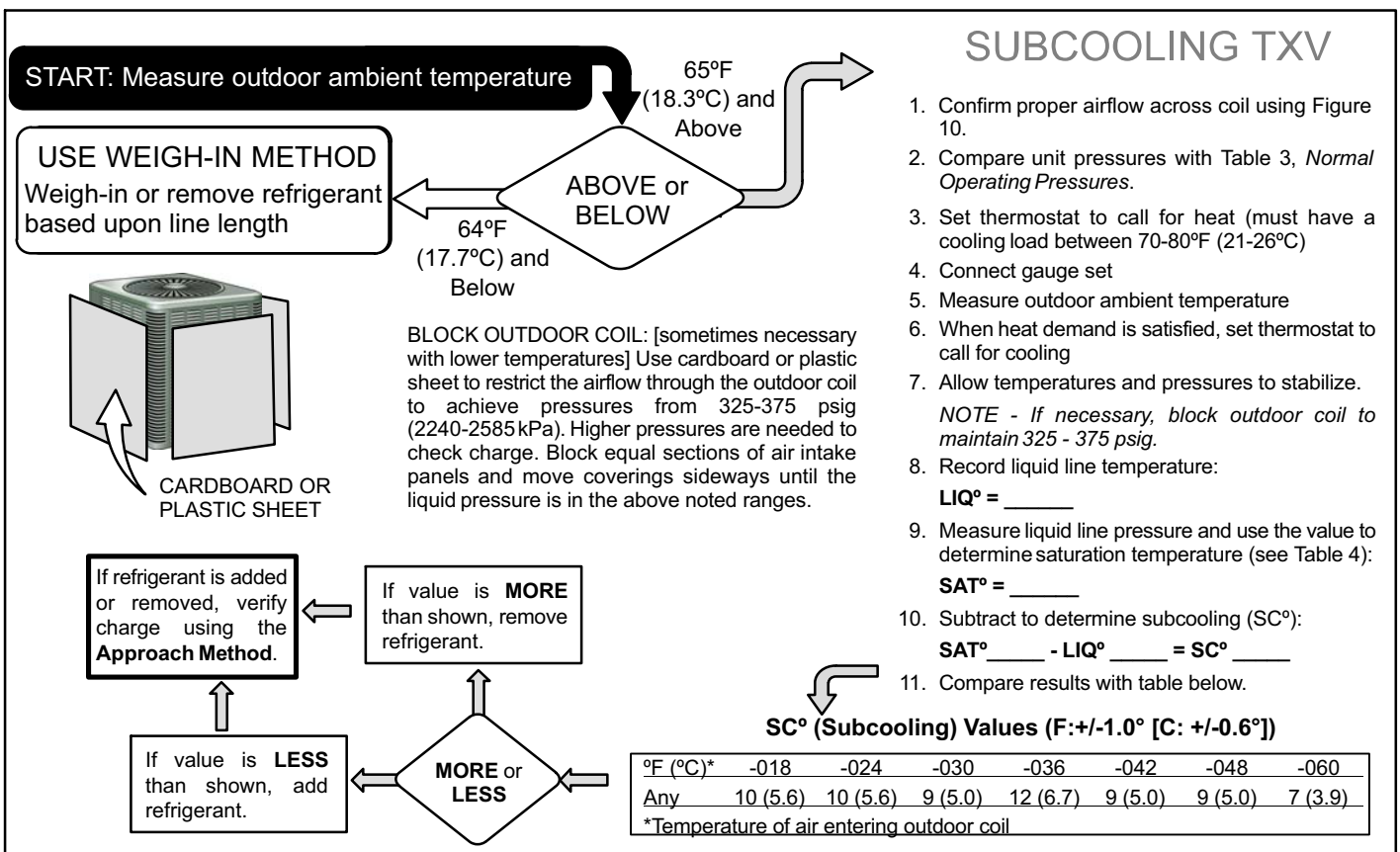


Figure 14. HFC-410A Subcooling TXV Charge

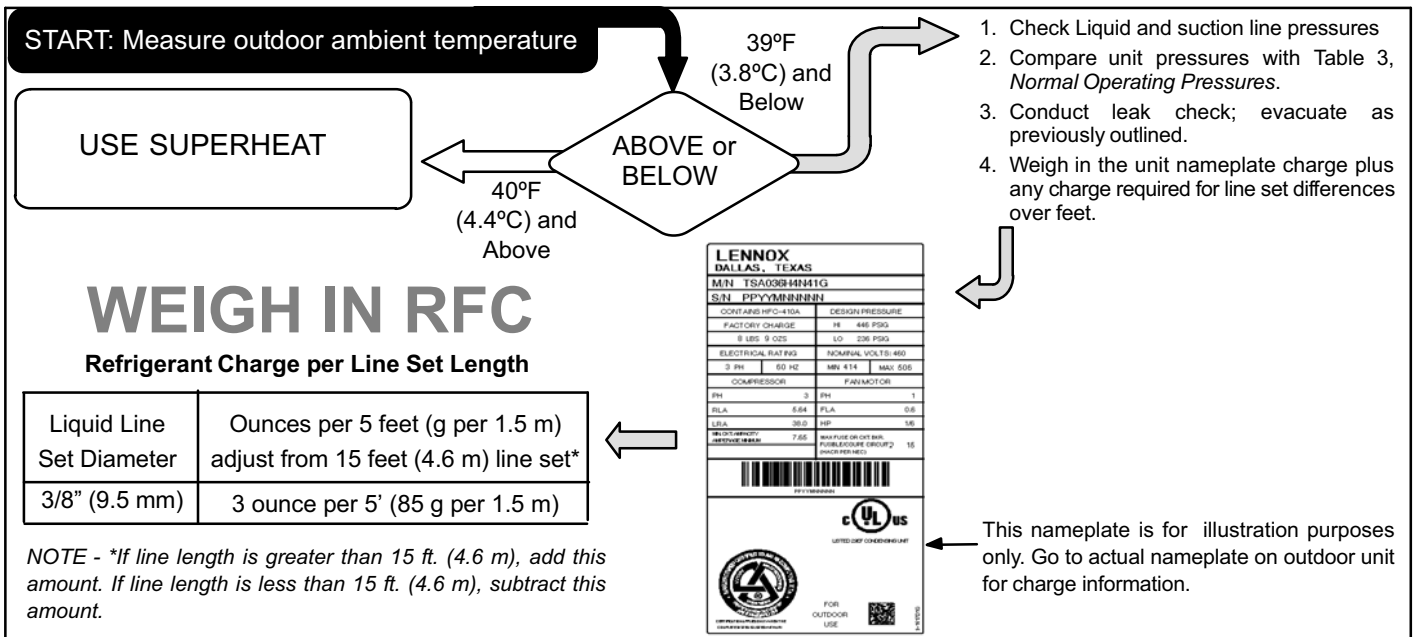


Figure 15. HFC-410A Weigh In RFC Method

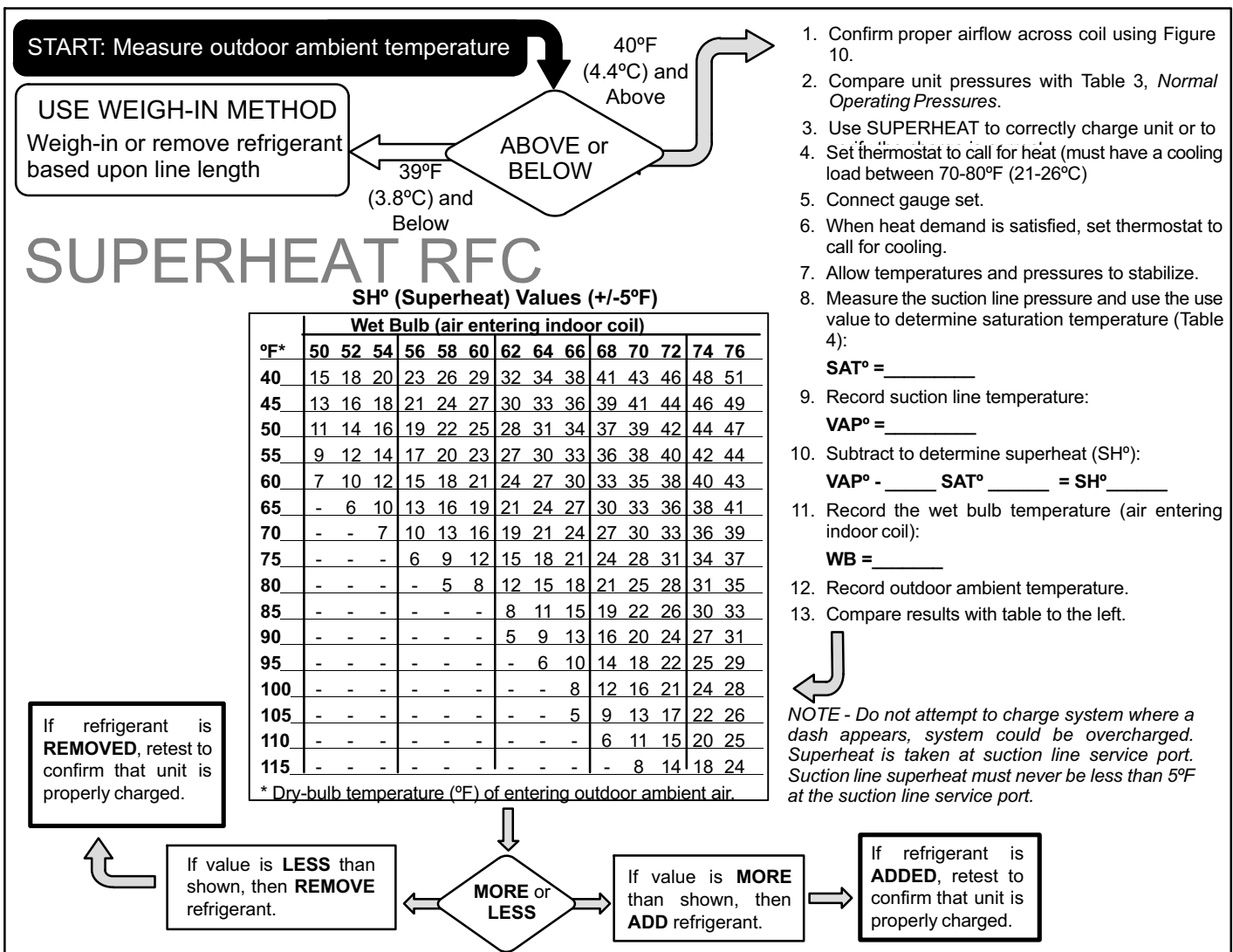


Figure 16. HFC-410A Superheat RFC Method

Table 3. HFC-410A Normal Operating Pressures (Liquid +10 and Suction +5 psig)

! IMPORTANT

Use this table to perform maintenance checks; it is not a procedure for charging the system. Minor variations in these pressures may be due to differences in installations. Significant deviations could mean that the system is not properly charged or that a problem exists with some component in the system.

13ACX	-018	-024	-030	-036	-042	-048	-060
°F (°C)*	Liquid / Suction	Liquid / Suction	Liquid / Suction	Liquid / Suction	Liquid / Suction	Liquid / Suction	Liquid / Suction
Expansion Valve (TXV)							
65 (18)	233 / 132	244 / 137	248 / 127	263 / 135	238 / 132	235 / 132	241 / 130
70 (21)	251 / 133	263 / 138	263 / 131	281 / 138	262 / 133	254 / 132	260 / 130
75 (24)	265 / 133	285 / 139	284 / 132	302 / 140	280 / 134	276 / 134	280 / 132
80 (27)	292 / 135	307 / 140	307 / 134	325 / 142	301 / 136	298 / 134	299 / 134
85 (29)	314 / 136	329 / 141	330 / 135	349 / 142	327 / 137	323 / 135	321 / 135
90 (32)	338 / 137	354 / 142	355 / 136	375 / 143	353 / 138	350 / 137	344 / 134
95 (35)	362 / 138	379 / 143	380 / 137	404 / 144	377 / 140	377 / 138	371 / 135
100 (38)	388 / 140	404 / 144	407 / 138	433 / 145	404 / 141	406 / 140	400 / 137
105 (41)	415 / 141	438 / 145	434 / 139	462 / 147	435 / 142	430 / 141	428 / 139
110 (43)	444 / 142	464 / 147	465 / 141	494 / 149	465 / 143	464 / 142	458 / 141
115 (45)	475 / 143	495 / 148	497 / 142	527 / 150	499 / 144	495 / 143	484 / 142
Fixed Orifice (RFC)							
65 (18)	233 / 121	246 / 126	245 / 123	261 / 134	246 / 126	247 / 125	248 / 124
70 (21)	250 / 124	265 / 129	265 / 126	281 / 136	263 / 128	266 / 128	266 / 126
75 (24)	270 / 128	286 / 132	286 / 129	301 / 138	284 / 131	286 / 131	288 / 130
80 (27)	291 / 131	307 / 135	308 / 132	324 / 140	305 / 133	307 / 133	309 / 133
85 (29)	313 / 134	330 / 137	331 / 135	346 / 142	327 / 135	329 / 135	330 / 135
90 (32)	335 / 136	353 / 140	355 / 138	371 / 144	350 / 138	353 / 138	354 / 138
95 (35)	359 / 138	378 / 142	380 / 140	396 / 146	374 / 140	377 / 140	377 / 140
100 (38)	383 / 140	402 / 143	405 / 142	422 / 148	399 / 142	403 / 142	406 / 142
105 (41)	409 / 142	428 / 145	431 / 144	448 / 150	424 / 144	428 / 144	431 / 144
110 (43)	436 / 145	456 / 147	458 / 146	477 / 151	452 / 146	455 / 146	457 / 146
115 (46)	464 / 147	486 / 149	487 / 148	506 / 153	481 / 148	483 / 147	484 / 148

*Values shown are typical pressures; indoor unit match up, indoor air quality equipment, and indoor load will cause the pressures to vary.

**Temperature of the air entering the outside coil.

Table 4. HFC-410A Temperature — Pressure (Psig)

°F	°C	Psig	°F	°C	Psig
-40	-40.0	11.6	60	15.6	170
-35	-37.2	14.9	65	18.3	185
-30	-34.4	18.5	70	21.1	201
-25	-31.7	22.5	75	23.9	217
-20	-28.9	26.9	80	26.7	235
-15	-26.1	31.7	85	29.4	254
-10	-23.3	36.8	90	32.2	274
-5	-20.6	42.5	95	35.0	295
0	-17.8	48.6	100	37.8	317
5	-15.0	55.2	105	40.6	340
10	-12.2	62.3	110	43.3	365
15	-9.4	70.0	115	46.1	391
20	-6.7	78.3	120	48.9	418
25	-3.9	87.3	125	51.7	446
30	-1.1	96.8	130	54.4	476
35	1.7	107	135	57.2	507
40	4.4	118	140	60.0	539
45	7.2	130	145	62.8	573
50	10.0	142	150	65.6	608
55	12.8	155			

Removing and Installing Louvers

WARNING

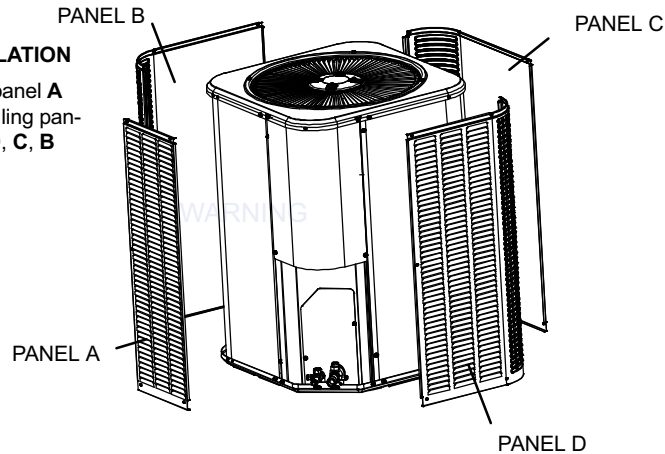
To prevent personal injury, or damage to panels, unit or structure, be sure to observe the following:

While installing or servicing this unit, carefully stow all removed panels out of the way, so that the panels will not cause injury to personnel, nor cause damage to objects or structures nearby, nor will the panels be subjected to damage (e.g., being bent or scratched).

While handling or stowing the panels, consider any weather conditions, especially windy conditions, that may cause panels to be blown around and battered.

ORDER OF REMOVAL AND REINSTALLATION

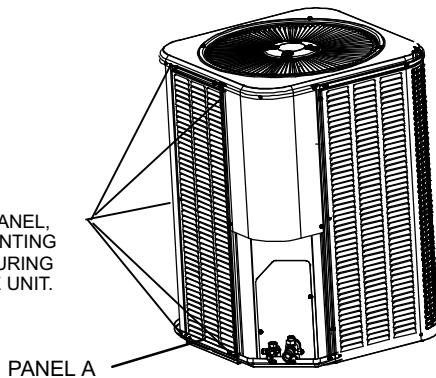
When removing the unit panels. Remove panel **A** first, then **B**, **C** and finally **D**. When reinstalling panels, reverse that order starting with panel **D**, **C**, **B** and finally **A**.



REMOVAL

STEP 1

TO REMOVE PANEL, REMOVE MOUNTING SCREWS SECURING PANEL TO THE UNIT.



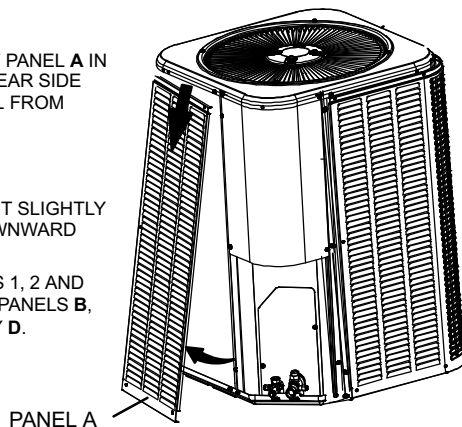
STEP 2

SLIGHTLY LIFT PANEL A IN ORDER TO CLEAR SIDE LIPS OF PANEL FROM BASE OF UNIT.

STEP 3

TILT PANEL OUT SLIGHTLY AND PULL DOWNWARD TO REMOVE.

REPEAT STEPS 1, 2 AND 3 TO REMOVE PANELS B, C AND FINALLY D.



INSTALLATION

STEP 1

STARTING WITH PANEL D, INSERT PANEL UNDER UNIT TOP CAP LIP AND LIFT SLIGHTLY TO CLEAR SIDE LIP OF PANEL FROM BASE.

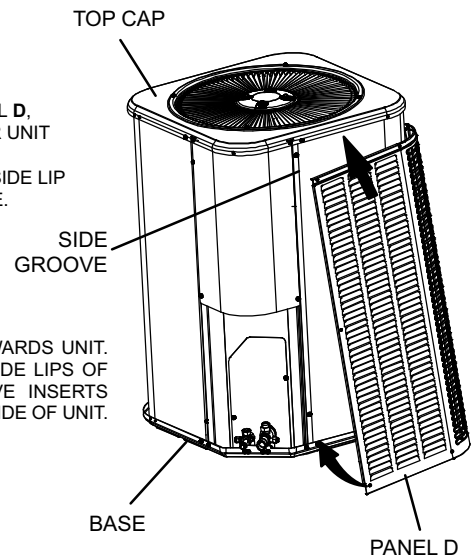
STEP 2

MOVE PANEL IN TOWARDS UNIT. ALIGN LEFT/RIGHT SIDE LIPS OF PANEL WITH GROOVE INSERTS ALONG LEFT/RIGHT SIDE OF UNIT.

STEP 3

SECURE PANEL, WITH MOUNTING SCREWS.

REPEAT STEPS 1 AND 2 TO INSTALL PANELS C, B AND FINALLY A.



System Operation

IMPORTANT

Some scroll compressor have internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system is raised above 40 psig. **DO NOT REPLACE COMPRESSOR.**

The outdoor unit and indoor blower will cycle on and off as dictated by demands from the room thermostat. When the thermostat's blower switch is in the **ON** position, the indoor blower will operate continuously.

HIGH PRESSURE SWITCH

13ACX units are equipped with a high-pressure switch that is located in the liquid line of the compressor as illustrated in figure on page 2.

The switch is a Single Pole, Single Throw (SPST), manual-reset switch which is normally closed and removes power from the compressor when discharge pressure rises above factory setting at 590 ± 10 psi. The manual-reset switch can be identified by a red cap that is press to preform the reset function.

Maintenance

DEALER

WARNING



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

Maintenance and service must be performed by a qualified installer or service agency. At the beginning of each cooling season, the system should be checked as follows:

Outdoor Unit

1. Outdoor unit fan motor is pre-lubricated and sealed. No further lubrication is needed.
2. Visually inspect all connecting lines, joints and coils for evidence of oil leaks.
3. Check all wiring for loose connections.
4. Check for correct voltage at unit (unit operating).
5. Check amp draw on outdoor fan motor.

Motor Nameplate: _____ **Actual:** _____.

6. Inspect drain holes in coil compartment base and clean if necessary.

NOTE - If insufficient cooling occurs, the unit should be gauged and refrigerant charge should be checked.

Outdoor Coil

Clean and inspect outdoor coil (may be flushed with a water hose). Ensure power is off before cleaning.

NOTE — It may be necessary to flush the outdoor coil more frequently if it is exposed to substances which are corrosive or which block airflow across the coil (e.g., pet urine, cottonwood seeds, fertilizers, fluids that may contain high levels of corrosive chemicals such as salts)

Sea Coast — Moist air in ocean locations can carry salt, which is corrosive to most metal. Units that are located near the ocean require frequent inspections and maintenance. These inspections will determine the necessary need to wash the unit including the outdoor coil. Consult your installing contractor for proper intervals/procedures for your geographic area or service contract.

Indoor Unit

1. Clean or change filters.
2. Lennox blower motors are prelubricated and permanently sealed. No more lubrication is needed.
3. Adjust blower speed for cooling. Measure the pressure drop over the coil to determine the correct blower CFM. Refer to the unit information service manual for pressure drop tables and procedure.
4. *Belt Drive Blowers* - Check belt for wear and proper tension.
5. Check all wiring for loose connections.
6. Check for correct voltage at unit. (blower operating)
7. Check amp draw on blower motor.

Motor Nameplate: _____ **Actual:** _____.

Indoor Coil

1. Clean coil if necessary.
2. Check connecting lines, joints and coil for evidence of oil leaks.
3. Check condensate line and clean if necessary.

HOMEOWNER

Cleaning of the outdoor unit's coil should be performed by a trained service technician. Contact your dealer and set up a schedule (preferably twice a year, but at least once a year) to inspect and service your outdoor unit. The following maintenance may be performed by the homeowner.

IMPORTANT

Sprinklers and soaker hoses should not be installed where they could cause prolonged exposure to the outdoor unit by treated water. Prolonged exposure of the unit to treated water (i.e., sprinkler systems, soakers, waste water, etc.) will corrode the surface of steel and aluminum parts and diminish performance and longevity of the unit.

Outdoor Coil

The outdoor unit must be properly maintained to ensure its proper operation.

- Please contact your dealer to schedule proper inspection and maintenance for your equipment.
- Make sure no obstructions restrict airflow to the outdoor unit.
- Grass clippings, leaves, or shrubs crowding the unit can cause the unit to work harder and use more energy.
- Keep shrubbery trimmed away from the unit and periodically check for debris which collects around the unit.

Routine Maintenance

In order to ensure peak performance, your system must be properly maintained. Clogged filters and blocked airflow prevent your unit from operating at its most efficient level.

1. **Air Filter** — Ask your Lennox dealer to show you where your indoor unit's filter is located. It will be either at the indoor unit (installed internal or external to the cabinet) or behind a return air grille in the wall or ceiling. Check the filter monthly and clean or replace it as needed.
2. **Disposable Filter** — Disposable filters should be replaced with a filter of the same type and size.

NOTE — If you are unsure about the filter required for your system, call your Lennox dealer for assistance.

3. **Reusable Filter** — Many indoor units are equipped with reusable foam filters. Clean foam filters with a mild soap and water solution; rinse thoroughly; allow filter to dry completely before returning it to the unit or grille.

NOTE — The filter and all access panels must be in place any time the unit is in operation.

4. **Electronic Air Cleaner** — Some systems are equipped with an electronic air cleaner, designed to remove airborne particles from the air passing through the cleaner. If your system is so equipped, ask your dealer for maintenance instructions.
5. **Indoor Unit** — The indoor unit's evaporator coil is equipped with a drain pan to collect condensate formed as your system removes humidity from the inside air. Have your dealer show you the location of the drain line and how to check for obstructions. (This would also apply to an auxiliary drain, if installed.)

Thermostat Operation

See the ComfortSense® 7000 thermostat homeowner manual for instructions on how to operate your thermostat.

Preservice Check

If your system fails to operate, check the following before calling for service:

- Verify room thermostat settings are correct.
- Verify that all electrical disconnect switches are ON.
- Check for any blown fuses or tripped circuit breakers.
- Verify unit access panels are in place.
- Verify air filter is clean.
- If service is needed, locate and write down the unit model number and have it handy before calling.

Accessories

For update-to-date information, see any of the following publications:

- Lennox 13ACX Engineering Handbook
- Lennox Product Catalog
- Lennox Price Book

Start-Up and Performance Checklist

Job Name _____	Job no. _____	Date _____
Job Location _____	City _____	State _____
Installer _____	City _____	State _____
Unit Model No. _____	Serial No. _____	Service Technician _____
Nameplate Voltage _____		
Rated Load Ampacity _____	Compressor _____	Outdoor Fan _____
Maximum Fuse or Circuit Breaker _____		
Electrical Connections Tight? <input type="checkbox"/>	Indoor Filter clean? <input type="checkbox"/>	Supply Voltage (Unit Off) _____
Indoor Blower RPM _____	S.P. Drop Over Indoor (Dry) _____	Outdoor Coil Entering Air Temp. _____
Discharge Pressure _____	Suction Pressure _____	Refrigerant Charge Checked? <input type="checkbox"/>
Refrigerant Lines: - Leak Checked? <input type="checkbox"/>	Properly Insulated? <input type="checkbox"/>	Outdoor Fan Checked? <input type="checkbox"/>
Service Valves: --- Fully Opened? <input type="checkbox"/>	Caps Tight? <input type="checkbox"/>	Thermostat
Voltage With Compressor Operating _____	Calibrated? <input type="checkbox"/>	Properly Set? <input type="checkbox"/> Level? <input type="checkbox"/>