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.

⚠ 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.

⚠ 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.

⚠ 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.

INSTALLATION INSTRUCTIONS

Elite® Series XC16 Units

AIR CONDITIONER
506101-01
07/09
Supersedes 04/08

Technical Publications
Litho U.S.A.

Table of Contents

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.

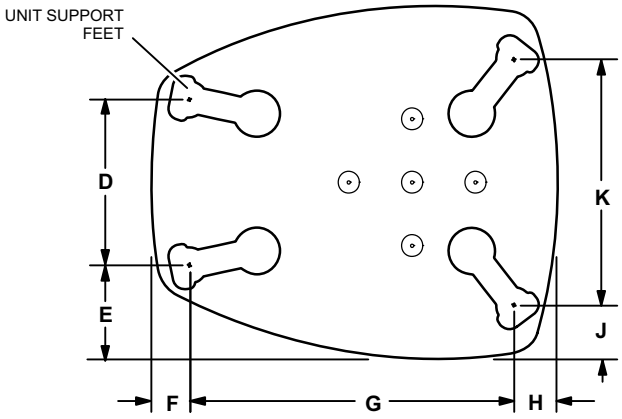
- Assembled outdoor unit

XC16 Outdoor Unit

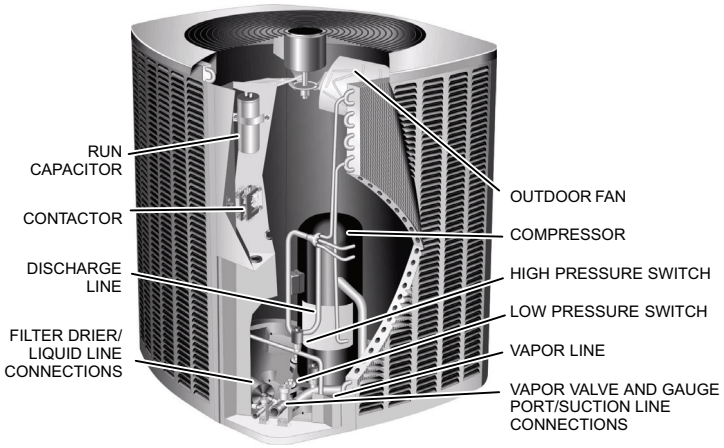
The XC16 Air Conditioners, which will also be referred to in this instruction as the outdoor unit, uses HFC-410A refrigerant. This outdoor unit must be installed with a matching indoor unit and line set as outlined in the XC16 Engineering Handbook. XC16 Air Conditioners are designed for use in thermal expansion valve (TXV) systems.

NOTE - The XC16 outdoor unit is rated for 230V applications only. A hard-start kit is required for applications where the supply voltage is less than 230V.

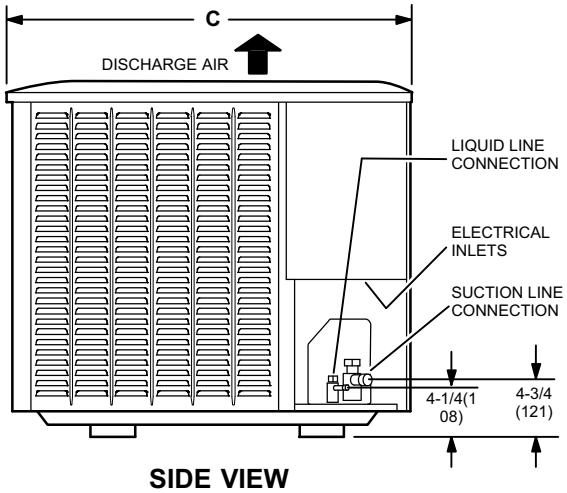
Unit Dimensions - Inches (mm)



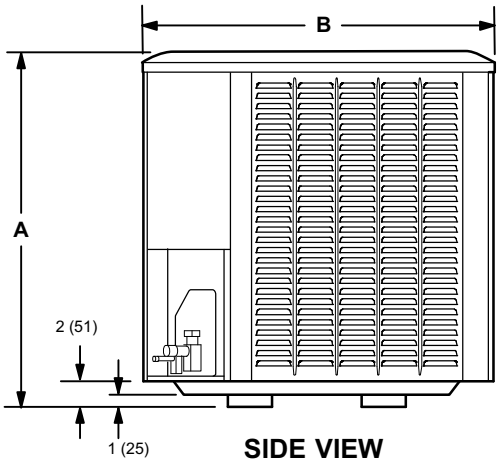
XC16 BASE WITH ELONGATED LEGS



XC16 PARTS ARRANGEMENT



SIDE VIEW



SIDE VIEW

XC16	A	B	C	D	E	F	G	H	J	K
-024	39 (991)	30-1/2 (775)	35 (889)	13-7/8 (352)	7-3/4 (197)	3-1/4 (83)	27-1/8 (689)	3-5/8 (92)	4-1/2 (114)	20-5/8 (524)
-036	45 (1143)	30-1/2 (775)	35 (889)							
-048	39 (991)	30-1/2 (775)	35 (889)							
-060	39 (991)	35-1/2 (902)	39-3/8 (1001)	16-7/8 (429)	8-3/4 (222)	3-1/8 (79)	30-3/4 (781)	4-5/8 (117)	3-3/4 (95)	26-7/8 (683)

⚠ 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

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.

When servicing or repairing HVAC components, ensure caps and fasteners are appropriately tightened. Table 1 lists torque values for typical service and repair items.

Table 1. Torque Requirements

Part	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

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USING MANIFOLD GAUGE SETS

When checking the system charge, only use a manifold gauge set that features low loss anti-blow back fittings. See figure 27 for a typical manifold gauge connection setup.

Manifold gauge sets 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 on the high side and a low side of 30” vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

OPERATING SERVICE VALVES

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

Each service valve is equipped with a service port which has a factory-installed valve stem.

⚠ 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.

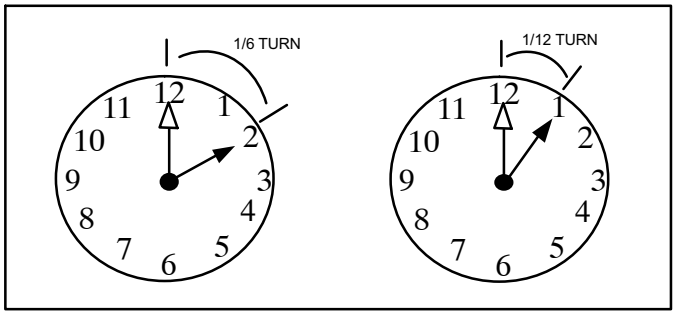

Figure 1. Cap Tightening Distances

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

⚠ IMPORTANT

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

Operating Angle-Type Service Valve

To Access Angle-Type Service Port:

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

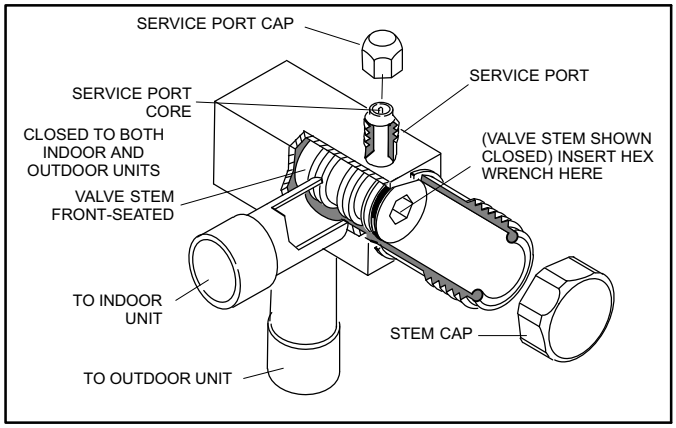

Figure 2. Angle-Type Service Valve (Font-Seated Closed)

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

To Open and Close Angle-Type Service Valve:

A valve stem cap protects the valve stem from contamination and assures a leak-free seal.

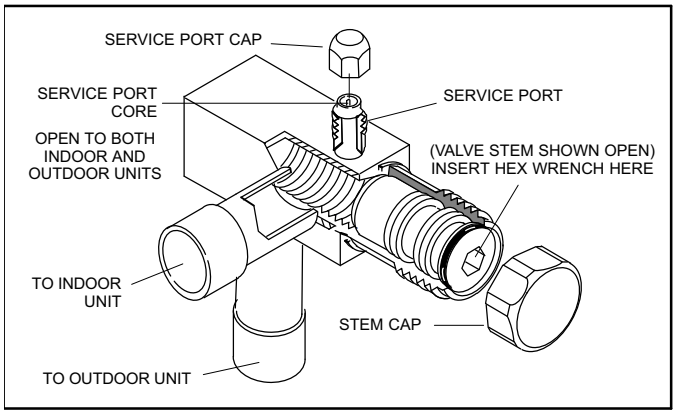

Figure 3. Angle-Type Service Valve (Back-Seated Opened)

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

3. Replace the stem cap and tighten as follows:
   - *With Torque Wrench*: Tighten finger tight and then tighten per table 1.
   - *Without Torque Wrench*: Finger tighten and use an appropriately sized wrench to turn an additional 1/12 turn clockwise as illustrated in figure 1.

Operating Ball-Type Service Valve

To Access Ball-Type 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 to the service port.
3. When testing is completed, replace service port cap and tighten as follows:
   - *With Torque Wrench*: Finger tighten and then tighten per table 1.
   - *Without Torque Wrench*: Finger tighten and use an appropriately sized wrench to turn an additional 1/6 turn clockwise as illustrated in figure 1.

To Open and Close Ball-Type Service Valve:

A valve stem cap protects the valve stem from contamination and assures a leak-free seal.

1. Remove stem cap with a wrench.
2. Use an appropriately sized wrench to open. To open valve, rotate stem counterclockwise 90°. To close rotate stem clockwise 90°.
3. Replace the stem cap and tighten as follows:
   - *With Torque Wrench*: Finger tighten and then tighten per table 1.
   - *Without Torque Wrench*: Finger tighten and use an appropriately sized to wrench turn an additional 1/12 turn clockwise as illustrated in figure 1.

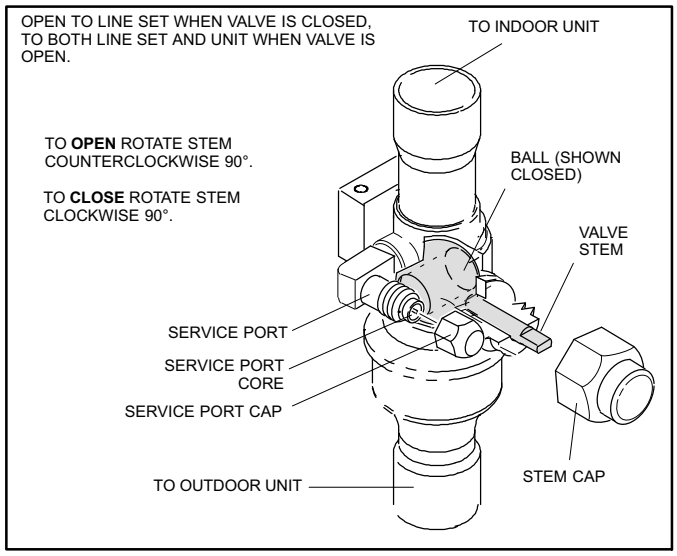

Figure 4. Ball-Type Service Valve

Recovering Refrigerant from Existing HCFC-22 System

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

METHOD 1:

Use this method if the existing outdoor unit is not equipped with manual shut-off valves, and plan on using existing HCFC-22 refrigerant to flush the system.

NOTE - Use recovery machine instructions for specific setup requirements.

Perform the following task:

1. Disconnect all power to the existing outdoor unit.
2. Connect to the existing unit a gauge set, clean recovery cylinder and a recovery machine. Use the instructions provided with the recover machine on how to setup the connections.
3. Remove all HCFC-22 refrigerant from the existing system. Check gauges after shutdown to confirm that the entire system is completely void of refrigerant.

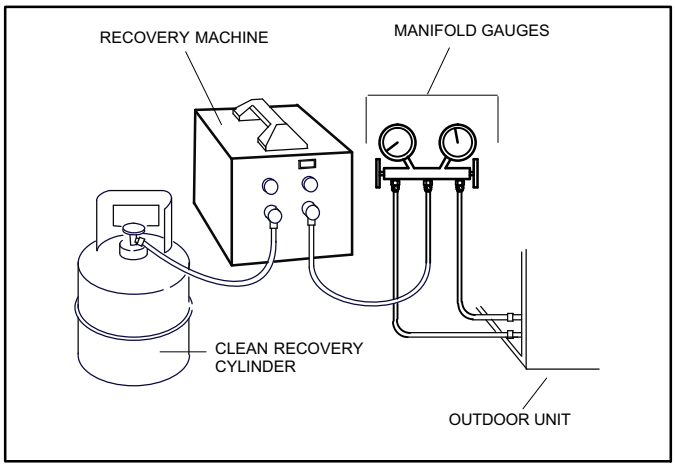

Figure 5. Typical Refrigerant Recovery (Method 1)

METHOD 2:

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

IMPORTANT: Some system configurations may contain higher than normal refrigerant charge due to either large internal coil volumes, and/or long line sets. The following conditions may cause the compressor to stop functioning:

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 cycled the compressor **OFF**.
- Compressor can stop pumping due to tripped internal pressure relief valve.

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- 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 suction 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:

1. Start the existing HCFC-22 system in the cooling mode and close the liquid line valve.
2. Pump as much of the existing HCFC-22 refrigerant with the compressor back into the outdoor unit until you have reached the limitations of the outdoor system. Turn the outdoor unit main power **OFF** and use a recovery machine to remove the remaining refrigerant in the system.

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

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

Removing Existing Outdoor Unit

Perform the following task at the existing outdoor unit:

- Disconnect line set at the service valves.
- Disconnect electrical service at the disconnect switch.
- Remove old outdoor unit.

Positioning New Outdoor Unit

See *Unit Dimensions* on page for sizing mounting slab, platforms or supports. Refer to figure 6 for mandatory installation clearance requirements.

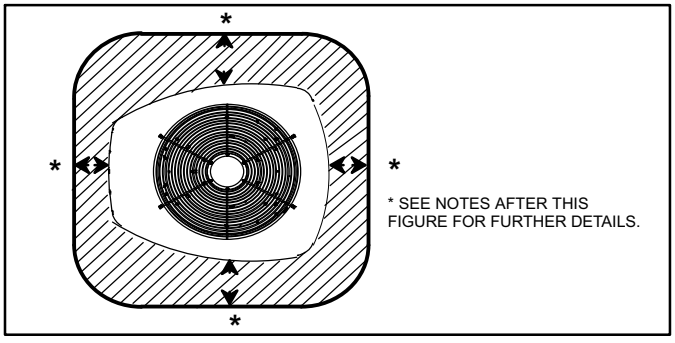

Figure 6. Installation Clearances

NOTES:

- Service clearance of 30 in. (762 mm) must be maintained on one of the sides adjacent to the control box.
- Clearance to one of the other three sides must be 36 in. (914 mm)·
- Clearance to one of the remaining two sides may be 12 in. (305 mm) and the final side may be 6 in. (152 mm)·
- 48 in. (1219 mm) clearance required on top of unit.
- A clearance of 24 in. (610 mm) must be maintained between two units.

POSITIONING CONSIDERATIONS

Consider the following when positioning the unit:

⚠ CAUTION

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

- 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 7.

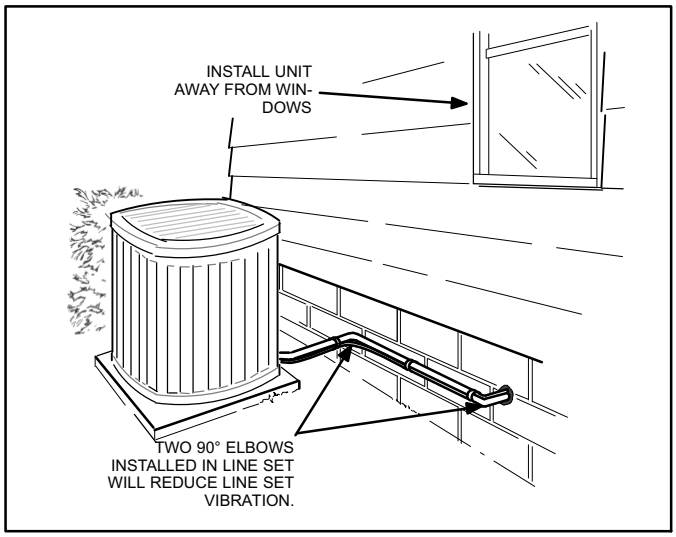

Figure 7. Outside Unit Placement

PLACING OUTDOOR UNIT ON SLAB

When installing unit at grade level, the top of the slab should be high enough above grade so that water from higher ground will not collect around the unit. The slab should have a slope tolerance as described in figure 8.

NOTE - If necessary for stability, anchor unit to slab as described in Stabilizing Unit on Uneven Surfaces on page 7.

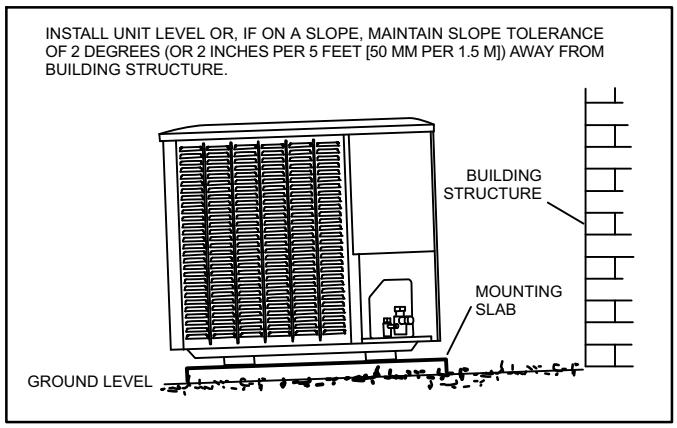

Figure 8. Slab Mounting at Ground Level

ELEVATING THE UNIT (SMALL-BASE UNITS)

If additional elevation is necessary, raise the unit by extending the length of the unit support feet. This may be done by cutting four equal true-cut lengths of Schedule (SCH) 40, 4" (101.6mm) piping to the height required as illustrated in figure 9.

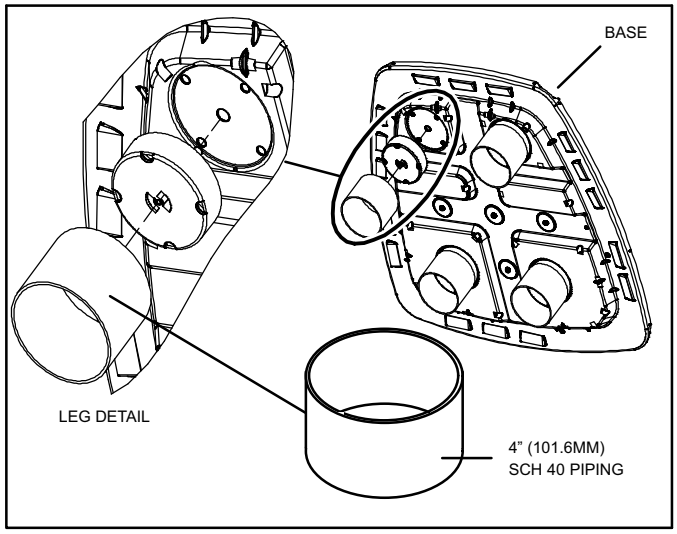

Figure 9. Elevated Slab Mounting using Feet Extenders (Small Base Units)

NOTE - Keep the height of extenders short enough to ensure a sturdy installation. If it is necessary to extend further, consider a different type of field-fabricated framework that is sturdy enough for greater heights.

The inside diameter of the 4" (101.6mm) piping is approximately 0.25" (6.35mm) greater than the pre-installed feet on the unit. Devise a shim that will take up the space and hold the extenders onto the feet during this procedure. Small strips of 0.125" (3.175mm) thick adhesive foam may be used. One or two small 1" (25.4mm) square strips should be adequate to hold the extender in place.

ELEVATING THE UNIT (LARGER-BASE UNITS)

Unlike the small-base units which use round support feet, the larger-base units are outfitted with elongated support feet as illustrated in figure 10 which uses a similar method for elevating the unit.

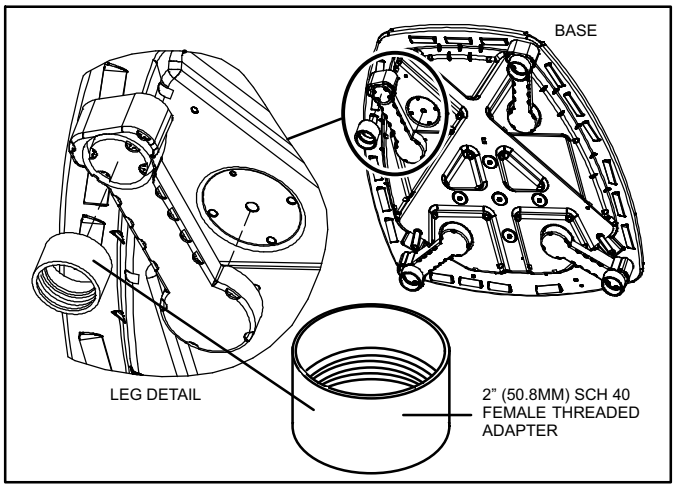

Figure 10. Elevated Slab Mounting using Feet Extenders (Larger Base Units)

If additional elevation is necessary, raise the unit by extending the length of the unit support feet. This may be achieved by using a 2" SCH 40 female threaded adapter.

The specified coupling will fit snuggly into the recessed portion of the feet. Use additional 2" SCH 40 male threaded adaptors which can be threaded into the female threaded adaptors to make additional adjustments to the level of the unit.

NOTE - Keep the height of extenders short enough to ensure a sturdy installation. If it is necessary to extend further, consider a different type of field-fabricated framework that is sturdy enough for greater heights.

STABILIZING UNIT ON UNEVEN SURFACES

To help stabilize an outdoor unit, some installations may require strapping the unit to the pad using brackets and anchors commonly available in the marketplace.

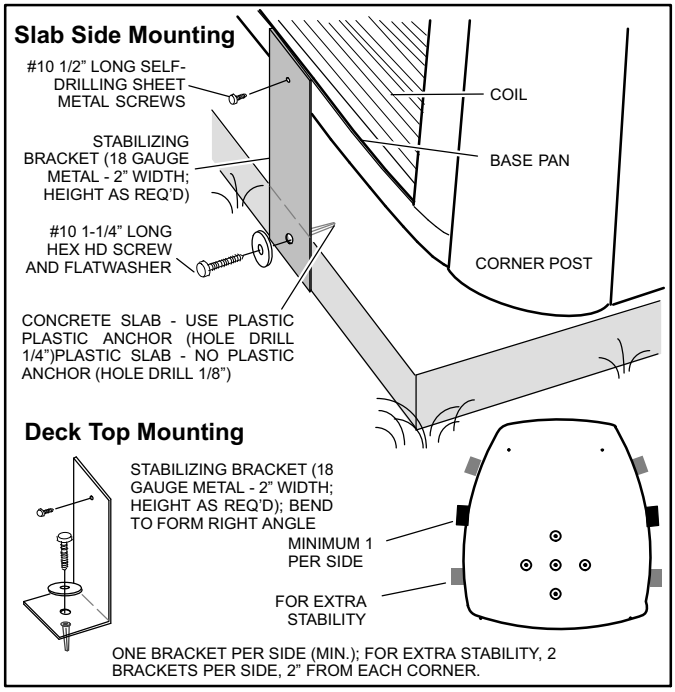

Figure 11. Installing Stabilizer Brackets

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⚠ IMPORTANT

Unit Stabilizer Bracket Use (field-provided):

Always use stabilizers when unit is raised above the factory height. (Elevated units could become unstable in gusty wind conditions).

Stabilizers may be used on factory height units when mounted on unstable an uneven surface.

With unit positioned at installation site, remove two side louvered panels to expose the unit base pan. Install the brackets as illustrated in figure 11 using conventional practices; replace the panels after installation is complete.

ROOF MOUNTING

Install unit at a minimum of four inches above the surface of the roof. Care must be taken to ensure weight of unit is properly distributed over roof joists and rafters. Either redwood or steel supports are recommended.

Removing and Installing Panels

REMOVING PANELS

Remove the louvered panels as follows:

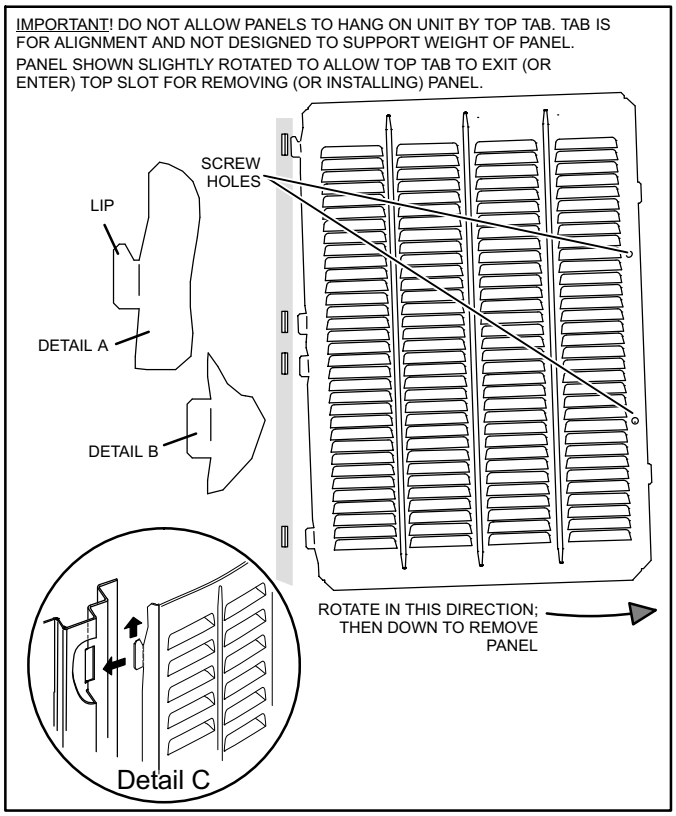


Figure 12. Removing/Installing Louvered Panels (Details A, B and C)

1. Remove two screws, allowing the panel to swing open slightly as illustrated in figure 12.

⚠ CAUTION

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.

NOTE - Hold the panel firmly throughout this procedure

2. Rotate bottom corner of panel away from hinge corner post until lower three tabs clear the slots as illustrated in figure 12, detail B.
3. Move panel down until lip of upper tab clears the top slot in corner post as illustrated in figure 12, detail A.

INSTALLING PANEL

Install the louvered panels as follows:

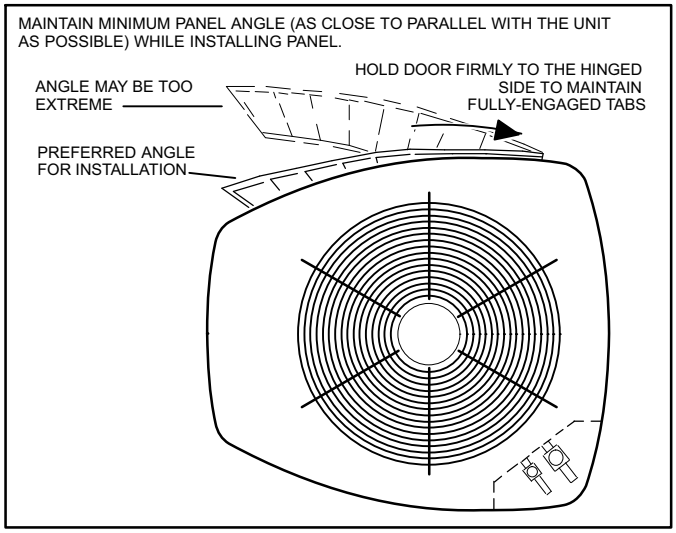


Figure 13. Removing/Installing Louvered Panels (Detail D)

1. Position the panel almost parallel with the unit as illustrated in figure 13, detail D with the screw side as close to the unit as possible.

2. With a continuous motion slightly rotate and guide the lip of top tab inward as illustrated in figure 12, details A and C, then upward into the top slot of the hinge corner post.
3. Rotate panel to vertical to fully engage all tabs.
4. Holding the panel's hinged side firmly in place, close the right-hand side of the panel, aligning the screw holes.
5. When panel is correctly positioned and aligned, insert the screws and tighten.

New or Replacement Line Set

This section provides information on installation or replacement of existing line set. If line set are not being installed 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 piping consists of liquid and suction lines from the outdoor unit (braze connections) to the indoor unit coil (flare or sweat connections). Use Lennox L15 (sweat, non-flare) series line set, or use field-fabricated refrigerant lines as listed in table 2.

Table 2. Refrigerant Line Set

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

NOTE - When installing refrigerant lines longer than 50 feet, see the Lennox Refrigerant Piping Design and Fabrication Guidelines, or contact Lennox Technical Support Product Applications for assistance. To obtain the correct information from Lennox, be sure to communicate the following points:

- Model (XC16) 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 XC16 is being used with either a new or existing indoor coil which is equipped with a liquid line which served as a metering device (RFCI), the liquid line must be replaced prior to the installation of the XC16 unit. Typically a liquid line used to meter flow is 1/4" in diameter and copper.

INSTALLING LINE SET

Line Set Isolation—This reference illustrates procedures, which ensure proper refrigerant line set isolation:

- Installation of **line set on vertical runs** is illustrated in figure 14.
- Installation of a **transition from horizontal to vertica**l is illustrated in figure 15.
- Installation of **line set on horizontal runs** is illustrated in figure 16.

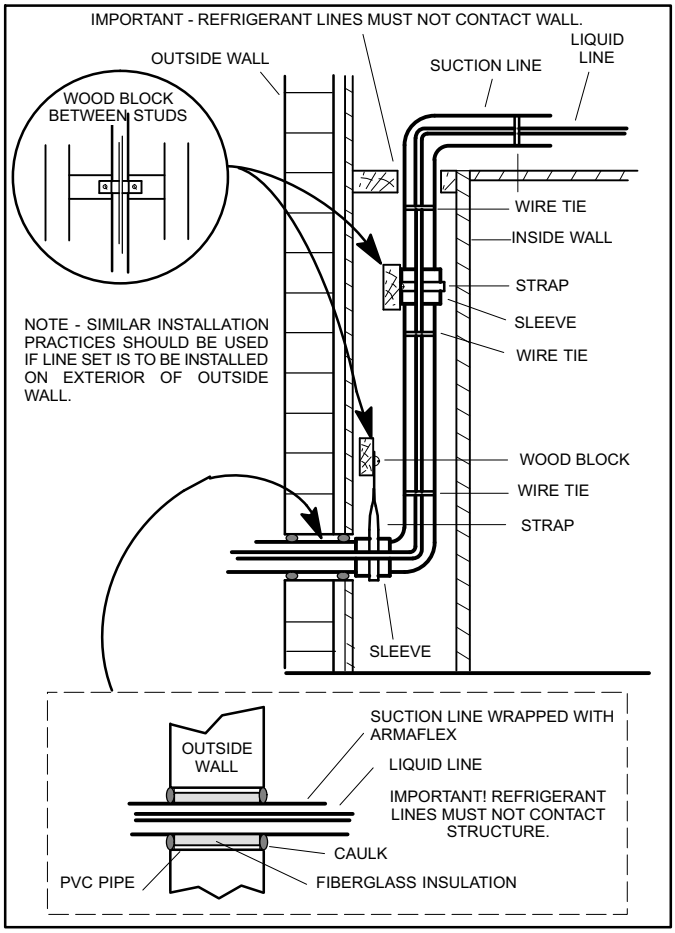


Figure 14. Refrigerant Line Set: Installing Vertical Runs (New Construction Shown)

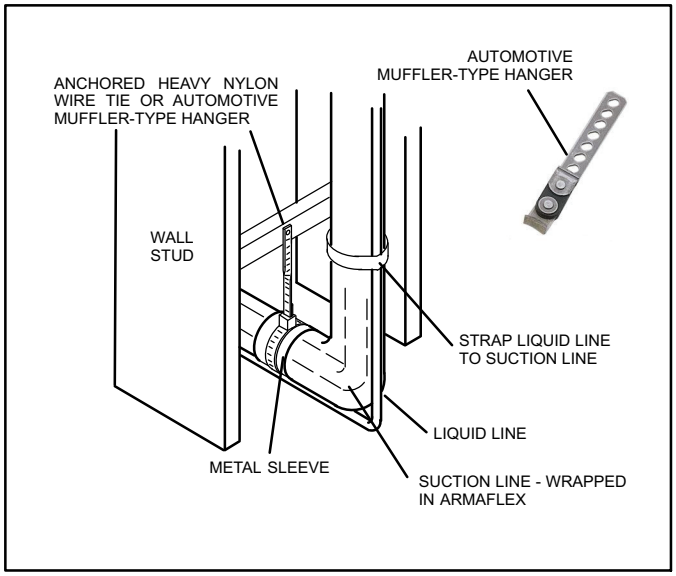


Figure 15. Refrigerant Line Set: Transition from Vertical to Horizontal

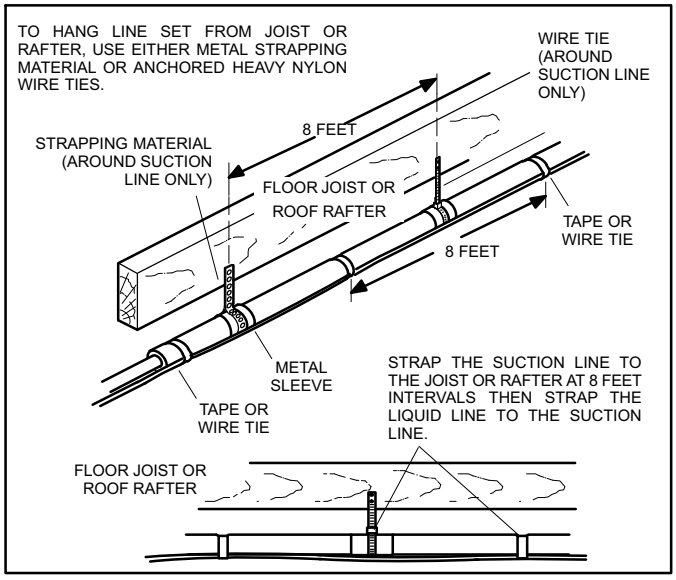


Figure 16. Refrigerant Line Set: Installing Horizontal Runs

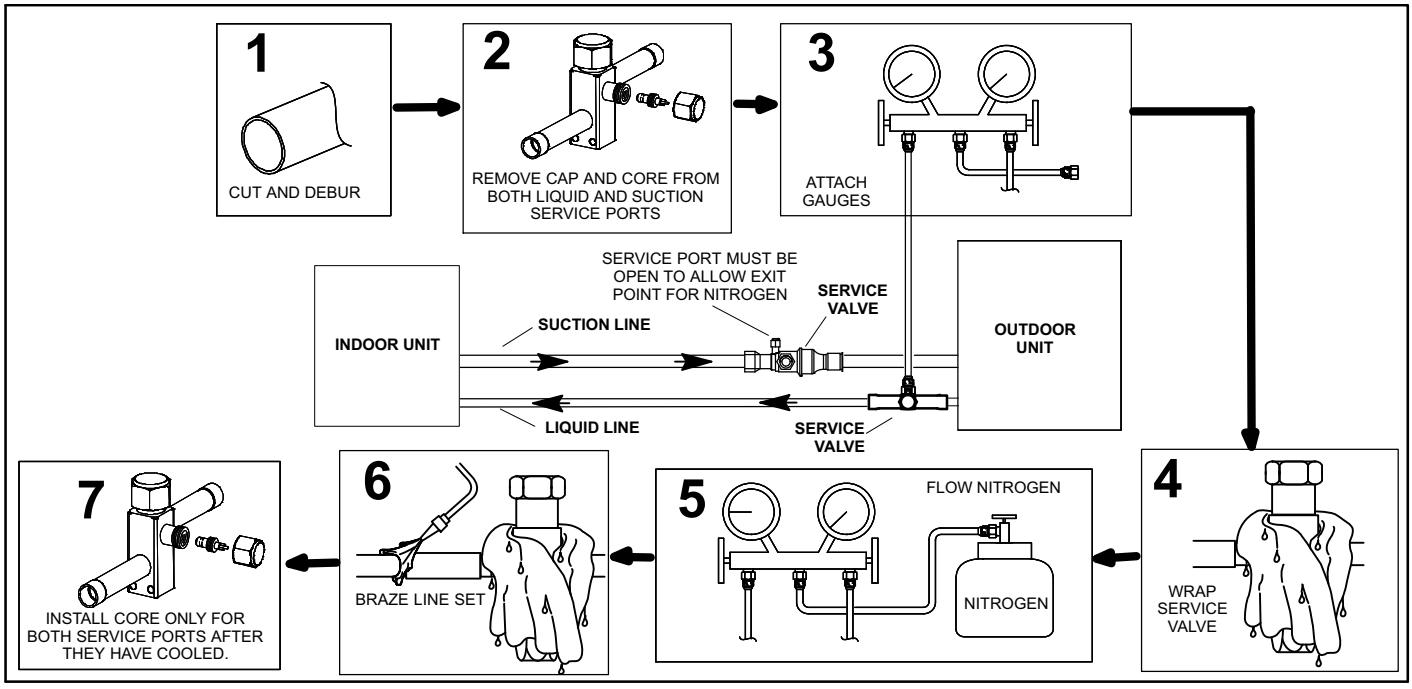


Figure 17. Brazing Connections

Brazing Connections

Use the following procedure to braze the line set to the new air conditioner unit. Figure 17 on page 9 is provided as a general guide for preparing to braze the line set to the air conditioner unit.

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

⚠ 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.

⚠ 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).

⚠ 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.

⚠ WARNING

Danger of fire. Bleeding the refrigerant charge from only the high side may result in the low side shell and suction tubing being pressurized. Application of a brazing torch while pressurized may result in ignition of the refrigerant and oil mixture - check the high and low pressures before unbrazing.

2. Remove service cap and core from both the suction and liquid line service ports.
3. Connect gauge low pressure side to liquid line service valve.
4. 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. Also, shield the light maroon R-410A sticker.
5. 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 suction service valve.

NOTE - The fixed orifice or TXV metering device at the indoor unit will allow <u>low pressure</u> nitrogen to flow through the system.)

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

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

⚠ IMPORTANT

Repeat procedure starting at paragraph 4 for brazing the suction line to service port valve.

7. After all connections have been brazed, disconnect manifold gauge set the from service ports and remove wrapping. Reinstall the service port core for both of the outdoor unit's service valves.

Removing Indoor Unit Metering Device

Remove the existing HCFC-22 fixed orifice or TXV from the indoor coil. The existing indoor unit HCFC-22 metering device is not approved for use with HFC-410A refrigerant and may prevent proper flushing.

REPLACEMENT PARTS

If replacement parts are necessary for the indoor unit, order kit 69J46 (LB-95325A). The kit includes:

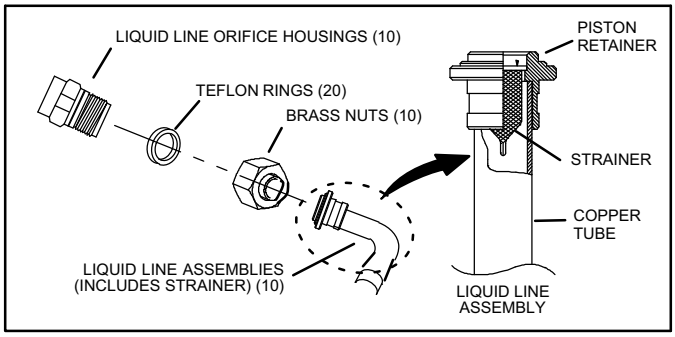


Figure 18. 69J46 Kit Components

TYPICAL FIXED ORIFICE REMOVAL PROCEDURE

Use the following procedures to remove a fixed orifice metering device from an existing indoor unit:

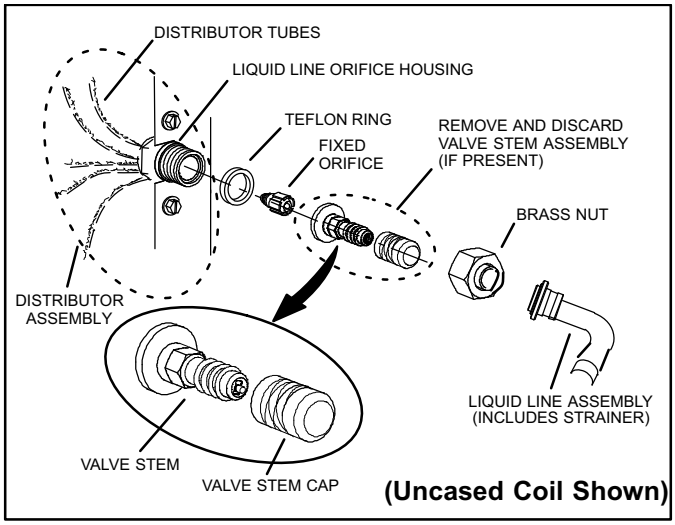


Figure 19. Typical Fixed Orifice Removal

1. On fully cased coils, remove the coil access and plumbing panels.
2. Remove any shipping clamps holding the liquid line and distributor assembly.
3. Using two wrenches, disconnect liquid line from liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.

4. Remove and discard fixed orifice, valve stem assembly if present and Teflon ring as illustrated in figure 19.
5. Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.

TYPICAL TXV REMOVAL PROCEDURE

Use following procedure for a typical TXV removal:

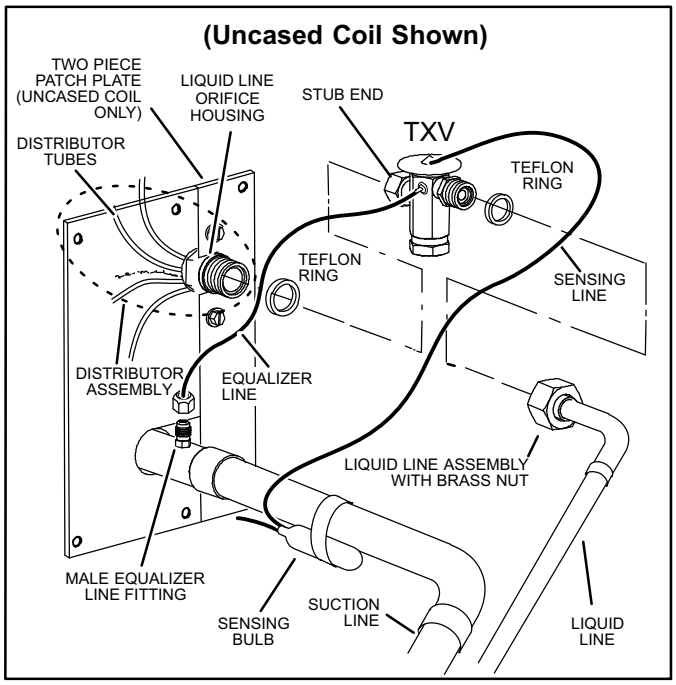


Figure 20. Typical TXV Removal

1. On fully cased coils, remove the coil access and plumbing panels.
2. Remove any shipping clamps holding the liquid line and distributor assembly.
3. Disconnect the equalizer line from the TXV equalizer line fitting on the suction line.
4. Remove the suction line sensing bulb as illustrated in figure 20.
5. Disconnect the liquid line from the TXV at the liquid line assembly.
6. Disconnect the TXV from the liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.
7. Remove and discard TXV and the two Teflon rings as illustrated in figure 20.
8. Use a field-provided fitting to temporary reconnect the liquid line to the indoor unit's liquid line orifice housing.

Flushing the System

⚠ IMPORTANT

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.

⚠ 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.

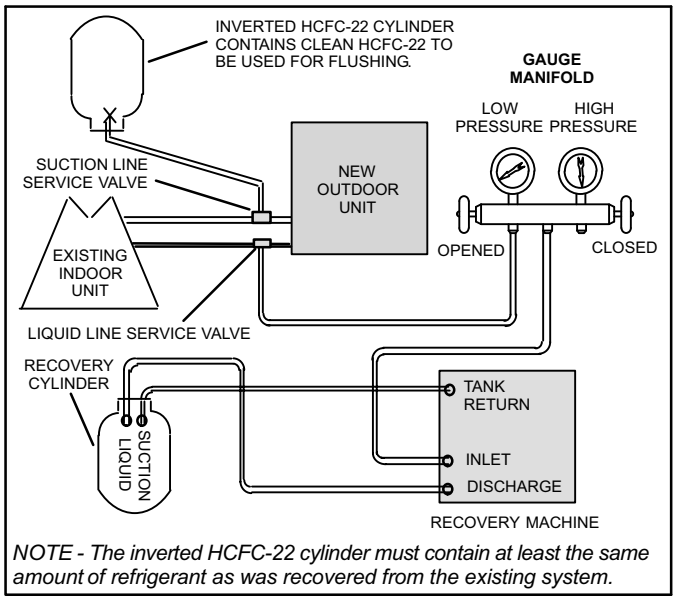
Failure to properly flush the system per the instructions below will void the warranty.

⚠ 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.

If the original system used:

- HCFC-22 refrigerant, then flush the system using the procedure provided in this section.
- HFC-410A refrigerant, then proceed to *Installing New Refrigerant Metering Device*.



NOTE - The inverted HCFC-22 cylinder must contain at least the same amount of refrigerant as was recovered from the existing system.

Figure 21. Typical Flushing Connection

⚠ CAUTION

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

REQUIRED EQUIPMENT

Equipment required to flush the existing line set and indoor unit coil:

- Two clean HCFC-22 recovery bottles,
- Oilless recovery machine with pump-down feature,
- Two gauge sets (one for HCFC-22; one for HFC-410A).

PROCEDURE

1. Connect the following:
   - HCFC-22 cylinder with clean refrigerant to the suction service valve,
   - HCFC-22 gauge set to the liquid line valve,
   - Recovery machine with an empty recovery tank to the gauge set.
2. 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.
3. Invert the cylinder of clean HCFC-22 and open its valve to allow liquid refrigerant to flow into the system through the suction 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.
4. After all of the liquid refrigerant has been recovered, switch the recovery machine to suction recovery so that all of the HCFC-22 suction is recovered. Allow the recovery machine to pull a vacuum on the system.
5. 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.
6. Use dry nitrogen to break the vacuum on the refrigerant lines and indoor unit coil before removing the recovery machine, gauges and refrigerant drum.

Installing New Indoor Unit Metering Device

XC16 units can be configured for use in with HFC-410A fixed orifice or TXV metering devices. This section provides instructions on installing either a fixed orifice or TXV refrigerant metering device.

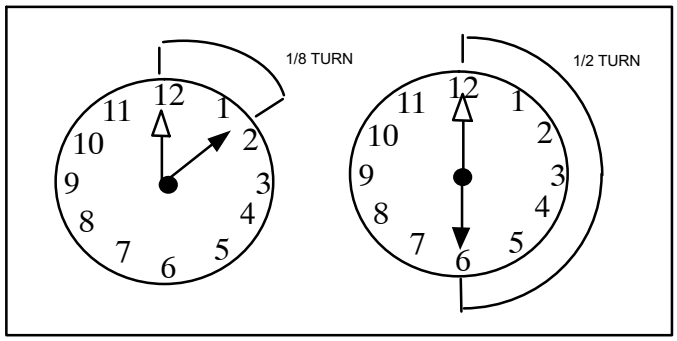


Figure 22. Tightening Distance

XC16 ENGINEERING HANDBOOK

See the XC16 *Engineering Handbook* for approved indoor/outdoor match-ups, applicable TXV kit and application information. The following is the typical contents of a TXV kit:

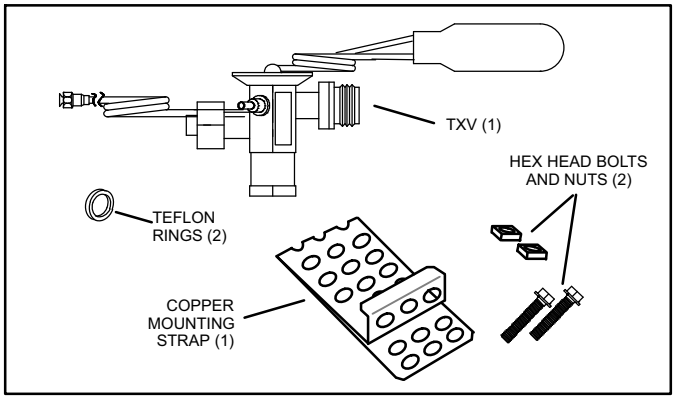


Figure 23. TXV Kit Components

TYPICAL TXV INSTALLATION PROCEDURE

The TXV 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 TXV in a manner that will provide access for field servicing of the TXV. Refer to Figure 24 for reference during installation of TXV unit.

To prevent any possibility of water damage, properly insulate all parts of the TXV assembly that may sweat due to temperature differences between the valve and its surrounding ambient temperatures.

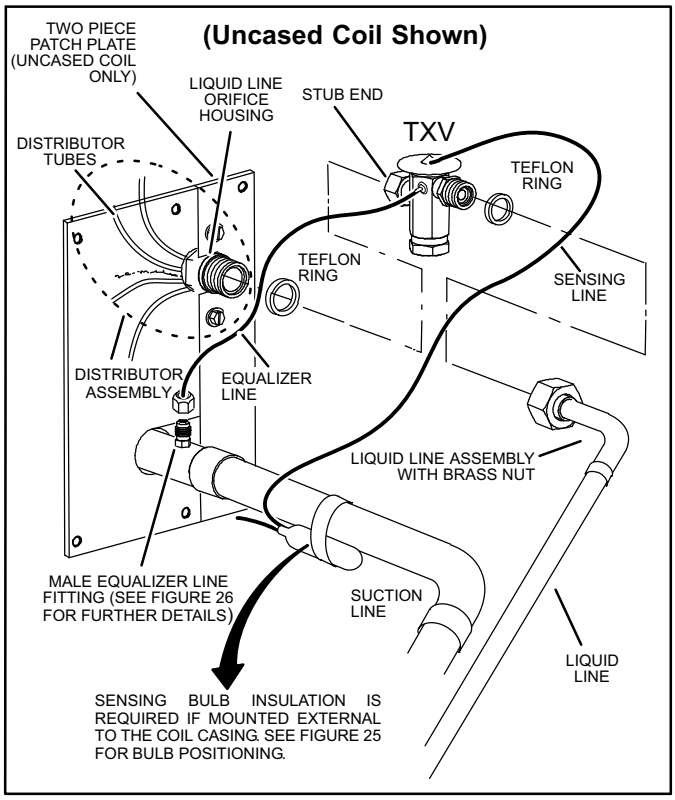


Figure 24. Typical TXV Installation

1. Remove the field-provided fitting that temporary reconnected the liquid line to the indoor unit's distributor assembly.
2. Install one of the provided Teflon rings around the stubbed end of the TXV and lightly lubricate the connector threads and expose surface of the Teflon ring with refrigerant oil.

3. Attach the stubbed end of the TXV 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 figure 22, or 20 ft-lb.
4. Place the remaining Teflon ring around the other end of the TXV. Lightly lubricate connector threads and expose surface of the Teflon ring with refrigerant oil.
5. Attach the liquid line assembly to the TXV. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in figure 22, or 20 ft-lb.
6. Attach the suction line sensing bulb in the proper orientation as illustrated in figure 25 using the clamp and screws provided.

NOTE - Insulating the sensing bulb once installed may be required when the bulb location is external to the coil casing.

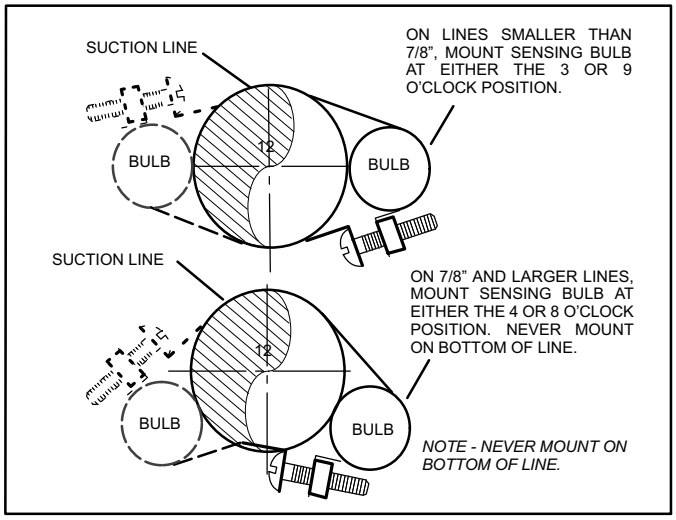


Figure 25. TXV Sensing Bulb Installation

7. Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the suction line as illustrated in figure 26.

⚠ IMPORTANT

When removing the flare nut, ensure that the copper flare seal bonnet is removed.

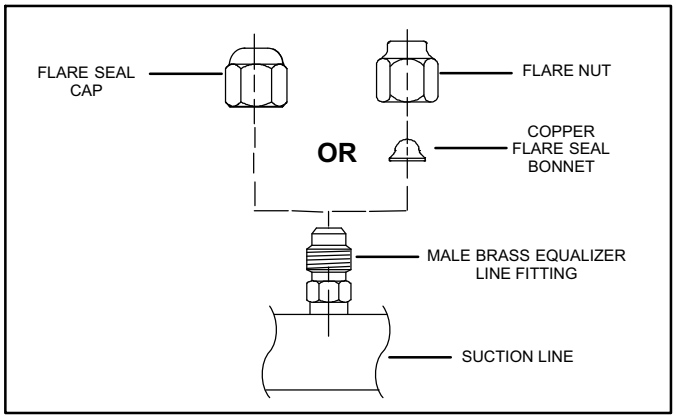


Figure 26. Copper Flare Seal Bonnet Removal

8. Connect the equalizer line from the TXV to the equalizer suction port on the suction line. Finger tighten the flare nut plus 1/8 turn (7 ft-lbs) as illustrated in figure 22.

Testing for Leaks

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

⚠ IMPORTANT

Leak detector must be capable of sensing HFC refrigerant.

⚠ 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.

1. Connect an HFC-410A manifold gauge set high pressure hose to the suction valve service port.

NOTE - Normally, the high pressure hose is connected to the liquid line port; however, connecting it to the suction port better protects the manifold gauge set from high pressure damage.

2. 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 (suction only).
3. 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.
4. Connect a cylinder of dry nitrogen with a pressure regulating valve to the center port of the manifold gauge set.

5. 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.
6. 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.

NOTE - Amounts of refrigerant will vary with line lengths.

7. Check all joints for leaks.
8. Purge dry nitrogen and HFC-410A mixture.
9. Correct any leaks and recheck.
10. After leak testing disconnect gauges from service ports.

Evacuating the System

⚠ 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.

⚠ 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.

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

1. Connect manifold gauge set to the service valve ports as follows:
   - low pressure gauge to *suction* line service valve
   - high pressure gauge to *liquid* line service valve
2. Connect micron gauge.
3. Connect the vacuum pump (with vacuum gauge) to the center port of the manifold gauge set.
4. Open both manifold valves and start the vacuum pump.
5. 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 to determine if there is a rapid rise in sure 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.*

6. 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 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.
7. 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.
8. 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.
9. 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.
10. Close manifold gauge valves and shut off the HFC-410A cylinder and remove the manifold gauge set.

Servicing Unit Delivered Void of Charge

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

1. Use nitrogen to pressurize the system and check for leaks. Repair all leaks.
2. Evacuate the system to remove as much of the moisture as possible.
3. Use nitrogen to break the vacuum and install a new filter drier in the system.
4. Evacuate the system again. Then, weigh the appropriate amount of HFC-410A refrigerant as listed on unit nameplate into the system.

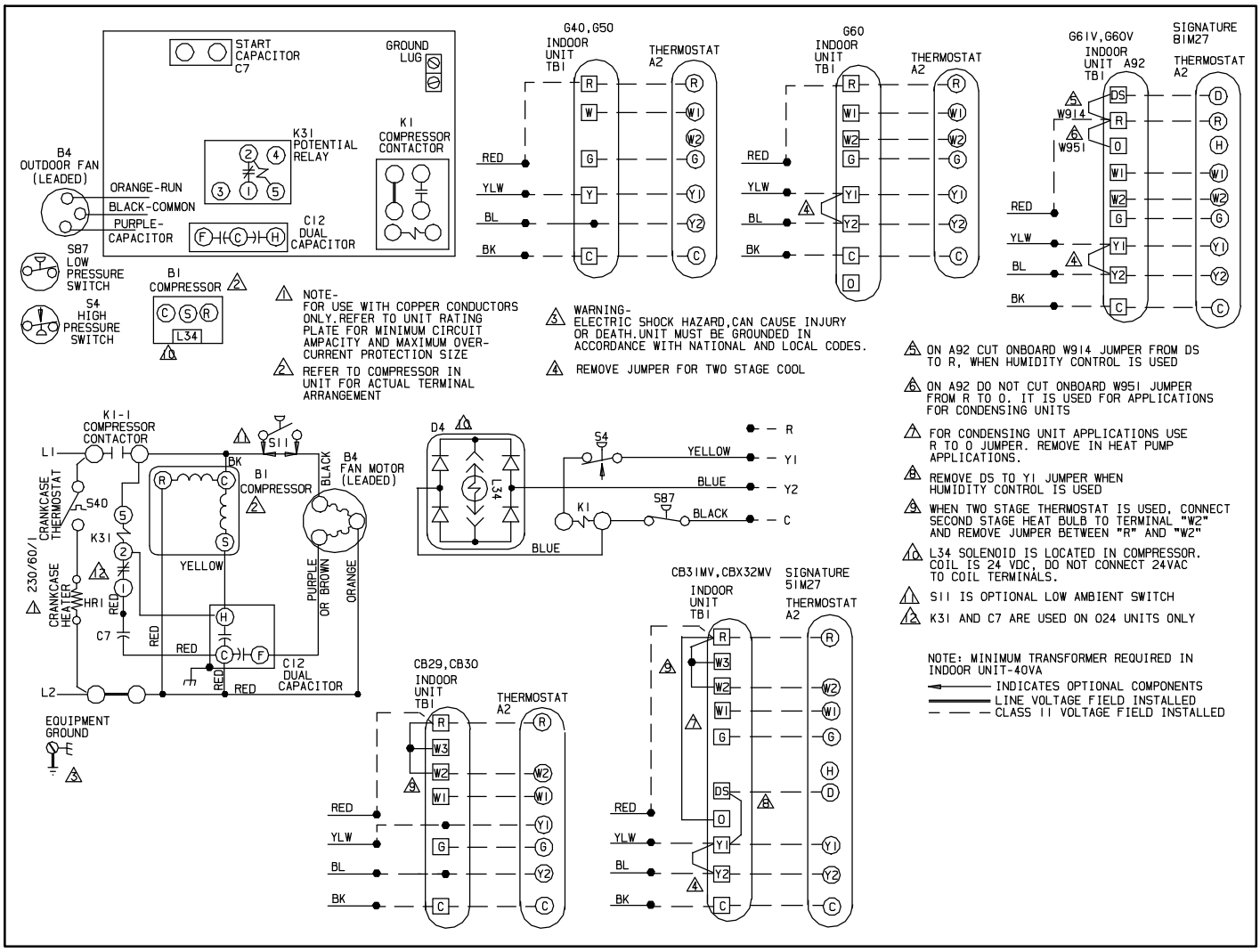


Figure 1. Typical Wiring Diagram

5. 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.**

Electrical Connections

⚠ WARNING

Electric Shock Hazard. Can cause injury or death.

Line voltage is present at all components on units with single-pole contactors, even when unit is not in operation!

Unit may have multiple power supplies. Disconnect all remote electric power supplies before opening access panel.

Unit must be grounded in accordance with national and local codes.

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 blower coil installation instructions for additional wiring application diagrams and refer to unit nameplate for minimum circuit ampacity and maximum overcurrent protection size.

TRANSFORMER - 24VAC

Use the transformer provided with the furnace or coil blower for low-voltage control power (24 - 40VAC minimum)

NOTE - The addition of accessories to the system could exceed the 40VAC power requirement of the factory-provided transformer. Measure the system's current and voltage after installation is complete to determine transformer loading. If loading exceeds the factory-provided transformer capacity, a larger field-provided transformer will need to be installed in the system.

WIRING CONNECTIONS

1. Install line voltage power supply to unit from a properly sized disconnect switch. Any excess high voltage field wiring should be trimmed or secured away from the low voltage field wiring as illustrated in figure 2.

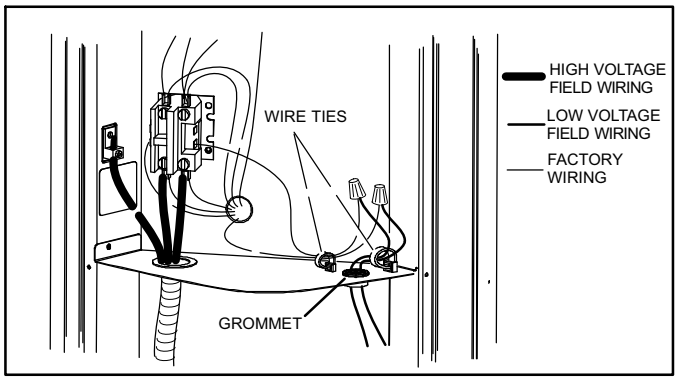


Figure 2. Separating High/Low Voltage (Typical Field Wiring)

NOTE - To facilitate conduit, a hole is located in the bottom of the control box.

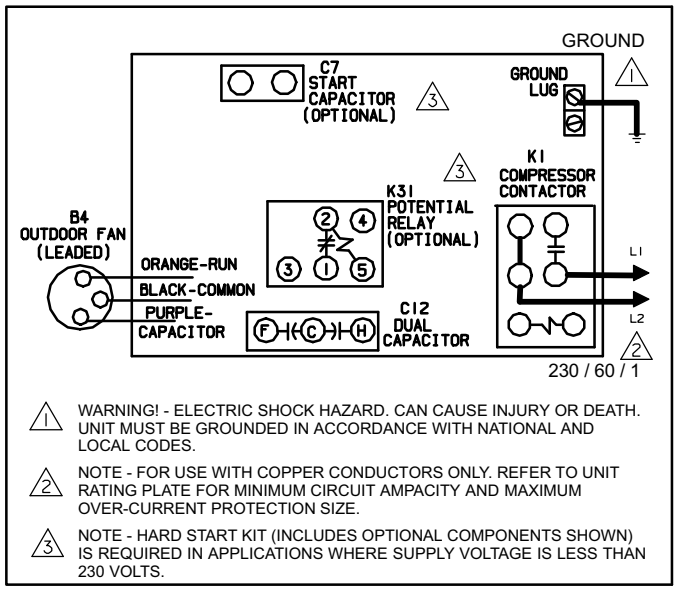


Figure 3. Typical Field Wiring Diagram

2. Ground unit at unit disconnect switch or to an earth ground.
3. Connect conduit to the unit using provided conduit bushing.

   NOTE - Units are approved for use only with copper conductors. 24VAC, Class II circuit connections are made in the low voltage junction box. See figure 3 for field wiring and figure 1 on page 15 for typical wiring. A complete unit wiring diagram is located inside the unit control box cover.
4. Install room thermostat (ordered separately) on an inside wall approximately in the center of the conditioned area and 5 feet (1.5 m) from the floor. It should not be installed on an outside wall or where it can be affected by sunlight, drafts or vibrations.
5. For proper voltages, select thermostat wire gauge per the following chart:

Table 1. Wire Run Lengths

Wire run length	AWG #	Insulation type
less than 100' (30m)	18	color-coded, temperature rating 35°C minimum
more than 100' (30m)	16	

6. Install low-voltage wiring from outdoor to indoor unit and from thermostat to indoor unit.
7. Do not bundle any excess 24V control wire inside control box. Run control wire through installed wire tie and tighten wire tie to provided low voltage strain relief and to maintain separation of field installed low and high voltage circuits as illustrated in figure 2 on page 16.

Start-Up, Testing and Charging Procedures

⚠ 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 outdoor unit) into the system.
4. Replace the stem caps and secure finger tight, then tighten an additional one-sixth (1/6) of a turn.
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 the power company and the voltage condition has been corrected.
6. Set the thermostat for a cooling demand. Turn on power to the indoor blower and close the outdoor unit 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 by using the procedures listed under this section.

SETTING UP TO CHECK CHARGE

1. Close manifold gauge set valves. Connect the center manifold hose to an upright cylinder of HFC-410A.
2. Connect the manifold gauge set to the unit's service ports as illustrated in figure 27.
   - low pressure gauge to suction line service port.
   - high pressure gauge to liquid line service port.

INDOOR COIL AIRFLOW CHECK

Check indoor coil airflow using the Delta-T (DT) process as illustration in figure 28.

DETERMINING CHARGE METHOD

To determine the correct charging method, use the illustration in figure 29.

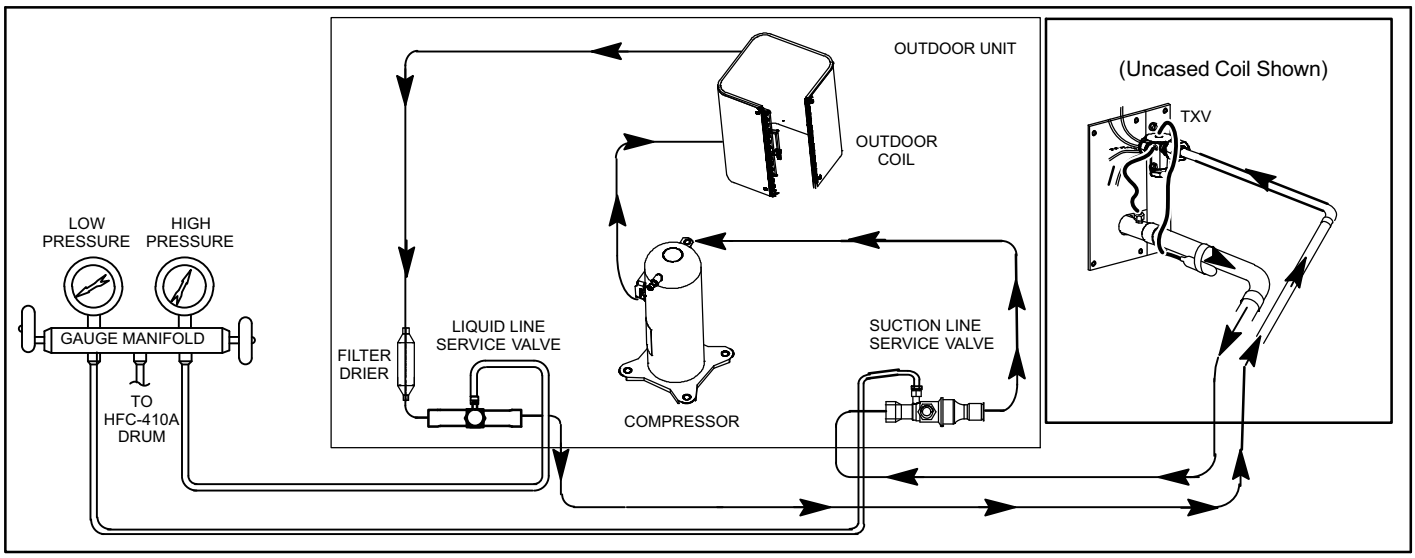
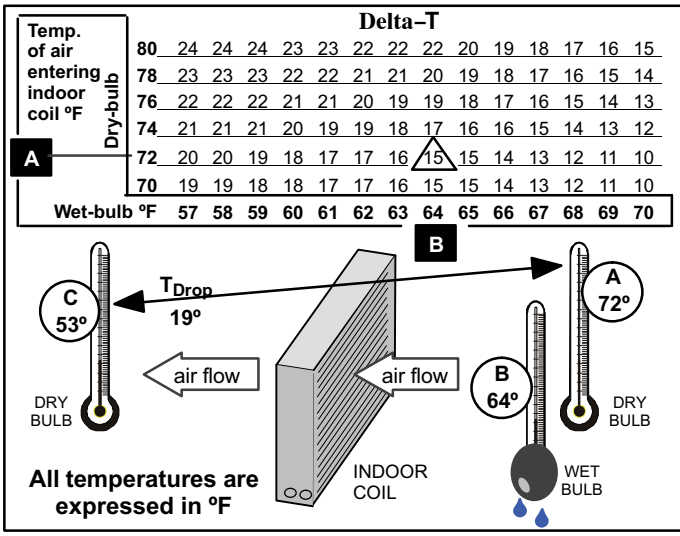


Figure 27. Typical Manifold Gauge Connection Setup



1. Determine the desired DT—Measure entering air temperature using dry bulb (**A**) and wet bulb (**B**). **DT** is the intersecting value of **A** and **B** in the table (see triangle).

2. Find temperature drop across coil—Measure the coil's dry bulb entering and leaving air temperatures (**A** and **C**). Temperature Drop Formula: (T_{Drop}) = **A** minus **C**.

3. Determine if fan needs adjustment—If the difference between the measured T_{Drop} and the desired **DT** (T_{Drop}–**DT**) is within ±3°, no adjustment is needed. See examples: Assume **DT** = 15 and **A** temp. = 72°, these **C** temperatures would necessitate stated actions:

C°	T_{Drop}	–	DT	=	°F	*ACTION*
53°	19	–	15	=	4	*Increase the airflow*
58°	14	–	15	=	-1	*(within ±3° range) no change*
62°	10	–	15	=	-5	*Decrease the airflow*

4. Adjust the fan speed—See indoor unit instructions to increase/decrease fan speed.

Changing air flow affects all temperatures; recheck temperatures to confirm that the temperature drop and DT are within ±3°.

Figure 28. Checking Indoor Airflow over Evaporator Coil using Delta-T Chart

START: Determine how refrigerant is metered

WHEN TO CHARGE?

- Warm weather best
- Can charge in colder weather

CHARGE METHOD? Determine by:

- Metering device type
- Outdoor ambient temperature

REQUIREMENTS:

- Sufficient heat load in structure
- Indoor temperature between 70-80°F (21-26°C)
- Manifold gauge set connected to unit
- Thermometers:
  - to measure outdoor ambient temperature
  - to measure liquid line temperature
  - to measure suction line temperature

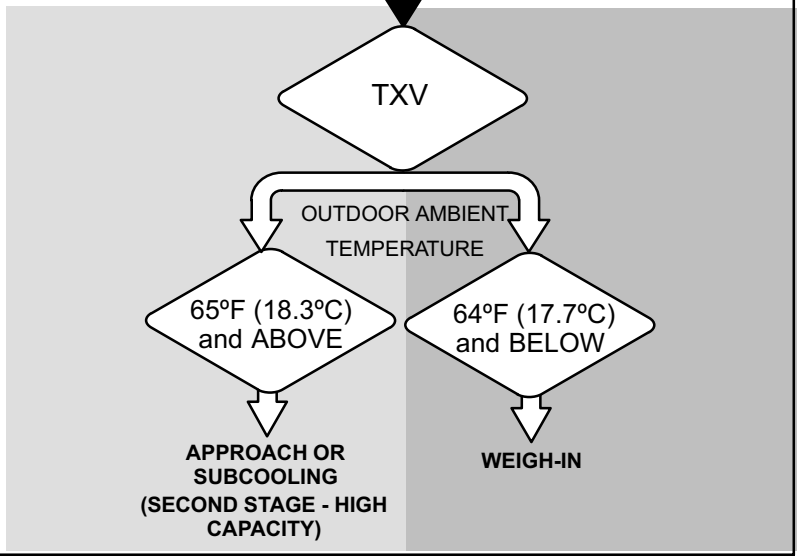


Figure 29. Determining Charging Method

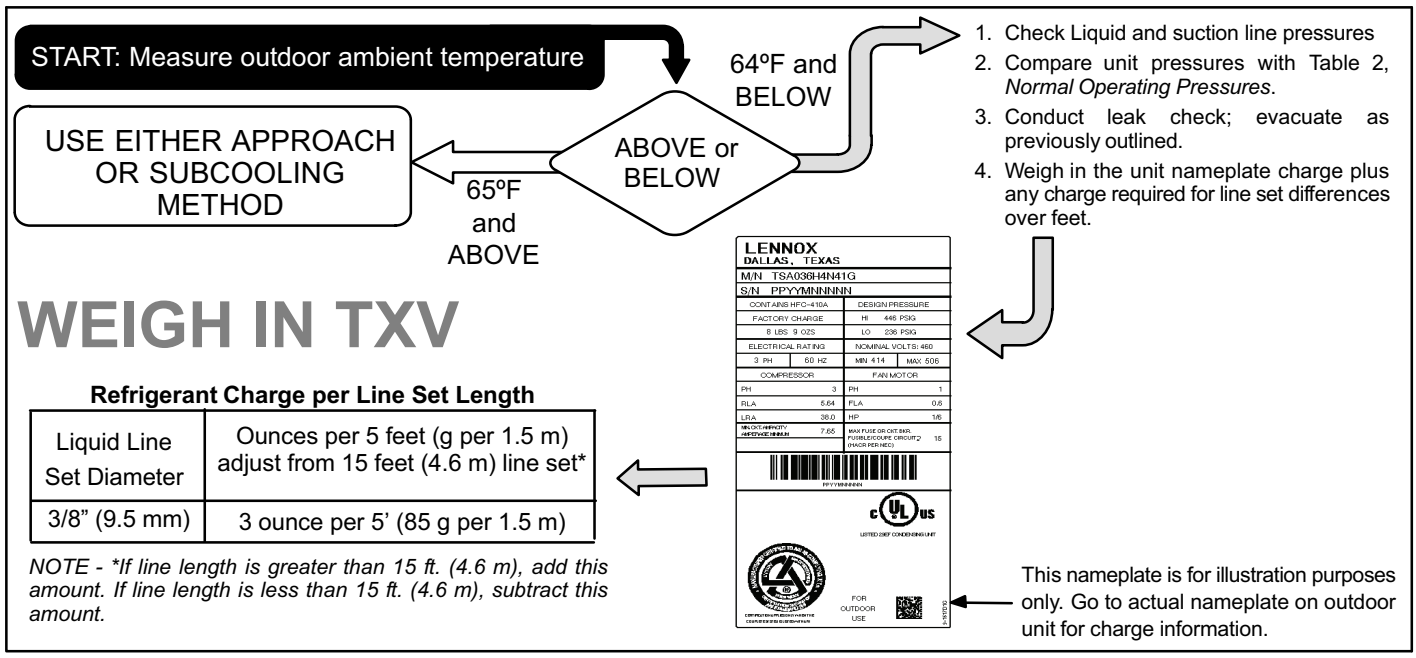


Figure 30. Weigh In Method

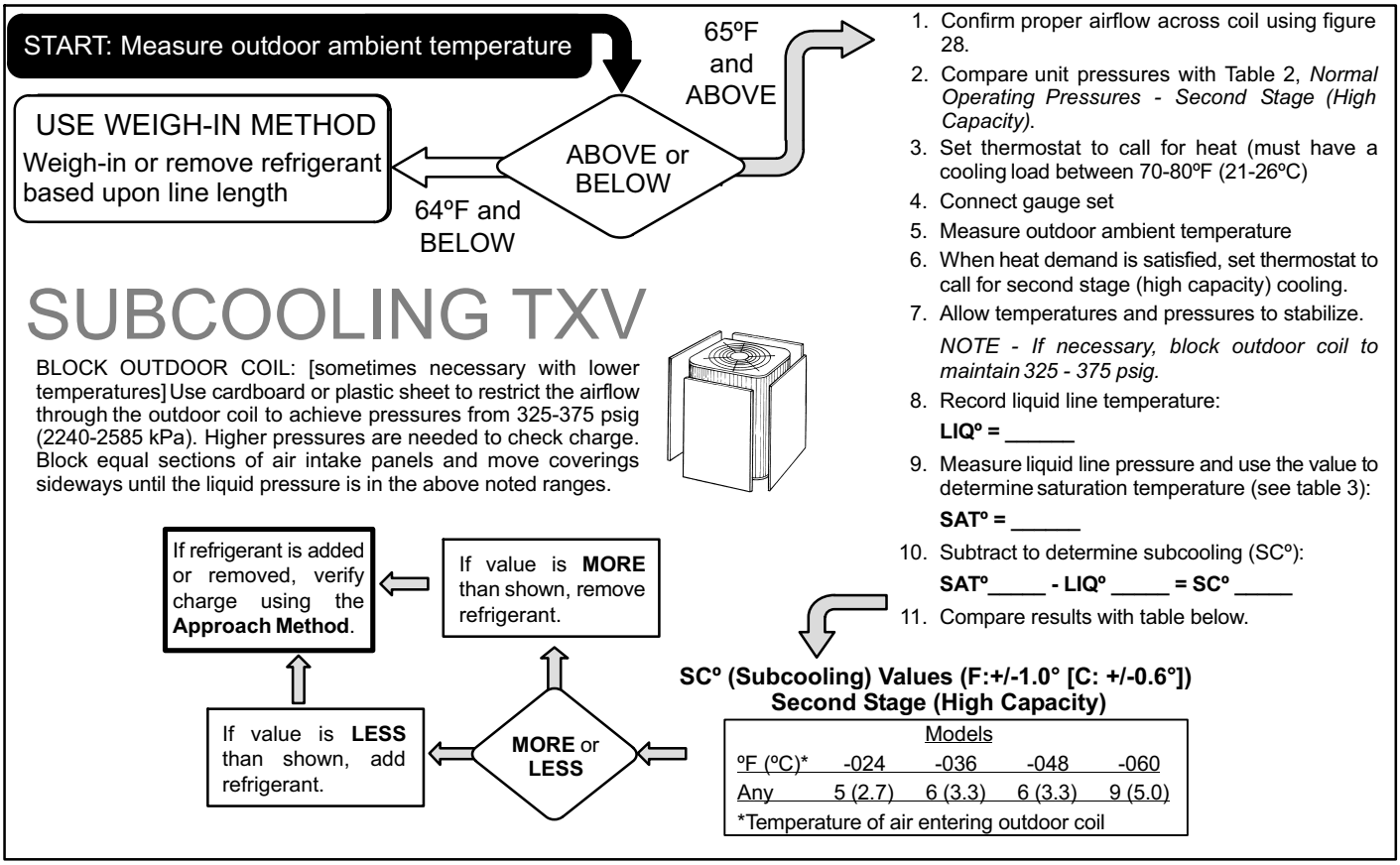


Figure 31. Subcooling TXV Charge — Second Stage (High Capacity)

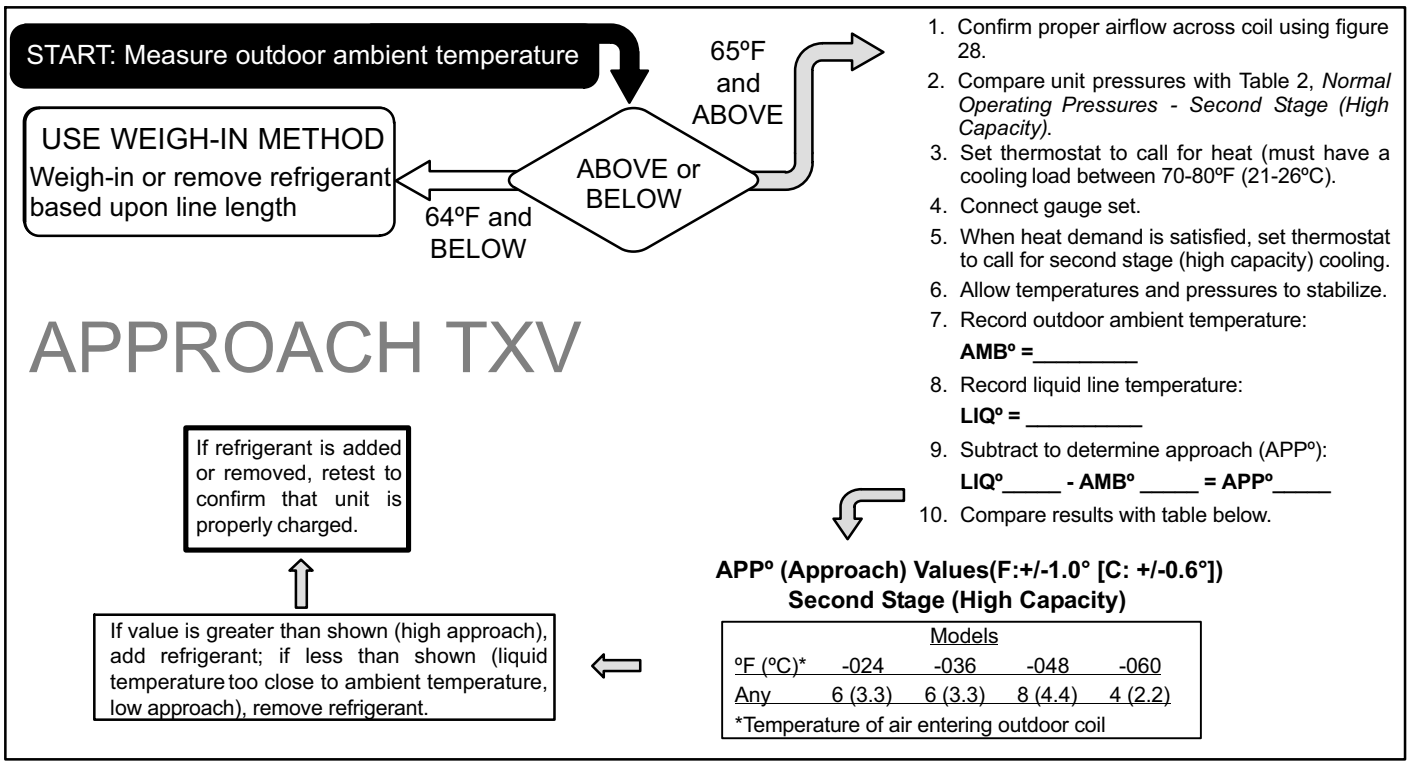


Figure 32. Approach TXV Charge — Second Stage (High Capacity)

Table 2. Normal Operating Pressures In PSIG (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.

Temp. of air entering outdoor coil °F (°C)	-024		-036		-048		-060	
	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction
First Stage (Low Capacity)								
65 (18.3)	215	144	226	142	224	142	215	136
75 (23.9)	247	146	261	144	258	144	250	139
85 (29.4)	288	148	304	145	299	146	291	142
95 (35.0)	332	151	352	147	345	148	337	144
105 (40.6)	381	153	405	150	395	150	388	146
115 (46.1)	435	155	460	150	450	153	444	148
Second Stage (High Capacity)								
65 (18.3)	225	140	228	144	235	135	220	130
75 (23.9)	258	142	262	146	269	137	256	133
85 (29.4)	301	144	306	148	313	139	299	136
95 (35.0)	346	146	353	150	361	141	347	138
105 (40.6)	397	149	405	151	412	143	402	141
115 (46.1)	452	151	462	154	471	146	462	143

**These are typical pressures only. Indoor indoor match up, indoor air quality, and indoor load will cause the pressures to vary.*

Table 3. HFC-410A Temperature (°F) - Pressure (Psig)

°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig	°F	Psig
32	100.8	48	137.1	63	178.5	79	231.6	94	290.8	110	365.0	125	445.9	141	545.6
33	102.9	49	139.6	64	181.6	80	235.3	95	295.1	111	370.0	126	451.8	142	552.3
34	105.0	50	142.2	65	184.3	81	239.0	96	299.4	112	375.1	127	457.6	143	559.1
35	107.1	51	144.8	66	187.7	82	242.7	97	303.8	113	380.2	128	463.5	144	565.9
36	109.2	52	147.4	67	190.9	83	246.5	98	308.2	114	385.4	129	469.5	145	572.8
37	111.4	53	150.1	68	194.1	84	250.3	99	312.7	115	390.7	130	475.6	146	579.8
38	113.6	54	152.8	69	197.3	85	254.1	100	317.2	116	396.0	131	481.6	147	586.8
39	115.8	55	155.5	70	200.6	86	258.0	101	321.8	117	401.3	132	487.8	148	593.8
40	118.0	56	158.2	71	203.9	87	262.0	102	326.4	118	406.7	133	494.0	149	601.0
41	120.3	57	161.0	72	207.2	88	266.0	103	331.0	119	412.2	134	500.2	150	608.1
42	122.6	58	163.9	73	210.6	89	270.0	104	335.7	120	417.7	135	506.5	151	615.4
43	125.0	59	166.7	74	214.0	90	274.1	105	340.5	121	423.2	136	512.9	152	622.7
44	127.3	60	169.6	75	217.4	91	278.2	106	345.3	122	428.8	137	519.3	153	630.1
45	129.7	61	172.6	76	220.9	92	282.3	107	350.1	123	434.5	138	525.8	154	637.5
46	132.2	62	175.4	77	224.4	93	286.5	108	355.0	124	440.2	139	532.4	155	645.0
47	134.6			78	228.0			109	360.0			140	539.0		

System Operation

The outdoor unit and indoor blower cycle on demand from the room thermostat. When the thermostat blower switch is in the **ON** position, the indoor blower operates continuously.

TWO-STAGE COMPRESSOR

The two-stage scroll compressor operates much like the standard scroll compressor. The two-stage compressor steps between low capacity and high capacity as required to meet cooling demand. The steps occur when gas is bypassed through a vent port in the first suction pocket. This bypassing of gas allows the compressor to operate at low capacity if thermostat demand allows, creating a more cost effective and efficient compressor.

Full capacity is achieved by blocking the vent port with a slider ring. The slider ring (vent port cover) is controlled by a 24VDC internal solenoid in the open position allowing low capacity. When energized the internal solenoid closes the slider ring, blocking the vent port and bringing the compressor to full capacity. Stepping can occur during a single thermostat demand as the motor runs continuously while the compressor steps from low to full capacity.

FILTER DRIER

A filter drier is factory-installed in each XC16 unit to ensure a clean, moisture-free system. Replacement driers are available (refer to Lennox Repair Part Program).

HIGH PRESSURE SWITCH

XC16 units are equipped with a high pressure switch that is located in the liquid line of the compressor. The switch (SPST, manual reset, normally closed) removes power from the compressor when liquid pressure rises above factory setting at 590 ± 10 psi.

LOW PRESSURE SWITCH

XC16 units are also equipped with a low pressure switch that is located in the vapor line of the compressor. The switch (SPST, auto-reset, normally closed) removes power from the compressor when vapor line pressure drops below factory setting at 40 ± 5 psi.

Maintenance

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency. At the beginning of each cooling season, the system should be checked as follows:

⚠ 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.

OUTDOOR UNIT

1. Clean and inspect outdoor coil (may be flushed with a water hose). Ensure power is off before cleaning.
2. Outdoor unit fan motor is pre-lubricated and sealed. No further lubrication is needed.
3. Visually inspect all connecting lines, joints and coils for evidence of oil leaks.
4. Check all wiring for loose connections.
5. Check for correct voltage at unit (unit operating).
6. Check amp draw on outdoor fan motor.

   Unit Nameplate: _____ Actual: _____
7. Inspect drain holes in coil compartment base and clean if necessary.

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

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.

INDOOR UNIT

1. Clean or change filters.
2. 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.
   Unit Nameplate: _____ Actual: _____

TWO-STAGE COMPRESSOR CHECKS

Use the checklist procedure on page 23, to verify part-load and full-load capacity operation of two-stage modulation compressors.

⚠ IMPORTANT

This performance check is ONLY valid on systems that have clean indoor and outdoor coils, proper airflow over coils, and correct system refrigerant charge. All components in the system must be functioning proper to correctly perform compressor modulation operational check. (Accurate measurements are critical to this test as indoor system loading and outdoor ambient can affect variations between low and high capacity readings).

Tools Required

- Refrigeration gauge set
- Digital volt/amp meter
- Electronic temperature thermometer
- On-off toggle switch

Procedure

NOTE - Block outdoor coil to maintain a minimum of 375 psig during testing).

1. Turn main power **OFF** to outdoor unit.
2. Adjust room thermostat set point 5ºF above the room temperature.
3. Remove control access panel. Install refrigeration gauges on unit. Attach the amp meter to the common (black wire) wire of the compressor harness. Attach thermometer to discharge line as close as possible to the compressor.
4. Turn toggle switch **OFF** and install switch in series with Y2 wire from room thermostat.
5. Cycle main power **ON**.
6. Allow pressures and temperatures to stabilize before taking measurements (may take up to 10 minutes).
7. Record all of the readings for the Y1 demand.
8. Close switch to energize Y2 demand. Verify power is going to compressor solenoid.
9. Allow pressures and temperatures to stabilize before taking any measured reading (this may take up to 10 minutes).
10. Record all of the readings with the Y1 and Y2 demand.
11. If temperatures and pressures change in the direction noted in chart, the compressor is properly modulating from low to high capacity. (If no amperage, pressures or temperature readings change when this test is performed, the compressor is not modulating between low and high capacity and replacement is necessary).
12. After testing is complete, return unit to original set up.

Homeowner Information

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.

⚠ IMPORTANT

Turn off electrical power to the unit at the disconnect switch before performing any maintenance. The unit may have multiple power supplies.

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.

⚠ 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.

6. **Outdoor Unit—**Make sure no obstructions restrict airflow to the outdoor unit. Leaves, trash or shrubs crowding the unit cause the outdoor 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.

   When removing debris from around the unit, be aware of metal edges on parts and screws. Although special care has been taken to keep exposed edges to a minimum, physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury.

   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 air conditioning or heat pump system.

THERMOSTAT OPERATION

Thermostat operations vary from one thermostat to another. The following provides general operation procedures. Refer to the user's information manual provided with your thermostat for specific operation details.

Temperature Setting Levers

Set the lever or dial to the desired temperature setpoints for both heating and cooling. Avoid frequent temperature adjustment; turning the unit off—then back on—before pressures can equalize will put stress on the unit's compressor.

Fan Switch

In **AUTO** or **INT** (intermittent) mode, the blower operates only when the thermostat calls for heating or cooling. This mode is generally preferred when humidity control is a priority. The **ON** or **CONT** mode provides continuous indoor blower operation, regardless of whether the compressor or furnace is operating. This mode is required when constant air circulation or filtering is desired.

System Switch

Set the system switch for heating, cooling or auto operation. The auto mode allows the system to automatically switch from heating mode to cooling mode to maintain predetermined comfort settings.

Temperature Indicator

The temperature indicator displays the actual room temperature.

PROGRAMMABLE THERMOSTATS

Your Lennox system may be controlled by a programmable thermostat. These thermostats provide the added feature of programmable time-of-day setpoints for both heating and cooling. Refer to the user's information manual provided with your thermostat for detailed programming and operation details.

Preservice Check

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

- Make sure all electrical disconnect switches are ON.
- Make sure the room thermostat Temperature Selector and System Switch (Heat, Cool, Auto) are properly set.
- If you discover any blown fuses or tripped circuit breakers, call your Lennox dealer for assistance.
- Make sure unit access panels are in place.
- Make sure air filter is clean.
- Write down the unit model number and have it handy before calling.

OPTIONAL ACCESSORIES

Refer to the Engineering Handbook for the latest optional accessories available for XC16 series. Below is a list of some of the optional accessories that may be available:

- Hard Start Kit
- Low Ambient Kit
- Timed Off Control
- Sound Cover
- Base Pan
- Suction Line Drier
- Crankcase Heater

Checklists

Two-Stage Modulation Compressors Field Operational Checklist

Unit Readings	Y1 - First-Stage	Expected results during Y2 demand (Toggle switch On)	Y2 - Second-Stage
COMPRESSOR			
Voltage		Same	
Amperage		Higher	
OUTDOOR UNIT FAN MOTOR			
Amperage		Same or Higher	
TEMPERATURE			
Ambient		Same	
Outdoor Coil Discharge Air		Higher	
Compressor Discharge Line		Higher	
Indoor Return Air		Same	
Indoor Coil Discharge Air		Lower	
PRESSURES			
Suction (Vapor)		Lower	
Liquid		Higher	

XC16 Start-Up and Performance Checklist

Customer _____ Address _____

Indoor Unit Model _____ Serial _____

Outdoor Unit Model _____ Serial _____

Notes: _____

START UP CHECKS

Refrigerant Type: _____

First Stage: Rated Load Amps _____ Actual Amps _____ Rated Volts _____ Actual Volts _____

Second Stage: Rated Load Amps _____ Actual Amps _____ Rated Volts _____ Actual Volts _____

Outdoor Unit Fan Full Load Amps _____ Actual Amps: Firsttage _____ Second Stage _____

COOLING MODE

Suction Pressure: First Stage: _____ Second Stage: _____

Liquid Pressure: First Stage: _____ Second Stage: _____

Supply Air Temperature: First Stage: _____ Second Stage: _____

Temperature: Ambient: _____ Return Air: _____

System Refrigerant Charge (Refer to manufacturer's information on unit or installation instructions for required subcooling and approach temperatures.)

Subcooling:	A		B	SUBCOOLING
Saturated Condensing Temperature (A) *minus* Liquid Line Temperature (B)		—		=
Approach:	A		B	APPROACH
Liquid Line Temperature (A) *minus* Outdoor Air Temperature (B)		—		=
Indoor Coil Temperature Drop (18 to 22°F)	A		B	COIL TEMP DROP
Return Air Temperature (A) *minus* Supply Air Temperature (B)		—		=