INSTALLATION INSTRUCTIONS

Dave Lennox Signature® Collection XC15 Units

AIR CONDITIONER
506044-01
04/08
Supersedes 02/08

Technical Publications
Litho U.S.A.

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.

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.

1 — Assembled outdoor unit.

1 — Bag Assembly

- 1 — Bushing (for low voltage wiring
- 2 — Isolation grommets for liquid and suction lines.

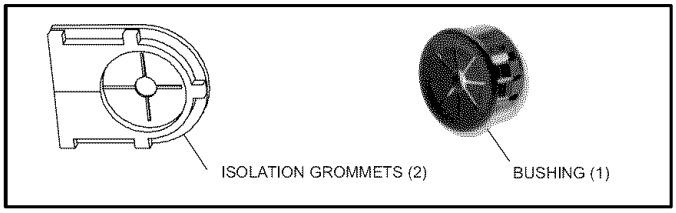
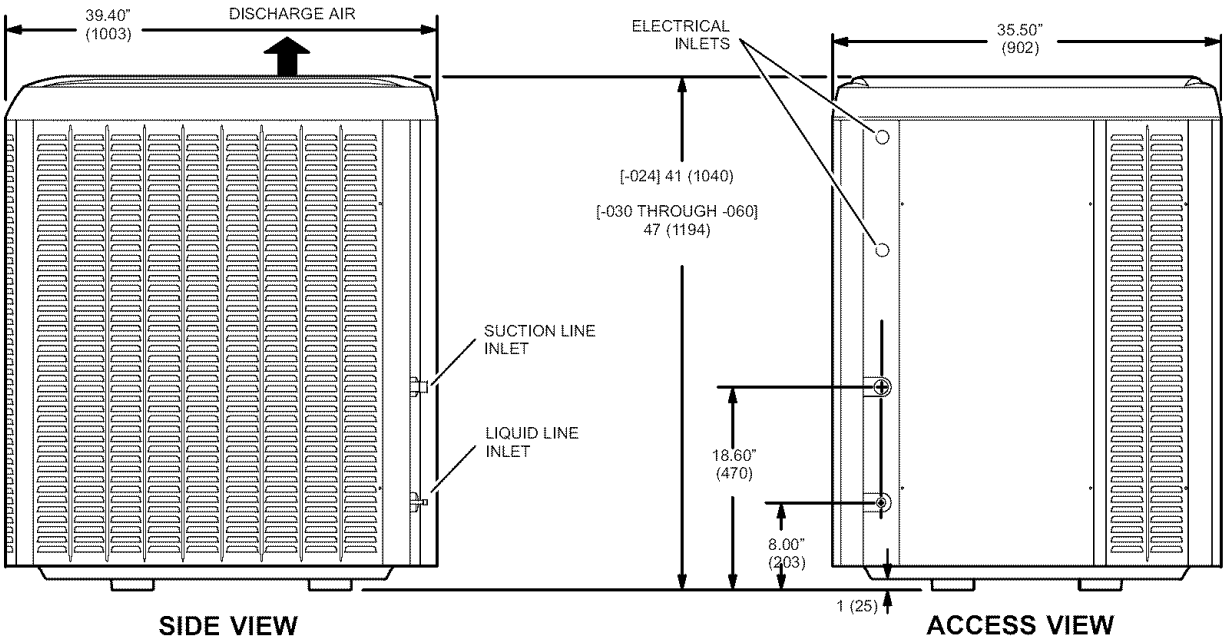


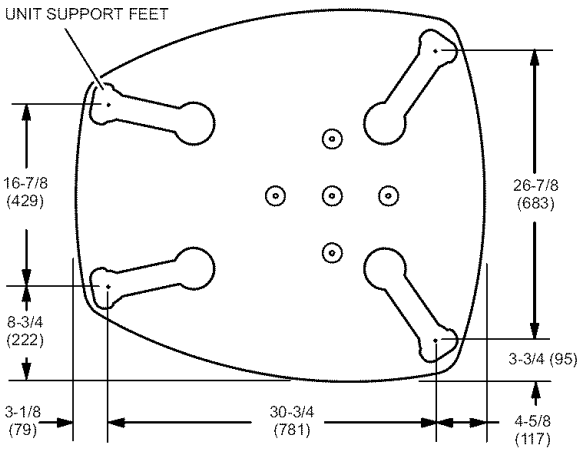
Figure 1. Bag Assembly (Parts)

Unit Dimensions - Inches (mm) and Parts Arrangement

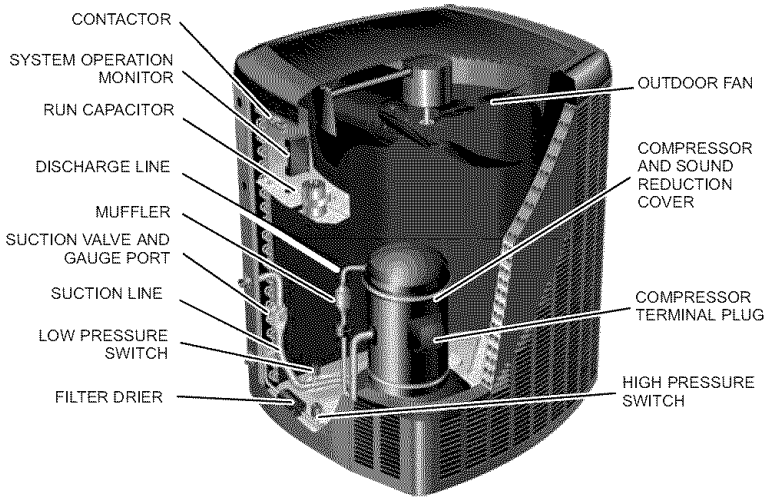


SIDE VIEW

ACCESS VIEW



BASE WITH ELONGATED LEGS



XC15 PARTS ARRANGEMENT

⚠ 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

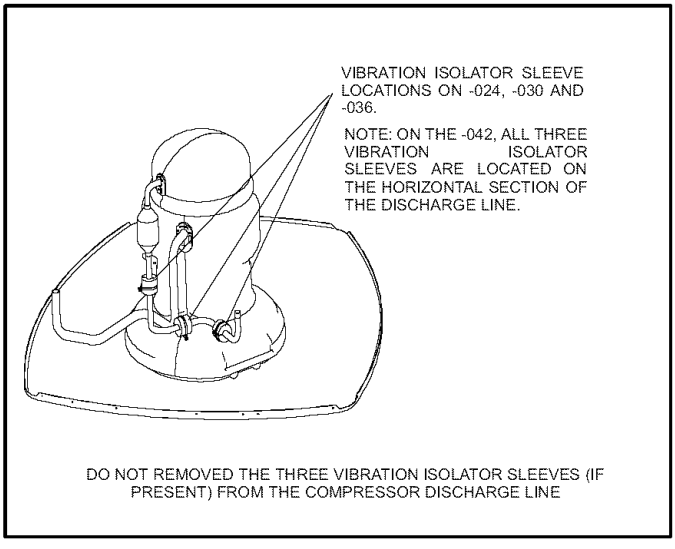


Figure 1. Discharge Line Vibration Isolators

506044-01 04/08

XC15 Outdoor Unit

The XC15 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 *Lennox XC15 Engineering Handbook*.

This outdoor unit is designed for use in systems that use thermal expansion valve (TXV) refrigerant metering devices.

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

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 4 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.

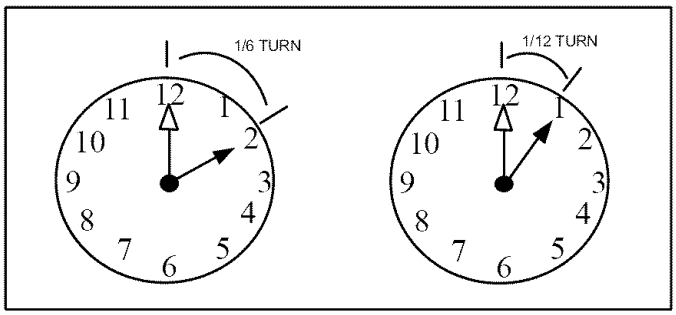


Figure 2. Cap Tightening Distances

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.

To Access Angle-Type Service Port:

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

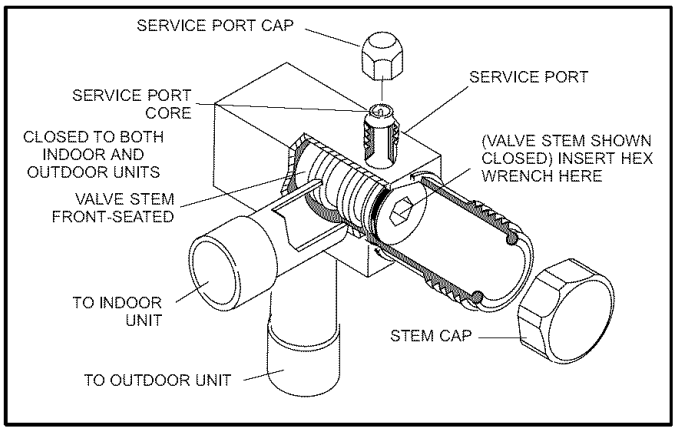


Figure 3. Angle-Type Service Valve (Font-Seated Closed)

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 2.

To Open and Close Angle-Type Service Valve:

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

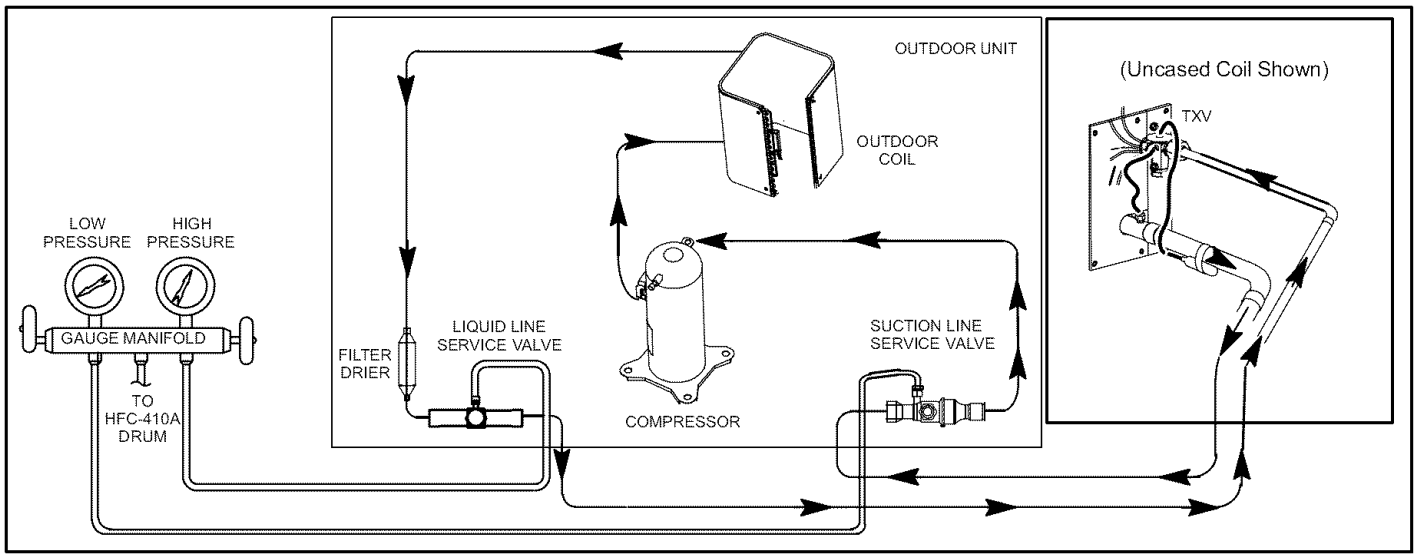


Figure 4. Typical Manifold Gauge Connection Setup

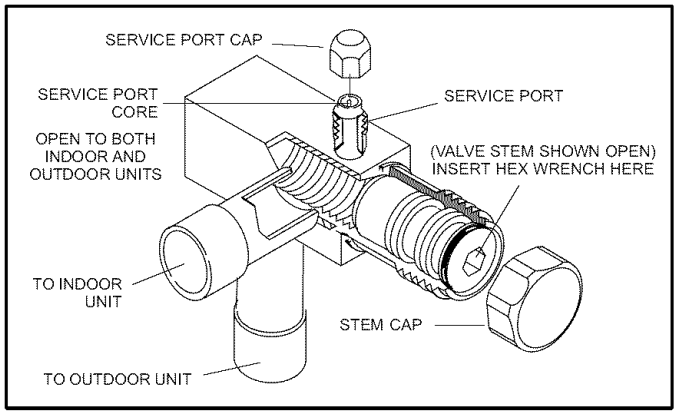


Figure 5. Angle-Type Service Valve (Back-Seated Opened)

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 2.

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 2.

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 2.

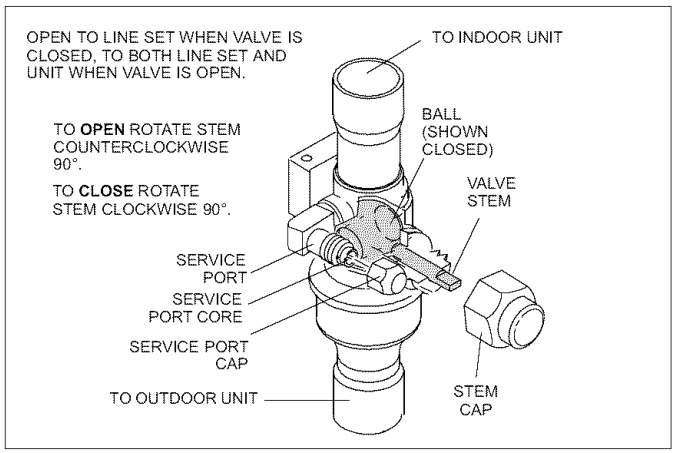


Figure 6. Ball-Type Service Valve

Recovering Refrigerant from Existing 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.

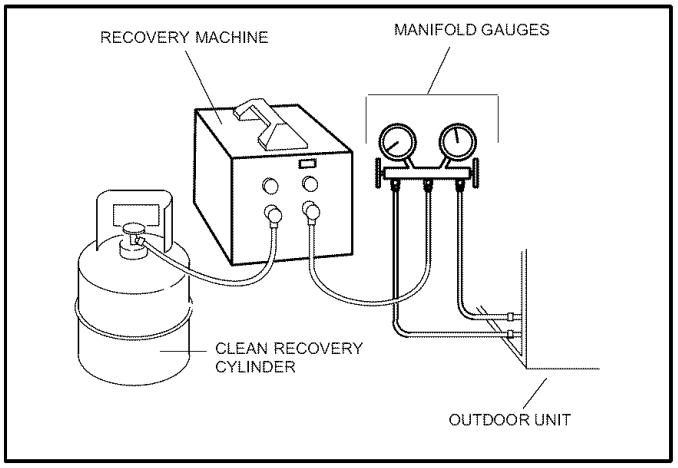


Figure 7. Typical Refrigerant Recovery (Method 1)

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.
- 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

⚠ CAUTION

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

See *Unit Dimensions* on page 2 for sizing mounting slab, platforms or supports. Refer to figure 8 for mandatory installation clearance requirements.

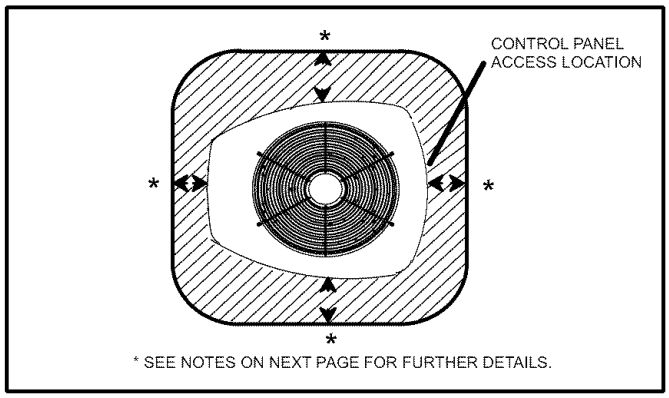


Figure 8. Installation Clearances

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:

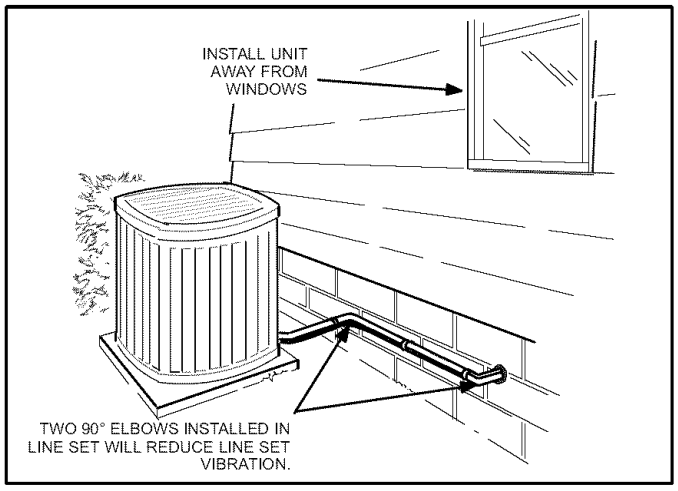


Figure 9. Outside Unit Placement

- 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 9.

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 10.

NOTE - Install unit level or, if on a slope, maintain slope tolerance of 2 degrees (or 2 inches per 5 feet [50 mm per 1.5 m]) away from building structure.

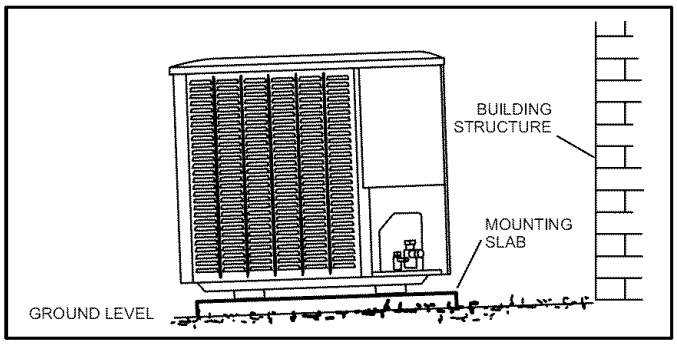


Figure 10. Slab Mounting at Ground Level

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

ELEVATING THE UNIT

Unlike the small-base units which use round support feet, the larger-base units are outfitted with elongated support feet as illustrated in figure 11 which uses a similar method for elevating the unit.

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.

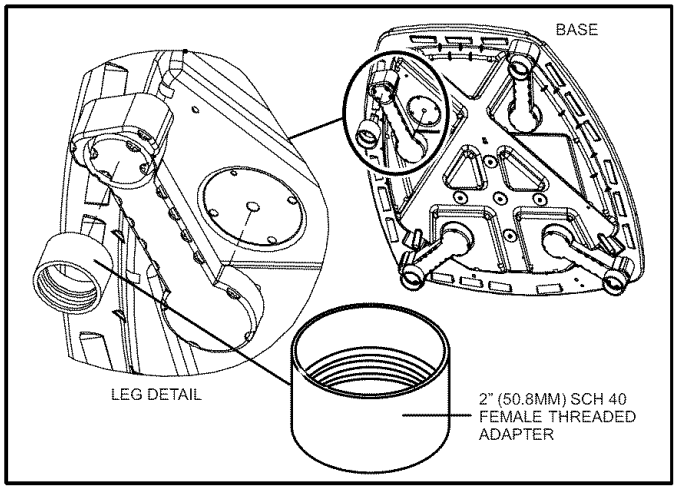


Figure 11. Elevated Slab Mounting using Feet Extenders (Larger Base Units)

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.

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.

With unit positioned at installation site, remove two side louvered panels to expose the unit base pan. Install the brackets as illustrated in figure 12 using conventional practices; replace the panels after installation is complete.

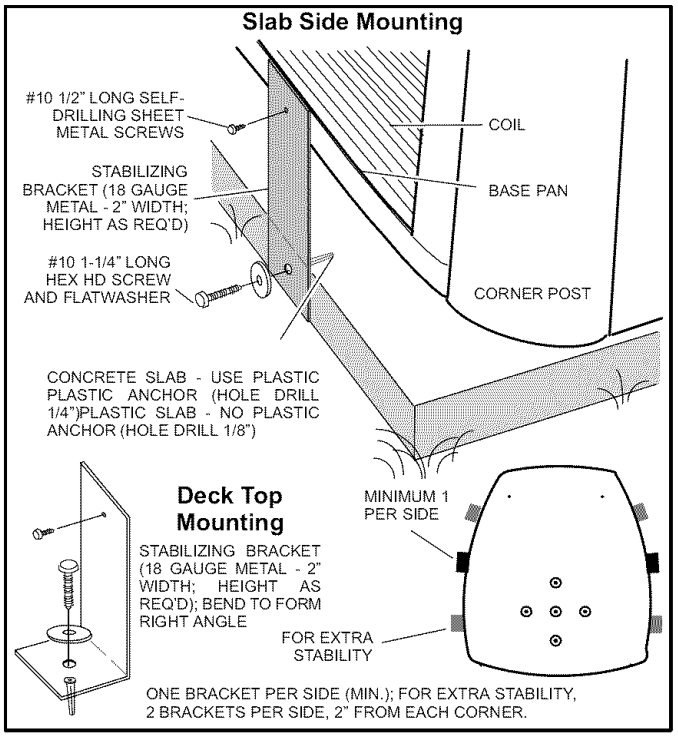


Figure 12. Installing Stabilizer Brackets

⚠ 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.

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

ACCESS PANEL

Remove and reinstall access panel as shown in figure 13.

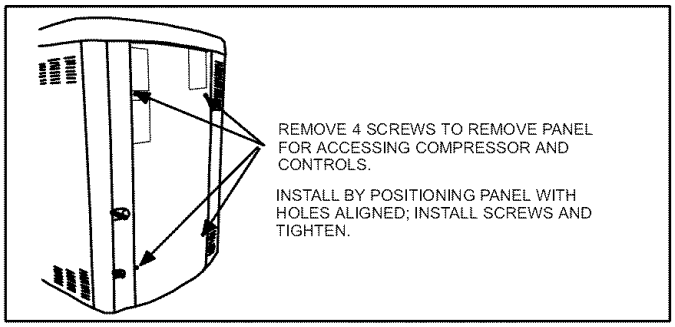


Figure 13. Access Panel

⚠ 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.

INSTALLING ISOLATION GROMMETS

Locate the isolation grommets (provided). Slide grommets onto suction and liquid lines. Insert grommets into mullion to isolate refrigerant lines from sheet metal edges.

REMOVING PANELS

Remove the louvered panels as follows:

1. Remove two screws, allowing the panel to swing open slightly as illustrated in figure 14.

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 14, detail B.
3. Move panel down until lip of upper tab clears the top slot in corner post as illustrated in figure 14, detail A.

INSTALLING PANEL

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.

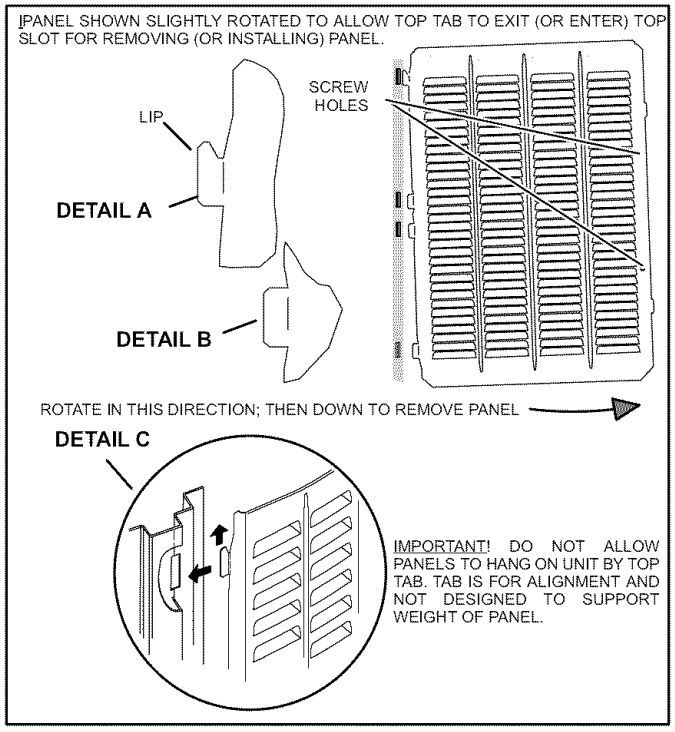


Figure 14. Removing/Installing Louvered Panels (Details A, B and C)

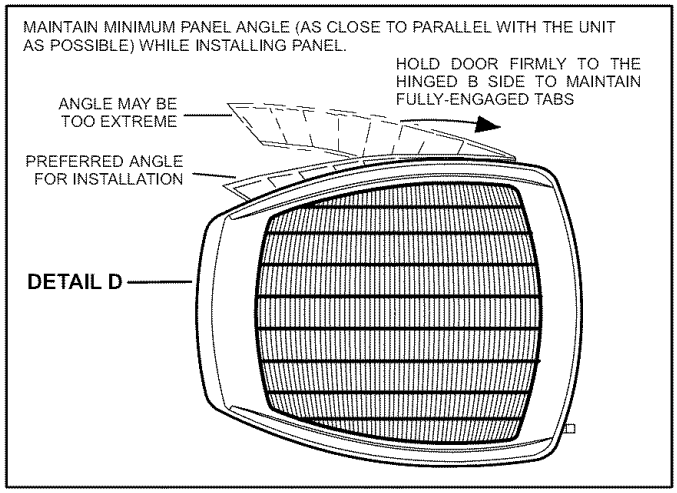


Figure 15. Removing/Installing Louvered Panels (Detail D)

Install the louvered panels as follows:

1. Position the panel almost parallel with the unit as illustrated in figure 15, 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 14, 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.

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.

MATCHING WITH NEW OR EXISTING INDOOR COIL AND LINE SET

⚠ IMPORTANT

Matching XC15 with a New Indoor Coil and Line Set—If installing a new indoor coil and reusing the existing line set that included a RFCI liquid line (small bore liquid line used as a metering device) then you must change to a standard size liquid line.

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 (XC15) 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.

Table 2. Refrigerant Line Set

Model	Field Connections		Recommended Line Set		
	Liquid Line	Vapor Line	Liquid Line	Vapor Line	L15 Line Sets
-024	3/8 in. (10 mm)	3/4 in. (19 mm)	3/8 in (10 mm)	3/4 in. (19 mm)	L15-41 15 - 50 ft. (5 - 15 m)
-030					
-036					
-042	3/8 in. (10 mm)	7/8 in (22 mm)	3/8 in. (10 mm)	7/8in (22 mm)	L15-65 15 - 50 ft. (5 - 15m)
-048					
-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

If the XC15 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 XC15 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 horizontal runs** is illustrated in figure 16.
- Installation of a **transition from horizontal to vertical** is illustrated in figure 17.
- Installation of **line set on vertical runs** is illustrated in figure 18.

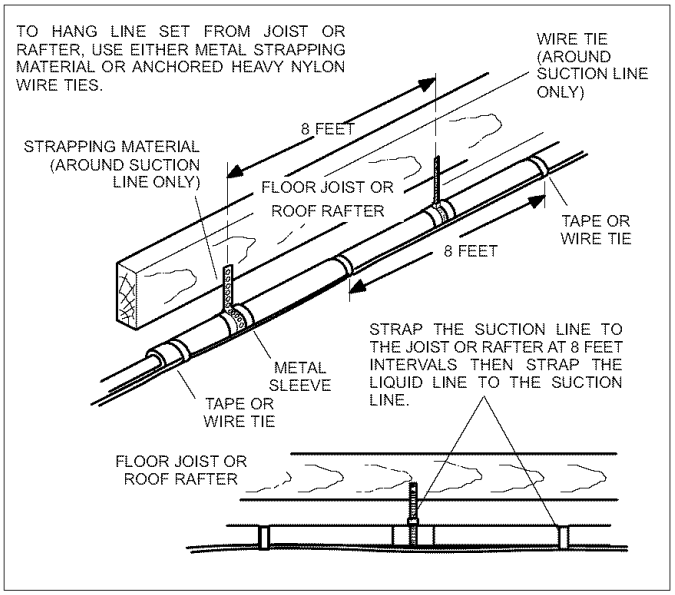


Figure 16. Refrigerant Line Set: Installing Horizontal Runs

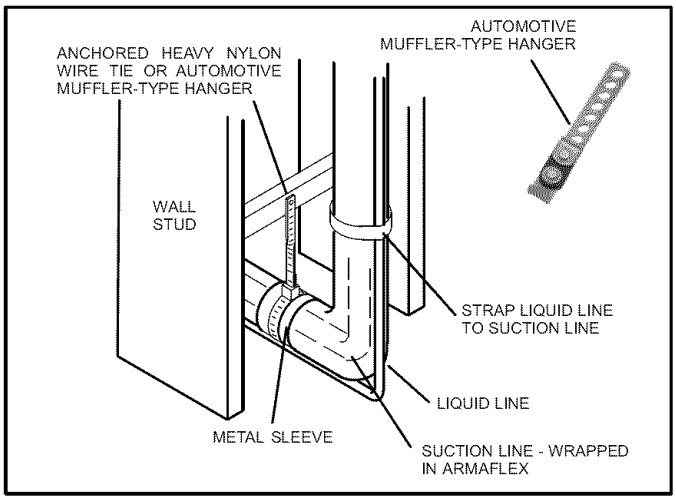


Figure 17. Refrigerant Line Set: Transition from Vertical to Horizontal

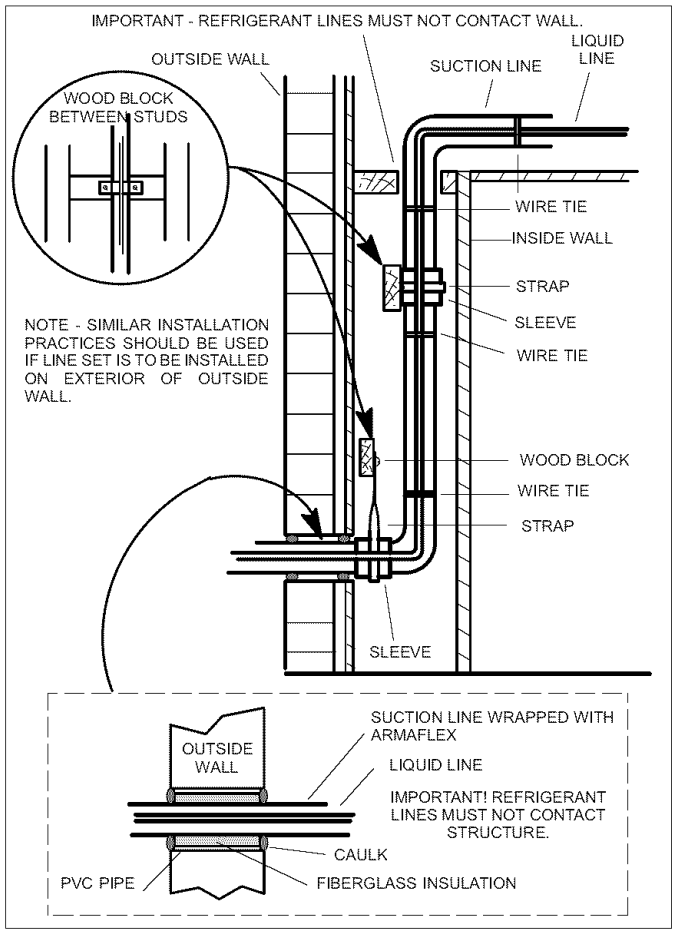


Figure 18. Refrigerant Line Set: Installing Vertical Runs (New Construction Shown)

Brazing Line Set Connections

Use the following procedure to braze the line set to the new air conditioner unit. Figure 19 on page 10 is provided as a general guide for preparing to braze the line set to the air conditioner unit.

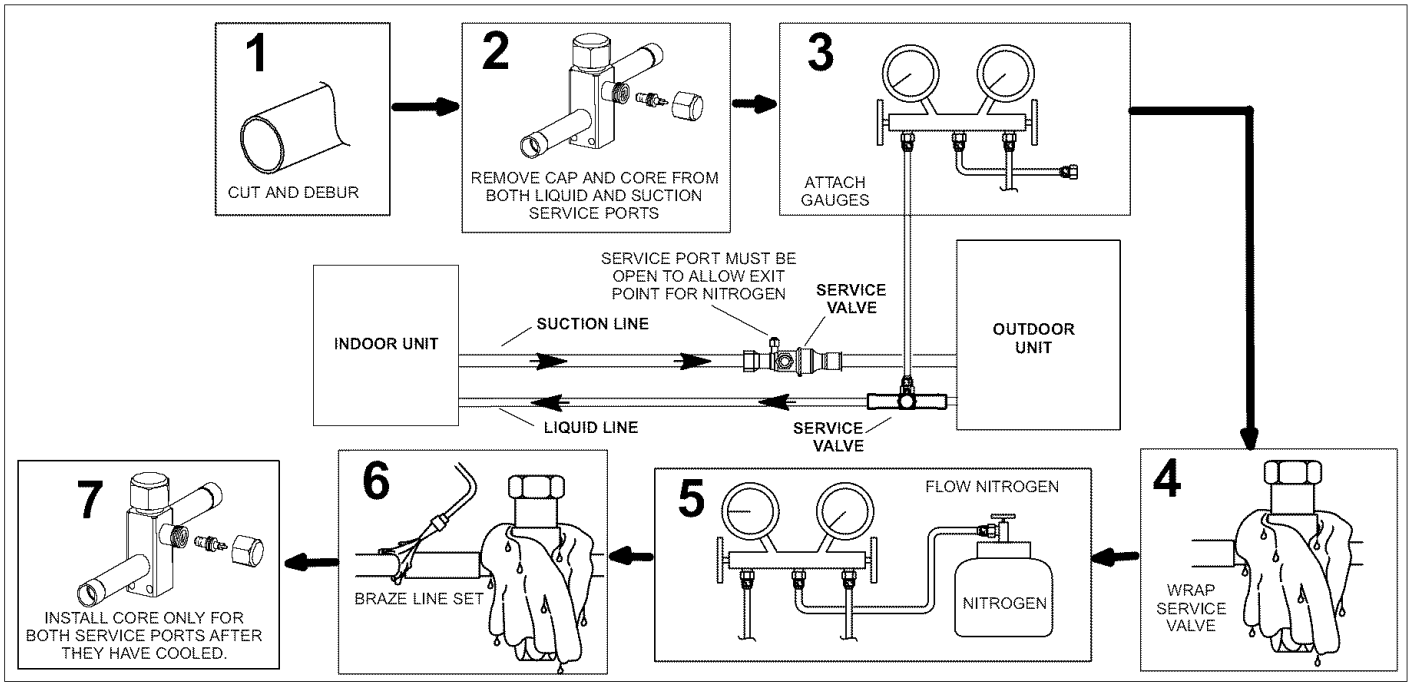


Figure 19. Brazing Connections

BRAZING CONNECTION PROCEDURE

Before brazing, remove the access panel as illustrated in figure 13; then remove the narrow piping panel to prevent burning off the paint as illustrated in figure 20.

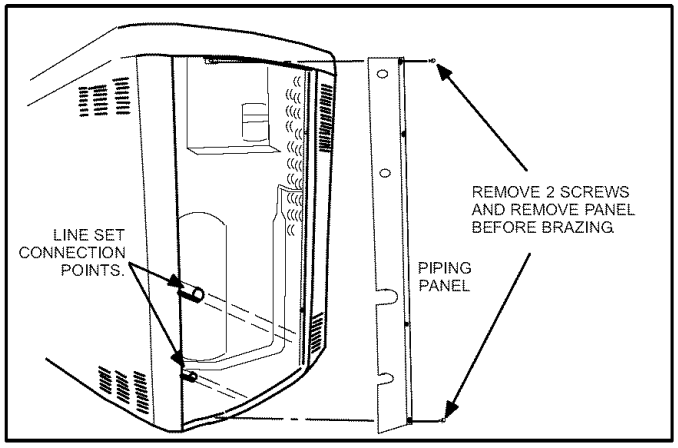


Figure 20. Piping Panel Removal

⚠ 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

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

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.

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.
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 HFC-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 TXV metering device at the indoor unit will allow low pressure 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:

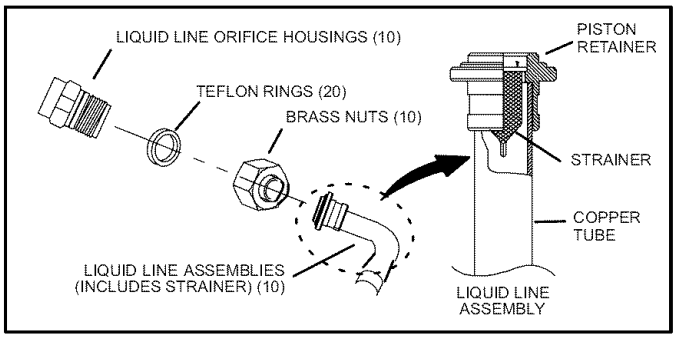


Figure 21. 69J46 Kit Components

TYPICAL FIXED ORIFICE REMOVAL PROCEDURE

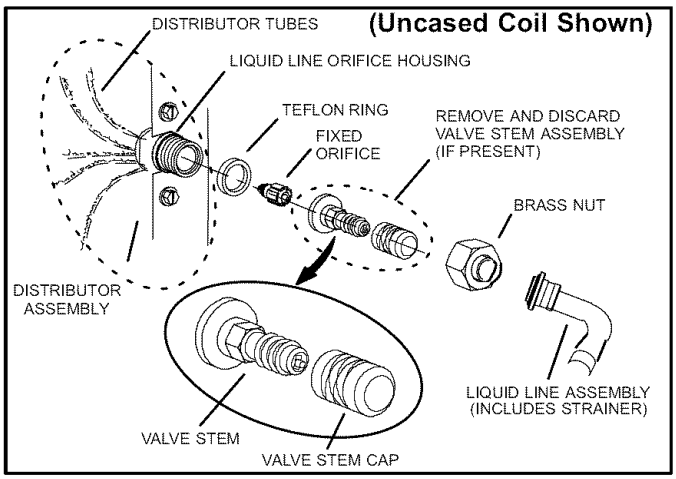


Figure 22. Typical Fixed Orifice Removal

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 22.
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

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 23.
5. Disconnect the liquid line from the TXV at the liquid line assembly.

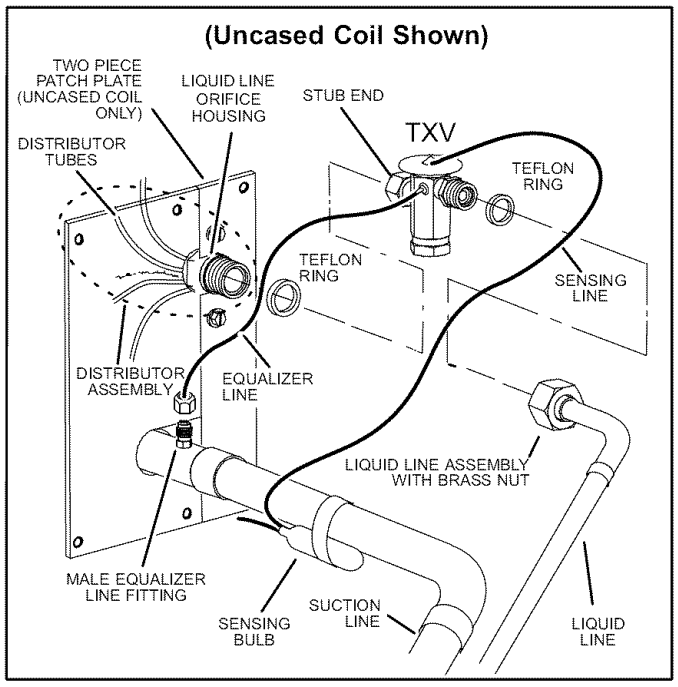


Figure 23. Typical TXV Removal

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 23.
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.

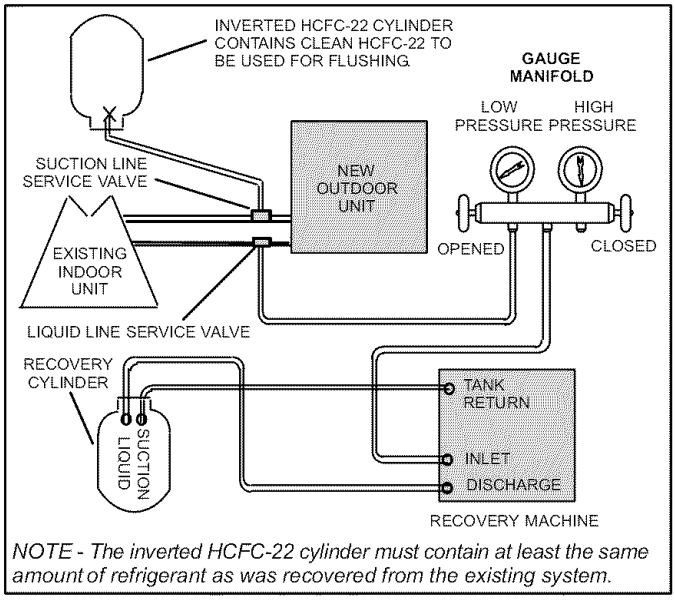
Failure to properly flush the system per the instructions below will void the warranty.

⚠ 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 24. 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

XC15 units are designed with HFC-410A TXV metering devices. This section provides instructions on installing TXV refrigerant metering device.

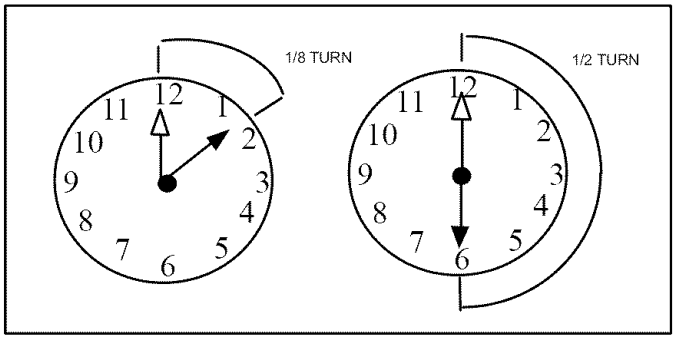


Figure 25. Tightening Distance

XC15 ENGINEERING HANDBOOK

See the XC15 *Engineering Handbook* for approved indoor/outdoor match-ups, applicable TXV kits and application information.

The following is the typical contents of a TXV kit:

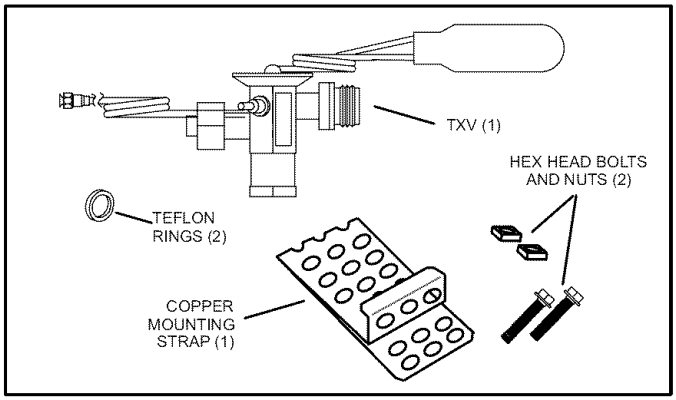


Figure 26. TXV Kit Components

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 27 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.

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 25, 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.

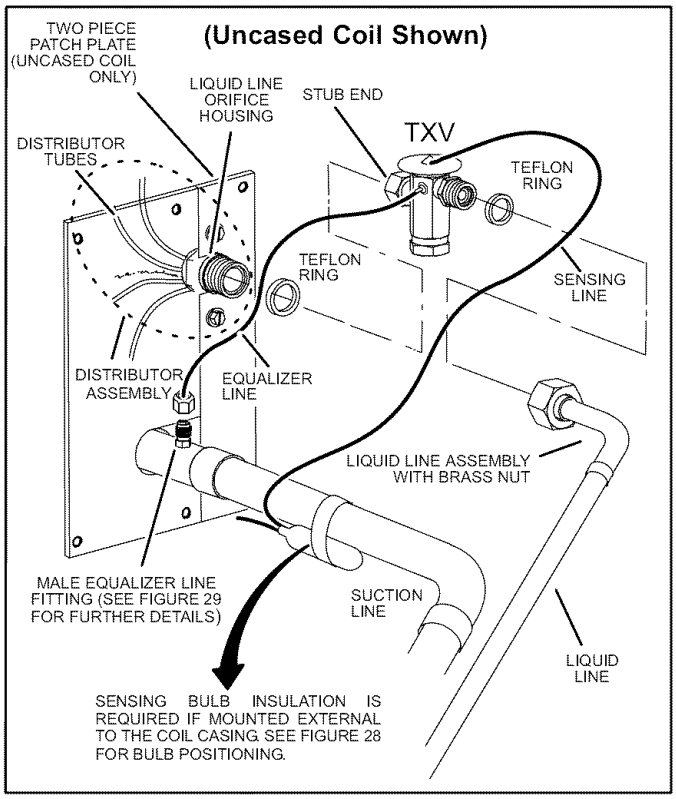


Figure 27. Typical TXV Installation

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 25, or 20 ft-lb.

6. Attach the suction line sensing bulb in the proper orientation as illustrated in figure 28 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.

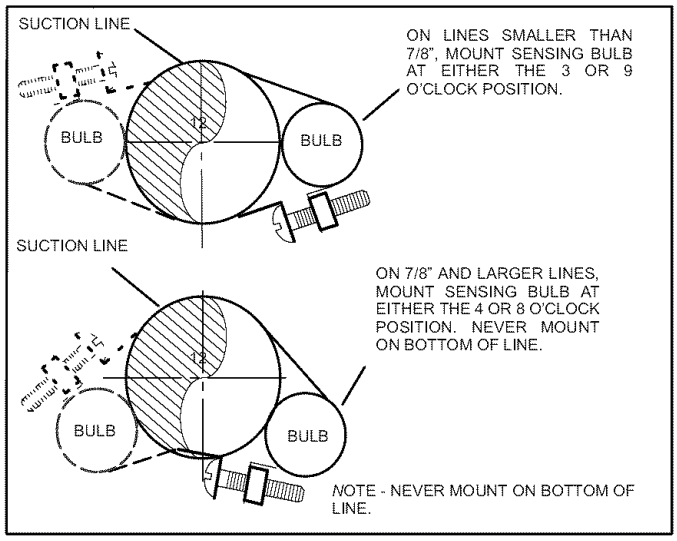


Figure 28. TXV Sensing Bulb Installation

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 29.

⚠ IMPORTANT

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

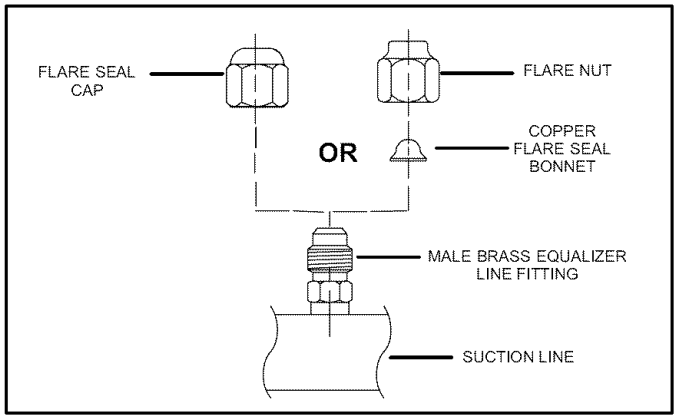


Figure 29. Copper Flare Seal Bonnet Removal

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 25.

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.
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

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.

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.
2. Ground unit at unit disconnect switch or to an earth ground.

NOTE - To facilitate conduit, a hole is in the bottom of the control box. Connect conduit to the control box using a proper conduit fitting.

NOTE - Units are approved for use only with copper conductors.

NOTE - 24VAC, Class II circuit connections are made in the low voltage junction box. See figure 30 for field wiring diagram.

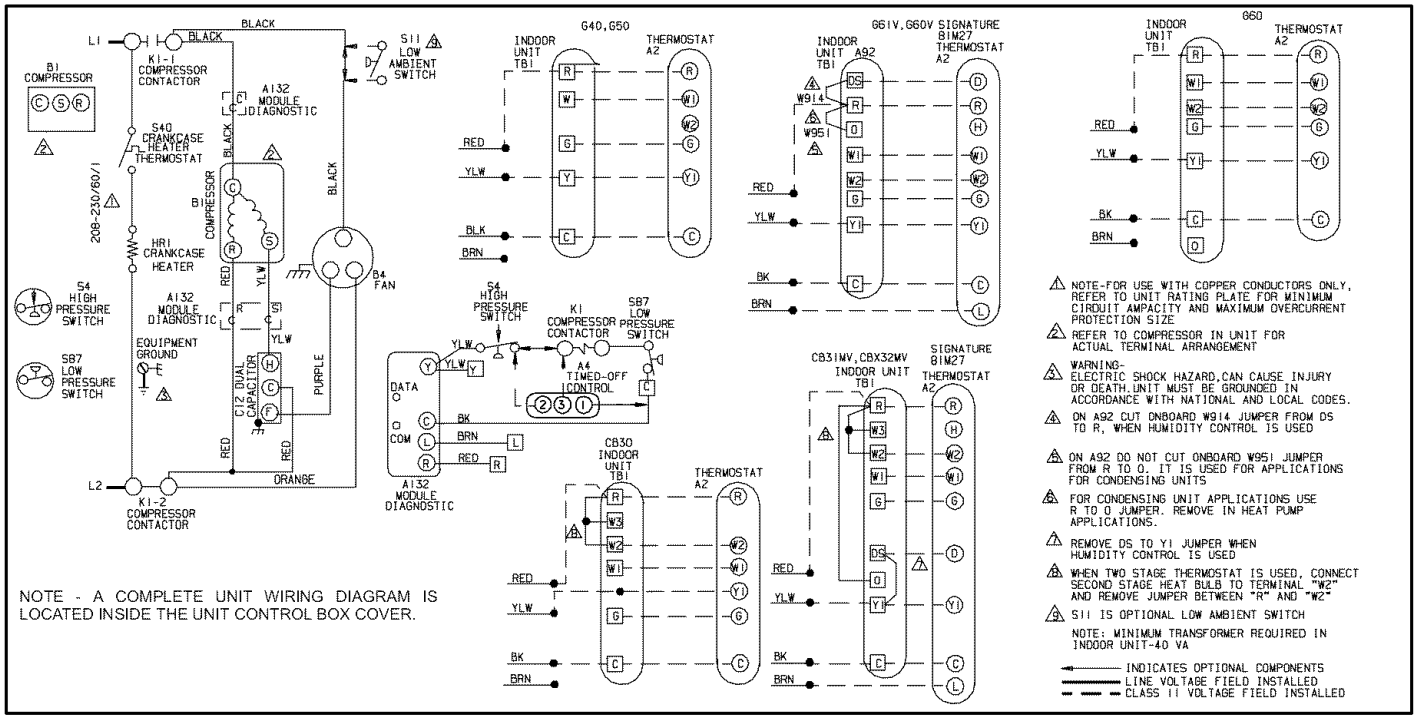


Figure 30. Typical Wiring Diagram

NOTE - See unit wiring diagram for power supply connections. If indoor unit is not equipped with blower relay. It must be field-provided and installed (P-8-3251 or equivalent)

NOTE - For proper voltages, select thermostat wire gauge per the following chart:

Table 3. 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	

3. 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, drafts or vibrations.
4. Install low voltage wiring from outdoor to indoor unit and from thermostat to indoor unit as illustrated in figure 30.
5. Do not bundle any excess 24V control wire inside control box. Run control wire through installed wire tie and tighten wire tie to provide low voltage strain relief and to maintain separation of field installed low and high voltage circuits.

Start-Up 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 *Testing and Charging System* on page 17.

SETTING UP TO CHECK CHARGE

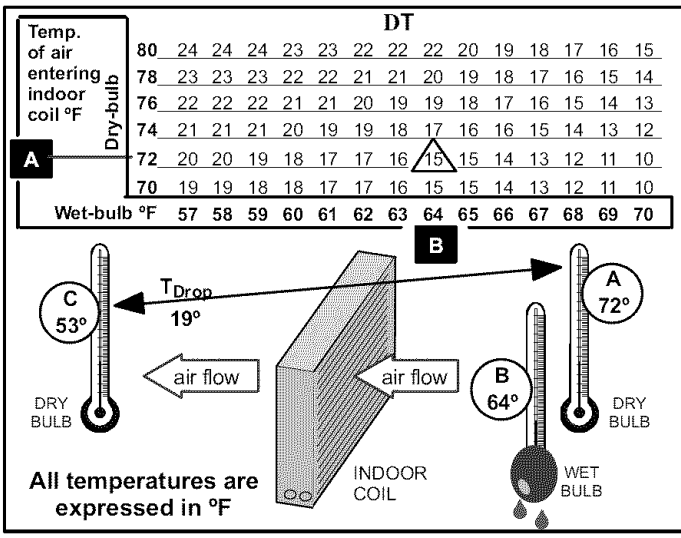
1. Close manifold gauge set valves. Connect the center manifold hose to an upright cylinder of HFC-410A.
2. Connect the manifold gauge set to the unit's service ports as illustrated in figure 4.
   - low pressure gauge to suction line service port.
   - high pressure gauge to liquid line service port.

INDOOR COIL AIRFLOW CHECK

Check indoor coil airflow using the Delta-T (DT) process as illustration in figure 31.

DETERMINING CHARGE METHOD

To determine the correct charging method, use the illustration in figure 32.



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**.

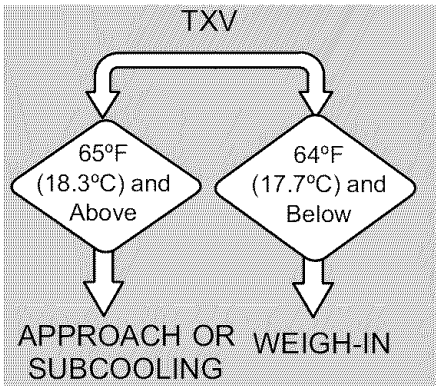
3. Determine if fan needs adjustment—If the difference between the measured T_{Drop} and the desired **DT** (T_{Drop}–**DT**) is within ±3°, no adjustment is needed. See examples: Assume **DT** = 15 and **A** temp. = 72°, these **C** temperatures would necessitate stated actions:

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



WHEN TO CHARGE?

- Warm weather best
- Can charge in colder weather

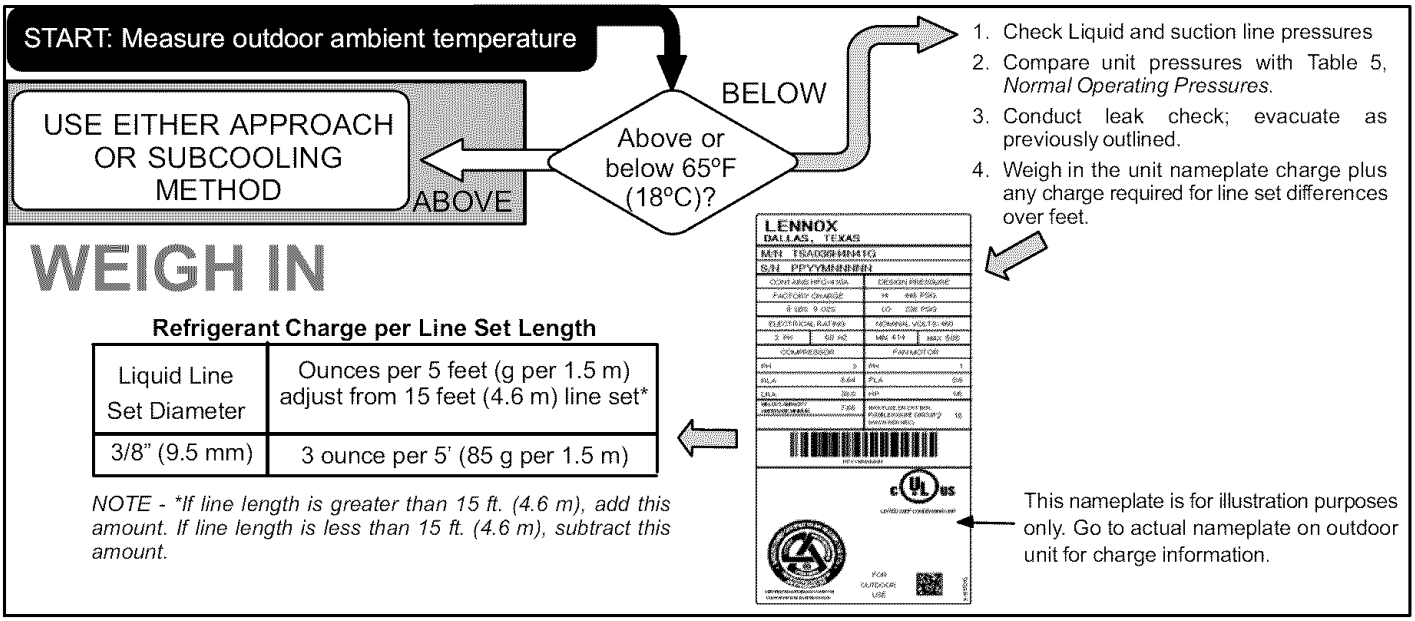
CHARGE METHOD? Determine by:

- 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 32. Determining Charge Method



1. Check Liquid and suction line pressures
2. Compare unit pressures with Table 5, *Normal Operating Pressures.*
3. Conduct leak check; evacuate as previously outlined.
4. Weigh in the unit nameplate charge plus any charge required for line set differences over feet.

Refrigerant Charge per Line Set Length

Liquid Line Set Diameter	Ounces per 5 feet (g per 1.5 m) adjust from 15 feet (4.6 m) line set*
3/8" (9.5 mm)	3 ounce per 5' (85 g per 1.5 m)

*NOTE - *If line length is greater than 15 ft. (4.6 m), add this amount. If line length is less than 15 ft. (4.6 m), subtract this amount.*

This nameplate is for illustration purposes only. Go to actual nameplate on outdoor unit for charge information.

Figure 33. Using Weigh In TXV Method

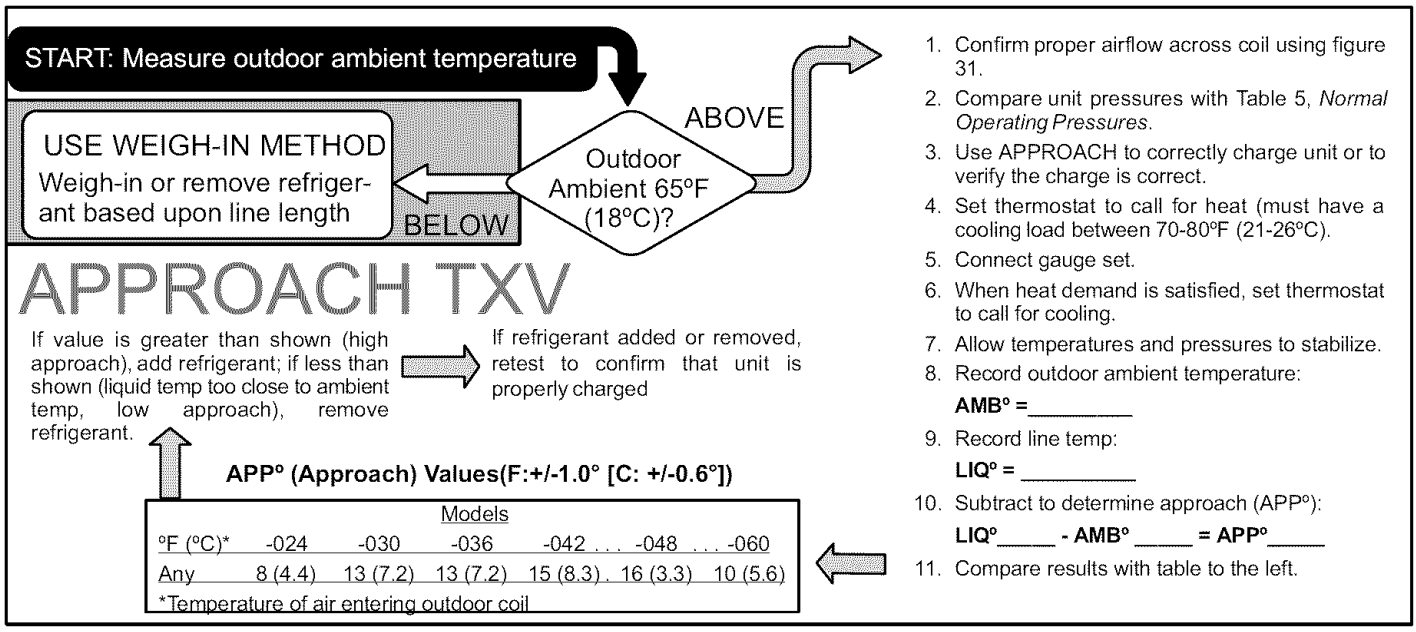


Figure 34. Using Approach TXV Method

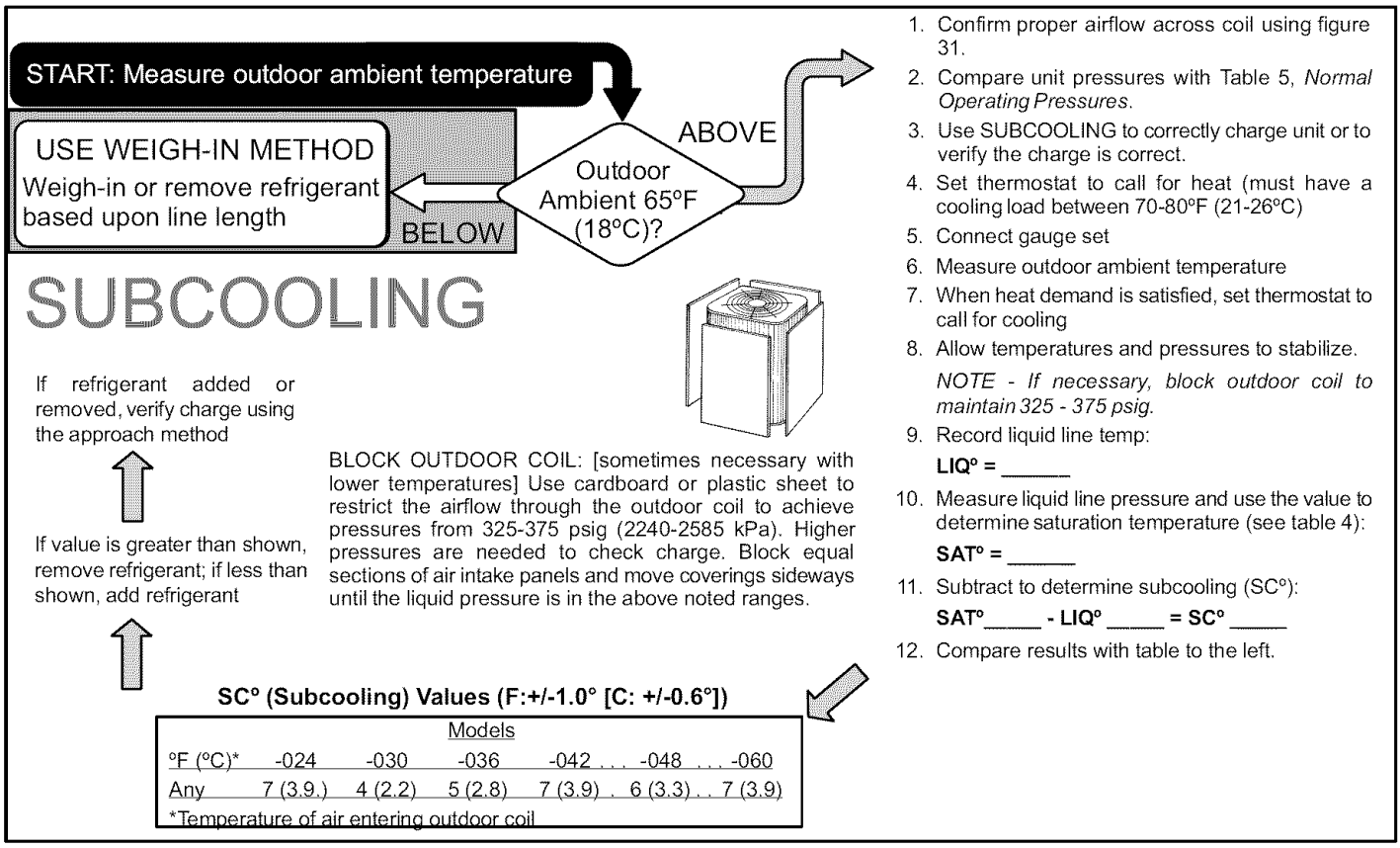


Figure 35. Using Subcooling TXV Method

Table 4. 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		

Table 5. 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.

Model	-024		-030		-036		-042		-048		-060	
°F (°C)**	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction	Liquid	Suction
65 (18.3)	238	139	246	138	251	133	261	144	224	129	242	131
70 (21.1)	256	139	265	139	270	134	281	145	241	130	262	132
75 (23.9)	275	140	287	140	291	134	303	146	259	131	282	134
80 (26.7)	296	141	307	141	312	134	326	147	279	133	303	135
85 (29.4)	319	142	330	142	335	136	350	148	301	134	326	136
90 (32.2)	342	142	354	143	359	137	376	149	323	135	349	137
95 (35.0)	366	143	379	144	384	138	402	150	347	137	372	138
100 (37.8)	392	144	404	144	411	140	430	151	372	138	397	140
105 (40.6)	418	146	432	145	438	141	459	152	397	140	422	141
110 (43.3)	448	146	461	147	468	143	490	153	422	141	448	143
115 (46.1)	480	147	491	148	501	144	525	154	449	143	475	146

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

** *Temperature of air entering outdoor coil.*

INSTALLING SERVICE VALVE CAPS

Disconnect gauge set and re-install both the liquid and suction service valve caps.

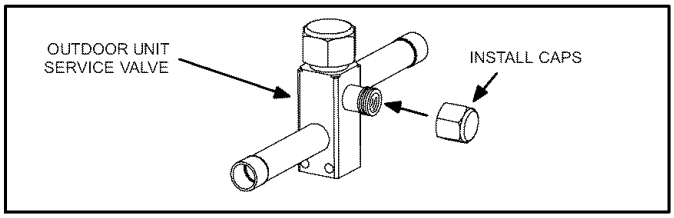


Figure 36. Installing Service Valve Port Caps

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.

HIGH PRESSURE SWITCH

XC15 units are equipped with a high-pressure switch that is located in the liquid line of the compressor as illustrated in *Unit Dimensions* 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 reset the module.

LOW PRESSURE SWITCH

XC15 units are equipped with a low pressure switch that is located in the suction line to the compressor as illustrated in *Unit Dimensions* on page 2. The switch is a Single Pole, Single Throw (SPST), auto-reset switch that is normal closed. The switch opens at 40 psi and closes at 90 psi.

FILTER DRIER

A drier is factory-installed in each XC15 unit as illustrated in *Unit Dimensions* on page 2. A replacement drier is available from Lennox. Refer to Lennox Repair Part Program.

Lennox System Operation Monitor (LSOM) (100034-2)

The diagnostic indicator detects the most common fault conditions in the air conditioning system. When an abnormal condition is detected, the module communicates the specific condition through its ALERT and TRIP lights. The module is capable of detecting both mechanical and electrical system problems.

⚠ IMPORTANT

This monitor does not provide safety protection. The is a monitoring device only and cannot control or shut down other devices.

LSOM—LED FUNCTIONS

The LSOM LED functions are described in the following table. Refer to table 8 for the complete explanation of troubleshooting codes.

Table 6. LED Functions

Label	LED Color	Function
Power	Green	Indicates voltage within the range of 19-28VAC is present at the system monitor power connection.
Alert	Yellow	Communicates an abnormal system condition through a unique flash code. The alert LED flashes a number of times consecutively; then pauses; then repeats the process. This consecutive flashing correlates to a particular abnormal condition.
Trip	Red	Indicates there is a demand signal from the thermostat but no current to the compressor is detected by the module.

RESETTING ALERT CODES

Alert codes can be reset manually or automatically:

Manual Reset

Cycle the 24VAC power to LSOM off and on. After power up, existing code will display for 60 seconds and then clear. Manual reset can be achieve by any of the following methods:

- Disconnecting **R** wire from the LSOM's **R** terminal.
- Turning the indoor unit off an on again.

Automatic Reset

After an alert is detected, the LSOM continues to monitor the compressor and system. When/if conditions return to normal, the alert code is turned off automatically.

COMPRESSOR WIRE ROUTING

The scroll compressor's run **R**, common **C**, and start **S** wires are factory routed through the holes in the LSOM marked **R**, **C**, and **S** as illustrated in figure 37. The common **C** wire need not be routed through the module for it to operate properly.

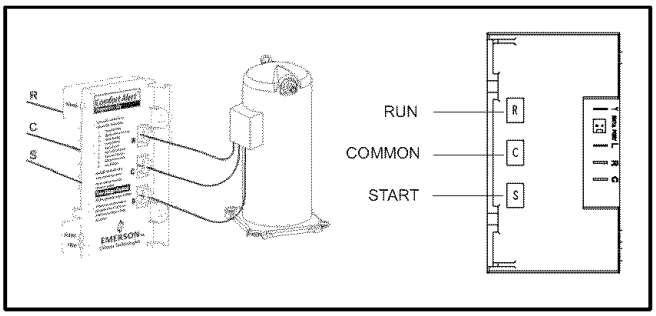


Figure 37. Compressor Wire Routing (Factory Installed)

TERMINAL CONNECTIONS

This section address terminal connections and their purpose.

Power (R and C Terminals)

LSOM requires a constant nominal 24VAC power supply. The wiring to the module's **R** and **C** terminals must be directly from the indoor unit or thermostat. The module can not be powered by the **C** terminal, defrost board or other control board without experiencing nuisance alerts.

When constant 24VAC (**R** wire) is not present in the outdoor unit, use one of the spare wires in the thermostat cable to bring power to the module. Connect the other end of the spare wire to **R** at the indoor unit or thermostat.

Thermostat Demand Wiring (Y Terminal)

LSOM requires a thermostat demand signal to operate properly. The thermostat demand signal input terminal, labeled **Y** on the module, should always be connected to the compressor contactor coil so that when the coil is energized, the demand signal input is 24VAC. When thermostat demand is not present, **Y** should be less than 0.5VAC.

Alert Communication (L Terminal) (Optional)

The **L** terminal is used to communicate alert codes to the room thermostat. On selected *Lennox Comfort Sense, Elite and Merit* thermostats there is an **L** terminal for direct input from the LSOM. See specific thermostat user guide on how alerts are displayed.

Data Port Terminal

The data port terminal is for future use and has not been implemented at this time.

INSTALLATION VERIFICATION

To verify correct LSOM installation, perform the two following functional tests:

Function Test 1

1. Disconnect power from the compressor.
2. Force a thermostat call for cooling.
3. The red LED should turn on indicating a compressor trip as long as 24VAC is measured at the **Y** terminal. If the red LED does not function as described, refer to table 7 to verify the wiring.

Function Test 2

1. Disconnect power from the compressor and 24VAC power from LSOM.
2. Remove the wire from the **Y** terminal of LSOM and reapply power to the compressor, allowing the

compressor to run. The yellow LED will begin flashing a code 8 indicating a welded contactor.

3. Disconnect power from the compressor and 24VAC power from the LSOM. While the LSOM is off, reattach the wire to the **Y** terminal.
4. Reapply power to the compressor and 24VAC power to the LSOM; the yellow LED will flash the previous code for 60 seconds and then turn off. If the yellow LED does not function as described, refer to table 7 to verify the wiring.

Table 7. LSOM Module LED Troubleshooting Codes

Status LED Condition	Mis-wired Module Indication	Status LED Troubleshooting Information
Green LED ON	Module not powering up.	Determine/verify that both R and C module terminals are connected and voltage is present at both terminals.
Green LED Intermittent	Module powers up only when compressor runs.	Determine if R and Y terminals are wired in reverse. Verify module's R and C terminals have a constant source.
Red LED ON	LED is on but system and compressor check OK.	[1] Verify Y terminal is connected to 24VAC at contactor coil. [2] Verify voltage at contactor coil falls below 0.5VAC when off. [3] Verify 24VAC is present across Y and C when thermostat demand signal is present; if not present, R and C wires are reversed.
Red and Yellow LED	Simultaneous flashing.	Indicates that the control circuit voltage is too low for operation. Verify R and C terminals are supplied with 19-28VAC.

Table 8. LSOM System LED Troubleshooting Codes

Status LED Condition	Status LED Description	Status LED Troubleshooting Information
Red LED ON	Thermostat demand signal Y1 is present, but compressor not running	[1] Compressor protector is open. • Check for high head pressure • Check compressor supply voltage [2] Outdoor unit power disconnect is open. [3] Compressor circuit breaker or fuse(s) is open. [4] Broken wire or connector is not making contact. [5] Low or high pressure switch open if present in the system. [6] Compressor contactor has failed to close.
Yellow Flash Code 1	**Long Run Time** - Compressor is running extremely long run cycles.	[1] Low refrigerant charge. [2] Evaporator blower is not running. • Check blower relay coil and contacts • Check blower motor capacitor • Check blower motor for failure or blockage • Check evaporator blower wiring and connectors • Check indoor blower control board • Check thermostat wiring for open circuit [3] Evaporator coil is frozen. • Check for low suction pressure • Check for excessively low thermostat setting • Check evaporator airflow (coil blockages or return air filter) • Check ductwork or registers for blockage. [4] Faulty metering device. • Check TXV bulb installation (size, location and contact) • Check if TXV is stuck closed or defective [5] Condenser coil is dirty. [6] Liquid line restriction (filter drier blocked if present). [7] Thermostat is malfunctioning. • Check thermostat sub-base or wiring for short circuit • Check thermostat installation (location and level)
Yellow Flash Code 2	**System Pressure Trip** - Discharge or suction pressure out of limits or compressor overloaded	[1] High head pressure. • Check high pressure switch if present in system • Check if system is overcharged with refrigerant • Check for non-condensable in system [2] Condenser coil poor air circulation (dirty, blocked, damaged). [3] Condenser fan is not running. • Check fan capacitor • Check fan wiring and connectors • Check fan motor for failure or blockage [4] Return air duct has substantial leakage.

Status LED Condition	Status LED Description	Status LED Troubleshooting Information
Yellow Flash Code 3	**Short Cycling** - Compressor is running only briefly	[1] Thermostat demand signal is intermittent. [2] Time delay relay or control board is defective. [3] If high pressure switch is present, see Flash Code 2 information.
Yellow Flash Code 4	**Locked Rotor**	[1] Run capacitor has failed. [2] Low line voltage (contact utility if voltage at disconnect is low). • Check wiring connections [3] Excessive liquid refrigerant in the compressor. [4] Compressor bearings are seized.
Yellow Flash Code 5	**Open Circuit**	[1] Outdoor unit power disconnect is open. [2] Unit circuit breaker or fuse(s) is open. [3] Unit contactor has failed to close. • Check compressor contactor wiring and connectors • Check for compressor contactor failure (burned, pitted or open) • Check wiring and connectors between supply and compressor • Check for low pilot voltage at compressor contactor coil [4] High pressure switch is open and requires manual reset. [5] Open circuit in compressor supply wiring or connections. [6] Unusually long compressor protector reset time due to extreme ambient temperature. [7] Compressor windings are damaged. • Check compressor motor winding resistance
Yellow Flash Code 6	**Open Start Circuit** - Current only in run circuit	[1] Run capacitor has failed. [2] Open circuit in compressor start wiring or connections. • Check wiring and connectors between supply and the compressor "S" terminal [3] Compressor start winding is damaged. • Check compressor motor winding resistance
Yellow Flash Code 7	**Open Run Circuit** - Current only in start circuit	[1] Open circuit in compressor start wiring or connections. • Check wiring and connectors between supply and the compressor "R" terminal [2] Compressor start winding is damaged. • Check compressor motor winding resistance
Yellow Flash Code 8	**Welded Contactor** - Compressor always runs	[1] Compressor contactor failed to open. [2] Thermostat demand signal not connected to module.
Yellow Flash Code 9	**Low Voltage** - Control circuit <17VAC	[1] Control circuit transformer is overloaded. [2] Low line voltage (contact utility if voltage at disconnect is low). • Check wiring connections
NOTE - Last code will display for 1 minute when power is cycled to module. Power must be on to module for a minimum of 1 minute for code to clear.		

Maintenance

⚠ 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.

At the beginning of each cooling season, check the system as follows:

NOTE - Outdoor fan motor is prelubricated and sealed. No further lubrication is needed.

1. Clean and inspect the outdoor coil. The coil may be flushed with a water hose. Ensure the power is turned off before you clean the coil.
2. Check connecting lines and coils for signs of oil leaks.
3. Check wiring for loose connections.
4. Check for correct voltage at unit (unit operating).
5. Check amp-draw outdoor fan motor:

   UNIT NAMEPLATE: _____ ACTUAL: _____

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

INDOOR COIL

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

INDOOR UNIT

1. Clean or change filters.
2. 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.
3. Check blower for accumulation of dirt or debris.
4. Check all wiring for loose connections
5. Check for correct voltage at unit (blower operating).
6. Check amp-draw on blower motor:

UNIT NAMEPLATE: _____ ACTUAL: _____

Sound Reduction (SR1) Cover

ASSEMBLY PROCEDURE

Figure 38 identifies the sound reduction parts. Assembly procedures are as follows:

1. Put SR1 base on unit base pan.
2. Install compressor on base.
3. Cover SR1 base with wet rags to protect against any brazing material.
4. Braze suction tube.
5. Braze discharge tube.
6. Cool connections to ambient temperature.
7. Perform leak check.
8. Install suction grommet.
9. Install SR1 left and right side covers.
10. Fasten 60" bottom cable tie.
11. Install discharge grommet.
12. Install top caps.
13. Fasten 36" top cable tie.
14. Fasten 36" middle cable tie.

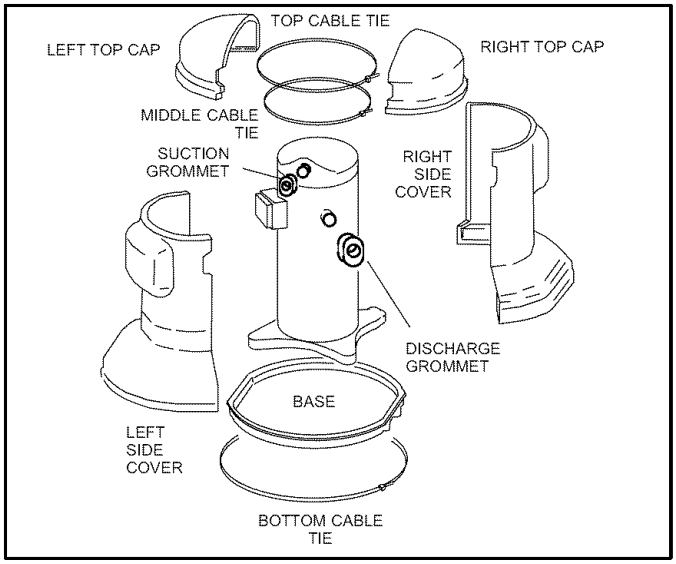


Figure 38. Sound Reduction Cover Parts

Homeowner Information

⚠ IMPORTANT

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

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.)

⚠ 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 unusual 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 set points for both heating and cooling. Refer to the user's information manual provided with your thermostat for 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 the system switch are properly set.
- Replace any blown fuses, or reset circuit breakers.
- Make sure unit access panels are in place.
- Make sure air filter is clean.
- Locate and record unit model number before calling.

Optional Accessories

Refer to the *Lennox XC15 Engineering Handbook* for the latest available optional accessories for this unit.

XC15 Start-Up and Performance Checklist

Customer _____ Address _____

Indoor Unit Model _____ Serial _____

Outdoor Unit Model _____ Serial _____

Notes: _____

_____

START UP CHECKS

Refrigerant Type: ___

Rated Load Amps ___ Actual Amps _____ Rated Volts _____ Actual Volts _____

Condenser Fan Full Load Amps _____ Actual Amps: _____

COOLING MODE

Suction Pressure: _ **Liquid Pressure:** _____

Supply Air Temperature: ____ Ambient **Temperature:** _____ Return Air: **Temperature:** ____

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

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

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