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Dallas, Texas, USA

**THIS MANUAL MUST BE LEFT WITH THE  
HOMEOWNER FOR FUTURE REFERENCE**

## General

This SL28XCV outdoor air conditioner **with all-aluminum coil** is designed for use with HFC-410A refrigerant only.

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

THIS UNIT IS A INTEGRAL COMPONENT OF A SYSTEM THAT WILL REQUIRE A COMMUNICATING THERMOSTAT AND COMMUNICATING AIR HANDLER OR FURNACE



This unit must be installed with an approved indoor air handler or coil. For AHRI Certified system match-ups and expanded ratings, visit [www.LennoxPros.com](http://www.LennoxPros.com).

# INSTALLATION INSTRUCTIONS

## Dave Lennox *Signature*® Collection SL28XCV System

AIR CONDITIONER

508022-01

3/2020

### PACKING LIST



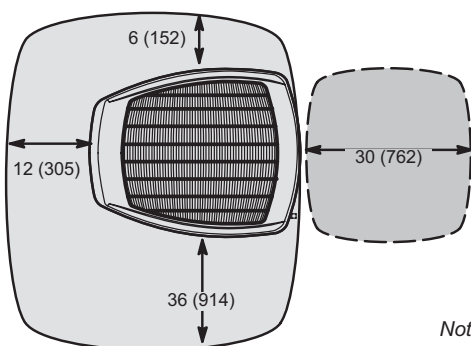
### WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, or service agency.

**IMPORTANT:** Special procedures are required for cleaning the all-aluminum coil in this unit. See page 20 in this instruction for information.

## SETTING THE UNIT – Clearances

### CLEARANCE ON ALL SIDES — INCHES (MILLIMETERS)

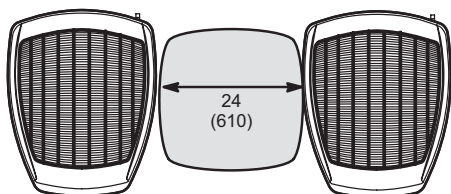


#### NOTES:

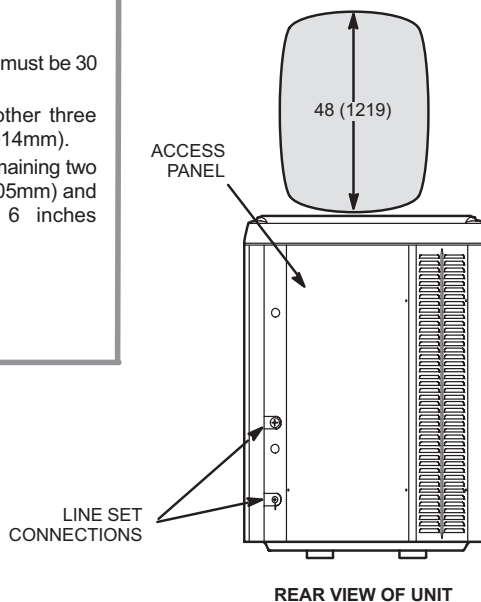
- Clearance to access panel must be 30 inches (762mm).
- Clearance to one of the other three sides must be 36 inches (914mm).
- Clearance to one of the remaining two sides may be 12 inches (305mm) and the final side may be 6 inches (152mm).

*Note: Dimensions are not to scale.*

### MINIMUM CLEARANCE BETWEEN TWO UNITS

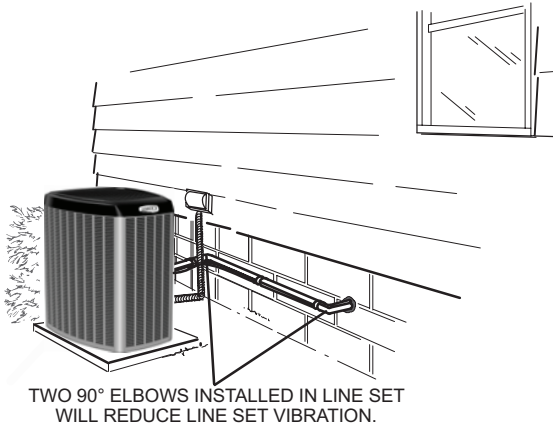


### MINIMUM CLEARANCE ABOVE UNIT



## DETAIL A

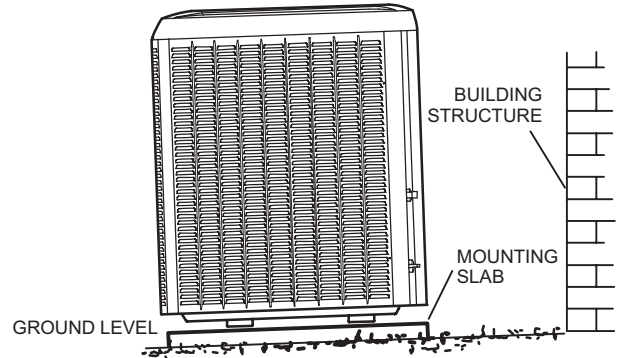
INSTALL UNIT AWAY FROM WINDOWS



Outside Unit Placement

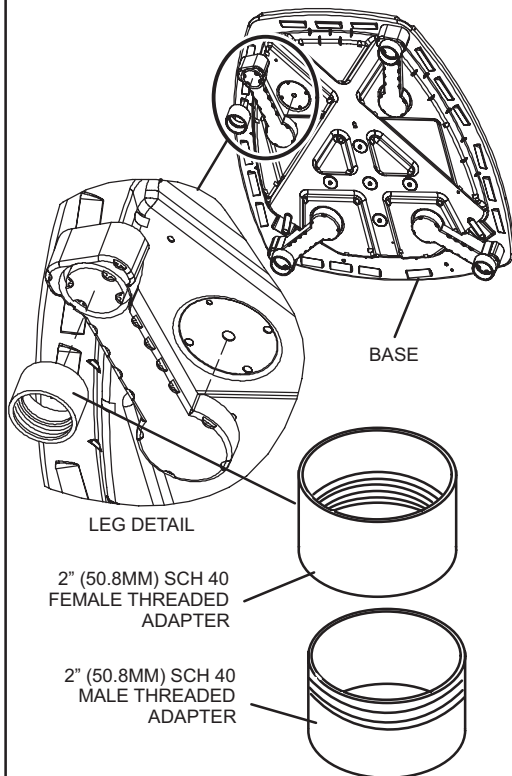
## DETAIL B

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.



Slab Mounting at Ground Level

## DETAIL C

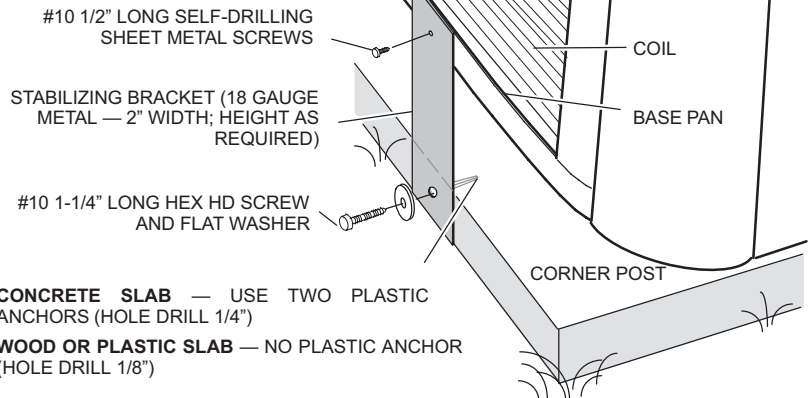


USE ADDITIONAL 2" SCH 40 MALE THREADED ADAPTERS WHICH CAN BE THREADED INTO THE FEMALE THREADED ADAPTERS TO MAKE ADDITIONAL ADJUSTMENTS TO THE LEVEL OF THE UNIT.

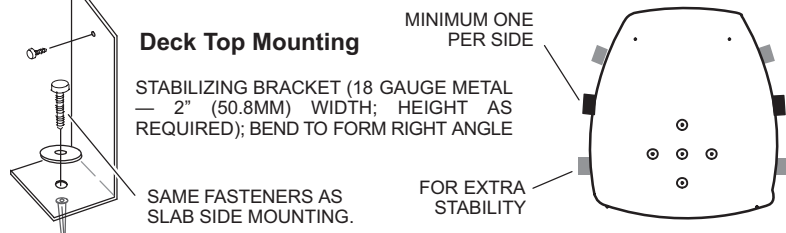
Elevated Slab Mounting using Feet Extenders

## DETAIL D

### Slab Side Mounting



### Deck Top Mounting

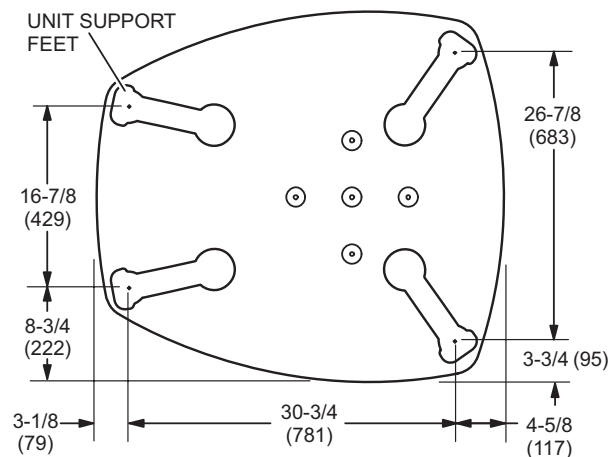


ONE BRACKET PER SIDE (MIN.); FOR EXTRA STABILITY, TWO BRACKETS PER SIDE, 2" (50.8MM) FROM EACH CORNER.

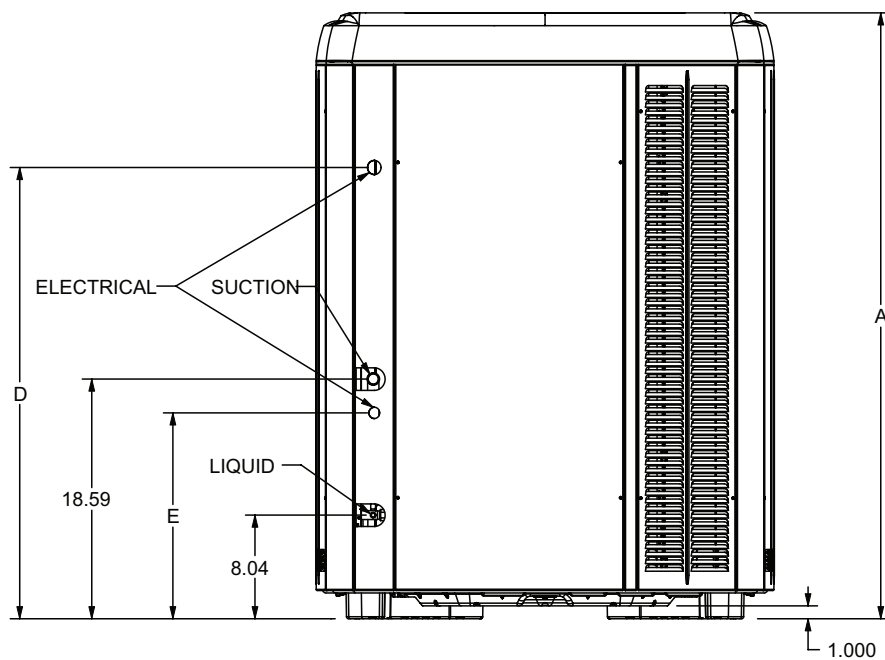
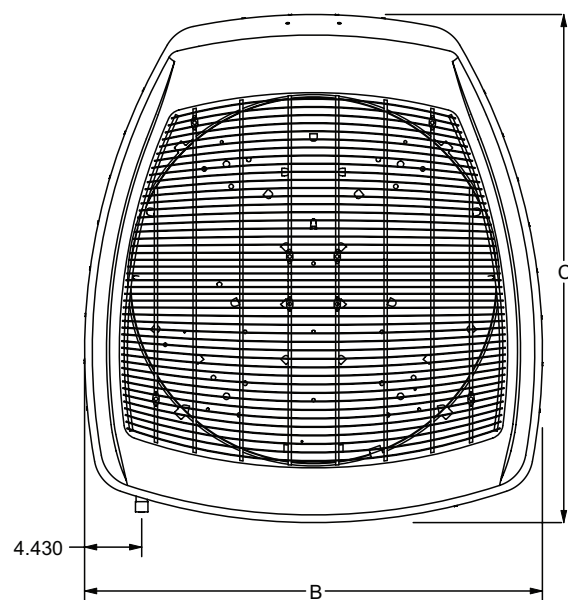
### Stabilizing Unit on Uneven Surfaces

**IMPORTANT** — 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.

## UNIT DIMENSIONS – INCHES (MM)



**BASE WITH ELONGATED LEGS**



UNIT	DIM A	DIM B	DIM C	DIM D	DIM E
SL28XCV-024	47.00	35.50	39.40	35.00	15.97
SL28XCV-036	47.00	35.50	39.40	35.00	15.97
SL28XCV-048	47.00	35.50	39.40	35.00	15.97
SL28XCV-060	47.00	35.50	39.40	35.00	15.97

## SETTING THE UNIT (Continued) – Unit Placement

### NOTICE!

#### Roof Damage!

This system contains both refrigerant and oil. Some rubber roofing material may absorb oil, causing the rubber to degrade. Failure to follow this notice could result in damage to roof surface.

### ⚠ IMPORTANT

This unit must be matched with an indoor coil as specified with AHRI. For AHRI Certified system match-ups and expanded ratings, visit [www.LennoxPros.com](http://www.LennoxPros.com). Coils previously charged with HCFC-22 must be flushed.

### ⚠ WARNING

To prevent personal injury, as well as damage to panels, unit or structure, observe the following:

While installing or servicing this unit, carefully stow all removed panels so that the panels will not cause injury to personnel, objects or nearby structures. Also, take care to store panels where they will not be subject to damage (e.g., being bent or scratched).

While handling or stowing the panels, consider any weather conditions (especially wind) that may cause panels to be blown around and damaged.

### ⚠ IMPORTANT

Exhaust vents from dryers, water heaters and furnaces should be directed away from the outdoor unit. Prolonged exposure to exhaust gases and the chemicals contained within them may cause condensation to form on the steel cabinet and other metal components of the outdoor unit. This will diminish unit performance and longevity.

### NOTICE!

Charging information is given on the charging procedure sticker on the unit access panel. For more in-depth information, consult the Installation and Service Procedures manual on [LennoxPros.com](http://LennoxPros.com) or through the Technical Support department at 800-453-6669.

### ⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

## REFRIGERANT PIPING

### ⚠ IMPORTANT

If this unit is being matched with an approved line set or indoor unit coil that 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. Polyvinyl ether (PVE) 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 system performance and capacity. Failure to properly flush the system per this instruction and the detailed Installation and Service Procedures manual will void the warranty.

Flush the existing line set per the following instructions. For more information, refer to the Installation and Service Procedures manual available on [LennoxPros.com](http://LennoxPros.com). **CAUTION** - DO NOT attempt to flush and re-use existing line sets or indoor coil when the system contains contaminants (i.e., compressor burn out).

Polyvinyl ether (PVE) oil is used in the SL28XCV compressors. For installations of the SL28XCV unit with refrigerant lines or coils previously charged with R410A and POE oil, Lennox recommends flushing the existing lines and coil with R410A refrigerant to remove excess POE oil that may be in the system.

If a new line set is being installed, size the piping per table 1.

**NOTE** - When installing refrigerant lines longer than 50 feet, refer to the Refrigerant Piping Design and Fabrication Guidelines manual available on [LennoxPros.com](http://LennoxPros.com) (Corp. 9351-L9), or contact the Technical Support Department Product Application group for assistance.

**NOTE** - For new or replacement line set installation, refer to Service and Application Note - Corp. 9112-L4 (C-91-4).

### ⚠ 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.

### ⚠ WARNING



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

## ⚠ WARNING

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

## ⚠ WARNING



Fire, Explosion and Personal Safety hazard. Failure to follow this warning could result in damage, personal injury or death.

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

## ⚠ WARNING

Polyvinyl ether (PVE) 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.

## ⚠ IMPORTANT

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

The SL28XCV is a variable-capacity cooling system utilizing variable speed compressor technology. With the variable speed compressor and variable pumping capacity, additional consideration must be given to refrigerant piping sizing and application. The guidelines below are to be used exclusively for the SL28XCV systems.

### COOLING SYSTEM (HFC410A)

- Total equivalent length equals 180 feet (piping and all fittings included).

**NOTE** – Length is general guide. Lengths may be more or less, depending on remaining system design factors.

- Maximum linear (actual) length = 150 feet.
- Maximum linear liquid lift = 60 feet.

**NOTE** – Maximum lifts are dependent on total length, number of elbows, etc. that contribute to total pressure drop.

- Maximum length vapor riser = 60 feet.
- **Up to 50 Linear Feet:** Use rated line sizes listed in table 1.
- **Between 51 and 150 Linear Feet:** Crankcase heater and nonbleed port TXV factory installed. No additional components required. Vertical vapor riser must be sized to the vapor riser listed in the table 2 on systems with line sets longer than 51 feet. Use tables 2 and 3 to determine the correct liquid and vapor line sizes.
- **Over 150 Linear Feet:** not recommended.
- Additional oil is not required for systems with line lengths up to 150 feet.

### SUCTION TRAPS

For systems with the outdoor unit 5 - 60 feet above the indoor unit, one trap must be installed at the bottom of the suction riser.

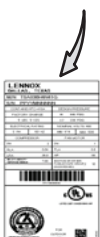
## ADDING REFRIGERANT FOR LONG LINE SETS

### WEIGH IN

#### CHARGING METHOD FOR LONG LINE SETS

64°F (17.7°C) and Below

Amount specified on nameplate + Adjust amount, for variation in line set length and liquid line diameter using table below. = Total charge



Liquid Line Set Diameter	HFC-410A (ounces per foot)
5/16"	0.40
3/8"	0.60
1/2"	1.00

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

**NOTE** — The above nameplate is for illustration purposes only. Go to actual nameplate on outdoor unit for charge information.

#### Charging Formula for Liquid Line Charge Adjustments

$[(\text{Line set oz./ft.} \times \text{total length}) - (\text{factory charge for line set})] = \text{charge adjustment}$

**Example:** Units are factory-charged for 15 feet (4.6 meters) of 3/8" line set. Factory charge for 3/8" is 0.60 oz/ft x 15 = 9.0 ounces.

FIGURE 1. Using HFC-410A Weigh In Method



**TABLE 1. Standard Refrigerant Line Set – Up to 50 Linear Feet**

Inches (mm)					
	Valve Size Connections		Recommended Line Sets		
SL28XCV*	Liquid Line	Suction Line	L15 Line Set Model	Line Set Length	Catalog Number
<b>-024 -036 -048</b>	3/8" (10 mm)	7/8" (22 mm)	L15-65-30	30 feet (9.1 m)	89J60
			L15-65-40	40 feet (12.2 m)	89J61
			L15-65-50	50 feet (15.2 m)	89J62
<b>-060</b>	3/8" (10 mm)	1-1/8" (29 mm) **	Field-fabricated		

\* Applicable to all minor revision numbers unless otherwise specified.

\*\* Some applications may require a field-provided 1-1/8" to 7/8" adapter.

**TABLE 2. SL28XCV Line Set Guidelines – Between 51 - 150 Feet Linear Length**

Model	Maximum Total Equivalent Length (ft)	Maximum Linear (actual) Length (ft)	Maximum Vapor Riser (ft)	Maximum Linear Liquid Lift (ft)	Preferred Vapor Line Sizes for Horizontal Runs	Required Vapor Riser Size
-024	180	150	60	60	7/8"	5/8"
-036	180	150	60	60	7/8"	3/4"
-048	180	150	60	60	7/8"	7/8"
-060	180	150	60	60	7/8"	7/8"

**TABLE 3. Liquid Line Diameter Selection Table**

Unit	Line Size	Total Linear Length (feet)						Max. Elevation (ft)
		25	50	75	100	125	150	
-024	5/16"	25	50	55	48	40	33	
	3/8"	25	50	60	60	60	60	
-036	3/8"	25	50	60	56	51	45	
	1/2"	25	50	60	60	60	60	
-048	3/8"	25	50	50	41	31	22	
	1/2"	25	50	60	60	60	60	
-060	3/8"	25	50	36	22	8	NR	
	1/2"	25	50	60	60	60	59	

**NOTE** - Shaded rows indicate rated liquid line size

- Find your unit on the left side of the table.
- Start with the rated liquid line size (shaded row) on the outdoor unit
- Select the actual Total Linear Length of your system shown at the top of the table.
- The elevation listed in the table is the maximum allowed for the liquid line listed.
- Select or consider the larger liquid line size shown in the table if the elevation does not meet your requirements.

**NOTE** - For new or replacement line set installation, refer to Service and Application Note - Corp. 9112-L4 (C-91-4).

## ⚠ 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.

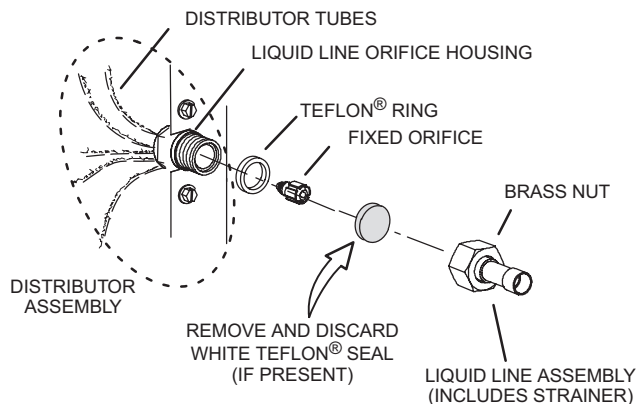
## ⚠ WARNING



Danger of fire. Bleeding the refrigerant charge from only the high side may result in pressurization of the low side shell and suction tubing. Application of a brazing torch to a pressurized system may result in ignition of the refrigerant and oil mixture. Check the high and low pressures before applying heat.

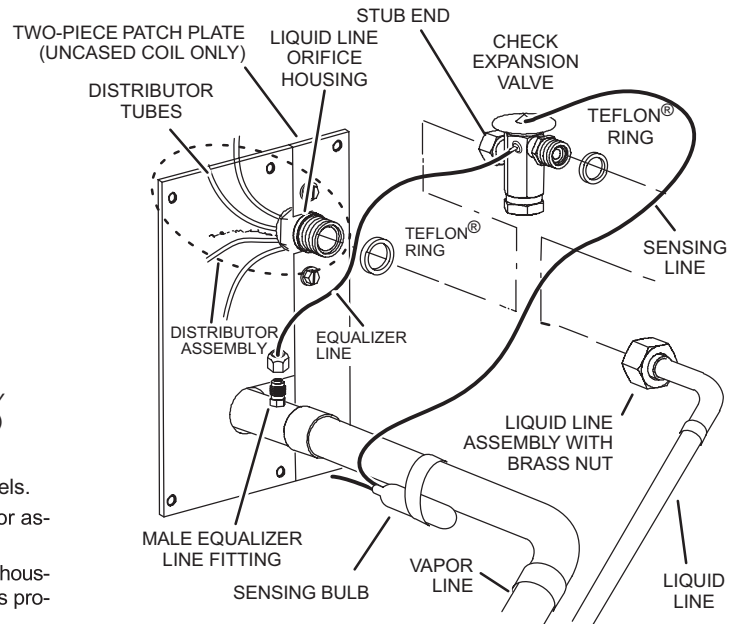
## REFRIGERANT PIPING – Removing Existing Indoor Metering Device

### 1A TYPICAL EXISTING FIXED ORIFICE REMOVAL PROCEDURE (UNCASED COIL SHOWN)



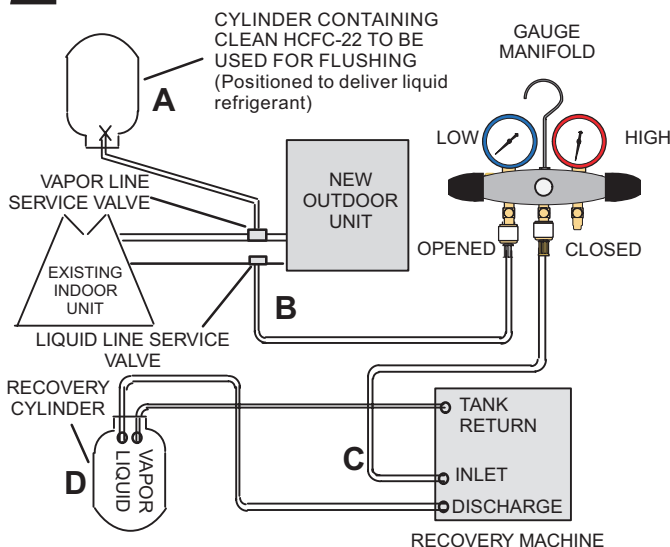
- A - On fully cased coils, remove the coil access and plumbing panels.
- B - Remove any shipping clamps from the liquid line and distributor assembly.
- C - Using two wrenches, disconnect liquid line from liquid line orifice housing. Take care not to twist or damage distributor tubes during this process.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

### OR 1B TYPICAL EXISTING EXPANSION VALVE REMOVAL PROCEDURE (UNCASED COIL SHOWN)



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

### 2 CONNECT GAUGES AND EQUIPMENT FOR FLUSHING PROCEDURE



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

### 3 FLUSHING LINE SET

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

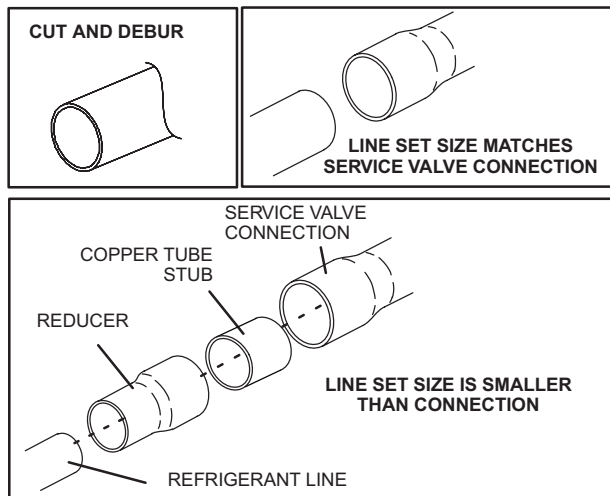
- A - Set the recovery machine for liquid recovery and start the recovery machine. Open the gauge set valves to allow the recovery machine to pull a vacuum on the existing system line set and indoor unit coil.
- B - Position the cylinder of clean HCFC-22 for delivery of liquid refrigerant and open its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

FIGURE 2

## REFRIGERANT PIPING – Brazing Procedures

### 1 PIPING PANEL REMOVAL / PREPARING LINE SET

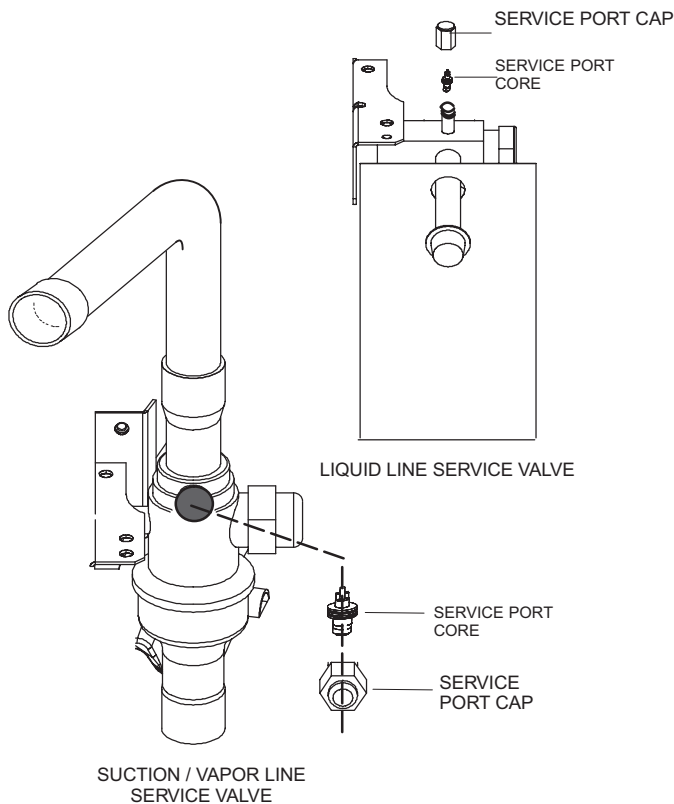
Remove piping panel to access service valves. Cut ends of the refrigerant lines square (free from nicks or dents) and debur the ends. The pipe must remain round. Do not crimp end of the line.



DO NOT CRIMP SERVICE VALVE CONNECTOR WHEN PIPE IS SMALLER THAN CONNECTION

### 2 CAP AND CORE REMOVAL

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



### 3 ATTACH THE MANIFOLD GAUGE SET FOR BRAZING

#### LIQUID AND SUCTION / VAPOR LINE SERVICE VALVES

- Connect gauge set low pressure side to liquid line service valve (service port).
- Connect gauge set center port to bottle of nitrogen with regulator.
- With valve core removed from the suction / vapor line service port, nitrogen flow will have an exit point.

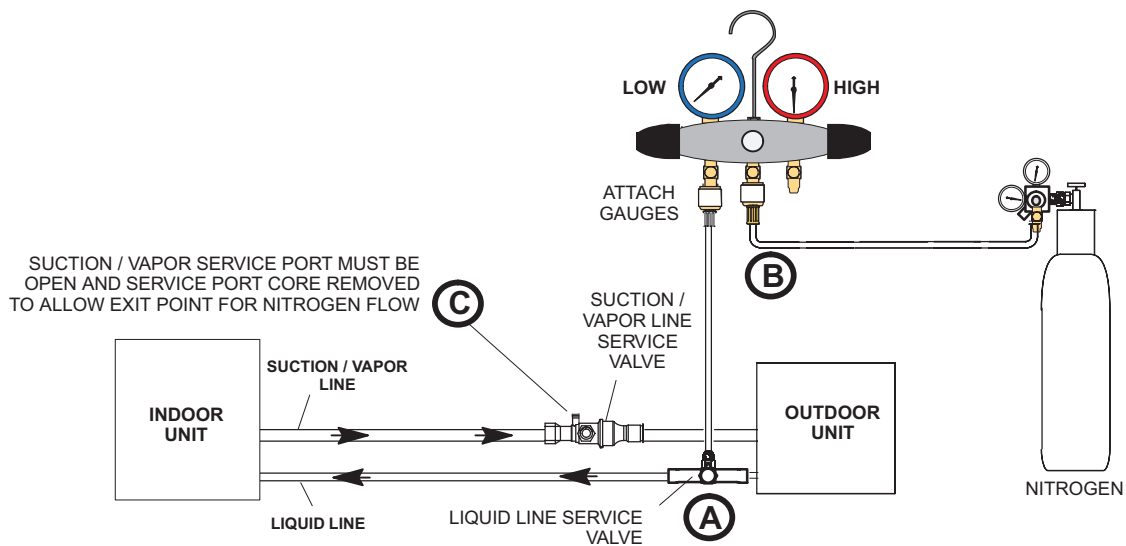


FIGURE 3



## 4 WRAP SERVICE VALVES

To help protect service valve seals during brazing, wrap water-saturated cloths around service valve bodies and copper tube stubs. Use additional water-saturated cloths under the valve body to protect the base paint.

## 5 FLOW NITROGEN

Flow regulated nitrogen (at 1 to 2 psig) through the refrigeration gauge set into the valve stem port connection on the liquid service valve and out of the suction / vapor valve stem port. See steps 3A, 3B and 3C on previous page and below for manifold gauge setup.



### WARNING

**FIRE, PERSONAL INJURY, OR PROPERTY DAMAGE** may result if you do not wrap a water-saturated cloth around both liquid and suction line service valve bodies and copper tube stub while brazing the line set! The braze, when complete, must be quenched with water to absorb any residual heat.

Do not open service valves until refrigerant lines and indoor coil have been leak-tested and evacuated. Refer to Installation and Service Procedures manual found on DAVENET.

## 6 BRAZE LINE SET

Cloths must remain water-saturated throughout the brazing and cool-down process.

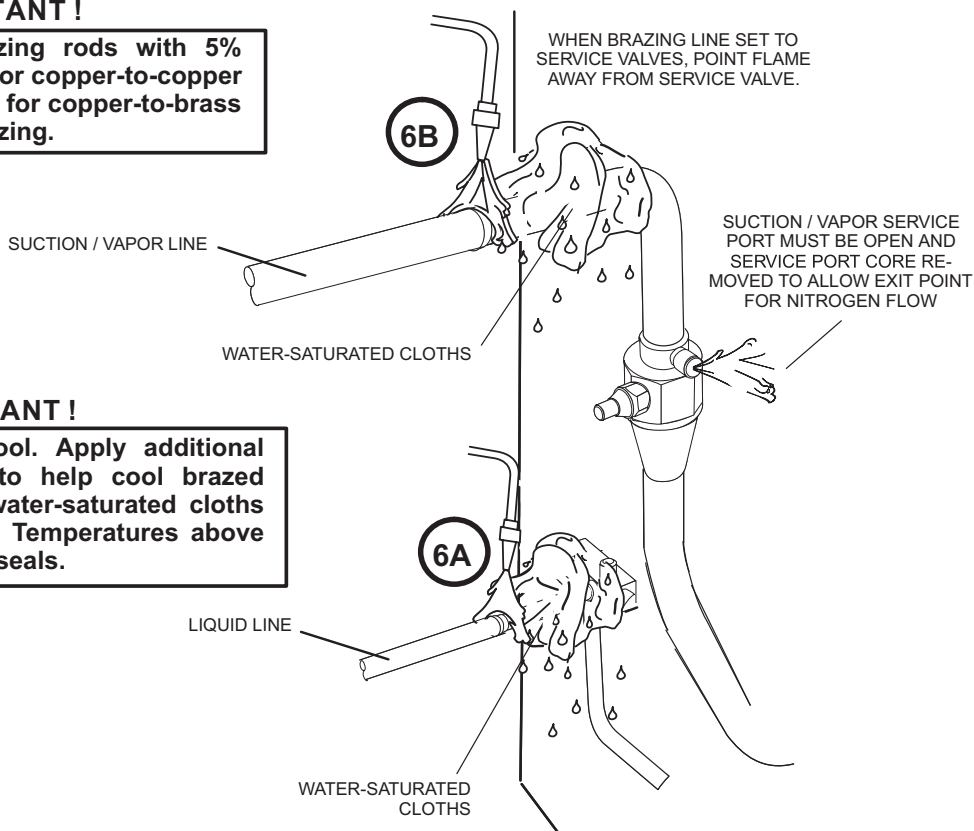
1. Braze liquid line to liquid line service valve.
2. Braze suction / vapor line to suction / vapor service valve.

### IMPORTANT !

Use silver alloy brazing rods with 5% minimum silver alloy for copper-to-copper brazing and 45% alloy for copper-to-brass or copper-to-steel brazing.

### IMPORTANT !

Allow braze joint to cool. Apply additional water-saturated cloths to help cool brazed joints. Do not remove water-saturated cloths until piping has cooled. Temperatures above 250°F will damage valve seals.



## 7 PREPARATION FOR NEXT STEP

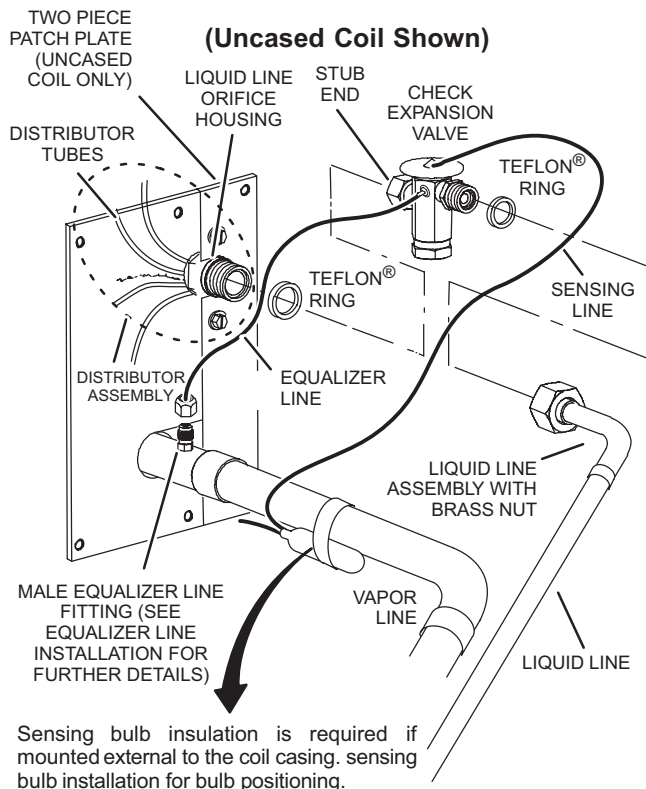
After all connections have been brazed, disconnect manifold gauge set from service ports. Apply additional water-saturated cloths to both services valves to cool piping. Once piping is cool, remove all water-saturated cloths.

FIGURE 4

## REFRIGERANT PIPING – Install Indoor Expansion Valve

This outdoor unit is designed for use in systems that include an expansion valve metering device (purchased separately) at the indoor coil. See the SL28XCV Product Specifications bulletin (EHB) for approved expansion valve kit match-ups and application information. The expansion valve unit can be installed internal or external to the indoor coil. In applications where an uncased coil is being installed in a field-provided plenum, install the expansion valve in a manner that will provide access for future field service of the expansion valve. Refer to below illustration for reference during installation of expansion valve unit.

### INDOOR EXPANSION VALVE INSTALLATION



- 3 - Install one of the provided Teflon® rings around the stubbed end of the check expansion valve and lightly lubricate the connector threads and expose surface of the Teflon® ring with refrigerant oil.
- 4 - Attach the stubbed end of the check expansion valve to the liquid line orifice housing. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above, or tighten to 20 ft-lb.
- 5 - Place the remaining Teflon® washer around the other end of the check expansion valve. Lightly lubricate connector threads and expose surface of the Teflon® ring with refrigerant oil.
- 6 - Attach the liquid line assembly to the check expansion valve. Finger tighten and use an appropriately sized wrench to turn an additional 1/2 turn clockwise as illustrated in the figure above or tighten to 20 ft-lb.



### SENSING BULB INSTALLATION

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

**NOTE** - Though it is preferred to have the sensing bulb installed on a horizontal run of the vapor line, installation on a vertical run of piping is acceptable if necessary.

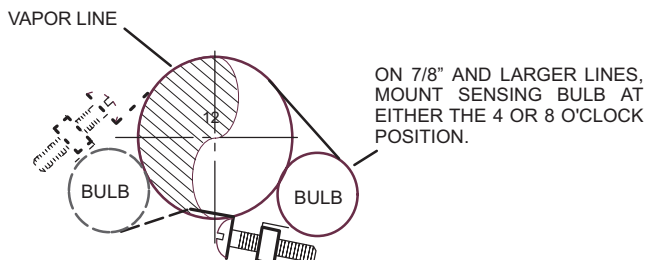
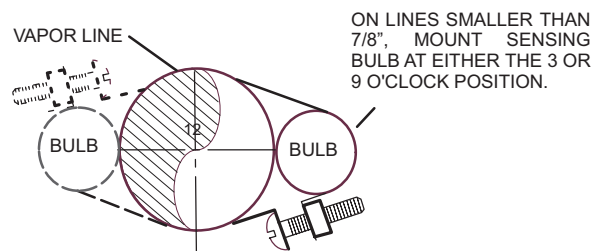
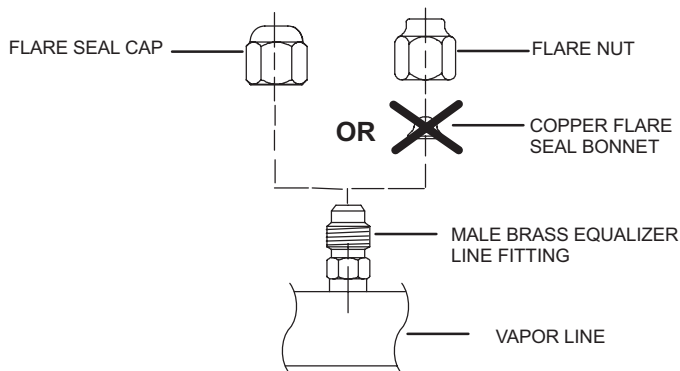
**NOTE** - Confirm proper thermal contact between vapor line and check/expansion bulb before insulating the sensing bulb once installed.

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



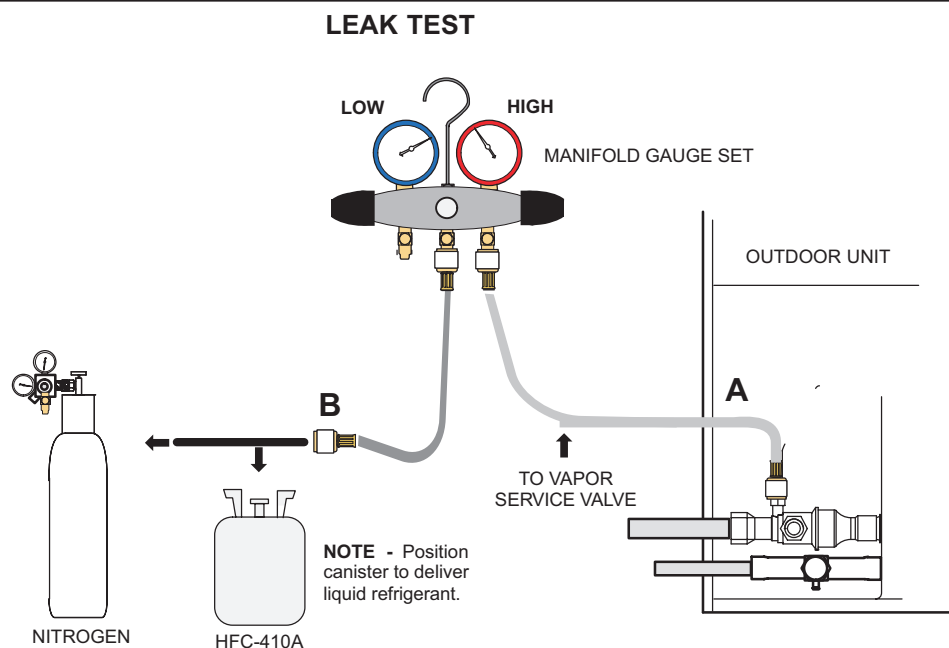
### EQUALIZER LINE INSTALLATION

- 1 - Remove and discard either the flare seal cap or flare nut with copper flare seal bonnet from the equalizer line port on the vapor line as illustrated in the figure below.
- 2 - Remove the field-provided fitting that temporarily reconnected the liquid line to the indoor unit's distributor assembly.



**NOTE** - NEVER MOUNT THE SENSING BULB ON BOTTOM OF LINE.

FIGURE 5



## 1 CONNECT GAUGE SET

**A** - Connect the high pressure hose of an HFC-410A manifold gauge set to the vapor valve service port.

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

**B** - With both manifold valves closed, connect the cylinder of HFC-410A refrigerant to the center port of the manifold gauge set.

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

## 2 TEST FOR LEAKS

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

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

**FIGURE 6**

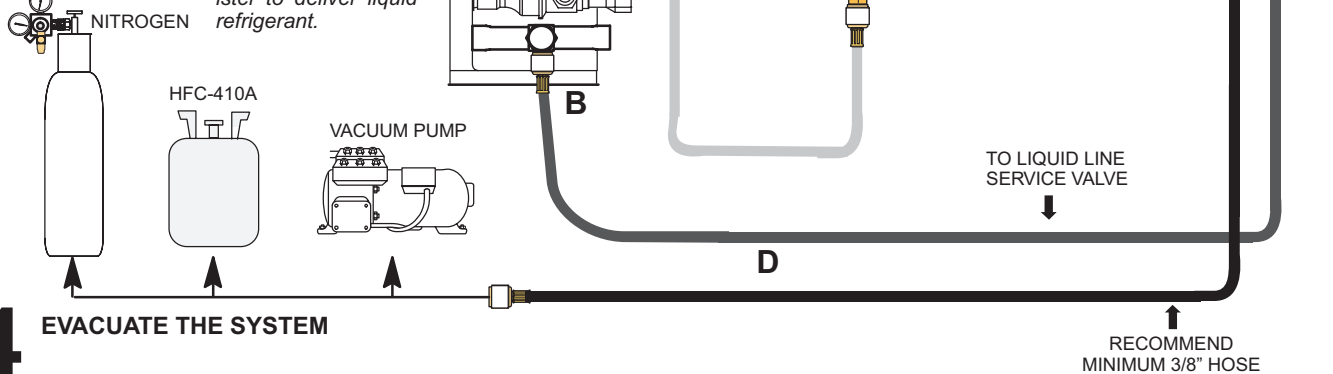
### 3

#### CONNECT GAUGE SET

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

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

**NOTE** - Position canister to deliver liquid refrigerant.



### 4

#### EVACUATE THE SYSTEM

- A - Open both manifold valves and start the vacuum pump.

- B - Evacuate the line set and indoor unit to an **absolute pressure** of 23,000 microns (29.01 inches of mercury).

**NOTE** - During the early stages of evacuation, it is desirable to close the manifold gauge valve at least once. A rapid rise in pressure indicates a relatively large leak. If this occurs, **repeat the leak testing procedure**.

**NOTE** - The term **absolute pressure** means the total actual pressure above absolute zero within a given volume or system. Absolute pressure in a vacuum is equal to atmospheric pressure minus vacuum pressure.

- C - When the absolute pressure reaches 23,000 microns (29.01 inches of mercury), perform the following:

- Close manifold gauge valves.
- Close valve on vacuum pump.
- Turn off vacuum pump.
- Disconnect manifold gauge center port hose from vacuum pump.
- Attach manifold center port hose to a nitrogen cylinder with pressure regulator set to 150 psig (1034 kPa) and purge the hose.
- Open manifold gauge valves to break the vacuum in the line set and indoor unit.
- Close manifold gauge valves.

- D - Shut off the nitrogen cylinder and remove the manifold gauge hose from the cylinder. Open the manifold gauge valves to release the nitrogen from the line set and indoor unit.

- E - 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.

- F - When the absolute pressure requirement above has been met, disconnect the manifold hose from the vacuum pump and connect it to a cylinder of HFC-410A positioned to deliver liquid refrigerant. Open the manifold gauge valve 1 to 2 psig in order to release the vacuum in the line set and indoor unit.

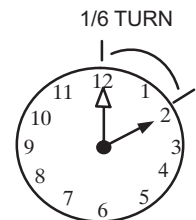
- G - Perform the following:

- Close manifold gauge valves.
- Shut off HFC-410A cylinder.
- Reinstall service valve cores by removing manifold hose from service valve. Quickly install cores with core tool while maintaining a positive system pressure.
- Replace stem caps and finger tighten them, then tighten an additional one-sixth (1/6) of a turn as illustrated.

#### WARNING !

**Possible equipment damage.**

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



**FIGURE 7**

## ELECTRICAL – Circuit Sizing and Wire Routing

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

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

### 24VAC TRANSFORMER

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

## ⚠ WARNING



Electrical Hazard

High Voltage

Wait 5 Minutes

Electrical components may hold charge.

Do not remove this panel or service this area for 5 minutes after the power has been removed.

## ⚠ WARNING

Fire Hazard. Use of aluminum wire with this product may result in a fire, causing property damage, severe injury or death. Use copper wire only with this product.

## ⚠ WARNING

Failure to use properly sized wiring and circuit breaker may result in property damage. Size wiring and circuit breaker(s) per Product Specifications bulletin (EHB) and unit rating plate.

## ⚠ WARNING

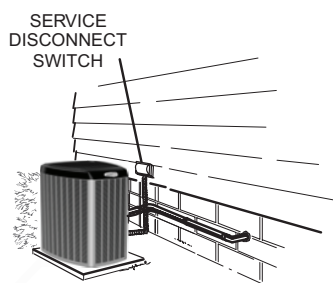
ELECTROSTATIC DISCHARGE (ESD)

Precautions and Procedures

Electrostatic discharge can affect electronic components. Take care during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Touch hand and all tools on an unpainted unit surface before performing any service procedure to neutralize electrostatic charge.

## 1 SIZE CIRCUIT AND INSTALL DISCONNECT SWITCH

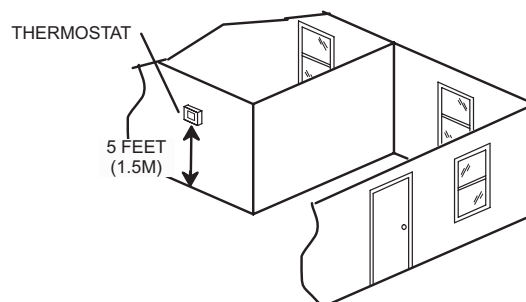
Refer to the unit nameplate for minimum circuit ampacity, and maximum fuse or circuit breaker size (HACR per NEC). Install power wiring and properly sized disconnect switch.



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

## 2 INSTALL THERMOSTAT

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



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

FIGURE 8



## ELECTRICAL – Outdoor Control (A175) Jumpers and Terminals

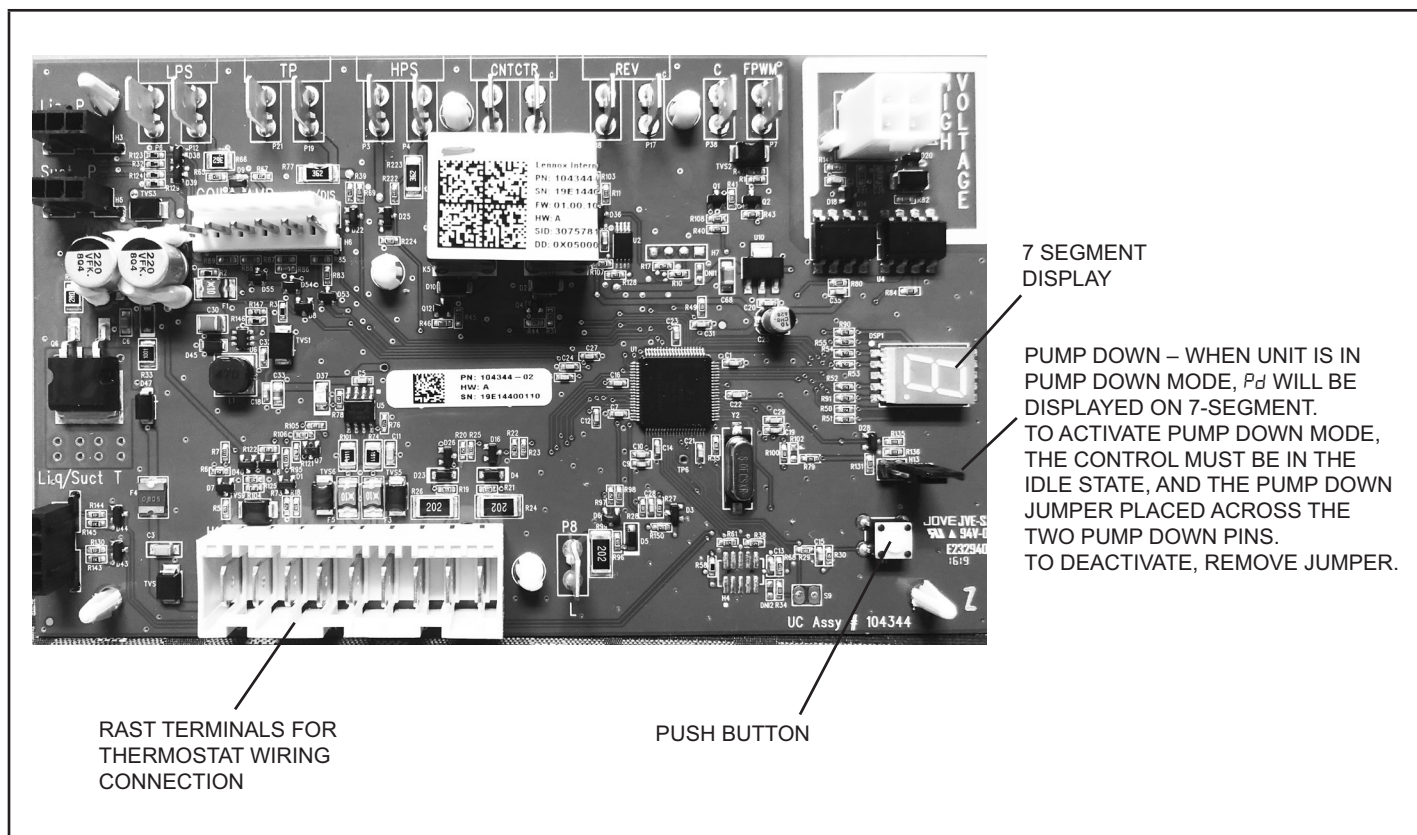
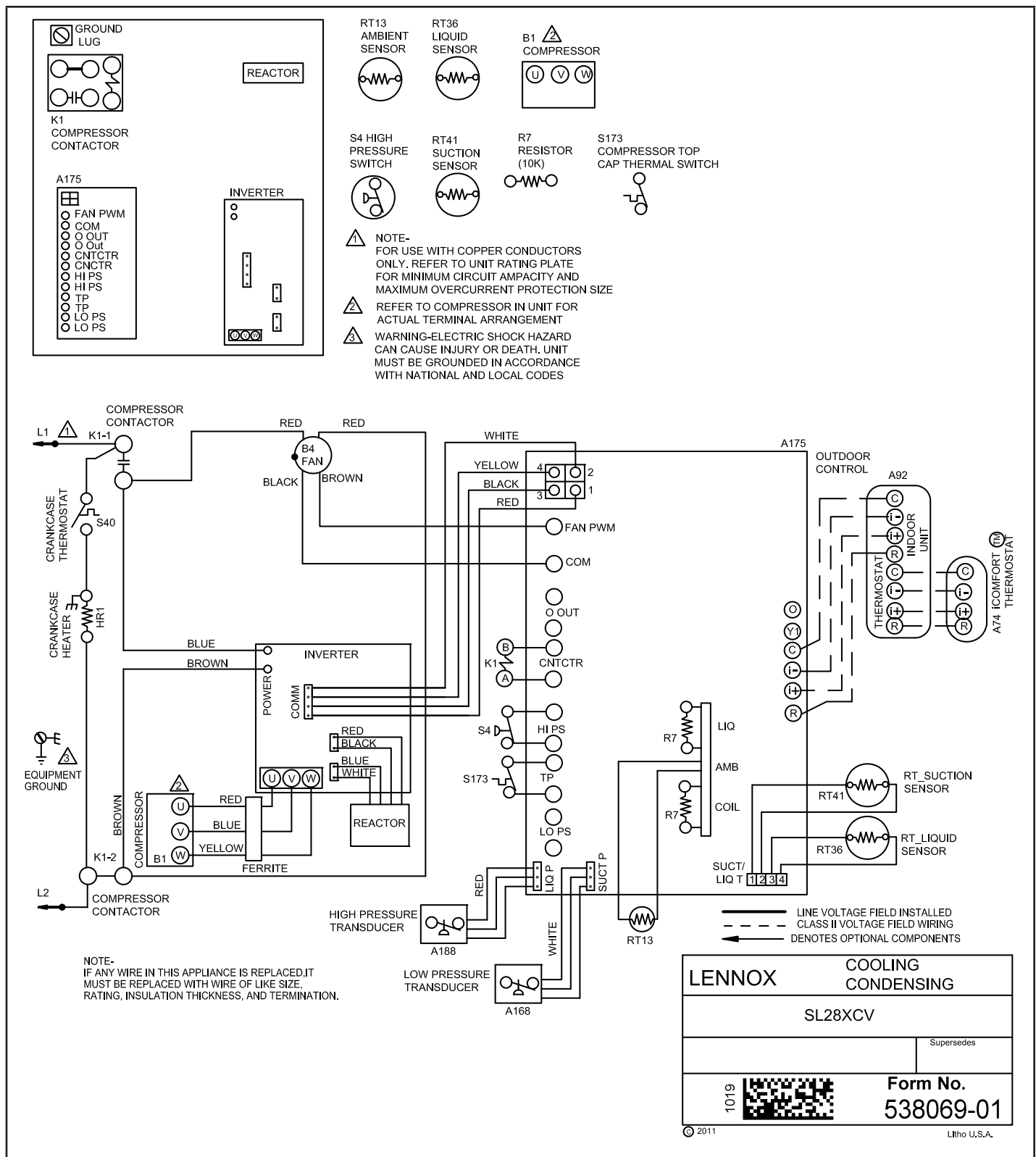
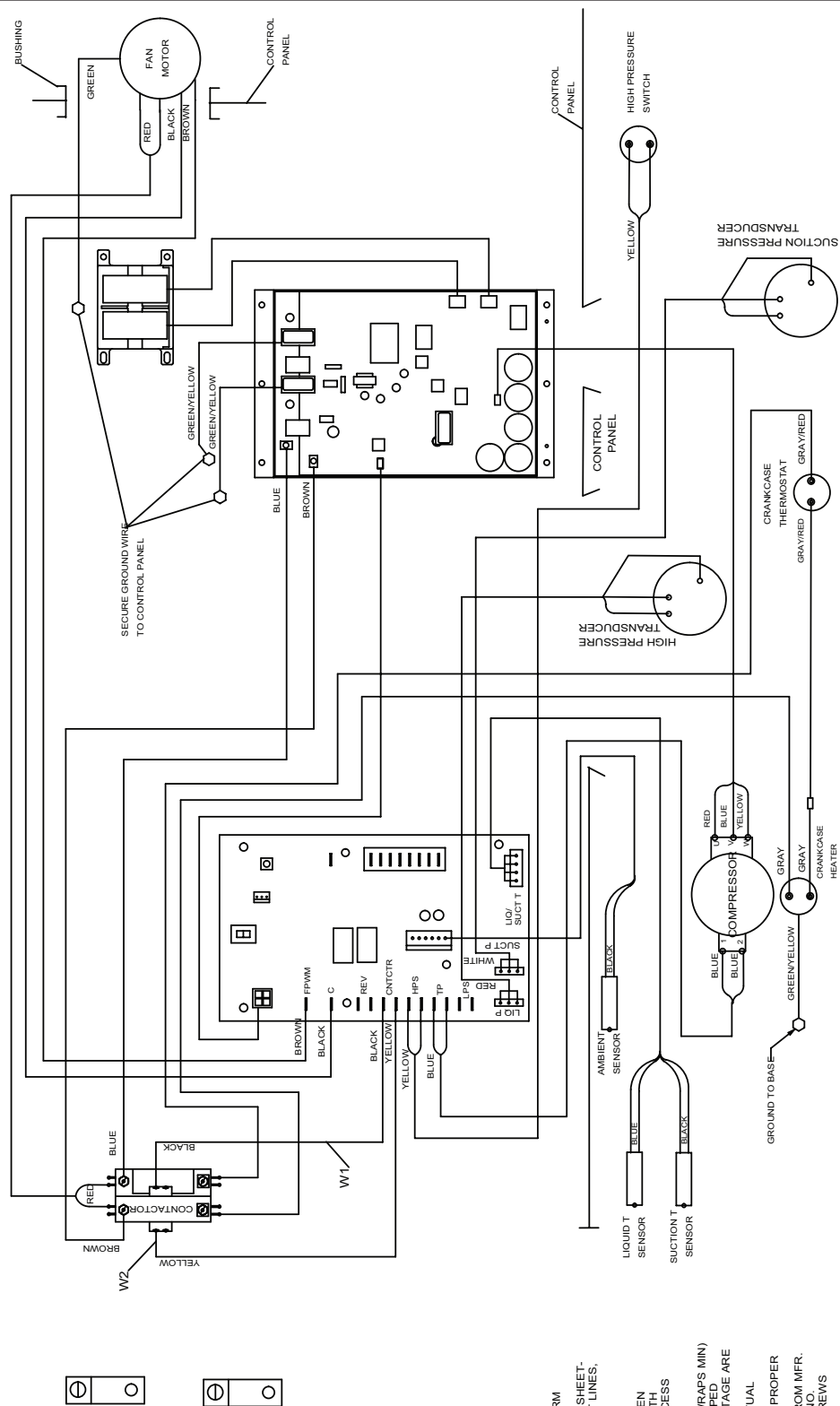


FIGURE 9



**FIGURE 10. Typical Field Wiring**



- GENERAL WIRING NOTES**
1. WIRE TERMINATION MUST CONFORM TO THE FOLLOWING:
  2. ROUTE WIRE AWAY FROM SHARP (SHEET-METAL) EDGES, HOT REFRIGERANT LINES, AND ALL MOVING PARTS.
  3. USE WIRE TIES TO BUNDLE, ROUTE, AND SECURE WIRING.
  4. ROUTE WIRING IN SPACES BETWEEN COMPARTMENTS AND PROVIDE ACCESS FOR SERVICE OR REPLACEMENT.
  5. TAPE WIRE NUTS AS FOLLOWS:  
-HAND TIGHTENED ARE TAPED (2 WRAPS MIN)  
-MACHINE TIGHTENED ARE NOT TAPED  
-TERMINALS FOR 120V VOLTAGE ARE ALWAYS TAPED (2 WRAPS MIN)  
6. REFER TO COMPRESSOR FOR ACTUAL TERMINAL ARRANGEMENT.
  7. WIRES WILL BE SHOWN GOING TO PROPER LOCATION IN CONTROL BOX.
  8. TERMINAL COLOR CHANGES FROM MFR. MFR. PLEASE NOTE TERMINAL NO.
  9. FILL ALL UNUSED HOLES WITH SCREWS
  10. BUNDLE EXCESS WIRE.

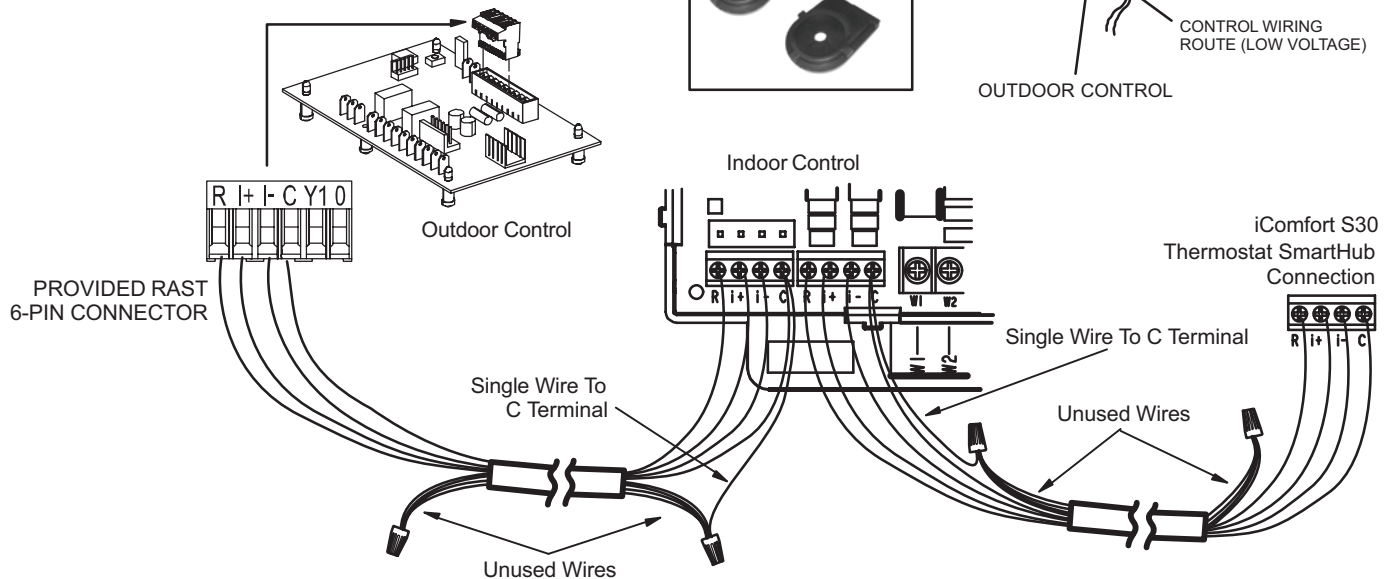
**FIGURE 11. Typical Factory Wiring**

## ROUTE CONTROL WIRES

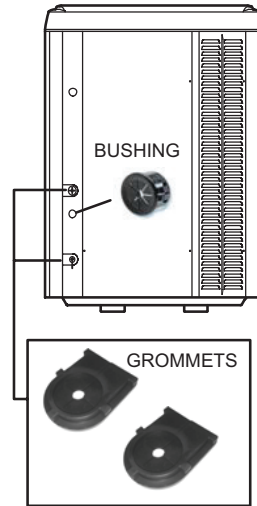
Maximum length of wiring (18 gauge) for all connections on the RSBus is 1500 feet (457 meters). Wires should be color-coded, with a temperature rating of 95°F (35°C) minimum, and solid-core (Class II Rated Wiring). All low voltage wiring must enter unit through provided field-installed busing installed in electrical inlet.

The iComfort S30 thermostat requires four thermostat wires between the thermostat and the furnace / air handler iComfort™ control and four wires between the outdoor unit and the furnace/air handler iComfort™ control. When a thermostat cable with more than four wires is used, the extra wires must be properly connected to avoid electrical noise (see below).

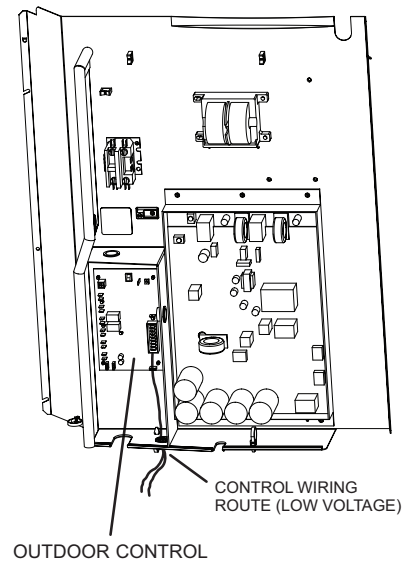
Use a wire nut to bundle the four unused wires at each end of the cable. Each bundle should also include an additional wire that should be connected on each end to the C terminal as shown in the figure below.



ELECTRICAL (CONTROL WIRING)  
AND LINE SET INLETS USE  
BUSHING AND GROMMETS  
PROVIDED IN BAG

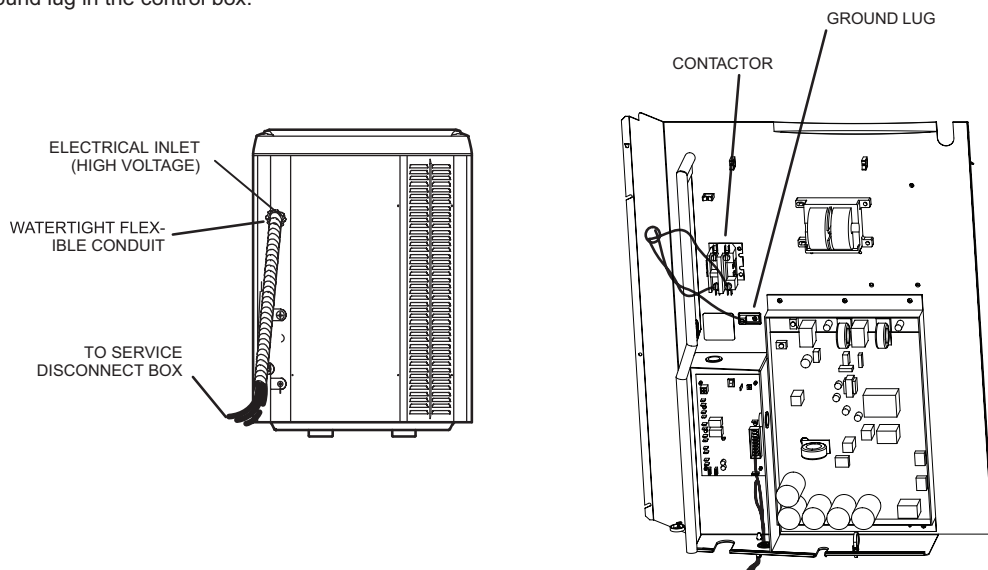


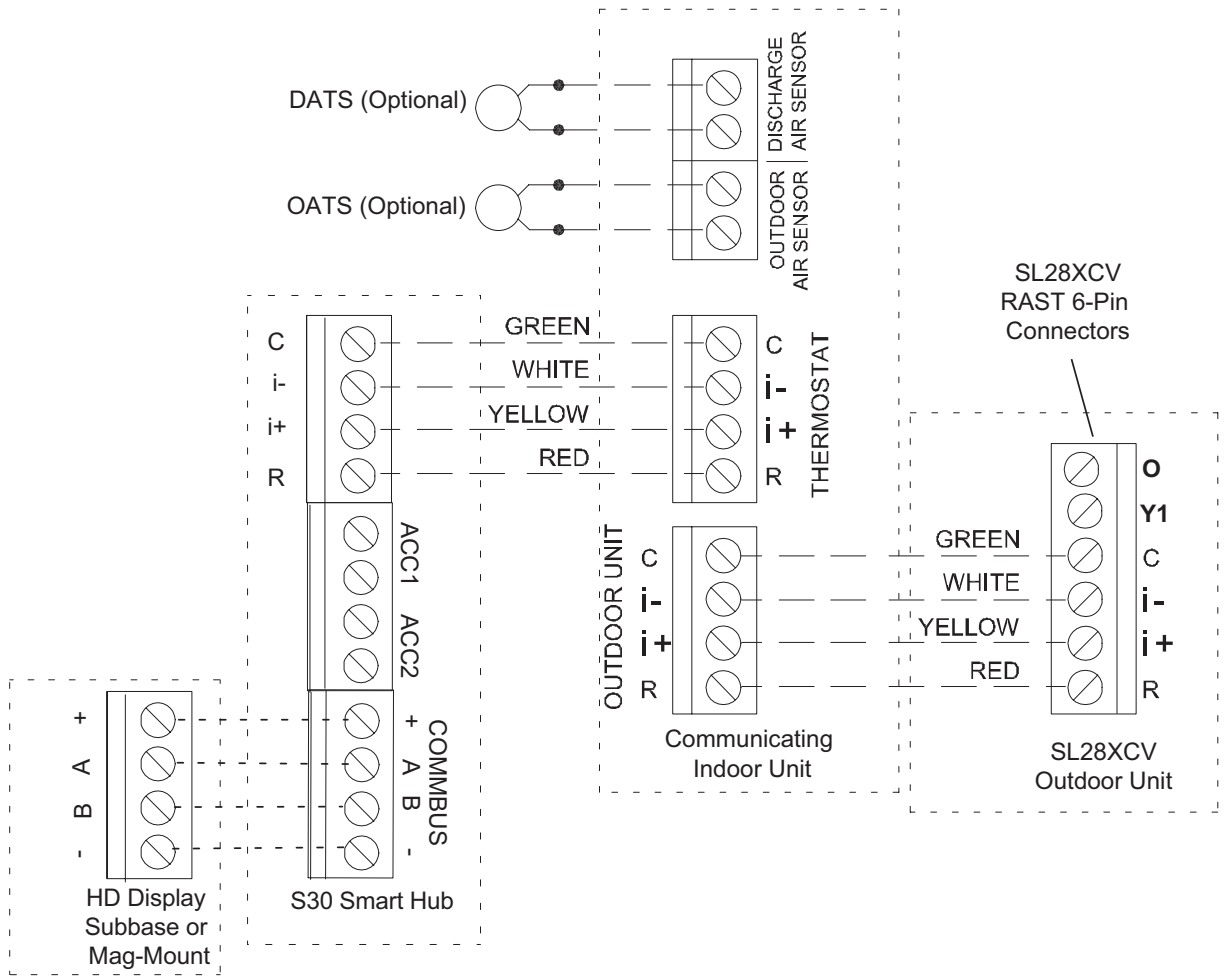
TYPICAL CONTROL BOX



## ROUTE HIGH VOLTAGE AND GROUND WIRES

Any excess high voltage field wiring should be trimmed and secured away from any low voltage field wiring. To facilitate a conduit, a cutout is located side panel of the control box. Connect conduit to the control box using a proper conduit fitting. Connect high voltage field wires to the line side of contactor located on the bottom of the contactor. Connect the ground wire to the ground lug in the control box.





**FIGURE 12. SL28XCV with iComfort S30 Communicating Thermostat – Field Wiring Diagram**



## UNIT START-UP

### **⚠ IMPORTANT**

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

- 1 - Rotate fan to check for binding.
- 2 - Inspect all factory- and field-installed wiring for loose connections.
- 3 - After evacuation is complete, open the liquid line and vapor line service valve stems to release the refrigerant charge (contained in outdoor unit) into the system.
- 4 - Replace the stem caps and tighten to the value listed in table 2.
- 5 - Check voltage supply at the disconnect switch. The voltage must be within the range listed on the unit's nameplate. If not, do not start the equipment until you have consulted with the power company and the voltage condition has been corrected.
- 6 - Connect manifold gauge set for testing and charging or use the Lennox Dealer Setup App to monitor the pressures and temperatures of the refrigeration system.
- 7 - Turn on power to the indoor unit and close the outdoor unit disconnect switch to start the unit. Start-up and testing should be performed with the unit operating at the maximum cooling capacity (100% capacity). The unit can be operated at maximum capacity by entering the test mode at the thermostat or using the Lennox Dealer Setup App. The S30 Test Mode can be selected by going to Menu> Advanced Settings> View Dealer Control Center> Test and then select Cooling - Maximum Rate Test.
- 8 - Recheck voltage while the unit is running. Power must be within range shown on the unit nameplate.
- 9 - Check system for sufficient refrigerant using the procedures outlined under *Checking Refrigerant Charge*.

## OPERATING MANIFOLD GAUGE SET AND SERVICE VALVES

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

Each valve is equipped with a service port which has a factory-installed valve stem. Figures 14 and 15 provide information on how to access and operate both angle- and ball-type service valves.

### Torque Requirements

When servicing or repairing heating, ventilating and air conditioning components, ensure the fasteners are appropriately tightened. Table 2 lists torque values for fasteners.

TABLE 1 – TORQUE REQUIREMENTS

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

### **⚠ IMPORTANT**

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

### Using Manifold Gauge Set

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

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

### OPERATING BALL-TYPE SERVICE VALVE

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

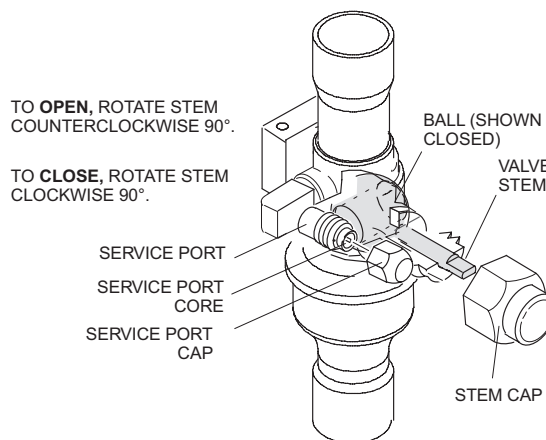
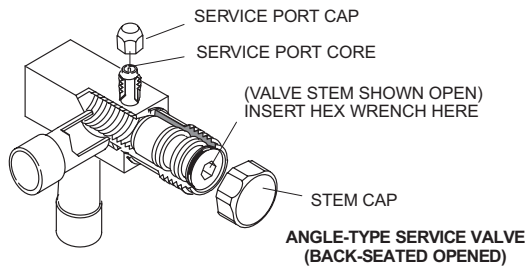


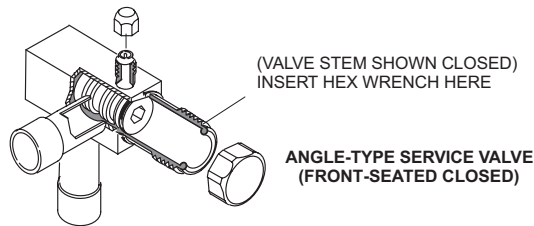
FIGURE 13

## OPERATING ANGLE-TYPE SERVICE VALVE

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



When service valve is **OPEN**, the service port is open to line set, indoor and outdoor unit.



When service valve is **CLOSED**, the service port is open to the line set and indoor unit.

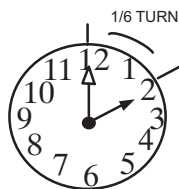
**NOTE** - A label with specific torque requirements may be affixed to the stem cap. If the label is present, use the specified torque.

FIGURE 14

## ACCESS SERVICE PORT

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

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



## Reinstall Stem Cap

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

- With torque wrench, finger tighten and then torque cap per table 2.
- Without torque wrench, finger tighten and use an appropriately sized wrench to turn an additional 1/12 turn clockwise.

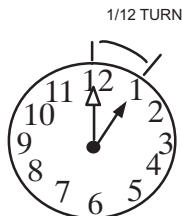


FIGURE 15

## Charging

The SL28XCV unit is factory-charged with enough HFC-410A refrigerant to accommodate a 15-foot length of refrigerant piping. For refrigerant piping greater than 15 feet, calculate the additional charge using the table below. Then add the additional refrigerant charge to the system.

**Charge should be checked and adjusted using the tables provided on the charging procedure sticker on the unit access panel.** Detailed information is given in the SL28XCV Installation and Service Procedures manual, which is available on LennoxPros.com.

## ⚠ IMPORTANT

**System charging should be performed with the unit operating at the maximum cooling capacity (100% capacity). The unit can be operated at maximum capacity by entering the test mode at the S30 thermostat or using the Lennox Dealer Setup App. The S30 Test Mode can be selected by going to Menu> Advanced Settings> View Dealer Control Center> Test and then select Cooling - Maximum Rate Test. Seven-segment display on outdoor control will show outdoor unit running capacity.**

### Refrigerant Charge per Line Set Length

LIQUID LINE DIA.	OUNCES PER 5 FEET (G PER 1.5 M) ADJUST FROM 15 FEET (4.6 M) LINE SET*
3/8" (9.5 MM)	3 OUNCES PER 5' (85 G PER 1.5 M)

\*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.

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

## Alarms

Alarm information is provided on the outdoor unit access panel and in the iComfort S30 Thermostat Installation and Setup Guide. Detail alarm information is also available in the SL28XCV Installation and Service Procedures manual, which is available on LennoxPros.com..

## Outdoor Control Seven-Segment Display and Push Button

Information concerning the outdoor control seven-segment display and push button operations are available on the unit access panel and in the SL28XCV Installation and Service Procedures manual.

## System Component Configuration (Outdoor Unit)

All configuration of the outdoor unit is completed using the iComfort S30 thermostat. Please refer to the iComfort S30 Thermostat Installation and Setup Guide for complete details on how to integrate this unit into a communicating system.

## High Pressure Switch (S4)

This unit is equipped with a high pressure switch which is located on the liquid line. The SPST, normally closed pressure switch opens when liquid line pressure rises above the factory setting of  $590 \pm 15$  psig and automatically re-sets at  $418 \pm 15$  psig.

## Homeowners Information

### CAUTION

Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch.

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. The system should be inspected and serviced before each cooling and heating season by a licensed professional HVAC service technician (or equivalent).

### Homeowner Maintenance

The following maintenance may be performed by the homeowner.

- Contact a licensed professional HVAC technician to schedule inspection and maintenance appointments for your equipment before each heating and cooling season.
- Check the indoor unit filter each month and replace the filter, if necessary.
- Have your Lennox dealer show you where your indoor unit 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. Disposable filters should be replaced with a filter of the same type and size.
- Check the indoor unit drain line for obstructions monthly. The indoor 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.)
- Check the area around the outdoor unit monthly and remove any obstructions that may restrict airflow to the outdoor unit. This would include grass clippings, leaves, or papers that may have settled around the unit.
- Trim shrubbery away from the unit and periodically check for debris which collects around the unit.
- During the winter months, keep the snow level below the louvered panels.

**NOTE** - The filter and all access panels must be in place any time the unit is in operation. If you are unsure about the filter required for your system, call your Lennox dealer for assistance.

## 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 the steel and aluminum parts, diminish performance and affect longevity of the unit.**

### Thermostat Operation

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

### Pre-Service Check

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

- Verify room thermostat settings are correct.
- Verify that all electrical disconnect switches are ON.
- Check for any blown fuses or tripped circuit breakers.
- Verify unit access panels are in place.
- Verify air filter is clean.

If service is needed, locate and write down the unit model number and have it handy before calling.

## Professional Maintenance

### NOTICE !

**Failure to follow instructions will cause damage to the unit.**

**This unit is equipped with an aluminum coil. Aluminum coils may be damaged by exposure to solutions with a pH below 5 or above 9. The aluminum coil should be cleaned using potable water at a moderate pressure (less than 50psi). If the coil cannot be cleaned using water alone, Lennox recommends use of a coil cleaner with a pH in the range of 5 to 9. The coil must be rinsed thoroughly after cleaning.**

**In coastal areas, the coil should be cleaned with potable water several times per year to avoid corrosive buildup (salt).**

Your heating and air conditioning system should be inspected and maintained twice each year (before the start of the cooling and heating seasons) by a licensed professional HVAC technician. You can expect the technician to check the following items. **These checks may only be conducted by a licensed professional HVAC technician.**

## **Outdoor Unit**

- 1 - Inspect component wiring for loose, worn or damaged connections. Also check for any rubbing or pinching of wires. Confirm proper voltage plus amperage of outdoor unit.
- 2 - Check the cleanliness of outdoor fan and blade condition (cracks) and clean or replace them, if necessary.
- 3 - Inspect base pan drains for debris and clean as necessary.
- 4 - Inspect the condition of refrigerant piping and confirm that pipes are not rubbing copper-to-copper. Also, check the condition of the insulation on the refrigerant lines. Repair, correct, or replace as necessary.
- 5 - Test capacitor. Replace as necessary.
- 6 - Inspect contactor contacts for pitting or burn marks. Replace as necessary.
- 7 - Check outdoor fan motor for worn bearings/bushings. Replace as necessary.
- 8 - Inspect and clean outdoor coils, if necessary and note any damage to coils or signs of leakage.

## **Indoor Unit (Air Handler or Furnace)**

- 1 - Inspect component wiring for loose, worn or damaged connections. Confirm proper voltage plus amperage of indoor unit.
- 2 - Inspect and clean or replace air filters in indoor unit.
- 3 - Check the cleanliness of indoor blower and clean blower, if necessary.
- 4 - Inspect the indoor coil drain pans and condensate drains for rust, debris, obstructions, leaks or cracks. Pour water in pans to confirm proper drainage from the pan through to the outlet of the pipe. Clean or replace as necessary.

- 5 - Inspect and clean indoor coil, if necessary.
- 6 - Inspect the condition of the refrigerant lines and confirm that pipes are not rubbing copper-to-copper. Also, ensure that refrigerant pipes are not being affected by indoor air contamination. Check condition of insulation on the refrigerant lines. Repair, correct, or replace as necessary.
- 7 - Inspect the duct system for leaks or other problems. Repair or replace as necessary.
- 8 - Check for bearing/bushing wear on indoor blower motor. Replace as necessary.
- 9 - If your heat pump is matched with a gas- or oil-fired furnace for auxiliary heating, indoor unit service will also include inspection and cleaning of the burners, and a full inspection of the gas valve, heat exchanger and flue (exhaust) system.

## **General System Test with System Operating**

- 1 - Your technician should perform a general system test. He will turn on the air conditioner to check operating functions such as the startup and shutoff operation. He will also check for unusual noises or odors, and measure indoor/outdoor temperatures and system pressures as needed. He will check the refrigerant charge per the charging sticker information on the outdoor unit.
- 2 - Verify that system total static pressure and airflow settings are within specific operating parameters.
- 3 - Verify correct temperature drop across indoor coil.

## SL28XCV Start-Up and Performance Checklist

Customer \_\_\_\_\_ Address \_\_\_\_\_

Indoor Unit Model \_\_\_\_\_ Serial \_\_\_\_\_

Outdoor Unit Model \_\_\_\_\_ Serial \_\_\_\_\_

Notes: \_\_\_\_\_

### START UP CHECKS

Refrigerant Type: \_\_\_\_\_

Input 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: \_\_\_\_\_ 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)