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Dallas, Texas, USA



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

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

**⚠ 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, service agency or the gas supplier.

Failure to follow safety warnings and these instructions exactly could result in property damage, dangerous operation, serious injury, or death.

Any additions, changes, or conversions required in order for the appliance to satisfactorily meet the application needs must be made by a licensed professional HVAC installer (or equivalent) using factory-specified parts.

Do not use this system if any part has been under water. A flood-damaged appliance is extremely dangerous. Immediately call a licensed professional HVAC service technician (or equivalent) to inspect the system and to replace all controls and electrical parts that have been wet, or to replace the system, if deemed necessary.

The State of California has determined that this product may contain or produce a chemical or chemicals, in very low doses, which may cause serious illness or death. It may also cause cancer, birth defects, or reproductive harm.

# INSTALLATION INSTRUCTION

## VPA Mini Heat Pump

VRF SYSTEMS  
OUTDOOR UNITS  
507449-01  
10/2014



**⚠ CAUTION**

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

**⚠ 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.

These units must be installed as a part of a matched system as specified in the Product Specifications (EHB) bulletin.

**General**

The VPA mini heat pump outdoor units are matched with up to seven indoor units to create a VRF (variable refrigerant flow) system that uses HFC-410A refrigerant.

Refer to the Product Specification bulletin (EHB) for the proper use of these heat pumps with matching indoor units, branch boxes, branch pipes, line sets and controls.

These instructions are intended as a general guide and do not supersede local or national codes in any way. Authorities having jurisdiction should be consulted before installation.

**Shipping and Packing List**

Check the components for shipping damage. If you find any damage, immediately contact the last carrier.

Package 1 of 1 contains the following:

- 1 - Assembled VPA mini heat pump outdoor unit
- 1 - Outdoor unit installation instruction
- 1 - Condensate drain connector

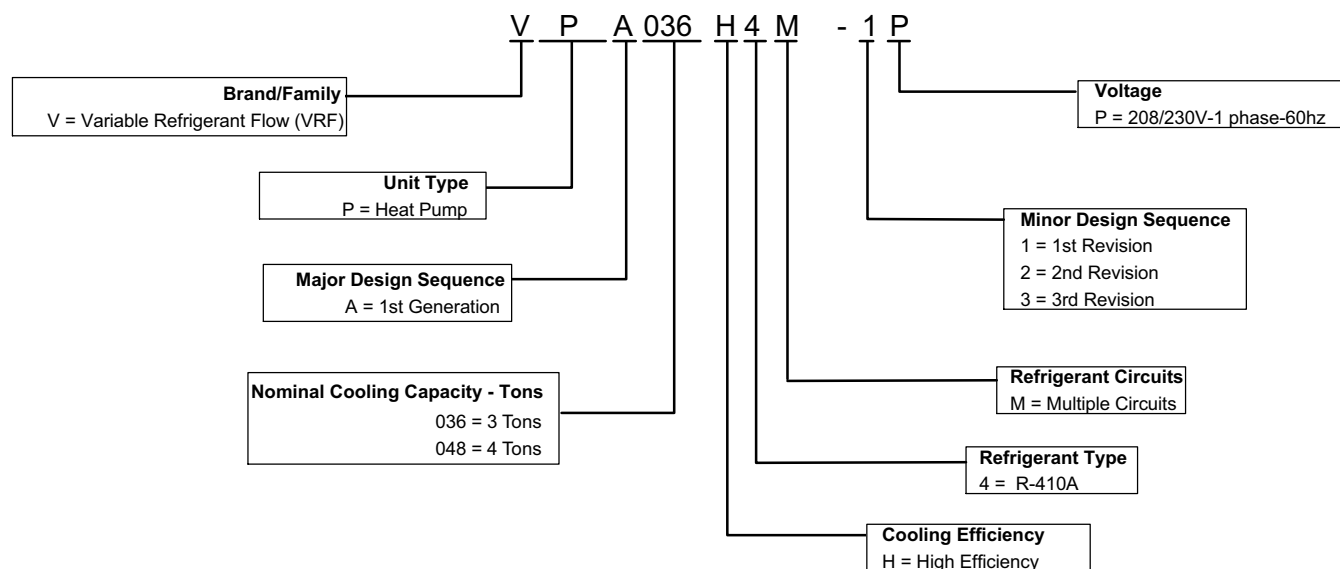
**Safety Requirements**

# ⚠ WARNING

## ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.

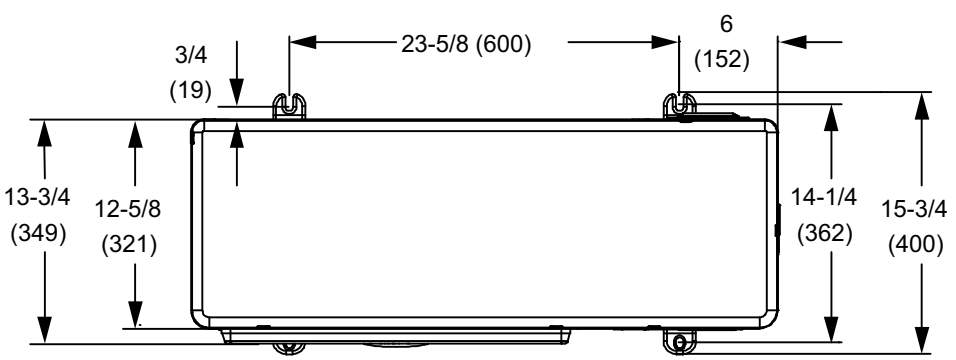
- Do not touch the unit or the controller if your hands are wet.
- Do not use combustible materials (hair spray, paint, etc.) near the unit.
- Do not replace a fuse with a fuse of a different rating. Do not use a jumper wire to replace a fuse.
- Do not insert your hands, tools or any other item into the air intake or air outlet at either the indoor or outdoor unit.
- Do not allow children to operate the system.

**Model Number Identification**

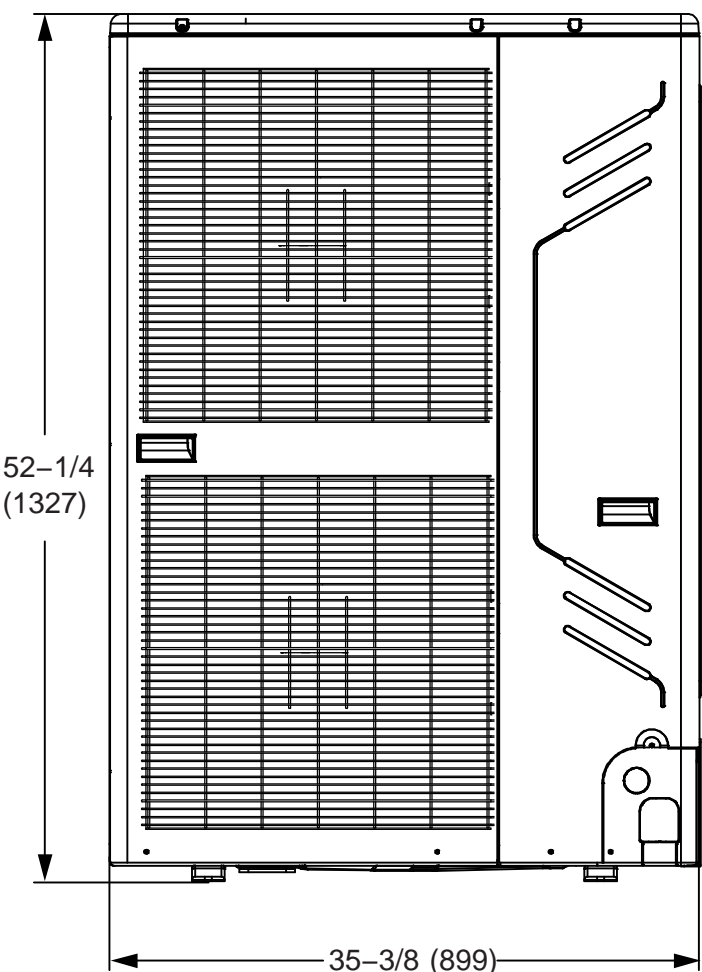


**Unit Dimensions - inches (mm)**

VPA036H4 and VPA048H4



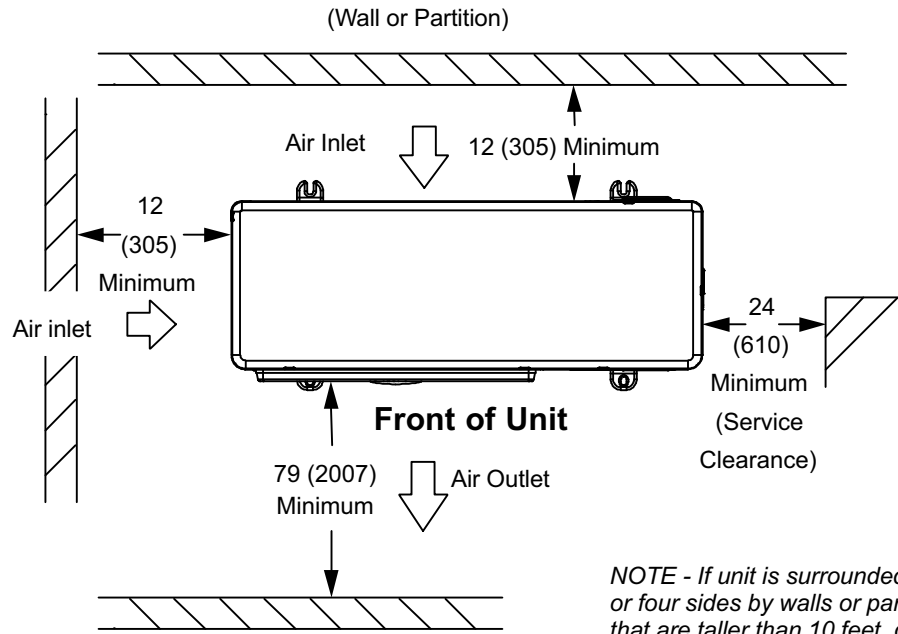
**TOP VIEW**



**FRONT VIEW**

**Installation Clearances - inches (mm)**

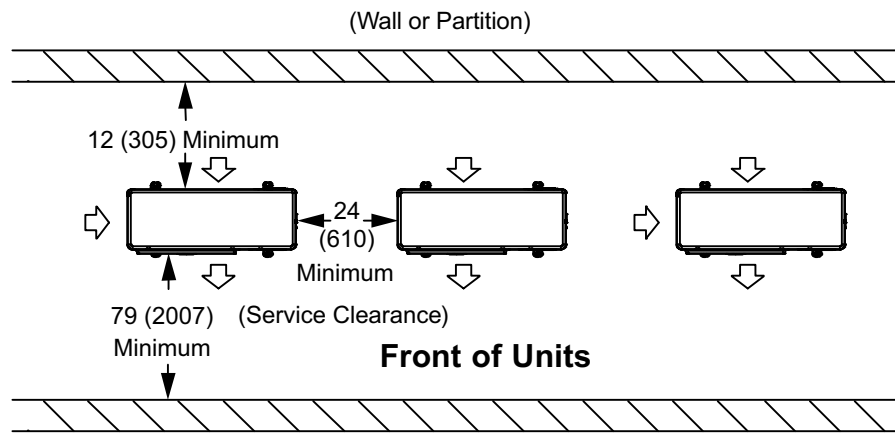
**Single Unit Installation**



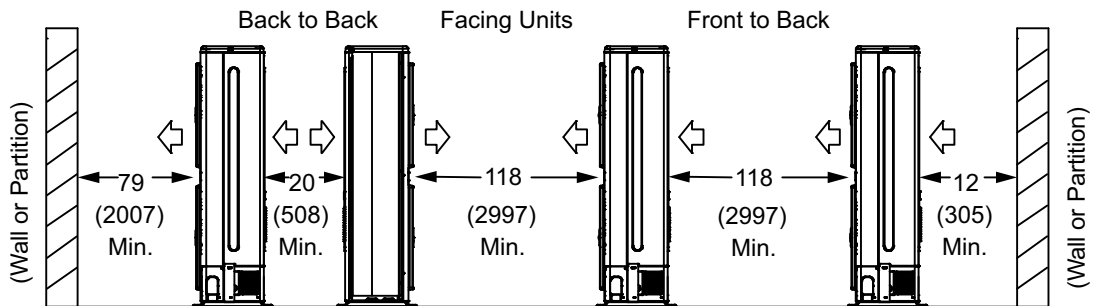
NOTE - 24 in. (610 mm) clearance required on top of unit.

NOTE - If unit is surrounded on three or four sides by walls or partitions that are taller than 10 feet, call Lennox VRF Applications group to discuss additional requirements.

**Parallel Units Side by Side**



**Parallel Units Back to Back, Facing and Front to Back**



## Unit Placement

### **⚠ WARNING**

Use the provided and specified components when installing equipment. Failure to do so may result in unit falling, water leaking or electrical shocks, causing personal injury or equipment or property damage.

Check stability of roof and unit support. If support is not capable of carrying weight of the unit, unit may fall causing personal injury or equipment damage.

Safely dispose of packing materials, which include nails, wood and other sharp objects, as well as plastic wrapping. Children playing with plastic wrap or bags risk the danger of suffocation.

### OUTDOOR UNIT POSITIONING CONSIDERATIONS

In addition to clearances, the following items should be considered when setting the outdoor unit:

- Some local governments have adopted sound ordinances based on the unit's sound level registered from the adjacent property, not from the property where the unit is installed. Install the unit as far as possible from the property line.
- Glass has a very high level of sound transmission. When possible, do not install the unit directly outside a window.
- Avoid installing the unit in areas exposed to extreme voltage variations (such as factories).
- Install unit level.
- Install the unit high enough above the ground or roof to allow adequate drainage of defrost water and prevent ice or snow build-up (required for heat pumps).
- The unit base should be elevated above the depth of average snows. In heavy snow areas, do not locate the unit where drifting will occur.
- When installed in areas where low ambient temperatures exist, locate unit so winter prevailing winds do not blow directly into outdoor unit.
- Locate unit away from overhanging roof lines which would allow water or ice to drop on, or in front of, coil or into unit.
- Allow sufficient space around unit for proper operation and maintenance.
- Install the outdoor unit a minimum of 3 feet away from any antenna, power cord (line), radio, telephone, security system, or intercom. Electrical interference and radio frequencies from any of these sources may affect operation.

**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.

### LIFTING THE UNIT

### **⚠ CAUTION**

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

Take care when using a sling to lift the unit for installation. The unit center of gravity is not at its physical center.

- Do not hold the air inlet grille while lifting the unit. This could result in damage to the cabinet.
- Do not touch the fan blades with your hands or other objects while lifting the unit.

## Installation

### SLAB OR ROOF MOUNTING

Install the unit a minimum of 4 inches (102 mm) above the roof or ground surface to avoid ice build-up around the unit. Locate the unit above a load bearing wall or area of the roof that can adequately support the unit. Consult local codes for rooftop applications.

- Use a field-provided slab or frame as specified in the Product Specifications (EHB) bulletin.
- Install the unit in an upright and level position.
- If the unit coil cannot be installed away from prevailing winter winds, a wind barrier should be constructed. Size barrier at least the same height and width as outdoor unit. Install barrier 12 inches (305 mm) minimum from the sides of the unit in the direction of prevailing winds.

### **IMPORTANT !**

#### **Roof Damage!**

**This system contains both refrigerant and oil. Some rubber roofing material may absorb oil. This will cause the rubber to swell when it comes into contact with oil. The rubber will then bubble and could cause leaks. Protect the roof surface to avoid exposure to refrigerant and oil during service and installation. Failure to follow this notice could result in damage to roof surface.**

### SECURING OUTDOOR UNIT TO SLAB OR FRAME

Brackets are provided at the base of the outdoor unit so that it can be secured to a field-provided slab or frame. Use lag bolts or equivalent to secure the outdoor unit to the slab or frame (figure 1).

**Refrigerant Piping Connections**

**⚠ WARNING**

Refrigerant leaks are unlikely; however, if a refrigerant leak occurs in the system, open a door or windows to dilute the refrigerant in the room. Turn off the unit and all other appliances that may cause a spark. Call a licensed professional HVAC technician (or equivalent) to repair the leak.

Use only R410A refrigerant to charge this system. Use of other refrigerant or gas will damage the equipment.

Do not allow air or other contaminants to enter system during installation of refrigerant piping. Contaminants will result in lower system capacity and abnormally high operating pressures and may result in system failure or explosion.

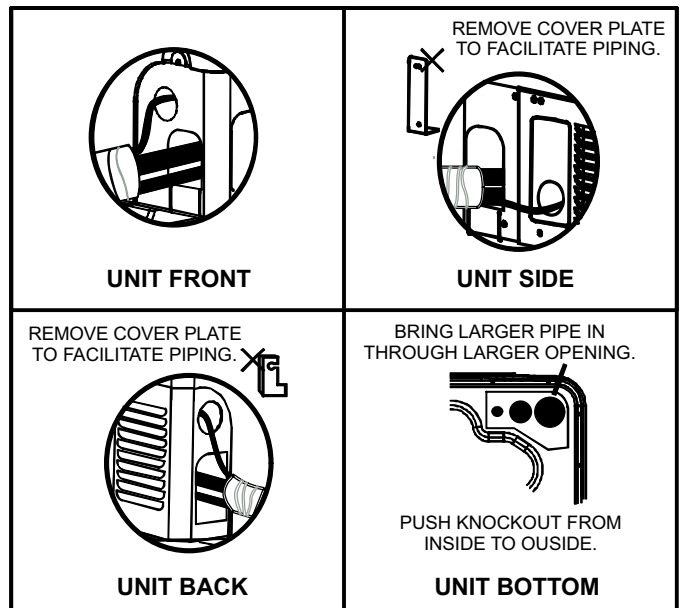
Insulate all refrigerant piping.

Refrigerant pipes may be very hot during unit operation. Do not allow contact between wiring and bare copper pipes.

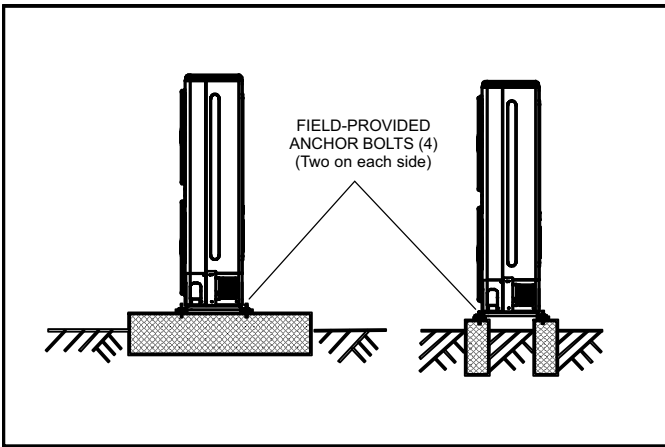
After refrigerant piping connections have been completed, check the system for leaks per commissioning instructions.

Field piping consists of two field-provided copper refrigerant lines connected to the outdoor unit using flared connections. These lines carry the liquid and vapor refrigerant to and from the indoor unit(s). The three-ton VPA036H4 can provide cooling to as many as five indoor units. The four-ton VPA048H4 can serve up to seven indoor units.

Refrigerant piping and wiring connections can be brought into the outdoor unit through openings provided in the front, side(s), pipe and underside of the unit. See figure 3.



**Figure 3. Refrigerant Piping / Wiring Inlets**

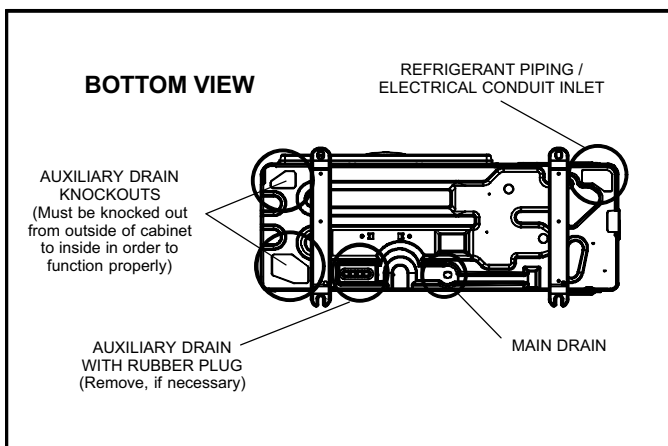


**Figure 1. Securing Outdoor Unit to Slab**

**CONDENSATE DRAINS**

The bottom of the outdoor unit is equipped with one main drain and three auxiliary drains to route water away from the unit during a defrost cycle (figure 2). If water produced during the defrost cycle is not drained away from the unit before it re-freezes, the drain may be blocked by ice. If necessary, remove the rubber plug to drain the water more quickly. If water is still draining too slowly, remove one or both of the auxiliary drain knockouts by pushing them from the outside to the inside. It will be necessary to protect the auxiliary drains to avoid access to the inside of the unit by bugs and other pests.

A condensate drain connector is provided with the unit. The connector can be used to attach a field-provided drain hose to the main drain to route condensate away from the unit.



**Figure 2. Factory-Provided Drains and Piping Inlet**

When multiple indoor units are served by a single outdoor unit, the refrigerant piping must be connected using either branch box(es) or individual branch pipes. Optional branch box V8MIDB01 (12A51) and branch pipes V8IDBP01 and V8IDBP02 are ordered separately. Each branch box can be used to connect a maximum of four indoor units to the outdoor unit. When the system includes five, six or seven indoor units, two branch boxes must be used.

When using branch pipes to connect multiple indoor units with a single outdoor unit, each indoor unit requires a separate branch pipe to connect both the liquid and gas (vapor) line to the system. Install these optional devices per the installation instructions provided with them. See the piping schematics on the following pages.

The following restrictions apply to each VPA system:

- Total refrigerant pipe length — 328 feet (100 m).
- Longest pipe length (actual) — 148 feet (45 m).
- Longest pipe length (equivalent) — 164 feet (50 m).
- Maximum difference between installation levels of indoor and outdoor unit —
  - Outdoor unit **above** indoor unit — 98.4 feet (30 m).
  - Outdoor unit **below** indoor unit — 65.6 feet (20 m).
- Maximum difference between installation levels of highest and lowest indoor units — 26.2 feet (8m).

Table 1 lists the connection sizes at the outdoor unit. The connections are made using the provided brass flare nuts at the end of the refrigerant piping connections. **Both liquid and gas (vapor) lines must be individually insulated.**

**Table 1. Refrigerant Piping Connections**

Model	Liquid Line	Gas (Vapor) Line
VPA036H4 VPA048H4	3/8 in.	5/8 in.

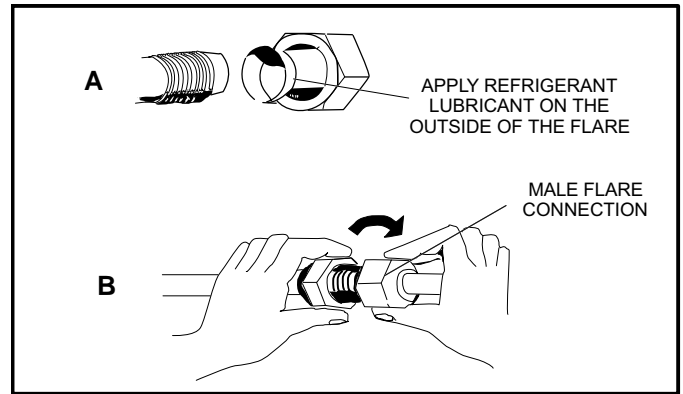
**NOTE** - Always slide a flare nut onto the field-provided refrigerant piping before flaring the lines.

- 1 - The seal on the unit refrigerant piping connections should remain in place until the last possible moment. This will prevent dust or water from getting into the refrigerant piping before it is connected.
- 2 - Remove the flare nuts and discard the seal from each of the piping connections.
- 3 - Slide the flare nuts onto the ends of the field-provided refrigerant piping **before** using a suitable flaring tool to flare the end of the copper pipe.
- 4 - Apply recommended HFC-410A refrigerant lubricant to the outside of the flared refrigerant lines (figure 4-A).

**IMPORTANT !**

**Mineral oils are not compatible with HFC-410A.**

- 5 - Align the threaded connections with the flared refrigerant lines. Tighten the flare nuts lightly at first to obtain a smooth match (figure 4-B).

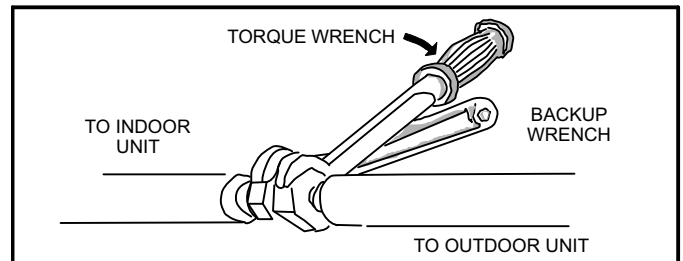


**Figure 4. Making Flared Connections**

- 6 - Once snug, continue another half-turn on each nut which should create a leak-free joint. A torque wrench may be used to tighten flare nuts using table 2 recommendations. (see figure 5). **Do not over-tighten a flared joint.**

**IMPORTANT !**

**Always use two wrenches when tightening flare nuts to avoid twisting refrigerant piping. DO NOT over-tighten flare nuts.**

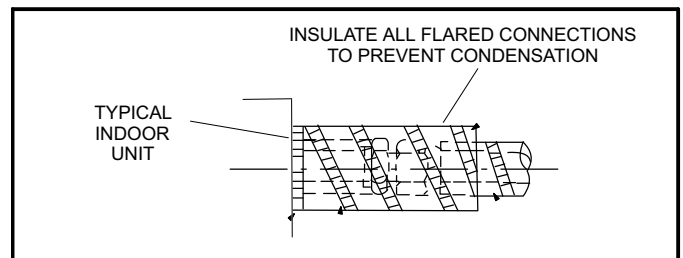


**Figure 5. Tighten Flare Nut**

**Table 2. Flare Nut Torque Recommendations**

Outside Diameter	Recommended Torque	No torque wrench available Finger tighten and use an appropriately sized wrench to turn an additional:
	U.S.	
3/8"	26 ft.- lb.	1/2 turn
5/8"	48 ft.- lb.	1 full turn

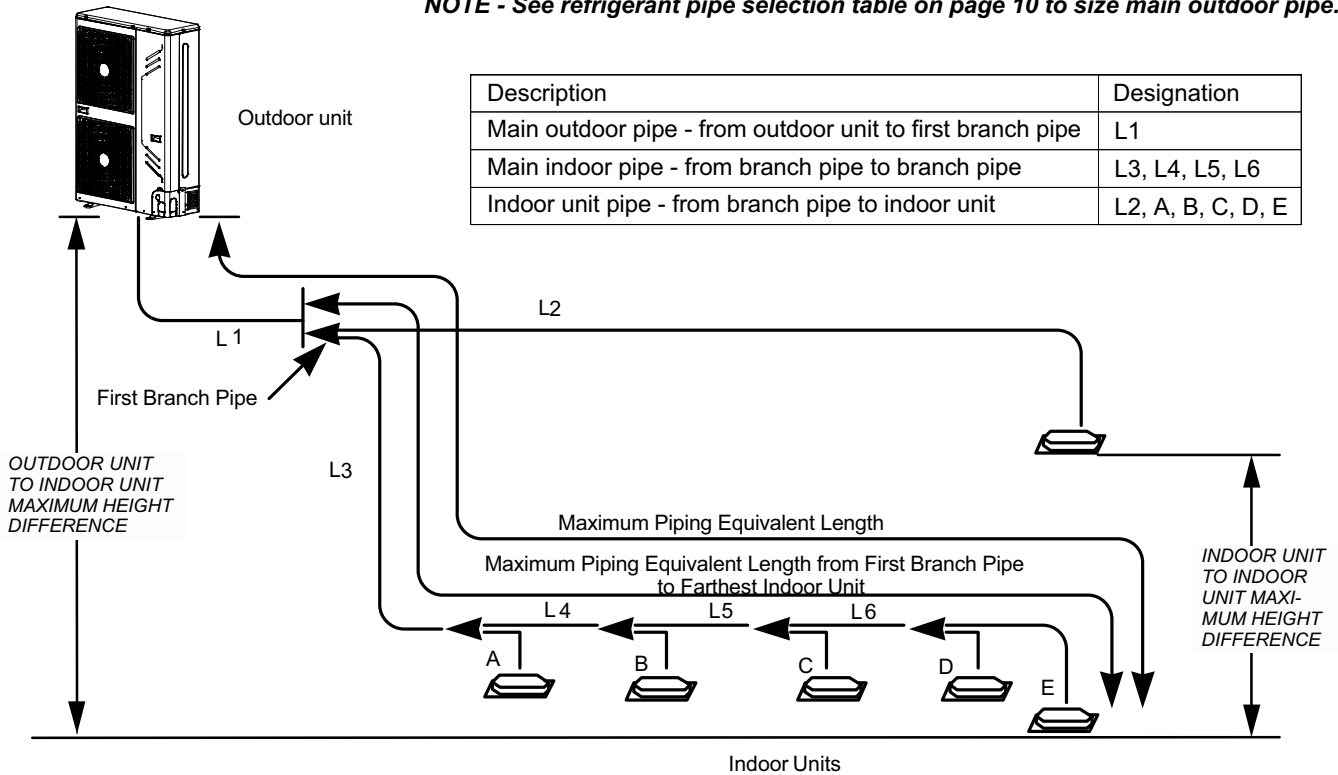
- 7 - Branch pipe connections may be brazed. **It is necessary to purge the pipes with nitrogen during brazing to avoid oxidation which may block the refrigerant piping.**
- 8 - After refrigerant piping has been installed and checked for leaks, apply insulation over the connector pipe and all flared connections.



**Figure 6. Insulate Flared Connections**

**Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - with Branch Pipe**

**NOTE - See refrigerant pipe selection table on page 10 to size main outdoor pipe.**



Description	Designation
Main outdoor pipe - from outdoor unit to first branch pipe	L1
Main indoor pipe - from branch pipe to branch pipe	L3, L4, L5, L6
Indoor unit pipe - from branch pipe to indoor unit	L2, A, B, C, D, E

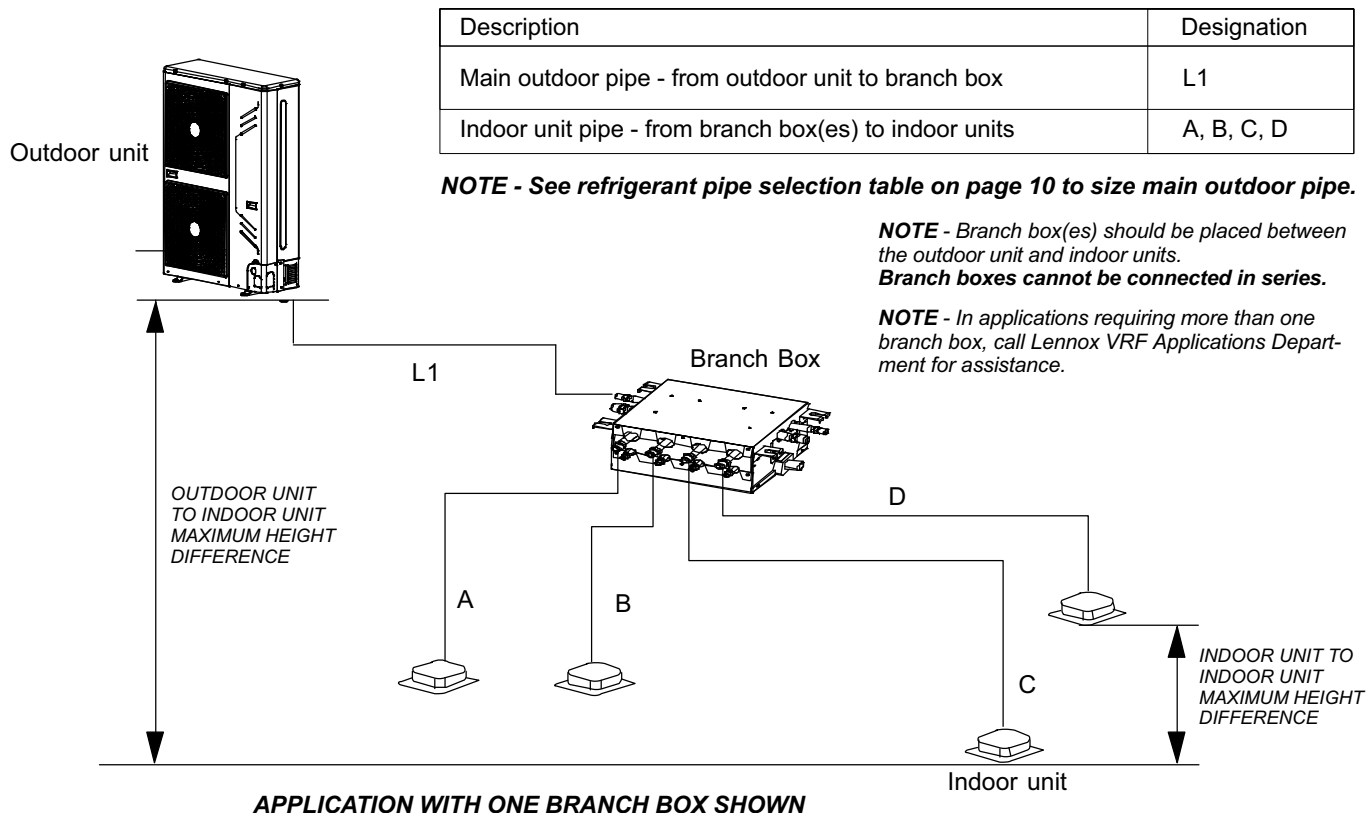
Length and Maximum Height Difference		Maximum Permitted Length	Piping	
<b>Pipe Length</b>	Total Piping Length (Actual)	≤ 328 ft. (100 m)	L1+L2+L3+L4+L5+L6 +A+B+C+D+E	
	Maximum Piping Length	Actual Length	≤ 148 ft. (45 m)	
		Equivalent Length	≤ 164 ft. (50 m)	L1+L3+L4+L5+L6+E
	Pipe length (from the first branch pipe to the farthest indoor unit)	≤ 65.6 ft. (20 m)	L3+L4+L5+L6+E	
<b>Maximum Height Difference</b>	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up	98.4 ft. (30 m)	---
		Outdoor Unit Down	65.6 ft. (20 m)	---
	Indoor Unit to Indoor Unit Maximum Height Difference	26.2 ft. (8 m)	---	

**NOTE - Each branch pipe equals 20 in. (508 mm) equivalent straight pipe length.**



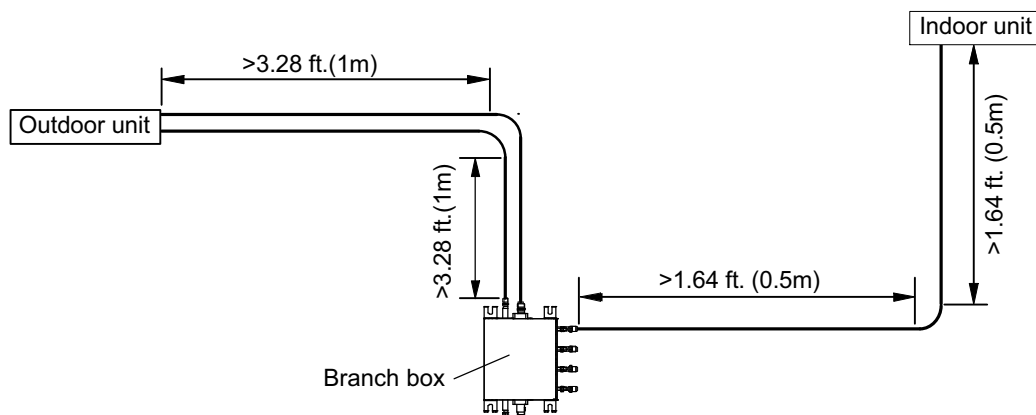
## Refrigerant Piping — Continued

### Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - with Branch Box



Length and Maximum Height Difference		Maximum Permitted Length	Piping
<b>Pipe Length</b>	Total Piping Length (Actual)	≤ 328 ft. (100 m)	L1+A+ B + C + D
	Maximum Piping Length	Actual Length Equivalent Length	L1+A, L1 + B, L1+C, L1 + D
	Pipe length (from the branch box to each indoor unit)	≤ 65.6 ft. (20 m)	A, B, C, D ≤ 65.6 ft. (20 m) each
<b>Maximum Height Difference</b>	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up Outdoor Unit Down	--- ---
	Indoor Unit to Indoor Unit Maximum Height Difference	26.2 ft. (8 m)	---

### Minimum Length of Straight Pipe Entering and Leaving the Branch Box



**Refrigerant Piping — Continued**

**Refrigerant Pipe Selection**

**MAIN OUTDOOR UNIT PIPE (L1) DIAMETER AND PIPE LENGTH BASED ON TOTAL CAPACITY**

Model No.	Capacity	Liquid Pipe Length	Main Gas Pipe Diameter Required	Main Liquid Pipe Diameter Required	Maximum Number of Indoor Units	Total Capacity of Indoor Units Combination Ratio Range	Indoor Unit Branch Pipe
VPA036H4	3 Ton	Less than 148 ft. (45 m)	5/8 in.	3/8 in.	5	45 to 110%	V8IDBP01
		More than 148 ft. (45 m)	3/4 in.				
VPA048H4	4 Ton	Less than 148 ft. (45 m)	5/8 in.	3/8 in.	7	45 to 110%	
		More than 148 ft. (45 m)	3/4 in.				

**INDOOR MAIN PIPE SELECTION (L3, L4, L5, L6)**

Downstream Indoor Unit Capacity (Buth)	Gas Pipe Diameter	Liquid Pipe Diameter	Indoor Unit Branch Pipe
A < 56,700	5/8 in.	3/8 in.	V8IDBP01

**INDOOR PIPE SELECTION (L2, A, B, C, D, E)**

Indoor Unit Type	Indoor Unit Size	Gas Pipe Diameter	Liquid Pipe Diameter
<b>V22A Compact 360° Cassette</b>	007, 009, 012, 015	1/2 in.	1/4 in.
<b>V33A Standard Efficiency 360° Cassette</b>	009, 012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048	5/8 in.	3/8 in.
<b>VCFA Ceiling/Floor Mount Non-Ducted</b>	012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048, 054	5/8 in.	3/8 in.
<b>VHIA Concealed High Static Ducted</b>	024, 030, 036, 048	5/8 in.	3/8 in.
<b>VMDA Concealed Medium Static Ducted</b>	007, 009, 012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048	5/8 in.	3/8 in.
<b>VWMA Wall-Mounted Non-Ducted</b>	007, 009, 012, 015	1/2 in.	1/4 in.
	018, 024, 030	5/8 in.	3/8 in.

**NOTES:**

If two or more indoor units are used, each indoor unit capacity should be less than 27,295 Btuh.

If the total capacity of the indoor units is greater than 100% of the capacity of the outdoor unit, individual indoor unit capacities will be reduced.

**Refrigerant Charge Adjustment**

When refrigerant piping connections have been completed, it will be necessary to adjust the system refrigerant charge based on the diameter and length of the liquid line pipe between the outdoor and indoor unit(s). Table 3 lists the refrigerant piping sizes along with the refrigerant adjustment required per foot of liquid line pipe. **This system is suitable for use with HFC-410A refrigerant only.**

**Table 3. Refrigerant Charge Adjustment**

Liquid Line Pipe Size	Additional Refrigerant Per Foot of Pipe Length
1/4 in.	0.015 lb.
3/8 in.	0.040 lb.
1/2 in.	0.080 lb.
5/8 in.	0.120 lb.
3/4 in.	0.181 lb.
7/8 in.	0.255 lb.

## Wiring Connections

### **⚠ WARNING**

Isolate the power supply before accessing unit electrical terminals.

Install unit so that unit disconnect is accessible.

Follow all local and national codes, as well as this installation instruction, during installation. Do NOT overload electrical circuit, as this may lead to failure and possible fire.

Use specified wiring and cable to make electrical connections. Clamp cables securely and make sure that connections are tight to avoid strain on wiring. Insecure wiring connections may result in equipment failure and risk of fire.

Wiring must be installed so that all cover plates can be securely closed.

Do not attempt to repair a damaged power cord.

Do not modify the power cord in any way. Do not attempt to extend the length of the power cord or use an extension cord with this appliance. Do not share the single power outlet with any other appliances.

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 unit nameplate for minimum circuit ampacity and maximum overcurrent protection size.

**NOTE** - Three-core shielded cable must be used for the communication wiring. This is necessary to ensure proper system communication and operation.

**NOTE** - The outdoor unit requires a separate 30-amp circuit breaker and power supply.

### **⚠ CAUTION**

This unit must be properly grounded and protected by a circuit breaker. The ground wire for the unit must not be connected to a gas or water pipe, a lightning conductor or a telephone ground wire.

Do not connect power wires to the outdoor unit until all other wiring and piping connections have been completed.

Install all wiring at least 3 feet away from televisions, radios or other electronic devices in order to avoid the possibility of interference with the unit operation.

Separate power wiring supplies must be provided for the outdoor unit and indoor unit(s).

- 1 - Select the appropriate electrical inlet into the outdoor unit. Conduit must be used and opening must be sealed after installation to avoid air infiltration and condensation.
- 2 - Locate the terminal strip in the outdoor unit control box. Connect the power wiring (sized per NEC/CEC and local codes) and communications cable (**three-core, shielded cable**) per figure 7. Refer to unit nameplate for rated voltage.

### **IMPORTANT !**

**DO NOT adjust DIP switch settings. Settings may only be adjusted by a trained technician as part of the commissioning procedures.**

### **Network Address and Commissioning**

After the system has been installed, the outdoor unit will automatically assign addresses to all connected indoor units. These addresses may be modified using an optional remote control as part of the commissioning procedure.

**DIP switch 1 on SW-1 on the outdoor unit main control is factory-set to OFF. In order to enable the automatic address function, this DIP switch must be moved to the ON position.**

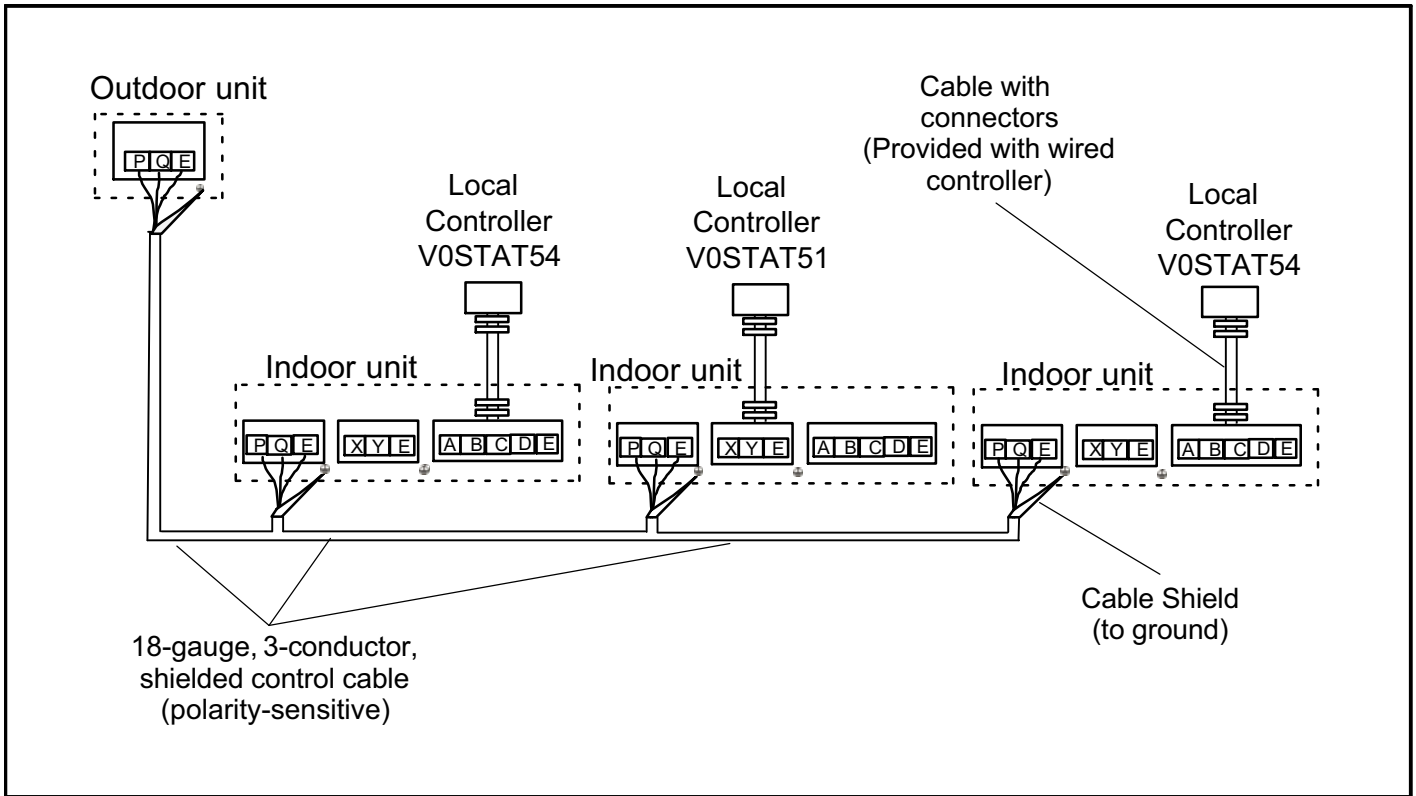


Figure 7. Typical Low-Voltage Field Wiring

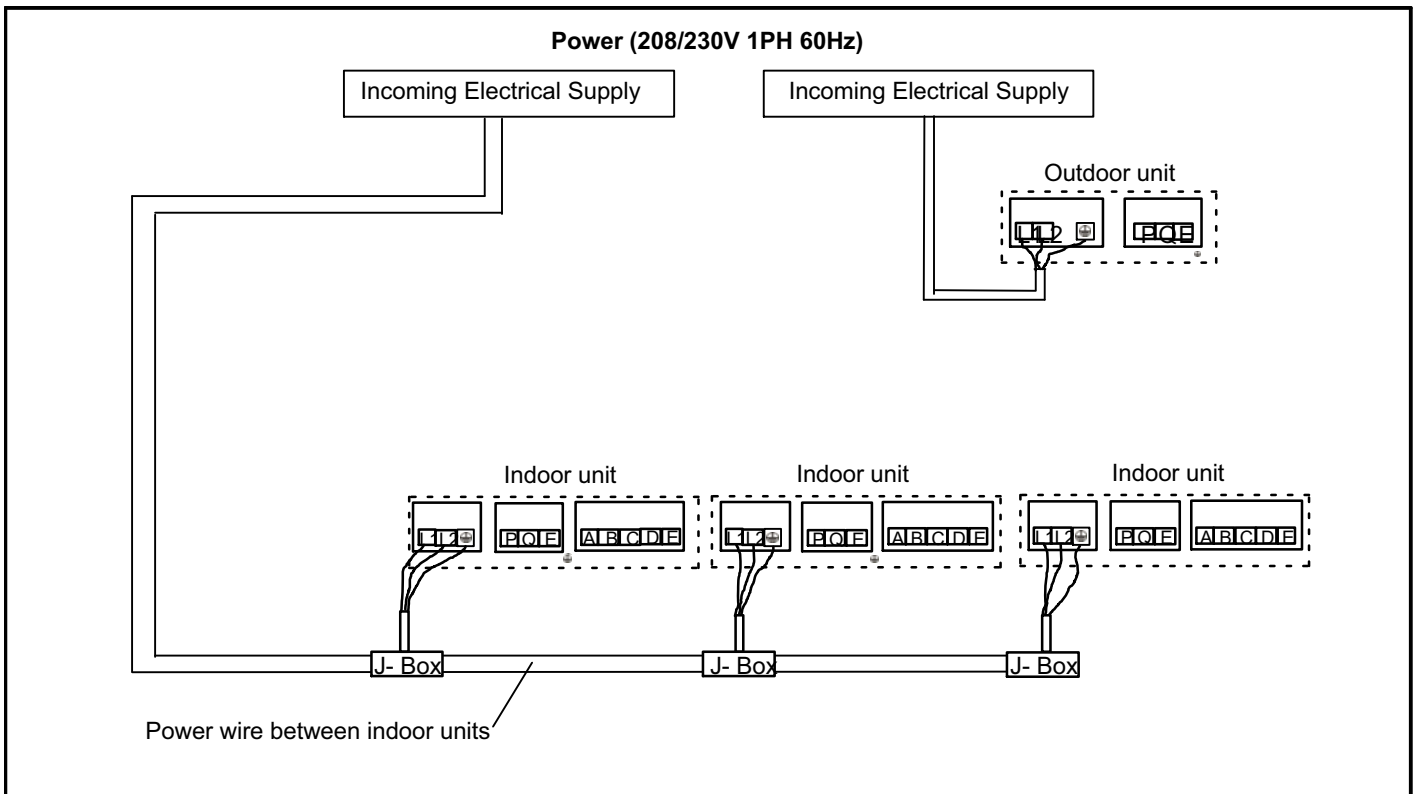


Figure 8. Typical 208/230V Single-Phase Power Wiring