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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.

INSTALLATION/OPERATION INSTRUCTIONS

LENNOX REAL Heat Pump

VPC***H4-3P
VRF SYSTEMS
OUTDOOR UNITS
508369-02
08/2023

⚠ CAUTION

To ensure proper system performance and reliability, Lennox does not recommend operation of VRF systems during any phase of construction. Construction debris, low temperatures, harmful vapors, and operation of the unit with misplaced filters can damage the units. Failure to follow these guidelines will result in the warranty being voided.

⚠ 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.

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

General

The Lennox REAL heat pump outdoor units are matched with up to nine indoor units to create a VRF (variable refrigerant flow) system that uses R-410A refrigerant.

Refer to the Product Specification bulletin (EHB) for the proper use of these heat pumps with matching indoor units, header pipes, 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 Lennox REAL heat pump outdoor unit
- 1 - Outdoor unit installation instruction
- 1 - Warranty card
- 1 - Terminating resistor
- 1 - Magnet ring

Safety Requirements

⚠ WARNING

ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.

Do not touch the unit or the controller if your hands are wet.

Do not operate appliances with an open flame near the unit.

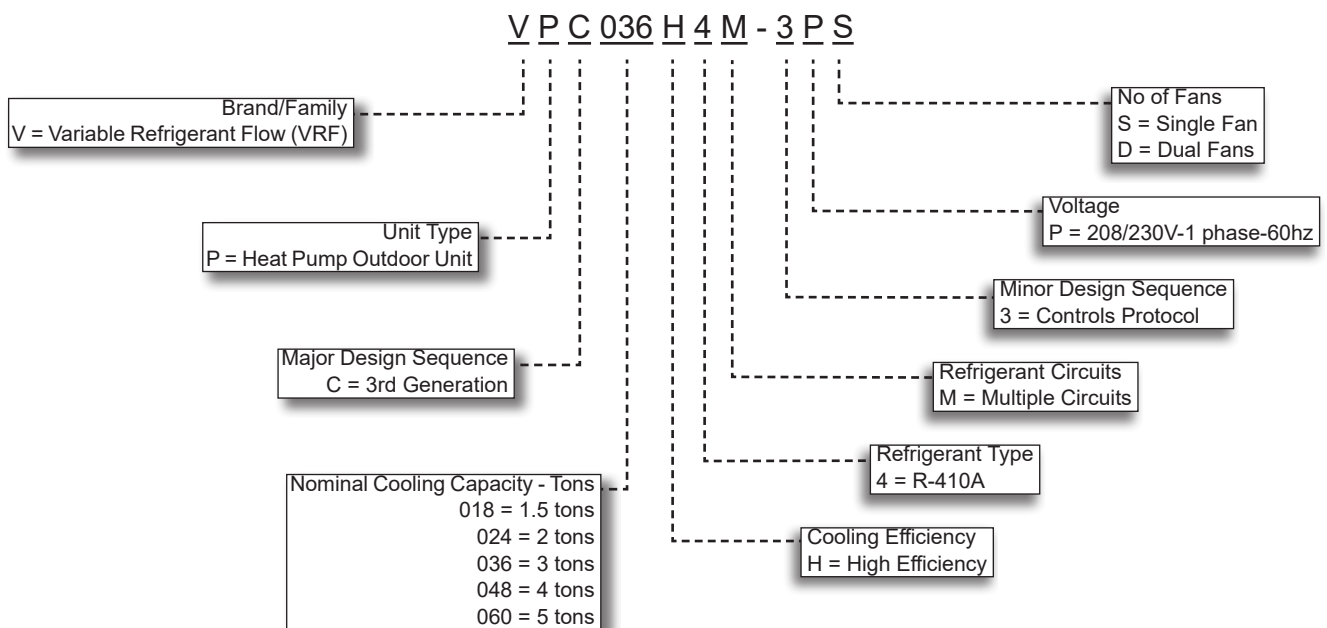
Do not replace a fuse with a fuse of a different rating. Do not use a jumper wire to replace a fuse. Do not insert your hands, tools or any other item into the air intake or air outlet at either the indoor or outdoor unit.

Do not allow children to operate the system.

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Model Number Identification



NOTE - Lennox REAL/VRF and Lennox Mini-Split products are similar in appearance to each other. Refer to the unit's model number to determine if the unit is a REAL/VRF (V) or Mini-Split (M) unit. It is not possible to mix the two types of equipment on any system.

System Piping

⚠ CAUTION

VRF system piping is customized for each installation. The Lennox VRF Selection Software (LVSS) piping report is an engineered design that must be followed. The piping diagram or diagrams included within the LVSS report have been prepared based on the information provided to the Lennox VRF applications department. When the indicated lengths change from the figures stated within the report, it is imperative that prior to the commencement of the refrigerant pipe work installation, Lennox VRF applications department are informed of these proposed changes.

Upon receipt of this new information the Lennox VRF applications department will confirm any changes that may be applicable to this installation. If changes are required, a new piping diagram will be produced and will supersede all other previously provided documents. Failure to provide this information regarding changes to the original design may lead to insufficient capacity, equipment failure, warranty being made void and the refusal to commission the system.

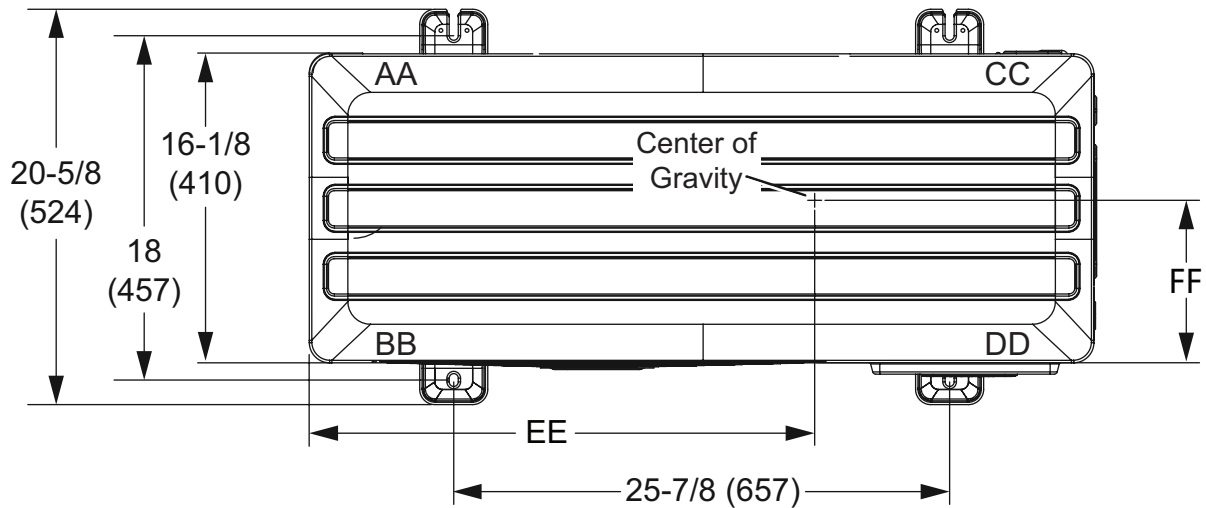
Dimensions

VPC018H4M-3P | VPC024H4M-3P | VPC036H4M-3PS

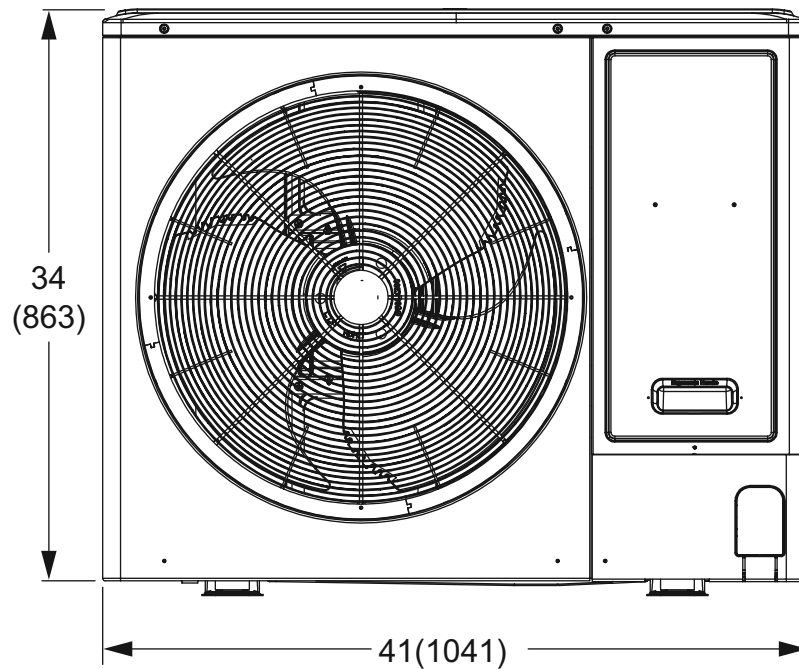
CORNER WEIGHTS

CENTER OF GRAVITY

AA		BB		CC		DD		EE		FF	
lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
30	14	28	13	81	37	46	21	28-1/8	714	12-3/8	314



TOP VIEW



FRONT VIEW

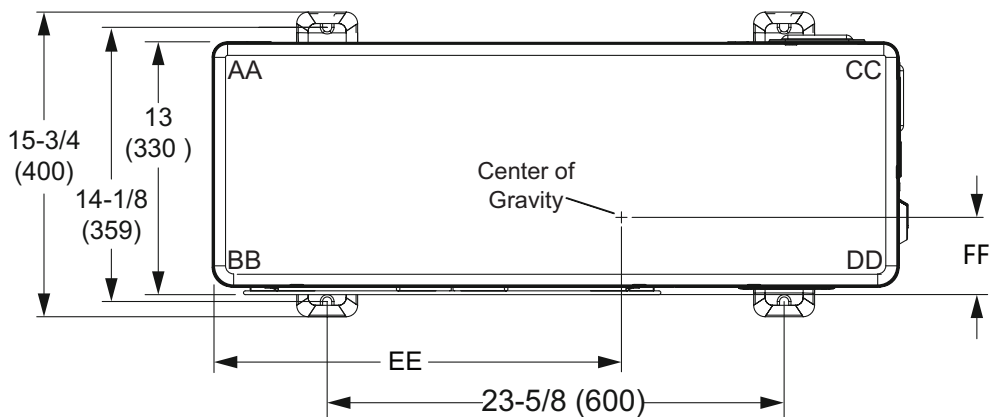
Dimensions

VPC036H4M-3PD | VPC048H4M-3 | VPC060H4M-3P

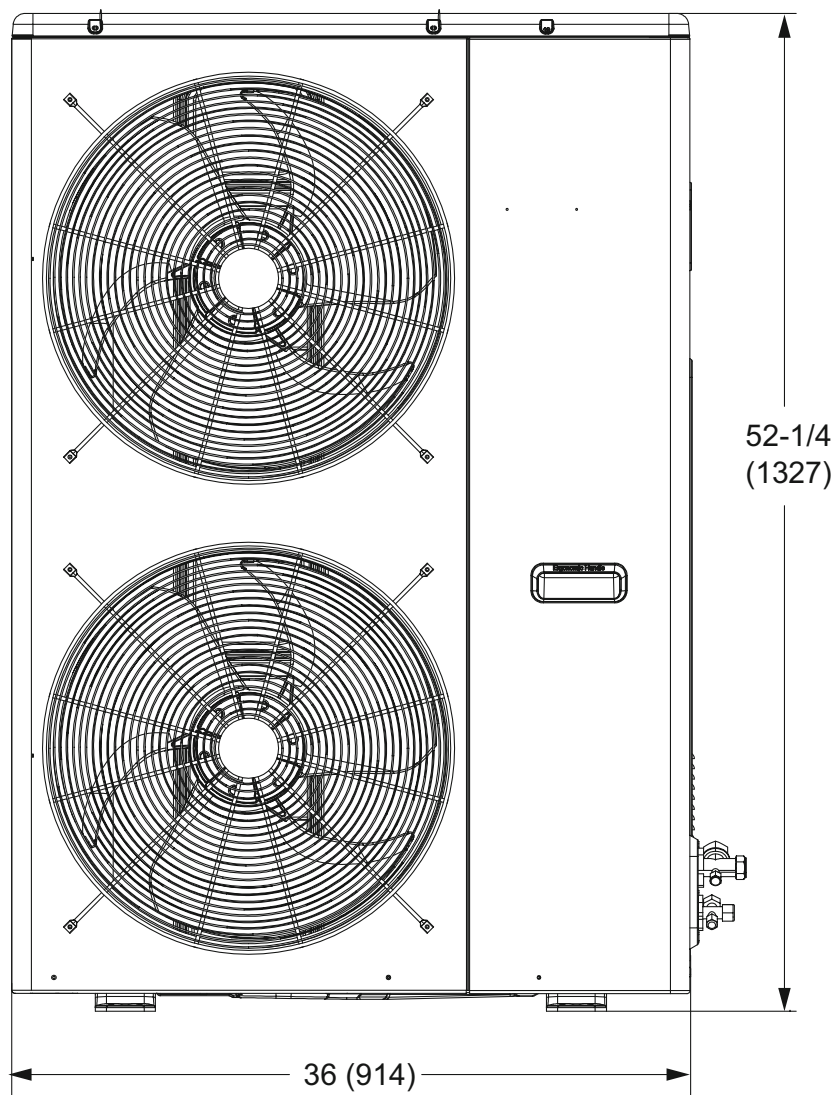
CORNER WEIGHTS

CENTER OF GRAVITY

AA		BB		CC		DD		EE		FF	
lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	in.	mm	in.	mm
24	11	66	30	46	21	67	31	20	508	5-3/8	137

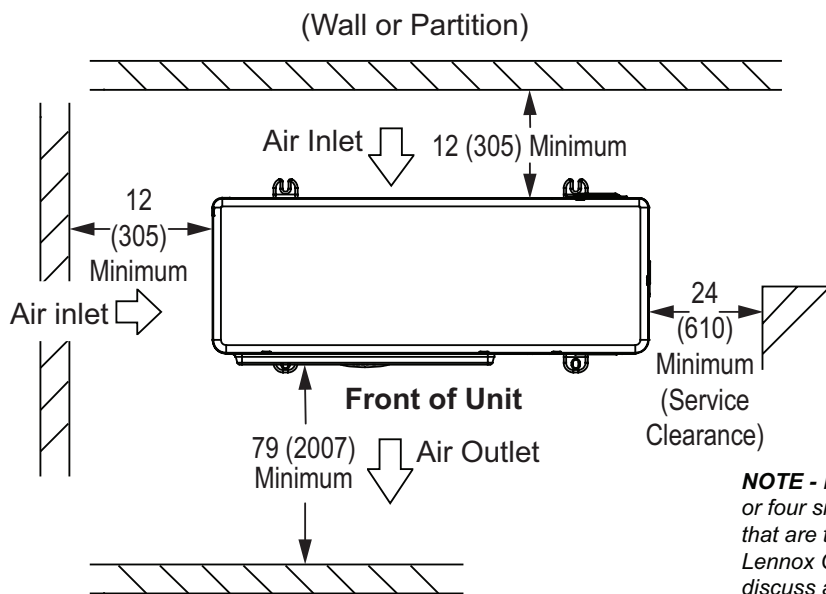


TOP VIEW



FRONT VIEW

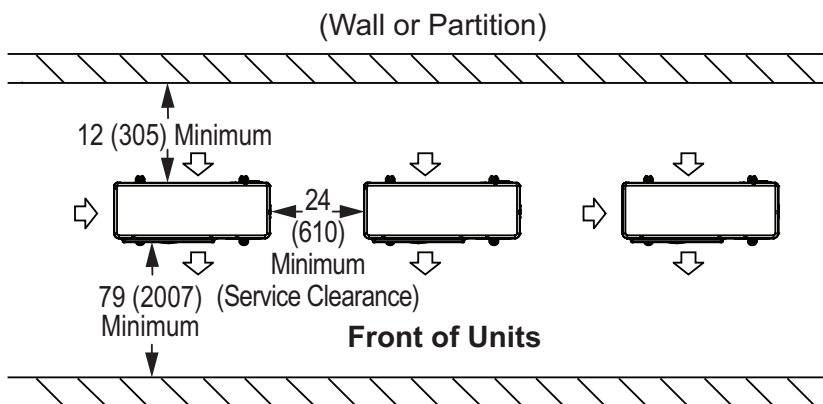
Single Unit Installation



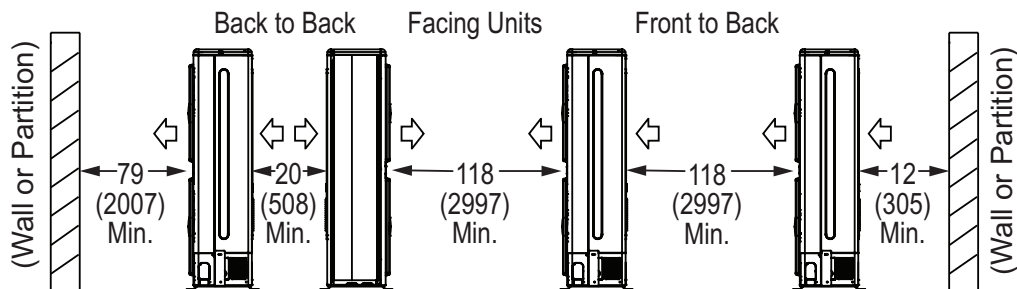
NOTE - If unit is surrounded on three or four sides by walls or partitions that are taller than 10 ft. (3 m), call Lennox Commercial Applications group to discuss additional requirements.

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

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 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 ft. (1 m) 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

- 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

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.

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.
- 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.

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.

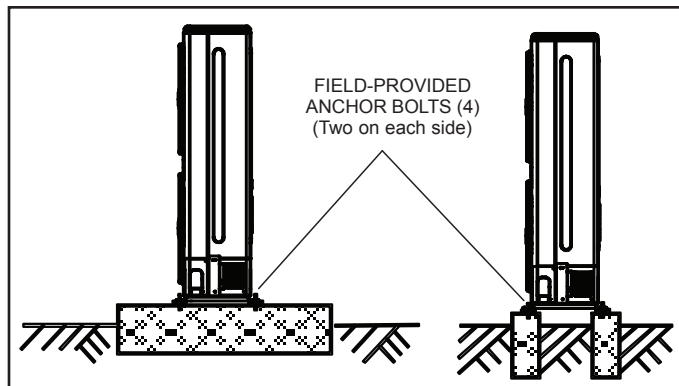


Figure 1. Securing Outdoor Unit to Slab

Securing Outdoor Unit to Wall-Mounted Brackets

- Units can be secured to field-provided wall-mounted brackets as long as the following conditions are met.
- Use lag bolts or equivalent to secure the outdoor unit to the wall-mounted brackets. Figure 2.
- Maintain proper air flow clearances.
NOTE - Minimum rear clearance can be 6 in. (152 mm) when mounted on brackets and with no obstructions on the other three sides.

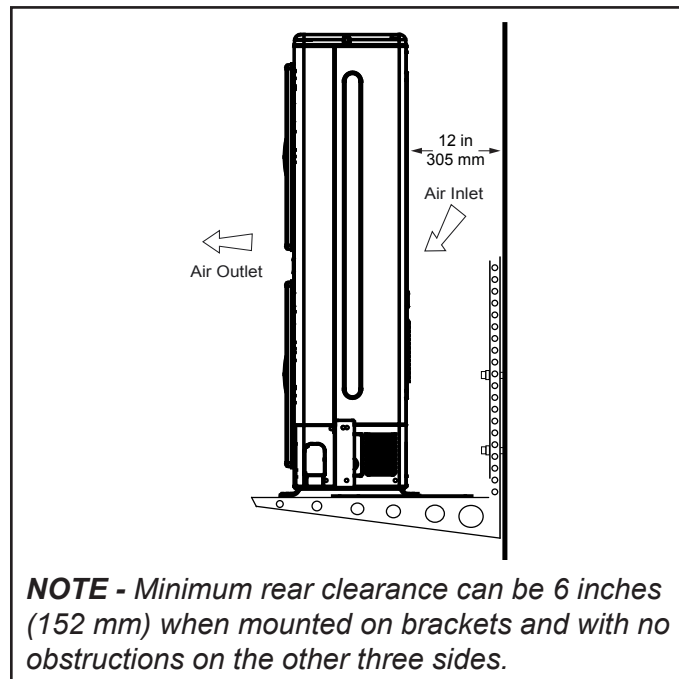


Figure 2. Unit on Wall-Mounted Brackets

Condensate Drains

- The bottom of the outdoor unit is equipped with multiple drain holes to route water away from the unit during a defrost cycle. Figure 3.
- 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.
- Protect drain holes to avoid access to the inside of the unit by bugs and other pests.
- Use a field-provided base pan if required for the application.

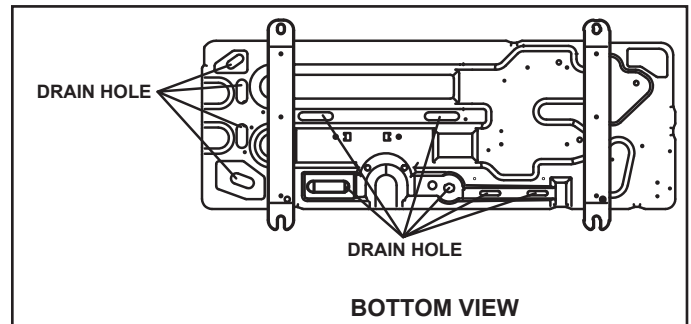


Figure 3. Factory-Provided Drains

Cold Climate Considerations

⚠ CAUTION

When operating the heat pump in a low outdoor ambient temperature, be sure to follow the instructions described below.

- To prevent exposure to wind, install the outdoor unit with its coil air inlet side facing the wall.
- Never install the outdoor unit at a site where the coil air inlet side may be exposed directly to wind.
- To prevent exposure to wind, install a wind barrier on the air discharge side of the outdoor unit.
- In heavy snowfall areas, select an installation site where the snow will not affect the unit.

Snow and Ice Protection

- Install the unit high enough above the ground or roof to allow adequate drainage of defrost water and prevent ice or snow build-up.
- Carefully consider how to manage defrost water disposal to prevent ice from blocking walkways or creating a safety hazard near the outdoor unit.
- In heavy snow areas, do not locate the unit where drifting will occur. The unit base should be elevated above the depth of average snows. Locate unit away from overhanging roof lines which would allow water or ice to drop on, or in front of, coil or into unit.
- There must be unobstructed air flow around the air inlet and the air outlet.
- The unit must not be installed in areas where a flammable gas leak may occur.

NOTE - All outdoor units have a factory-installed base pan heater.

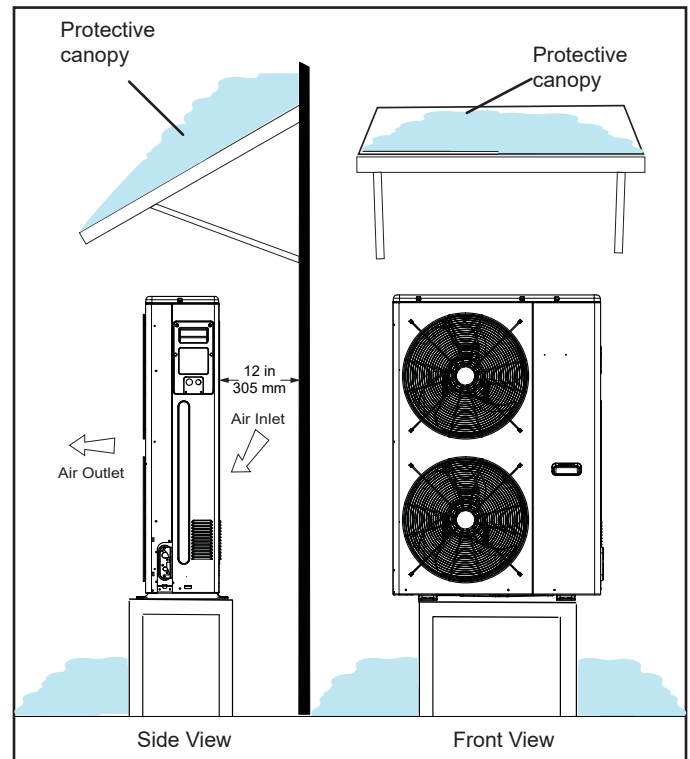


Figure 4. Unit on Pedestal (Stand) Above Snow Line

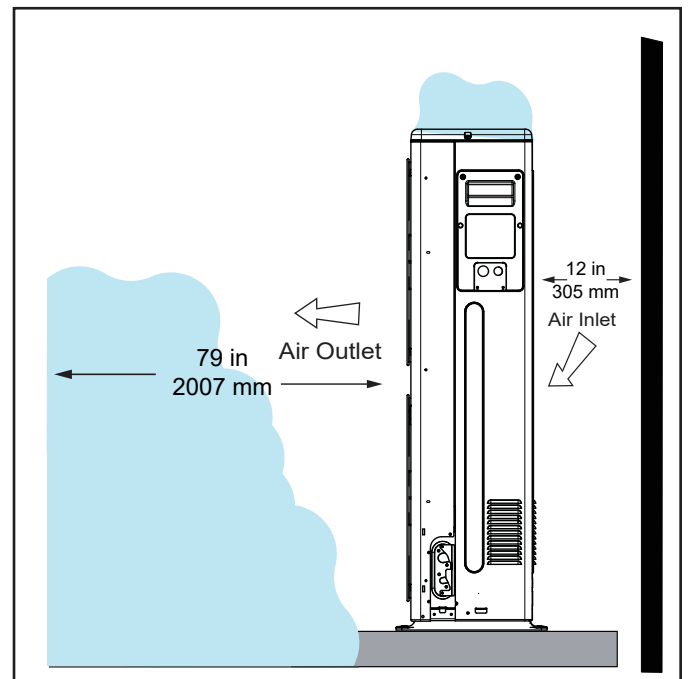


Figure 5. Air Flow Obstructed by Snow

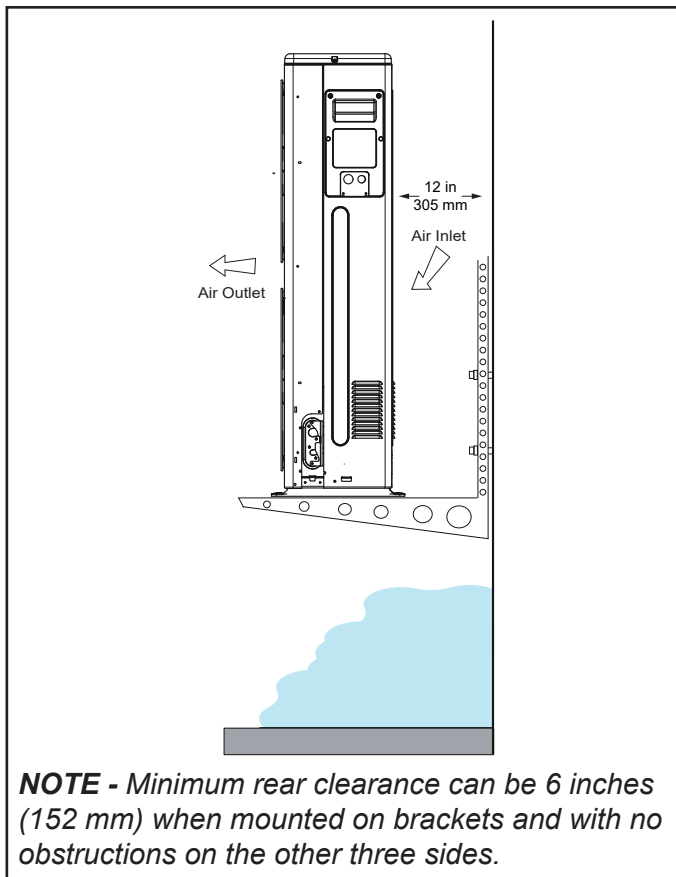


Figure 6. Unit on Brackets Above Snow Line

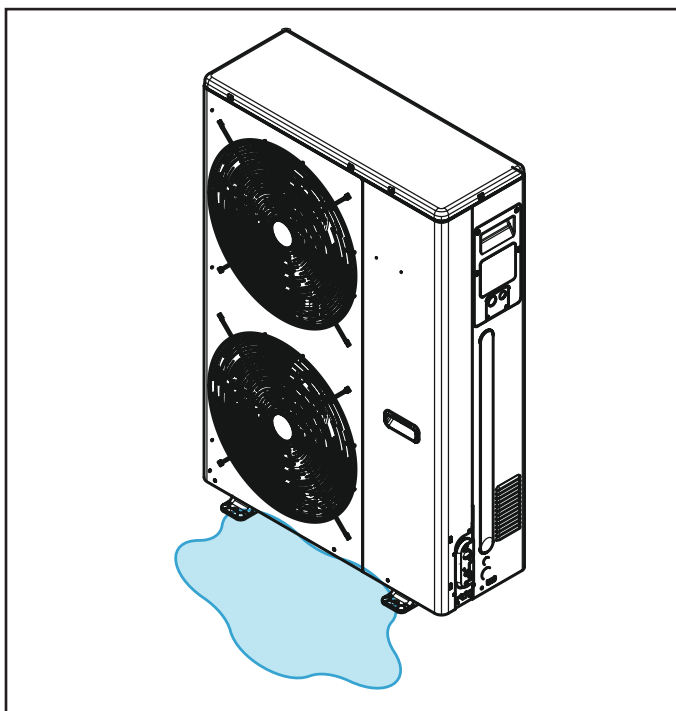


Figure 7. Avoid Defrost Water Ice Hazard

Prevailing Winds Protection

If unit coil cannot be installed away from prevailing winter winds, some method of protecting the coil is required. Minimum clearances from wind barrier must be observed at all times. Common application examples are:

- Construct a wind barrier. Size barrier at least the same height and width as outdoor unit. Install a barrier 12 inches (305 mm) minimum from the sides of the unit in the direction of prevailing winds.
- Install outdoor unit in non-confined space.
- Install outdoor unit in alcove or under roof overhang but not under or directly near a storm gutter.

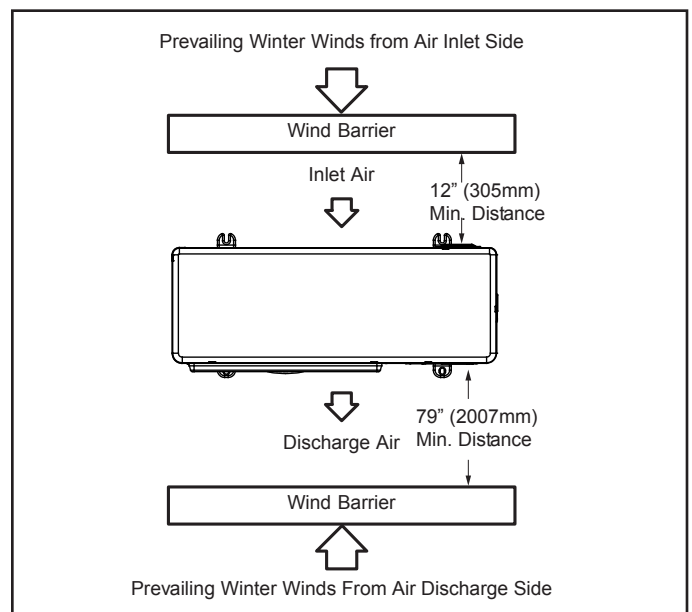


Figure 8. Unit with Wind Barrier

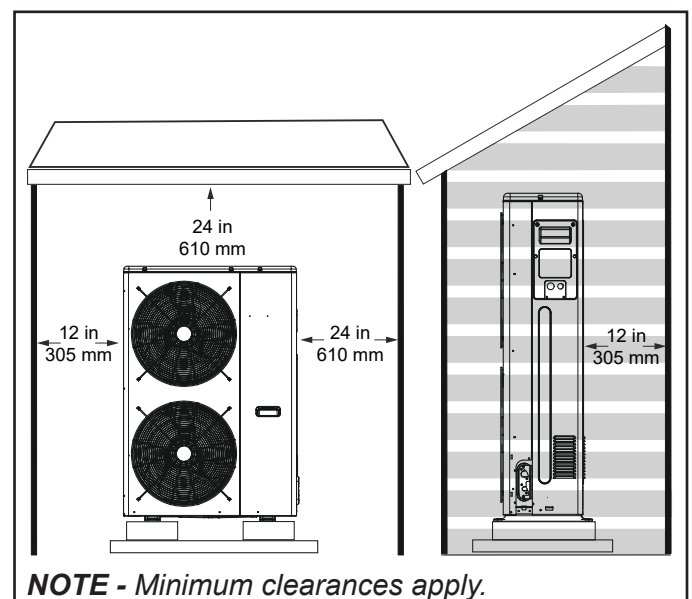


Figure 9. Unit Inside of Mechanical Enclosure

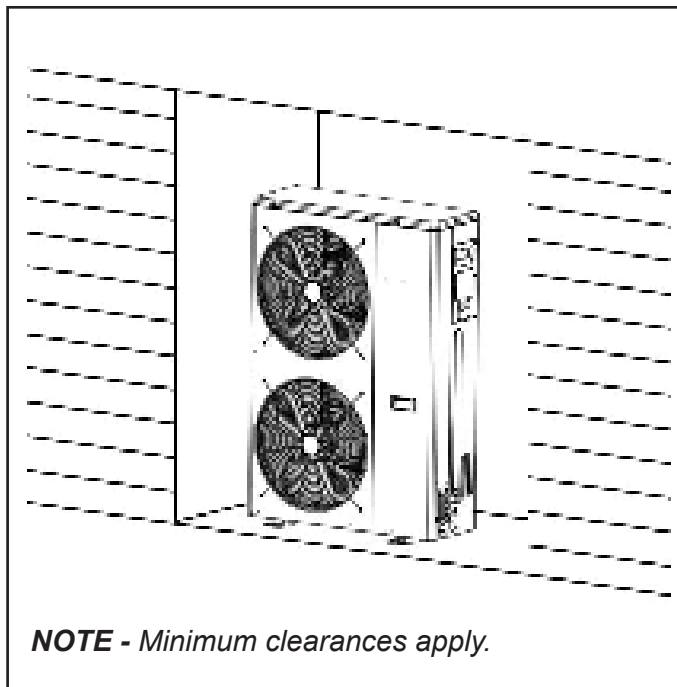


Figure 10. Unit installed in Alcove

Buried Refrigerant Pipe Protection

- **All** refrigerant lines must be insulated regardless of if it is buried.
- In addition to insulating each line of piping, buried lines must rest inside a **sealed, watertight** conduit.
- The conduit must be designed so it cannot collect and retain water.

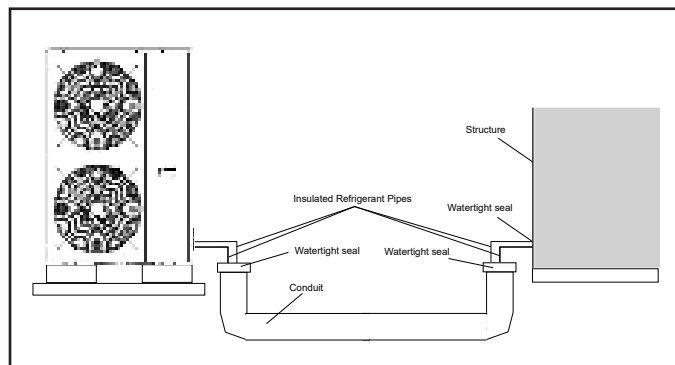


Figure 11. Buried Refrigerant Pipe Protection

Installing the Unit Inside of Building

REAL outdoor units may be installed indoors if the following guidelines are followed.

- Refer to Figure 12 for critical clearances.
- If field-fabricating ductwork to directly discharge air outdoors, use the dimensions shown in Figure 15 as a guide.
- Include inspection doors in discharge ductwork within 12 inches (305 mm) of the unit.
- Do not restrict access to the unit's electrical service panel.

- Allow enough space between the unit and exterior wall to allow for coil service.
- Provide a drain pan underneath the unit to prevent condensation leaks.
- Contact VRF Applications support for guidance for your application.
email: vrftechsupport@lennoxind.com
phone: 800-4LENNOX (800-453-6669)

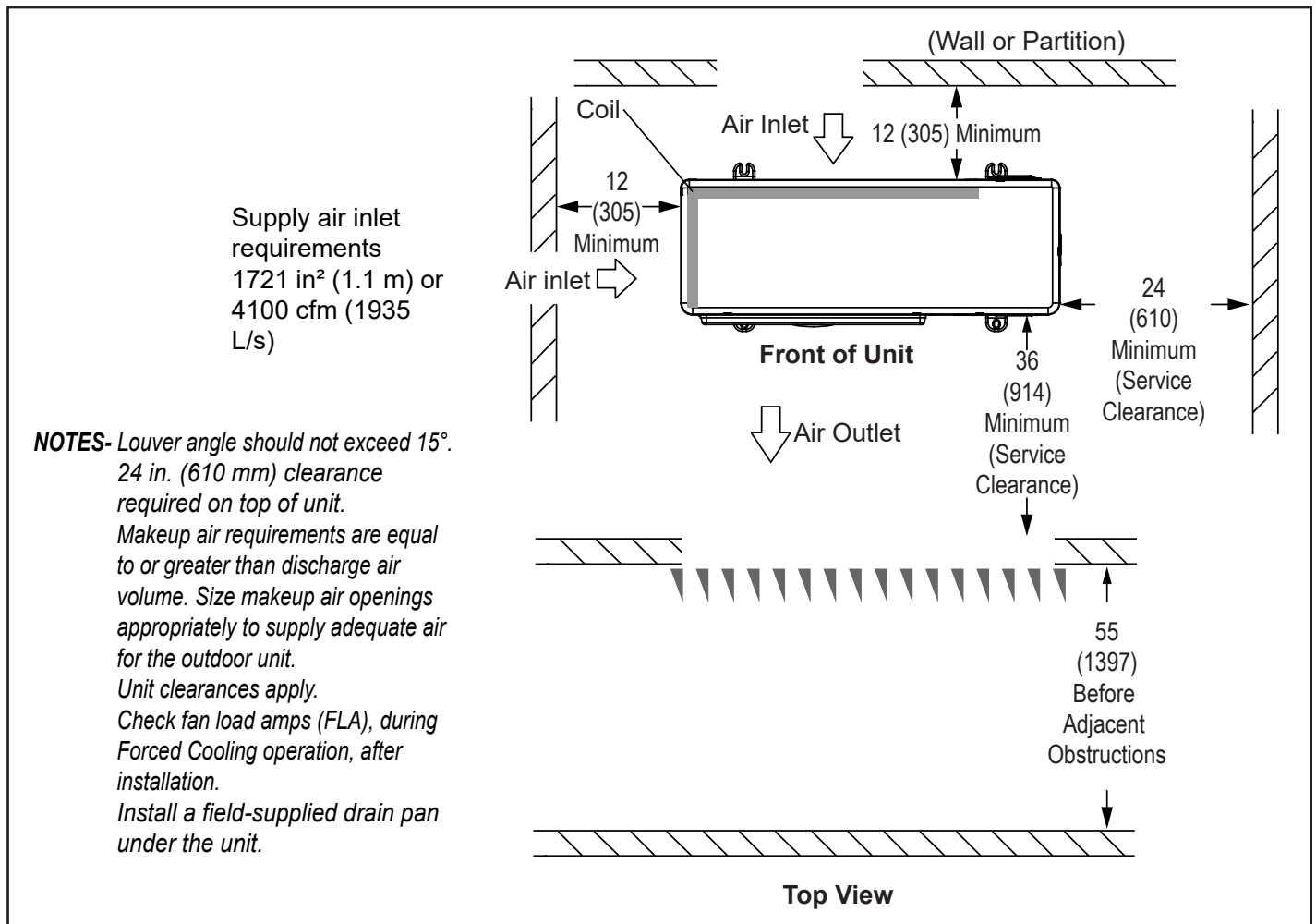


Figure 12. Inside Installation Clearances

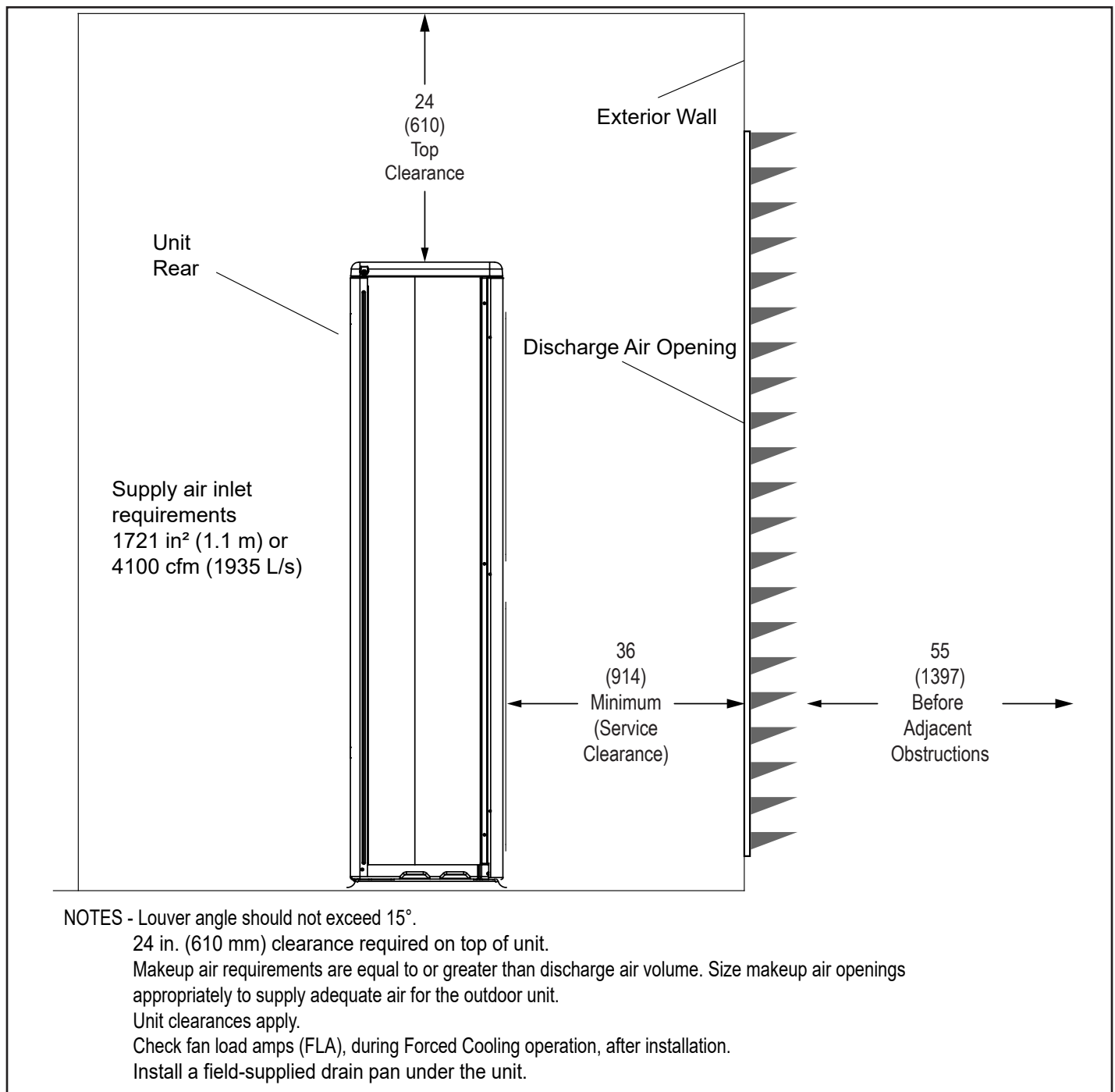


Figure 13. Louvered Discharge Opening Considerations

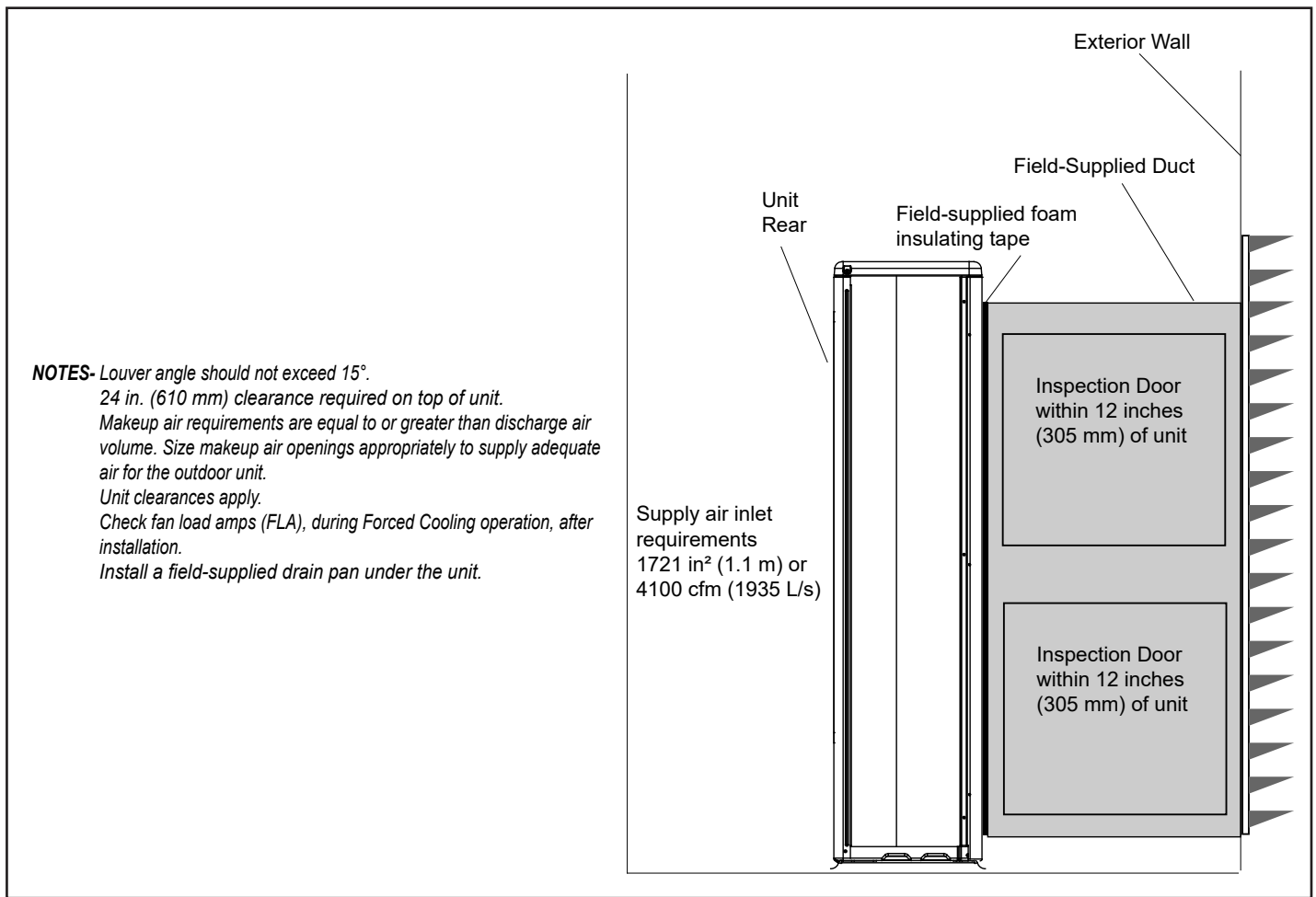


Figure 14. Ducted Discharge Considerations

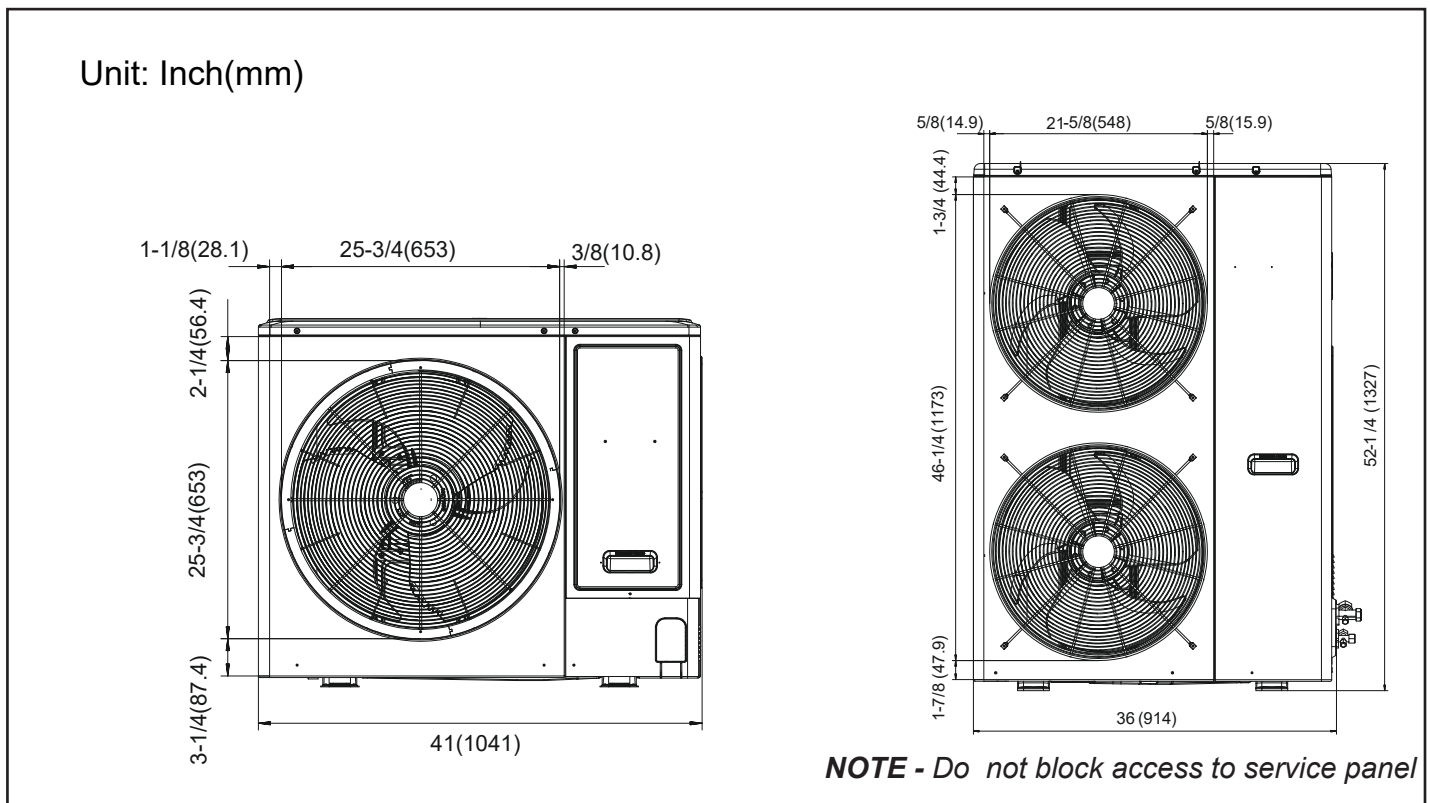


Figure 15. Unit Front Dimensions

⚠ WARNING

Refrigerant leaks are unlikely; however, if a refrigerant leak occurs, 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.

Both liquid and gas (vapor) lines must be individually insulated.

Field piping consists of two field-provided copper refrigerant lines connected to the outdoor unit. These lines carry the liquid and vapor refrigerant to and from the indoor unit(s).

Table 1. Maximum Number of Indoor Units

Outdoor Unit Model	Capacity	Maximum Number of Indoor Units
VPC018H4M-3P	1.5 ton	3
VPC024H4M-3P	2 ton	4
VPC036H4M-3PS*	3 ton	5
VPC036H4M-3PD*	3 ton	5
VPC048H4M-3P	4 ton	7
VPC060H4M-3P	5 ton	9

*S means single fan unit, D means dual fan unit.

Refrigerant piping and wiring connections can be brought into the single fan outdoor unit through openings provided in the front, back side, or bottom of the unit. Dual fan cabinets have external refrigerant pipe connections See Figure 16.

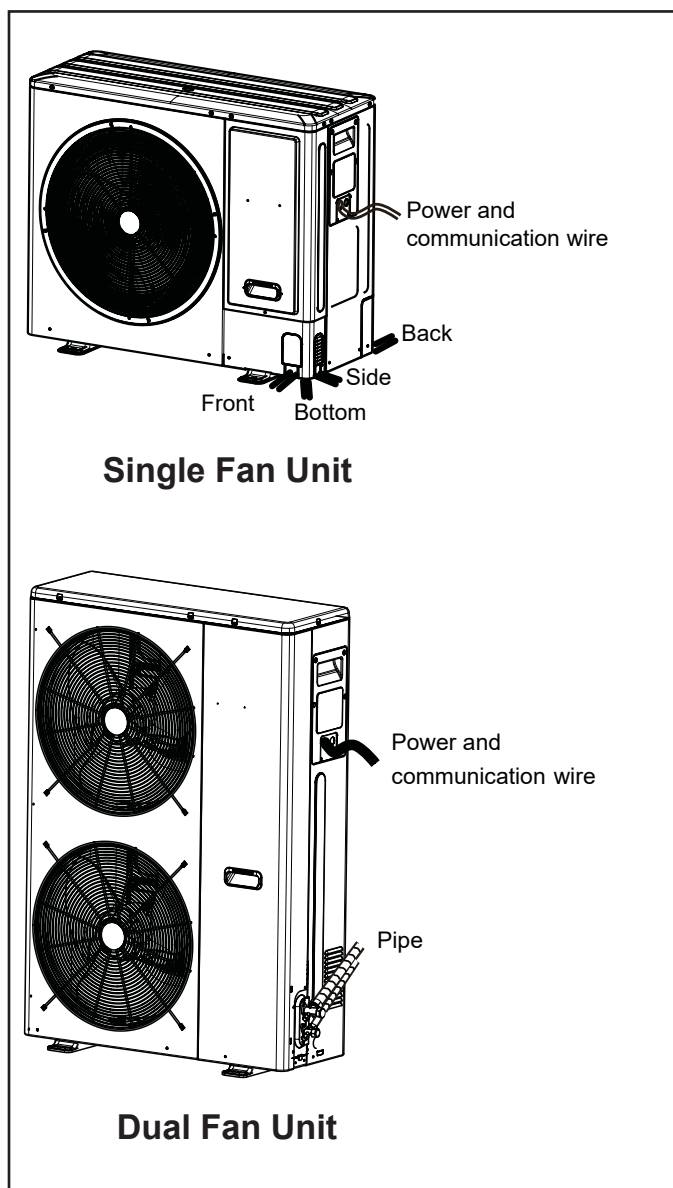


Figure 16. Refrigerant Piping / Wiring Inlets

Table 2 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 2. Refrigerant Piping Connections

Outdoor Unit Model	Liquid Line	Gas (Vapor) Line
VPC018H4M-3P	3/8 in.	5/8 in.
VPC024H4M-3P		
VPC036H4M-3PS*		
VPC036H4M-3PD*	3/8 in.	3/4 in.
VPC048H4M-3P		
VPC060H4M-3P		

When multiple indoor units are served by a single outdoor unit, the refrigerant piping must be connected using either individual branch pipes or four-port header kits. Optional branch pipes V8IDBP01 and V8IDBP02, and header kits V8HDRK04 are ordered separately.

Refer to the instruction manual for detailed installation instructions for each.

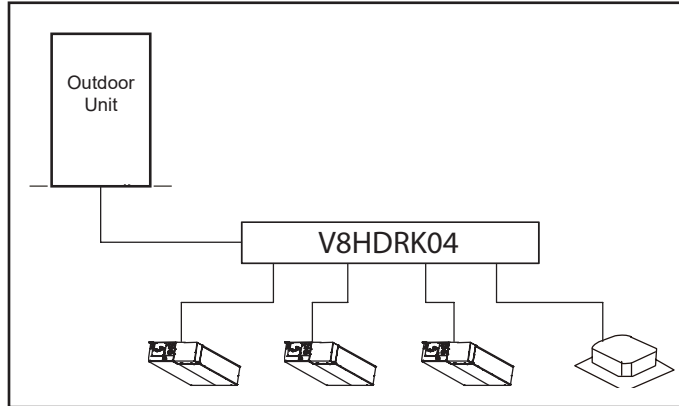


Figure 17. Connection to Header Pipe Kit

The header kits can be used to connect a maximum of four indoor units to the outdoor unit. When the system includes five, six, seven, or eight indoor units, two four-port header kits must be used. When the system includes nine indoor units, two header kits and a branch joint is 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.

Provide 24 to 36 inches (610 to 914 mm) of straight pipe before and after each header pipe kit to avoid creating refrigerant turbulence and flash points. Failure to follow 24 inch (610 mm) minimum guideline can lead to reduced capacity and equipment damage.

Support piping on both sides of the header kit.

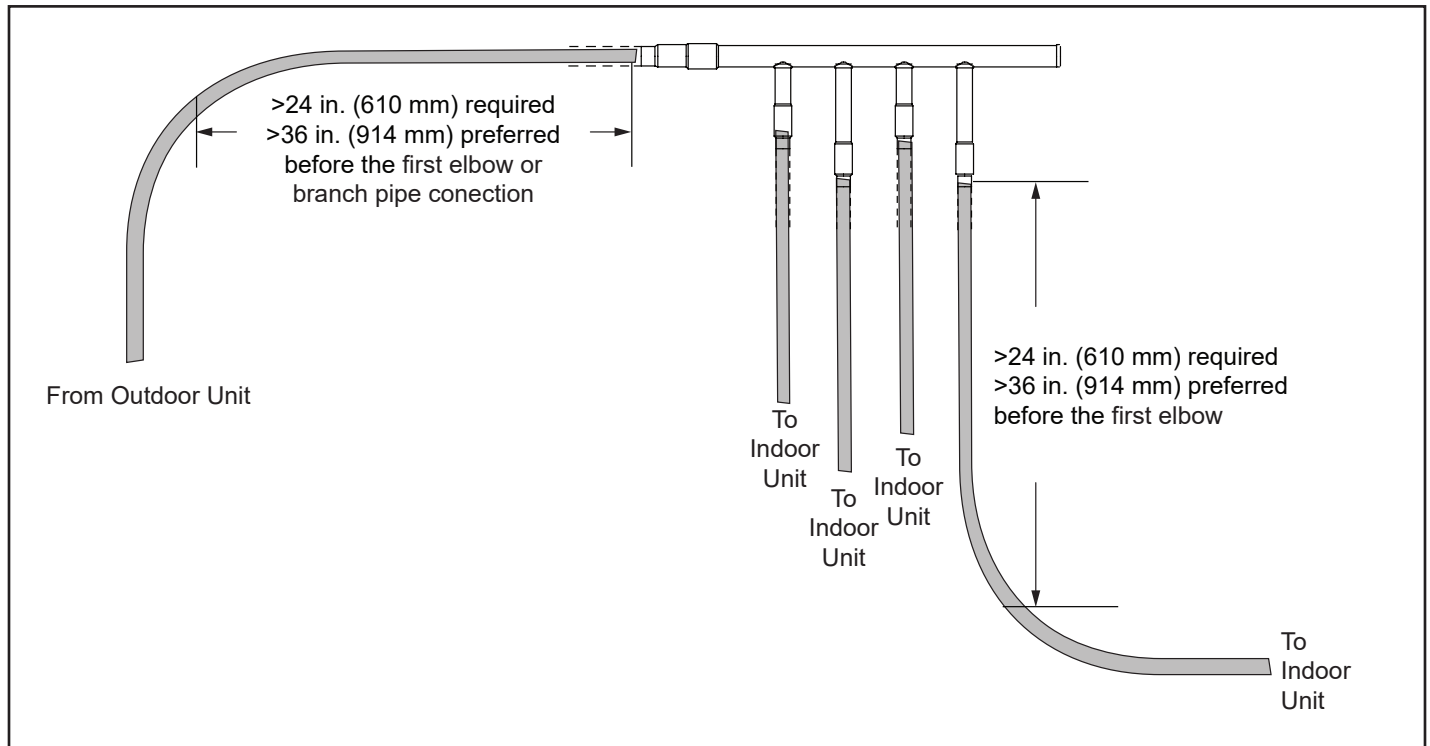


Figure 18. 24 to 36 inches (610 to 914 mm) of Straight Pipe Before and After Header Pipe Kit

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 from the connections on the unit 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 R-410A refrigerant lubricant to the outside of the flared refrigerant lines (Figure 19-A).

! IMPORTANT

The compressor in this unit contains PVE oil (Polyvinylether). PVE oil is formulated for hydrofluorocarbon (HFC) refrigerants, such as R-410a, which this system contains. While it may have some miscibility properties with mineral-based oil and POE oil (Polyolester), it is not recommended to mix PVE oil with any other type of refrigerant oil.

5. Align the threaded connections with the flared refrigerant lines. Tighten the flare nuts lightly at first to obtain a smooth match (Figure 19-B).
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 3 recommendations. See Figure 20. **Do not over-tighten a flared joint. Flared connections should always be accessible and must be insulated to prevent condensation.**

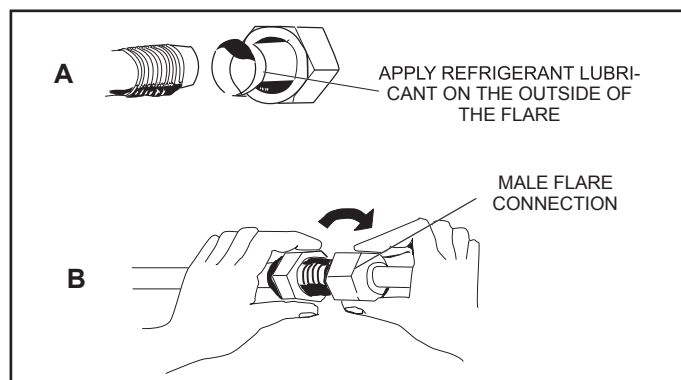


Figure 19. Making Connections (Male to Female Connection)

! IMPORTANT

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

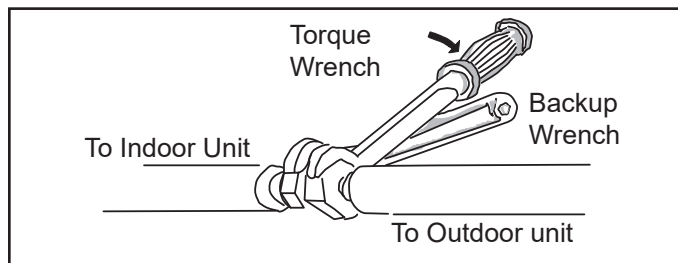


Figure 20. Tighten Flare Nut

Table 3. Flare Nut Torque Recommendations

Outside Diameter	Recommended Torque	No torque wrench available Finger tighten and use an appropriately sized wrench to turn an additional:
Inches		
3/8"	26 ft.-lb. (35 N-m)	1/2 turn
5/8"	48 ft.-lb. (65 N-m)	1 turn
3/4"	60 ft.-lb. (81 N-m)	1 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 strainers.
8. After refrigerant piping has been installed and checked for leaks, apply insulation over all flared connections. See Figure 21.

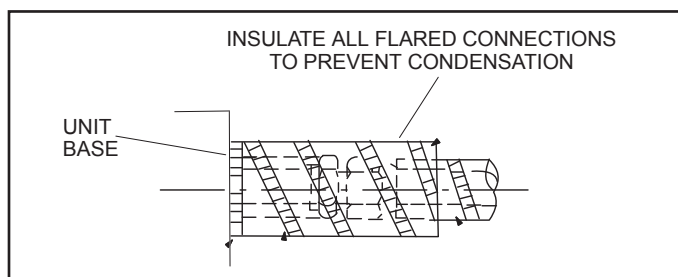
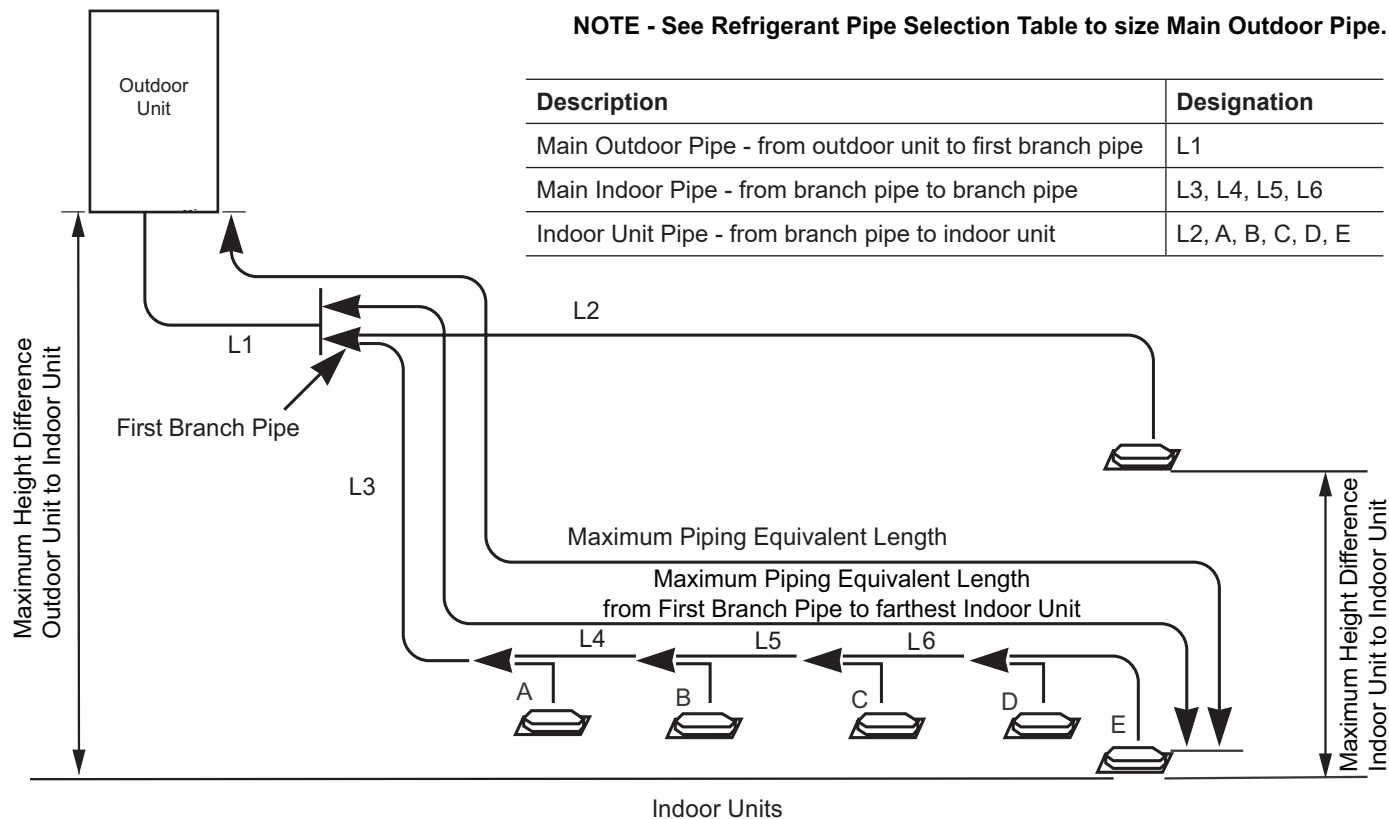


Figure 21. Insulate Flared Connections

Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - With Branch Pipe

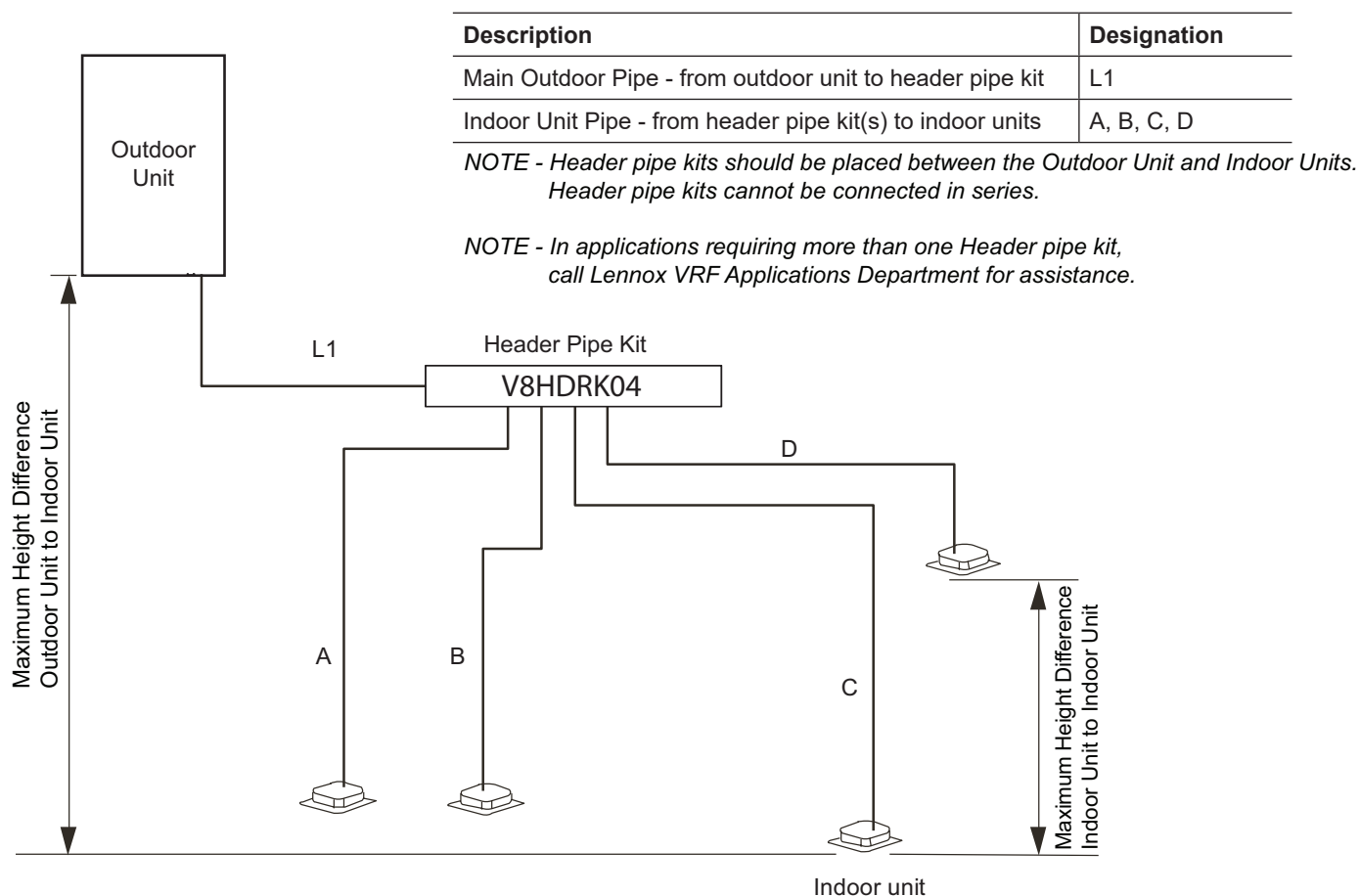


Length and Maximum Height Difference			Maximum Permitted Length	Piping
Pipe Length	Total Piping Length (Actual)		≤492 ft. (150 m)	L1+L2+L3+L4+L5+L6 +A+B+C+D+E
	Maximum Piping Length	Actual Length	≤296 ft. (90 m)	L1+L3+L4+L5+L6+E
		Equivalent Length	≤328 ft. (100 m)	
	Pipe length (from the first line branch pipe to farthest indoor unit)		≤131 ft. (40 m)	L3+L4+L5+L6+E
Maximum Height Difference	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up	≤164 ft. (50 m)	- - -
		Outdoor Unit Down	≤131 ft. (40 m)	- - -
	Indoor Unit to Indoor Unit Maximum Height Difference		≤49 ft. (15 m)	- - -

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

Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - With One Header Pipe Kit

NOTE - See Refrigerant Pipe Selection Table to size Main Outdoor Pipe.



Length and Maximum Height Difference			Maximum Permitted Length	Piping
Pipe Length	Total Piping Length (Actual)		≤492 ft. (150 m)	L1+A+B+C+D
	Maximum Piping Length	Actual Length	≤296 ft. (90 m)	L1+A, L1+B, L1+C, L1+D
		Equivalent Length	≤328 ft. (100 m)	
	Pipe length (from the header pipe kit to each indoor unit)		65.6 ft. (20 m)	A, B, C, D ≤ 65.6 ft. (20 m) each
Maximum Height Difference	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up	≤164 ft. (50 m)	- - -
		Outdoor Unit Down	≤131 ft. (40 m)	- - -
	Indoor Unit to Indoor Unit Maximum Height Difference		≤49 ft. (15 m)	- - -

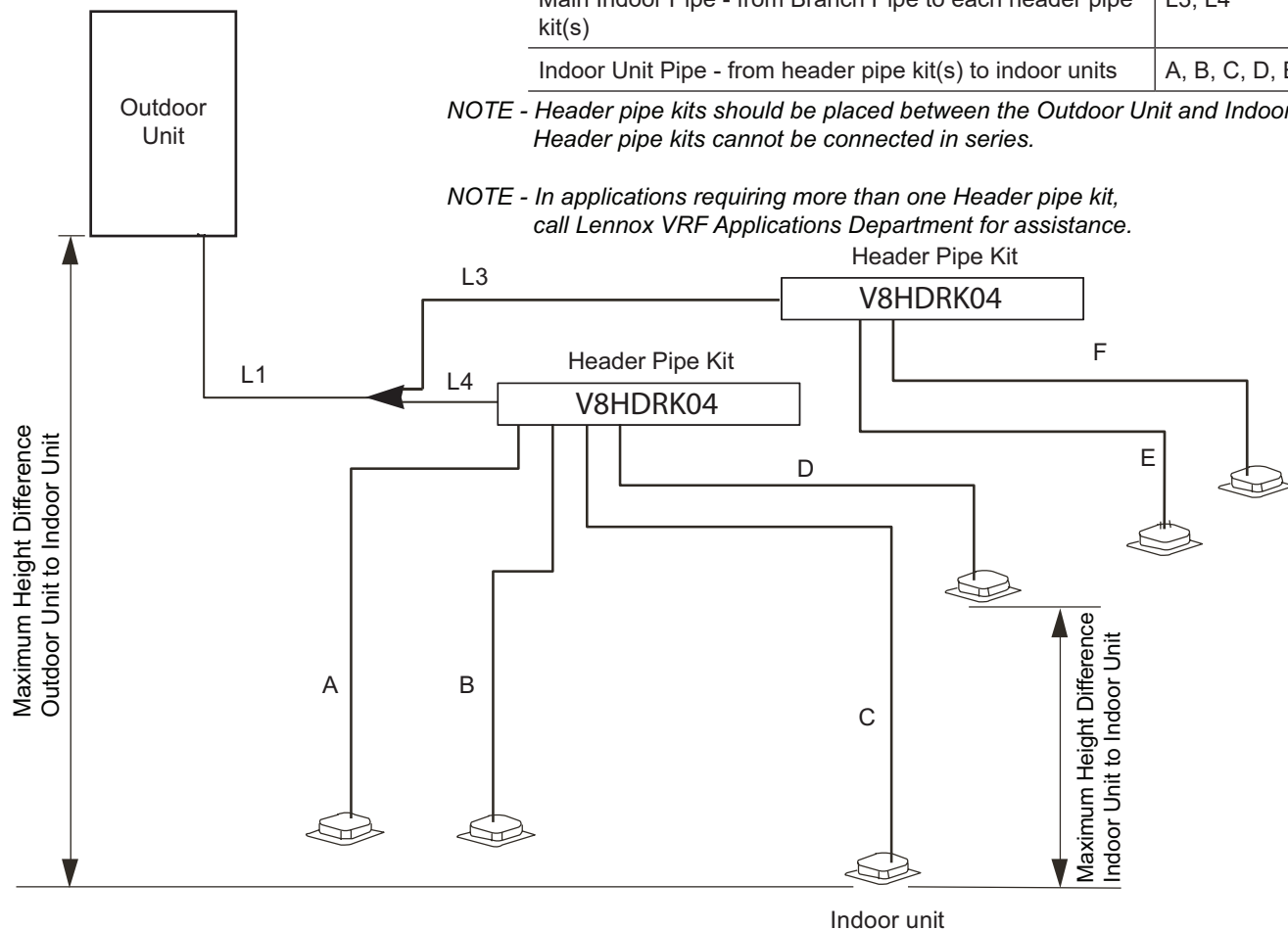
Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - With Two Header Pipe Kits

NOTE - See Refrigerant Pipe Selection Table 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 each header pipe kit(s)	L3, L4
Indoor Unit Pipe - from header pipe kit(s) to indoor units	A, B, C, D, E, F

NOTE - Header pipe kits should be placed between the Outdoor Unit and Indoor Units. Header pipe kits cannot be connected in series.

NOTE - In applications requiring more than one Header pipe kit, call Lennox VRF Applications Department for assistance.



Length and Maximum Height Difference			Maximum Permitted Length	Piping
Pipe Length	Total Piping Length (Actual)		≤492 ft. (150 m)	L1+A+B+C+D+E+F+L3+L4
	Maximum Piping Length	Actual Length	≤296 ft. (90 m)	L1+L4+A, L1+L4+B, L1+L4+C, L1+L4+D, L1+L3+E, L1+L3+F
		Equivalent Length	≤328 ft. (100 m)	
	Pipe length from the first Branch Pipe to each indoor unit.		65.6 ft. (20 m)	L4+A, L4+B, L4+C, L4+D, L3+E, L3+F ≤ 65.6 ft. (20 m) each
Maximum Height Difference	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up	≤164 ft. (50 m)	---
		Outdoor Unit Down	≤131 ft. (40 m)	---
	Indoor Unit to Indoor Unit Maximum Height Difference		≤49 ft. (15 m)	---

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

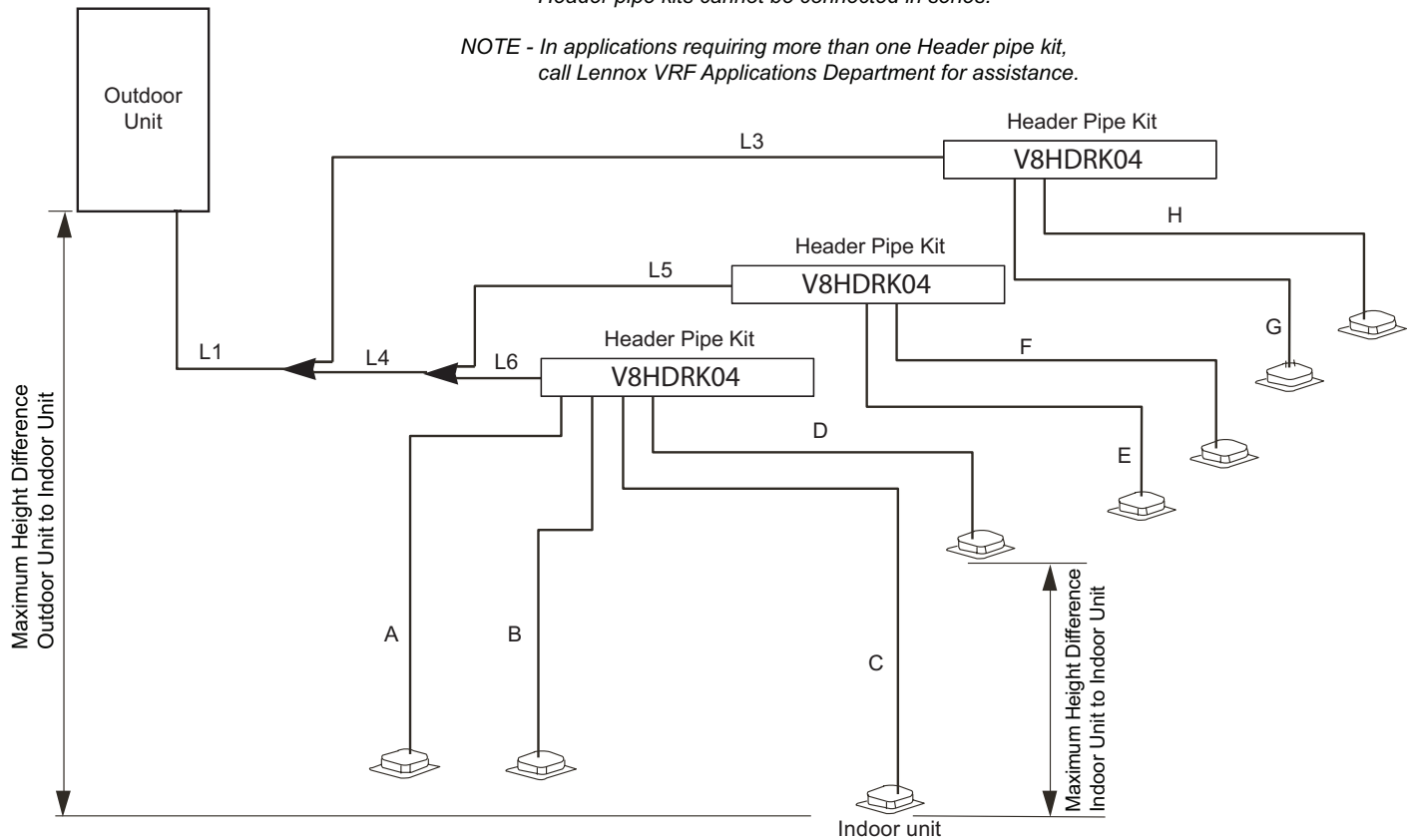
Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference - With Three Header Pipe Kits

NOTE - See Refrigerant Pipe Selection Table 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 each header pipe kit(s) or Branch Pipe	L3, L4, L5, L6
Indoor Unit Pipe - from header pipe kit(s) to indoor units	A, B, C, D, E, F, G, H

*NOTE - Header pipe kits should be placed between the Outdoor Unit and Indoor Units.
Header pipe kits cannot be connected in series.*

NOTE - In applications requiring more than one Header pipe kit, call Lennox VRF Applications Department for assistance.



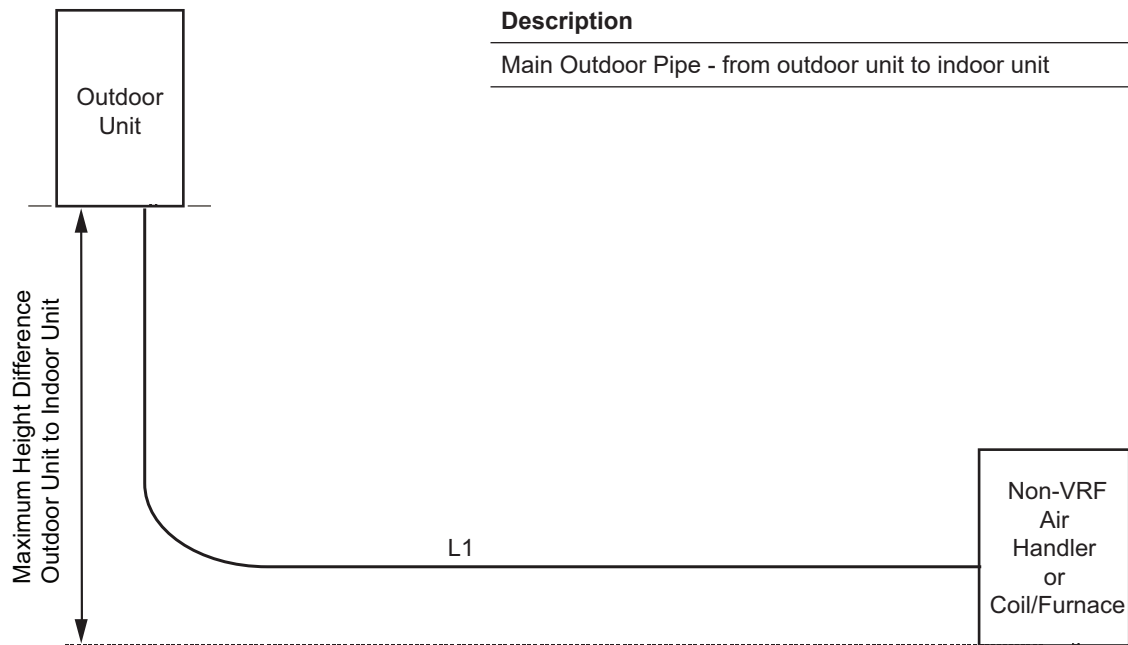
Length and Maximum Height Difference			Maximum Permitted Length	Piping
Pipe Length	Total Piping Length (Actual)		≤492 ft. (150 m)	L1+A+B+C+D+E+F+G+H+L3+L4+L5+L6
	Maximum Piping Length	Actual Length	≤296 ft. (90 m)	L1+L4+L6+A, L1+L4+L6+B, L1+L4+L6+C, L1+L4+L6+D, L1+L4+L5+E, L1+L4+L5+F, L1+L3+H, L1+L3+G
		Equivalent Length	≤328 ft. (100 m)	
	Pipe length from the first Branch Pipe to each indoor unit.		65.6 ft. (20 m)	L4+L6+A, L4+L6+B, L4+L6+C, L4+L6+D, L4+L5+E, L4+L5+F, L3+H, L3+G ≤ 65.6 ft. (20 m) each
Maximum Height Difference	Indoor Unit to Outdoor Unit Maximum Height Difference	Outdoor Unit Up	≤164 ft. (50 m)	---
		Outdoor Unit Down	≤131 ft. (40 m)	---
	Indoor Unit to Indoor Unit Maximum Height Difference		≤49 ft. (15 m)	---

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

Maximum Permitted Refrigerant Pipe Length and Maximum Height Difference – With Non-VRF Air Handler or Coil/Furnace

NOTE - See Refrigerant Pipe Selection Table to size Main Outdoor Pipe.

Description	Designation
Main Outdoor Pipe - from outdoor unit to indoor unit	L1



Length and Maximum Height Difference			Maximum Permitted Length	Piping
Pipe Length	Maximum Piping Length	Actual Length	≤164 ft. (50 m)	L1
		Equivalent Length	≤180 ft. (55 m)	
Maximum Height Difference	Indoor Unit to Outdoor Unit Maximum Height Difference		≤98 ft. (30 m)	

NOTE - The air handler unit must have a furnished thermostatic expansion valve.

Refrigerant Pipe Selection

Table 4. Main Outdoor Piping Sizes for Connection to VRF Indoor Units and AHU Control Kits
MAIN OUTDOOR UNIT PIPE (L1) DIAMETER AND PIPE LENGTH BASED ON TOTAL CAPACITY

Model No.	Liquid Pipe Length	Main Gas (Vapor) Pipe Diameter Required	Main Liquid Pipe Diameter Required	Maximum Number of Indoor Units	Indoor Unit Branch Pipe
VPC018H4M-3P	Less than 148 ft. (45 m)	5/8 in.	3/8 in.	3	V8IDBP01
	More than 148 ft. (45 m)	5/8 in.	3/8 in.		
VPC024H4M-3P	Less than 148 ft. (45 m)	5/8 in.	3/8 in.	4	
	More than 148 ft. (45 m)	5/8 in.	3/8 in.		
VPC036H4M-3PS	Less than 148 ft. (45 m)	5/8 in.	3/8 in.	5	
	More than 148 ft. (45 m)	¹ 3/4 in.	3/8 in.		
VPC036H4M-3PD	Less than 148 ft. (45 m)	¹ 5/8 in.	3/8 in.	5	
	More than 148 ft. (45 m)	3/4 in.	3/8 in.		
VPC048H4M-3P	Less than 148 ft. (45 m)	¹ 5/8 in.	3/8 in.	7	
	More than 148 ft. (45 m)	3/4 in.	3/8 in.		
VPC060H4M-3P	Less than 148 ft. (45 m)	3/4 in.	3/8 in.	9	V8IDBP01
	More than 148 ft. (45 m)	² 7/8 in.	3/8 in.		V8IDBP02

¹ Field provided 5/8 x 3/4 in. adaptor required for gas pipe connection.

² Field provided 5/8 x 7/8 in. adaptor required for gas pipe connection.

Table 5. Main Outdoor Piping Sizes for One-to-One Connection to Non-VRF Air Handler of Furnace New Installations

MAIN OUTDOOR UNIT PIPE (L1) DIAMETER AND ALLOWED LINE SET DIAMETER WITH AIR HANDLER

Model No.	Main Outdoor Unit Pipe	
	Gas (Vapor) Pipe Diameter Required	Liquid Pipe Diameter Required
VPC018H4M-3P	¹ 3/4 in.	3/8 in.
VPC024H4M-3P	¹ 3/4 in.	3/8 in.
VPC036H4M-3PS	¹ 3/4 in.	3/8 in.
VPC036H4M-3PD	3/4 in.	3/8 in.
VPC048H4M-3P	² 7/8 in.	3/8 in.
VPC060H4M-3P	² 7/8 in.	3/8 in.

¹ Field provided 5/8 x 3/4 in. adaptor required for gas (vapor) pipe connection at outdoor unit.

² Field provided 5/8 x 7/8 in. adaptor required for gas (vapor) pipe connection at outdoor unit.

Table 6. Main Outdoor Piping Sizes for One-to-One Connection to Non-VRF Air Handler of Furnace Retrofit Installations

ALLOWABLE LINE SET DIAMETER FROM EXISTING SYSTEM WITH NON-VRF AIR HANDLER OR COIL/FURNACE

Model No.	Outdoor Unit		Existing Line Sets						
	Gas Pipe Connection	Liquid Pipe Connection	Gas Pipe Existing Line Set Diameter				Liquid Pipe Existing Line Set Diameter		
			5/8 in.	3/4 in.	7/8 in.	1-1/8 in.	1/4 in.	5/16 in.	3/8 in.
VPC018H4M-3P	3/4 in.	3/8 in.	¹ •	•	N/A	N/A	⁴ •	⁵ •	•
VPC024H4M-3P	3/4 in.	3/8 in.	¹ •	•	N/A	N/A	N/A	⁵ •	•
VPC036H4M-3PS	3/4 in.	3/8 in.	N/A	•	N/A	N/A	N/A	⁵ •	•
VPC036H4M-3PD	3/4 in.	3/8 in.	N/A	•	² •	N/A	N/A	N/A	•
VPC048H4M-3P	7/8 in.	3/8 in.	N/A	N/A	•	³ •	N/A	N/A	•
VPC060H4M-3P	7/8 in.	3/8 in.	N/A	N/A	•	³ •	N/A	N/A	•

¹ Field provided 3/4 x 5/8 in. adaptor required for gas (vapor) pipe connection to outdoor unit.

² Field provided 3/4 x 7/8 in. adaptor required for gas (vapor) pipe connection to outdoor unit.

² Field provided 7/8 x 1-1/8 in. adaptor required for gas (vapor) pipe connection to outdoor unit.

⁴ Field provided 3/8 x 1/4 in. adaptor required for liquid pipe connection to outdoor unit.

⁵ Field provided 3/8 x 5/16 in. adaptor required for liquid pipe connection to outdoor unit.

Table 7. Main Indoor Piping Sizes for Connection to VRF Indoor Units and AHU Control Kits

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

Downstream Indoor Unit Capacity (Btuh)	Gas (Vapor) Pipe Diameter	Liquid Pipe Diameter	Indoor Unit Branch Pipe
A < 56,700	5/8 in.	3/8 in.	V8IDBP01
56,700 ≤ 78,500	3/4 in.	3/8 in.	V8IDBP01

Table 8. Indoor Piping Sizes for Connection to VRF Indoor Units and AHU Control Kits**INDOOR PIPE SELECTION (L2, A, B, C, D, E, F, G, H)**

Indoor Unit Type	Indoor Unit Size	Gas (Vapor) Pipe Diameter	Liquid Pipe Diameter
V22B Compact 360° Cassette	007, 009, 012, 015	1/2 in.	1/4 in.
V33B High Efficiency 360° Cassette	009, 012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048	5/8 in.	3/8 in.
VOWA One-Way Cassette	007, 009, 012, 015	1/2 in.	1/4 in.
	018, 024	5/8 in.	3/8 in.
VCFB Ceiling/Floor Mount Non-Ducted	012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048	5/8 in.	3/8 in.
VHIB Concealed High Static Ducted	012, 015	1/2 in.	1/4 in.
	024, 030, 036, 048, 054	5/8 in.	3/8 in.
	072	7/8 in.	3/8 in.
VOSB Outside Air Unit	036, 048, 054	5/8 in.	3/8 in.
VMDB Concealed Medium Static Ducted	007, 009, 012, 015	1/2 in.	1/4 in.
	018, 024, 030, 036, 048	5/8 in.	3/8 in.
VSCA/VSEA Floor Standing Units (Cased/Exposed)	007, 009, 012, 015, 018	1/2 in.	1/4 in.
	024	5/8 in.	3/8 in.
VVCB Vertical Air Handler	012	1/2 in.	1/4 in.
	018, 024, 030, 036, 048, 054	5/8 in.	3/8 in.
	060	7/8 in.	3/8 in.
	007, 009, 012, 015	1/2 in.	1/4 in.
VWMB Wall-Mounted Non-Ducted	018, 024, 030	5/8 in.	3/8 in.

NOTE - 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.

Table 9. Total Piping Length and Indoor Unit Combination Ratios for Connection to VRF Indoor Units and AHU Control Kits**INDOOR UNIT COMBINATION RATIO**

Indoor Units	Combination Ratio	Total Piping Length
Standard indoor units (Except VVCB and VHIB)	≤ 100%	< 492 ft. (150 m)
Standard indoor units (Includes VVCB or VHIB)	≤ 100%	< 492 ft. (150 m)
	100% - 130%	< 328 ft. (100 m)
Contains Air Handler Control Kit	≤ 100%	< 492 ft. (150 m)
Only VOSB indoor unit	≤ 100%	< 492 ft. (150 m)
VOSB and other types of indoor units	Not allowed	Not allowed
VVCB Vertical Air Handler	≤ 100%	< 164 (50 m)

NOTE - Minimum combination ratio of VPC018H4M is 65%, all others are 50%.

- 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.
- Flow the pipework with dry (oxygen-free) nitrogen (2.9 psig (20 kPa) or 3 CFH (85 LPH) during brazing to avoid oxidation which may block the refrigerant piping.
- Do not use anti-oxidants when brazing.
- Do not use flux when brazing copper-to-copper piping. Use phosphor copper brazing filler alloy (BCuP) which does not require flux. Flux has a harmful effect on refrigerant pipe.
- Use a wet cloth to insulate the shut-off valve during brazing.
- Use dedicated gauges and hoses with R-410A equipment.

Pressure Test

- Follow the pressure test specifications in Table 10 for pressure test.
- Use oxygen-free nitrogen to pressure test to 600 psig (4137 kPa) and hold for 1 hour.

Evacuate System

- Follow the triple evacuation process described on this page evacuate the system.
- Use a vacuum pump capable of evacuating to lower than 500 Microns (0.5 Torr).
- Do not open any of the outdoor unit shut-off valves (possible max 5 valves). The outdoor unit does not need to be evacuated.
- Evacuate the system to 500 Microns (0.5 Torr), or below, for 4 hours.

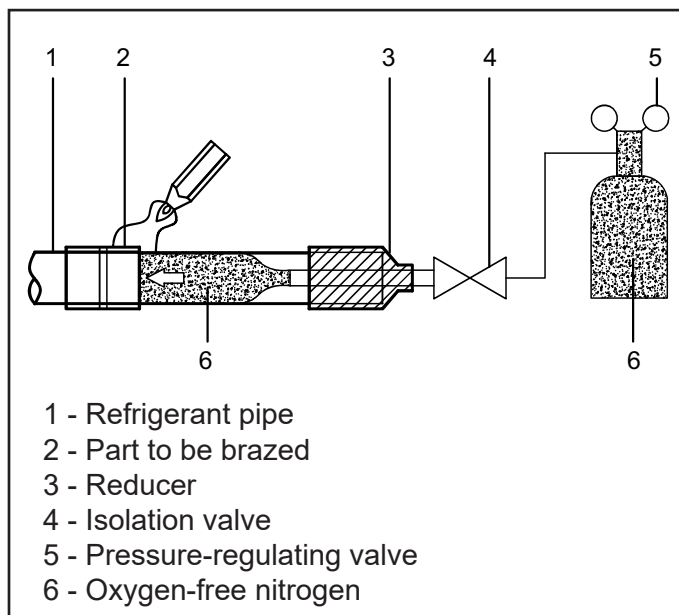


Figure 22. Brazing Best Practices

⚠ IMPORTANT

Use only oxygen-free nitrogen (OFN).

Table 10. Pressure Test Specifications

1	3 bar	44 psig (303 kPa)	Minimum of 10 minutes
2	15 bar	220 psig (1517 kPa)	Minimum of 10 minutes
3	32 bar	470 psig (3241 kPa)	Minimum of 10 minutes
4	41 bar	600 psig (4137 kPa)	1 hour. Stress test to prove the integrity of the complete installation.
5	32 bar	470 psig (3241 kPa)	24 hours. Lower system pressure test, after confirmation No. 4 was successfully completed.

Triple Evacuation Procedure

A Micron or Torr gauge must be used for this procedure.

1. Discharge the oxygen-free nitrogen and evacuate the system to a reading of 8000 Microns (8 Torr) using all service valves.
2. Break the vacuum by allowing nitrogen into the two inter-connecting pipework port connections (vapor line pipe and liquid line pipe) until a positive pressure is achieved.
3. Evacuate the system to a reading of 5000 Microns (5 Torr).
4. Break the vacuum by allowing nitrogen into the two inter-connecting pipework port connections (vapor line pipe and liquid line pipe) until a positive pressure is achieved.
5. Evacuate the system to a minimum reading of 500 Microns (0.5 Torr).
6. For a moisture free system, ensure the vacuum is held without movement for a minimum of 4 hours.
7. If pressure loss is detected, carry out steps 2 through 6 until no pressure loss is observed.

Additional Refrigerant Charge

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 11 lists the refrigerant piping sizes along with the refrigerant adjustment required per foot of liquid line pipe.

This system is suitable for use with R-410A refrigerant only.

1. Calculate the additional refrigerant charge using the diameter and length of the liquid pipe (only)

Liquid Line Length Calculation

Calculate additional refrigerant charge using the diameter and length of the liquid pipe.

Table 11. Refrigerant Charge Adjustment

Liquid Line Pipe Size	Additional Refrigerant Per Foot of Pipe Length lb. (kg)
1/4 in.	0.015 lb. (0.007 kg)
3/8 in.	0.040 lb. (0.018 kg)
1/2 in.	0.080 lb. (0.036 kg)

2. Calculate the additional refrigerant charge for each liquid line branch pipe kit.
3. If the ratio of VMDB or V33B Indoor unit capacity exceeds 80% of all indoor units, use Table 12 to determine the additional refrigerant charge to add. For VPC036H4M-3PD units and larger, refer to Table 12 to know how much additional refrigerant to add for any VRF indoor unit.
4. Total all calculations.
5. Add the calculated additional refrigerant to the system.

Liquid Line Pipe Size	Additional Refrigerant Per Foot of Pipe Length lb. (kg)
5/8 in.	0.120 lb. (0.054 kg)
3/4 in.	0.181 lb. (0.082 kg)
7/8 in.	0.255 lb. (0.116 kg)

Branch Pipe Kit Calculation

Add .22 lb. (.09 kg) per EACH liquid line branch pipe for additional charge calculation.

Table 12. Additional Charge Amount of Indoor Unit

Outdoor Unit Model	Indoor Unit is VRF Unit lb. (kg)			Indoor Unit is Non-VRF Air Handler or Furnace/Coil lb. (kg)
	VVCB indoor units exceed 80% of all indoor units and indoor unit amount ≥ 2	V33B indoor units exceed 80% of all indoor units and indoor unit amount ≥ 2	Other	
VPC018H4M-3P	-	0.66 lb. (0.30 kg)	0.33 lb. (0.15 kg)	-
VPC024H4M-3P	1.54 lb. (0.70 kg)	1.10 lb. (0.50 kg)	0.66 lb. (0.30 kg)	-
VPC036H4M-3PS	1.65 lb. (0.75 kg)	1.52 lb. (0.69 kg)	0.66 lb. (0.30 kg)	-
VPC036H4M-3PD	1.32 lb. (0.60 kg)	1.76 lb. (0.80 kg)	-	0.44 lb. (0.20 kg)
VPC048H4M-3P	3.31 lb. (1.50 kg)	2.20 lb. (1.00 kg)	-	0.66 lb. (0.30 kg)
VPC060H4M-3P	4.96 lb. (2.25 kg)	2.20 lb. (1.00 kg)	-	0.73 lb. (0.33 kg)

Table 13. Maximum Refrigerant Charge Amount

Outdoor Unit Model	Maximum Refrigerant Charge Amount lb. (kg)
VPC018H4M-3P	22.77 lb. (10.32 kg)
VPC024H4M-3P	24.80 lb. (11.25 kg)
VPC036H4M-3PS	25.00 lb. (11.34 kg)

Outdoor Unit Model	Maximum Refrigerant Charge Amount lb. (kg)
VPC036H4M-3PD	30.35 lb. (13.76 kg)
VPC048H4M-3P	30.35 lb. (13.76 kg)
VPC060H4M-3P	30.35 lb. (13.76 kg)

NOTE - Follow the auto charge procedure when the charging information is not available in this manual. For example, when matching with a Non-VRF air handler or furnace with unknown coil volume and construction.

⚠ 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 over current protection size.

NOTE - Two-conductor, stranded, 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 circuit breaker and power supply.

1. Select the appropriate electrical inlet into the outdoor unit. Local and national codes apply.
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. Refer to unit nameplate for rated voltage.

⚠ IMPORTANT

Power wiring must comply with National, State, and Local codes.

NOTE - Use 18 GA 2-Conductor, Stranded, Shielded Communication Cable for connection to VRF indoor units and AHU Control Kits. Use solid core thermostat wire for connection to air handler or furnace.

NOTE - Connect to either PQ terminals or CBYW terminals but not both.

⚠ 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.

Do not install the unit near a lighting appliance that includes a ballast. The ballast may affect remote control operation.

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

Do not cross-connect refrigerant piping or signal wires between VRF systems. Each VRF system must be piped and wired separately.

Each indoor unit must have its own electrical disconnect.

Do not run signal wire and power wire in the same conduit; keep distance between the two conduits per local codes. (Make sure to set address of outdoor unit in case of parallel multi-outdoor units.)

Take care when making final power and control cable connections. Cross connection will result in damage to unit's main board.

Only apply power to the system after performing all of the pre-commissioning steps.

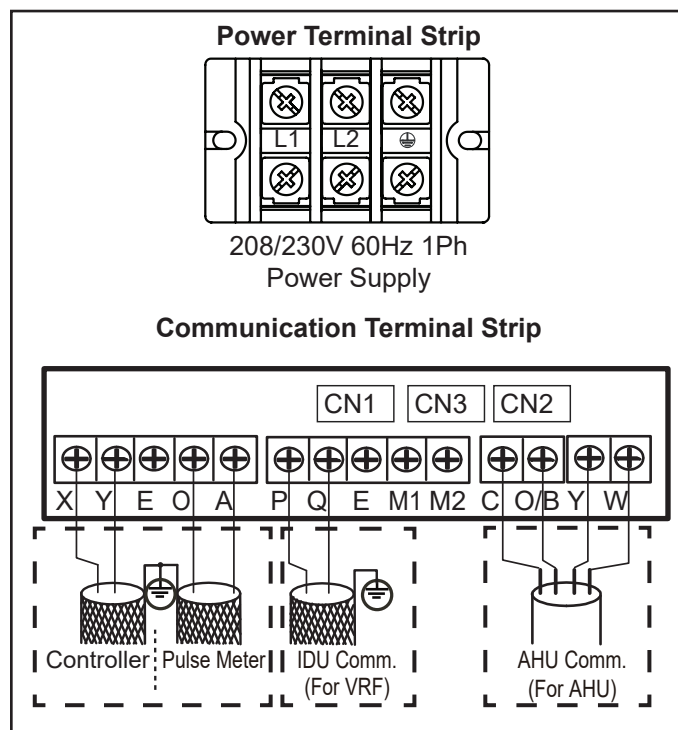
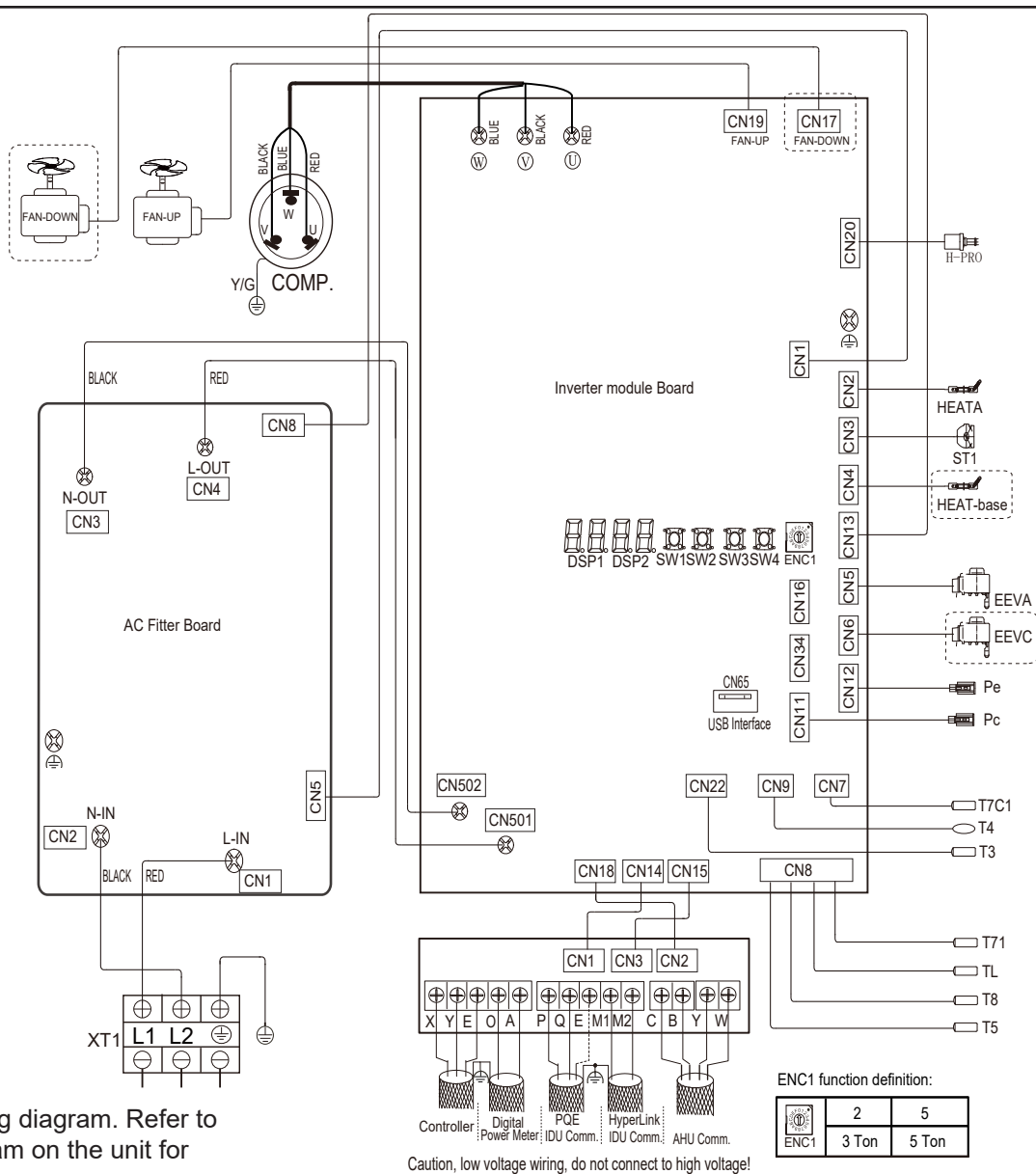


Figure 23. Wiring Terminals



Typical wiring diagram. Refer to wiring diagram on the unit for actual wiring.

Symbol	Name
COMP	Compressor
H-PRO	High Pressure Switch
HEATA	Crankcase heater
Pc	High pressure sensor
ST1	Four-way valve
T3	Heat exchanger temperature sensor
T5	Liquid pipe temperature sensor
TL	Heat exchanger liquid temperature sensor
T7C1	Discharge temperature sensor

Symbol	Name
Fan	DC Fan
EEVA/C	Electronic expansion valve
Heat-base	Chassis electric heating belt
Pe	Low pressure sensor
XT1	Terminal block
T4	Outdoor ambient temperature sensor
T8	Heat exchanger gas temperature sensor
T71	Suction temperature sensor

NOTE - When the unit is energized, after 10 seconds, the main board display will light up.

Figure 24. Typical Unit Wiring Diagram

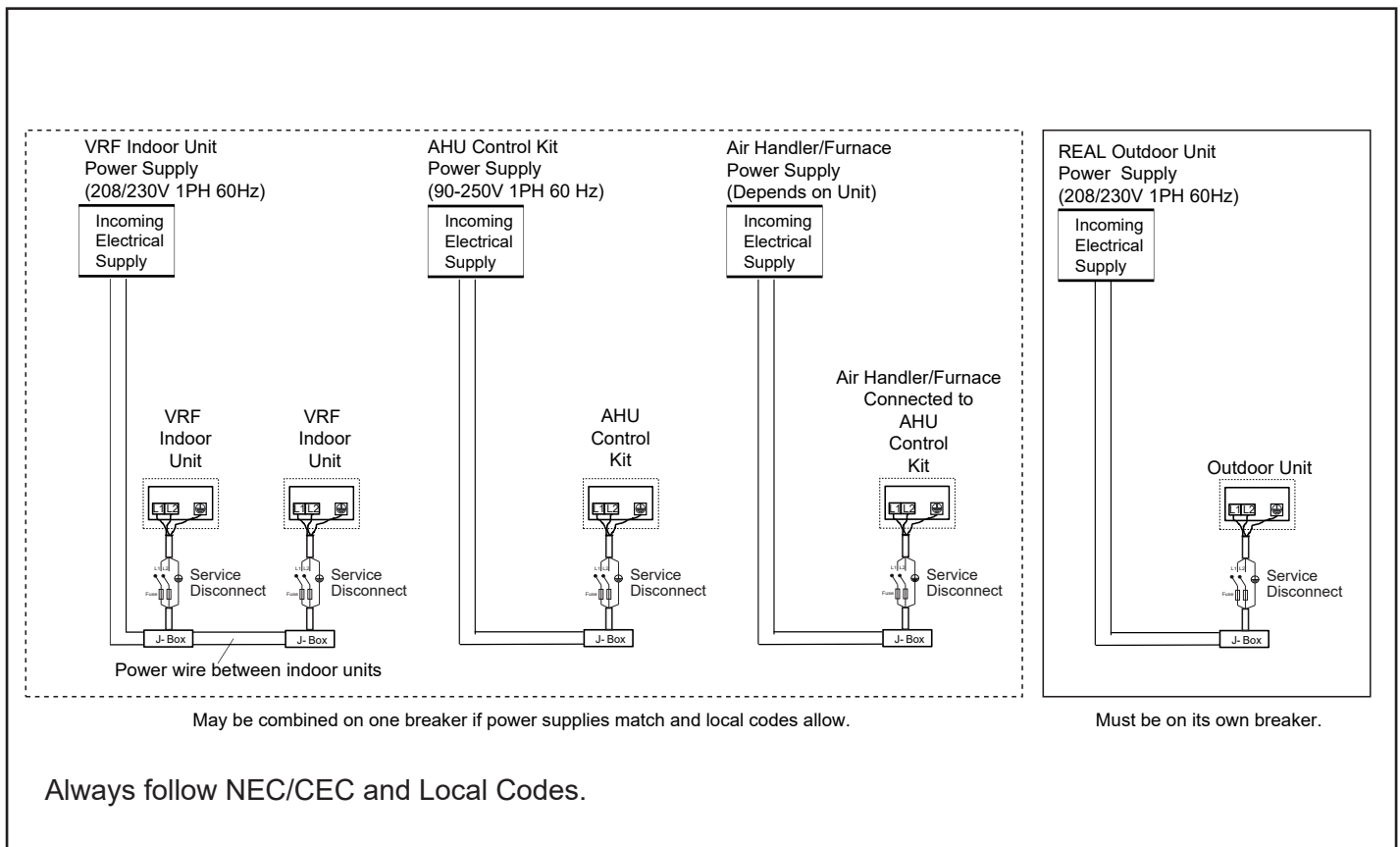


Figure 25. Typical REAL System Power Wiring

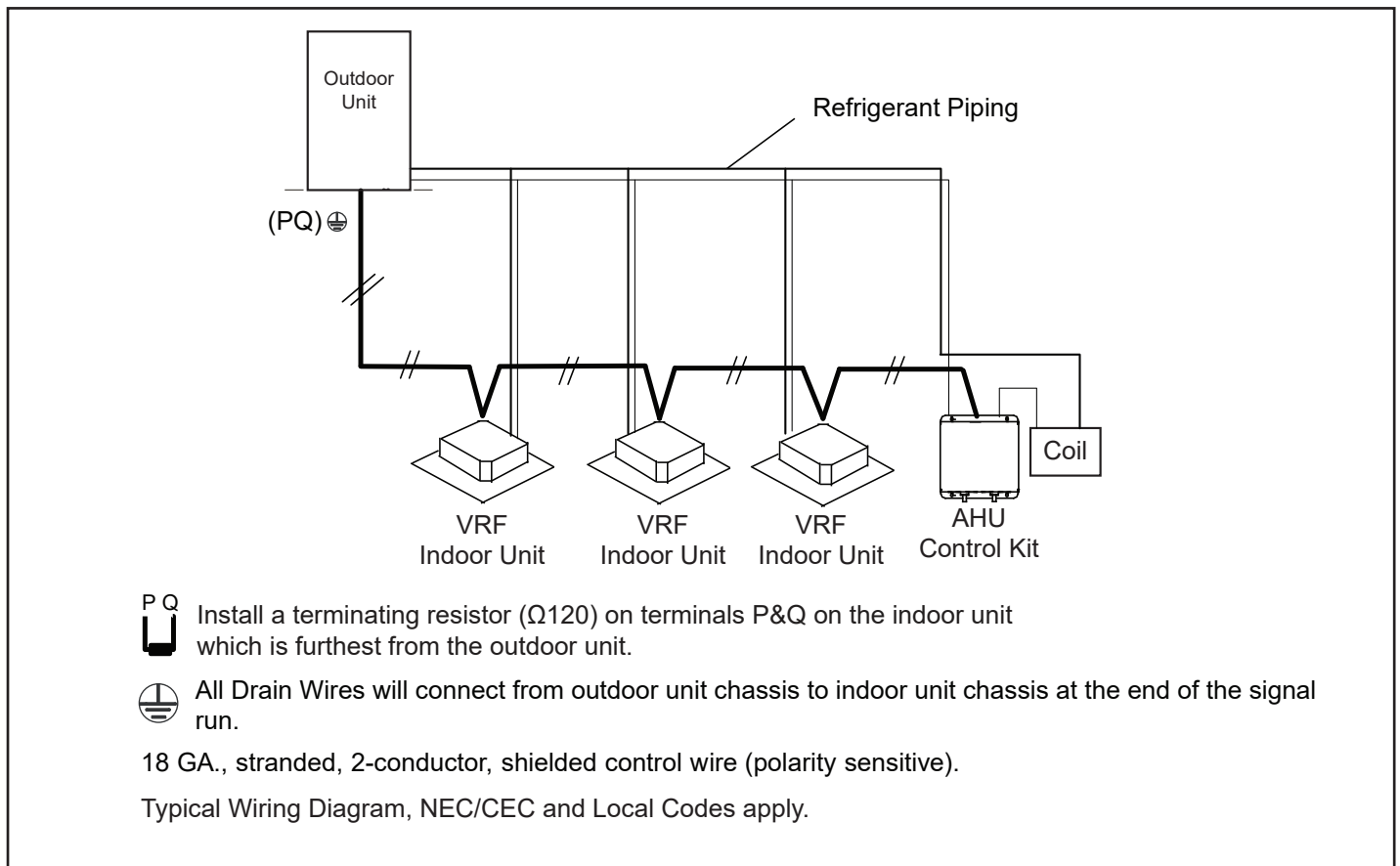
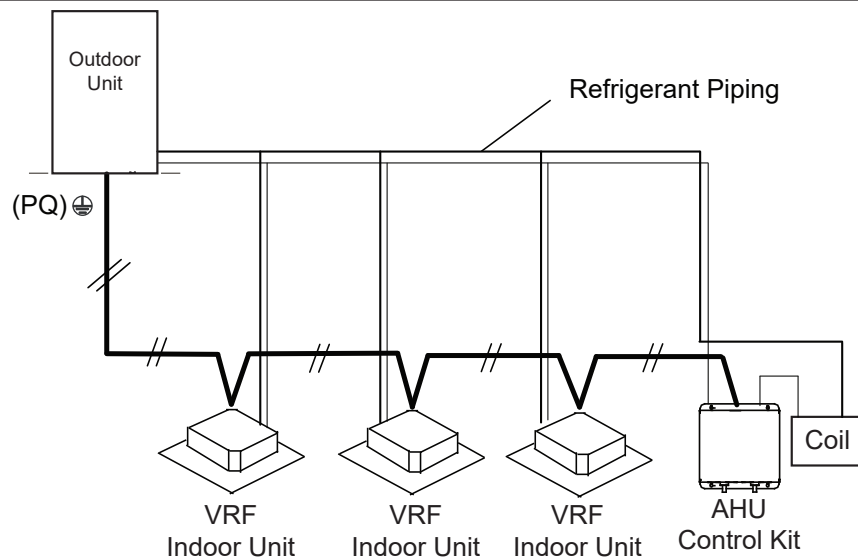


Figure 26. Typical VRF Indoor Unit and AHU Control Kit Communication Wiring



Install a terminating resistor ($\Omega 120$) on terminals P&Q on the indoor unit which is furthest from the outdoor unit.

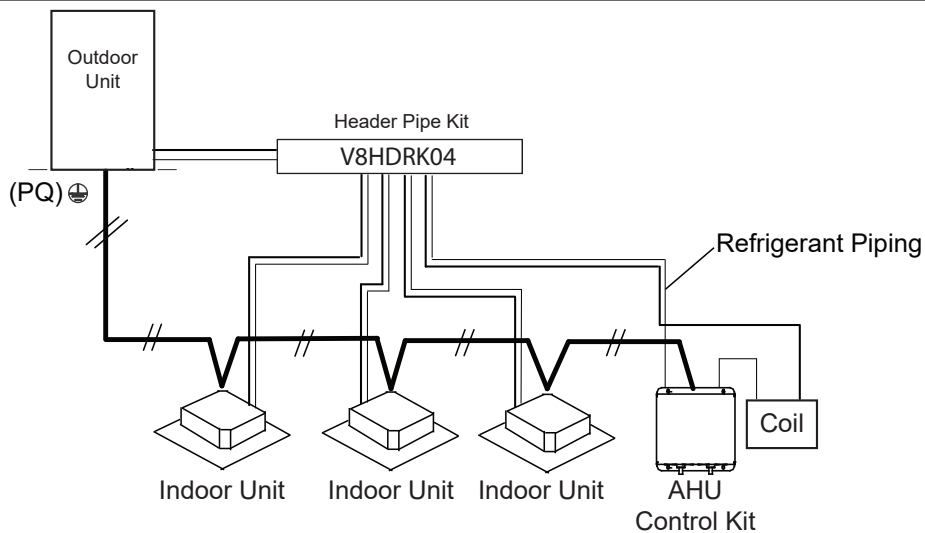


All Drain Wires will connect from outdoor unit chassis to indoor unit chassis at the end of the signal run.

18 GA., stranded, 2-conductor, shielded control wire (polarity sensitive).

Typical Wiring Diagram, NEC/CEC and Local Codes apply.

Figure 27. Typical VRF Indoor Unit and AHU Control Kit Communication Wiring



Install a terminating resistor ($\Omega 120$) on terminals P&Q on the indoor unit which is furthest from the outdoor unit.

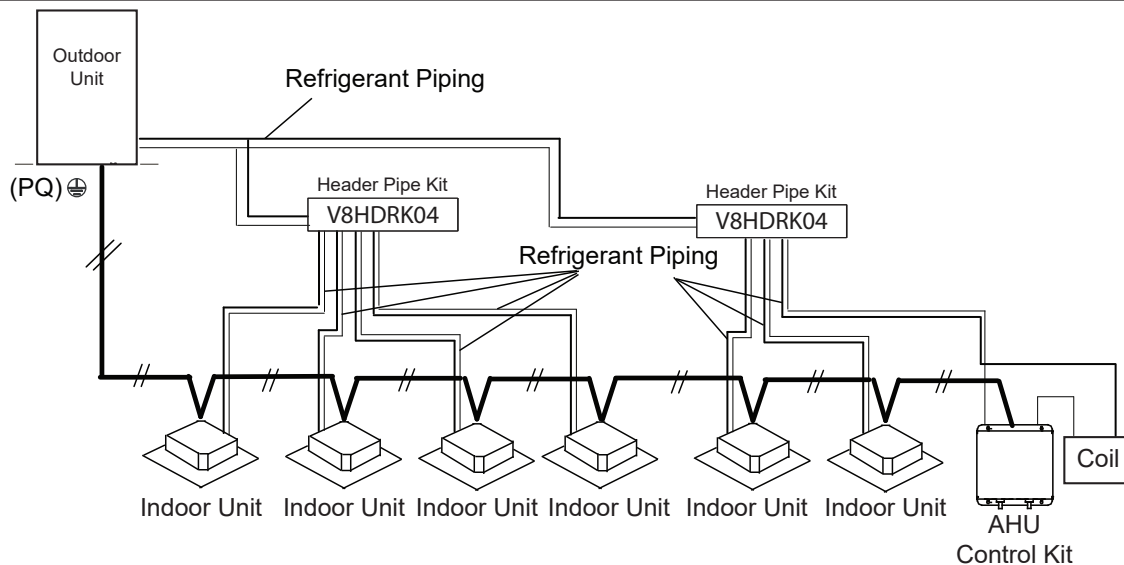


All Drain Wires will connect from outdoor unit chassis to indoor unit chassis at the end of the signal run.

18 GA., stranded, 2-conductor, shielded control wire (polarity sensitive).

Typical Wiring Diagram, NEC/CEC and Local Codes apply.

Figure 28. Typical VRF Indoor Unit and AHU Control Kit Communication Wiring




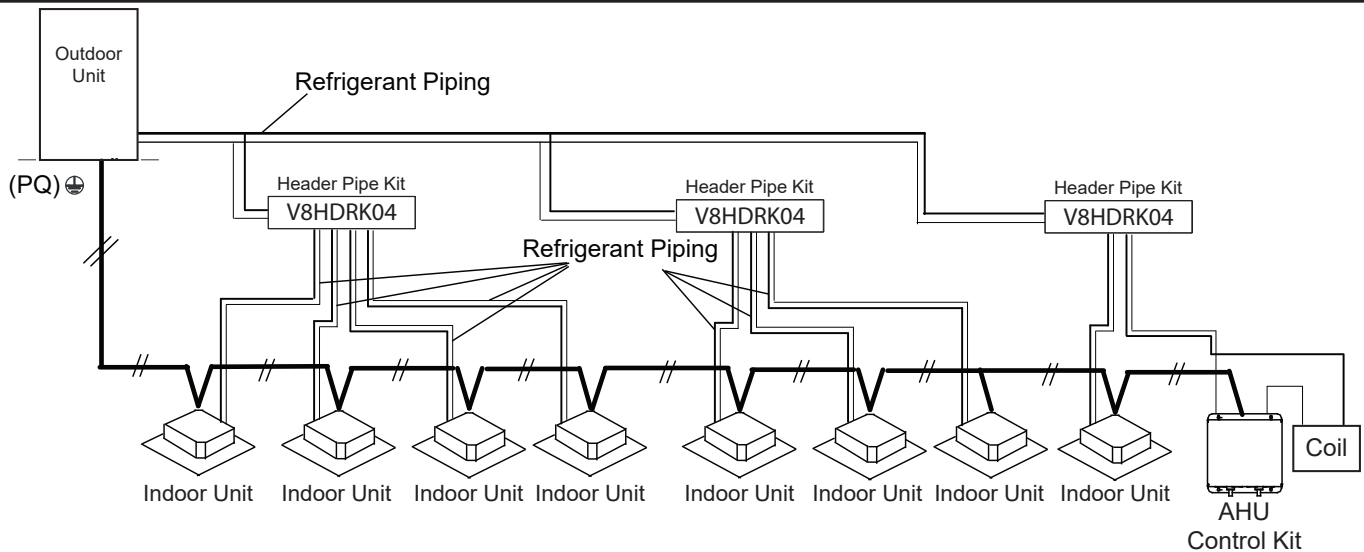
- P Q** Install a terminating resistor ($\Omega 120$) on terminals P&Q on the indoor unit which is furthest from the outdoor unit.
-  All Drain Wires will connect from outdoor unit chassis to indoor unit chassis at the end of the signal run.
- 18 GA., stranded, 2-conductor, shielded control wire (polarity sensitive).
- Typical Wiring Diagram, NEC/CEC and Local Codes apply.

Figure 29. Typical VRF Indoor Unit and AHU Control Kit Communication Wiring




- P Q** Install a terminating resistor ($\Omega 120$) on terminals P&Q on the indoor unit which is furthest from the outdoor unit.
-  All Drain Wires will connect from outdoor unit chassis to indoor unit chassis at the end of the signal run.
- 18 GA., stranded, 2-conductor, shielded control wire (polarity sensitive).
- Typical Wiring Diagram, NEC/CEC and Local Codes apply.

Figure 30. Typical VRF Indoor Unit and AHU Control Kit Communication Wiring

Support 3H and 2C thermostat

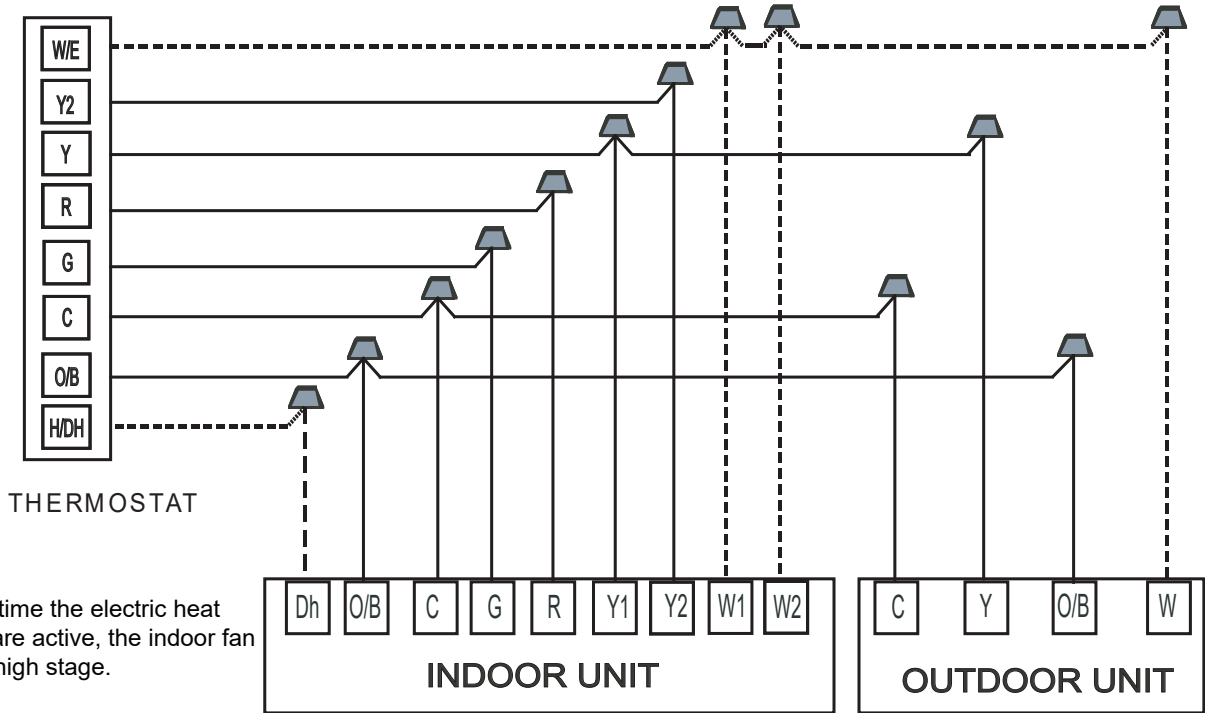


Figure 31. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 3H/2C Thermostat

Wiring for 4H and 2C thermostat

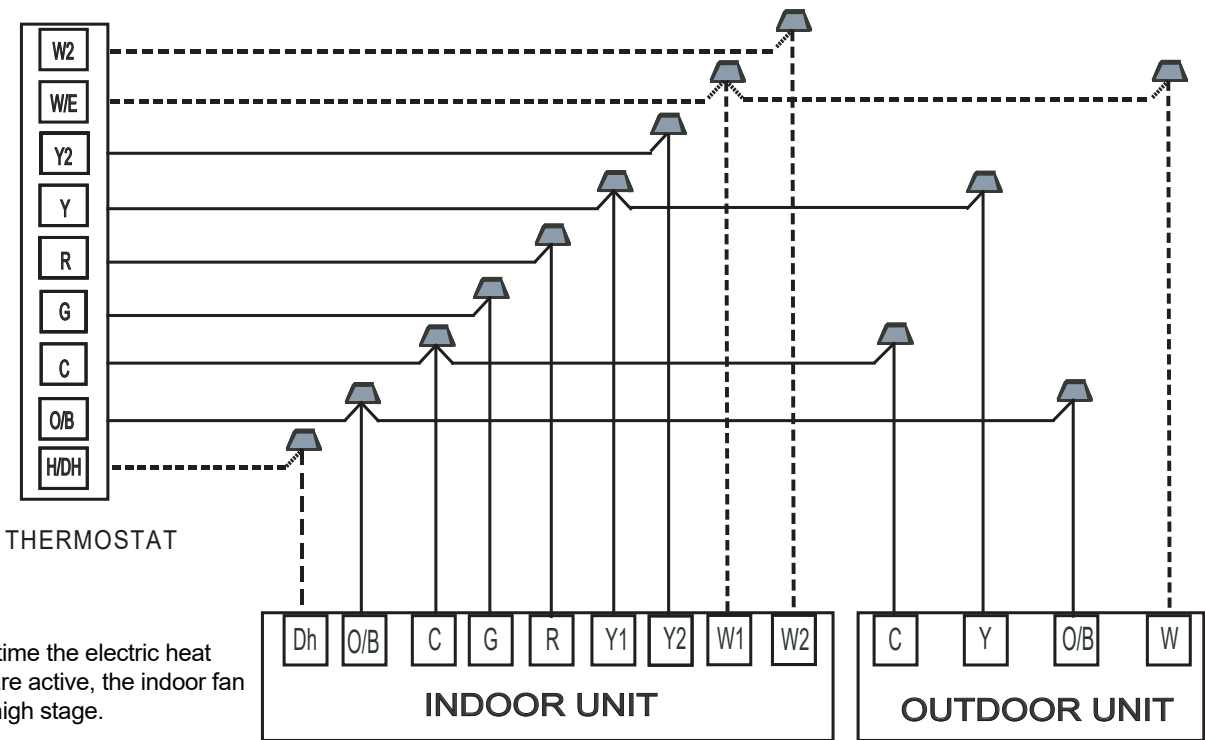
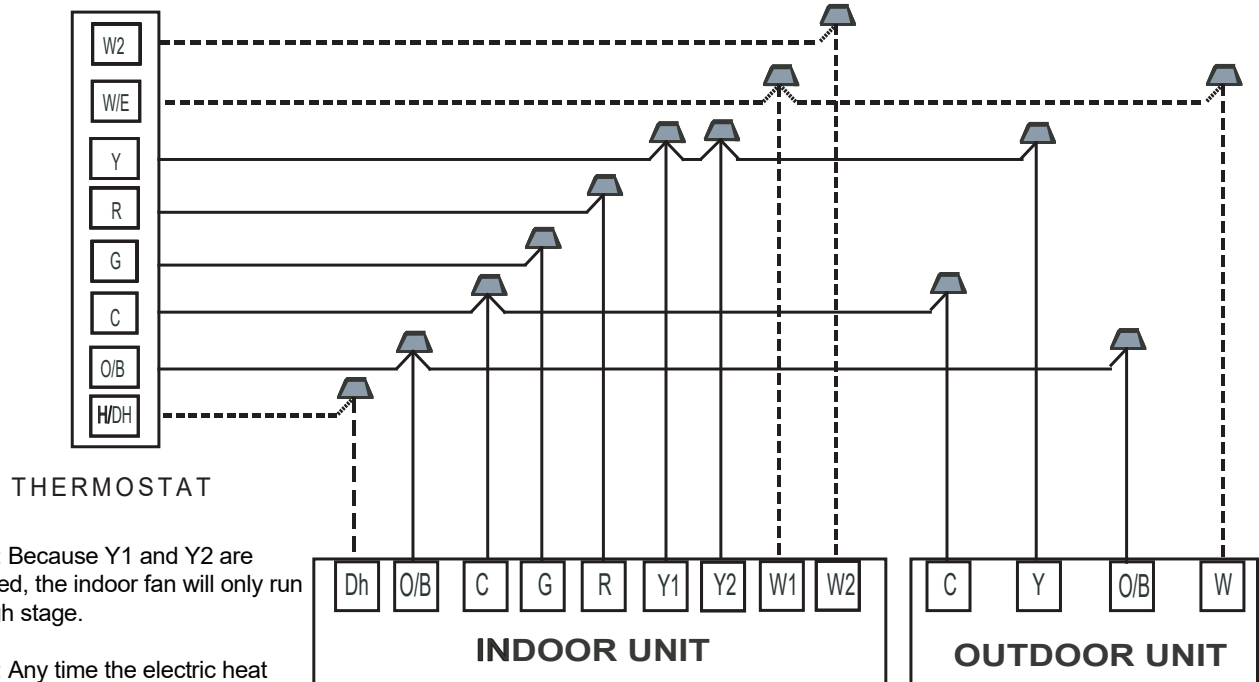


Figure 32. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 4H/2C Thermostat

Wiring for 3H and 1C thermostat

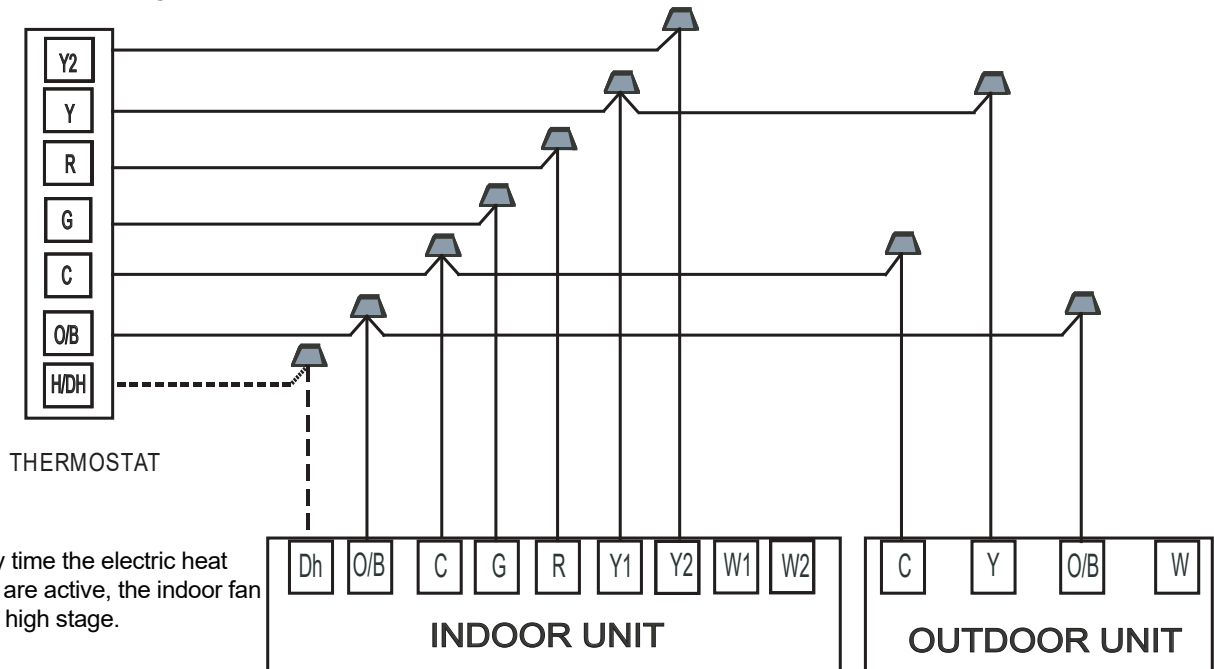


Note: Because Y1 and Y2 are jumped, the indoor fan will only run in high stage.

Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 31. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 3H/1C Thermostat

Wiring for 2H and 2C thermostat



Note: Any time the electric heat elements are active, the indoor fan will run in high stage.

Figure 32. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 2H/2C Thermostat

Wiring for 1H and 1C thermostat

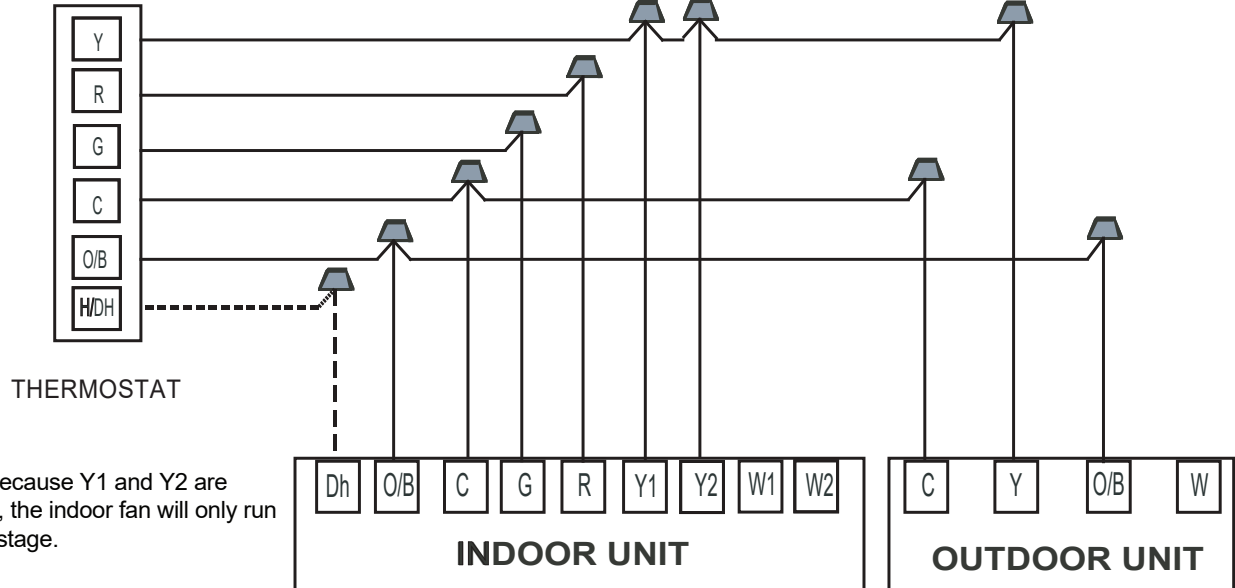


Figure 31. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 1H/1C Thermostat

Wiring for 2H and 1C thermostat

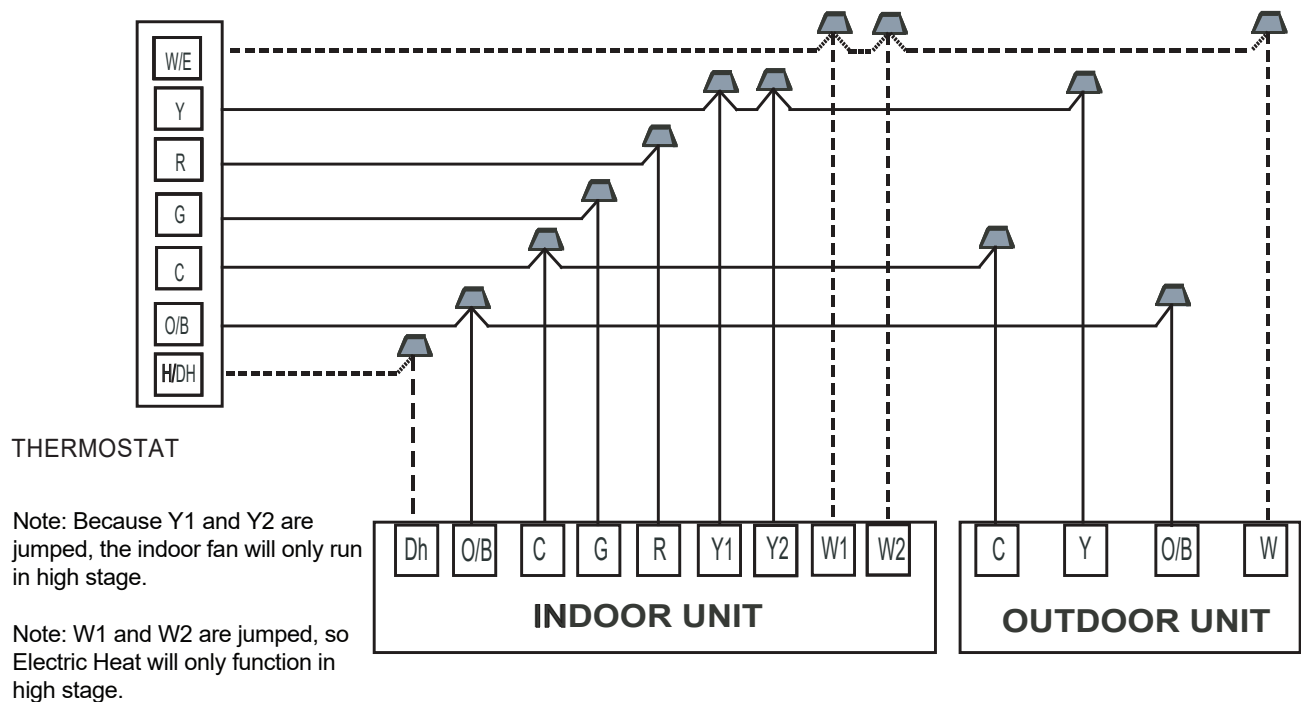


Figure 32. Typical Communication Wiring Non-VRF Air Handler or Furnace/Coil & 2H/1C Thermostat

Table 14. Electrical Parameters

Model No.	VPC018H4M-3P	VPC024H4M-3P	VPC036H4M-3PS
Line voltage data - 60 Hz - 1 phase	208/230V	208/230V	208/230V
¹ Maximum Overcurrent Protection (MOCP) amps	25	25	25
² Minimum circuit ampacity (MCA)	15	15	20
Compressor	No. of compressors	1	1
	Rated load amps	10.6	14.6
Outdoor Fan Motor	Motor type	DC	DC
	No. of motors	1	1
	Full load amps	1.2	1.7
	Output - W	190	190

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

Model No.	VPC036H4M-3PD	VPC048H4-3P	VPC060H4-3P
Line voltage data - 60 Hz - 1 phase	208/230V	208/230V	208/230V
¹ Maximum Overcurrent Protection (MOCP) amps	30	40	40
² Minimum circuit ampacity (MCA)	25	28	35
Compressor	No. of compressors	1	1
	Rated load amps	18.4	26.4
Outdoor Fan Motor	Motor type	DC	DC
	No. of motors	2	2
	Full load amps	(2) 0.90 + 0.88	(2) 0.90 + 0.88
	Output - W	(2) 90 + 90	(2) 90 + 90

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

¹ HACR type circuit breaker or fuse.

² Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

Magnet Ring

The magnet ring is used to strengthen the communication cable signal in applications where there is interference.

Wrap the PQ communication wire around the magnet ring as shown in Figure 33.

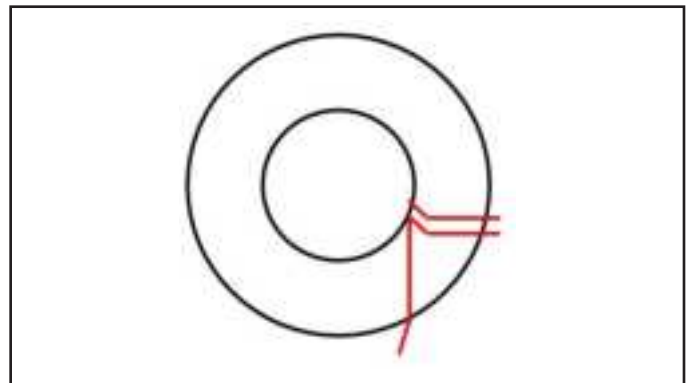


Figure 33. Magnet Ring

Checklist Before Start Up

	All interconnecting pipework has been fully completed.
	Condensate disposal system fully completed and gravity portions have been tested.
	Control cabling installation complete except for final connections to outdoor unit.
	Required additional refrigerant added - Add refrigerant before opening service valves.
	Outdoor service valves fully open.
	Main power supply is available for all outdoor units and will be activated 24 hours prior to startup.
	Main power supply is available for all indoor units.
	Local controllers installed where necessary.
	Site conditions suitable for operating the equipment. (REAL systems shall not operate during construction.)
	Protective covers removed from all indoor and outdoor units.
	Cassette panels installed.

Commissioning**Step 1: Power on**

Power on all indoor units and the outdoor unit.

Step 2: Enter commissioning mode

When the outdoor unit is first powered on, it displays “- - -” which means the unit is not commissioned.

Press and hold the Down and Up buttons simultaneously for 5 seconds to enter the commissioning mode.

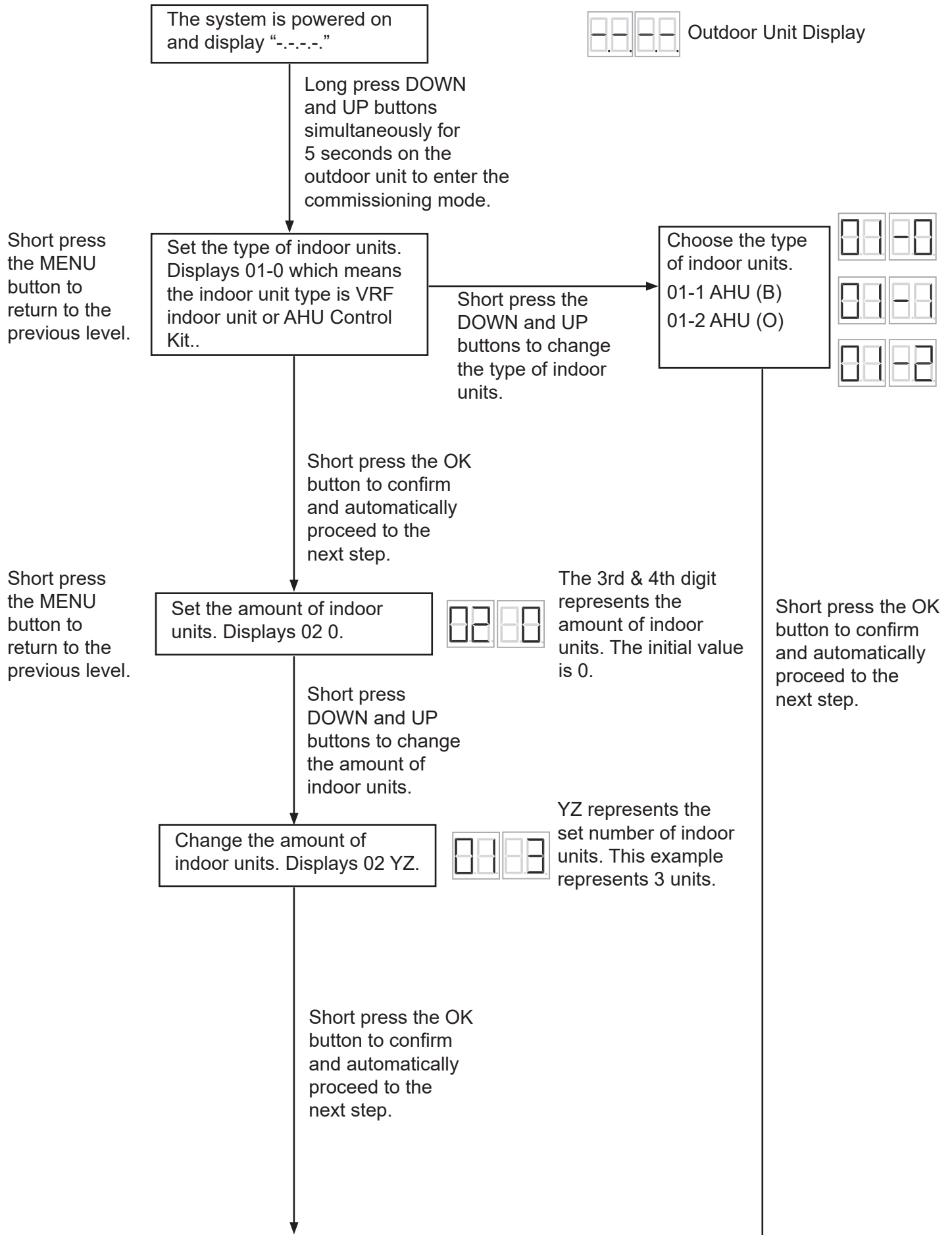
Step 3: Set the indoor unit type (See flow chart on next page)

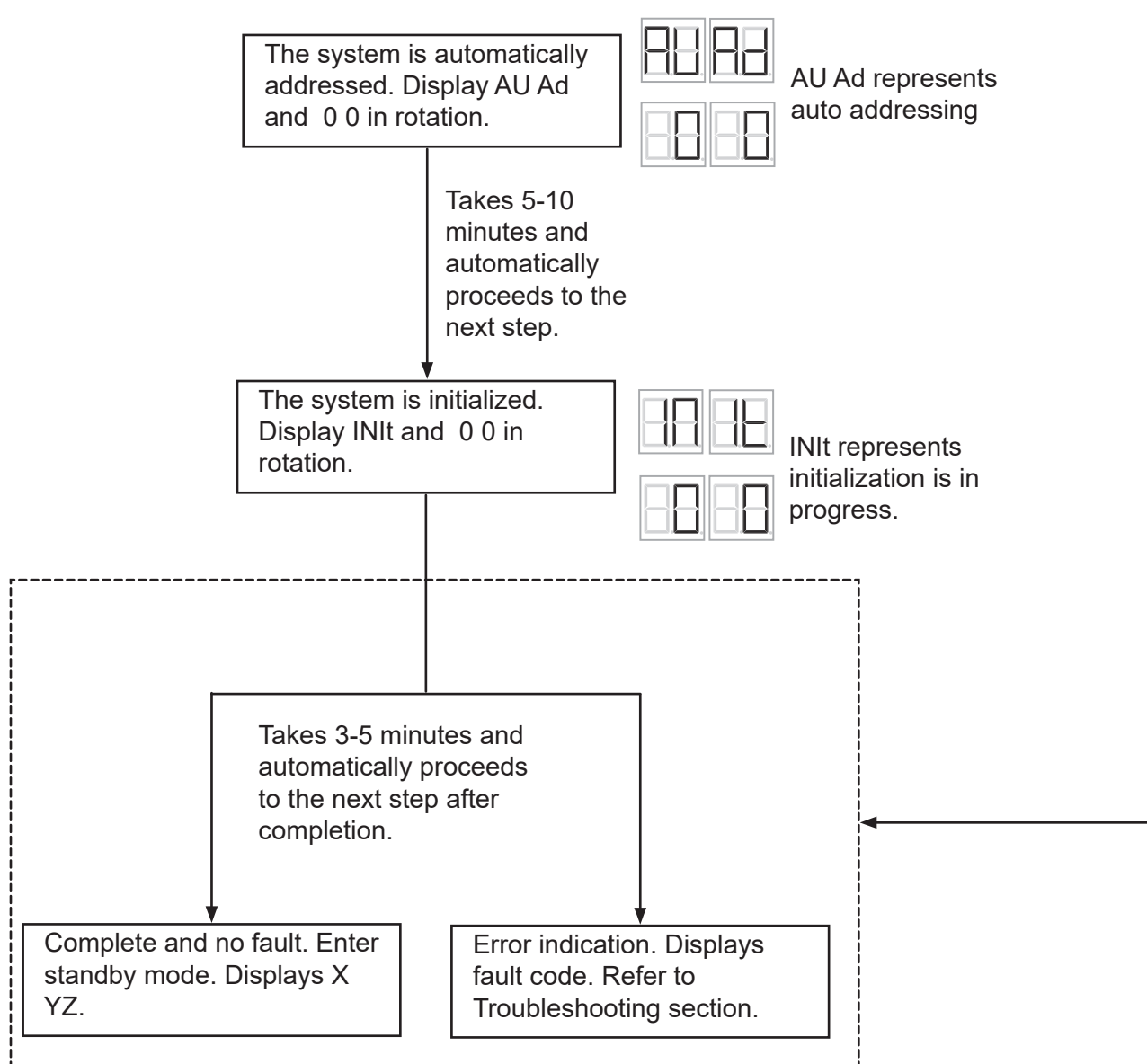
The digital display of the outdoor unit displays “01 _0”, where 4th digit flashing. The 4th digit represents the type of indoor unit. The initial value is 0 which means indoor unit type is VRF indoor unit or AHU Control Kits. Short press the Down or Up button to change the number.

Once the number of indoor unit type has been set, short press the OK button to confirm and automatically proceed to the next step.

Step 4: Set the indoor unit amount

The digital display of the outdoor unit displays “02 _ _” where 3rd and 4th digits flashing. Short press the Down or Up button to change the indoor unit amount. Press OK to confirm. The system will set indoor unit addresses automatically. VRF Indoor Units only.





Spot Check (Diagnostic Data) SW 2

Press SW 3 UP & SW 2 DOWN to CHECK the number of times shown in the No** column to view system data and performance information.

No**	Parameter description	Parameter value*
--	Stand by (Outdoor unit address + indoor unit quantity)/ frequency/special status	
0	Outdoor unit address	0
1	Outdoor Unit capacity	Unit: Ton
2	Quantity of outdoor units	1
3	Quantity of indoor units	1~9
4	Reserved	
5	Target frequency of outdoor unit	Displacement frequency (1)
6	Reserved	
7	Actual frequency of compressor	Actual frequency
8	Reserved	
9	Operating Mode	0: Off 2: Cooling 3: Heating
10	Fan 1 Speed	Unit: RPM
11	Fan 2 Speed	Unit: RPM
12	T2 (Indoor unit coil temp sensor average)	Actual temperature DISP. Unit: °C
13	T2B (Indoor unit coil outlet temp sensor average)	Actual temperature DISP. Unit: °C
14	T3 (Outdoor unit coil temperature sensor)	Actual temperature DISP. Unit: °C
15	T4 (Ambient temperature sensor)	Actual temperature DISP. Unit: °C
16	T5 (Liquid pipe temperature sensor)	Actual temperature DISP. Unit: °C
17	Reserved	
18	Reserved	
19	T7C1 (Discharge temperature sensor 1)	Actual temperature DISP. Unit: °C
20	Reserved	
21	T71 (Suction temperature sensor)	
22	Reserved	
23	T8 (Outdoor unit coil inlet temperature sensor)	Actual temperature DISP. Unit: °C
24	Ntc	Actual temperature DISP. Unit: °C
25	Max Pc	Actual pressure DISP. /100Unit: MPa
26	TL (Outdoor unit coil outlet temperature sensor)	Actual temperature DISP. Unit: °C
27	Discharge superheat degree	Actual temperature DISP. Unit: °C
28	Primary current	Actual current DISP. /10 Unit: A
29	Inverter compressor current	Actual current DISP. /10 Unit: A
30	Reserved	
31	EEVA position	Actual Value DISP. *24
32	Reserved	
33	Reserved	

No**.	Parameter description	Parameter value*
34	Reserved	
35	High pressure of unit	Actual pressure DISP. /100Unit: MPa
36	Low pressure of unit	Actual pressure DISP. /100Unit: MPa
37	Quantity of online indoor units	Actual quantity
38	Quantity of running indoor units	Actual quantity
39	Heat exchanger status	[0] OFF [1] C1: Condenser [2] D1: Reserved [3] D2: Reserved [4] E1: Evaporator [5] F1: Reserved [6] F2: Reserved
40	Special mode	[0] Not in special mode [1] Oil return [2] Defrost [3] Startup [4] Stop [5] Quick check [6] Reserved
41	Reserved	
42	Reserved	
43	Evaporating sensor temperature	Actual temperature DISP. Unit: °C
44	Condensing sensor temperature	Actual temperature DISP. Unit: °C
45	DC Voltage	Actual voltage Unit: V
46	AC Voltage	Actual voltage Unit: V
47	Quantity of indoor units in cooling mode	
48	Quantity of indoor units in heating mode	
49	Capacity of indoor units in cooling mode	
50	Capacity of indoor units in heating mode	
51	Reserved	
52	Reserved	
53	Reserved	
54	Software version	
55	Last error code	Service error code
56	Last error code	Error code
57	Reserved	
58	Reserved	
59	Reserved	

(1) Need to convert to current compressor output volume. For single fan model: compressor output volume is 24. Target frequency = Actual frequency * 24 / 60. For dual fan model: compressor output volume is 42. Target frequency = Actual frequency * 42 / 60.

Troubleshooting

Digital Display	Error Code Definition
E2	Communication error between indoor and main outdoor unit
E4	T3/T4/T5/TL/T71/T8 temperature sensor error
E5	Power voltage out of range
E7	Compressor discharge temp sensor error
E9	EEPROM error
F6	EEVA/EEVC error
C7	Inverter Module Temperature Protection
P1	High Pressure Protection
P3	Input current over load
P4	High compressor discharge temperature protection
P9	Fan motor error
PL	High compressor module temperature protection
PP	Low compressor discharge superheat protection
H0	Communication error between main control chip and inverter driver chip
H7	Quantity of indoor unit decreased
H8	High pressure sensor error
Hb	Low pressure sensor error
L0	Compressor inverter module error (Compressor inverter module protection)
L1	Low voltage protection of DC bus (Compressor inverter module protection)
L2	Over voltage protection of DC bus (Compressor inverter module protection)
L4	Compressor Module Protection
A0	Emergency Stop

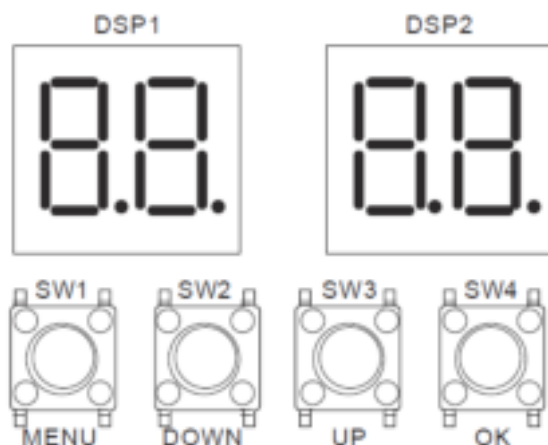


Table 15. Digital Display Output

Outdoor Unit State	Parameters Displayed on DSP1	Parameters Displayed on DSP2
Standby	Unit's Address	The number of indoor units in communication with the outdoor unit
Normal Operation	-	Running Speed of the compressor in rotations per second
Error	Protection code	
In menu mode	Displays menu mode code	
Spot check	Displays system check code	
Standby with low energy consumption	No display	

NOTE - Press any button one time to activate display.

Table 16. Function of Buttons SW1 to SW4

Button	Function
SW3 (UP)	In menu mode: previous and next buttons for menu modes.
SW2 (DOWN)	Not in menu mode: previous and next buttons for spot check information.
SW1 (MENU)	Enter / exit menu mode.
SW4 (OK)	Confirm to enter specified menu.

Menu Mode

1. Press and hold SW1 (MENU) for 5 seconds to enter menu mode. The digital display will display "n1".
2. Press SW2 / SW3 (DOWN / UP) button to select the first-level menu "n1", "n2", "n3", "n4", or "nb".
3. Press SW4 (OK) button to enter the specified first-level menu. For example, enter "n4" mode.
4. Press SW2 / SW3 (DOWN / UP) button to select the second-level menu "n41" to "n47".
5. Press SW4 (OK) button to enter the specified first-level menu. For example, enter "n43" mode.
6. Press SW2 / SW3 (DOWN / UP) button to select the specified menu mode code.
7. Press SW4 (OK) button to enter specified menu mode.

⚠ CAUTION

To avoid touching live electrical parts, use a non-metallic tool (like a plastic or wooden toothpick) to change switch and button settings on the board.

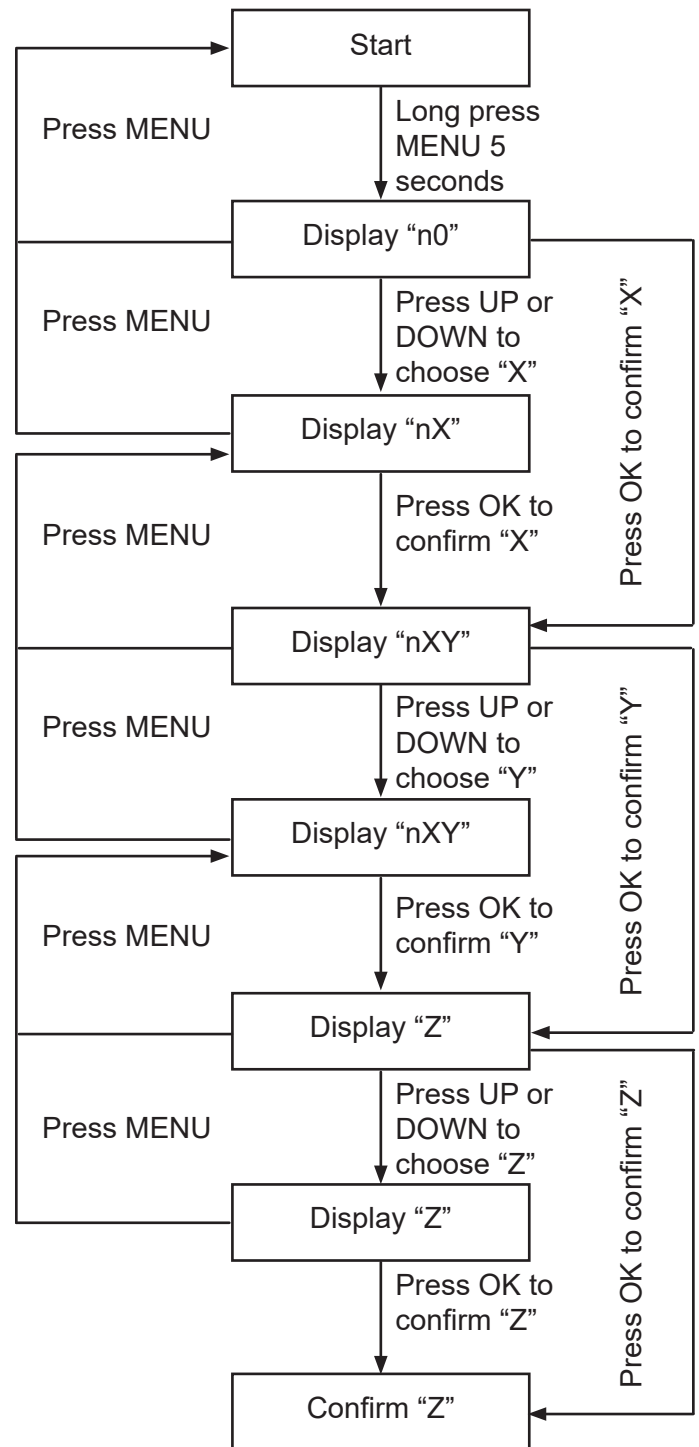


Table 17. Function Menu

First-Level Menu	Second-Level Menu	Specified Menu Mode	Description	Default
[0]	[0]	[0]	Error Code History	
		[1]	Clear Error Code History	
	[1]	[0]	Indoor Unit Address	
	[2]	[1]	Driver's Address	
[1]*	[0]	[-]	Service Mode	
	[1]	[0]	Cooling Test	
		[1]	Heating Test	
	[2]	[0]	Refrigerant Recovery to Outdoor Unit	
		[1]	Refrigerant Recovery to Indoor Unit	
		[2]	Balance System Refrigerant	
	[5]	[-]	Vacuum Mode	
	[6]	[-]	Set VIP Indoor Unit Address	
[2]*	[0]	[0]	Outdoor Ambient Priority	
		[1]	Cooling Priority	
		[2]	VIP/Voting Priority Mode	
		[3]	Heating Mode Only	
		[4]	Cooling Mode Only	
		[5]	Heating Priority Mode	
		[9]	Demand Priority Mode	X
	[5]	[0]	Celsius Unit (Indoor Unit Display)	
		[1]	Fahrenheit Unit (Indoor Unit Display)	X
	[9]	Set target ambient temperature (T4 Setpoint) for automatic Priority Mode.		
		[0]	50	X
		[1]	60	
		[2]	70	
[3]	[2]	[0]	0 ft. (0m) Level Distance between Indoor Unit and Outdoor Unit	X
		[1]	32.8 ft. (10m) Level Distance between Indoor Unit and Outdoor Unit	
		[2]	65.6 ft. (20m) Level Distance between Indoor Unit and Outdoor Unit	
		[3]	98.4 ft. (30m) Level Distance between Indoor Unit and Outdoor Unit	
		[4]	131.2 ft. (40m) Level Distance between Indoor Unit and Outdoor Unit	
		[5]	164.0 ft. (50m) Level Distance between Indoor Unit and Outdoor Unit	

First-Level Menu	Second-Level Menu	Specified Menu Mode	Description	Default
[4]	[1]	[-]	Network Address	0
	[2]*	[-]	Number of Indoor Units	1
	[4]*	[0]	Auto Address	
		[1]	Clear Address	
	[6]	[0]	VRF Indoor Unit or AHU Control Kit (PQ Communication)	
		[1]	Non-VRF Indoor Unit (CBYW (24V) Communication) 4-Way Valve Controlled by B	
		[2]	Non-VRF Indoor Unit (CBYW (24V) Communication) 4-Way Valve Controlled by O	
[6]	[0]	[0]	Cooling Target temperature setting (Ke0=27)	
		[1]	Cooling Target temperature setting (Ke0=32)	
		[2]	Cooling Target temperature setting (Ke0=36)	
		[3]	Cooling Target temperature setting (Ke0=39)	X
		[4]	Cooling Target temperature setting (Ke0=43)	
		[5]	Cooling Target temperature setting (Ke0=46)	
		[6]	Cooling Target temperature setting (Ke0=48)	
		[7]	Cooling Target temperature setting (Ke0=50)	
		[8]	Cooling Target temperature setting (Ke0=52)	
	[2]	[0]	Heating Target temperature setting (Kc0=106)	
		[1]	Heating Target temperature setting (Kc0=108)	
		[2]	Heating Target temperature setting (Kc0=109)	
		[3]	Heating Target temperature setting (Kc0=111)	
		[4]	Heating Target temperature setting (Kc0=113)	
		[5]	Heating Target temperature setting (Kc0=115)	X
		[6]	Heating Target temperature setting (Kc0=118)	
		[7]	Heating Target temperature setting (Kc0=124)	

First-Level Menu	Second-Level Menu	Specified Menu Mode	Description	Default
[8]*	[b]	[0]	No compressor lockout temperature	X
		[1]	7°F (-14°C) compressor lockout temperature	
		[2]	10°F (-12°C) compressor lockout temperature	
		[3]	16°F (-9°C) compressor lockout temperature	
		[4]	19°F (-7°C) compressor lockout temperature	
		[5]	25°F (-4°C) compressor lockout temperature	
		[6]	30°F (-1°C) compressor lockout temperature	
		[7]	36°F (2°C) compressor lockout temperature	
		[8]	39°F (4°C) compressor lockout temperature	
		[9]	45°F (7°C) compressor lockout temperature	
		[10]	50°F (10°C) compressor lockout temperature	
		[11]	55°F (13°C) compressor lockout temperature	
		[12]	61°F (16°C) compressor lockout temperature	
		[13]	64°F (18°C) compressor lockout temperature	
		[14]	70°F (21°C) compressor lockout temperature	
		[15]	75°F (24°C) compressor lockout temperature	
		[16]	81°F (27°C) compressor lockout temperature	
[9]	[4]	[0]	Forced Defrost	
		[1]	Forced Oil Return	
	[5]	[-]	Release Central Controller Emergency Stop	

*For VRF Indoor Unit and AHU Control Kit Only

⚠ CAUTION

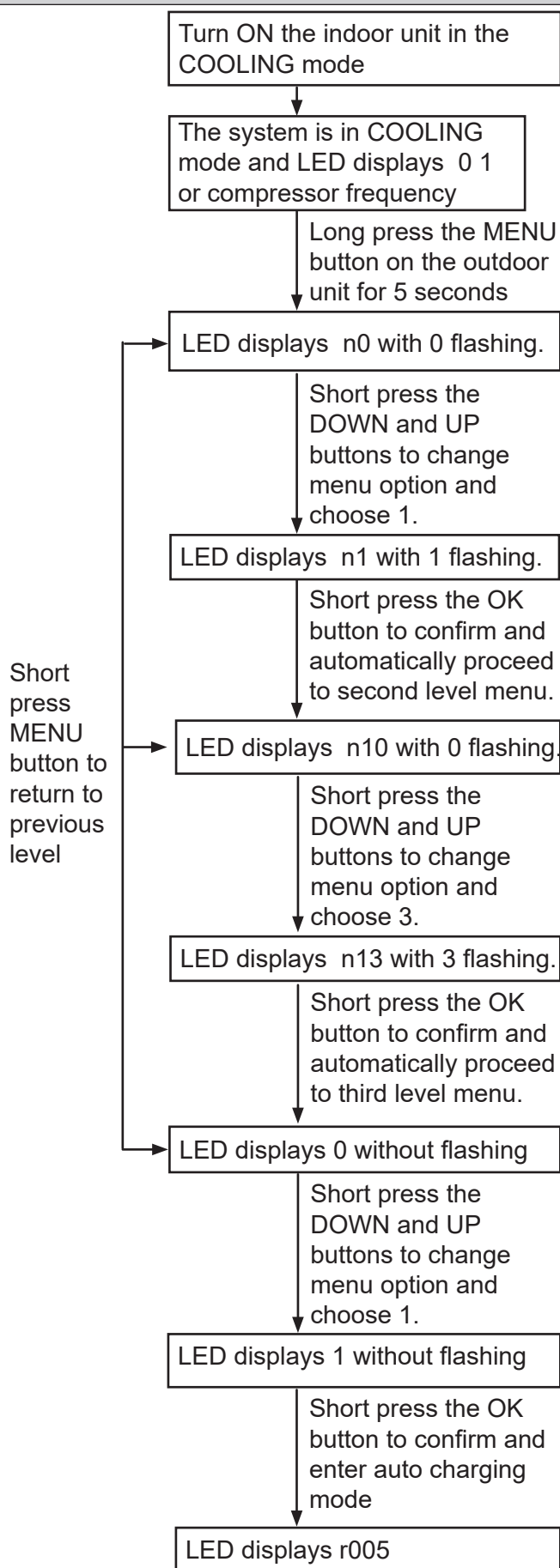
Only use auto charge if all of the following conditions are met or damage to the equipment may occur.

1. Refrigerant pipe length is unknown.
2. Only one indoor unit is connected.
3. Connection ratio of outdoor to indoor unit is between 80% - 100%.
4. Outdoor ambient temperature is between 41°F - 109°F (5°C - 43°C).
5. Indoor ambient temperature is between 70°F - 90°F (21°C - 32°C).

Auto Charge Instructions

1. System must be successfully commissioned prior to performing auto charge.
2. Turn off the refrigerant supply.
3. Connect the R-410A refrigerant canister to the auto charging port.
4. Place the indoor unit into the Cooling mode with the fan set to High.
5. Enter auto charge mode by following the steps in this flow chart.
6. Turn on the refrigerant supply. The system will charge in 30 to 60 minutes.
7. When auto charge is complete, the LED will display "END".
8. Press the OK button for 5 seconds to exit auto charge mode.
9. Turn off refrigerant supply and disconnect from auto charging port.

NOTE - The indoor unit must be in cooling mode for auto charge to work. The indoor unit cannot be in heating mode or fan-only mode.



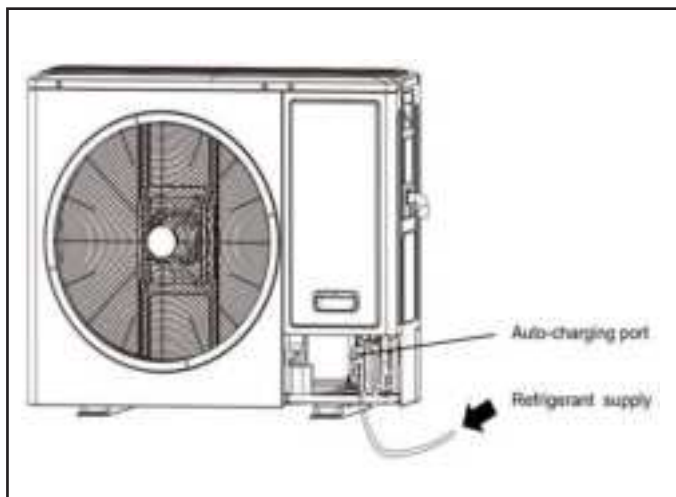


Figure 34. Single Fan Cabinet Auto Charge Port

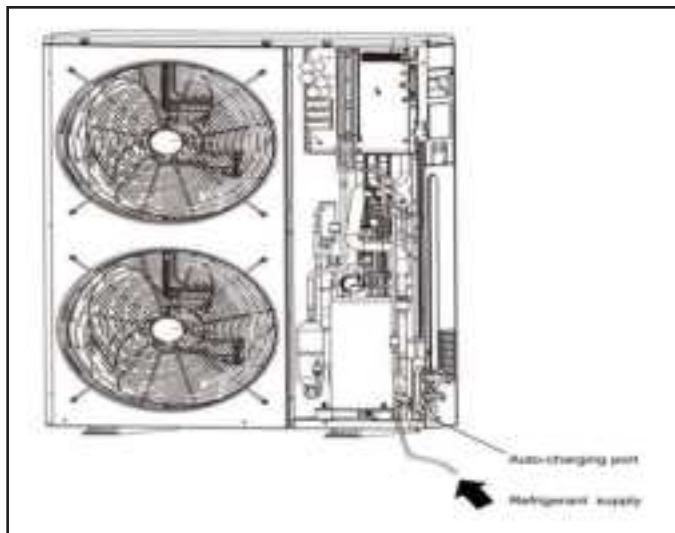


Figure 35. Dual Fan Cabinet Auto Charge Port

Technical Support

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Scan this QR code to download the Lennox VRF & Mini-Splits App
from the Apple App Store or the Google Play store.

The app contains technical literature and troubleshooting resources.

