

Installation Instruction



Fig. 1 —Sizes 9K to 36K

NOTES: Read the entire instruction manual before starting the installation.
Images are for illustration purposes only. Actual models may differ slightly.

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SAFETY CONSIDERATIONS

Installing, starting up, and servicing air- conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.).


Only trained, qualified installers and service mechanics should install, start- up, and service this equipment.

Untrained personnel can perform basic maintenance functions such as coil cleaning. All other operations should be performed by trained service personnel only.

When working on the equipment, observe the precautions in the literature and on tags, stickers, and labels attached to the equipment.

Follow all safety codes. Wear safety glasses and work gloves. Keep a quenching cloth and a fire extinguisher nearby when brazing. Use care in handling, rigging, and setting bulky equipment.

Read these instructions thoroughly and follow all warnings or cautions included in the literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements. Recognize safety information.

This is the safety - alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety- alert symbol.

DANGER identifies the most serious hazards which will result in severe personal injury or death.

WARNING signifies hazards which could result in personal injury or death.

CAUTION is used to identify unsafe practices which may result in minor personal injury or product and property damage.

NOTE is used to highlight suggestions which will result in enhanced installation, reliability, or operation.



WARNING

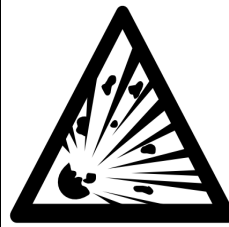
ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing, modifying, or servicing system, the main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.



WARNING



EXPLOSION HAZARD

Failure to follow this warning could result in death, serious personal injury, and/or property damage.

Never use air or gases containing oxygen for leak testing or operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.



CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Do not bury more than 36 in. (914 mm) of refrigerant pipe in the ground. If any section of pipe is buried, there must be a 6 in. (152 mm) vertical rise to the valve connections on the outdoor units. If more than the recommended length is buried, refrigerant may migrate to the cooler buried section during extended periods of system shutdown. This causes refrigerant slugging and could possibly damage the compressor at start-up.

ACCESSORIES

The system is shipped with the following accessories. Use all of the installation parts and accessories to install the system. Improper installation may result in water leakage, electrical shock and fire, or cause the equipment to fail. Keep the installation manual in a safe place and do not discard any other accessories until the installation work has been completed.

Table 1 —Accessories

PART NO.	PART NAME	QTY.
1	Outdoor unit	1
-	Literature package including installation instructions and warranty	1
-	Mounting pads for the outdoor unit (helps with vibration prevention during unit operation)	4
-	Drain Joint	1
-	Drain Hose	1

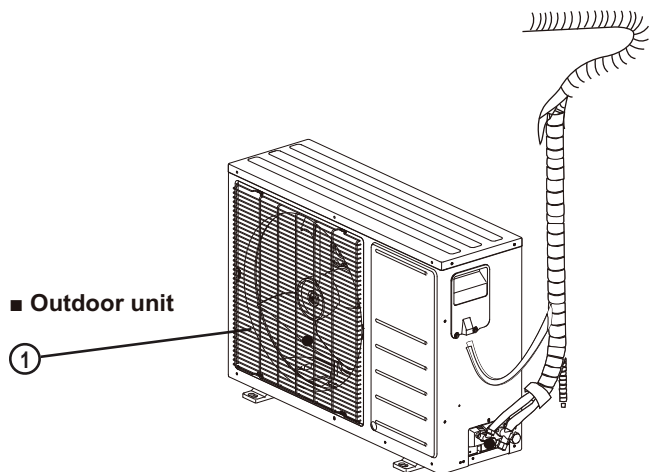


Fig. 2 — Outdoor Unit

NOTE:

- If the outdoor unit is higher than the indoor unit, prevent rain from flowing into the indoor unit along the connection pipe by making a downward arc in the connection pipe before it enters the wall to the indoor unit. This ensures that rain drips from the connection pipe before it enters the wall.
- Piping and the interconnecting wiring are field supplied.
- Figure 2 is only a sketch. The actual model may differ slightly.

Table 2 lists the units covered in this document.

Table 2 — Unit Sizes

SYSTEM TONS	BTUH	VOLTAGE - PHASE	OUTDOOR MODEL
1.00	12,000	115-1	38MARBQ12AA1
0.75	9,000	208/230-1	38MARBQ09AA3
1.00	12,000	208/230-1	38MARBQ12AA3
1.50	18,000	208/230-1	38MARBQ18AA3
2.00	24,000	208/230-1	38MARBQ24AA3
2.50	30,000	208/230-1	38MARBQ30AA3
3.00	36,000	208/230-1	38MARBQ36AA3

DIMENSIONS

System Size			12K	9K	12K	18K	24K	30K	36K
			(115V)	(208/230V)	(208/230V)	(208/230V)	(208/230V)	(208/230V)	(208/230V)
Outdoor Unit	Unit								
	Height (H)	in (mm)	21.85 (555)	21.81 (554)	21.81 (554)	26.50 (673)	31.89 (810)	31.89(810)	31.89 (810)
	Width (W)	in (mm)	30.12 (765)	31.69 (805)	31.69 (805)	35.04 (890)	37.24 (946)	37.24(946)	37.24 (946)
	Depth (D)	in (mm)	11.93 (303)	12.99 (330)	12.99 (330)	13.46 (342)	16.14 (410)	16.14(410)	16.14 (410)
	Weight - Net	lbs. (kg)	66.80 (30.3)	74.07 (33.6)	73.63 (33.4)	100.97 (45.8)	134.48 (61)	141.76(64.3)	150.13 (68.1)
	Packaging								
	Height	in (mm)	24.02 (610)	24.21 (615)	24.21 (615)	29.13 (740)	34.84 (885)	34.84(885)	34.84 (885)
	Width	in (mm)	34.92 (887)	36.02 (915)	36.02 (915)	39.17 (995)	42.91 (1090)	42.91(1090)	42.91 (1090)
	Depth	in (mm)	13.27 (337)	14.57 (370)	14.57 (370)	15.67 (398)	19.69 (500)	19.69(500)	19.69 (500)
	Weight - Gross	lbs. (kg)	72.31 (32.8)	80.25 (36.4)	79.37 (36)	108.03 (49)	144.40 (65.5)	151.90(68.9)	158.95 (72.1)
	Carton Drawing No.	--	877*327*590	905*360*590	905*360*590	985*388*720	1075*485*86	1075*485*86	1075*485*86
	Carton Material	--	Carton Box						
	Material Thickness	in (mm)	0.197 (5)	0.197 (5)	0.197 (5)	0.197 (5)	0.295 (7.5)	0.295(7.5)	0.295 (7.5)

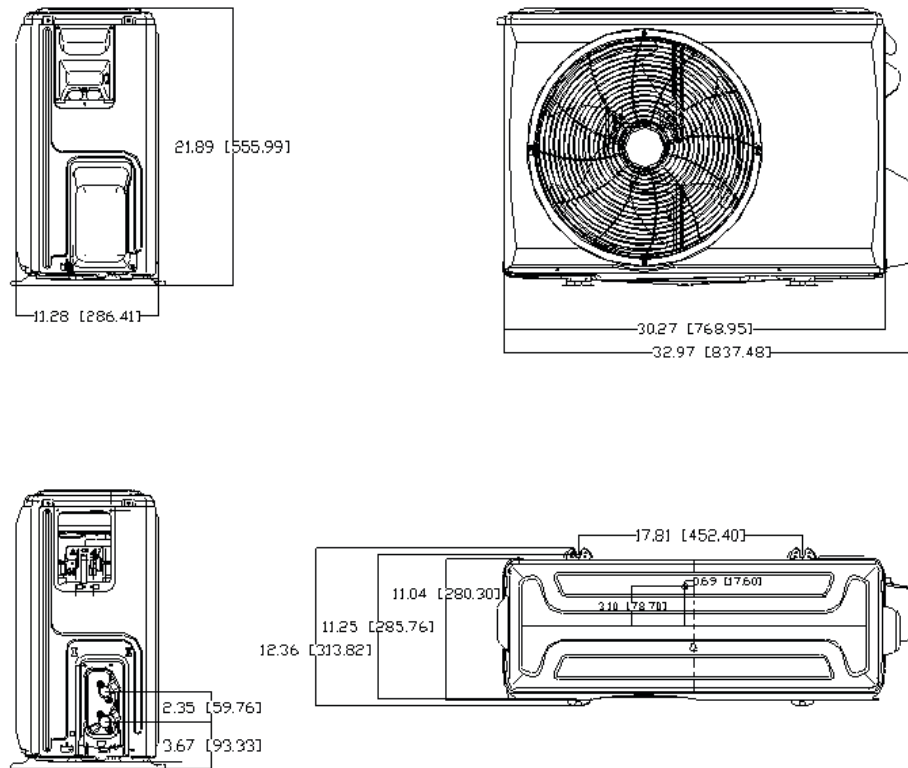


Fig. 3 — Size 12K (115V)

DIMENSIONS (CONT)

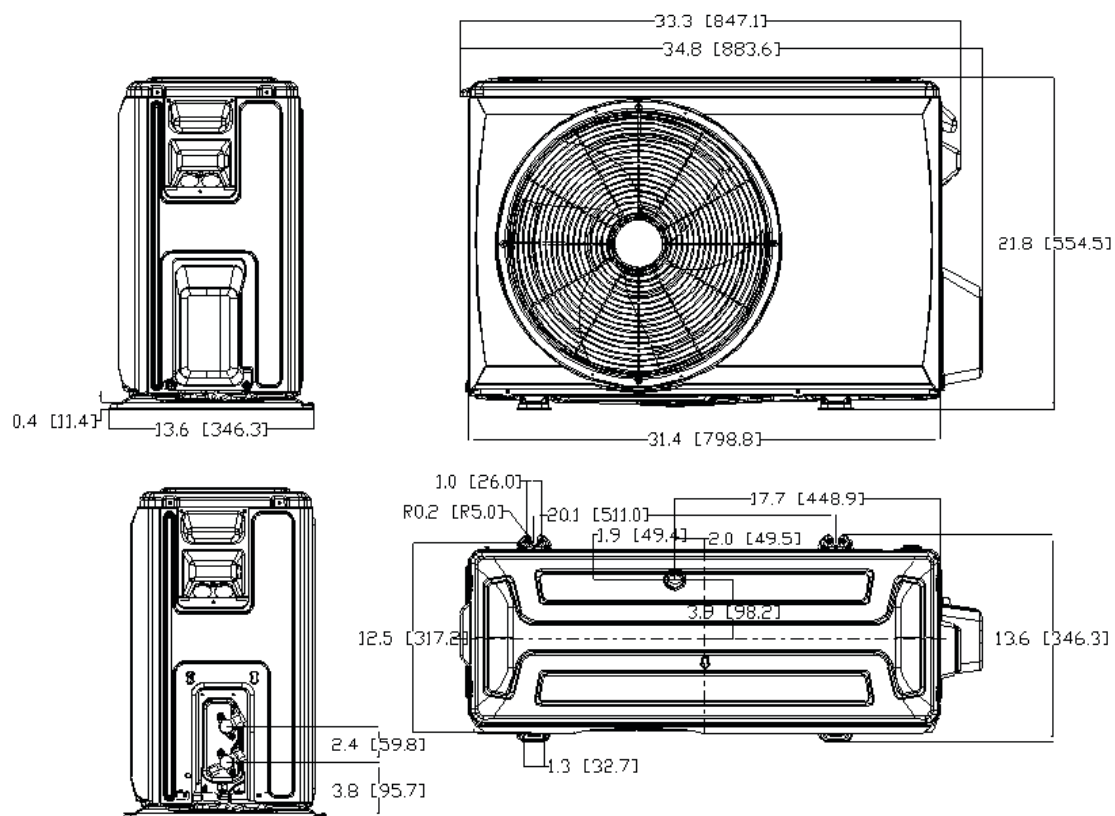


Fig. 4 — Sizes 9K-12K (208/230V)

DIMENSIONS (CONT)

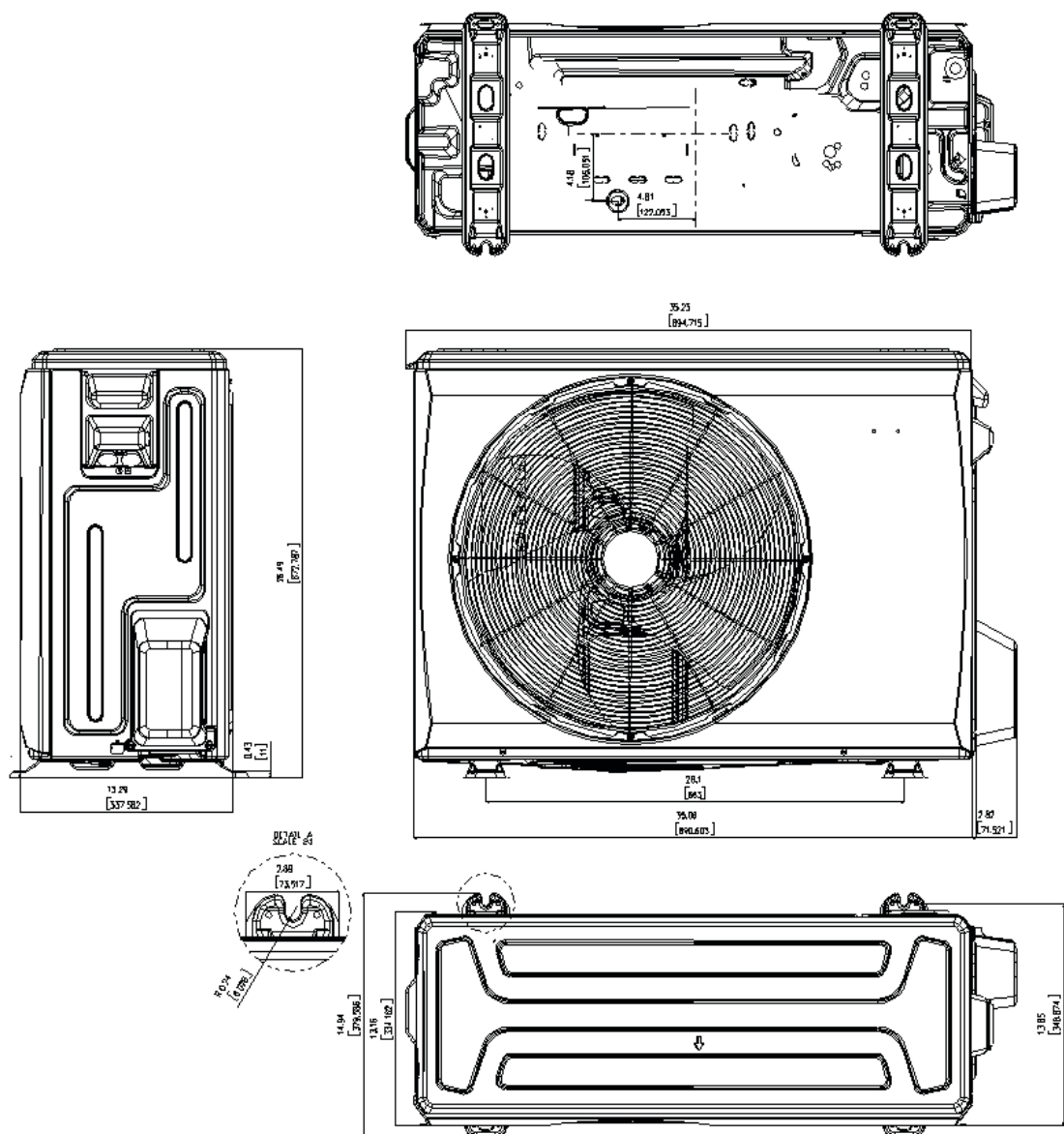


Fig. 5 — Size 18K (208/230V)

DIMENSIONS (CONT)

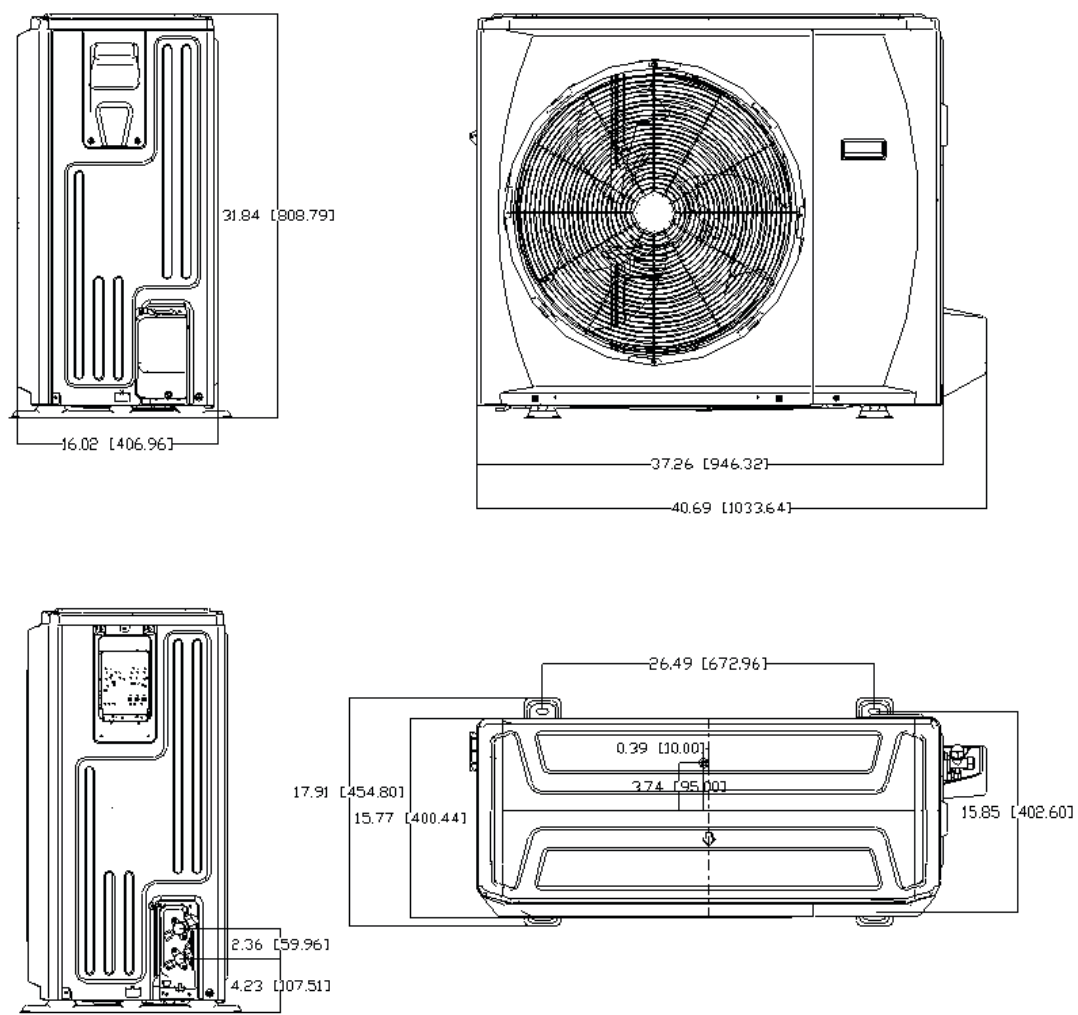


Fig. 6 — Sizes 24K, 30K, and 36K (208/230V)

CLEARANCES

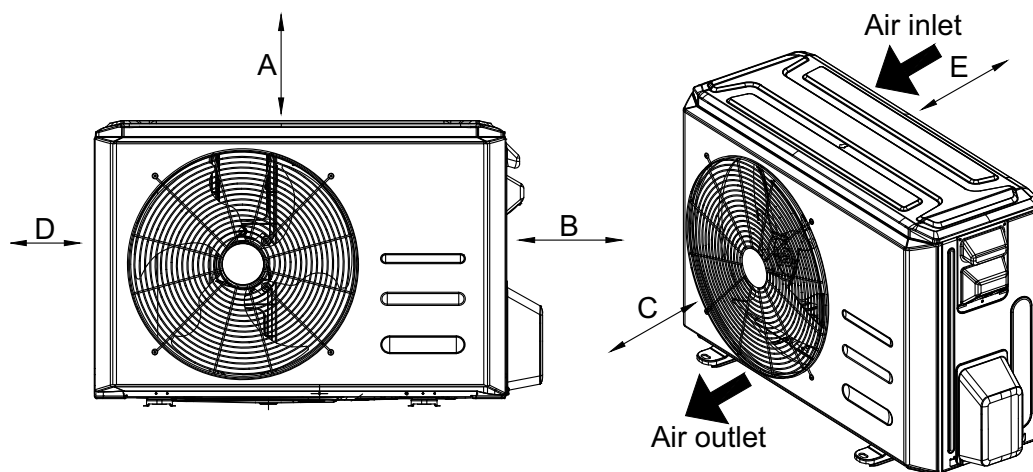


Fig. 7 — Clearances

Table 3 — Clearance Dimensions

UNIT	MINIMUM VALUE IN. (MM)
A	24 (610)
B	24 (610)
C	24 (610)
D	4 (101)
E	4 (101)

NOTE: The outdoor unit must be mounted at least 2in (50mm) above the maximum anticipated snow depth.

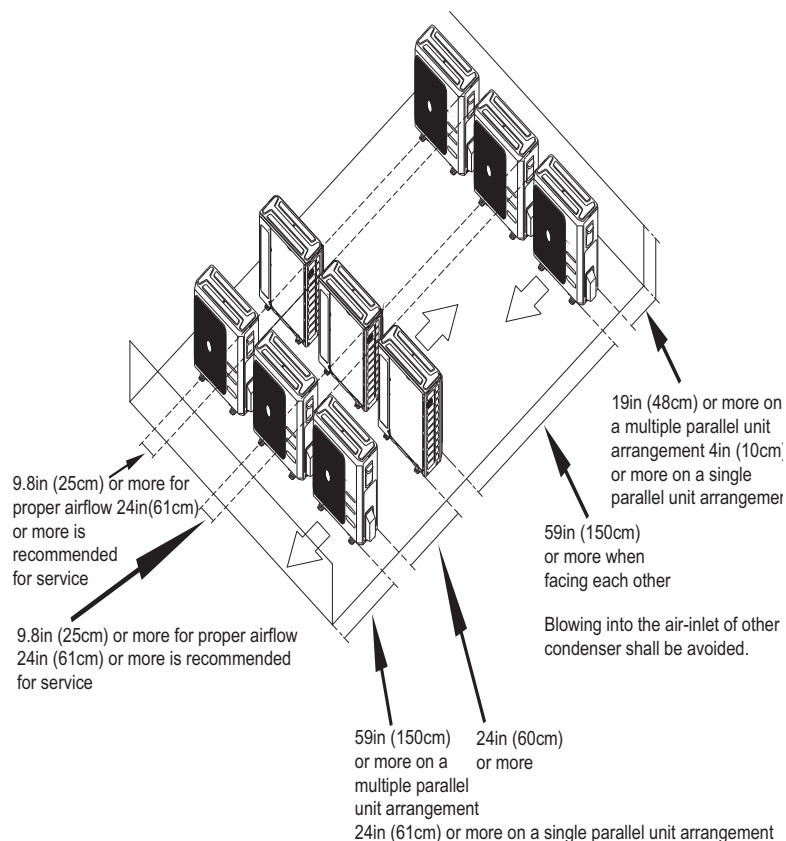


Fig. 8 — Clearances for multiple units

INSTALLATION REQUIREMENTS

- A location which is convenient to installation and not exposed to strong winds.
- A location which can bear the weight of the outdoor unit and where the outdoor unit can be mounted in a level position.
- A location which provides appropriate clearances (see Fig. 7).
- Allow sufficient space for airflow and service of the unit. See Fig. 7 for the required minimum distances between the unit or walls.

NOTE: DO NOT install the indoor or outdoor units in a location with special environmental conditions. For those applications, contact your Ductless representative.



WARNING

PRODUCT INSTALLATION

- Installation must be performed by an authorized dealer or specialist. A defective installation can cause water leakage, electrical shock, or fire.
- The installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire. (In North America, installation must be performed in accordance with the requirements of NEC or CEC by authorized personnel only.)
- Contact an authorized service technician for repair or maintenance of this unit. This appliance must be installed in accordance with local codes.
- Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, or unit failure.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall
- Install drainage piping according to the instructions in this manual. Improper drainage may cause water damage to your home and property.
- **DO NOT** install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause a fire.
- **DO NOT** turn on the power until all work has been completed.
- When moving or relocating the system, consult experienced service technicians for the disconnection and re-installation of the unit.

INSTALLATION

Step 1 - Check Equipment

Unpack the unit and move to the final location. Remove the carton, taking care not to damage the unit. Inspect the equipment for damage prior to installation. File a claim with the shipping company if the shipment is damaged or incomplete.

Locate the unit rating plate which contains the proper installation information. Check the rating plate to ensure the unit matches the job specifications.

Step 2 - Mount Unit

1. Select the installation location of the outdoor unit following the installation requirements. To prevent high wind exposure, install the outdoor unit with the air inlet side facing the wall (see fig 9).

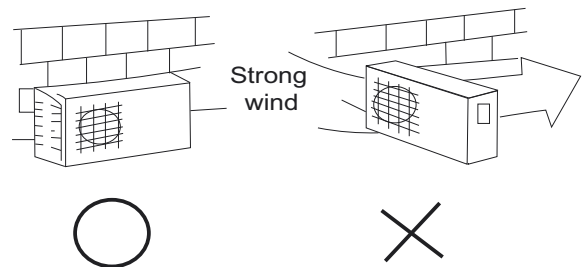


Fig. 9 — High Wind Installation

2. Use a rigid base to support the unit in a level position. If conditions or local codes require the unit be attached to a pad, tie down bolts should be used and fastened through knockouts provided in unit base pan. Refer to unit mounting pattern in Fig. 3 to determine base pan size and knockout hole location. For hurricane tie downs, contact distributor for details and PE (Professional Engineer) Certification, if required. For extreme outdoor conditions applications refer to the 'Cold Climate Application Guideline Ductless.



CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

In regions with snowfall and cold temperatures, avoid installing the outdoor unit in areas where it can be covered by snow. Blocking the air intake may result in reduced airflow, significantly reduced performance and damage to the equipment.

Step 3 - Condensate Drain Installation

NOTE: Install drains must meet local sanitation codes.

Install the outdoor unit drain joint

Fit the seal into the drain joint, then insert the drain joint into the base pan hole of the outdoor unit. Rotate 90° to securely assemble them. Connect the drain joint with an extension drain hose to avoid condensate from draining off the outdoor unit during the heating mode.

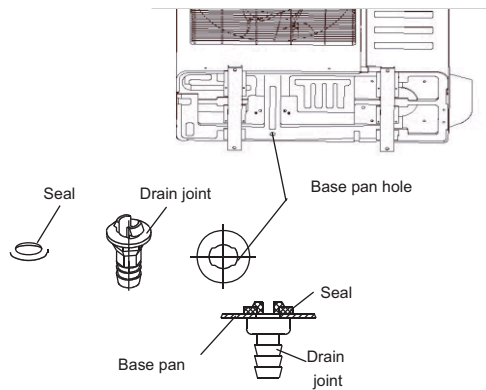



Fig. 10 — Drain Joint

NOTE: Images are for illustration purposes only.

NOTE: Basepan built-in with multiple holes for proper draining during defrost. For applications where it is required to seal these holes, and re-direct the condensate drain, rubber plugs are available through RCD.

Table 4 — Base Pan Rubber Plugs

OUTDOOR UNIT MODEL NUMBER PER UNIT	BASE PAN RUBBER PLUGS RCD PART NUMBER	QUANTITY
38MARBQB12R--1 38MARBQB09R--3 38MARBQB12R--3	12600801A00077	13
38MARBQB18R--3	12600801A00077	25
38MARBQB24R--3 38MARBQB30R--3 38MARBQB36R--3	12600801A00117	5



CAUTION

EQUIPMENT DAMAGE HAZARD

In cold climates, ensure the drain hose is as vertical as possible to ensure swift water drainage. If water drains too slowly, it can freeze in the hose and flood the unit.

Step 4 - Refrigerant Piping

Table 5 — Piping and Refrigerant

System Size			12K (115V)	9K (208/230V)	12K (208/230V)	18K (208/230V)	24K (208/230V)	30K (208/230V)	36K (208/230V)
Piping	Min. Piping Length	ft.(m)	9.8(3)	9.8(3)	9.8(3)	9.8(3)	9.8(3)	9.8(3)	9.8(3)
	Standard Piping Length	ft.(m)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)
	Max. outdoor-indoor height difference (OU higher than IU)	ft.(m)	32.8 (10)	32.8 (10)	32.8 (10)	65.6 (20)	82 (25)	82 (25)	98.4 (30)
	Max. outdoor-indoor height difference (IU higher than OU)	ft.(m)	32.8 (10)	32.8 (10)	32.8 (10)	65.6 (20)	82 (25)	82 (25)	98.4 (30)
	Max. Piping Length with no additional refrigerant charge per System (Standard Piping length)	ft.(m)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)	24.6 (7.5)
	Total Maximum Piping Length per system	ft.(m)	82 (25)	82 (25)	82 (25)	98.4 (30)	164 (50)	164 (50)	213 (65)
	Additional refrigerant charge (between Standard – Max piping length)	Oz/ft (g/m)	0.161(15)	0.161(15)	0.161(15)	0.161(15)	0.322(30)	0.322(30)	0.322(30)
	Suction Pipe (size - connection type)	In (mm)	ø1/2" (12.7)	ø3/8" (9.52)	ø1/2" (12.7)	ø1/2" (12.7)	ø5/8" (15.9)	ø5/8" (15.9)	ø5/8" (15.9)
Refrigerant	Refrigerant Type	Type	R410A	R410A	R410A	R410A	R410A	R410A	R410A
	Charge Amount	lb. (kg)	2.47(1.12)	2.6(1.18)	2.6(1.18)	4.08(1.85)	5.73(2.6)	6.06(2.75)	7.5(3.4)

IMPORTANT: Both refrigerant lines must be insulated separately. Use refrigeration grade tubing ONLY. No other type of tubing may be used. Use of other types of tubing will void the manufacturer's warranty.

- The minimum refrigerant line length between the indoor and outdoor unit is 10 ft. (3m).
- When paired with Ductless indoor units, size the line sets based on the connection size of the indoor unit unless specified.
- When paired with conventional or multi-family fan coils, size the line sets based on the liquid and gas connection size of the outdoor unit; a field supplied reducer may be required.
- All outdoor units have an electronic expansion valve to manage the refrigerant flow of the fan coil connected.
- Do not open the service valves or remove the protective caps from the tubing ends until all connections are made.
- Bend the tubing with bending tools to avoid kinks and flat spots.
- Keep the tubing free of dirt, sand, moisture, and other contaminants to avoid damaging the refrigerant system.
- Avoid sags in the suction line to prevent the formation of oil traps.
- Insulate each tube with a minimum 3/8-in. (10 mm) wall thermal pipe insulation. Inserting the tubing into the insulation before making the connections will save time and improve installation quality.



WARNING

All field piping must be completed by a licensed technician and must comply with the local and national regulations. When the system is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. If the refrigerant leaks and its concentration exceeds its proper limit, hazards due to lack of oxygen may result. When installing the refrigeration system, ensure that air, dust, moisture or foreign substances do not enter the refrigerant circuit. Contamination in the system may cause poor operating capacity, high pressure in the refrigeration cycle, explosion or injury. Ventilate the area immediately if there is refrigerant leakage during the installation. Leaked refrigerant gas is hazardous. Ensure there is no refrigerant leakage after completing the installation work.



CAUTION

DO NOT install the connecting pipe until both the indoor and outdoor units have been installed. Insulate both the gas and liquid piping to prevent condensation.

Use the following steps to connect the refrigerant piping:

1. Run the interconnecting piping from the outdoor unit to the indoor unit.
2. Connect the refrigerant piping and drain line outside the indoor unit. Complete the pipe insulation at the flare connection then fasten the piping and wiring to the wall as required. Completely seal the hole in the wall.
3. Cut tubing to the correct length.

When preparing refrigerant pipes, take extra care to cut and flare them properly. This ensures efficient operation and minimizes the need for future maintenance.

- a. Measure the distance between the indoor and outdoor units.
- b. Using a pipe cutter, cut the pipe a little longer than the measured distance.
- c. Make sure the pipe is cut at a perfect 90° angle.

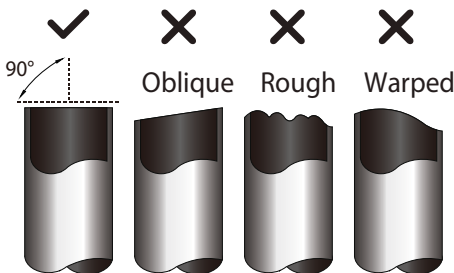


Fig. 11 — Pipe Cutting



CAUTION

DO NOT DEFORM PIPE WHILE CUTTING

Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

4. Remove Burrs

Burrs can affect the air-tight seal of the refrigerant piping connection. Therefore, they must be completely removed. To remove:

 - a. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.
 - b. Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.

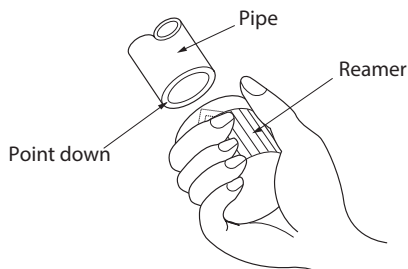


Fig. 12 — Deburring Tool

5. Flare Pipe Ends

Proper flaring is essential to achieving an airtight seal.

- a. After removing the burrs from the cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
- b. Sheath the pipe with insulating material.
- c. Place factory flare nut on pipe facing the proper direction. Make sure they are facing the right direction. Once the ends are flared, it is impossible to put them on or change their direction.

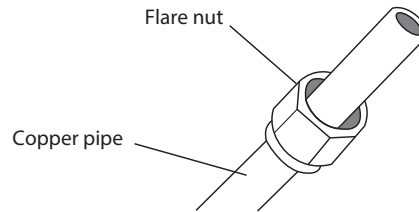


Fig. 13 — Copper pipe and flare nut

- d. Remove the PVC tape from ends of pipe when ready to perform the flaring work.
- e. Clamp the flare block on the end of the pipe. The end of the pipe must extend beyond the flare form.

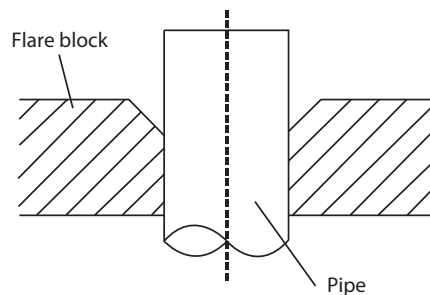


Fig. 14 — Flare Block

- f. Place the flaring tool onto the form.
- g. Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions in Table 6.

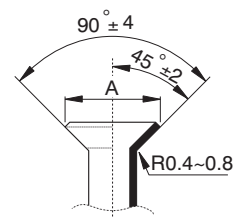


Fig. 15 — Flare Shape

Table 6 — Flare Nut Spacing

OUTER DIAMETER IN (MM)	A" IN (MM)	
	MAX.	MIN.
Ø 1/4" (6.35)	0.05 (1.3)	0.03 (0.7)
Ø 3/8" (9.52)	0.06 (1.6)	0.04 (1.0)
Ø 1/2" (12.7)	0.07 (1.8)	0.04 (1.0)
Ø 5/8" (15.88)	0.09 (2.2)	0.08 (2.0)

- h. Remove the flaring tool and flare block, then inspect the end of the pipe for cracks and even flaring.

6. Connect the Pipes

Connect the copper pipes to the indoor unit first, then connect the pipes to the outdoor unit. Connect the low-pressure pipe first, then connect the high pressure pipe.

- When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared ends of the pipes.
- Align the center of the two pipes that you will connect.

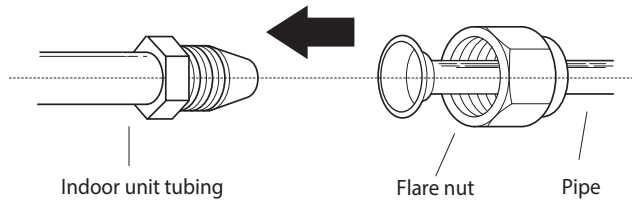


Fig. 16 — Align the center of the two pipes

- Tighten the flare nut as much as possible by hand.
- Using a wrench, grip the nut on the unit tubing.
- While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values listed in Table 7.

Table 7 — Tightening Torque

BRASS FLARE SIZE (IN")	RECOMMENDED SEATING TORQUE FOR BRASS FLARE NUTS	N-M
Ø1/4	8-10 Ft. - Lbs.	10.8 to 13.6
Ø3/8	15-18 Ft. - Lbs	20.3 to 24.4
Ø1/2	28-32 Ft. - Lbs	38.0 to 43.4
Ø5/8	38-42 Ft. - Lbs	51.5 to 56.9
Ø3/4	50-55 Ft. - Lbs.	68.0 to 74.6

NOTE: Use both a backup wrench and a torque wrench when connecting or disconnecting pipes to or from the unit.

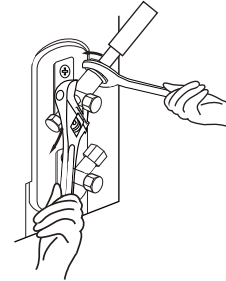


Fig. 17 — Torque wrench with backup wrench



CAUTION

Wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite. Ensure the pipe is properly connected. Over tightening may damage the bell mouth and under tightening may lead to leakage.

All tubing bends should be performed with a properly sized tubing bender to prevent kinking or damaging the tubing.

- After connecting the copper pipes to the indoor unit, wrap the power cable, signal cable and the piping together with binding tape.

NOTE: While bundling these items together, **DO NOT** intertwine or cross the signal cable with any other wiring.

- Thread this lineset through the wall and connect it to the outdoor unit.
- Insulate all piping, including the outdoor unit valves.

NOTE: **DO NOT** open the service valves until pressure test is complete.

7. Pressure Test Piping



CAUTION

Only use Dry Nitrogen to pressure test refrigerant systems. Use of other gases can result in injury, property damage or death.

NOTE: Use refrigeration gauges that are pressure rated for R410a refrigerant.

- Attach low side gauge hose to the 5/16" Schrader valve on the outdoor unit service valve.
- Attach the charging hose to the regulator on the dry nitrogen tank.
- Preset the nitrogen regulator to 550 psi.
- Slowly pressurize the line set until the low side gauge reads 500 psi. Do not exceed 550 psi.
- Close all the valves on the nitrogen tank and gauges.
- Allow the pressure test to stand for a minimum of 30 minutes.
- If the pressure holds, release the nitrogen and proceed with "Step 5 - Evacuate Coil And Tubing System" on page 14.
- If the pressure goes down in the 30 minute delay, leak check the tubing and flare fittings to identify the source of the leak. Return to Step C, above.

Step 5 - Evacuate Coil And Tubing System



CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Never use the system compressor as a vacuum pump.

Refrigerant tubes and the indoor coil should be evacuated using the recommended 500 microns deep vacuum method. The alternate triple evacuation method may be used if the procedure outlined below is followed.

NOTE: Always break a vacuum with dry nitrogen.

Using Vacuum Pump

1. Completely tighten flare nuts A, B, C, D. Connect the manifold gage charge hose to a charge port of the low side service valve (see Fig. 18).
2. Connect the charge hose to vacuum pump.
3. Fully open the low side of manifold gage (see Fig. 19).
4. Start the vacuum pump.
5. Evacuate using either the deep vacuum or triple evacuation method.
6. After evacuation is complete, fully close the low side of manifold gage and stop the vacuum pump operation.
7. The factory charge contained in the outdoor unit is good for up to 25 ft. (8 m) of line length. For refrigerant lines longer than 25 ft. (8 m), add refrigerant, up to the allowable length.
8. Disconnect the charge hose from the charge connection of the low side service valve.
9. Fully open service valves B and A.
10. Securely tighten the service valve caps.

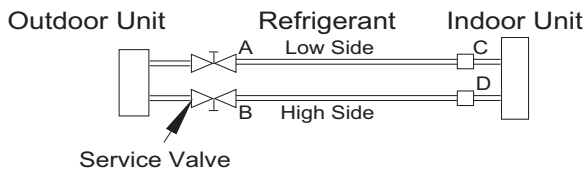


Fig. 18 — Service Valve

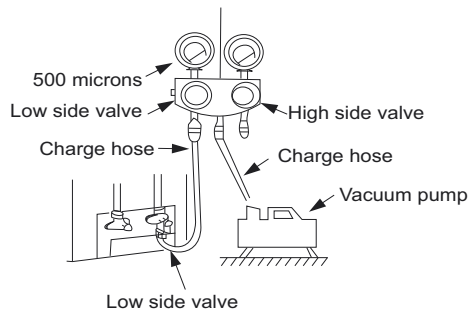


Fig. 19 — Manifold

Evacuation

Evacuation of the system will remove air or nitrogen (non-condensables) as well as moisture. A proper vacuum will assure a tight, dry system before charging with refrigerant. The two methods used to evacuate a system are the deep vacuum method and the triple vacuum method.

Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gauge capable of accurately measuring this vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and moisture (see Figure 20).

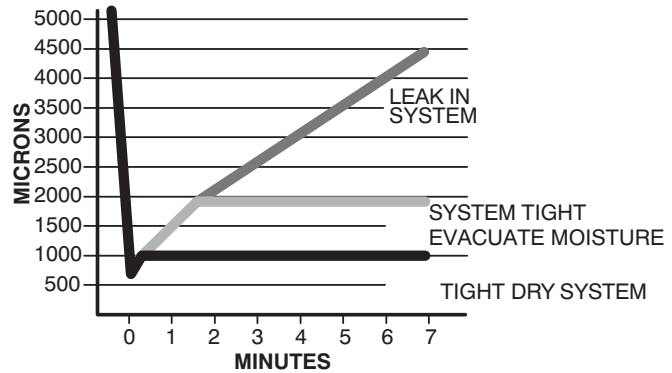


Fig. 20 — Deep Vacuum Graph

Triple Evacuation Method

The triple evacuation method should be used when vacuum pump is not capable of pumping down to 500 microns and system does not contain any liquid water. Refer to Fig. 21 and proceed as follows:

1. Attach refrigeration gauges and evacuate system down to 28 in. of mercury and allow pump to continue operating for an additional 15 minutes.
2. Close service valves and shut off vacuum pump.
3. Connect a nitrogen cylinder and regulator to system and flow nitrogen until system pressure is 2 psig.
4. Close service valve and allow system to stand for 1 hour. During this time, dry nitrogen will be able to diffuse throughout the system absorbing moisture.
5. Repeat this procedure as indicated in Fig. 21. System will then be free of any contaminants and water vapor.

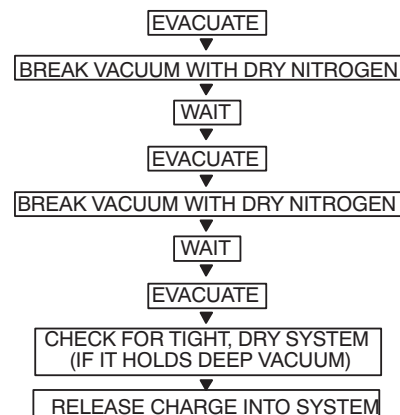


Fig. 21 — Triple Evacuation Method

Final Tubing Check

IMPORTANT: Check to be certain factory tubing on both the indoor and outdoor unit has not shifted during shipment. Ensure tubes are not rubbing against each other or any sheet metal. Pay close attention to the feeder tubes, making sure wire ties on feeder tubes are secure and tight.

Step 6 - Electrical Connections

Install All Power and Interconnecting Wiring to Outdoor Units

1. Mount the outdoor power disconnect.
2. Run the power wiring from the main box to disconnect per NEC and local codes.
3. Remove the field wiring cover from the unit by loosening the screws.
4. Remove the caps on the conduit panel.
5. Connect the conduit to conduit panel (see Fig. 22).
6. Properly connect both the power supply and control lines to the terminal block per the connection diagram for the appropriate unit capacity and voltage.
7. Ground the unit in accordance with NEC and local electrical codes.
8. Use the lock nuts to secure the conduit.
9. Reinstall the field wiring cover.



CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

Be sure to comply with local codes while running wire from indoor unit to outdoor unit.

Every wire must be connected firmly. Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, ensure all wiring is tightly connected.

No wire should be allowed to touch the refrigerant tubing, compressor or any moving parts.

Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner.

Connecting cable with the conduit shall be routed through hole in the conduit panel.

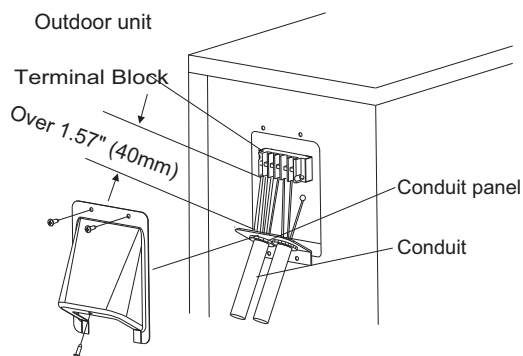


Fig. 22 —Field Wiring

WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Power and Communication Wiring: The main power is supplied to the outdoor unit. The field supplied 14/3 power/communication wiring, from the outdoor unit to the indoor unit, consists of four (4) wires and provides the power for the indoor unit. Two wires are high voltage AC power, one is communication wiring and the other is a ground wire.

To minimize communication interference: If installed in a high Electromagnetic field (EMF) area and communication issues arise, a 14/2 stranded shielded wire can be used to replace 2 (L2/N) and 3 (S) between the outdoor and indoor units - landing the shield onto the ground in the outdoor unit only.

Table 8 — Wiring Sizes

CABLE	CABLE SIZE	REMARKS
Connection Cable	14AWG	3 wire + Ground 1Φ 208/230 V (Stranded wire is recommended)



WARNING

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation. Wires should be sized based on NEDC and local codes.



CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation. Be sure to comply with local codes while running wire from the indoor unit to the outdoor unit. Every wire must be connected firmly. Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Ensure all wiring is tightly connected.

No wire should touch the refrigerant tubing, compressor or any moving parts. Disconnecting means must be provided and shall be located within sight and readily accessible from the air conditioner. Connecting cable with conduit shall be routed through the hole in the conduit panel.

ELECTRICAL DATA

Table 9 — Electrical Data

Outdoor Unit		12K(115V)	9K(208/230V)	12K(208230V)	18K(208/230V)	24K(208/230V)	30K(208/230V)	36K(208/230V)
Minimum Circuit Ampacity (MCA)	A	19	15	15	16	25	23	28
Maximum Overcurrent Protection Ampacity (MOPA)	A	25	15	15	25	35	30	35
Voltage-Phase-Frequency		115-1-60	208/230-1-60					
Max – Min Voltage Range		127-104	253-187					
Cooling								
Running Current	(A)	8	2.5	3.72	6.3	8.1	11.4	18.5
Power Consumption	(W)	923	556	857	1440	1845	2605	4235
Power Factor	(%)	81.54	95	95.2	95	94	96.5	98.7
Heating								
Running Current Range	(A)	8.7	4.1	4.1	7.3	10.9	14.7	18.3
Power Consumption	(W)	1000	907	907	1700	2500	3380	4200
Power Factor	(%)	81.35	96.4	94.9	95	96	97.6	98.7

*Permissible limits of the voltage range at which the unit will operate satisfactorily.

LEGEND

FLA - Full Load Amps

MCA - Minimum Circuit Amps

MOCP - Maximum Over-Current Protection

RLA - Rated Load Amps

CONNECTION DIAGRAMS

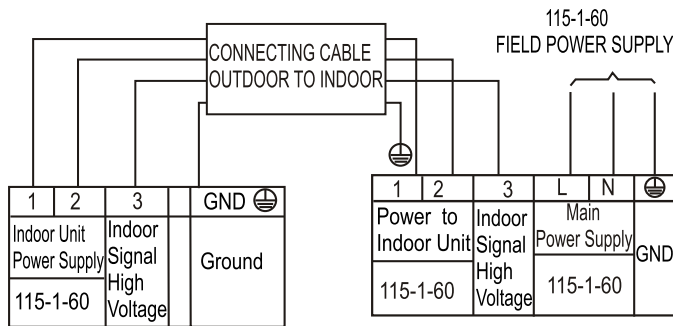


Fig. 23 — Connection Diagram 12K (115V)

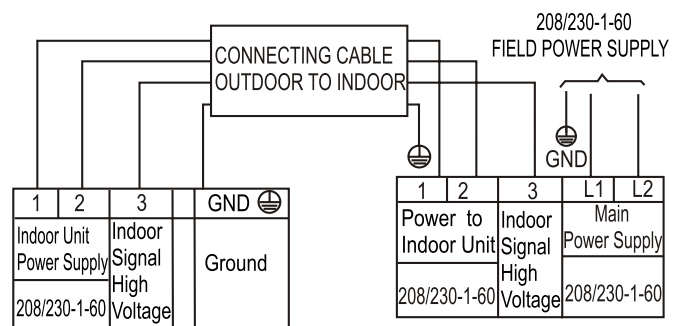


Fig. 25 — Connection Diagram 24K-36K (208-230V)

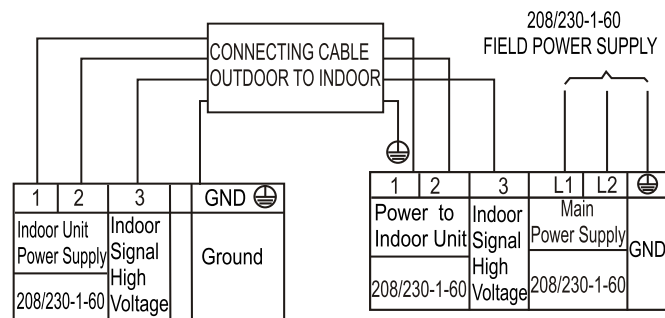


Fig. 24 — Connection Diagram 9K-18K (208-230V)

NOTES:

1. Do not use the thermostat wire for any connection between indoor and outdoor units.
2. All connections between the indoor and outdoor units must be made as shown in Figures 23 - 25. The connections are sensitive to polarity and will result in a fault code.

START-UP

Test Operation

Perform a test operation after completing a gas leak and electrical safety check. Review the indoor unit installation instructions and owner's manual for additional start up information.

System Checks

1. Conceal the tubing where possible.
2. Ensure that the drain tube slopes downward along its entire length.
3. Ensure all tubing and connections are properly insulated.
4. Fasten the tubes to the outside wall, when possible.
5. Seal the hole through which the cables and tubing pass.

Outdoor Unit

1. Are there unusual noises or vibrations during operation?

Explain the Following Items to the Customer (with the aid of the Owner's Manual):

2. Explain care and maintenance.
3. Present the installation instructions to the customer.

CARE AND MAINTENANCE

To help ensure high performance and minimize possible equipment failure, periodic maintenance must be performed on this equipment. Maintenance frequency may vary depending upon geographic areas.

TROUBLESHOOTING

For ease of service, the systems are equipped with diagnostic code display LEDs on both the indoor and outdoor units. The outdoor diagnostic display are two LEDs (Red and Green) on the outdoor unit board and is limited to very few errors. The indoor diagnostic display is a combination of flashing LEDs on the display panel or the front of the unit.

There may be a few error codes displayed in the indoor unit that might relate to the outdoor unit's problems. If possible, always check the diagnostic codes displayed on the indoor unit first. The diagnostic codes displayed in the outdoor units are listed in Table 10.

Table 10 — Unit Diagnostic Guides

GREEN LED	RED LED	FAILURE MODE
On	X	Standby, normal
X	On	Operation, normal
On	On	High/Low voltage protection on compressor terminal
On	☆	EEPROM error
X	☆	The compressor speed is out of control
☆	On	Zero-crossing signal detection error; lack of phase; synchronization error
☆	X	IGBT or Module protection
☆	☆	Communication error

☆ = Flashing, X = Off

For additional diagnostic information, refer to the service manual.

OUTDOOR UNIT DIAGNOSTIC GUIDES

For ease of service, the systems are equipped with diagnostic code display LEDs on both the indoor and outdoor units. The outdoor diagnostic is displayed on the outdoor unit microprocessor board.

There may be a few error codes displayed in the indoor unit that might relate to the outdoor unit's problems. If possible, always check the diagnostic codes displayed on the indoor unit first. The diagnostic codes displayed on the outdoor units are listed on Table 10 on page 17.

Table 11 — Indoor Unit Diagnostic Codes

OPERATION LAMP (TIMES)	TIMER LAMP	DISPLAY	ERROR INFORMATION
☆1	OFF	EH 00/EH 0A	Indoor unit EEPROM parameter error
☆2	OFF	EL 01	Indoor/outdoor unit communication error
☆3	OFF	EH 02	Zero-crossing signal detection error
☆4	OFF	EH 03	Indoor fan operating outside of the normal range
☆5	OFF	EC 51	Outdoor unit EEPROM parameter error
☆5	OFF	EC 52	T3 is in open circuit or has short circuited
☆5	OFF	EC 53	T4 is in open circuit or has short circuited
☆5	OFF	EC 54	TP is in open circuit or has short circuited
☆5	OFF	EC 56	T2B is in open circuit or has short circuited
☆6	OFF	EH 60	T1 is in open circuit or has short circuited
☆6	OFF	EH 61	T2 is in open circuit or has short circuited
☆12	OFF	EC 07	Outdoor fan operating outside of the normal range
☆9	OFF	EH 0b	Indoor PCB/Display board communication error
☆8	OFF	EL 0C	Refrigerant leakage detection
☆7	FLASH	PC 00	IPM malfunction or IGBT OSCP
☆2	FLASH	PC 01	Over voltage or over low voltage protection
☆3	FLASH	PC 02	Compressor or IPM high temp/pressure protection
☆5	FLASH	PC 04	Inverter compressor drive error
☆1	FLASH	PC 08	Current overload protection
☆6	FLASH	PC 40	Comm. error between outdoor chip and compressor chip
☆7	FLASH	PC 03	Low pressure protection
☆1	ON	--	Indoor units mode conflict
☆9	OFF	EH b1	Indoor board and Multi-function communication error
☆11	OFF	FH 0d	Ionizer malfunction

O (on – light) X (off – light) ☆ (flash)

For additional diagnostic information, refer to the service manual.

Table 12 — Indoor Unit Functional Codes

DISPLAY	DESCRIPTION
dF	Defrost
SC	Self clean
CL	Filter cleaning reminder
CL	Active Clean (*model dependent)
nF	Filter replacement reminder
FP	Heating in room temperature under 8°C
FC	Forced cooling
AP	AP mode of WIFI connection
CP	Remote switched off
LL	Remote or Wire controller Lock
On	Time On
Off	Time Off
E-C-O	ECO mode
SD	Power abnormal detection
d1	Receive DR1 signal
d2	Receive DR2 signal
d3	Receive DR3 signal
dE	DR input error signal
FH 0P	AP mode is activated / no WIFI kit installed
FH 0d	See outdoor unit for Error Code information
EH/EC/EL/PC	See outdoor unit for Error Code information

DUCTLESS START-UP CHECKLIST

Installation Data

Site Address: _____

City: _____ State: _____ Zip Code: _____

Installing Contractor: _____ Contractor Contact #: () _____ - _____

Job Name: _____ Start-up Date: _____

Distributor: _____

System Details

UNITS	MODEL NO.	SERIAL NO.	CONTROLLER
OUTDOOR UNIT			
INDOOR UNIT A			

Wiring Electrical

Wire Size and Type Used? AWG: _____ TYPE: _____

Are there any breaks, splices, wire nuts or butt connectors between the outdoor unit and the indoor door unit? YES: _____ NO: _____

Was the wiring from the outdoor unit port to the correct indoor unit verified? YES: _____ NO: _____

REMARKS: _____

Voltage Check

Wiring: Single zone _____

Outdoor Unit Disconnect	1(L1):GND		Outdoor Unit Terminal Block	1(L1):GND		NOTES: _____ _____ _____ _____
	2(L2):GND			2(L2):GND		
	1(L1):2(L2)			1(L1):2(L2)		
Indoor Unit Voltage Check @ Outdoor Unit	1(L1):GND		Indoor Unit Voltage Check @ Indoor Unit	1(L1):GND		NOTES: _____ _____ _____ _____
	2(L2):GND			2(L2):GND		
	1(L1):2(L2)			1(L1):2(L2)		
	2(L2):3(S)			2(L2):3(S)		

Ductless Start-Up Checklist (CONT)

Piping

Leak Check:

System held 500 psig (max. 550psi) for a minimum of 30 minutes using dry nitrogen. YES: _____ NO: _____

Evacuation Method:

- Was the Triple Evacuation Method used as outlined in the installation manual? YES: _____ NO: _____
- Was the Deep Vacuum Method used as outlined in the installation manual? YES: _____ NO: _____
- Did the System Hold 500 microns for 1 hour? YES: _____ NO: _____
- Does the line set match the diameter of the evaporator connections? YES: _____ NO: _____
- For Conventional Fan Coils, does the line set match the outdoor unit size? YES: _____ NO: _____

Single Zone Piping:

Has the liquid pipe length been measured and the additional charge calculated? Size: _____ Length: _____ Charge: _____

NOTES:

PORT	LIQUID SIZE		SUCTION SIZE		LENGTH	CHARGE	NOTES: _____
A							_____ _____

Performance Check

For 1:1 Single Zone Systems: Adjust the set-point to create an operational call for the desired testing operation. Allow the system to run for a minimum of 10 min. and record the following details:

(Operational data recorded on applicable heads with the wireless remote controller's Point Check function)

UNIT	SET-POINT	MODE	T1	T2	T3	T4	Tb	Tp	Th	LA/Lr
A										

Error Codes

Were there any error codes present at start-up? YES: _____ NO: _____

Indoor Unit Error Code:		Notes:
Outdoor Unit Error Code:		
Wall Controller:		
24V Interface:		

Comments:
