

DLCMRA

INSTALLATION INSTRUCTIONS

Multi-zone Outdoor Unit Ductless System - Sizes 18, 27, 36, and 48



Fig. 1 — Size 18K



Fig. 2 — Sizes 27K and 36K



Fig. 3 — Size 48K

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NOTES:

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

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.

When working on the equipment, observe 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 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 literature and attached to the unit. Consult local building codes and current editions of the National Electrical Code (NEC) NFPA 70. In Canada, refer to current editions of the Canadian electrical code CSA 22.1.


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, 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.

GENERAL

These instructions cover the installation, start-up and servicing of the multi-zone outdoor unit connected to up to five indoor fan coil units. For approved combinations, refer to the product data document.

PARTS LIST

Table 1 — Parts List

Part No.	Part Name	Qty
1	Outdoor Unit	1
-	Literature package including installation instructions and warranty	1
-	Grommet to secure the outdoor unit (helps with vibration prevention during unit operation)	4
-	Drain joint	1
-	Drain hose	1
-	Conversion Joints (see Table 4)	-

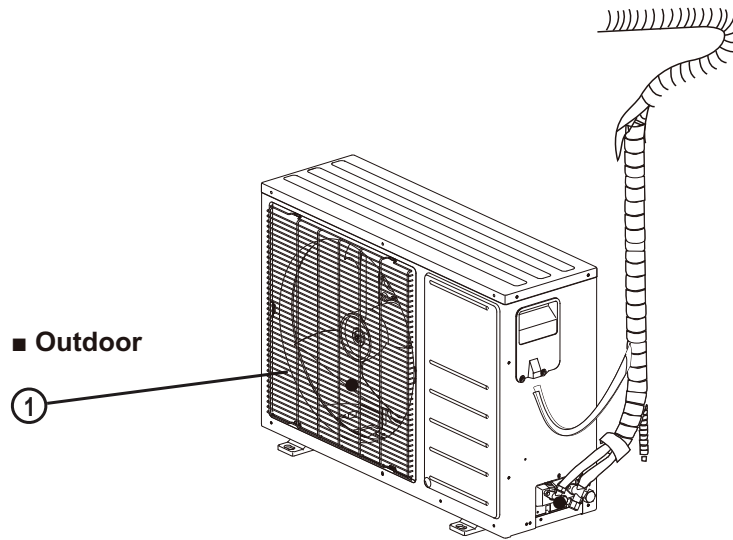


Fig. 4 — Parts List

NOTES:

- 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.
- The illustration above (Fig. 4) is only a sketch. Different models may be differ slightly.

The units listed in Table 2 are covered in this manual.

Table 2 — Unit Sizes

System Tons	kBTUh	V-Ph-Hz	Outdoor Model
1.5	18	208/230-1-60	DLCMRAH18BAK
2.1	27		DLCMRAH27CAK
3.6	36		DLCMRAH36DAK
4.0	48		DLCMRAH48EAK

SYSTEM REQUIREMENTS

Allow sufficient space for airflow and unit service. See Fig. 5 — on page 6 for the minimum required distances between the unit and walls or ceilings.

PIPING REQUIREMENTS

IMPORTANT: Both refrigerant lines must be insulated separately.

The minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m). The following lengths are allowed.

Table 3 lists the pipe sizes for the outdoor unit. For the indoor unit pipe sizes refer to the indoor unit installation instructions.

Table 3 — Piping and Refrigerant

System Size			18K	24K	36K	48K
Piping	Min. Piping Length per each indoor unit	ft (m)	10 (3)	10 (3)	10 (3)	10 (3)
	Standard Piping Length per each indoor unit	ft (m)	25 (7.5)	25 (7.5)	25 (7.5)	25 (7.5)
	Max. outdoor-indoor height difference (OU higher than IU)	ft (m)	49 (15)	49 (15)	65 (20)	65 (20)
	Max. outdoor-indoor height difference (IU higher than OU)	ft (m)	49 (15)	49 (15)	65 (20)	65 (20)
	Max. height different between indoor units	ft (m)	32 (10)	32 (10)	32 (10)	32 (10)
	Max. Length per each indoor unit	ft (m)	82 (25)	98 (30)	115 (35)	115 (35)
	Max. Piping Length with no additional refrigerant charge per System (Standard Piping length x No. of Zones)	ft (m)	49 (15)	74 (22.5)	98 (30)	123 (37.5)
	Total Maximum Piping Length per system	ft (m)	131 (40)	197 (60)	263 (80)	328 (100)
	Additional refrigerant charge (between Standard – Max piping length)	Oz/ft (g/m)	0.16 (15)	0.16 (15)	0.16 (15)	0.16 (15)
	Suction Pipe Size	in (mm)	3/8*2 (9.5*2)	3/8*3 (9.5*3)	1/2 *1+3/8*3 (12.7*1+9.5*3)	1/2 *2+3/8*3 (12.7*2+9.5*3)
Liquid Pipe Size	in (mm)	1/4 *2 (6.3*2)	1/4 *3 (6.3*3)	1/4 *4 (6.3*4)	1/4 *5 (6.3*5)	
Refrigerant	Refrigerant Type		R410A	R410A	R410A	R410A
	Heat Pump Models Charge Amount	Lbs (kg)	4.41 (2.0)	6.17 (2.8)	6.61 (3.0)	10.13 (4.6)

NOTE: For piping runs greater than the “Maximum Piping Length with no additional refrigerant charge per System”, see Additional Refrigerant Charge (see Table 5).

Refrigerant Piping:

Line sets to be sized based on the connection size of the indoor unit. Each pipe should be insulated individually.

Conversion Joints:

The outdoor unit includes a package of conversion joints to facilitate installation of the various fan coil sizes. These joints are to be connected to the outdoor unit as needed to match the line set size.

Table 4 — Conversion Joints

No. of Zones	Size	Adaptor	Qty.
2 zone	18	3/8"--1/2"	2
3 zone	27	3/8"--1/2"	3
4 zone	36	3/8"--1/2"	3
		1/2"--3/8"	1
		1/4"--3/8"	1
		1/2"--5/8"	1
5 zone	48	1/2"--3/8"	2
		1/4"--3/8"	2
		1/2"--5/8"	2
		3/8"--1/2"	3

Table 5 — Additional Refrigerant Charge

Unit Size	Min. No. of Zones	Max. No. of Zones	Charge oz. (kg.)	Additional Charge Required After ft. (m)	Additional Charge oz./ft. (g/m)	Total Maximum Piping Length ft. (m.)
18	2	2	70.55 (2.0)	49 (15)	0.16 (15)	131 (40)
27	2	3	98.76 (2.8)	74 (22.5)	0.16 (15)	197 (60)
36	2	4	105.82 (3.0)	98 (30)	0.16 (15)	263 (80)
48	2	5	162.26 (4.6)	123 (37.5)	0.16 (15)	328 (100)

Additional Refrigerant Calculation

Sum Total Liquid Pipe ft. (m) - Additional Charge Required After ft. (m.) x Additional Charge oz./ft. (g/m) 0.16 (15)

NOTES:

If the calculation results in a negative number no additional refrigerant is required. Electronic expansion valves in the outdoor unit are used as metering devices.

WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. See the rating plate and/or the installation instructions of the compatible outdoor unit for MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Recommended Connection Method for Power and Communication Wiring:

The main power is supplied to the outdoor unit. The field supplied 14/3 stranded wire with ground with a 600 volt insulation rating, power/communication wiring from the outdoor unit to indoor unit consists of four (4) wires and provides the power for the indoor unit. Two wires are line voltage AC power, one is communication wiring (S) and the other is a ground wire. Wiring between indoor and outdoor unit is polarity sensitive. The use of BX wire is NOT recommended.

If installed in a high Electromagnetic field (EMF) area and communication issues exists, a 14/2 stranded shielded wire can be used to replace L2 and (S) between outdoor unit and indoor unit landing the shield onto ground in the outdoor unit only.



WARNING

EQUIPMENT DAMAGE HAZARD

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

Wires should be sized based on NEC 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.

DIMENSIONS

Table 6 — Dimensions

UNIT SIZE		18	27	36	48
Height	in (mm)	27.6 (703)	31.89 (810)	31.89 (810)	52.48 (1333)
Width	in (mm)	37.31 (948)	41.22 (1047)	41.22 (1047)	41.14 (1045)
Depth	in (mm)	14.82 (376)	17.91 (455)	17.91 (455)	17.63 (448)
Weight-Net	lbs (kg)	105.8 (48)	156.5 (71)	156.5 (71)	223.8 (101.5)

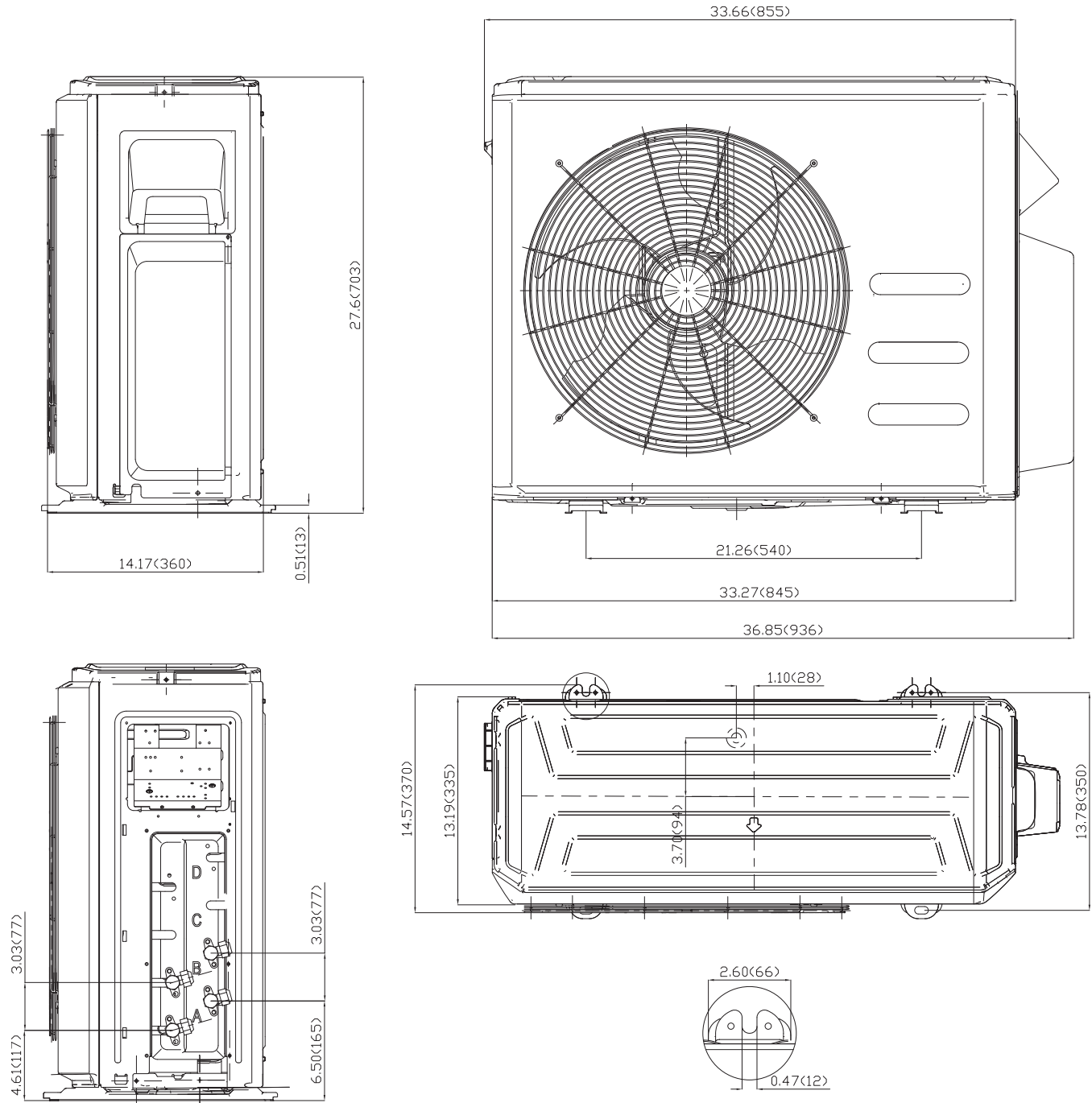


Fig. 5 — Outdoor Dimensions Size 18K

NOTE: Master valves are not available on the 18K unit.

DIMENSIONS (CONT)

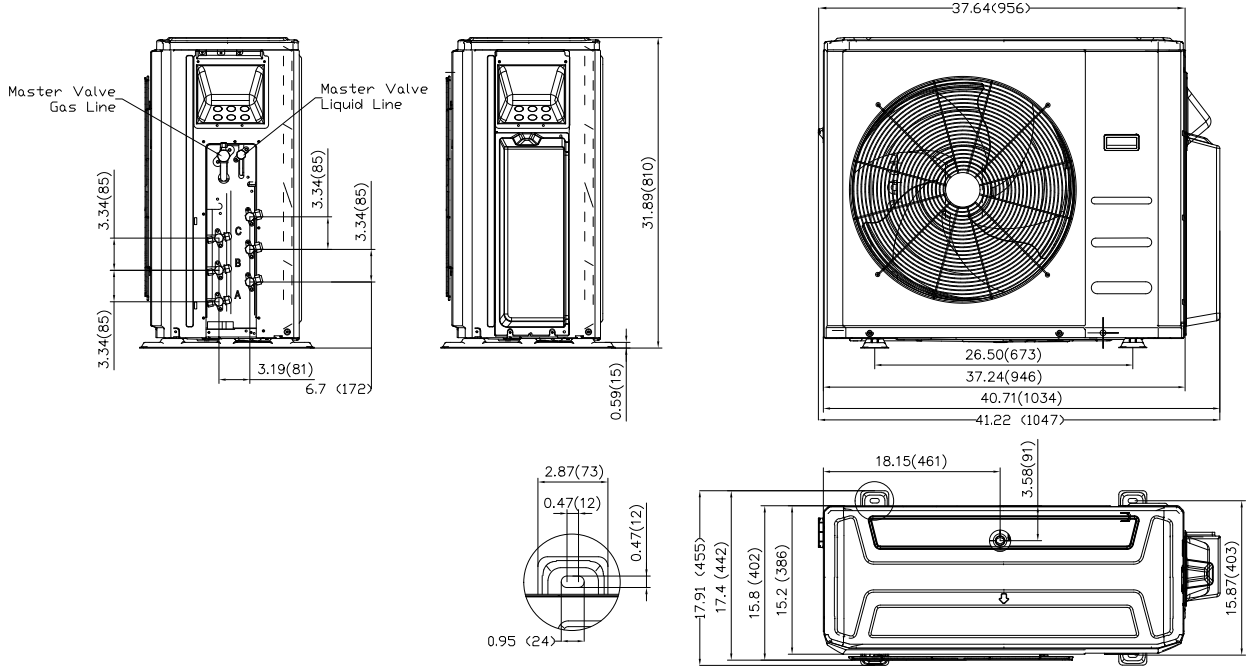


Fig. 6 — Outdoor Dimensions Size 27K

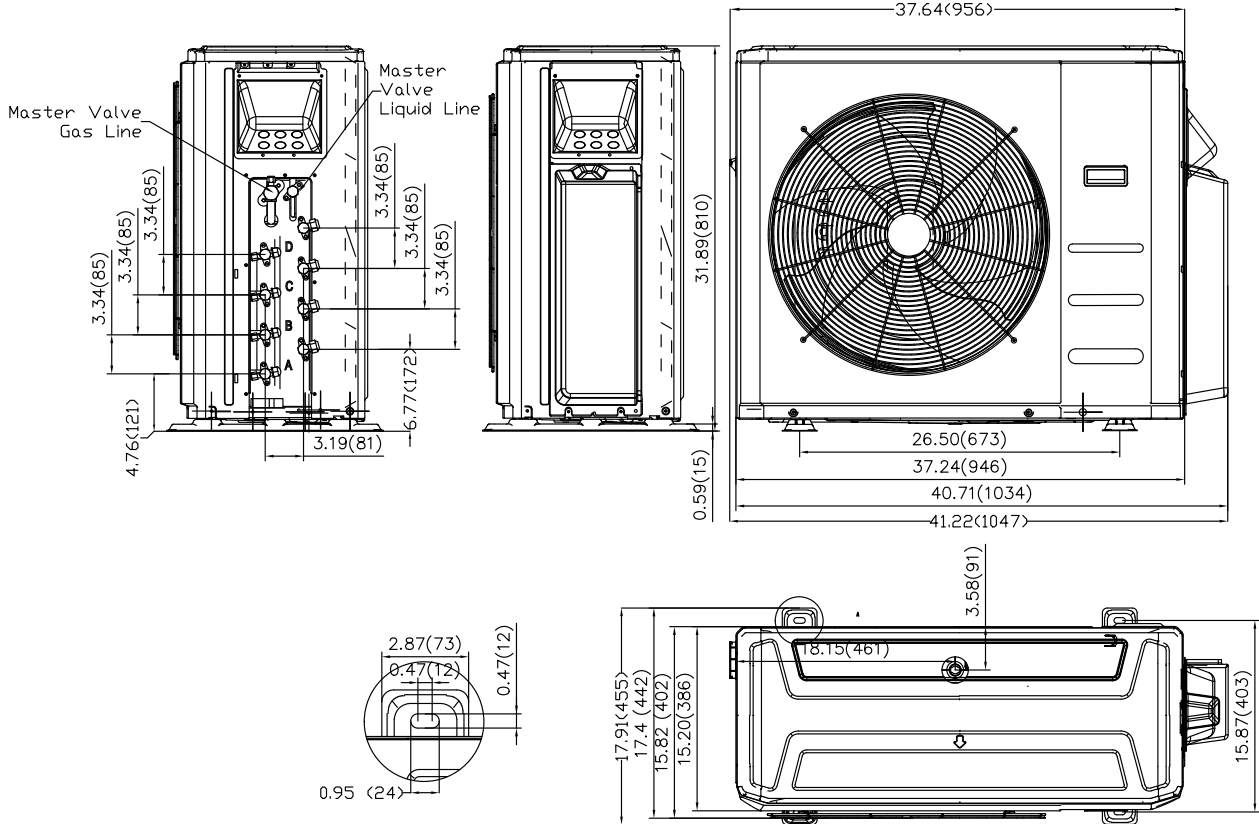


Fig. 7 — Outdoor Dimensions Size 36K

DIMENSIONS (CONT)

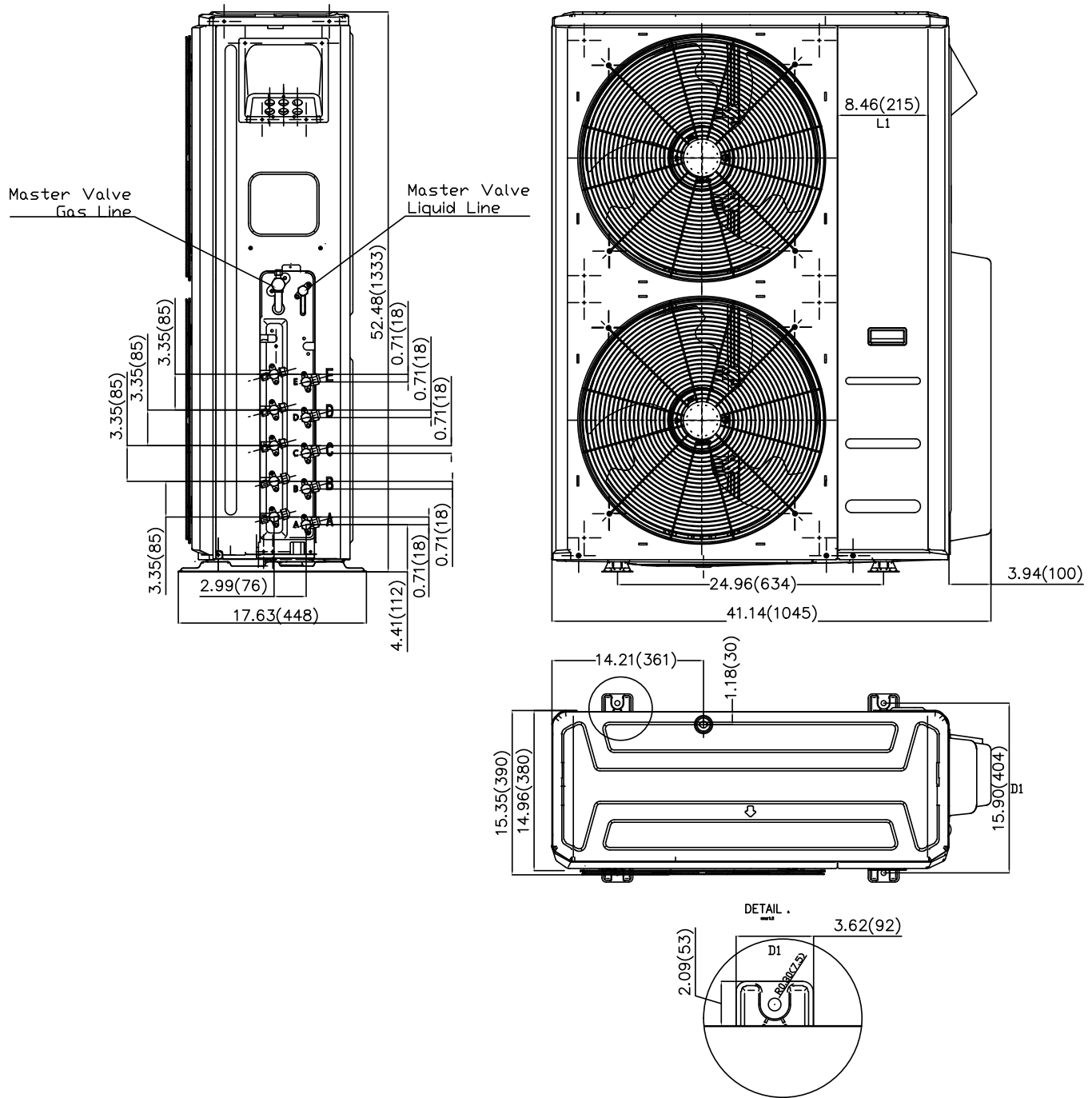


Fig. 8 — Outdoor Dimensions Size 48K

CLEARANCES

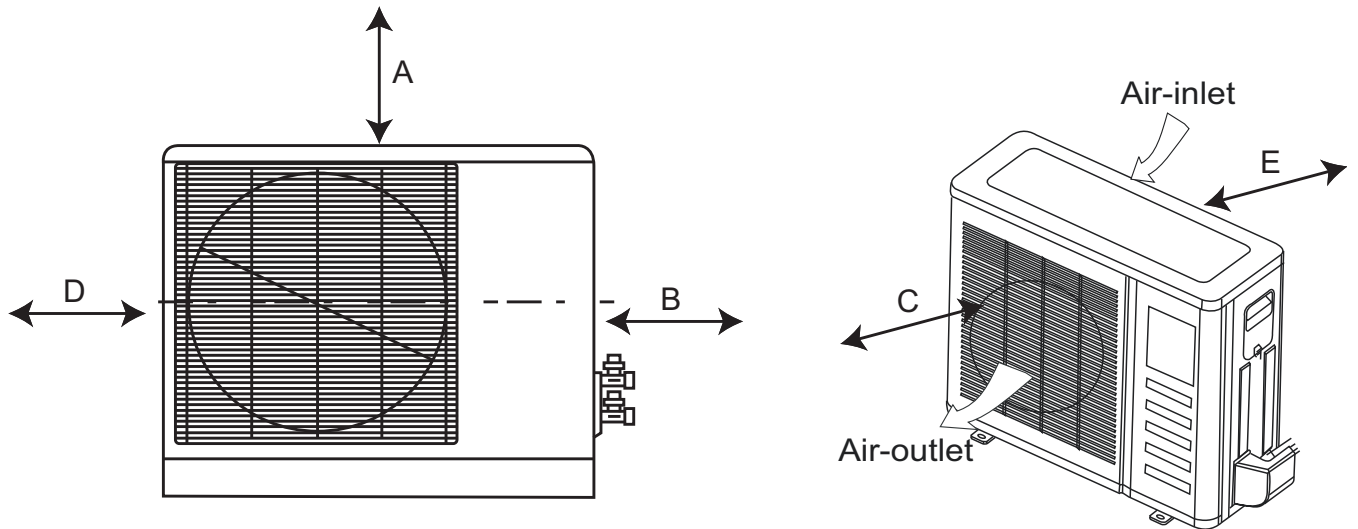


Fig. 9 — Clearances

Table 7 — Clearance Values

UNIT	MINIMUM VALUE in. (mm)
A	24 (609)
B	24 (609)
C	24 (609)
D	4 (101)
E	6 (152)

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

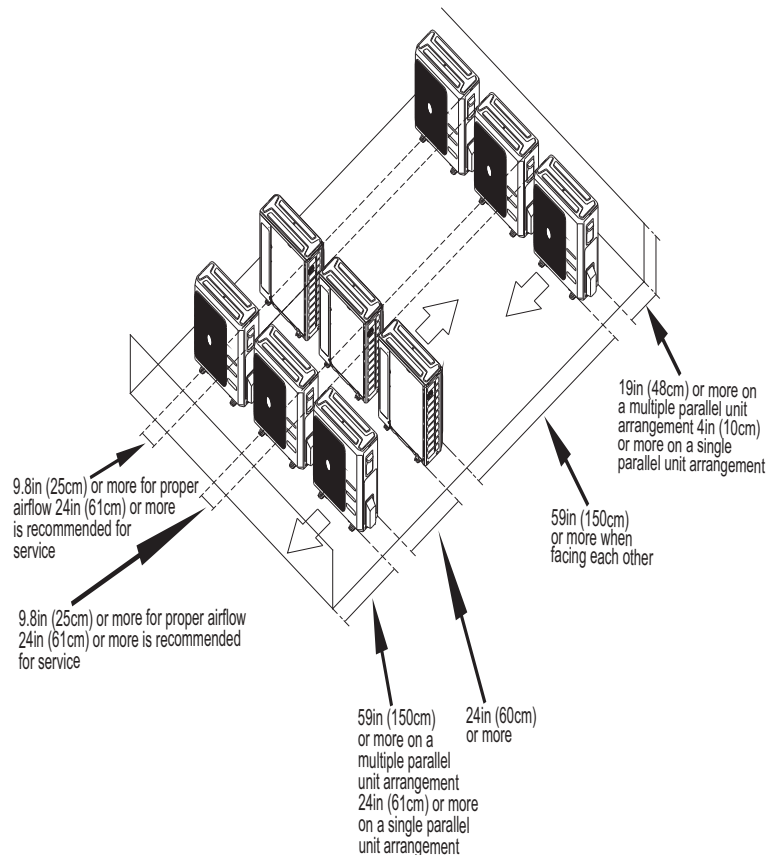


Fig. 10 —Clearances for multiple units

INSTALLATION GUIDE

Up to five fan coil units can be connected to one outdoor unit.
Refer to the product data for approved combinations.

INSTALLATION TIPS

Ideal installation locations include:

Outdoor Unit

- 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 with appropriate clearances as outlined (See Fig. 9 — on page 9).
- Do not install the indoor or outdoor units in a location with special environmental conditions. For those applications, contact your Ductless representative.

OUTDOOR UNIT INSTALLATION

1. Use a rigid base to support unit in a level position.
2. Locate the outdoor unit and connect piping and wiring.

CAUTION

EQUIPMENT DAMAGE HAZARD

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

Excessive torque can break flare nut depending on installation conditions.

NOTE: Install the outdoor unit on a rigid base to reduce noise levels and vibration. Determine the optimal air outlet direction to prevent discharged air from being blocked. If the installation site is exposed to strong winds such as a coastal areas, ensure the fan's proper operation by installing the unit lengthwise along the wall or use dust or shield plates. If the unit needs to be suspended, the installation bracket should comply with the suspension requirements in the installation bracket diagram. The installation wall should be solid brick, concrete or the same intensity construction, or take steps to reinforce and dampen the support. The connection between the bracket and the wall as well as the bracket and the air conditioner should be firm, stable and reliable. Ensure there is no obstacle which may block the radiating air.

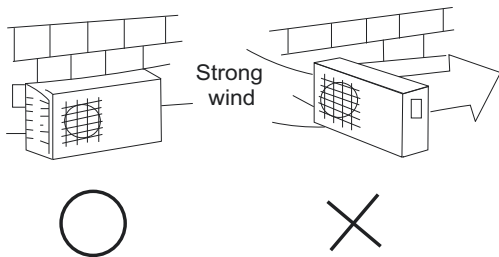


Fig. 11 — High Wind Installation

MAKE REFRIGERANT PIPING CONNECTIONS (OUTDOOR UNIT)

IMPORTANT: Use refrigeration grade tubing ONLY. No other type of tubing may be used. Use of other tubing types will void the manufacturer's warranty.

Piping Guide:

- Do not open service valves or remove protective caps from tubing ends until all the 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 minimum 3/8-in. (10 mm) wall thermal pipe insulation. Inserting the tubing into the insulation before making the connections saves time and improves installation quality.

1. The unit is equipped with multiple pairs of service valves. Each pair is clearly marked (color and letter) to identify the indoor unit circuits. In the outdoor unit wiring area, each indoor unit interconnecting terminal block is marked (letter) the same as the corresponding pair of service valves. The indoor units must be piped and wired in matched sets (A to A; B to B, etc.).

NOTE: Any size indoor unit can be connected to any port number on the outdoor unit.

2. It is not required to use all of the available fan coil connections if the application does not require them at the current time. The system can be expanded at any time.
3. Conversion joints are supplied with the outdoor unit. They are required for certain fan coil combinations. Connect joints to the outdoor unit as needed to match the line set size.
4. Remove the service connection, if provided with the unit.

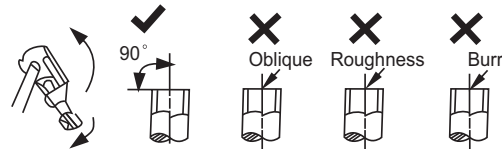


Fig. 12 — Cut the pipe

5. Remove all the burrs from the cut cross section of the pipe avoiding any burrs inside the tubes.
6. Remove the flare nuts attached to the indoor and outdoor units.
7. Install the correct size flare nut onto the tubing and make a flare connection. Refer to Table 8 for the flare nut spaces.

Table 8 — Flare Nut Spacing

OUTER DIAM. (mm)	A (mm)	
	Max.	Min.
Ø1/4" (6.35)	0.05 (1.3)	0.03 (0.7)
Ø3/8" (9.52)	0.06 (1.6)	0.04 (1.0)
Ø1/2" (12.7)	0.07 (1.8)	0.04 (1.0)
Ø5/8" (15.88)	0.09 (2.2)	0.08 (2.0)

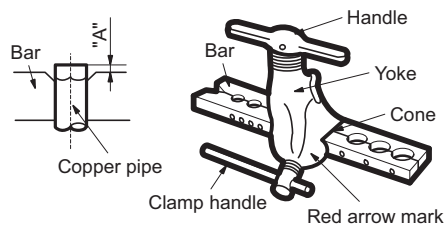


Fig. 13 — Flare Nut Spacing

8. Apply a small amount of refrigerant oil to the flare connection on the tubing.
9. Align the center of the pipes and/or the service valve.

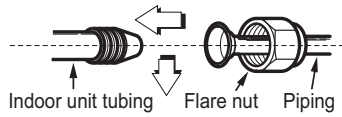


Fig. 14 — Align Pipe Center

10. Connect both the liquid and gas piping to the indoor unit.
11. Tighten the flare nut using a torque wrench as specified in Table 9.
12. Complete the installation.

Table 9 — Tightening Torque

Brass Flare Size	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

INSTALL ALL POWER AND INTERCONNECTING WIRING TO OUTDOOR UNIT

1. Mount the outdoor power disconnect.
2. Run power wiring from the main box to the disconnect per NEC and local codes.
3. Remove the field wiring cover (if available) from the unit by loosening the screws.
4. Remove the caps on the conduit panel.
5. Connect the conduit to the conduit panel (see Fig. 15).
6. Properly connect both the power supply and control lines to the terminal block per the connection diagram.
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 conduit shall be routed through hole in the conduit panel.

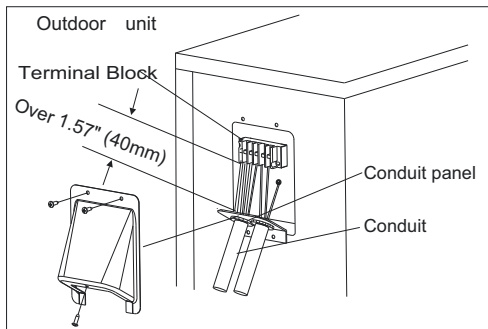


Fig. 15 — Field Wiring

DRAIN CONNECTIONS

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.

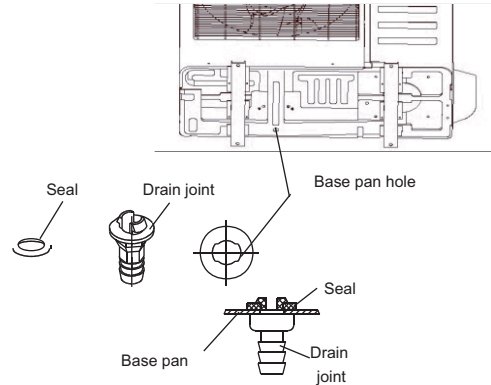


Fig. 16 — Drain Joint

⚠ CAUTION

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.

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 RC.

Table 10 — Rubber Plugs

Outdoor Unit Model Number	Basepan Base Rubber Plugs RC Part Number	Quantity per unit
DLCMRAH18BAK	12600801A00077	25
DLCMRAH27CAK DLCMRAH36DAK	12600801A00117	5
DLCMRAH48EAK	12600801A00118	5

ELECTRICAL DATA

Table 11 — Electrical Data

UNIT SIZE	SYSTEM VOLTAGE	OPERATING VOLTAGE	COMPRESSOR	OUTDOOR FAN			MCA	MOCP
	VOLT / PHASE / HZ	MAX / MIN*	RLA	FLA	HP	W		
18	208 230/1/60	253/187	10	0.74	0.07	50	18	25
27			15	0.9	0.16	120	25	35
36			19	1.3	0.16	120	30	45
48			21	1.0x2	0.11	85	35	50

*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

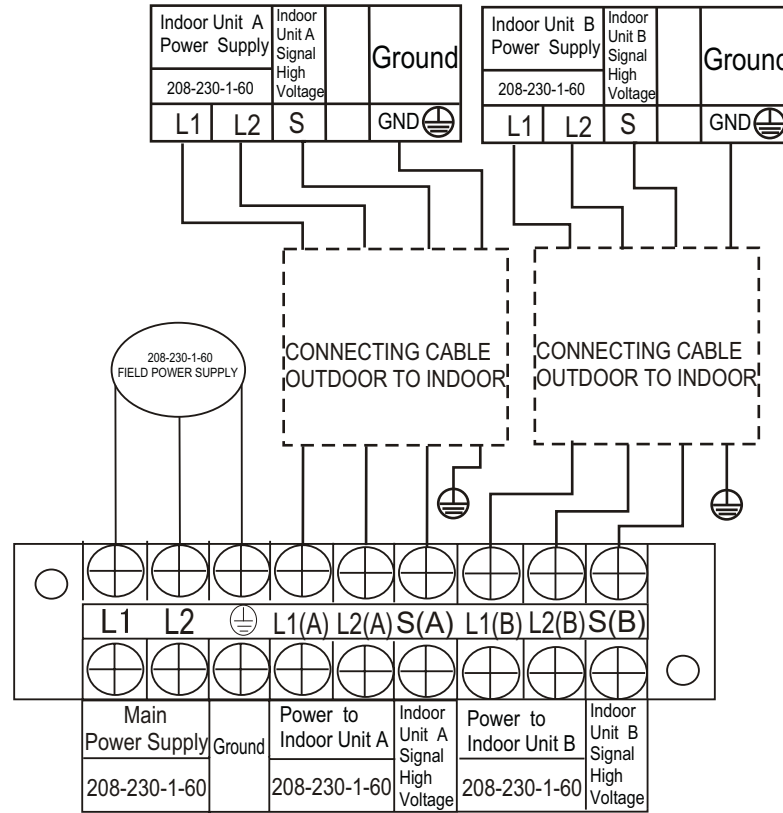


Fig. 17 — Connection Diagram Size 18K 2 Zone

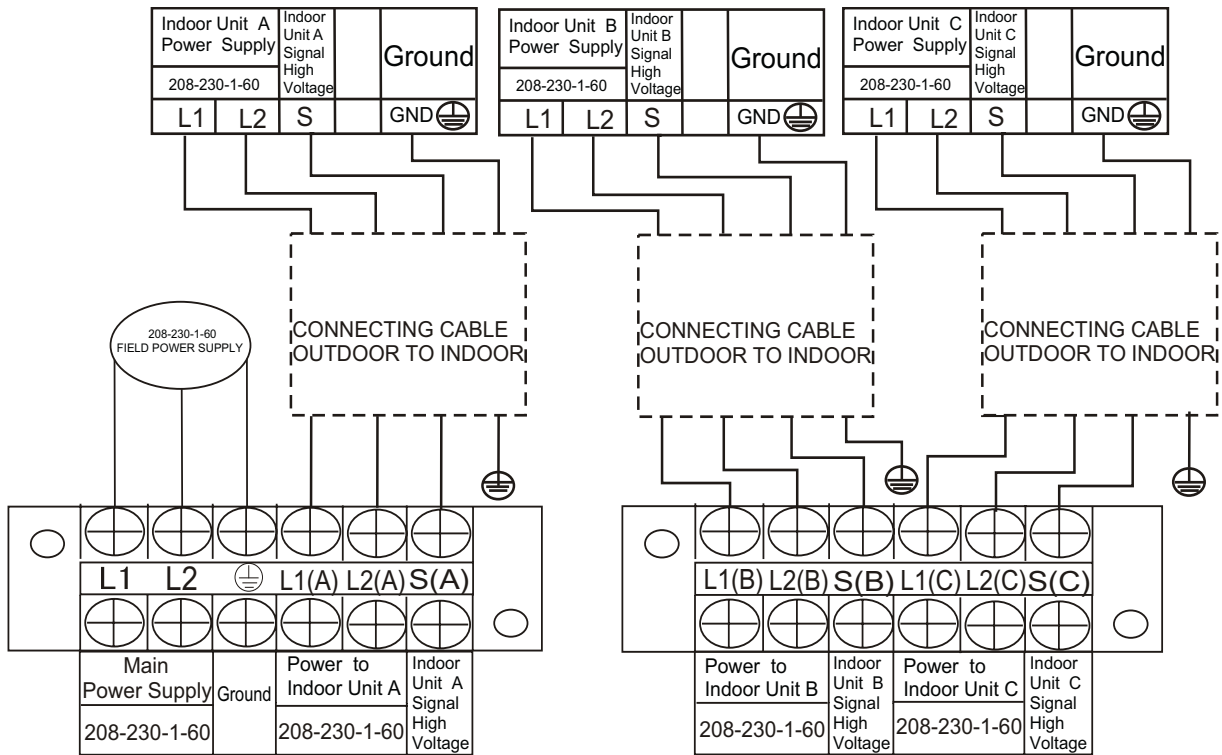


Fig. 18 — Connection Diagram Size 27K 3 Zone

CONNECTION DIAGRAMS (CONT)

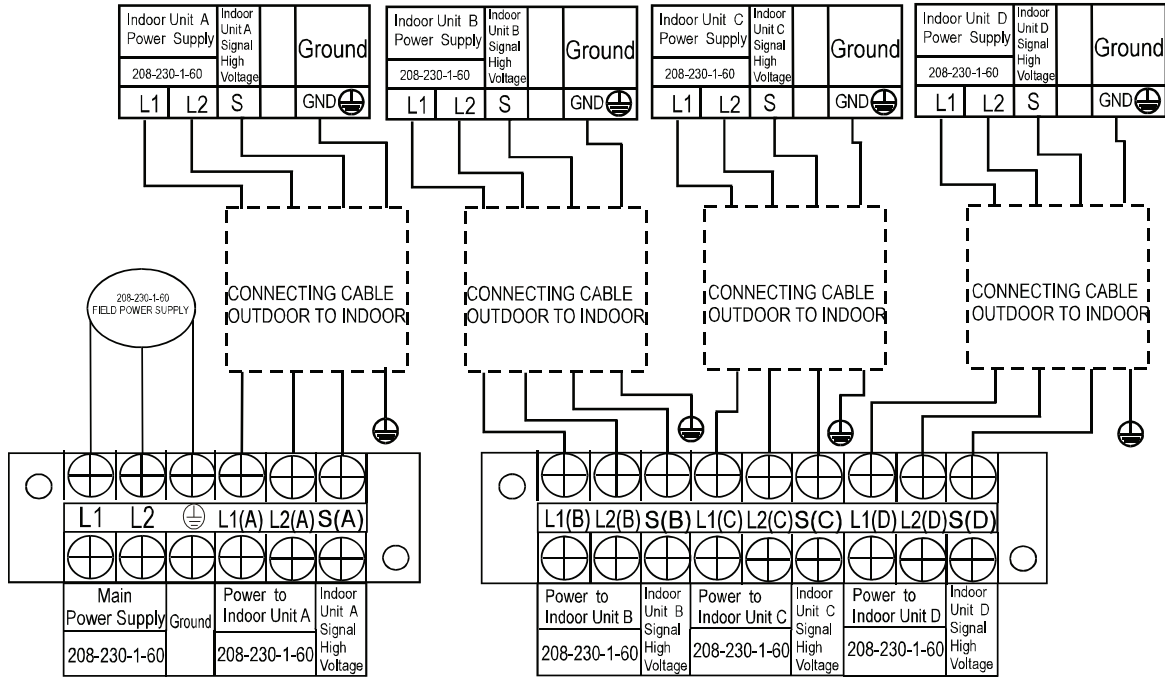


Fig. 19 — Connection Diagram Size 36K 4 Zone

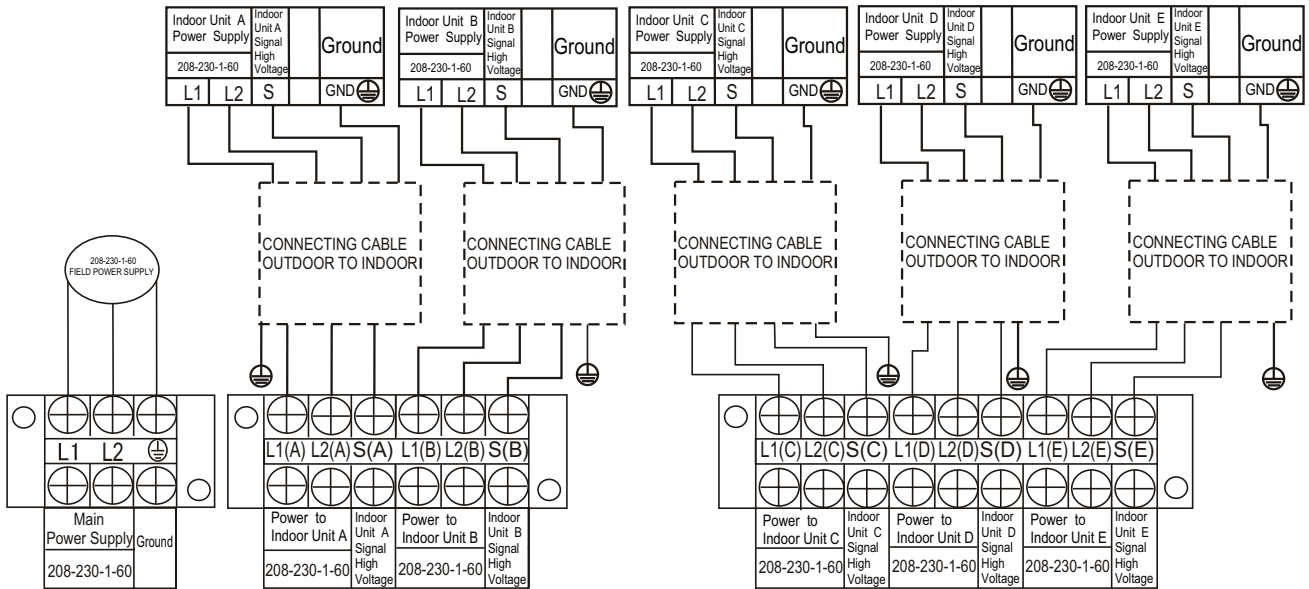


Fig. 20 — Connection Diagram Size 48K 5 Zone

AUTOMATIC WIRING/PIPING CORRECTION

The unit is capable of automatically correcting a wiring/piping error. Indoor units do not have to be in the run mode. The outdoor temperature should be above 41°F (5°C) to use this feature. Press the **CHECK** button on the outdoor unit PCB board for 6 seconds until the display shows “CE” (“FA” may appear first – continue to press **CHECK**).

The outdoor unit takes control of the indoor units and adjust fan speed(s) according to the program. Setpoint display (if available) will be “76” and outdoor unit will start the compressor and fan to dispense refrigerant to the indoor heads to determine piping setup versus physical wiring. When the controller has adjusted control so that each indoor unit is synced to its piping port (approximately 5-10 minutes, depending on temperature, unit size, etc.), “CE” is replaced with “00” on the display and the control program terminates.

NOTE: The indoor units will not automatically release from the “76” setting or return to previous control. Use the indoor units’ remote controllers to restore them to normal function.

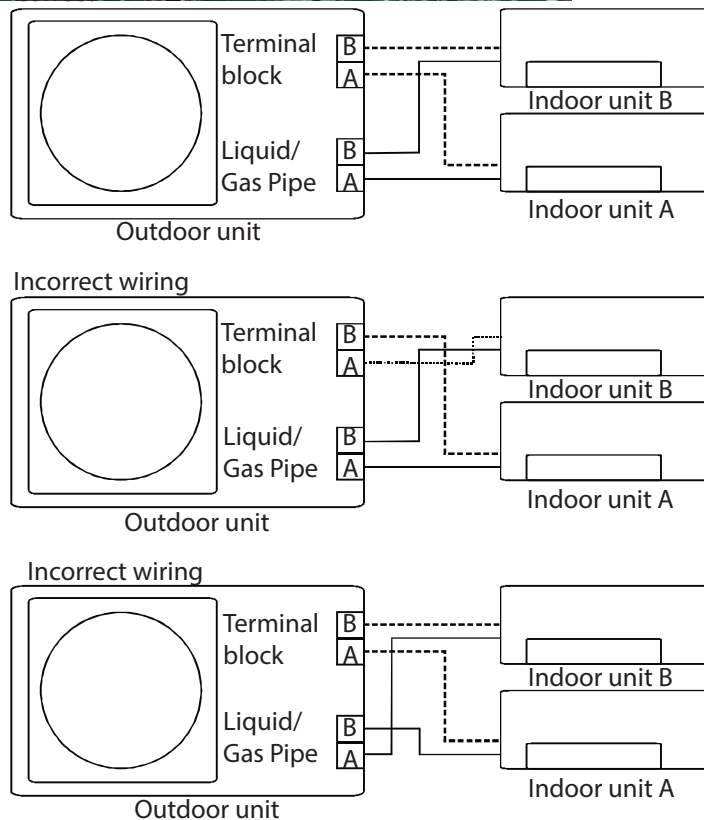
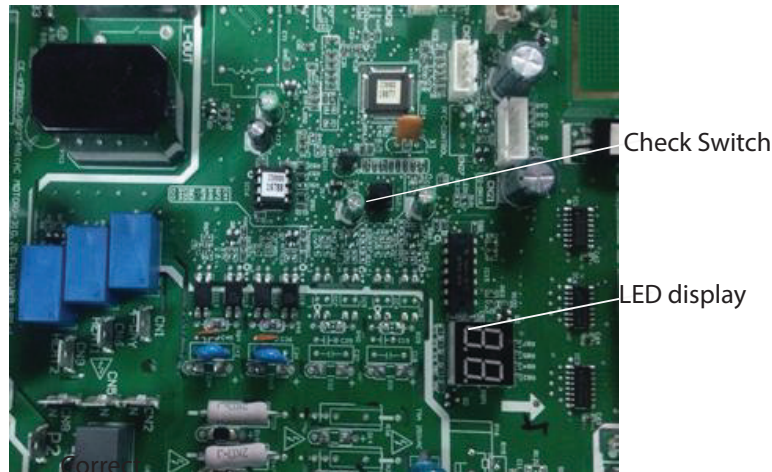


Fig. 21 — Automatic Wiring/Piping Correction

SYSTEM VACUUM AND CHARGE

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 pipes and indoor unit coils should be evacuated using the recommended 500 microns deep vacuum method. The alternate triple evacuation method may be used if the following procedure is followed. Always break a vacuum with dry nitrogen.

NOTE: All units (except the 18,000 BTU model) have a Master Suction and Liquid Line Service Valve.

Using Vacuum Pump

1. Completely tighten the flare nuts of the liquid and gas pipes on the indoor and outdoor side (for all fan coils) (see Fig 22).

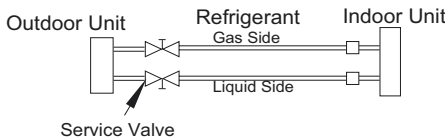


Fig. 22 — Service Valves

2. For size 18, **DO NOT** open the Gas or Liquid service valves until the evacuation is complete. For sizes 24-48, fully open all the connected Individual Service Valves (with the line set attached). **DO NOT** open the Master Service Valves until the evacuation is complete (see Fig 22).
3. For size 18, connect the manifold gauge (low side hose) to the Individual Service Valve (5/16 port, use the adapter to fit a 1/4in hose) to evacuate each of the circuits. For sizes 24-48, connect the manifold gauge (low side hose) to the Master service valve (5/16 port, use the adapter to fit a 1/4in. hose) to evacuate all circuits at the same time (see Fig. 25).
4. Connect the charge hose to the vacuum pump.
5. Open (fully) the low pressure valve of the manifold gauge (see Fig. 25 for 18. Fig. 26 for sizes 24-48).
6. Start the vacuum pump.
7. Evacuate using either the deep vacuum or the triple evacuation method (see Fig. 27 and 28).
8. After the evacuation is complete, fully close the low pressure valve of the manifold gauge and stop the vacuum pump operation.
9. Insert a hexagonal wrench into each Gas Side Service Valve for size 18 or into the Master Gas Side Service Valve for sizes 24-48 and open the valve by turning the wrench 1/4 counterclockwise. Listen for gas to exit the system (see Fig. 23).

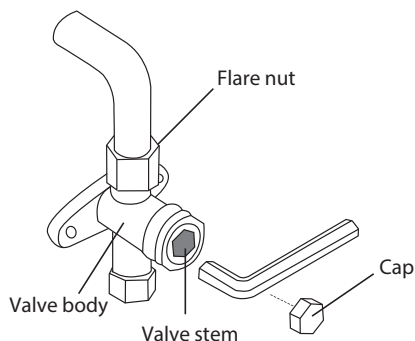


Fig. 23 — Service Valve Diagram

10. Reference Table 5 on page 4 when additional charge is needed.
11. Disconnect the charge hoses and manifold gauge.
12. Using a hexagonal wrench, fully open all the gas and liquid service valves for the size 18 and all the Master Gas and Liquid service valves for sizes 24-48 (see Fig. 23).

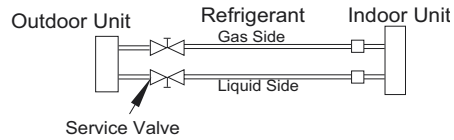


Fig. 24 — Service Valves Sizes 24-48

NOTE: The Master valve utilizes a 5/16 port.

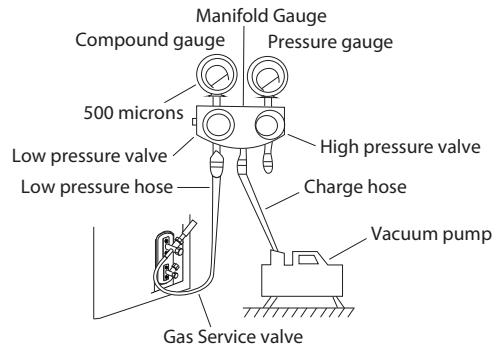


Fig. 25 — Manifold Gauge

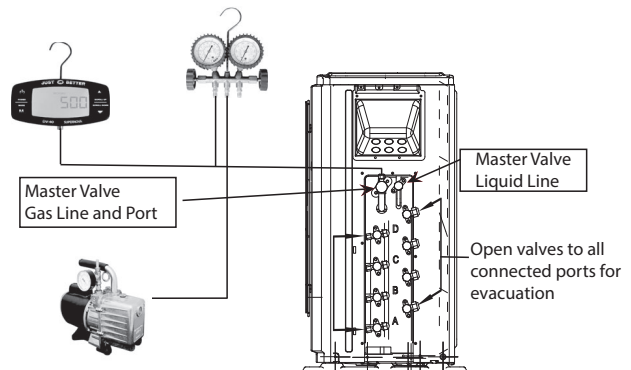


Fig. 26 — Manifold Sizes 24-48

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 liquid water (see Fig. 27).

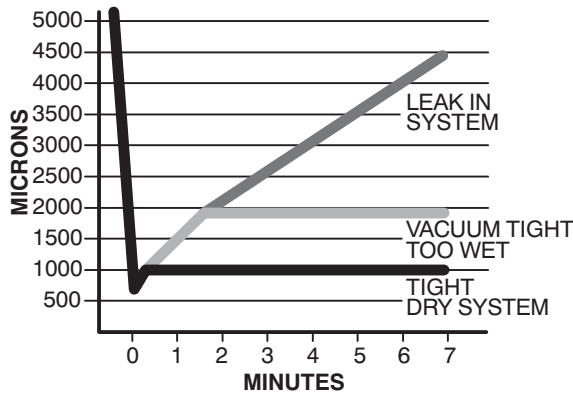


Fig. 27 — Deep Vacuum Graph

Triple Evacuation Method

The triple evacuation is the recommended method of dehydration. Refer to Fig. 28 and proceed as follows:

1. Pump the system down to 1500 microns and allow the pump to continue operating for an additional 15 minutes.
2. Close the service valves and shut off the vacuum pump.
3. Connect a dry nitrogen cylinder and regulator to the system and break vacuum until the system reaches 2 psig.
4. Close the service valve and allow the system to stand for 1 hr. During this time, the dry nitrogen can diffuse throughout the system absorbing moisture.
5. Pump the system down to 1000 microns.
6. Break the vacuum with dry nitrogen (2 psig).
7. Pump the system down to 500 microns.
8. Perform the hold test for 30 minutes.

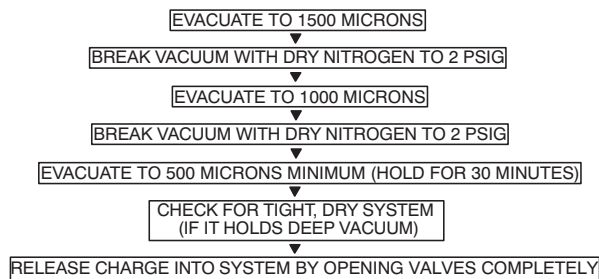


Fig. 28 — Triple Evacuation Method

Final Tubing Check

IMPORTANT: Ensure the 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 feeder tubes, making sure wire ties on the feeder tubes are secure and tight.

START-UP



CAUTION

DO NOT apply power to the outdoor unit if the Master Service Valves are not fully open. Compressor damage will occur.

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 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.

OUTDOOR UNIT DIAGNOSTIC GUIDES

For ease of service, the systems are equipped with a diagnostic code display LED 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 on 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. In standby, the LED displays "- -".

In the compressor operation, the LED displays the running frequency.

In the defrosting mode, the LED displays "dF" or alternative displays between the running frequency and "dF" (each appears for 0.5s).

During the compressor pre-heating cycle, the LED displays "PH" or alternative displays between the running frequency and "PH" (each appears for 0.5s).

During the oil return process, the LED displays "RO" or alternative displays between the running frequency and "RO" (each appears for 0.5s).

In the low ambient cooling mode, the LED displays "LC" or alternative displays between the running frequency and "LC" (each appears for 0.5s).

In the forced cooling mode, the LED displays "FC" or alternative displays between the running frequency and "FC" (each appears for 0.5s).

When PFC module protection occurs three times within 15 minutes, the LED displays "E6" or alternative displays between the running frequency and "E6" (each appears for 0.5s).

In protection or malfunction, the LED displays an error code or a protection code.

The diagnostic codes displayed on the outdoor units are listed on Table 12.

Table 12 — Outdoor Unit Error Display

OUTDOOR UNIT DISPLAY	LED STATUS	INDOOR UNIT DISPLAY
E0	Outdoor EEPROM malfunction	F4
E2	Communication malfunction between indoor and outdoor units	E1
E3	Communication malfunction between IPM board and outdoor main board	- -
E4	Open or short circuit of outdoor temperature sensor (T3,T4,T5,T2B)	F2/F1/F3/F6
E5	Voltage protection	P1
E6	PFC module protection	- -
E8	Outdoor fan speed has been out of control (Only for DC fan motor models)	F5
E9	Wrong wiring connection of 24K indoor unit	- -
F1	No A Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
F2	No B Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
F3	No C Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
F4	No D Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
F5	No E Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
F6	No F Indoor unit coil outlet temp. sensor or connector of sensor is defective	- -
P0	Temperature protection of compressor top	P2
P1	High pressure protection	P2
P2	Low pressure protection	P2
P3	Current protection of compressor	F0
P4	Temperature protection of compressor discharge	- -
P5	High temperature protection of condenser	- -
P6	IPM module protection	P0