

40MBAB

Air Handler Unit Ductless System

Sizes 18K to 60K

Installation Instructions

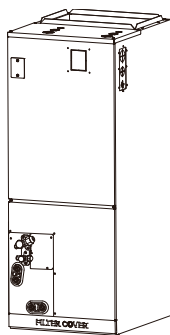


Fig. 1 — Air Handler

A220687

NOTE: Read the entire instruction manual before starting the installation.

TABLE OF CONTENTS


	PAGE
SAFETY CONSIDERATIONS	1
MODEL NUMBERS AND ACCESSORIES	2
DIMENSIONS	4
INSTALLATION REQUIREMENTS	5
INSTALLATION	5
Step 1 - Check Equipment	5
Step 2 - Mount Unit	6
Step 3 - Mount Positions	6
Step 4 - Installing Ductwork	10
Step 5 - Condensate Drains	11
Step 6 - Refrigerant Piping	12
Step 7 - Evacuate Coil and Tubing System	14
Step 8 - Mount Electric Heater (Optional)	15
INDOOR UNIT WIRING	18
WIRING REQUIREMENTS	19
ELECTRICAL DATA	20
CONNECTION DIAGRAMS AND CONTROL METHODS	21
AUXILIARY CONTACTS	28
TEST RUN	29
SYSTEM CHECKS	30
START-UP PROCEDURES	30
TROUBLESHOOTING	31
ELECTRIC AUXILIARY HEATING WIRING DIAGRAMS	32

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in the literature and attached to the unit. Consult the local building codes and the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada, refer to the current editions of the Canadian Electrical Code CSA C22.2 No. 60335-2-40. Recognize safety information.

This is the safety-alert symbol . When you see this symbol on the unit and in instruction manuals, be of the potential for personal injury. Understand the 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 OPERATION HAZARD

Failure to follow this warning could result in personal injury or death. Before installing or servicing the unit, always turn off all power to the unit. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag the switch with a suitable warning label.



CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

MODEL NUMBERS AND ACCESSORIES

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.

WARNING

INSTALLATION
 Entrust a licensed contractor to install the unit. Installation by unskilled persons may lead to improper installation, electric shock, or fire. Re-installation must be performed by authorized professionals. Non-compliance may lead to electric shock or fire.

CAUTION

This unit is **NOT** equipped with a single point electrical connection for an Auxiliary Heat Package. A separate power supply is required for the Auxiliary Heat Package.

Table 1 — Indoor Unit Model Numbers

kBTUh	V-Ph-Hz	ID Model No.
18	208/230-1-60	40MBABQ18XB3
24		40MBABQ24XB3
30		40MBABQ30XB3
36		40MBABQ36XB3
36		40MBABQ36XA3
48		40MBABQ48XA3
60		40MBABQ60XA3

CAUTION

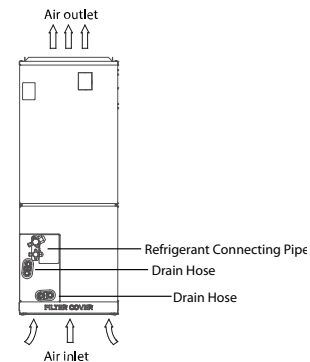
This unit is **NOT** equipped with a single point electrical connection for an Auxiliary Heat Package. A separate power supply is required for the Auxiliary Heat Package.

ACCESSORIES

The system is shipped with the following accessories (see Table 2). 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 accessories until the installation is complete.

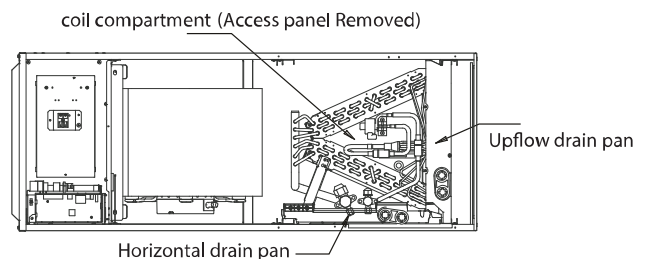
Table 2 — Accessories

Name	Shape	Quantity
Owner's and Installation Manual		2
Wireless Remote Controller		1
Batteries		2
Suction Line Flare to Braze Adapter 7/8" (60K Models Only)		1
Wired Remote Controller		1
Zip Ties		2
Coil Foam Tape		4
Liquid Line Flare to Braze Adapter 3/8" (60K Models Only)		1



A22069

Fig. 2 — Air Handler



A220693

Fig. 3 — Indoor Unit Representation

Indoor Unit Parts

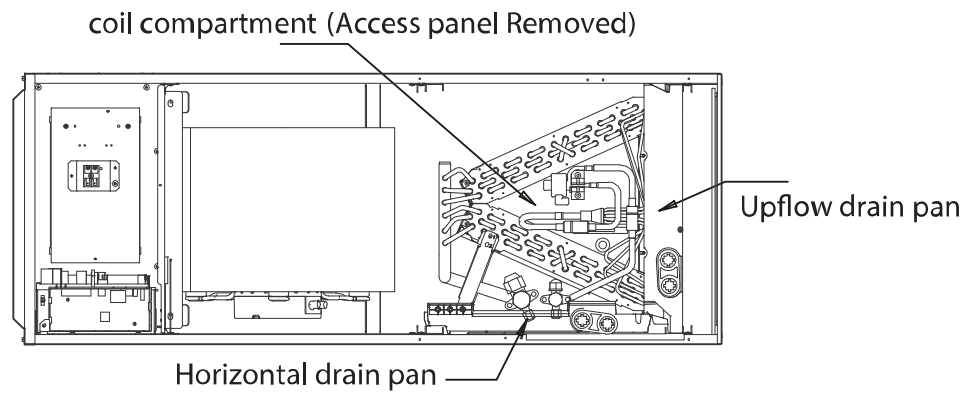


Fig. 4 — Indoor Unit Representation

A220693

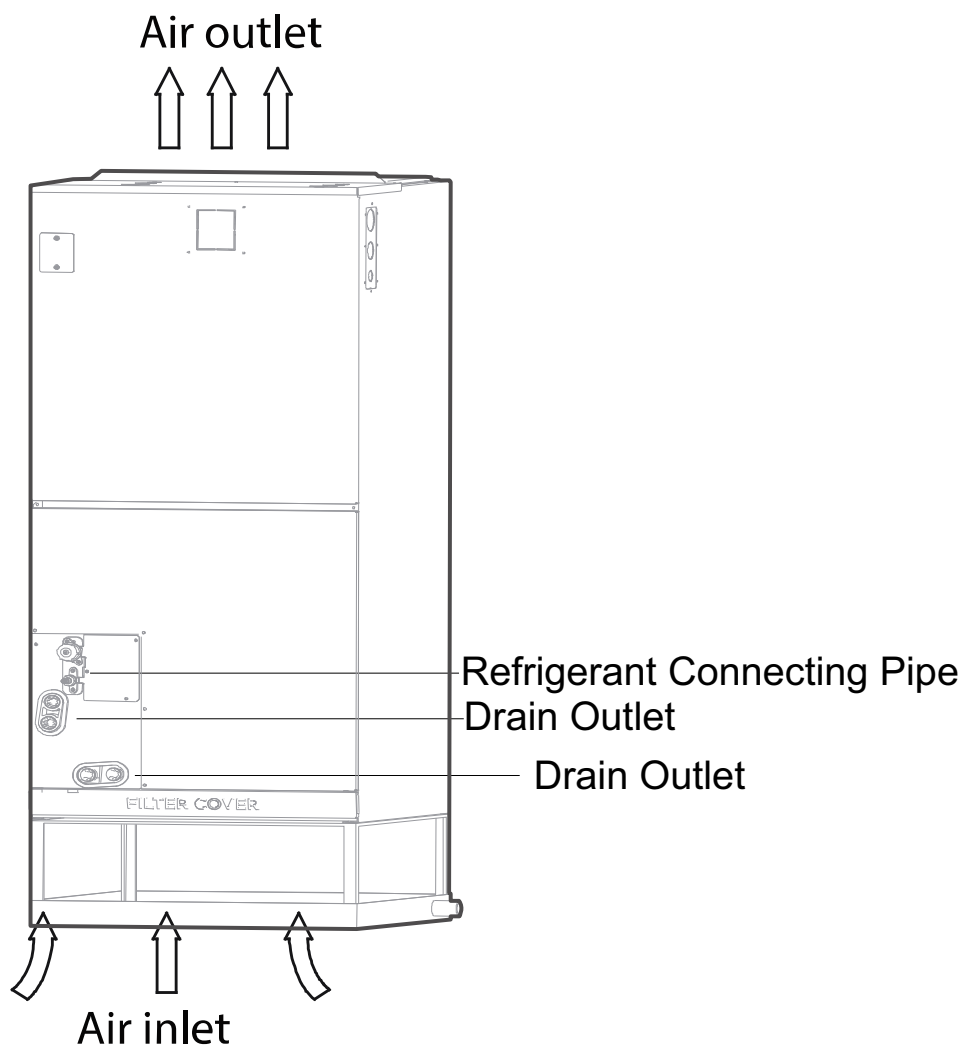


Fig. 5 — Air Handler

A220692

DIMENSIONS

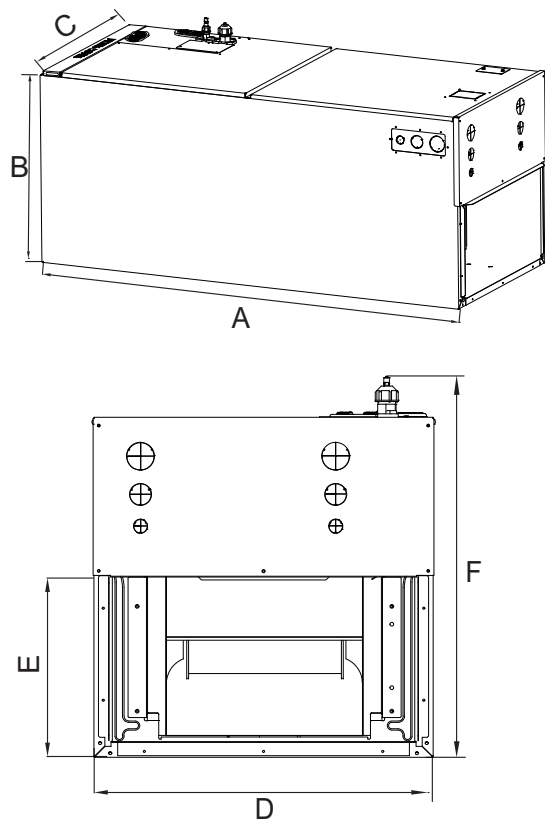


Fig. 6 — 40MBAB Dimensions

A220787

Table 3 — Model A

Model	Dimensions					
	A (Height)	B (Depth)	C (Width)	D	E	F
18K-24K	45in	21in	17.5in	15.75in	10.25in	23in
	(1143mm)	(534mm)	(445mm)	(400mm)	(260mm)	(585mm)
30K-48K	49in	21in	21in	19.31in	10.25in	23in
	(1245mm)	(534mm)	(534mm)	(490mm)	(260mm)	(585mm)
60K	53in	21in	24.5in	22.88in	10.25in	23in
	(1346mm)	(534mm)	(622mm)	(580mm)	(260mm)	(585mm)

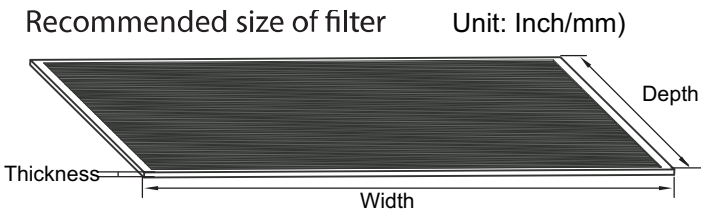


Fig. 7 — Recommended Filter Size

Table 4 — Recommended Filter Size

Model (Btu/h)	Width		Depth		Thickness	
	Inch	mm	Inch	mm	Inch	mm
18-24K	16	406.4	20	508	1	25.4
30-48K	19-1/2	495.3	20	508	1	25.4
60K	23	584.2	20	508	1	25.4

INSTALLATION REQUIREMENTS

Review the following information before installing the unit:

- **Do not** install the indoor units near a direct source of heat such as direct sunlight or a heating appliance.
- Allow sufficient space for airflow and unit servicing. See Fig. 8 — on page 6 for the minimum required distances between the unit and the walls or ceilings.
- Communication wiring must be at least 3 ft. (1m) away from all electromagnetic interference (televisions, radios, etc.) sources. Interference is still possible even if this distance is maintained.
- Ensure any hanger used is strong enough to withstand the unit's weight.
- If the indoor unit is installed in an unconditioned space, running for long periods of time when the temperatures are outside the recommended indoor unit operation ranges, it is recommended that the installer seal all corners of the indoor unit to prevent any leaks and add insulation material (13/32 to 13/16 in (10-20 mm)) to the entire surface of the indoor unit to avoid condensation or heat transfer.

NOTE: Nuisance sweating may occur if the unit is installed in a high humidity environment with low airflow.

Table 5 — Operating Range

OPERATING RANGE (Min/Max °F (°C))		
	Cooling	Heating
Indoor DB	62 / 90 (17 / 32)	32 / 86 (0 / 30)
Indoor WB	59 / 84 (15 / 29)	N/A



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.
- Install drainage piping according to the instructions in this manual and in accordance with local codes. Improper drainage may cause water damage to your home and property.
- For units that have an auxiliary electric heater installed, ensure 1" of clearance from any combustible materials for first 3 feet (1 meter) of plenum and duct work exiting the unit.
- **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.

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



WARNING

Securely install the indoor unit on a structure that can sustain its weight. If the structure is too weak, the unit may fall and cause personal injury, unit and property damage, or death.

DO NOT install the indoor unit in a bathroom or laundry room as excessive moisture can short the unit and corrode the wiring.



CAUTION

Install the indoor and outdoor units, cables and wires at least 3.2 ft (1m) from televisions, routers, computer equipment or radios to prevent static or image distortion. Depending on the appliances, a 3.2 ft (1m) distance may not be sufficient.

If the indoor unit is installed on metal, it must be electrically grounded.

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 be sure the unit matches the job specifications.

The indoor unit should be installed in a location that meets the following requirements:

- **Enough room for installation and maintenance**
- **Enough room for the lineset and drainpipe**
- **A structure that can sustain the weight of the indoor unit**
- **The air inlet and outlet are not impeded**
- **There is no direct radiation from heaters**



CAUTION

DO NOT install the unit in the following locations:

- Areas with oil drilling or fracking
- Coastal areas with high salt content in the air
- Areas with caustic gases in the air, such as near hot springs
- Areas with power fluctuations, such as factories
- Enclosed spaces, such as cabinets
- Areas with strong electromagnetic waves
- Areas that store flammable materials or gas
- Rooms with high humidity, such as bathrooms or laundry rooms.

Step 2 - Mount Unit

The unit can stand or lie on the floor, or hang from a ceiling or a wall. Allow space for wiring, piping, and servicing the unit.

IMPORTANT: When the unit is installed over a finished ceiling and/or living area, building codes may require a field-supplied secondary condensate pan to be installed under the entire unit.

Some localities may allow as an alternative, the running of a separate, secondary condensate line. Consult the local codes for additional restrictions or precautions.

NOTE: Nuisance sweating may occur if the unit is installed in a high humidity environment with low airflow.

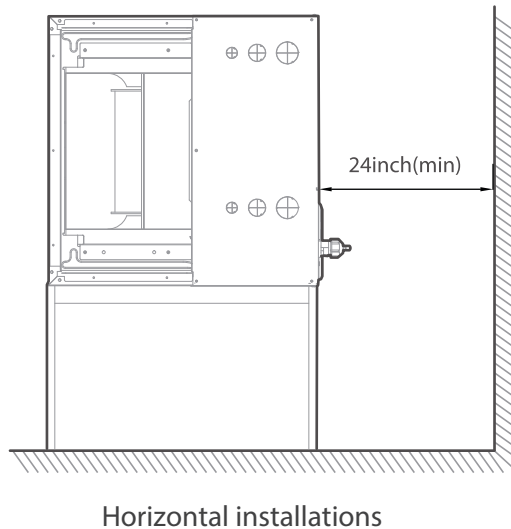


Fig. 8 — Horizontal Installations

Step 3- Mount Positions

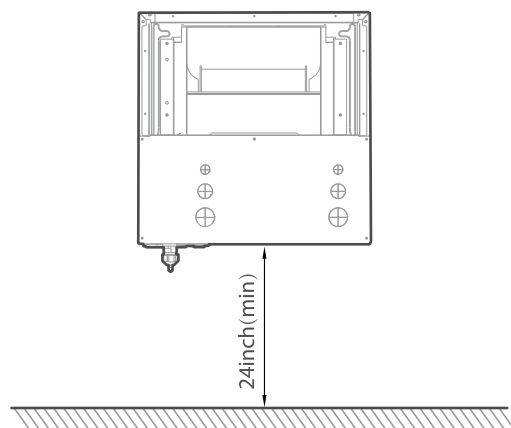


Fig. 9 — Vertical Installations

MORE REQUIREMENTS:

Air supply and return may be handled in one of several ways best suited to the installation. The vast majority of problems encountered with combination cooling systems can be linked to improperly designed or installed duct systems.

It is therefore highly important to the success of an installation that the duct system be properly designed and installed. Use flexible duct collars to minimize the transmission of vibration/noise into the conditioned space. Where return air duct is short, or where sound could potentially be a problem, sound absorbing liner should be used inside the duct.

Duct must be insulated where it runs through an unconditioned space during the cooling season.

The use of a vapor barrier is recommended to prevent absorption of moisture from the surrounding air into the insulation.

The supply air duct connection should be properly sized by use of a transition to match unit opening.

All ducts should be suspended using flexible hangers and never fastened directly to the structure.

This unit is not designed for non-ducted (freeblow) applications.

Duct work should be fabricated and installed in accordance with local and/or national codes.



CAUTION

A field-fabricated secondary drain pan, with a drain pipe to the outside of the building, is required in all installations over a finished living space or in any area that may be damaged by overflow from the main drain pan. In some localities, local codes may require a secondary drain pan for any horizontal installation.

INSTALLATION DIRECTION SELECTION

The units can be installed in a vertical (down and up) and Horizontal (right and left) configuration.

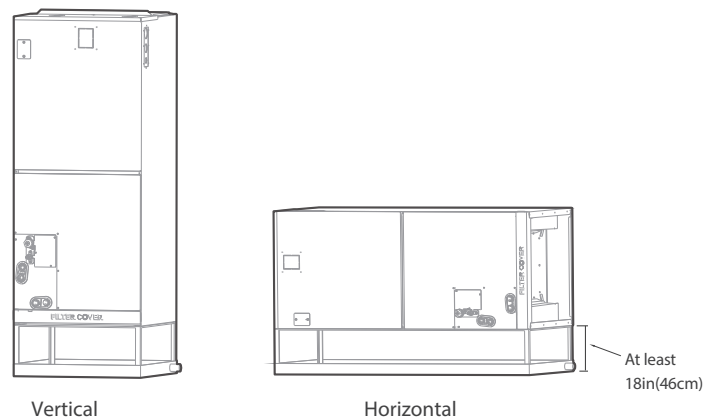


Fig. 10 — Vertical or Horizontal Installation

NOTE: For horizontal installation a secondary drain pan (field supplied) must be installed.

AIRFLOW DIRECTION FOR DIFFERENT INSTALLATION LOCATIONS

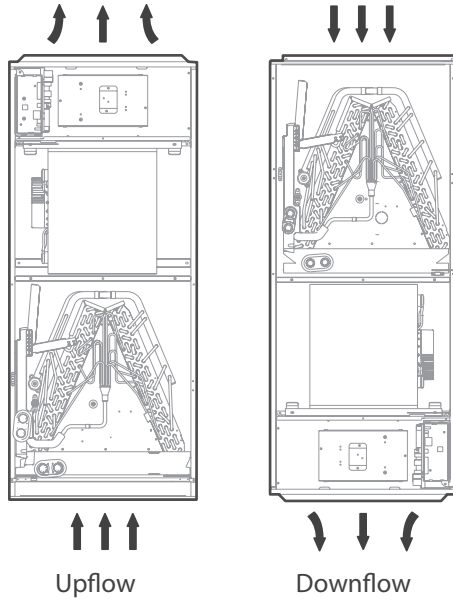


Fig. 11 — Vertical Airflow

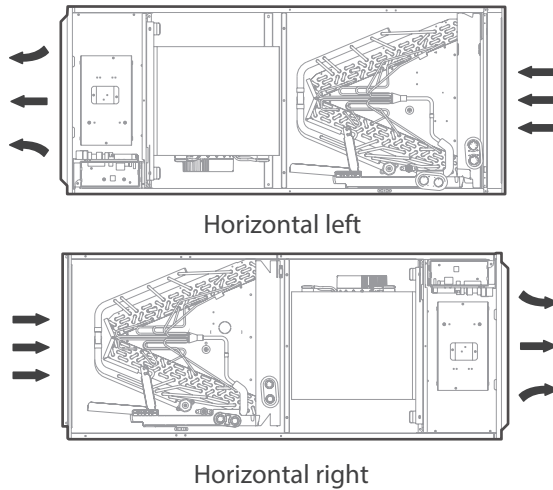


Fig. 12 — Horizontal Airflow

NOTE: Vertical up and horizontal left installation does not need to change the direction of evaporator.

CONNECTING WIRE AND PIPES

Follow these steps to perform vertical down installation and horizontal right installation.

1. Open the upper cover.
2. Open the electronic control box cover.
3. Connect the wire according to the wiring diagram.
4. Connect the pipes and install the drainage pipes.

DOWNFLOW AND HORIZONTAL RIGHT INSTALLATIONS

NOTE: The unit may be installed in one of the upflow, downflow, horizontal left or horizontal right orientations.

1. Remove the filter door.

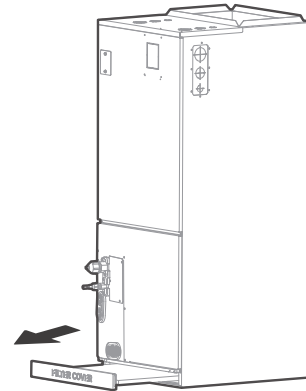


Fig. 13 — Remove the filter door

2. Remove the upper cover assembly.

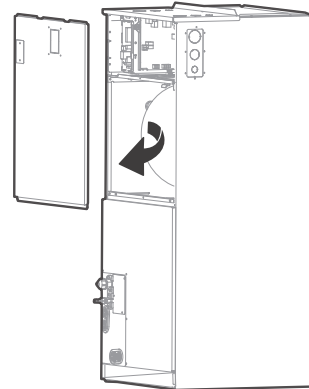


Fig. 14 — Remove the upper cover assembly

3. Remove the evaporator cover plate.

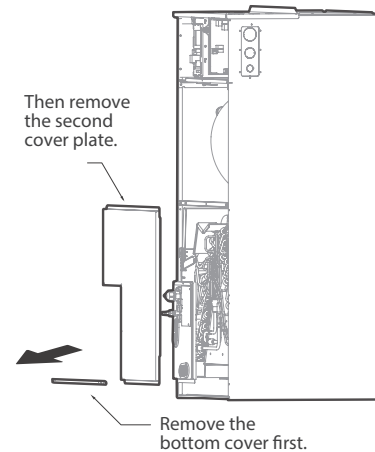


Fig. 15 — Remove the evaporator cover plate

4. Indication of the position of each temperature sensor of the evaporator (confirm your model).

18-24K model

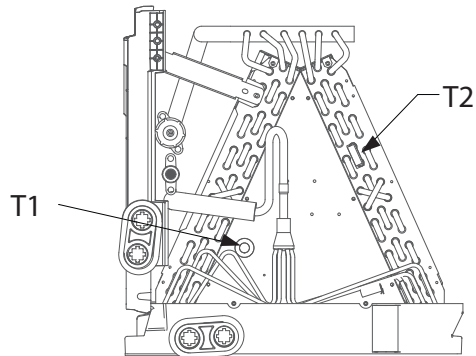
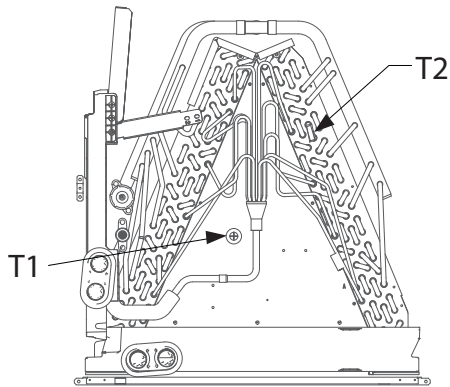


Fig. 16 — Temperature sensor position

30-48K model



60K model

Fig. 17 — Temperature sensor position

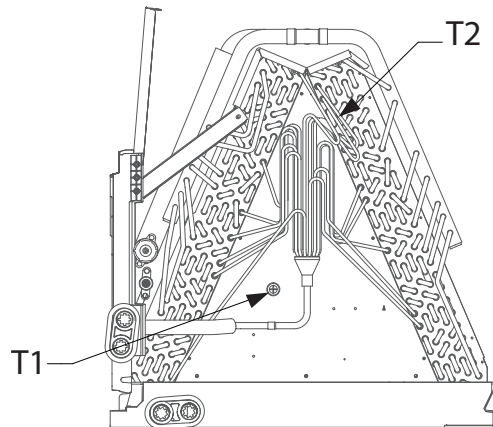


Fig. 18 — Temperature sensor position

5. Unplug temperature sensors T1,T2 from the control board.

- T1: Room temperature sensor
- T2: Evaporator central sensor plug

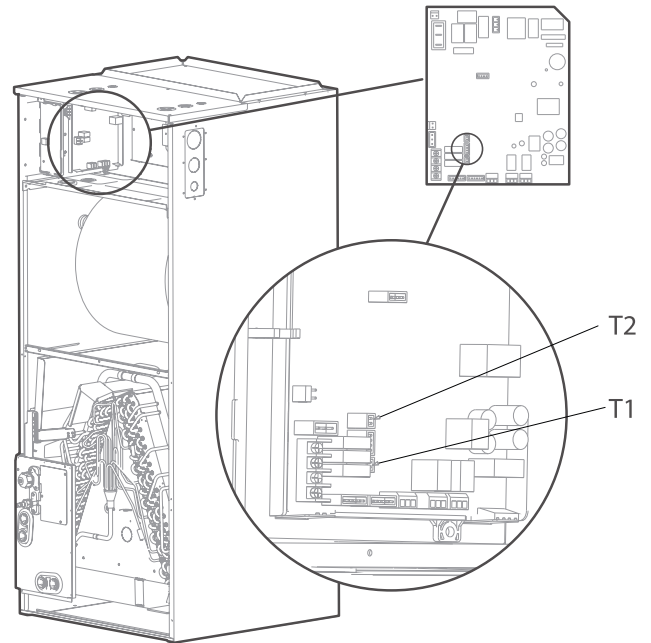


Fig. 19 — Unplug Temperature Sensors

6. Remove the T1,T2 sensor wire ties,

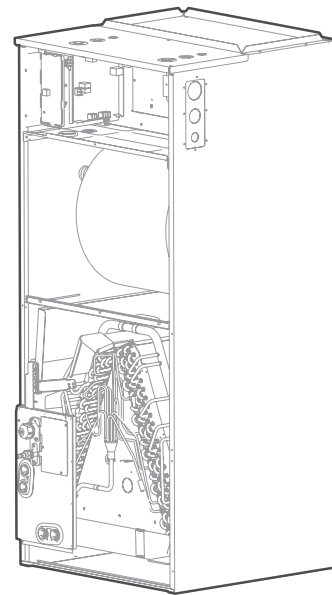


Fig. 20 — Remove the T1,T2 sensor wire ties

7. Remove the evaporator and drain pan then rotate 180° (when your equipment needs to be a vertically downed configuration).

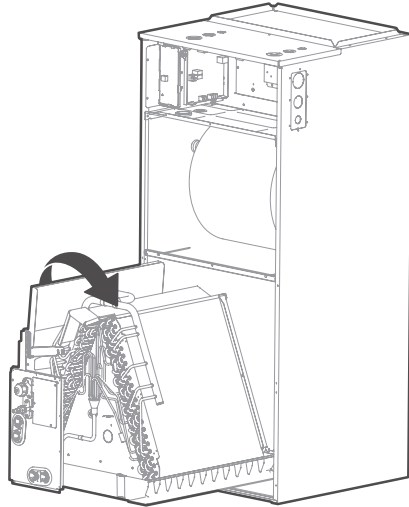


Fig. 21 — Remove the evaporator and drain pan

8. Adjust the mounting parts position according to the direction of equipment.

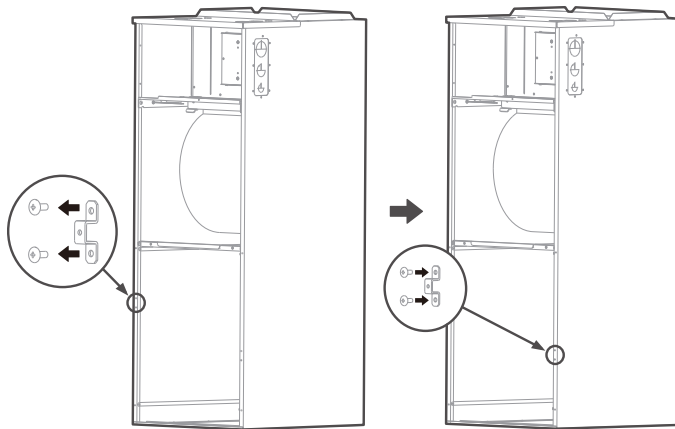


Fig. 22 — Adjust the mounting parts position

9. Reinstall the evaporator and drain pan.

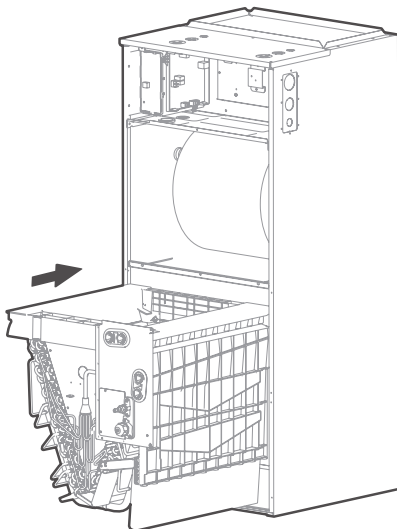
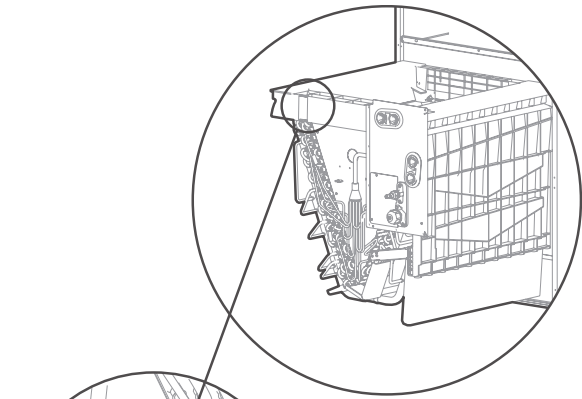
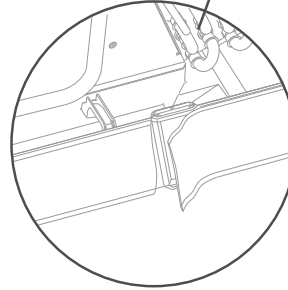


Fig. 23 — Reinstall the evaporator and drain pan

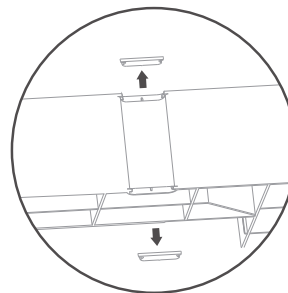
10. Reinstall T1, T2 sensor plug and tie up the sensor wires.



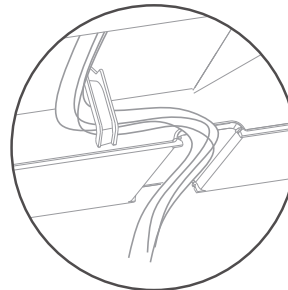
Cut the foam gasket.



Remove knockouts as shown



Hook the wire into the buckle and go down from the wire slot.



Replace the foam gasket over wires.

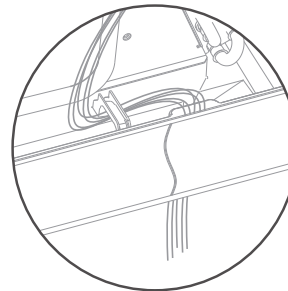


Fig. 24 — Reinstall T1, T2 sensor plug and tie up the sensor wires

NOTE: The wire body needs to pass through the wire groove from the drain pan and applied to the drain pan's hook.

11. The evaporator is assembled in place.

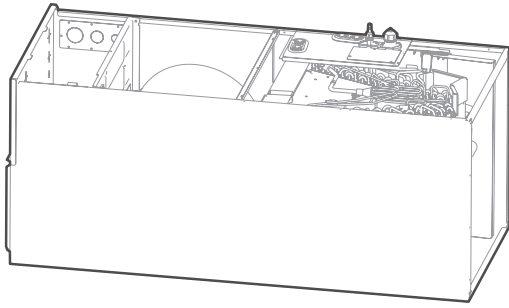


Fig. 25 — The evaporator is assembled in place

12. Use cable ties to fix the room temperature sensor.

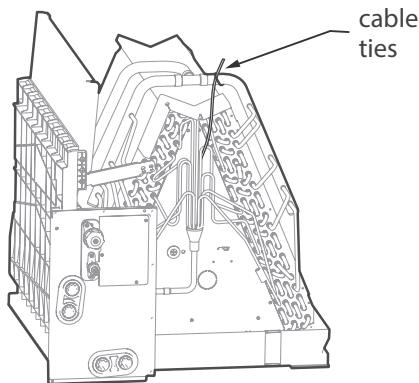


Fig. 26 — Use cable ties to fix the room temperature sensor

13. Reinstall evaporator cover plate.

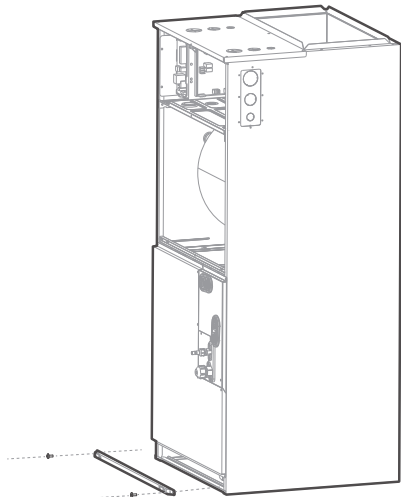


Fig. 27 — Reinstall evaporator cover plate

14. Connect the wire according to the wiring diagram.

15. Reassemble the upper cover and reinstall the filter and filter cover plate.

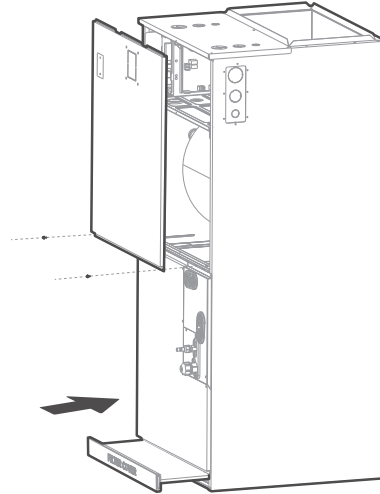


Fig. 28 — Reassemble the upper cover and filter



CAUTION

CAUTION FOR ALL PIPE INSTALLATIONS

The drainpipe is used to drain water away from the unit. If the drainpipe is bent or installed incorrectly, water may leak and cause a water-level switch malfunction.

In **HEAT** mode, the outdoor unit discharges water. Ensure that the drain hose is placed in an appropriate area to avoid water damage and icy conditions on walkways.

DO NOT pull the drainpipe forcefully, doing so may disconnect it.

NOTE: If installed above a finished living space, a secondary drain pan (as required by many building codes), must be installed under the entire unit and its condensate drain line must be routed to a location such that the user witnesses the condensate discharge.

Step 4 - Installing Ductwork

Connect the supply-air duct over the outside of the 3/4in (19 mm) flanges provided on the supply-air opening. Secure the duct to the flange, using proper fasteners for the type of duct used, and seal duct-to-unit joint. If the return-air flanges are required, install the factory-authorized accessory kit.

Use flexible connectors between the ductwork and unit to prevent transmission of vibration. When the electric heater is installed, use heat-resistant material for the flexible connector between the ductwork and the unit at the discharge connection. Ductwork passing through the unconditioned space must be insulated and covered with a vapor barrier.

Units equipped with 20kW or greater electric heaters require a 1 in (25mm) clearance to combustible materials for the first 36in (914mm) of supply duct. Follow the local codes.

DUCTWORK ACOUSTICAL TREATMENT

Metal duct systems that do not have a 90 degree elbow and 10ft (3m) of main duct to first branch takeoff may require internal acoustical insulation lining. As an alternative, fibrous ductwork may be used if constructed and installed in accordance with the latest edition of the SMACNA construction standard on fibrous glass ducts. Both acoustical lining and fibrous ductwork shall comply with the National Fire Protection Association as tested by UL Standard 181 for Class 1 air ducts.

The air supply and return may be handled in one of several ways; whichever situation is best suited for the installation (See Fig. 5 — on page 3). A large number of issues encountered with split-system installations can be linked to improperly designed or installed duct systems. It is therefore very important that the duct system be properly designed and installed.

Use of flexible duct collars is recommended to minimize the transmission of vibration/noise into the conditioned space. Where the return air duct is short, or where sound is liable to be a problem, sound absorbing glass fiber should be used inside the duct.

Insulation of duct work must be installed according to local codes and best practices. The supply air duct should be properly sized by use of a transition to match unit opening.

This unit is not designed for non-ducted (free blow) applications.

NOTE: Duct work should be fabricated and installed in accordance with local and/or national codes.

Plenum Clearances

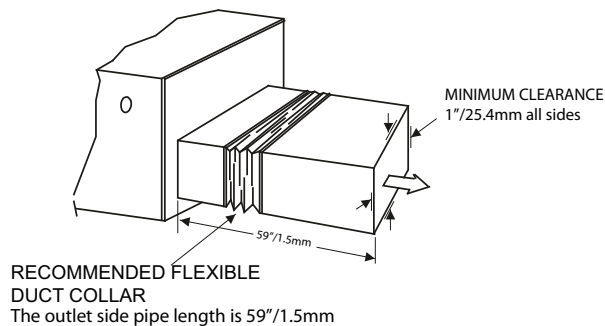


Fig. 29 — Flexible Duct Collar Connection

A220799

Step 5 - Condensate Drains

The drainpipe is used to drain water away from the unit. Improper installation may cause unit and property damage.



CAUTION

- Insulate suction line to prevent condensation, which could lead to water damage. Check the local codes.
- If the drainpipe is bent or installed incorrectly, water may leak and cause a water-level switch malfunction.
- In **HEAT** mode, the outdoor unit may discharge water. Ensure that the outdoor drain will not contribute to damage and slippage.
- **DO NOT** pull the drainpipe forcefully. This could disconnect it.

NOTE: Installation requires adapting the locally sourced drain line to a "3/4" NPT female pipe thread connection.

INDOOR DRAINPIPE INSTALLATION

1. Cover the drainpipe with insulation, as required, to prevent condensation and leakage. These units operate with a positive pressure at the drain connection and a drain trap is required. The trap needs to be installed as close to the unit as possible. Ensure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.

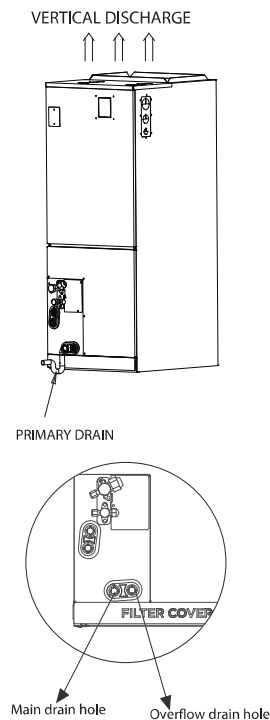


Fig. 30 — Vertical Discharge

A220800

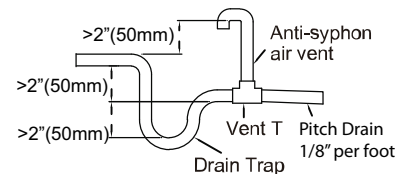


Fig. 31 — Vertical Discharge

A220801

NOTE: Horizontal runs must also have a drain trap installed ahead of the horizontal run to eliminate air trapping.

NOTE: When using an extended drainpipe, tighten the indoor connection with an additional protection tube to prevent it from pulling loose.

2. Hand tighten the plug(s) for drain holes that are unused,

Incorrect installation may cause water to flow back into the unit and flood.

- Use a 1" core drill to drill a hole in the wall. Make sure the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 0.5in (12mm) (see Figure 32). This will ensure proper water drainage. Place the protective wall cuff in the hole. This protects the edges of the hole and helps seal the hole once the installation is complete.

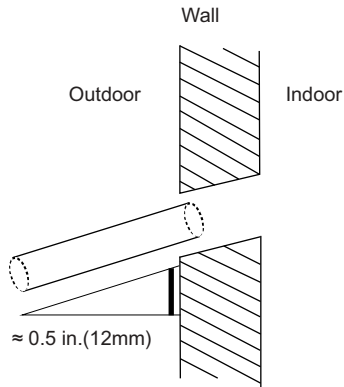


Fig. 32 — Drill hole

A220804

NOTE: When drilling the hole, make sure to avoid wires, plumbing, and other sensitive components.

- Pass the drain hose through the wall hole. Ensure the water drains to a safe location where it will not cause water damage or a slipping hazard.

NOTE: The drainpipe outlet should be at least 2in(5cm) above the ground. If it touches the ground, the unit may become blocked and malfunction. If you discharge the water directly into a sewer, make sure that the drain has a U or S pipe to catch odors that might otherwise come back into the house. Follow the local plumbing codes.

Step 6 - Refrigerant Piping

IMPORTANT: Suction line must be insulated.

- The minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m).
- Table 6 lists the pipe sizes for the indoor unit. Refer to the outdoor unit's installation instructions for the additional allowed piping lengths and refrigerant information.
- Refer to the outdoor unit's installation manual for details regarding the allowable pipe length and height difference.

Table 6 — Piping Size

		18K	24K	30K	36K	48K	60K
Gas Pipe (Connection Size)	In (mm)	1/2 (13)	5/8 (16)	5/8 (16)	5/8 (16)	5/8 (16)	7/8 (22)
Liquid Pipe (Connection Size)	In (mm)	1/4 (6)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)

⚠ 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 suction line to prevent condensation.

Use the following steps to connect the refrigerant piping:

- Run the interconnecting piping from the outdoor unit to the indoor unit.
- 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.
- Cut tubing to 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.

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

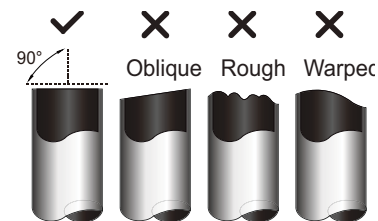


Fig. 33 — Pipe Cutting

A220805

⚠ CAUTION

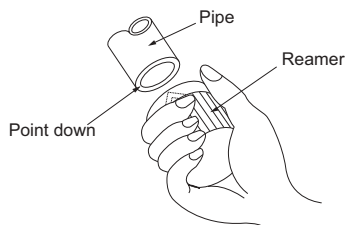
DO NOT DEFORM PIPE WHILE CUTTING

Be extra careful not to damage, dent, or deform the pipe while cutting. This drastically reduces 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:

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



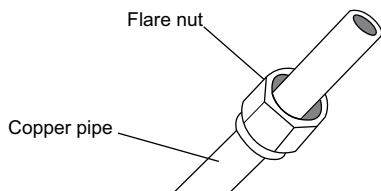
A220806

Fig. 34 — Deburring tool

5. Flare Pipe Ends

Proper flaring is essential to achieving an airtight seal.

- After removing the burrs from the cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
- Sheath the pipe with insulating material.
- Place flare nuts on both ends of the pipe. Ensure they are facing the right direction. Once the ends are flared, it is impossible to put them on or change their direction.



A220807

Fig. 35 — Copper pipe and flare nut

- Remove the PVC tape from ends of pipe when ready to perform the flaring work.
- Clamp the flare block on the end of the pipe. The end of the pipe must extend beyond the flare form.
- Place the flaring tool onto the form.
- Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions in Table 7.
- Remove the flaring tool and flare block, then inspect the end of the pipe for cracks and even flaring.

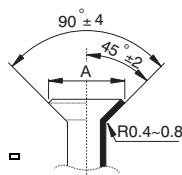


Fig. 36 — Flare Shape

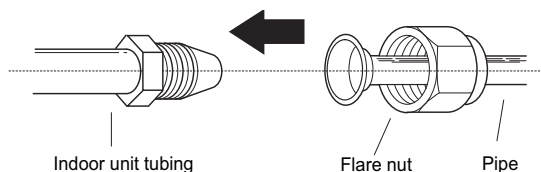
Table 7 — Flare Nut Spacing

Pipe Gauge In (mm)	Tightening Torque	Flare Dimension (A) (Unit: In/mm)	
		Min	Max
Ø 1/4" (6.35)	18-20 N.m	0.33/8.4	0.34/8.7
Ø 3/8" (9.52)	32-39 N.m	0.52/13.2	0.53/13.5
Ø 1/2" (12.7)	49-59 N.m	0.64/16.2	0.65/16.5
Ø 5/8" (15.9)	57-71 N.m	0.76/19.2	0.78/19.7
Ø 7/8" (22)	85-110 N.m	1.04/26.4	1.06/26.9

6. Connect the Pipes

Connect the copper pipes to the outdoor unit first, then connect the pipes to the indoor 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.

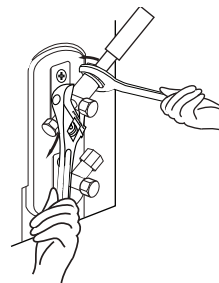


A220815

Fig. 37 — 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. See Table 7.

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



A220813

Fig. 38 —Torque wrench with backup wrench

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 outdoor 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.

13. Thread this lineset through the wall to connect to the indoor unit.
14. Refer to the liquid line and gas line connection O.D. sizes in Table 6 based on the model being installed. Cut and deburr the tubing (review "Remove Burrs" on page 13) to prepare it for brazing. Setup the nitrogen apparatus and connect to the outside unit to flow nitrogen while brazing. Braze the tubing and any fittings to obtain a proper seal.
15. Adjust the nitrogen apparatus to pressurize the system. Pressure test the system to a maximum of 500 psig for at least 60 minutes.
16. Insulate suction line completely, including the outdoor unit valves.



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.

17. Brazing Adapter (Optional)

When flare to braise adapter is used, follow these steps:

- a. Refer to the liquid line and gas line connection O.D. sizes in Table 6 on page 12 based on the model being installed. Cut and deburr the tubing (review "Remove Burrs" on page 13) to prepare it for brazing. Setup the nitrogen apparatus and connect to the outside unit to flow nitrogen while brazing. Braze the tubing and any fittings to obtain a proper seal.
- b. Adjust the nitrogen apparatus to pressurize the system. Pressure test the system to a maximum of 500 psig for at least 60 minutes.
- c. Insulate suction line completely, including the outdoor unit valves.

Step 7 - 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.

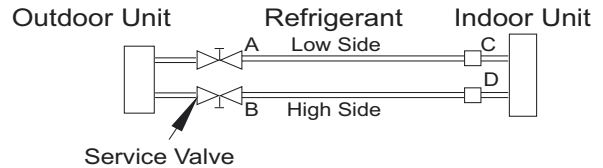
Refrigerant tubes and the indoor coil should be evacuated using the recommended 500 microns deep vacuum method. The alternate triple evacuation method may be used if the procedure outlined below is followed.

NOTE: Always break a vacuum with dry nitrogen.

Using Vacuum Pump

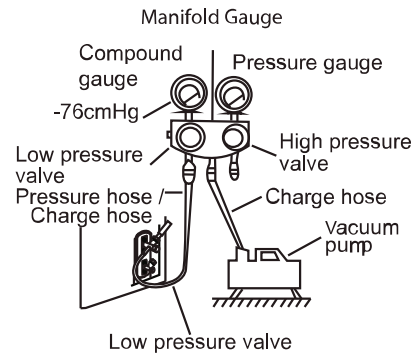
1. Completely tighten flare nuts A, B, C, D, connect the manifold gage charge hose to a charge port of the low side service valve (see Fig. 39).
2. Connect the charge hose to vacuum pump.
3. Fully open the low side of manifold gage (see Fig. 40).
4. Start the vacuum pump.
5. Evacuate using either the 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.



A220816

Fig. 39 — Service Valve



A220790

Fig. 40 — Manifold

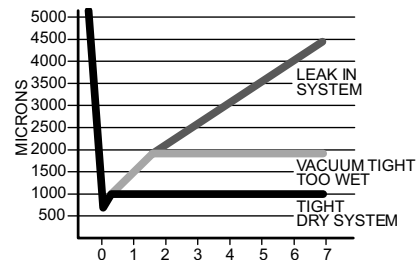
Evacuation

Evacuation of the system removes 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.

NOTE: DO NOT add a filter line drier.



A220817

Fig. 41 — 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. 42 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 can diffuse throughout the system absorbing moisture.
5. Repeat this procedure as indicated in Fig. 42. The system should now be free of any contaminants and water vapor.

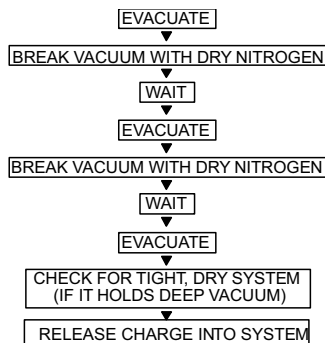


Fig. 42 —Triple Evacuation Method

A220818

Final Tubing Check






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 8 - Mount Electric Heater (Optional)

Heater Kits

This unit is not equipped with an electric heater package. A factory-approved, field-installed, ETL listed heater package is available from your equipment supplier. Factory-authorized, field-installed electric heater packages are available in sizes 5kW through 25kW. Electric heaters that are not factory approved may cause damage which would not be covered under the equipment warranty. Review the product data literature for all available accessory kits.

Table 8 — Accessories

Name	Shape	Quantity
Owner's and Installation Manual		1
Seal		1
Screw		7
Electric Auxiliary Heating Wiring Diagram		1
Circuit Breaker Label		1

NOTE: Installation must be performed by an authorized dealer or specialist. Use recommended PPE when installing the unit.

Specification of electric auxiliary heat modules: 5kW, 8kW, 10kW, 15kW, 20kW, 25kW.


Table 9 — Auxiliary Heater Compatibility

MODEL (Btu/h)	5kW	8kW	10kW	15kW	20kW	25kW
18K	Y	Y	Y	-	-	-
24K	Y	Y	Y	Y	-	-
30K	Y	Y	Y	Y	-	-
36K	Y	Y	Y	Y	Y	-
48K	-	Y	Y	Y	Y	-
60K	-	-	Y	Y	Y	Y

Table 10 — Power Requirements for Heaters

Heater Kit Size (KW)	Model Number	MCA Circuit 1 208V/ 230V	MCA Circuit 2 208V/ 230V	MCA Circuit 3 208V/ 230V	MOPD Circuit 1 208V/ 230V	MOPD Circuit 2 208V/ 230V
5	EHKMB0 5KN	23.0/ 27.0			25.0/ 30.0	
8	EHKMB0 8KN	37.0/ 42.0			40.0/ 45.0	
10	EHKMB1 0KN	46.0/ 53.0			50.0/ 60.0	
15	EHKMB1 5KN	23.0/ 27.0	46.0/ 53.0		25.0/ 30.0	50.0/ 60.0
20	EHKMB2 0KN	46.0/ 53.0	46.0/ 53.0		50.0/ 60.0	50.0/ 60.0
25	EHKMB2 5KN	23.0/ 27.0	46.0/ 53.0	46.0/ 53.0	25.0/ 30.0	50.0/ 60.0

NOTE: The EHKMA series of heaters is NOT compatible with the 40MBAB air handler.



CAUTION

This electric auxiliary heat module is internally mounted in the air handler. **DO NOT** mount in the ductwork.

If the unit needs to be equipped with the electric auxiliary heat module, check the electric auxiliary heat module specification that is compatible with the unit to avoid unnecessary consequences caused by improper matching and refer to Product Data Manual.

INSTALLATION REQUIREMENTS

NOTE: Installation of Auxiliary Electric Heat Module should be completed before installing the discharge ductwork to insure proper alignment of the inside support brackets.

Before installation, check the list of electric auxiliary heat modules and physical objects. After transportation, check whether the electric heat module is damaged. If any damage is detected, contact the after-sales personnel immediately.

NOTE: A separate power source is required for an Auxiliary Electric Heater. These units do NOT support a SINGLE POINT electrical connection when utilizing auxiliary heat.

ELECTRIC AUXILIARY HEAT MODULE INSTALLATION AND WIRING

1. Remove the upper cover and use professional tools to remove the upper cover knock-outs.

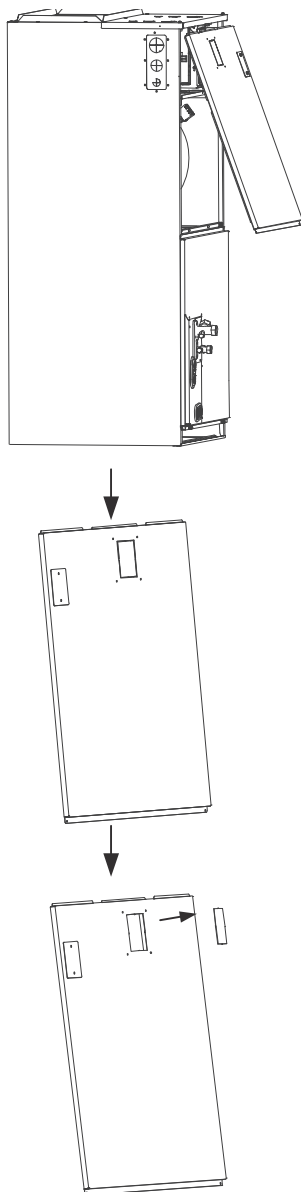
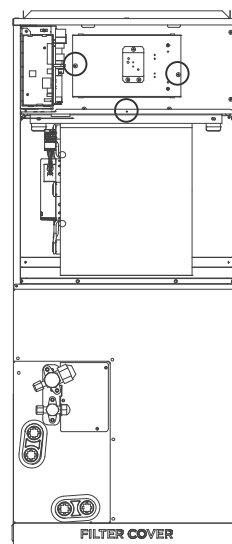


Fig. 43 — Remove the Upper Cover

A220792

2. Remove the terminal block and power cord.
3. Loosen the screws.
4. Remove the electric auxiliary heating cover.

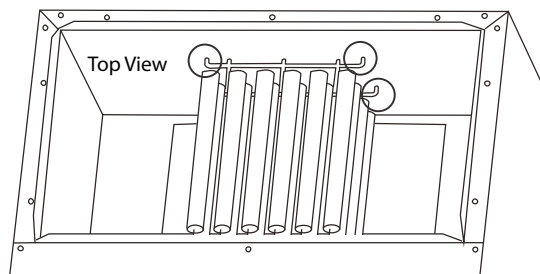
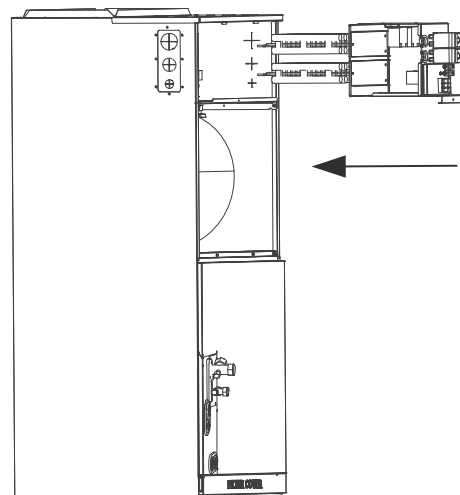


A220793

Fig. 44 — Remove the Terminal Block and Power Cord

5. Install the electric auxiliary heating component into the chassis shell along the front of the unit.

NOTE: Insert the front end into the shell assembly hole.



A220794

Fig. 45 — Install the Electric Auxiliary Heating Component

6. Tighten the screws.

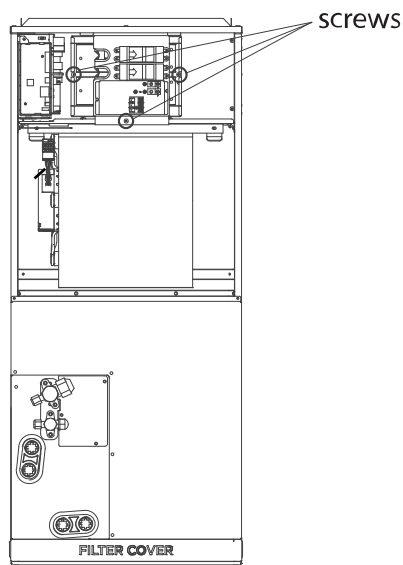


Fig. 46 — Tighten the Screws

- 7. Wiring according to the wiring template.
- 8. Install the upper cover.
- 9. Install the waterproof case.

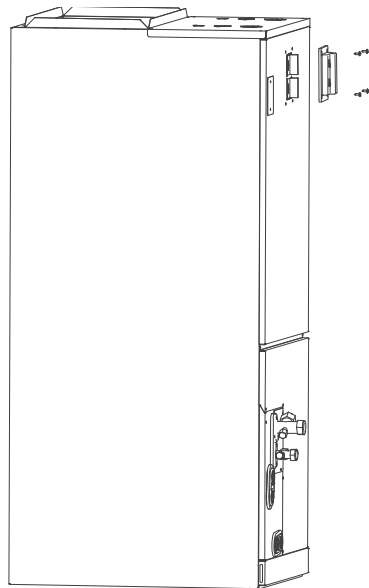


Fig. 47 — Wiring According to the Wiring Template

After the electric heating wiring is connected and before powering on:

- check all wiring and ensure a reliable connection of the wire body
- ensure the electric heating screw is tightened
- ensure the size selection of the power wire meets the power supply requirements.

NOTE: An electric auxiliary heating wiring diagram is supplied with the accessories. For maintenance convenience, paste the wiring diagram in the inside cover after the installation of electric auxiliary heating modules is complete.

NOTE: After installing the electric auxiliary heat module, adhere the air switch label near the upper cover air switch.

Table 11 — Specifications

Specifications	No. of Circuit Breakers	No. of Relays	No. of Power Cord Groups	No. of Power Cord Grounding Screws
5kW	1	1	2	2
8kW	1	2	2	2
10kW	1	2	2	2
15kW	2	3	2	2
20kW	2	4	3	3
25kW	3	5	4	4

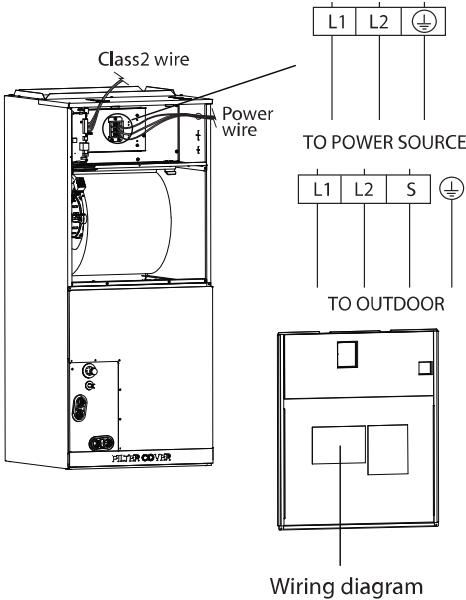


Fig. 48 — Indoor Unit Wiring Diagram

NOTE: The electric auxiliary heat wiring diagram is supplied with the accessories. Paste the wiring diagram in the designated position after installing the heat modules.

INDOOR UNIT WIRING

Use the following steps to wire the indoor unit.

NOTE: Wiring in this section is for the base unit ONLY. Auxiliary Electric Heat wiring is covered in “INDOOR UNIT WIRING” on page 18.

1. Prepare the cable for connection.
 - a. Using wire strippers, strip the insulation from both ends of the signal cable to reveal about 1/2 in (12mm) of wire.
 - b. Strip the insulation from both ends of the wires.
 - c. Use a wire crimper to crimp the fork terminals to the ends of the wires.
2. Open the indoor unit's front panel. Use a screwdriver to remove the cover of the electric control box on the indoor unit.
3. Thread the power cable and the signal cable through the wire outlet.
4. Connect the fork terminals to the terminals. Match the wire colors/labels with the labels on the terminal block.
5. Firmly screw the fork terminals of each wire to its corresponding terminal. Refer to the serial number and wiring diagram located on the cover of the electric control box.

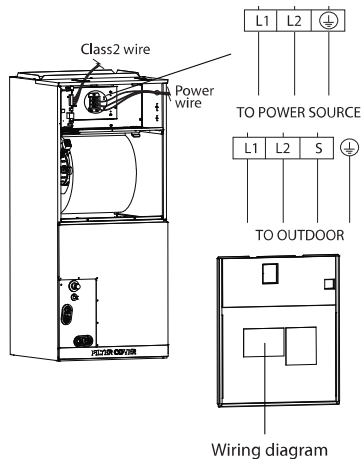


Fig. 49 — Control Box and Wiring Diagram

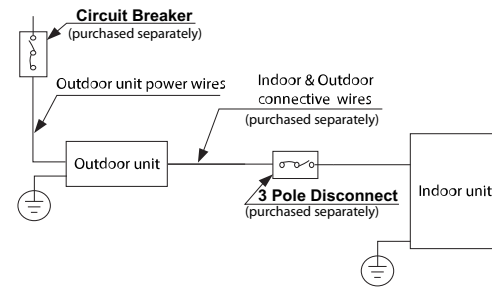
A220791



CAUTION

While connecting the wires, strictly follow the wiring diagram.
The refrigerant circuit can become very hot.
Keep the interconnection cable away from the copper tube.

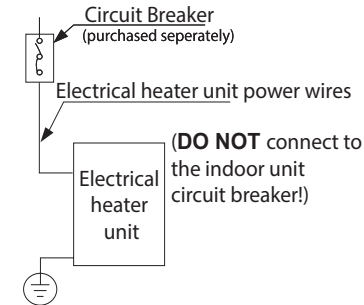
6. Clamp down the cable with the cable clamp. The cable must not be loose or put strain on the fork terminals.
7. Reattach the electric box cover.
The main power is supplied to the outdoor unit. When disconnecting the power of the outdoor unit, the indoor unit would lose power. A disconnect switch is not required on the indoor unit side on the wiring between the outdoor and indoor unit. A 3 pole disconnect (purchased separately) may be used for extra protection between the indoor and outdoor unit.



A220820

Fig. 50 — Wiring Connection of Indoor Unit

The Auxiliary Heater must have a separate branch electric circuit with a field-supplied disconnect switch located within sight from, and readily accessible from, the unit.



A220821

Fig. 51 — Wiring Connection of Electric Heater (optional)

WIRING REQUIREMENTS

Size all wires per the NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use the electrical data from the outdoor unit (MCA - minimum circuit amps and MOCP - maximum over current protection), to correctly size the wires and the disconnect fuse or breakers respectively.

SIZE 18 - 36K (NON LIGHT-COMMERCIAL MODELS) RECOMMENDED CONNECTION METHOD FOR POWER AND COMMUNICATION WIRING

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 cable can be used to replace L2 and (S) between the outdoor and indoor units - landing the shield onto the ground in the outdoor unit only.

Table 12 — Wiring Sizes 12K-36K

Cable	Cable Size	Remarks
Connection Cable	14AWG	3 wire + Ground 1Φ 208/230 V (Stranded wire is required)

SIZES 36-60 (LIGHT-COMMERCIAL MODELS) RECOMMENDED CONNECTION METHOD FOR POWER AND COMMUNICATION WIRING

Power and Communication Wiring: The main power is supplied to the outdoor unit. The field supplied power wiring from the outdoor unit to the indoor unit consists of three (3) wires and provides the power for the indoor unit. Two wires are high voltage AC power and one is a ground wire. To minimize voltage drop, the factory recommended wire size is 14/2 power stranded with a ground.

Communication Wiring: A separate 2-wire cable (stranded, shielded, copper conductor), with a 600 volt rating and double insulated copper wire, must be used as the communication wire from the outdoor unit to the indoor unit. Use a separate shielded 16AWG stranded control wire.

Table 13 — Wiring Sizes 36K-60K

Cable	Cable Size	Remarks
Power Connection Cable	14AWG	2 wire + Ground 1Φ 208/230 V
Communication Cable	16AWG	2 wire stranded shielded control wire



CAUTION

EQUIPMENT DAMAGE HAZARD

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 a 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 located within sight and readily accessible from the system. Route the connecting cable with conduit through the hole in the conduit panel.

NOTE: The main power is supplied to the outdoor unit. When disconnecting the power of the outdoor unit, the indoor unit would lose power. A disconnect switch is not required on the Indoor unit side on the wiring between the Outdoor and Indoor unit. A 3 pole disconnect may be used for extra protection between the indoor and outdoor unit (refer to local codes). A separate power source is required for an auxiliary electric heater.

ELECTRICAL DATA**Table 14 — Electrical Data**

MODEL NO.		INDOOR FAN			MAX FUSE CB AMP
	V-PH-HZ	FLA	HP	W	
40MBABQ18XB3	208-230/1/60	2	0.33	68	Refer to outdoor unit installation instructions – Indoor unit powered by the outdoor unit
40MBABQ24XB3		3	0.33	68	
40MBABQ30XB3		3.5	0.50	168	
40MBABQ36XB3		3.5	0.50	168	
40MBABQ48XA3		3.5	0.75	235	
40MBABQ60XA3		7.0	1	286.5	

CONNECTION DIAGRAMS AND CONTROL METHODS

- Control the air handler fan coil unit (mainly) with the following methods:
- **SCENARIO #1 Third party heat pump thermostat (Not Included):**
Allows the control of the air handler via the built-in 24V interface.
To enable this scenario, SW1-1 must be set to the **ON** position
 - **SCENARIO #2 Wireless controller (Included):**
Hand-held wireless remote provides the same functionality as the wired controller and can be used in conjunction with the wired controller. Refer to the Owner’s Manual for the remote’s operational instructions.

- For this scenario to be enabled, SW1-1 must be set to the **OFF** position
- **SCENARIO #2 Wired controller (Included, optional accessory) - KSACN1001AAA:**
Non-polarity controller used to operate all functions. The wired controller is equipped with an infrared receiver and can be used in conjunction with the wireless controller.
For this scenario to be enabled SW1-1 must be set to the **OFF** positions (default).

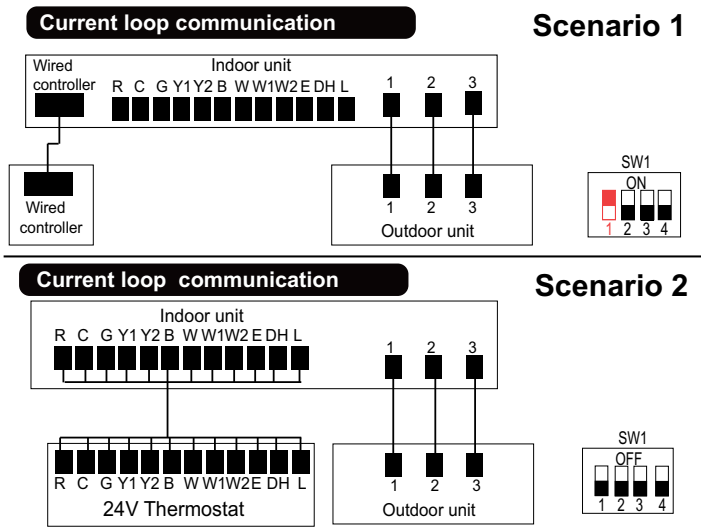


Fig. 52 — Connection Methods for 18K-36K Residential Units

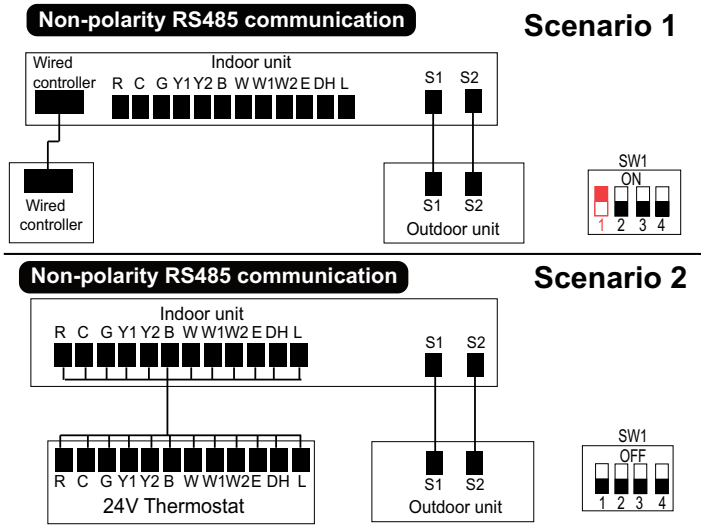


Fig. 53 — Connection Methods for 36K-60K Light Commercial Units

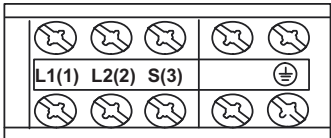


Fig. 54 — Control and Power Terminal on Indoor Unit (Sizes 18K, 24K, 30K, 36K) Non-Light Commercial Models

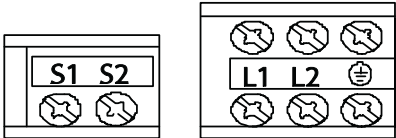


Fig. 55 — Control and Power Terminal on Indoor Unit (Sizes 36K, 48K, 60K) Light Commercial Models

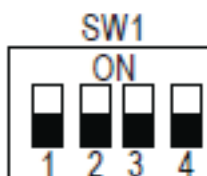
NOTE: When DIP SWITCH SW1 is set to default, the system automatically detects the wiring method according to scenarios 1 and 2. In the event of unexpected failure, DIP SWITCH SW1 can be set according to each wiring method.

Table 15 — Dip Switch Definitions

Dial Code	Control Scenario	Function	ON	OFF
SW1-1*	ON is for 1 and OFF is for 2	Control Function	24 V Communication	[Default] Auto Detect or Wired controller
SW1-2	1,2	Anti-cold blow protection option	NO	[Default] YES
SW1-3	1,2	Single cooling / heating and cooling options	Cooling	[Default] Cooling & Heating
SW1-4*	OFF is for 2	NOT AVAILABLE FOR UNIT. LEAVE OFF FOR ALL FUNCTIONS		Leave Off
SW2-1	2	Compressor Running Compensation (Demand working with heat pump+ Electric heat)	Compressor slower speed	[Default] Faster Compressor
SW2-1	1	Temperature differential to activate first stage auxiliary heat (the GAP of T1 and Ts) Wire controller demand with heat pump + Electric heat working together	2°F	[Default] 4°F
SW2-2	1	Electric heat on delay	YES	[Default] NO
SW2-3	1	Electric auxiliary heating delay to start time	30 minutes	[Default] 15 minutes
SW2-4	1	Compressor/Auxiliary heat outdoor ambient lockout	The compressor will not operate if the outdoor temperature is lower than the temperature represented by S3	[Default] The heater will not operate if the outdoor temperature is greater than the temperature represented by S3
Rotary Switch S3	1	Set outdoor temperature Limitation (for auxiliary heating or compressor)	0 means that the temperature protection is not turned on, the dial range is 1 through F, 1 equals -4°F and it increased up to 46°F	
SW3-1	2	Maximum continuous runtime allowed before system automatically stages up capacity to satisfy set point. This adds 1 to 5°F to the user set point in the calculated control point to increase capacity and satisfy user set point	30 minutes	[Default] 90 minutes
SW3-2	2	Cooling and heating Y/Y2 compressor speed adjustment.	Compressor slower speed	[Default] Faster Compressor
SW3-3	2	Compressor Running (demand working with heat pump+ Electric heat)	Compressor slower speed	[Default] Faster Compressor
SW3-3	1	Temperature differential to activate second stage auxiliary heating (the GAP of T1 and Ts) Wire controller demand with heat pump+ Electric heat working together	4°F	[Default] 6°F
SW3-4	2	Fan speed of the COOLING mode when 24V thermostat is applied for.	Turbo	High
SW4	1,2	Electric heat nominal CFM adjustment	Available settings are 000/001/010/011. Each digit corresponds to an individual switch position. For example [SW4-1 OFF , SW4-2 ON, SW4 -3 OFF] = 010.	
S4-1	2	Default ON	[Default] For single stage supplemental heat, W1 and W2 are connected	For dual stage supplemental heat, W1 and W2 are controlled independently.
S4-2	2	DH function selection	[Default] Dehumidification control not available	Dehumidification feature is enabled through thermostat

***NOTE:** When DIP SWITCH SW1 is set to default, the system automatically detects the wiring method according to the two control scenarios. In the event of an unexpected failure, DIP SWITCH SW1 can be set according to Table 15.

Default Setting



SW1

This dip switch group mainly controls and selects the type of unit. It is suggested that adjustments are only made under the guidance of the authorized technician.

- **SW1-1:** Control function, (ON: 24V Thermostat; OFF Auto Detect or Wired controller, default)
- **SW1-2:** Use this dip switch to determine whether to stop the fan when cold air is released; OFF stops the fan, ON does not stop the fan, the default is OFF
- **SW1-3:** Select Cooling Only and heat pump functions; ON: cooling only; OFF: heating and cooling, default
- **SW1-4:** Dip switch has no function.

NOTE: When DIP SWITCH SW1 is set to default, the system automatically detects the wiring method according to the two control scenarios. In the event of an unexpected failure, DIP SWITCH SW1 can be set according to Table 15 on page 22.

NOTE: Auto detect is available after serial number 0223V26809. With this feature active, the system automatically detects which controller is being used with all the SW1 dip switches set to default. Prior to the serial number cutoff, the control scenario needs to be set for Scenario 1(SW 1-1 ON).

SW2

This dip switch group controls compressor compensation or opening form of the electric auxiliary heat depending on control scenario being used.

- **SW2-1 (Control Scenario 2):** This dip switch can control compressor compensation speed when heat pump and electric hear are ON simultaneously. OFF: Faster compressor speed, default; ON: Slower compressor speed used for energy conservation
- **SW2-1 (Control Scenario 1):** This dip switch can control the temperature difference when the electric heating is turned on. OFF: 4°F(2°C), default; ON: 2°F(1°C), 3-level temperature setting, consistent with user thermostat setting.

NOTE: When E/AUX controls electric heating, there is no temperature difference, and it starts directly.

- **SW2-2, SW2-3:** This two-digit dialing code can control the delayed start of electrically-assisted heat. When the temperature difference is too great, the delayed start and the delayed start time can be selected.

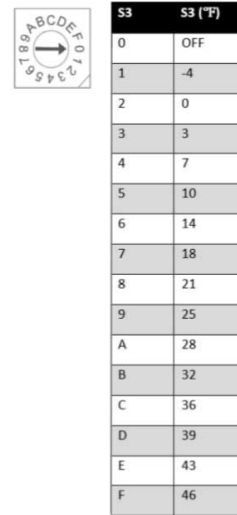
SW2-2	1-bit dialing, ON 5°F (2.5°C), OFF without delay
	1 bit dialing, OFF 15 minutes, ON 30 minutes, 15 minutes by default, delayed opening time

- **SW2-4:** This dial code controls the permissible opening temperature of electric heating or compressor, OFF allows the opening temperature of electric heating (using the set temperature of **S3 Rotary Switch** as the upper limit temperature of electric heating), and ON the allowable opening temperature of the compressor (using **Rotary Dial S3** as the upper limit temperature of electric heating). The lower limit temperature at which the compressor can allow operation.)

S3 Rotary Switch

Ambient temperature controlled by electric heating or compressor, 0 means no temperature protection is turned on, Rotary Dial position 1 through F maps to -4°F (-20°C) through 46°F (8°C). Each rotary dial point is a 4°F (2°C) change from the previous point.

Example: Set dial point 1 = -20C. Dial point 2 = -18C.Dial point F = 8C, and each scale represents 4°F (2°C).



S3	S3 (°F)
0	OFF
1	-4
2	0
3	3
4	7
5	10
6	14
7	18
8	21
9	25
A	28
B	32
C	36
D	39
E	43
F	46

Fig. 56 — SW3 Settings

SW3

This dip switch group mainly controls compressor compensation or adjustments to temperature dead-bands depending on control scenario being used.

- **SW3-1:** This dialing code can set the continuous operation time for increasing the set temperature by 1°F-5°F(0.5°C~3°C) before reaching the temperature. The default is OFF = 90 minutes; ON = 30 minutes.
- **SW3-2:** This dialing code can set Y/Y2 Y/Y2 compressor speed adjustment. OFF: Faster compressor speed, default; ON: Slower compressor speed used for energy conservation
- **SW3-3 (Control Scenario 2):** This dip switch can control compressor compensation speed when heat pump and electric hear are ON simultaneously. OFF: Faster compressor speed, default; ON: Slower compressor speed used for energy conservation
- **SW3-3 (Control Scenario 1):** This dialing code can set W2 signal setting temperature adjustment deviation, ON: 4°F (2°C); OFF: 6°F (3°C).
- **SW3-4:** This dip switch enables **TURBO** fan speed for cooling (ON for **TURBO**). This allows for **TURBO** speed in **COOLING** mode and **AUTO** fan logic. OFF: High speed, default, ON: **TURBO** speed

SW4 Air Flow Adjustment

This dip switch group works as a combination and enables nominal CFM adjustments. Only switches 1-3 are enabled. Switch 4 is reserved for future use. The available settings are: 000/001/010/011, and the air flow is adjusted according to Table 19:

S4 Dip Switch Settings

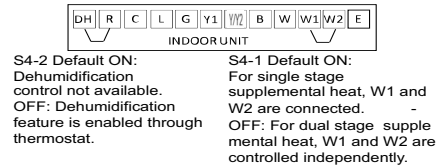
This dip switch group is for configuring the staging of supplemental heat and for dehumidification fan control.

•**S4-1:** Use this dip switch when 2 stages of supplemental heat, W1 and W2, are available; OFF allows for independent control of W1 and W2 via the Thermostat (dual stage), ON is used for single stage supplemental heat, W1 and W2 are internally jumped together. The default is ON

•**S4-2:** Use this dip switch to enable dehumidification fan operation. OFF removes the internal jumper from R to DH, meaning DH will be controlled via the thermostat. When the system is configured for dehumidification and there is a demand present, the 24V output from the thermostat drops to 0V, the refrigeration system starts the dehumidification operation, and the fan air volume drops to low fan speed.

ON creates an internal jump between R and DH, meaning no external dehumidification signal is present, DH will always receive a 24V signal and the fan will operate as normal. The default is ON.

NOTE: S4-2 operates on reverse logic. DH is energized when there is no external dehumidification control.



A220844

Fig. 57 — S4 DIP Switch

Table 16 — Electric Heater Nominal Air Flow Settings

Electric Heater Nominal Air Flow Settings (Sheet 1 of 3)

Capacity	External Static Pressure Range	Fan Speed	Electric Heater Kit	24V Thermostat		Wired Controller		Air Volume CFM
				DIP Switch	24V Terminal Engaged	DIP Switch	Mode	
40MBABQ18XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	618
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	576
		Cooling Medium	—	—	Y1	—	Cool	529
		Cooling Low	—	—	—	—	Cool	488
		Heat Pump Turbo	—	—	—	—	Heat	565
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	541
		Heat Pump Medium	—	—	Y1	—	Heat	435
		Heat Pump Low	—	—	—	—	Heat	400
		Electric heater kit 0 (Default)	10KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	653
		Electric heater kit 1	10KW, 8KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	624
		Electric heater kit 2	8KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	594
		Electric heater kit 3	5KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	565
40MBABQ24XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	824
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	759
		Cooling Medium	—	—	Y1	—	Cool	694
		Cooling Low	—	—	—	—	Cool	629
		Heat Pump Turbo	—	—	—	—	Heat	788
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	753
		Heat Pump Medium	—	—	Y1	—	Heat	641
		Heat Pump Low	—	—	—	—	Heat	524
		Auxiliary Heater Default 0	15KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	871
		Auxiliary Heater 1	15KW, 10KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	841
		Auxiliary Heater 2	10KW, 8KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	818
		Auxiliary Heater 3	5KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	788

Electric Heater Nominal Air Flow Settings (Sheet 2 of 3)

Capacity	External Static Pressure Range	Fan Speed	Electric Heater Kit	24V Thermostat		Wired Controller		Air Volume CFM
				DIP Switch	24V Terminal Engaged	DIP Switch	Mode	
40MBABQ30XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	988
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	894
		Cooling Medium	—	—	Y1	—	Cool	806
		Cooling Low	—	—	—	—	Cool	712
		Heat Pump Turbo	—	—	—	—	Heat	918
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	876
		Heat Pump Medium	—	—	Y1	—	Heat	665
		Heat Pump Low	—	—	—	—	Heat	453
		Auxiliary Heater Default 0	15KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	1088
		Auxiliary Heater 1	15KW, 10KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	1029
		Auxiliary Heater 2	10KW, 8KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	976
		Auxiliary Heater 3	5KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	918
40MBABQ36XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	1188
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	1082
		Cooling Medium	—	—	Y1	—	Cool	971
		Cooling Low	—	—	—	—	Cool	865
		Heat Pump Turbo	—	—	—	—	Heat	1112
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	1059
		Heat Pump Medium	—	—	Y1	—	Heat	794
		Heat Pump Low	—	—	—	—	Heat	582
		Auxiliary Heater Default 0	20KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	1306
		Auxiliary Heater 1	15KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	1241
		Auxiliary Heater 2	10KW, 8KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	1176
		Auxiliary Heater 3	8KW, 5KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	1112

Electric Heater Nominal Air Flow Settings (Sheet 3 of 3)

Capacity	External Static Pressure Range	Fan Speed	Electric Heater Kit	24V Thermostat		Wired Controller		Air Volume CFM
				DIP Switch	24V Terminal Engaged	DIP Switch	Mode	
40MBABQ48XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	1471
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	1282
		Cooling Medium	—	—	Y1	—	Cool	1094
		Cooling Low	—	—	—	—	Cool	906
		Heat Pump Turbo	—	—	—	—	Heat	1471
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	1306
		Heat Pump Medium	—	—	Y1	—	Heat	1141
		Heat Pump Low	—	—	—	—	Heat	976
		Auxiliary Heater Default 0	20KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	1741
		Auxiliary Heater 1	15KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	1653
		Auxiliary Heater 2	10KW, 8KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	1559
		Auxiliary Heater 3	8KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	1471
40MBABQ60XA3	0 - 0.80 in. w.g.	Cooling Turbo	—	SW3-4=ON	Y2/Y	—	Cool	1806
		Cooling High	—	SW3-4=OFF	Y2/Y	—	Cool	1582
		Cooling Medium	—	—	Y1	—	Cool	1359
		Cooling Low	—	—	—	—	Cool	1135
		Heat Pump Turbo	—	—	—	—	Heat	1659
		Heat Pump High	—	—	B+Y2/Y, W	—	Heat	1582
		Heat Pump Medium	—	—	Y1	—	Heat	1247
		Heat Pump Low	—	—	—	—	Heat	976
		Auxiliary Heater Default 0	25KW	SW4-1=OFF SW4-2=OFF SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=OFF	Heat + AUX, AUX	2171
		Auxiliary Heater 1	20KW, 15KW	SW4-1=OFF SW4-2=OFF SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=OFF SW4-3=ON	Heat + AUX, AUX	2029
		Auxiliary Heater 2	15KW, 10KW	SW4-1=OFF SW4-2=ON SW4-3=OFF	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=OFF	Heat + AUX, AUX	1894
		Auxiliary Heater 3	10KW	SW4-1=OFF SW4-2=ON SW4-3=ON	W1, W2, AUX	SW4-1=OFF SW4-2=ON SW4-3=ON	Heat + AUX, AUX	1753

DISPLAY MODE OF OPERATION

Table 17 — Display Mode of Operation

DISPLAY MODE	OPERATING CODE
IDLE/SHUTDOWN	00
CONSTANT FAN	01
COOLING Y1	02
COOLING Y2	03
DEHUM Y1	04
DEHUM Y2	05
HEATING Y1	06
HEATING Y2	07
W1 ELECTRIC HEAT	08
W2 ELECTRIC HEAT	09
Y1/Y2/W1 AUX HEAT	10
Y1/Y2/W2 AUX HEAT	11
EMERGENCY HEAT	12

MATCHING WITH MULTI ZONE OUTDOOR UNIT

When matching with multi zone outdoor unit, the indoor unit cannot be started due to the mode conflict listed in Table 18.

Table 18 — Matching with Multi Zone Unit

AHU MODE	OTHER IDU ZONES MODE	MODE CONFLICT UNIT
Fan	Heating/Electric heat/Emergency heat	AHU
Cooling		
Dehumidification		
Heating	Fan/Cooling/Dehumidification	Other IDU Zones
Electric Heat		
Emergency Heat		

NOTE:

- When HEATING reaches the temperature and shuts down with other IDU zones heating normally, the AHU fan stops running, and the Fan-ON mode is invalid.
- The heat pump starts synchronously when the Emergency heat or Electric heat is started.
- When the two AHU units are connected by multi zone outdoor unit, the above rules are applicable while one of the AHU units regarded as other IDU zones.

AUXILIARY CONTACTS

Main Board

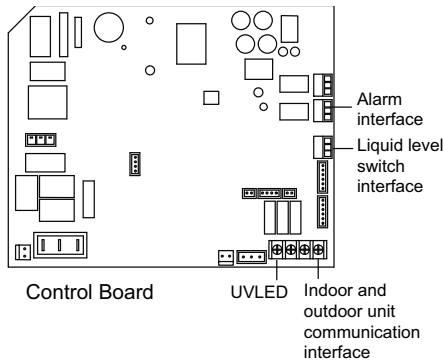


Fig. 58 — Auxiliary Contacts

WORK terminal port CN23 – DRY CONTACT – OUTPUT

- The WORK port is linked to the unit's indoor blower
- When the indoor blower is off, the contact is open
- When the indoor blower is running, the contact is closed
- There is no voltage from CN23, power is provided from the external control system and not from the unit
- The contacts are rated at 250VAC and 10 AMP maximum
- If an active 24V signal output is required, G and C ports (thermostat connections) may be used instead

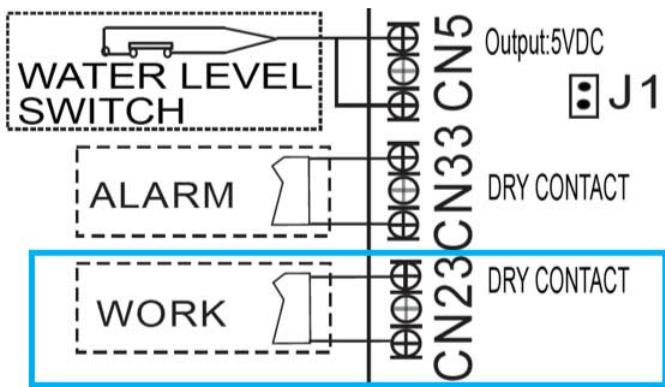


Fig. 59 — WORK Terminal Port CN23

ALARM terminal port CN33 – NORMALLY OPEN DRY CONTACT (OUTPUT)

- Allows the terminal port to connect to an external ALARM interface or annunciator
- There is no voltage from CN33, power is provided from the ALARM system and not from the unit
- The contacts are rated at 250VAC and 10 AMP maximum

- When the unit experiences a problem, the contact closes, and the ALARM is triggered. When the unit experiences a problem, the relay closes, and the ALARM is triggered.

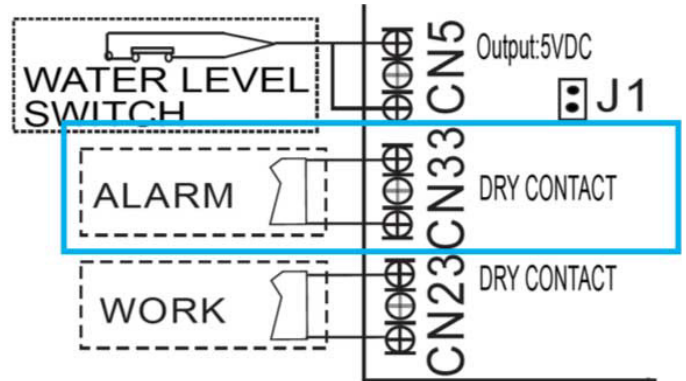


Fig. 60 — ALARM Terminal Port CN33

WATER LEVEL switch terminal port CN5 – SWITCH INPUT

- To enable this switch, jumper J1 must be removed
- A field supplied float switch can be directly connected to CN5
- CLOSED contacts = normal
- OPEN contacts = overflow
- When an overflow condition occurs, a signal is sent to the system to turn it off: Alarm EE is displayed.

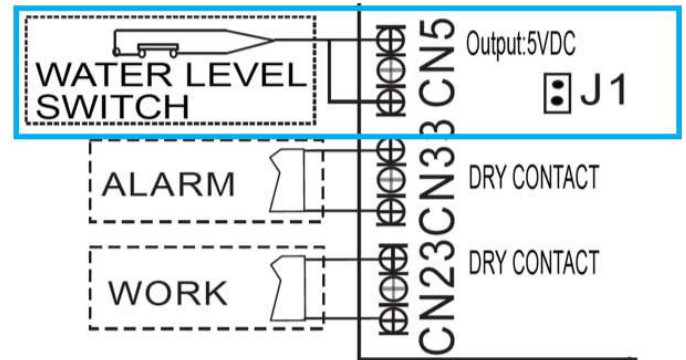


Fig. 61 — WATER LEVEL Terminal Port CN5

UV LED terminal port CN43 – OUTPUT 24VAC:

- The UV LED port is linked to the unit's fan
- When the fan is running, the relay is closed and there is an output of 24VAC through the contacts that can be used to power a compatible UV LED LIGHT

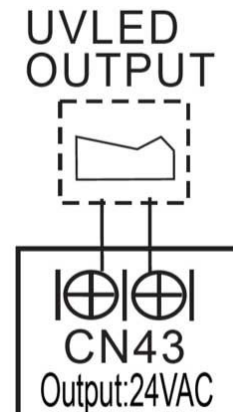


Fig. 62 — UV LED Terminal Port CN43

24V Interface Board

Remote control (ON-OFF) terminal port CN2 and jumper JR1 – OUTPUT 12VDC:

- Remove the jumper JR1 to enable the ON-OFF function
- When the remote switch is off (OPEN); the unit is OFF
- When remote switch is on (CLOSE); the unit is ON
- When the remote switch is close/open, the unit responds to the demand within 2 seconds
- When the remote switch is on, you can use the included remote controller or wired controller to operate the unit as normal. When the remote switch off, the unit would not respond the command from the remote controller or wired controller and a CP code would be displayed on the board.
- The voltage of the port is 12V DC, design Max. current is 5mA.

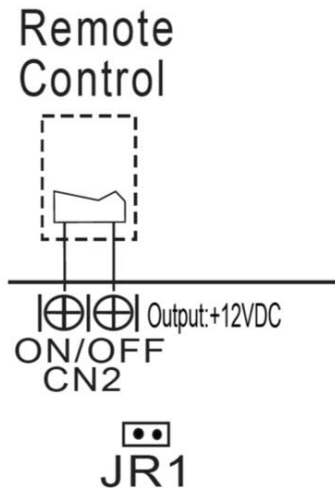


Fig. 63 — Remote Control Terminal Port CN2 and Jumper JR1

Control Logic

Table 19 — Indoor Unit Connector

Connector	Purpose
R	24V
C	COMMON
G	FAN
Y	First stage cooling
Y Y2	Second stage cooling
B	Heating (Four-way valve)
W	Heating operation
W1	Electric Heating Operation 1
W2	Electric Heating Operation 2
E/AUX	Emergency Heat / Auxiliary Heat
DH	Dehumidification
L	Error Signal

LED Display

The control displays active faults switches on the **LED** display. If the control displays the fault switch and the **LED** flashes quickly, the unit has malfunctioned. Refer to the detailed fault switches.

TEST RUN

BEFORE THE TEST RUN

A test run must be performed after the entire system has been completely installed. Confirm the following points before performing the test.

- Indoor and outdoor units are properly installed.
- Piping and wiring are properly connected.
- There are no obstacles near the unit's inlet and outlet that might cause poor performance or product malfunction.
- Refrigeration system does not leak.
- Drainage system is unimpeded and draining to a safe location.
- Heating insulation is properly installed.
- Grounding wires are properly connected.
- Length of the piping and additional refrigerant recorded.
- Power voltage is the correct voltage for the system.



CAUTION

Failure to perform the test run may result in unit damage, property damage, or personal injury.

Test Run Instructions

- Open both the liquid and gas stop valves.
- Turn on the main power switch and allow the unit to warm up.
- Set the air conditioner to the **COOL** mode.
- For the indoor unit:**
 - Double check to see if the room temperature is being registered correctly.
 - Ensure the manual buttons on the indoor unit work properly.
 - Ensure the drainage system is unimpeded and draining smoothly.
 - Ensure there is no vibration or abnormal noise during operation.
- For the outdoor unit:**
 - Check to see if the refrigeration system is leaking.
 - Ensure there is no vibration or abnormal noise during operation.
 - Ensure the wind, noise, and water generated by the unit do not disturb neighbors or pose a safety hazard.
- Drainage Test**
 - Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
 - Remove the test cover. Add 2,000 ml of water to the tank through the attached tube.
 - Turn on the main power switch and run the air conditioner in the **COOL** mode.
 - Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.
 - Ensure there are no leaks in any of the piping.
 - Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

NOTE: If the unit malfunctions or does not operate according to your expectations, please refer to the Troubleshooting section of the owner's manual before calling customer service.

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.

INDOOR UNIT

1. Do all the remote controller buttons function properly?
2. Do the display panel lights work properly?
3. Does the drain work?

Explain the following items to customer (with the aid of the owner's manual):

1. How to turn air conditioner **ON** and **OFF**;
2. How to select **COOLING**, **HEATING** and other the operating modes;
3. How to set a desired temperature;
4. How to set the timer to automatically start and stop air conditioner operation;
5. How to control all the other features of the remote controller and display panel.
6. How to remove and clean the air filter.
7. Unit care and maintenance.

Present the owner's manual and installation instructions to the customer.

START-UP PROCEDURES

Refer to outdoor unit's installation instructions for system start-up instructions.



CAUTION

UNIT COMPONENT HAZARD

Failure to follow this caution may result in product damage. Never operate the unit without a filter. Damage to the blower motor or coil may occur. For those applications where access to an internal filter is impractical, a field-supplied filter must be installed in the return duct system.

CARE AND MAINTENANCE

To continue high performance and minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local dealer as to the proper frequency of maintenance contract.

The ability to properly perform maintenance on this equipment requires certain mechanical skills and tools. If you do not possess these, contact your dealer for maintenance. The only consumer service recommended or required is filter replacement or cleaning on a monthly basis.

TROUBLESHOOTING

For ease of service, the systems are equipped with diagnostic code display LEDs on some outdoor units. The outdoor diagnostic display consists of two LEDs (red and green) on the outdoor unit board and is limited to a few errors. The indoor diagnostic display is a digital readout on the display panel. If possible, always check the diagnostic codes displayed on the indoor unit first before consulting a service technician. The diagnostic codes, displayed in the indoor and outdoor units, are listed in Table 20.

Table 20 — Indoor Unit Diagnostic Guides

DISPLAY	ERROR INFORMATION
EH00	Indoor EEPROM Malfunction
EL01	Communication malfunction between the indoor and outdoor units
EH03	Indoor fan speed malfunction
EC51	Outdoor EEPROM malfunction
EC52	Condenser coil temperature sensor (T3) malfunction
EC53	Outdoor ambient temperature sensor (T4) malfunction
EC54	Outdoor unit exhaust temperature sensor error
EH60	Indoor Room Temperature Sensor T1 Error
EH61	Indoor Evaporator Coil Temperature Sensor T2 Error
EH62	Air inlet temperature sensor error
EC07	Outdoor DC fan speed malfunction
EH0b	Indoor PCB and display board communication error
EL0C	Refrigerant leakage detection
EH0E	Indoor water level warning error
FL09	New and old platform match malfunction
PC00	Inverter module (IPM) protection
PC01	Over high voltage or over low voltage protection
PC02	High temperature protection of compressor top/IPM temperature protection
PC04	Inverter compressor drive error
PC03	Low pressure protection
PC0L	Low temperature protection of outdoor unit
----	Indoor units mode conflict (only when connected to a Multi-Zone Outdoor unit)

NOTE: If the LED display shows DF (Defrost) or FC (Forced Cooling), these are operational codes and, not fault or protection.

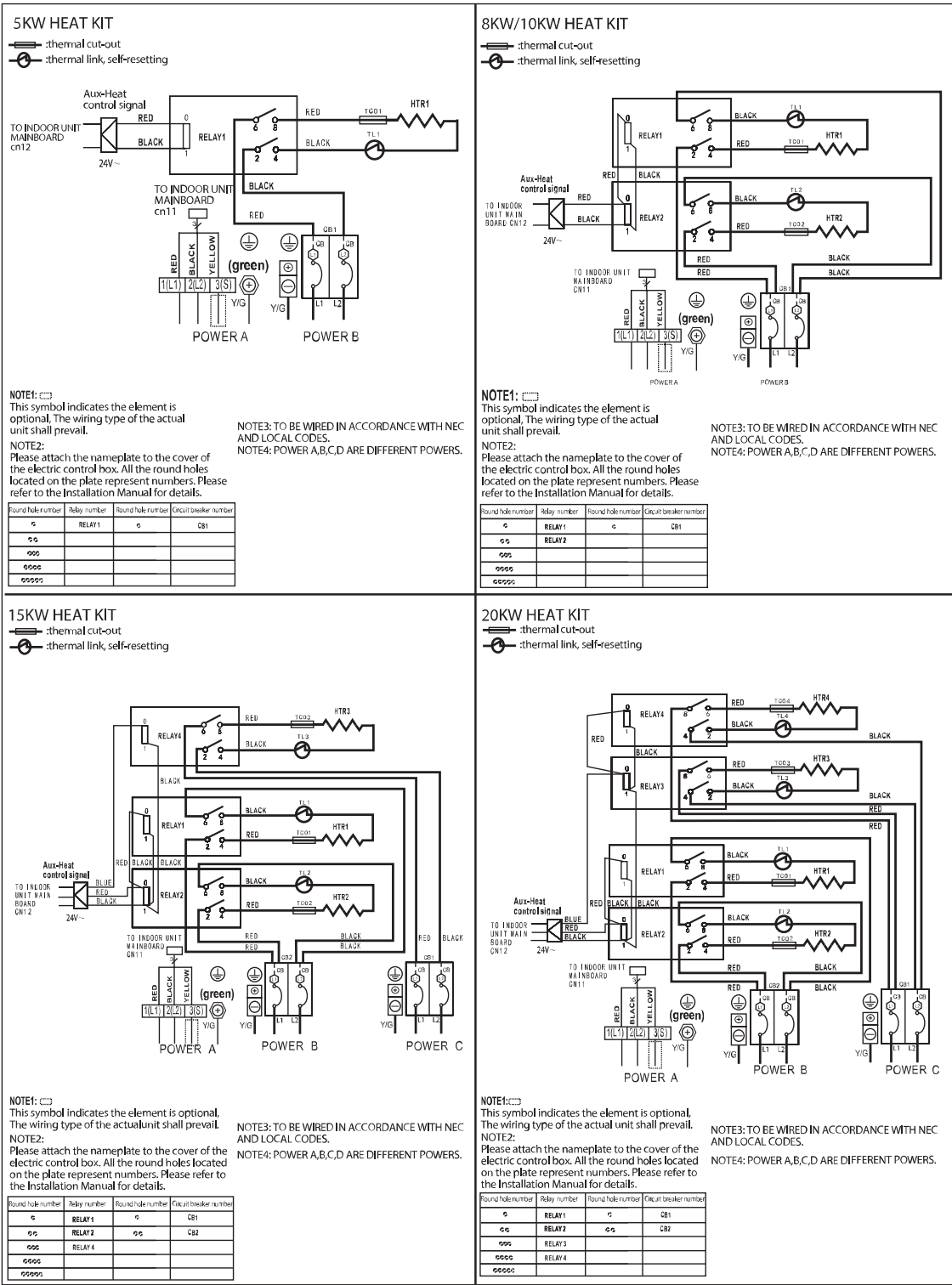
For additional diagnostic information, refer to the indoor unit service manual.

ELECTRIC AUXILIARY HEATING WIRING DIAGRAMS

Table 21 — Specifications

Specifications	No. of Circuit Breakers	No. of Relays	No. of Power Cord Groups*	No. of Power Cord Grounding Screws
5kW	1	1	2	2
8kW	1	2	2	2
10kW	1	2	2	2
15kW	2	3	2	2
20kW	2	4	3	3
25kW	3	5	4	4

*Power cord “A” for main unit on all sizes



ELECTRIC AUXILIARY HEATING WIRING DIAGRAMS (CONT)

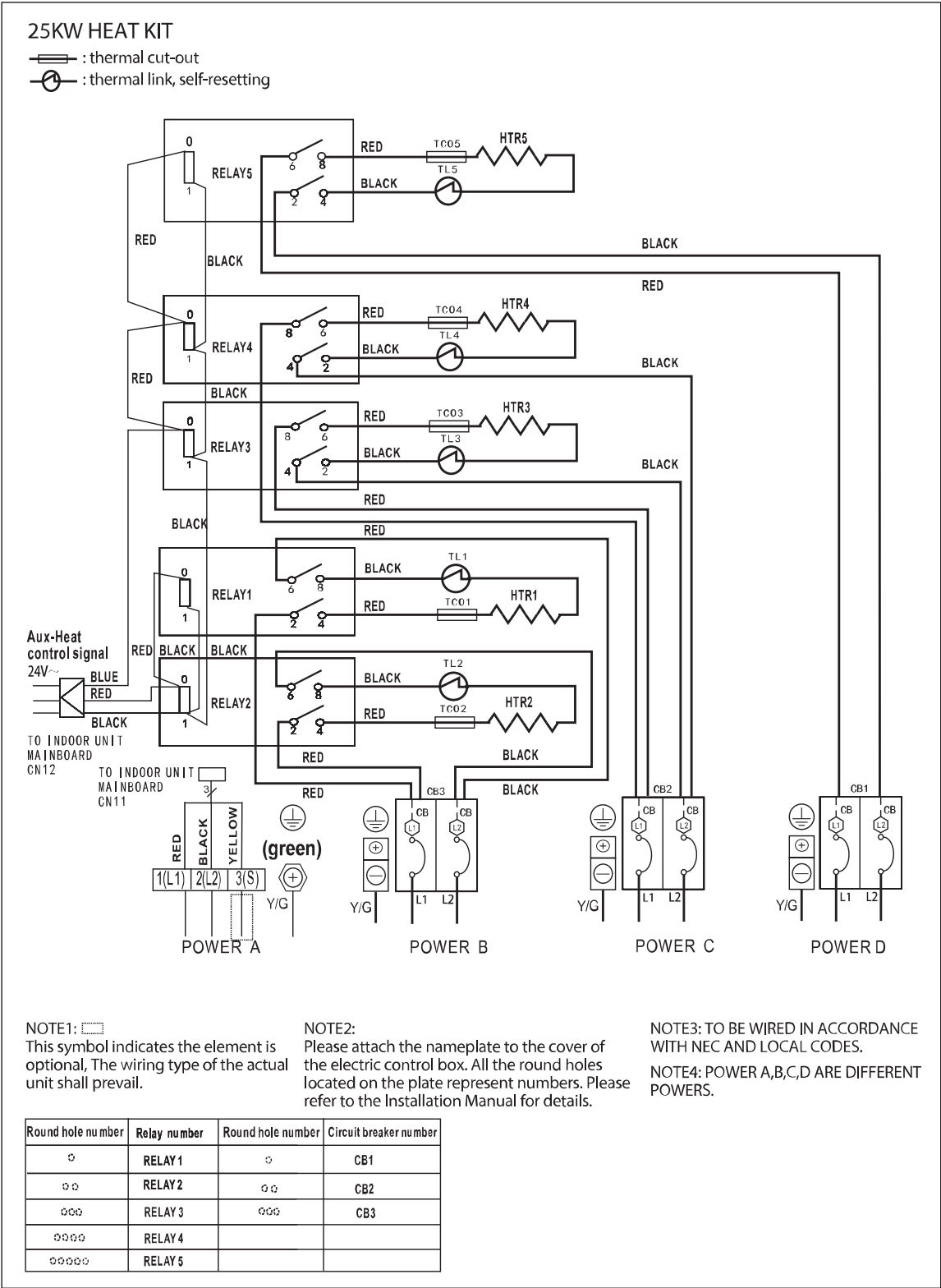


Fig. 65 — Electric Auxiliary Heating Wiring Diagram

A220798

