

Installation Instructions

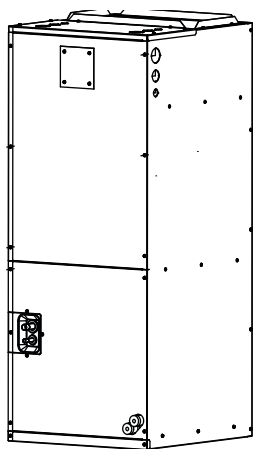


Fig. 1 — Air Handler

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

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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 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 C22.1. Recognize safety information.

This is the safety-alert symbol . When you see this symbol on the unit and in instruction manuals, be alert to 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 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.

INTRODUCTION

The Air Handler models are R-410A Fan Coils designed for installation flexibility allowing multi-position installation Upflow, down flow, horizontal right & horizontal left. These units leave the factory compliant with low leak requirements of less than 2% cabinet leakage rate at 0.5 inches W.C. when tested in accordance with ASHRAE 193 standard.

The metering device is installed on the outdoor unit and the fan coils do not have the device. All fan coils have a DC fan motor with variable speeds for efficiency. The units have been designed for up-flow, down-flow, and horizontal orientations, including manufactured and mobile home applications.

These units require a field supplied air filter and electrical disconnect* and are designed specifically for R-410A refrigerant heat pumps. These units are available for systems of 24,000 through 48,000 BTUh nominal cooling capacity (depending on the local codes) See “Step 8 - Electrical Connections” on page 16.

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.

HEATER PACKAGES

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 20kW. Electric heaters that are not factory approved could cause damage which would not be covered under the equipment warranty. Review the product data literature for all available accessory kits.

Table 1 — Indoor Unit Model Numbers

KBTUH	V-PH-HZ	ID MODEL NO.
24	208/230-1-60	40MBAAQ24XA3
36		40MBAAQ36XA3
48		40MBAAQ48XA3

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 has been completed.

Table 2 — Accessories

NAME	SHAPE	QUANTITY
Owner's and Installation Manual		1
Wireless Remote Controller*		1
Battery		1
Infrared Display Panel (located in the Air Handler Unit)		1

*The wireless remote is only used to set up the static pressure and airflow.

NOTE: To use the Wireless Remote for Air Flow Adjustment or Static Pressure setting, the outer panel and control panel cover must be removed to make the IR Receiver accessible. See “Step 10 - Setting Static Pressure and Airflow” on page 20.

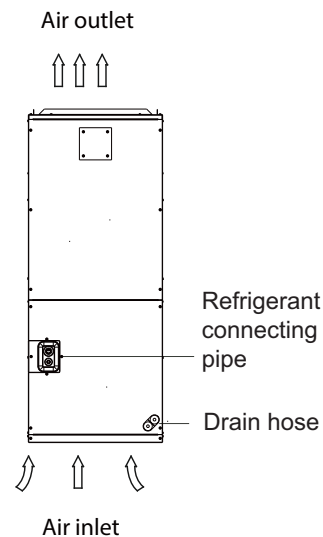


Fig. 2 — Air Handler

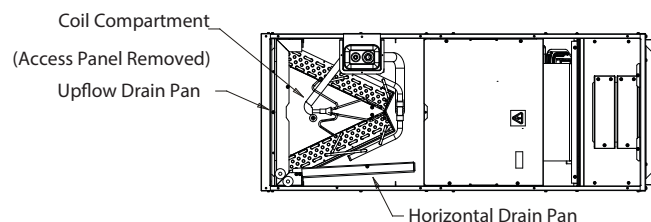


Fig. 3 — Indoor Unit Representation

DIMENSIONS

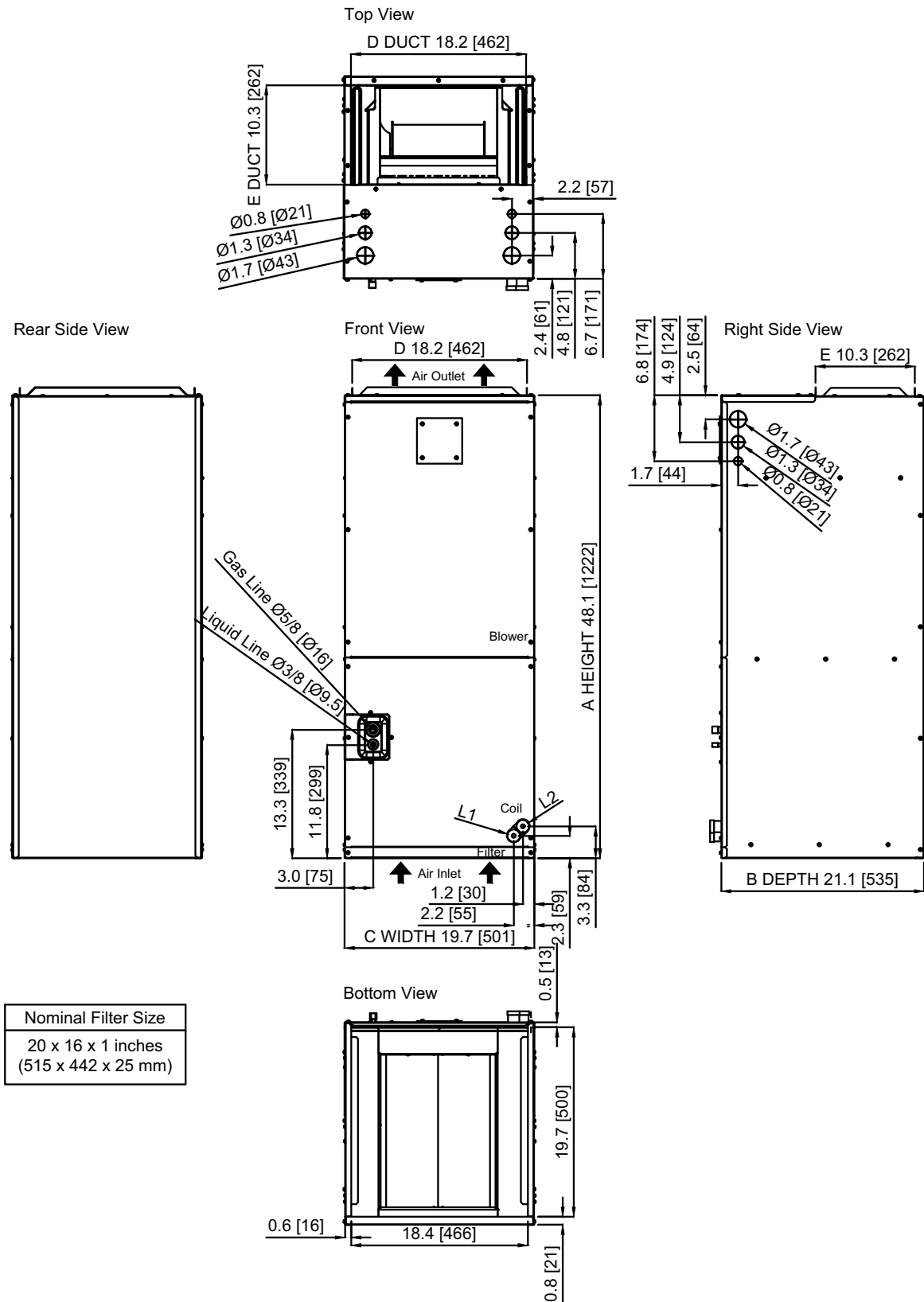


Fig. 4 — Dimensions

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. 6 — on page 5 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 to seal all the corners of the indoor unit to prevent any leakage 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 3 — 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)	

 **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, **DO NOT** install the unit within 3 feet (1 meter) of any combustible materials.
- **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 horizontal ceiling and 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.

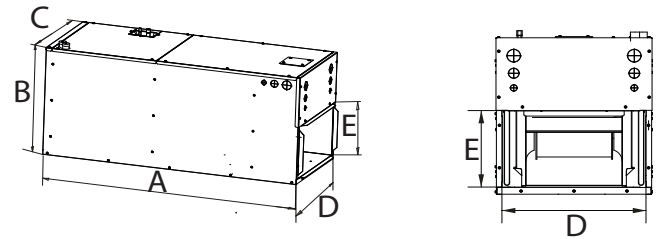


Fig. 5 — Indoor Unit Dimensions

Table 4 — Indoor Unit Dimensions

SIZES	A	B	C	D	E
24-48	48.2in (1,224mm)	21in (533mm)	19.6in (498mm)	18.2in (461mm)	10.3in (261mm)

Allow a minimum of 24in (60.9 cm) clearance from access panels.

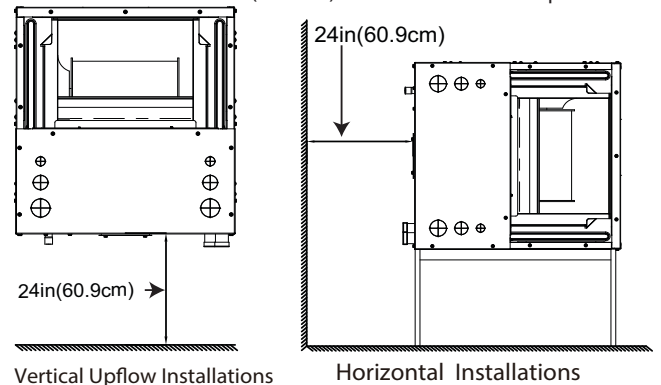


Fig. 6 — Installation Clearances

A. Upflow or Horizontal-Right Installation

The units can be installed in a vertical Upflow or horizontal (right) configuration.

NOTE: There is no need to change the direction of the evaporators with Vertical Upflow and Horizontal Right installations.

Follow these steps to perform a Vertical Upflow installation and Horizontal Right installation:

1. Open the upper cover.
2. Open the cover of the electronic control box.
3. Connect all necessary wiring according to the wiring diagram.
4. Connect the lineset.
5. Install the drain lines.

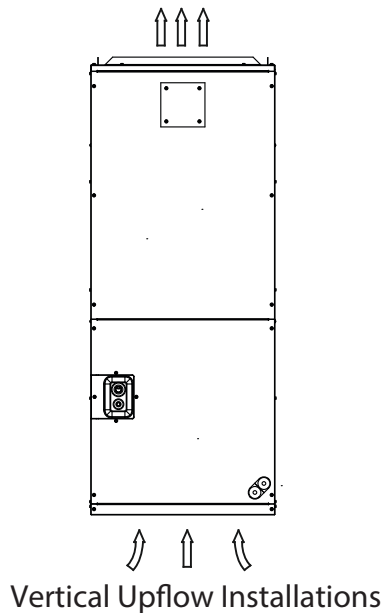


Fig. 7 — Vertical Upflow Installations

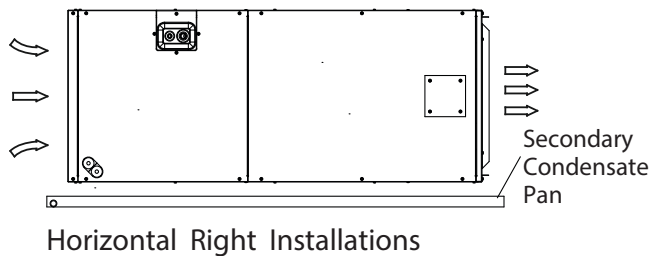


Fig. 8 — Horizontal Right Installations

NOTE: For a horizontal right installation, secondary condensate pan (field supplied) must be installed (refer to local codes).

B. Downflow or Horizontal-Left Installation

For the Horizontal Left installation and the Vertical Downflow installation, the direction of the evaporator should be changed and the drain pan should be removed first.

Use the following steps to remove the drain pan.

1. Remove the filter cover.
2. Remove the filter.

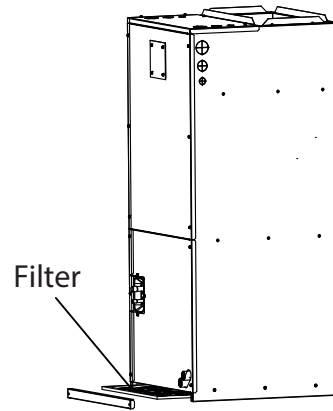


Fig. 9 — Remove the Filter

3. Open the evaporator cover and remove the drain plug.

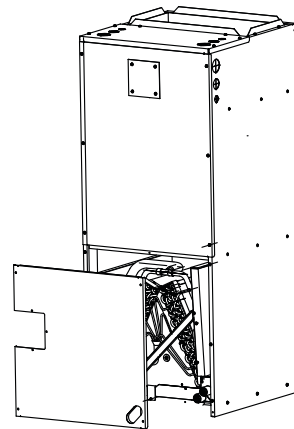


Fig. 10 — Open the evaporator cover and remove the drain plug

4. Remove the drain pan support bracket and the locking clip.

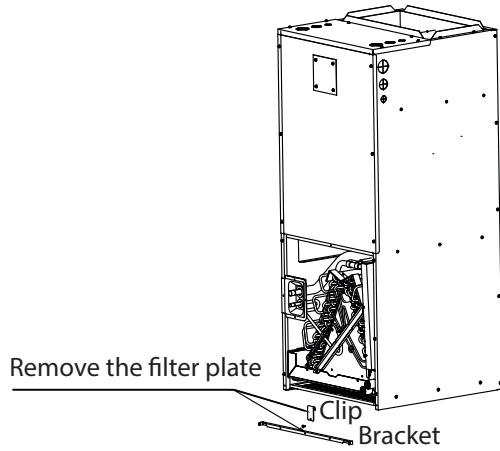


Fig. 11 — Remove the Support Bracket and Clip

5. Remove the pipe temperature sensor and room temperature sensor.

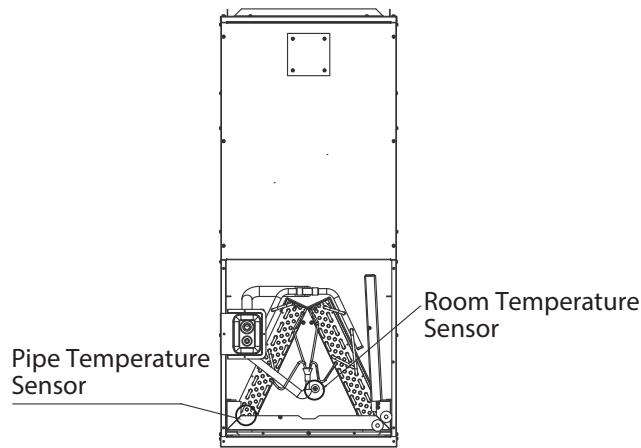


Fig. 12 — Pipe and room temperature sensors

6. Remove the evaporator and drain pan assembly.

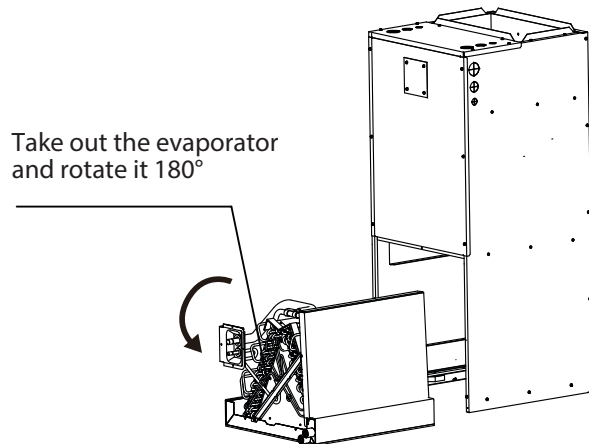


Fig. 13 — Rotate the evaporator

7. Rotate the evaporator 180°.

8. Reinstall the evaporator and drain pan assembly.

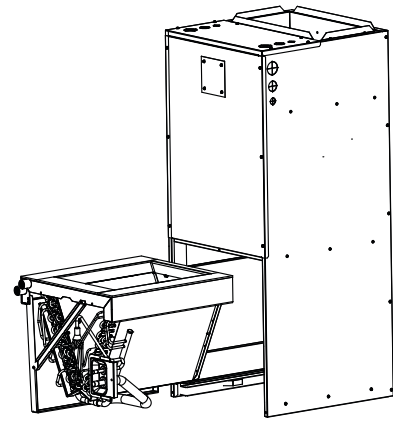
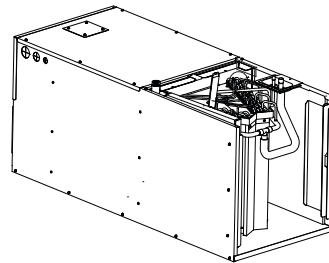


Fig. 14 — Reinstall the evaporator and drain pan assembly

9. Reinstall the pipe temperature sensor in its original position. Attach the room temperature sensor to the evaporator output pipe protection sleeve.



Pipe temperature cable and room temperature cable pass through the top of the water intake plate and the left side plate.

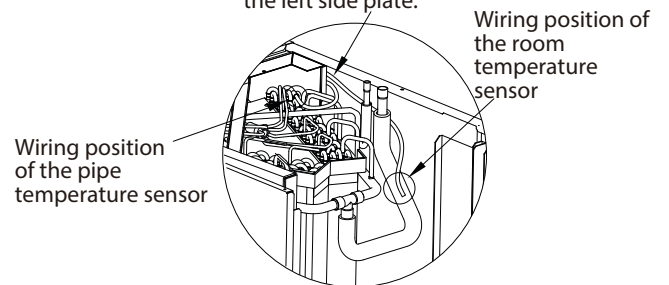


Fig. 15 — Reinstall the Pipe Temperature Sensor

10. Reinstall the drain pan support bracket and locking clip.

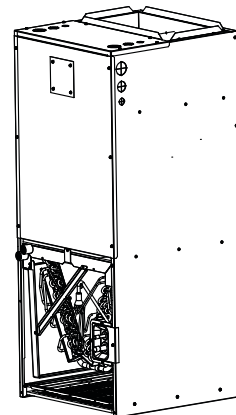


Fig. 16 — Reinstall the Drain Pan Fixed Plate

11. Reinstall the evaporator cover.

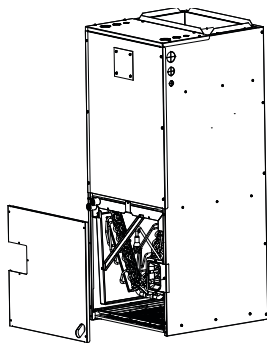


Fig. 17 — Reinstall the Evaporator Cover

12. Reinstall the filter and the filter plate.

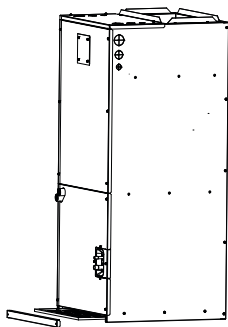
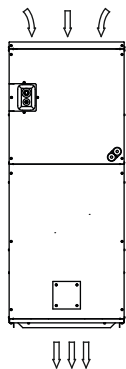


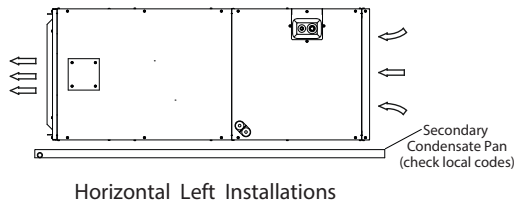
Fig. 18 — Reinstall the filter and filter plate

- 13. Open the lower cover.
- 14. Open the electronic control box.
- 15. Connect all the necessary wiring according to the wiring diagram.
- 16. Connect the lineset.
- 17. Install the drain lines.



Vertical Downflow Installations

Fig. 19 — Vertical Downflow Installations



Horizontal Left Installations

Fig. 20 — Horizontal Left Installations

NOTE: For a horizontal left installation, a secondary condensate pan (field supplied) must be installed (refer to local codes).

Step 3 - Mount Electric Heater (Optional)

Table 5 — Accessories

NAME	SHAPE	QUANTITY
Owner's and Installation Manual		1
Seal		1
Screw		2
Resilient Cap		1
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, 10kW, 15kW, 20kW.

CAUTION

The electric auxiliary heat module is internally mounted in the air handler. **DO NOT MOUNT IN DUCTWORK!**

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

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.

ELECTRIC AUXILIARY HEAT MODULE INSTALLATION AND WIRING

1. Remove the six screws securing the upper cover plate and the chassis.



Fig. 21 — Upper Cover Plate

2. Remove the four screws securing the electric auxiliary heat cover plate and the upper cover plate.

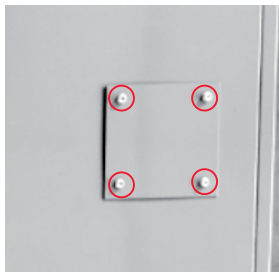


Fig. 22 — Electric Auxiliary Heat Module Plate

3. Remove the screws and the sheet-metal cover(s) reserved for the electric heating module.

NOTES:

- For model 5KW, 10KW, remove three screws from the upper sheet metal cover only.
- For model 15Kw, 20KW, remove the upper and lower sheet metal covers.

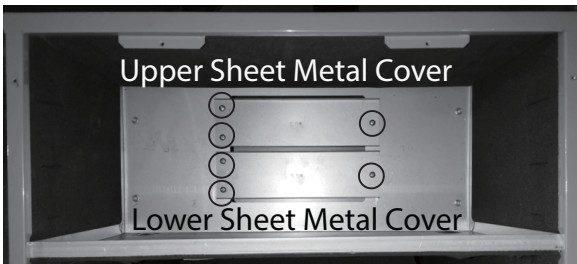


Fig. 23 — Remove Sheet Metal Covers

4. Insert the heating module into the opening made by removal of the sheet metal cover(s). Ensure the two support rod ends are on the opposite bulkhead.

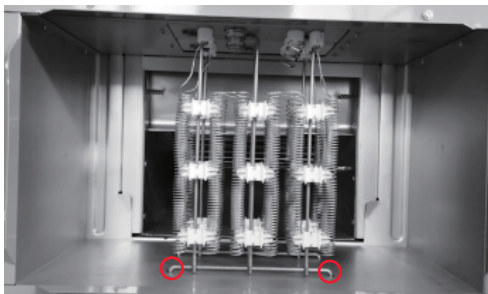


Fig. 24 — Insert Heating Module

5. Use the 3 screws (6 screws for 15K or 20K) removed previously and fasten the outer cover of the module into the access hole.

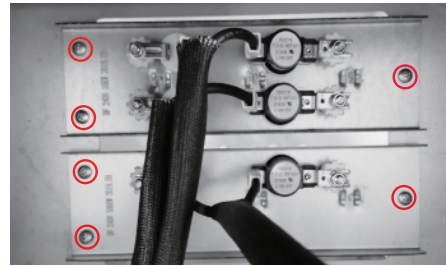


Fig. 25 — Install the Electric Heating Module

6. Secure one end of the electric heating terminal board to the sheet metal slot close to the fan, and the other end to the sheet metal on the top cover plate with two screws.
7. Secure the 2 tabs on the Power Terminal mounting bracket in the slots provided and fasten the lower tabs with 2 screws.

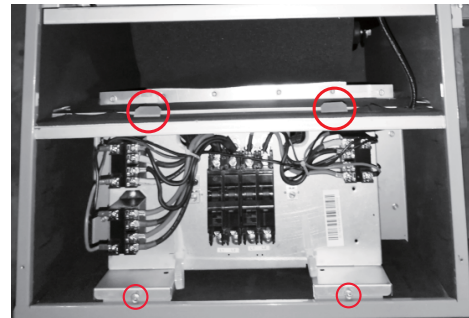


Fig. 26 — Electrical Heating Terminal

8. Remove the cover for the electronic controls. After completing the following steps, the cover needs to be re-installed.

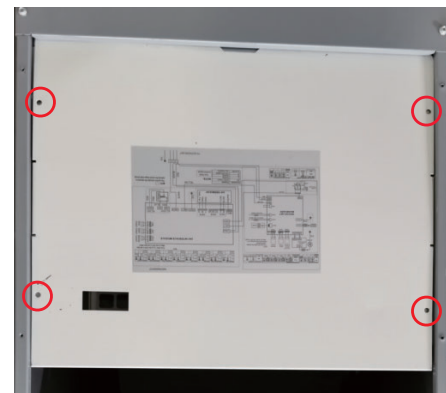


Fig. 27 — Remove the electronic control box

9. Insert the white plug of the electric heating control line into the electric control box through the reserved crossing hole and insert into the corresponding white plug in the electronic control box.

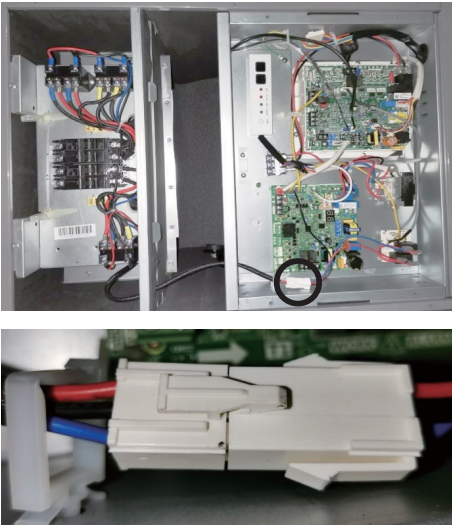


Fig. 28 — Insert the white plug wire

10. Connect the low voltage control wire (W2) of the third party thermostat to the AUX terminal of the 24 volt interface (does not matter which terminal). Figure 29 shows the interface board AUX terminal.

NOTE: The control wire may be connected to the AUX terminals in any order.



Fig. 29 — Connect the auxiliary heat wire

11. Power Wiring should be sized in accordance with NEC (CEC) requirements and local codes (see Table 6 on page 11). Choose the power cord and the power cord installation location (see Figure 30). Each circuit breaker group needs to connect to the power input line. Where needed, Jumper L1 and L2 to the terminals for the other contactor.

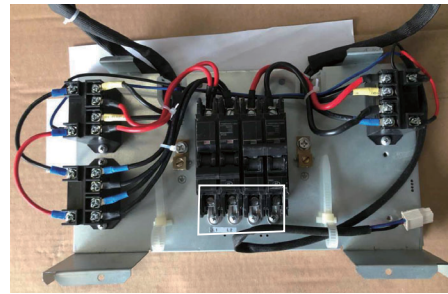


Fig. 30 — Choose the power cord installation location

12. See Figure 31 for the securing position of the power supply ground wire. Secure the power input wires for each group, and make sure that the cable is properly grounded.

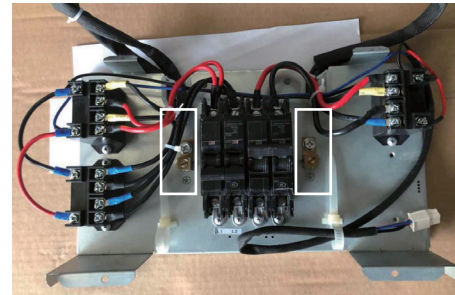


Fig. 31 — Secure the power input wires of each group

NOTE: After installing the electric auxiliary heat module, place the circuit breaker label near the upper cover circuit breaker.

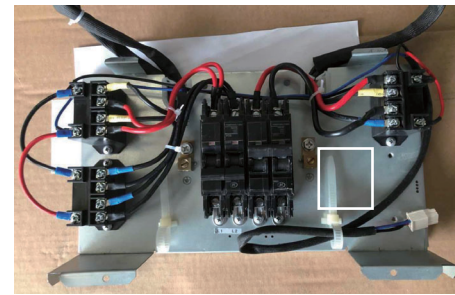


Fig. 32 — Circuit Breaker Label Placement

13. Remove the resilient cap and seal from the auxiliary heat module accessory bag, and attach the seal to the resilient cap.

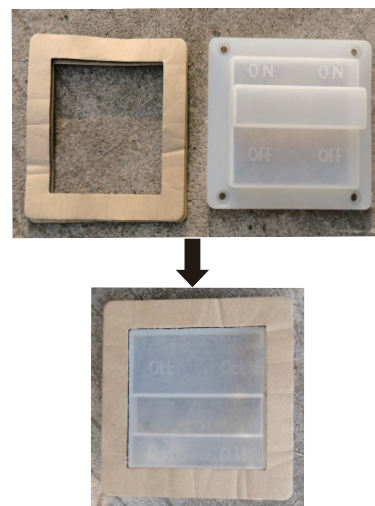


Fig. 33 — Remove the resilient cap

14. Fasten the resilient cap and seal on the upper cover plate with 4 screws.

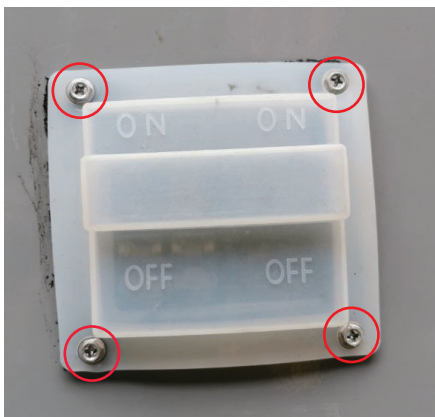


Fig. 34 — Fasten the resilient cap

15. Reassemble the electronic control cover and secure it with screws. Reassemble the upper cover plate and secure it with screws. After the electric heating wiring is connected, confirm the plate is secure before powering the unit on. Check all the wiring and ensure a reliable connection with the wire body.

Table 6 — Specifications

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

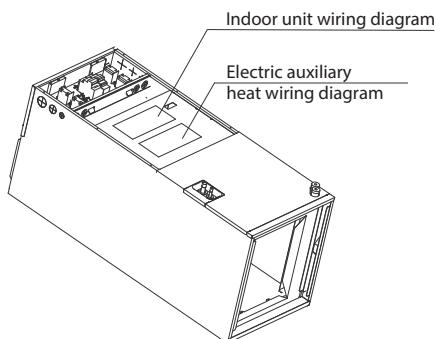


Fig. 35 — Indoor Unit Wiring Diagram

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

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 electric heaters require a 1in (25mm) clearance to combustible materials for the first 36in (914mm) of supply duct.

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 5). 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 (freeblow) applications. Duct work should be fabricated and installed in accordance with local and/or national codes.

Plenum Clearances

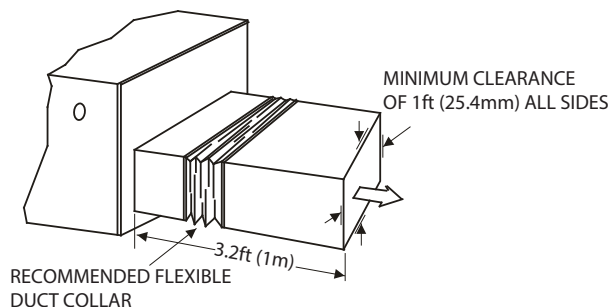


Fig. 36 — Flexible Duct Collar Connection

Step 5 - Condensate Drains

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



CAUTION

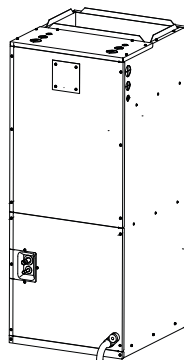
- Insulate all piping to prevent condensation, which could lead to water damage. Check the local codes.
- If the drainpipe is bent or installed incorrectly, water may leak and cause a water-level switch malfunction.
- In **HEAT** mode, the outdoor unit may discharge water. Ensure that the outdoor drain 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.

VERTICAL DISCHARGE



PRIMARY DRAIN

Fig. 37 — Vertical Discharge

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

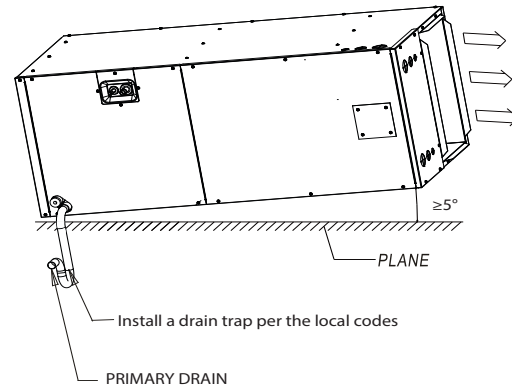


Fig. 38 — Primary Drain

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

Figure 37 shows how to trap or plug all drains to provide a vertical discharge. Figure 38 shows how to trap or plug all drains to provide a right-hand discharge.

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

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

2. Use a 2.5in (65mm) 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). 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.

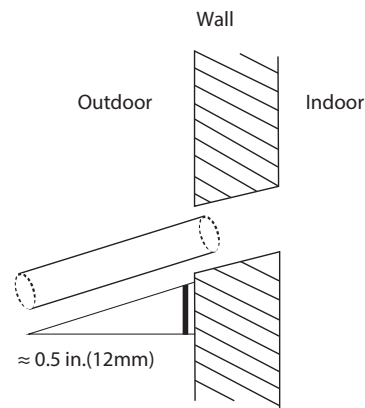


Fig. 39 — Drill hole

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

3. Pass the drain hose through the wall hole. Make sure 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: Both refrigerant lines must be insulated separately.

- The minimum refrigerant line length between the indoor and outdoor units is 10 ft. (3 m).
- Table 7 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 7 — Piping Size

		24K	36K	48K
Gas Pipe (Connection Size)	In (mm)	5/8 (16)	5/8 (16)	5/8 (16)
Liquid Pipe (Connection Size)	In (mm)	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 both the gas and liquid piping 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.
- Make sure the pipe is cut at a perfect 90° angle.

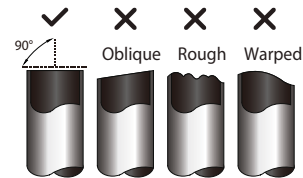


Fig. 40 — Pipe Cutting



CAUTION

DO NOT DEFORM PIPE WHILE CUTTING

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

- 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.

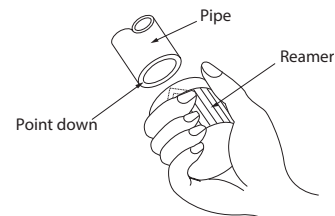


Fig. 41 — Deburring tool

- 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. Make sure they are facing the right direction. Once the ends are flared, it is impossible to put them on or change their direction.

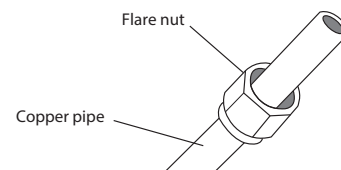


Fig. 42 — Copper pipe and flare nut

- Remove the PVC tape from ends of pipe when ready to perform the flaring work.

- e. Clamp the flare block on the end of the pipe. The end of the pipe must extend beyond the flare form.

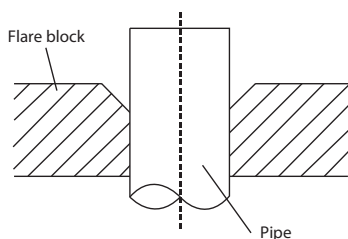


Fig. 43 — Flare Block

- f. Place the flaring tool onto the form.
- g. Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions in Table 8 on page 14.

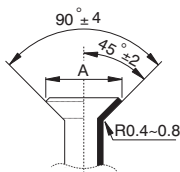


Fig. 44 — Flare Shape

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

Table 8 — Flare Nut Spacing

OUTER DIAM. (MM)	A IN (MM)	
	MAX.	MIN.
Ø 3/8"(9.52)	0.06"(1.6)	0.04"(1.0)
Ø 1/2"(12.7)	0.07"(1.8)	0.04"(1.0)
Ø 5/8"(15.88)	0.09"(2.2)	0.08"(2.0)

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.

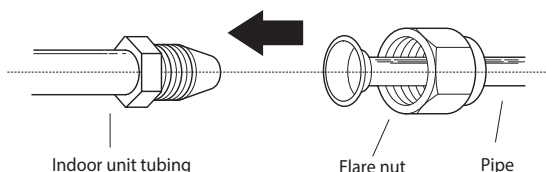


Fig. 45 — Align the center of the two pipes

- Tighten the flare nut as much as possible by hand.
- Using a wrench, grip the nut on the unit tubing.
- While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values listed in Table 9.

Table 9 — Tightening Torque

BRASS FLARE SIZE	RECOMMENDED SEATING TORQUE FOR BRASS FLARE NUTS	N-M
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

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

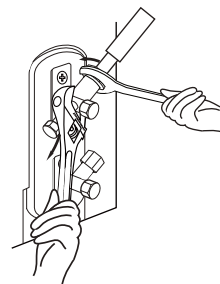


Fig. 46 — Torque wrench with backup wrench



CAUTION

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


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

- After connecting the copper pipes to the 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.

- Thread this lineset through the wall to connect to the indoor unit.
- The liquid line sweat connection is 3/8" O.D. copper and the suction line sweat connection is 5/8" O.D. copper. Use the appropriate adapters for tubing that runs from the outdoor unit. 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.
- Adjust the nitrogen apparatus to pressurize the system. Pressure test the system to a maximum of 500 psig for at least 60 minutes.
- Insulate both lines of the line set separately and 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. 47).
2. Connect the charge hose to vacuum pump.
3. Fully open the low side of manifold gage (see Fig. 48).
4. Start the vacuum pump.
5. Evacuate using either the deep vacuum or triple evacuation method.
6. After evacuation is complete, fully close the low side of manifold gage and stop the vacuum pump operation.
7. The factory charge contained in the outdoor unit is good for up to 25 ft. (8 m) of line length. For refrigerant lines longer than 25 ft. (8 m), add refrigerant, up to the allowable length.
8. Disconnect the charge hose from the charge connection of the low side service valve.
9. Fully open service valves B and A.
10. Securely tighten the service valve caps.

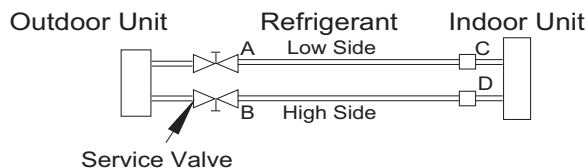


Fig. 47 — Service Valve

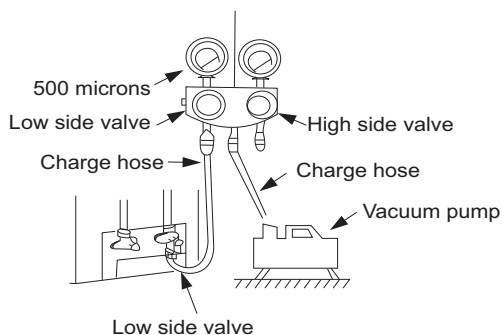


Fig. 48 — Manifold

Evacuation

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

Deep Vacuum Method

The deep vacuum method requires a vacuum pump capable of pulling a vacuum of 500 microns and a vacuum gauge capable of accurately measuring this vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and moisture (see Fig. 49).

NOTE: DO NOT add a filter line drier.

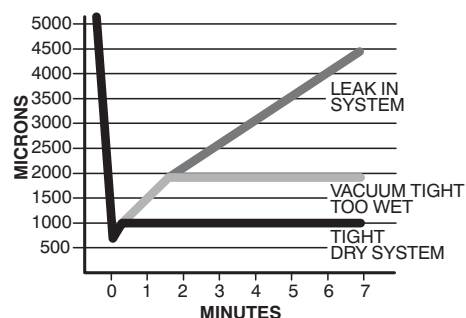


Fig. 49 — Deep Vacuum Graph

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. 50 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. 50. The system should now be free of any contaminants and water vapor.

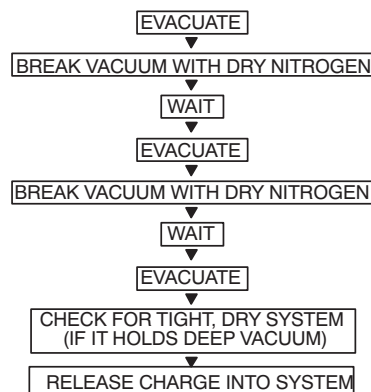


Fig. 50 — Triple Evacuation Method

Final Tubing Check

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

Step 8 - Electrical Connections

Before proceeding with electrical connections, make certain that the supply voltage, frequency, phase, and ampacity are as specified on the unit rating plate. Review the unit wiring label for proper field high and low voltage wiring.

Ensure all electrical connections are in accordance with the NEC and any local codes or ordinances that may apply. Use copper wire only.



CAUTION

PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in product or property damage.

If a disconnect switch is to be mounted on the unit, select a location where the drill or fastener will not contact electrical or refrigerant components.



WARNING

ELECTRICAL SHOCK HAZARD

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

Field wires on the line side of the disconnect found in the fan coil unit remain live, even when the pull-out is removed.

Service and maintenance to incoming wiring cannot be performed until the main disconnect switch (remote to the unit) is turned off.



CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation. Size the wires in accordance with NEC and local codes.

INDOOR UNIT WIRING

Use the following steps to wire the indoor unit.

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.

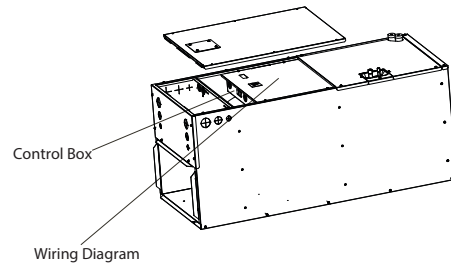


Fig. 51 — Control Box and Wiring Diagram



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.

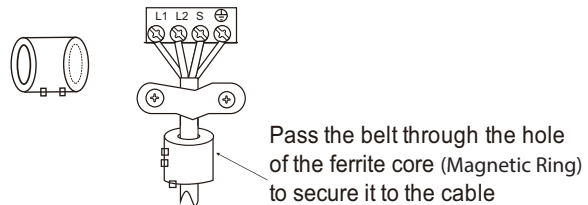


Fig. 52 — Ferrite Core (Magnetic Ring)

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.

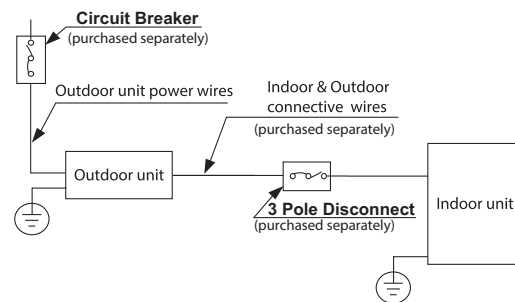


Fig. 53 — Wiring Connection of Indoor Unit

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.

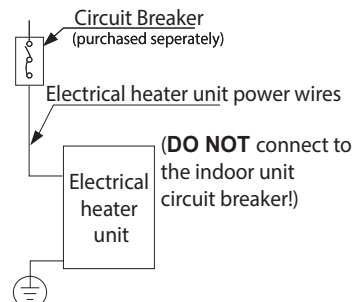


Fig. 54 — Wiring Connection of Electric Heater (optional)

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 24 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 10 — Wiring Size 24

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

SIZES 36-48 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.

Please use a separate shielded 16AWG stranded control wire.

Table 11 — Wiring Sizes 36-48

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 12 — Electrical Data

UNIT SIZE	V-PH-HZ	INDOOR FAN			MAX FUSE CB AMP
		FLA	HP	W	
24	208-230/1/60	5	0.20	120	Refer to outdoor unit installation instructions – Indoor unit powered by the outdoor unit
36		5	0.42	250	
48		5	0.65	400	

CONNECTION DIAGRAMS

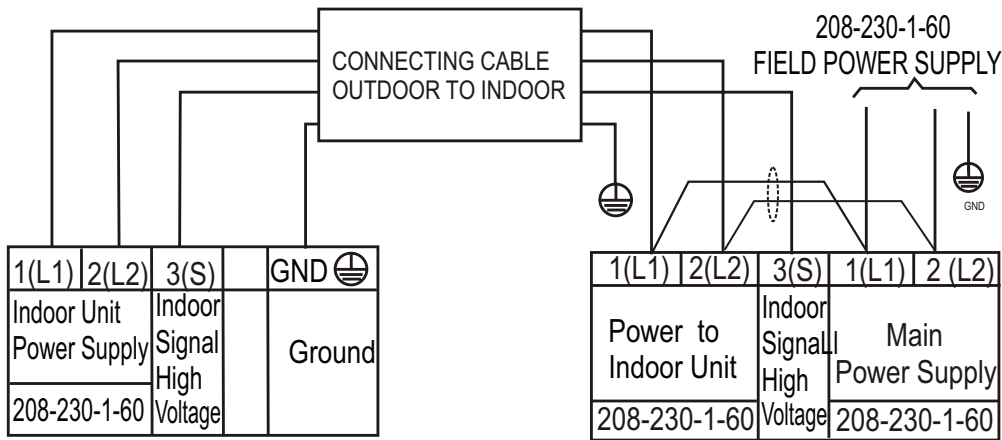


Fig. 55 — Connection Diagram (size 24K)

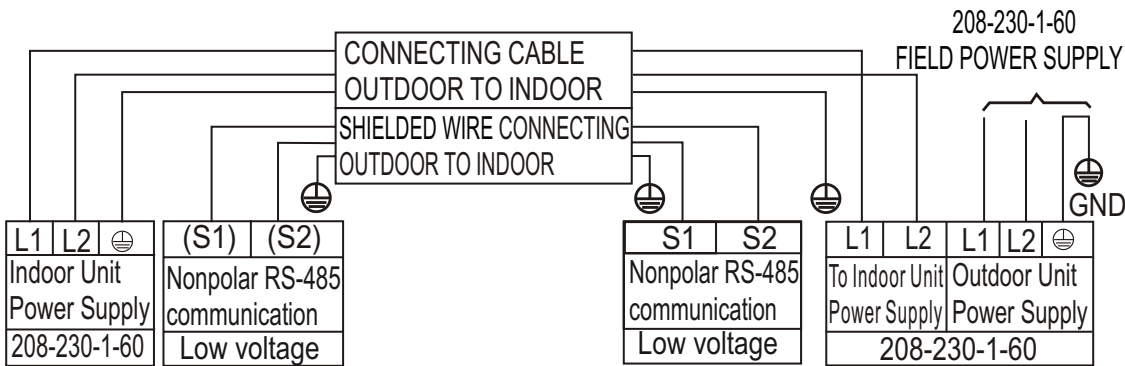


Fig. 56 — Connection Diagram (sizes 36K and 48K)

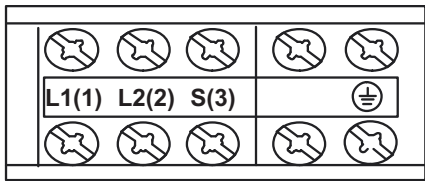


Fig. 57 — Control and Power Terminal on Indoor Unit (size 24K)

CN 8 on
24V Interface

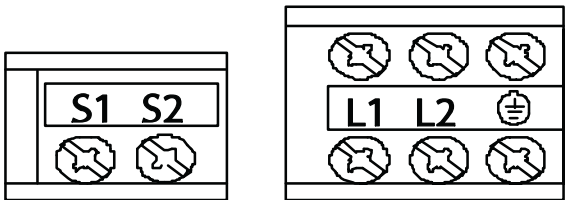


Fig. 58 — Control and Power Terminals on Indoor Unit (sizes 36K to 48K)

Step 9 - Third Party Thermostat Installation

The indoor unit has a 24V transformer that provides flexibility, functionality and control by a 3rd party thermostat* (field supplied).

1. Run the thermostat wiring from the thermostat to the 24V interface using connection R and C on CN15 and Y, W, G on CN19. see Fig. 64.
2. The 24V Interface Dip Switches come pre-configured for normal operation and easy installation. Dip Switch 2-1 can be configured to make the system operate in the **COOLING ONLY** mode. Dip Switch 3-1 can be configured for the **DRY** mode when not using auxiliary heat.

Table 13 — DIP Switch 2-1

SW2-1	RESULT	NOTE
ON	COOLING ONLY	
OFF	HEAT PUMP	Default

Table 14 — DIP Switch 3-1

SW3-1	RESULT	NOTE
ON	DRY Mode	
OFF	Used on future applications	Default

3. Configure the thermostat to operate as a single stage cooling and heating (**DO NOT** configure the thermostat as Heat Pump).

*A conventional 5-wire thermostat is required. A 2 Heat/ 1 Cool thermostat is required for electric heat application.

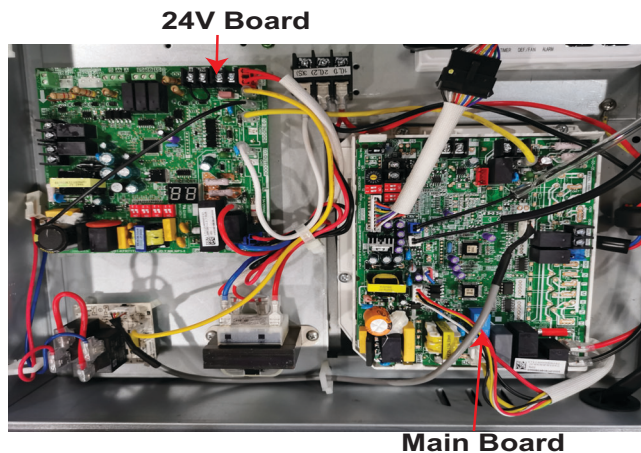


Fig. 59 — Indoor Unit Control Box Size 24

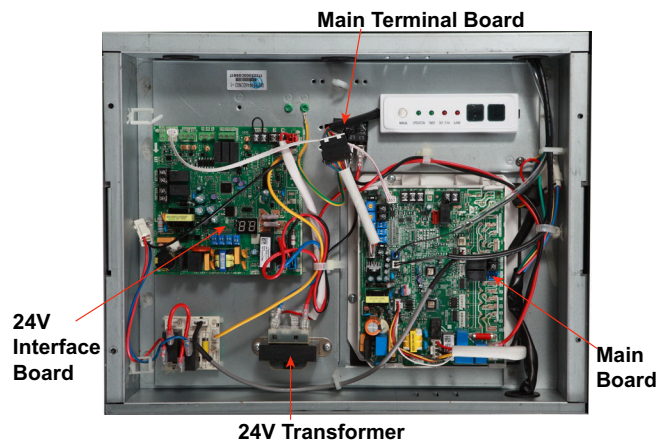


Fig. 60 — Indoor Unit Control Box Sizes 36 - 48

LED Display

The control displays active faults codes on the LED display. When the control displays the fault code and the LED flashes quickly, there is something wrong with the system. Refer to “TROUBLESHOOTING” on page 27 for the detailed fault codes.

Temperature Sensor

The unit has one temperature sensor, which is called a Pipe Temperature Sensor. If the temperature sensor is damaged, the system shuts down and the LED flashes repeatedly.

Connector

Table 15 — Connector

Connector	Purpose
Y	Cooling
W	Heating
G	Fan-Auto Speed
AUX/DRY	Aux-Heat/Dry

Table 16 — Mode Setting

Y	W	G	AUX/DRY	SETTING MODE
√	X	*	*	Cooling
X	√	*	X	Heating (without aux-heater)
X	√	*	√	Heating (with aux-heater)
X	X	√	X	Fan only
√	√	*	*	OFF
X	X	X	X	OFF
X	X	*	√ (Dry)	Dry
X	X	*	√ (AUX)	Emergency Heating

Table 17 — Fan Speed Setting

UNIT ON/OFF	G	SETTING FAN SPEED
√	X	Auto Fan Speed
√	√	Auto Fan Speed
X	X	Fan OFF

√	ON
X	OFF
*	ON or OFF

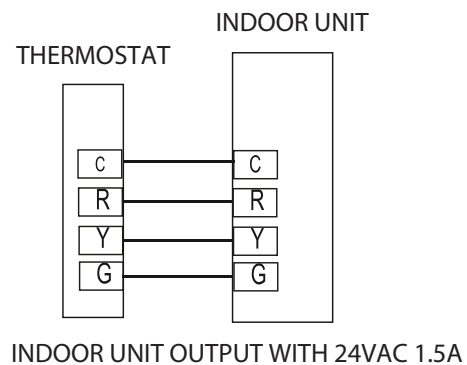
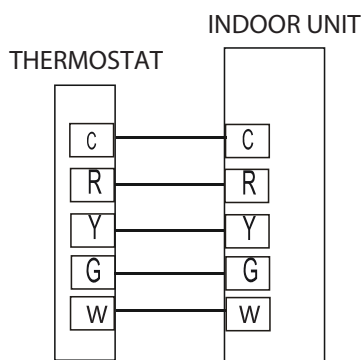


Fig. 61 — Cooling Only System Wiring Diagram



INDOOR UNIT OUTPUT WITH 24VAC 1.5A

Fig. 62 — Cooling and Heating System Wiring Diagram

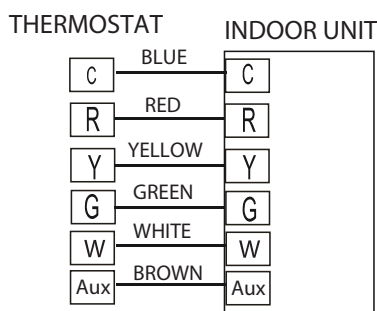


Fig. 63 — Cooling and Heating Units Adopt Electric Heating Device

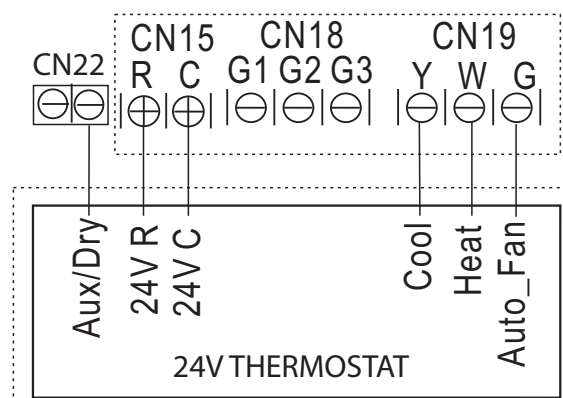


Fig. 64 — 24V Thermostat Wiring Diagram

Step 10 - Setting Static Pressure and Airflow

NOTE: Remove the middle panel from the unit and the control panel cover to allow access to the IR Receiver.

The indoor fan coil units can be programmed to have different static pressures settings or airflows; the factory default setting is SP1 (see “FAN PERFORMANCES AT VARYING STATIC PRESSURES” on page 23).

Follow the next steps to set the **static pressure** or **Automatic Airflow** using the Wireless Remote Controller according to the installation conditions.

- The external static pressure can be manually changed to the fan curves SP1, SP2, SP3, SP4.
- Choose the Automatic Airflow “AF” adjustment function to automatically identify the static pressure and regulate the airflow amount.

Follow these instructions to configure:

1. Ensure the test run is done with a dry coil. If the coil is not dry, run the unit for 2 hours in the **FAN ONLY** mode to dry the coil.
2. Check that both the power supply wiring and the duct installation have been completed. Check that the supply air vent is properly positioned. Check that the air filter is properly attached to the air return side passage of the unit.
3. If there is more than one air inlet and/or outlet, adjust the dampers so that the airflow rate of each air inlet and outlet conforms to the designed airflow rate. The wireless remote controller is required to setup the static pressure of the indoor air handler units.

NOTE: When a system is using the 24V interface built-in, the indoor unit’s fan speed defaults to AUTO with the indoor unit’s default logic.

The external static pressure should be selected using the wireless remote controller (RG57F3(B)/BGEFU1), included with the indoor unit, by pointing it toward the indoor unit’s Infrared Receiver located inside the control box.

- a. Before using the service functions of the remote, turn **OFF** the thermostat if connected.
- b. Turn off the power to the indoor and outdoor units for 3 minutes.
- c. Turn the power back on. Wait 1 minute and check the 24 volt Interface digital display. If the display reads “00”, then proceed. If not, make sure that the thermostat is turned **OFF**.
- d. Remove the batteries from the RG57 wireless remote controller and wait for the remote screen to clear or press any button and the screen clears.
- e. Reinstall the batteries.
- f. Within 30 seconds of replacing the batteries, simultaneously press **MODE** and **TIMER ON** for five (5) seconds. You are now in the **SERVICE FUNCTION** mode – and the remote display reads **F1**.
- g. Manual static pressure or **AUTOMATIC AIRFLOW ADJUSTMENT** selection:
 1. For manual static pressure selection, press the **DOWN** arrow in the center of the remote (labeled **TEMP**) to display **E9**. Press **MODE** to set the external static pressure/airflow rate in the range of 1~4. Press **TIMER ON** to confirm. **NOTE: Reinstall the middle panel and leave in place while the fan is running to set the fan curve.** The values on the remote controller (1,2,3,4) correlate directly to the static pressure curves **SP1, SP2, SP3, SP4** (See “FAN PERFORMANCES AT VARYING STATIC PRESSURES” on page 23). After selecting speed power off the outdoor unit for 3 minutes to lock in the change.
 2. If choosing the **AUTOMATIC AIRFLOW ADJUSTMENT** function, with **F1** in the remote display, press the **DOWN** arrow once and **d4** appears. Press **TIMER ON** to confirm. **NOTE: Reinstall the middle panel and leave in place while the fan is running to establish automatic air flow adjustment.** **AF** appears in the unit’s LED display. The system starts the fan for the airflow automatic adjustment. The **ON** indicator flashes when the fan runs during the **AUTOMATIC AIRFLOW ADJUSTMENT**. After 3 to 6 minutes, the system stops operating once the **AUTOMATIC AIRFLOW ADJUSTMENT** is complete.
- h. Remove the remote controller battery, and then re-insert the battery after the remote controller screen goes blank. The remote controller exits the **SERVICE FUNCTION** mode.

Independent Auxiliary Heat Operation

For applications where the auxiliary heat needs to operate independently, or in the event of an issue with the outdoor unit, a heat-pump thermostat and a single pole double throw relay are required. Figure 65 shows the wiring diagram for when independent operation of the auxiliary heat is needed. During normal operation, the auxiliary relay automatically switches the system between cooling and heating through use of the O signal.

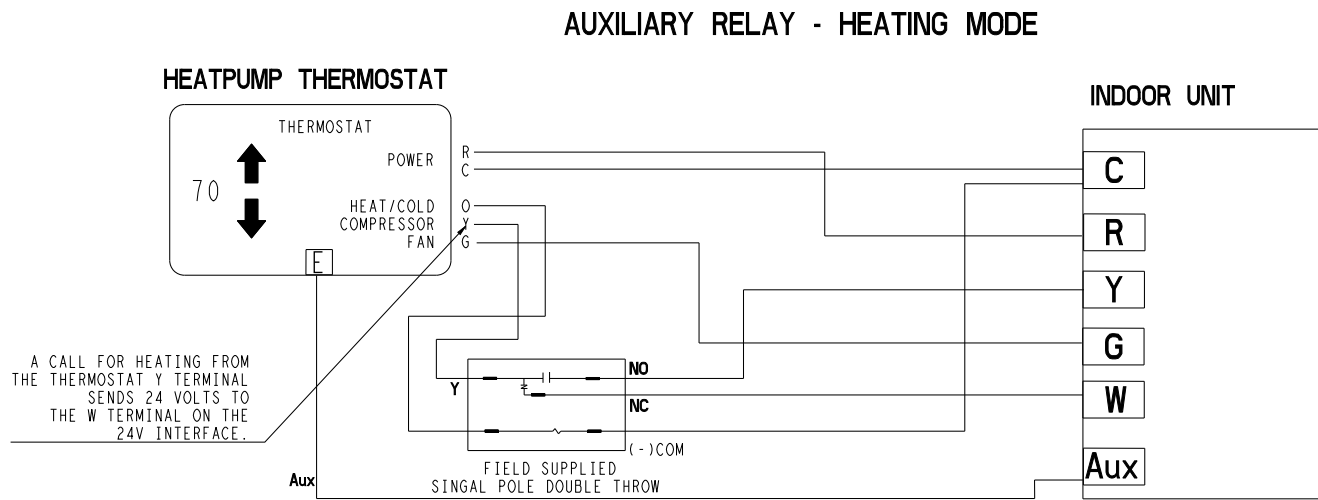


Fig. 65 — Auxiliary Relay - Heating Mode

SETTING STATIC PRESSURE WHEN USING THE RG57 WIRELESS CONTROLLER:

The external static pressure should be selected using the wireless remote controller (RG57F3(B)/BGEFU1), included with the indoor unit, by pointing it toward the indoor unit's Infrared Receiver typically located inside the control box.

1. Before using the service functions of the remote, turn **OFF** the indoor unit with the remote.
2. Turn off the power to the indoor and outdoor units for 3 minutes. Turn the power back on.
3. Remove the batteries from the RG57 remote and wait for the remote screen to clear or press any button and the screen will clear.

4. Reinstall the batteries.
5. Within 30 seconds of replacing the batteries, simultaneously press **MODE** and **TIMER ON** for five (5) seconds. You are now in the **SERVICE FUNCTION** mode – and the remote display reads **F1**.
6. Press the **DOWN** arrow in the center of the remote (labeled **TEMP**) to display **E9**.
7. Press Δ or ∇ to select **E9**.
8. Press **MODE** to set the airflow rate in the range of 1~4.
9. Press **TIMER ON** to confirm.
10. Remove the remote controller battery, and then re-insert the battery after the remote controller screen goes blank. The remote controller exits the **MODIFICATION** mode. After you power **OFF** the unit, power the unit **ON** again and the unit retains the setting value.

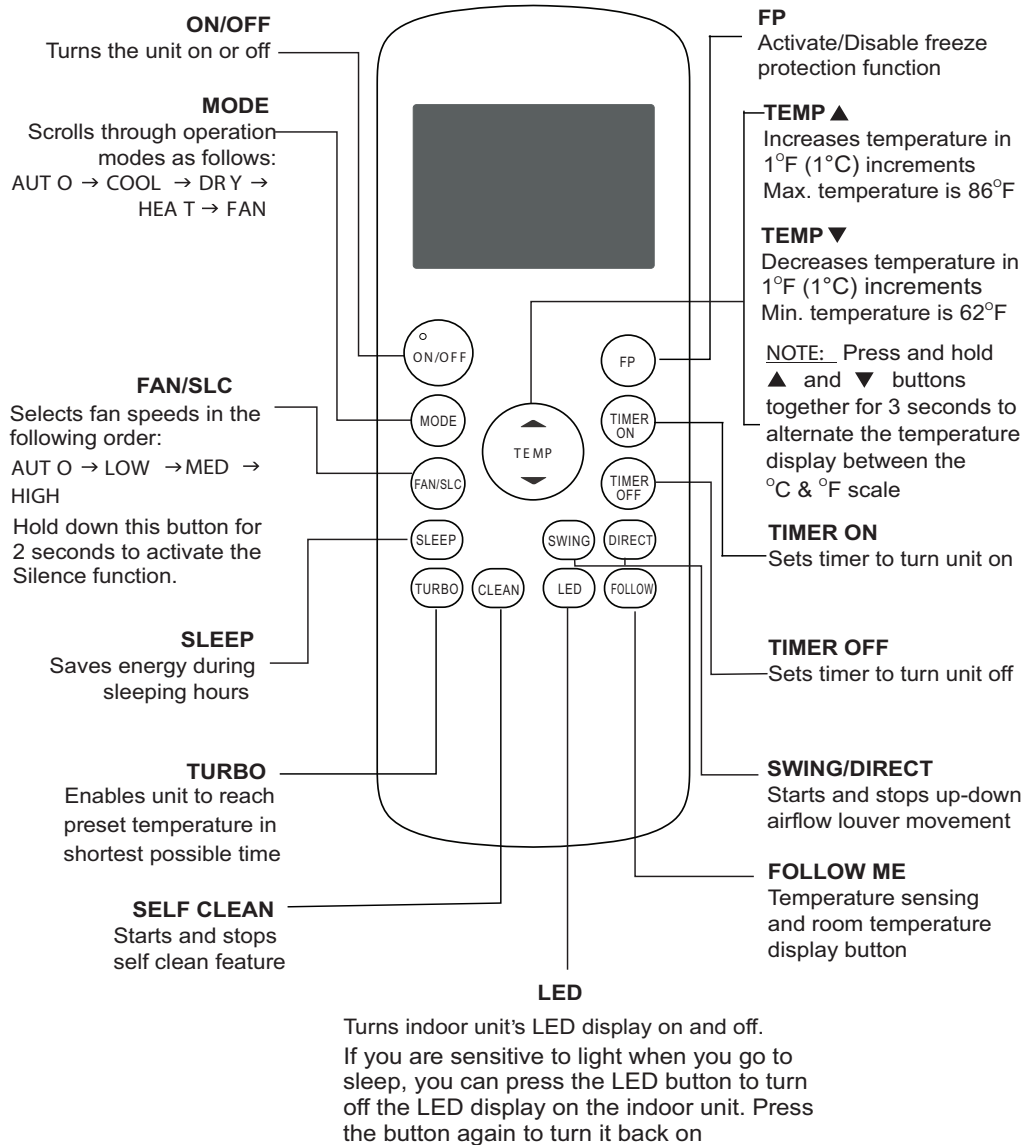


Fig. 66 — RG57 Remote Controller

FAN PERFORMANCES AT VARYING STATIC PRESSURES

Table 18 — Static Pressure at the Rated Point and Static Pressure Range

AHU	FAN COIL BLOWER PERFORMANCE CFM (DRY COIL WITHOUT FILTER OR ELECTRIC HEAT)										
Model Number	Static Pressure	Speed	EXTERNAL STATIC PRESSURE (in.w.c.)								
			0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
24	SP1	High	1,076	975	853	675	502	200	/	/	/
		Medium	942	822	658	465	184	/	/	/	/
		Low	797	648	437	100	/	/	/	/	/
	SP2	High	1,250	1,175	1,075	965	815	650	475	200	/
		Medium	1,185	1,095	996	855	685	512	291	/	/
		Low	1,100	1,005	892	712	558	322	/	/	/
	SP3	High	1,490	1,415	1,334	1,250	1,156	1,028	880	750	600
		Medium	1,375	1,294	1,206	1,100	988	822	676	500	284
		Low	1,285	1,200	1,105	995	845	685	525	252	/
	SP4	High	1,825	1,756	1,670	1,592	1,515	1,450	1,360	1,250	1,120
		Medium	1,630	1,556	1,480	1,400	1,310	1,215	1,105	950	825
		Low	1,525	1,450	1,372	1,280	1,190	1,074	935	785	650
36	SP1	High	1,335	1,270	1,165	1,062	950	810	645	450	240
		Medium	1,185	1,100	990	845	685	520	335	/	/
		Low	1,020	915	775	600	405	/	/	/	/
	SP2	High	1,475	1,405	1,320	1,230	1,125	990	855	715	570
		Medium	1,340	1,260	1,172	1,055	920	775	630	460	275
		Low	1,205	1,115	1,011	870	715	555	380	/	/
	SP3	High	1,648	1,585	1,515	1,440	1,354	1,235	1,125	990	875
		Medium	1,510	1,440	1,362	1,275	1,168	1,040	910	780	645
		Low	1,385	1,305	1,215	1,115	986	855	727	580	421
	SP4	High	1,815	1,733	1,663	1,605	1,528	1,435	1,346	1,235	1,130
		Medium	1,668	1,606	1,539	1,465	1,380	1,275	1,178	1,050	941
		Low	1,558	1,481	1,406	1,350	1,219	1,100	986	875	748
48	SP1	High	1,611	1,530	1,462	1,375	1,276	1,170	1,052	925	831
		Medium	1,498	1,417	1,333	1,225	1,125	998	900	775	631
		Low	1,375	1,297	1,212	1,110	994	860	716	558	389
	SP2	High	1,774	1,701	1,642	1,570	1,504	1,420	1,313	1,202	1,081
		Medium	1,662	1,595	1,531	1,460	1,366	1,275	1,161	1,040	915
		Low	1,558	1,481	1,406	1,323	1,220	1,110	986	880	748
	SP3	High	1,868	1,805	1,736	1,675	1,604	1,532	1,433	1,330	1,211
		Medium	1,781	1,709	1,649	1,582	1,511	1,420	1,308	1,208	1,081
		Low	1,662	1,595	1,531	1,460	1,366	1,275	1,161	1,040	915
	SP4	High	2,024	1,974	1,919	1,850	1,795	1,726	1,652	1,560	1,466
		Medium	1,942	1,872	1,818	1,765	1,697	1,620	1,534	1,455	1,345
		Low	1,825	1,770	1,708	1,648	1,578	1,492	1,400	1,295	1,180

>300CFM <450CFM

NOTES:

- Airflow based upon dry coil at 230v without filter or electric heater.
- To avoid potential for condensate blowing out of drain pan prior to making drain trap:
Return static pressure must be less than 0.40 in wc.
Horizontal applications of 48 size must have supply static greater than 0.20 in wc.
- Airflow above 400 cfm/ton could result in condensate blowing off coil or splashing out of drain pan.

FAN PERFORMANCES AT VARYING STATIC PRESSURES (CONT.)

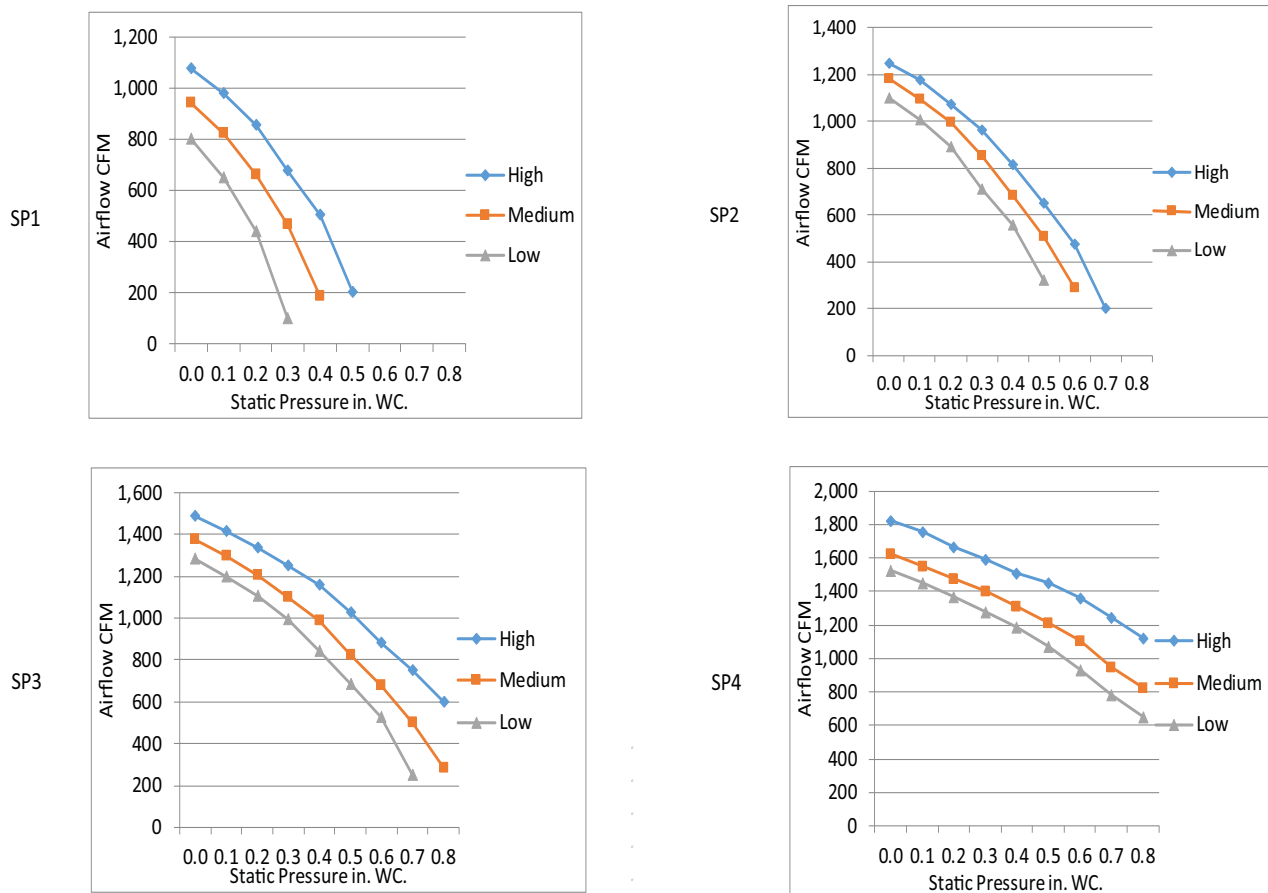


Fig. 67 — Fan Performance - 24K

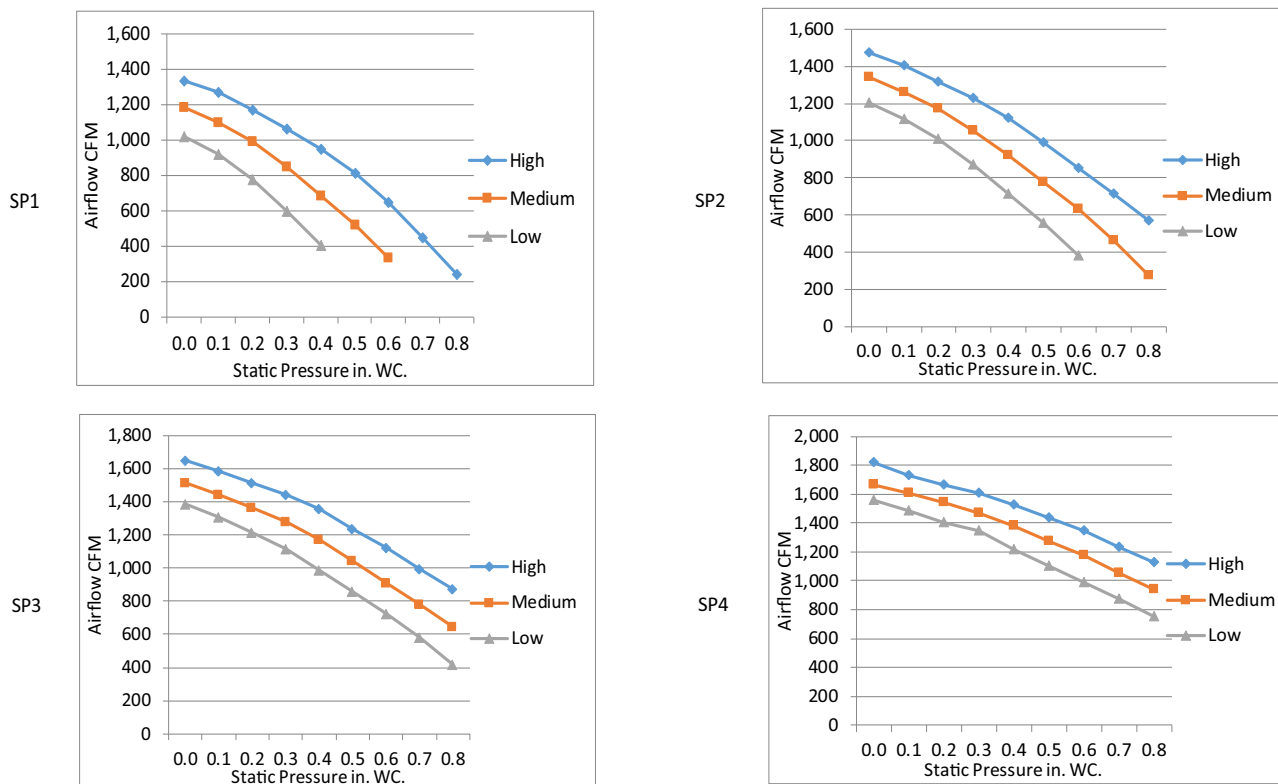


Fig. 68 — Fan Performance - 36K

FAN PERFORMANCES AT VARYING STATIC PRESSURES (CONT.)

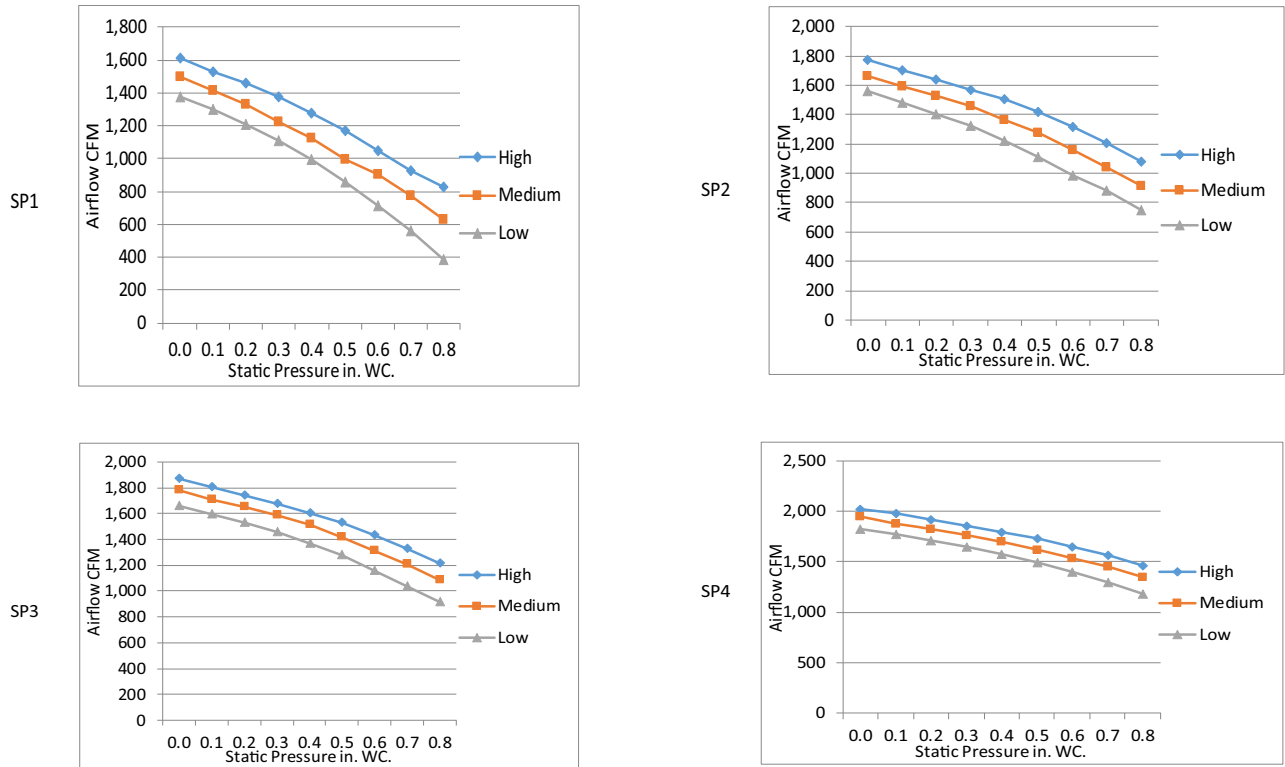


Fig. 69 — Fan Performance - 48K

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.

- a. Indoor and outdoor units are properly installed.
- b. Piping and wiring are properly connected.
- c. There are no obstacles near the unit's inlet and outlet that might cause poor performance or product malfunction.
- d. Refrigeration system does not leak.
- e. Drainage system is unimpeded and draining to a safe location.
- f. Heating insulation is properly installed.
- g. Grounding wires are properly connected.
- h. Length of the piping and additional refrigerant stow capacity have been recorded.
- i. 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

1. Open both the liquid and gas stop valves.
2. Turn on the main power switch and allow the unit to warm up.
3. Set the air conditioner to the **COOL** mode.
4. **For the indoor unit:**
 - a. Double check to see if the room temperature is being registered correctly.
 - b. Ensure the manual buttons on the indoor unit work properly.
 - c. Ensure the drainage system is unimpeded and draining smoothly.
 - d. Ensure there is no vibration or abnormal noise during operation.
5. **For the outdoor unit:**
 - a. Check to see if the refrigeration system is leaking.
 - b. Ensure there is no vibration or abnormal noise during operation.
 - c. Ensure the wind, noise, and water generated by the unit do not disturb neighbors or pose a safety hazard.
6. **Drainage Test**
 - a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
 - b. Remove the test cover. Add 2,000 ml of water to the tank through the attached tube.
 - c. Turn on the main power switch and run the air conditioner in the **COOL** mode.
 - d. Listen to the drain pump to detect if it makes any unusual noises or sounds.
 - e. 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.
 - f. Ensure there are no leaks in any of the piping.
 - g. 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 19.

Table 19 — Indoor Unit Diagnostic Guides

RUNNING LED	TIMER LED	DISPLAY	ERROR INFORMATION
--	--	dF	Defrost
--	--	cF	Warming in heating mode
--	--	SC	Self clean
--	--	CL	Clean filter
--	--	nF	Replacing filter
--	--	FP	Heating in room temperature under 46°F(8°C)
--	--	FC	Forced cooling
--	--	AP	AP mode for WIFI setup
--	--	CP	Remote start stop contact is open
--	--	AF	Constant Air Flow
--	--	LL	Remote or Wire controller Lock
--	--	d1	Receive DR1 signal
--	--	d2	Receive DR2 signal
--	--	d3	Receive DR3 signal
--	--	dE	DR input error signal
1 time	OFF	E0	Indoor unit EEPROM parameter error
2 times	OFF	E1	Indoor/outdoor unit communication error
4 times	OFF	E3	The indoor fan speed is operating outside of the normal range
5 times	OFF	E4	Indoor room temperature sensor T1 is in open circuit or has short circuited
6 times	OFF	E5	Evaporator coil middle temperature sensor T2 is in open circuit or has short circuited
7 times	OFF	EC	Refrigerant leakage detection
8 times	OFF	EE	Water-level alarm malfunction
9 times	OFF	E8	Communication error between master and slave unit (for twins system)
10 times	OFF	E9	Another indoor unit malfunction (for twins system)
11 times	OFF	Ed	Outdoor unit malfunction
1 time	ON	F0	Current overload protection
2 times	ON	F1	Outdoor room temperature sensor T4 is in open circuit or has short circuited
3 times	ON	F2	Condenser coil temperature sensor T3 is in open circuit or has short circuited
4 times	ON	F3	Compressor discharge temperature sensor TP is in open circuit or has short circuited
5 times	ON	F4	Outdoor unit EEPROM parameter error
6 times	ON	F5	The outdoor fan speed is operating outside of the normal range
7 times	ON	F6	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited (for free-match indoor units)
11 times	ON	FA	Communication error between indoor two chips
1 time	FLASH	P0	IPM malfunction or IGBT over-strong current protection
2 times	FLASH	P1	Over voltage or over low voltage protection
3 times	FLASH	P2	Top temperature protection of compressor
5 times	FLASH	P4	Inverter compressor drive error
6 times	FLASH	--	Indoor units mode conflict (match with multi outdoor unit)
7 times	FLASH	P6	Low pressure protection
8 times	FLASH	P7	IGBT temperature sensor TH is in open circuit or has short circuited

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

ADVANCED SERVICE AND INSTALLATION FUNCTIONS

Refer to the service manual of the Wireless Remote Controller for access to advanced function such as:

- Auto-Start Function
- Temperature Compensation
- Filter reminder
- Indoor Fan Motor Speed Control after set temperature is reached
- Lowest or Highest Temperature Setting
- Static Pressure Setting

All changes should be performed **ONLY** by authorized professionals.

