

HEAT CONTROLLER, INC.

INSTALLATION INSTRUCTIONS

SMA/SMH 18/24

Version C

Single Zone Ductless Mini-Split System
A/C and Heat Pump

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Installation Manual for Single Zone Ductless Mini-Split

- For correct installation, read this manual before starting the installation. Please save this manual in a safe place.
- Only trained and qualified service personnel should install, repair or service air conditioning equipment. Users should not install the air conditioner by themselves.
- Pictures in this manual may be slightly different from the air conditioner you purchased. These pictures are only representations.

INSTALLATION PRECAUTION

Installation in the following places is not recommended.

- Near equipment which contains or uses oil.
- Coastal locations where exposure to high winds and high concentrations of salt in the air may damage the air conditioner.
- A location with exposure to sulfide gas such as hot-spring resort.
- Places where there are high frequency machines such as wireless equipment, welding machines, or in a medical facility. The unit uses a remote controller and may cause electrical interference with nearby wireless equipment.
- A location with abnormal environmental conditions such as locations where the unit is exposed to excessively high or low ambient temperatures, exposure to adverse weather, corrosive fumes, dust laden or moisture-laden atmospheres and hazardous locations.
- A location where there are combustible gases or volatile matter.

Recommended Areas of Installation

Indoor Unit

- A place where there are no obstacles or blockages, near the inlet or outlet airflow areas of the unit.
- A place which can bear the weight of the indoor unit.
- A place which provides adequate clearance around the indoor unit as required.
- A place 3.3ft or more away from TV or radio equipment to ensure there is no electronic/wireless interference.
- A place which is far away from heat or steam sources and flammable gas.
- Install the indoor unit on the wall where the height from the floor is more than 7.5 feet.

Outdoor Unit

- A place which is convenient for installation and not exposed to a high winds or air with high concentrations of salt content.
- A place which can bear the weight of the outdoor unit.
- A place where the outdoor unit can be installed in a horizontal level position.
- A place where the operation noise and discharge air will not disturb others.
- A place free from leakage of combustible gases.
- Where an allowable head level for the connective piping is less than 16 feet and length of the connective piping is less than 33 feet.
- A place which provides recommended clearance around the outdoor unit.

Note:

1. The appliance should not be installed in the laundry room.
2. All the connections must be in accordance with local and national electric codes.
3. For power details of the air conditioner, refer to the rating plate of the product.

Installation Parts

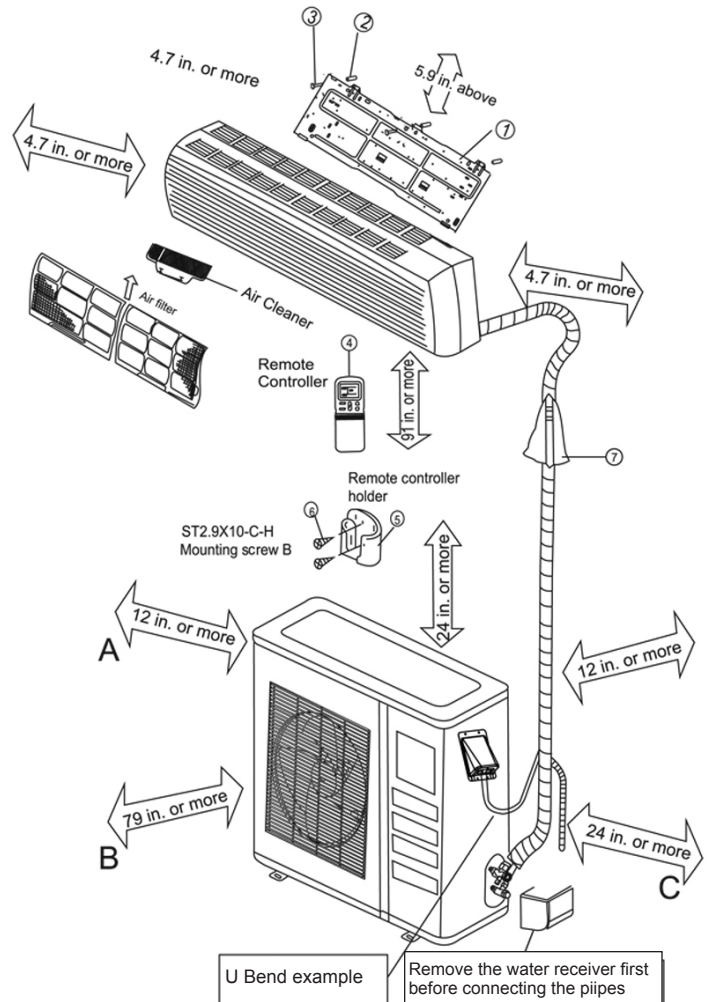
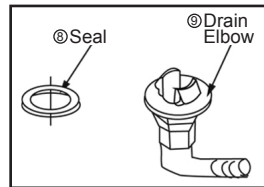
Please install the accessories attached with unit correctly according to this installation manual.

Part No.	Name of Part	Quantity	
1	Installation Plate	1	
2	Anchor	8	
3	Mounting Screw A (ST3.9x25-C-H)	8	
4	Remote Controller	1	
5	Remote Controller Holder	1	
6	Mounting Screw B (ST2.9x10-C-H)	2	
7	Refrigerant Pipe	Liquid side	ϕ 1/4" (<24,000 Btu/h)
			ϕ 3/8" (\geq 24,000Btu/h)
		Gas Side	ϕ 1/2" (<24,000 Btu/h)
			ϕ 5/8" (\geq 24,000 Btu/h)
8	Seal*	1	
9	Drain Elbow*	1	

**Cautions on remote controller installation

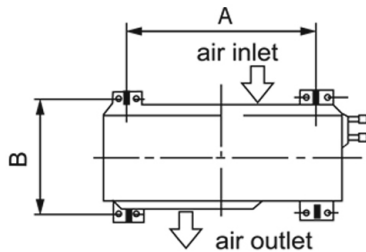
- Keep the remote controller at least 3 feet from the nearest TV set or stereo equipment to avoid possible electronic interference.
- Do not leave the remote controller in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Ensure that the positive and negative poles are correct when inserting batteries into the remote controller.

* See outdoor installation instructions



Anchoring the Outdoor Unit

- The outdoor unit should not be exposed to strong winds
- Anchor the outdoor unit with ϕ 5/16" anchor bolts



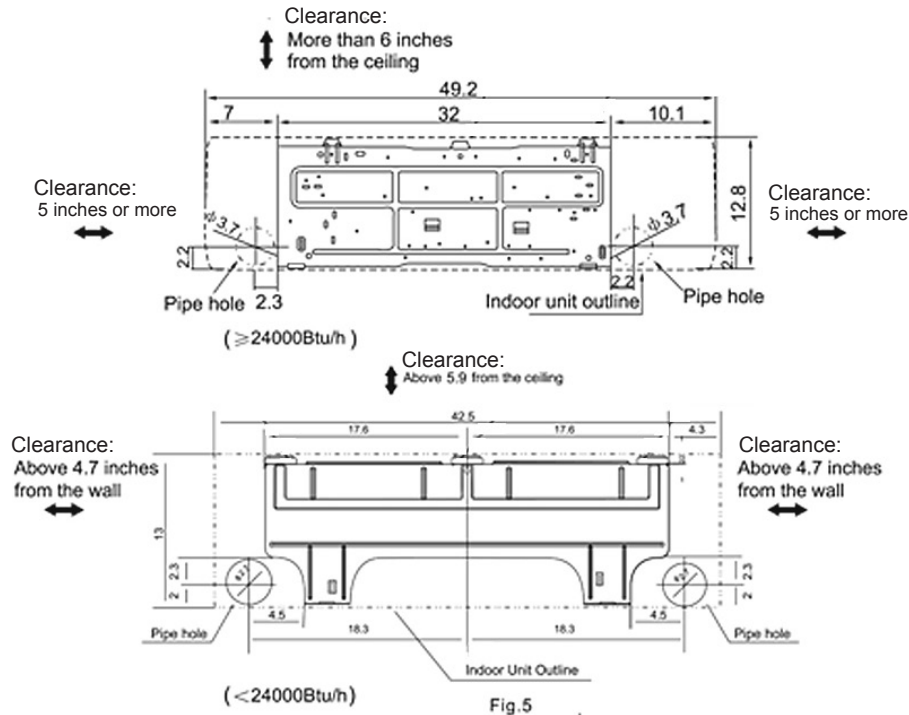
Model	A	B
<24000Btu/h	24	12
\geq 24000Btu/h	24	12

NOTICE: There should be at least two of the air flow inlets/ outlets labeled "A", "B", "C" above free from blockage.

INDOOR UNIT INSTALLATION

1. Mounting Installation Plate and creating a Wall opening

Installation Plate and its measurements (inches):



1. Attach the installation plate

- Install the installation plate horizontally on structural members in the wall with the spaces provided around the plate.
- In case of block, brick, concrete or similar type walls, make use appropriate anchors and mounting screws.
- Attach the installation plate on the wall.



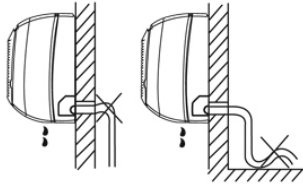
2. Creating a wall opening

- Determine the pipe hole position using the installation plate, and drill the Pipe hole ($\phi 3.75$ in) so it slants slightly downward.
- Always use a piping hole liner when piercing a wall, made of metal lath, wire lath or metal plate.

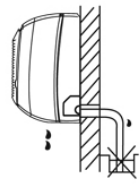
2. Line Set and Condensate Drain Line

1. Condensate Drain

- A. Run the drain hose sloping downward. **DO NOT** install the drain hose as illustrated below.

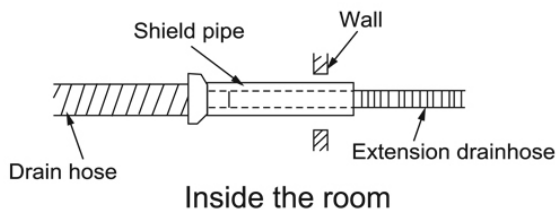


Do not form a rise.

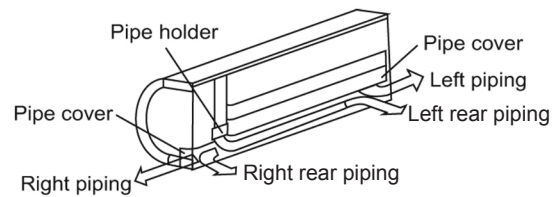


Do not put the drain end into water.

- B. When extending the drain hose, insulate appropriately.

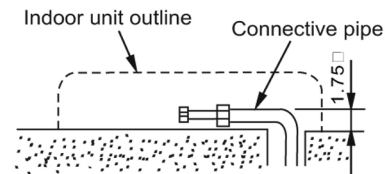


2. Line Set



- A. For left-hand and right-hand piping, remove the pipe cover from the side panel.

- B. For the left-hand and left-rear-hand piping, install the piping as shown. Bend the pipe so it is no more than 1.75 inches from the wall.



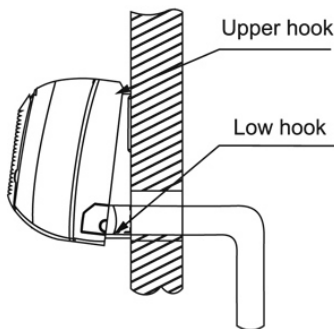
- C. Attach the end of the pipe to the fittings on the indoor unit.

(Refer to Tightening Connection in REFRI-GRANT PIPING CONNECTION)

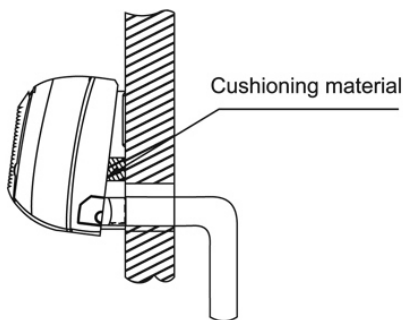
CAUTION

- Connect the indoor unit first, then the outdoor unit. Bend and arrange the piping carefully.
- Do not allow the piping to loosen from the indoor unit during installation.
- Be sure not to let the drain hose slack.
- Insulate both pipes.
- Do not allow the power cable and control cable to be crossed.

3. Indoor Unit Installation



- A. Pass the piping through the hole in the wall.
- B. Place the upper lip at the back of the indoor unit onto the upper hook of the installation plate. Move the indoor unit from side to side to see that it is secured onto the hook of the installation plate.
- C. Push the lower part of the indoor unit up to the wall. Then move the indoor unit from side to side and up and down to ensure it is secured to the installation plate.



- D. Piping can easily be installed by placing a piece of foam between the unit and the wall to assist in holding the unit away from the wall during installation.

4. Electrical Work

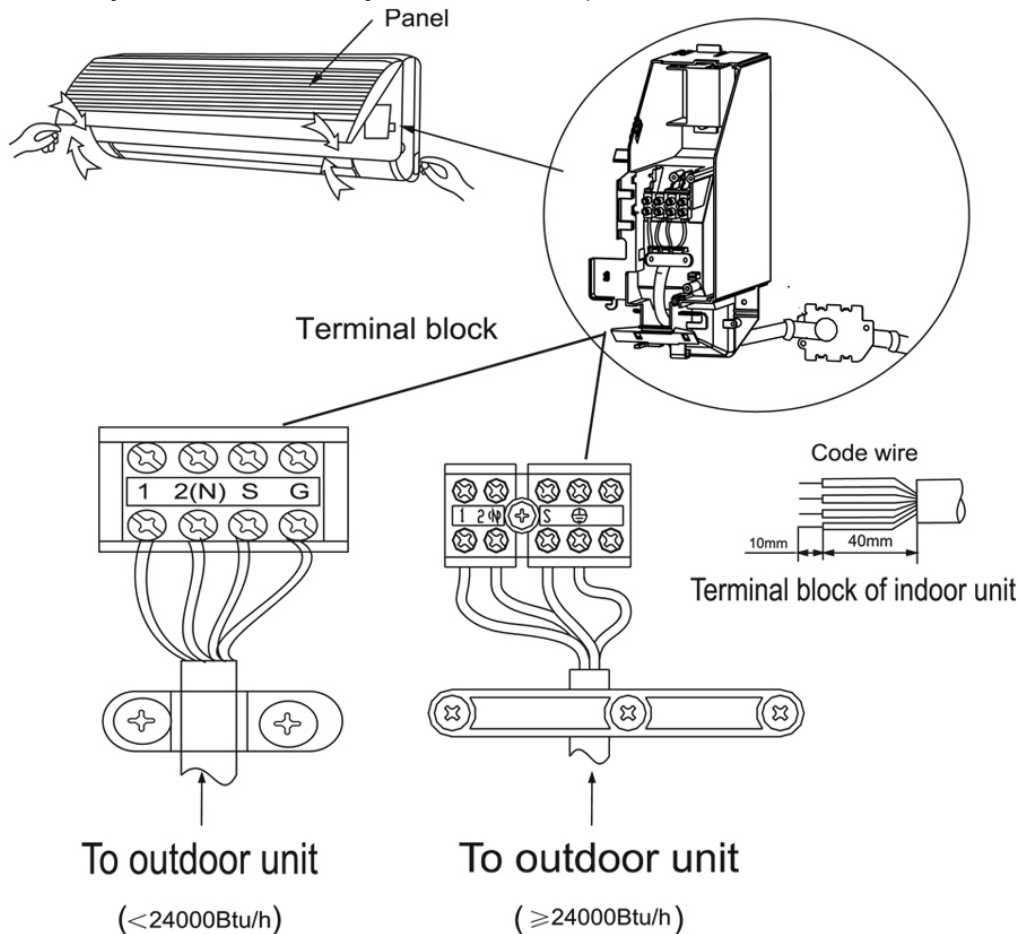
- Connect unit to a dedicated circuit.
- Refer to the unit's rating plate from proper supply voltage.

Caution

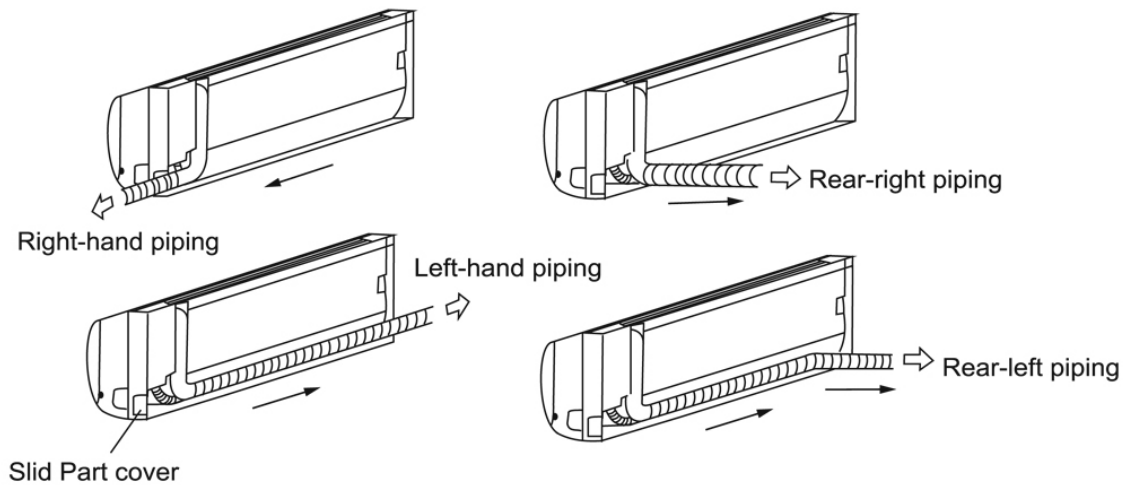
- A. To determine wire size (AWG) see unit rating label for minimum circuit ampacity and size per local and national electrical codes.
- B. Fuse or HACR circuit breaker for dedicated circuit to be selected based on the maximum fuse size data from unit rating label.
- C. Install disconnecting means as necessary at outdoor unit and indoor unit as required by local and national electrical codes.
- D. Properly ground the unit in compliance with local and national electrical codes.
- E. All wiring to the unit and interconnecting between indoor and outdoor units must comply with local and national electrical codes.
- F. Do not exceed the power code by splicing.
- G. Voltage should be in range of 90%~110% of unit's voltage.
- H. The indoor unit is powered through the interconnecting cable. The indoor unit requires no separate power source.

5. Connecting Cables

- A. Lift the panel, loosen the screw, then open the Electric Box Cover.
- B. Connect the wires to the terminals on the control board individually according to the outdoor unit connection.
- C. Wrap cables not connected to terminals with electrical tape so that they will not touch any electrical components.



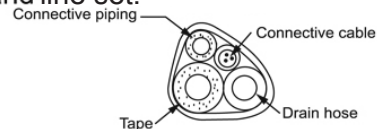
6. Piping and Wrapping



- A. For the left-hand and right-hand piping, remove the rear plate bushing from the left side of the rear plate.
- B. Wind the line set, drain hose and wiring with tape securely and evenly. Consult local and national electrical codes for proper routing and placement of electrical wiring.
- C. When installing the indoor unit lower than the outdoor unit, make a "u-bend" trap to prevent rain water from running along the connecting pipe to the inside of the building/room where the indoor unit is located.

Caution

- Install the drain hose at the bottom as shown in the diagram below.
- Carefully arrange and wrap the piping so as to not to damage the drain hose and line set.

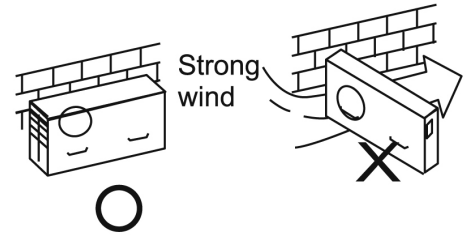


- Make sure to run the drain hose sloped downward so that condensate drains smoothly.
- Before wrapping electrical wiring with line set, consult local and national codes for proper installation of line voltage wiring.

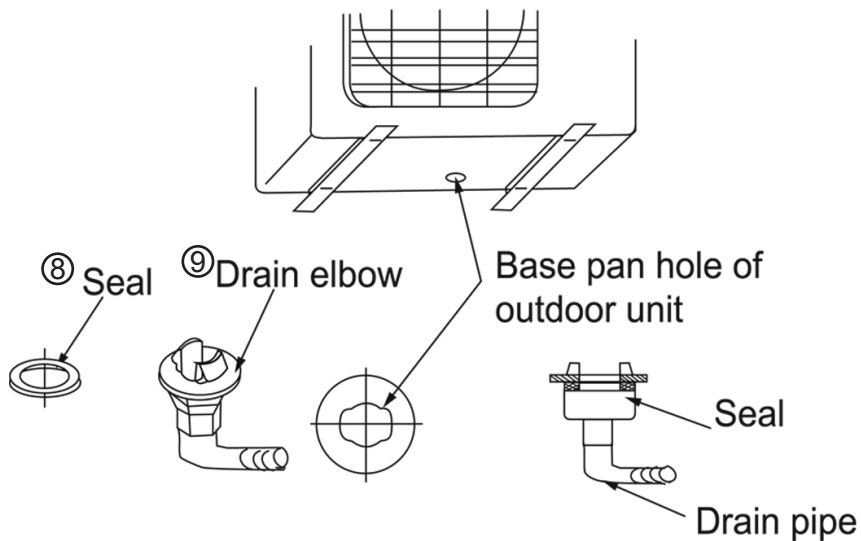
OUTDOOR UNIT INSTALLATION

1. Outdoor Installation Precaution

- Install the outdoor unit on a rigid base to prevent noise and vibration.
- Locate the air outlet direction where the discharged air is not blocked. Ensure there are no obstacles blocking the unit's air flow.
- If the installation location is exposed to strong winds, place the unit length wise along a wall or use shield plates to protect against high winds.
- If suspending the unit, the installation wall should be solid brick, concrete or of similar construction. If not, reinforce the supporting wall. The connections between the bracket and wall and the bracket and the air conditioner must be firm, stable and reliable. Consult all local and national building codes.
- If suspending the unit, follow the instructions provided by the bracket manufacturer.



2. Drain Elbow Installation

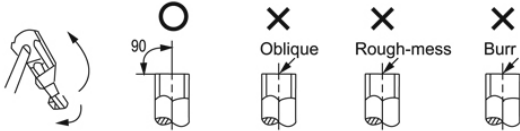


Fit the seal into the drain elbow, then insert the drain elbow into the outdoor unit's base pan hole, rotate 90° to securely assemble them. To discharge excessive condensate from the outdoor unit when in heating mode, connect the drain elbow to a drain hose (locally purchased).

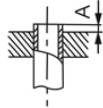
3. Refrigerant Piping Connection

1. Flaring

A. Cut the pipe with a pipe cutter.



B. Insert a flare nut onto the pipe, then flare the pipe.

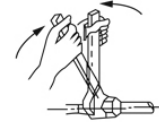


Outlet diam. (In.)	A (in.)	
	Max.	Min.
φ 1/4	.05	.03
φ 3/8	.06	.04
φ 1/2	.07	.04
φ 5/8	.09	.08

2. Tightening Connection

A. Align pipes to be connected.

B. Hand tighten the flare nut and then tighten it with a spanner and torque wrench as shown.



Caution

- Excessive torque can break the flare nut. Ensure the proper torque is adhered to in the chart below.

Outlet diam.	Tightening torque	Additional tightening torque
φ 1/4	126(lbf-ft) (160kgf.cm)	157(lbf-ft) (200kgf.cm)
φ 3/8	243(lbf-ft) (310kgf.cm)	274(lbf-ft) (350kgf.cm)
φ 1/2	392(lbf-ft) (500kgf.cm)	431(lbf-ft) (550kgf.cm)
φ 5/8	589(lbf-ft) (750kgf.cm)	606(lbf-ft) (800kgf.cm)

4. Wiring Connection

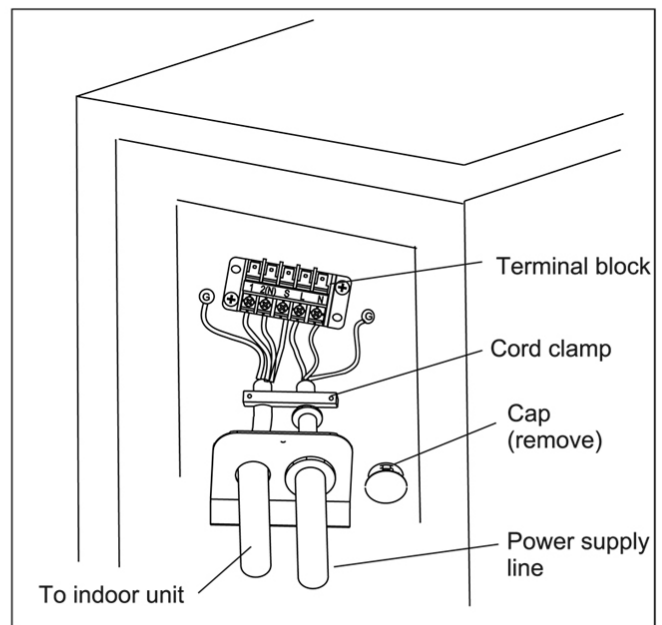
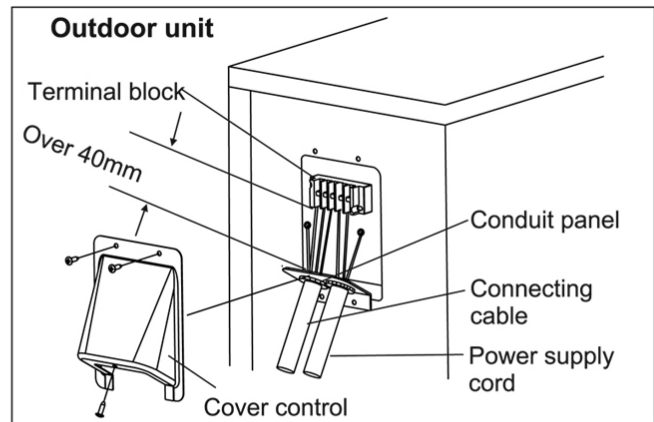
- A. Remove the cover from the unit by loosening the 3 screws.
- B. Remove caps on the conduit panel. Temporarily mount the conduits (not included) on the conduit panel.
- C. Properly connect both the power supply and interconnecting lines to the corresponding terminals on the terminal block.
- D. Ground the unit in accordance with local and national electrical codes.
- E. Be sure to cut each wire allowing several inches longer than the required length for wiring.
- F. Use lock nuts to secure the conduit tubes.

WARNING

Use a dedicated circuit. Use HACR break sized per unit's rating plate. Size wires according to minimum circuit ampacity shown on the unit's rating plate.

- Be sure to comply with local and national electrical codes while running the wire from the indoor unit to the outdoor unit.
- Install disconnects from the outdoor and indoor units as required by national and local electrical codes.
- Every wire must be connected firmly. Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist.

NOTE: To prevent wire from loosening, secure wires and/or cords under cord clamp.



AIR PURGE AND TEST OPERATION

1. Air Purge

Choose purge method from the table:

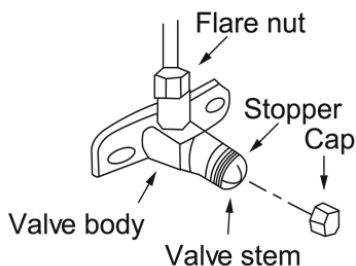
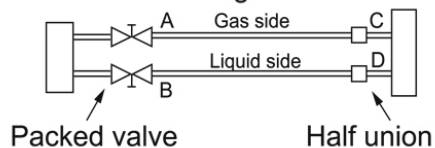
Connective pipe length	Air purging method	Additional amount of refrigerant to be charged
Less than 16ft.	Use vacuum pump	-----
16ft~ 33ft.	Use vacuum pump	(L-16 ft.)X1 oz. where L=Length

- For the R410A refrigerant models, make sure the refrigerant added into the air conditioner is liquid form in all cases.

Caution in Handling the Packed Valve

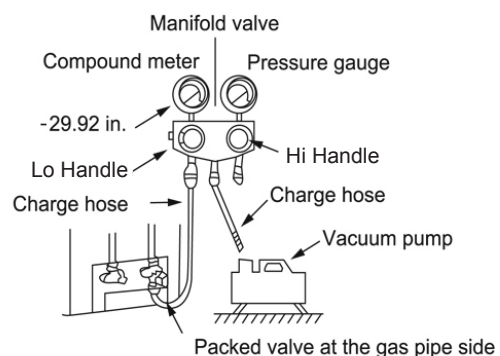
- Open the valve stem until it hits against the stop. Do not try to open it further.
- Securely tighten the valve stem cap with a spanner or wrench.
- Torque the valve properly:
Gas pipe side (0.38"): 23.5 N-cm (300 kgf-cm)
Liquid pipe side (0.25"): 12.56 N-cm (160 kgf-cm)

Outdoor unit Refrigerant Indoor unit



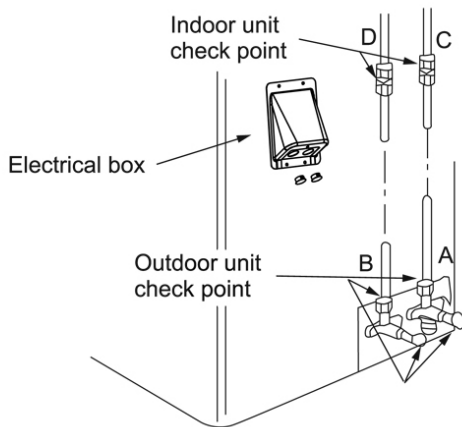
Using the Vacuum Pump

- Completely tighten the flare nuts A, B, C, D. Connect the manifold valve charge hose to the charge port of the packed valve on the gas pipe side.
- Connect the charge hose to the vacuum pump.
- Fully open the Lo side handle.
- Operate the vacuum pump to evacuate. After starting evacuation, slightly loosen the flare nut of the packed valve on the gas pipe side and check that the air is entering. (Operation noise of the vacuum pump changes and a compound meter indicates 0 instead of minus)
- After the evacuation is complete, fully close the Lo side handle and stop the operation of the vacuum pump.
 - Continue evacuation for 15 minutes or more and check that the compound meter indicates -29.92 inHg.
- Turn the stem of the packed valve B about 45° counterclockwise, securely tighten the flare nut after 6-7 seconds. Disconnect the charge hose from the charge connection of the packed valve at the gas pipe side.
- Fully open the packed valves B and A.
- Securely tighten the cap of the packed valve.



2. Gas Leak Check

Make sure connections do not leak with leak detector or soapy water.

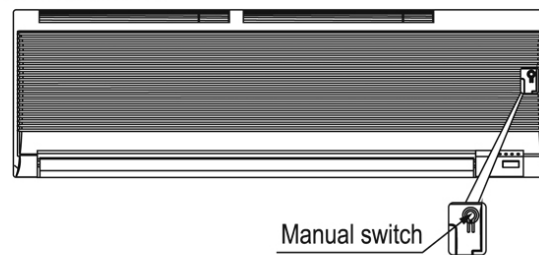


- A. Lo packed valve
- B. Hi packed valve
- C. End of indoor unit connection
- D. End of indoor unit connection

3. Test Operation

Test the unit's operation after completing gas leak check at all flare nut connections and complete an electrical safety check.

- A. Check that all tubing and wiring have been properly connected.
- B. Check that the gas and liquid side service valves are fully open.
- C. Connect the power, press the ON/OFF button on the remote controller to turn the unit on.
- D. Use the MODE button to select COOL, HEAT (cooling & heating models only), AUTO and FAN to check if all the functions works well.
- E. When the room temperature is too low (lower than 63°F), the unit can not be controlled by the remote controller to run in cooling mode. Manual operation must be used when the remote controller is disabled or when maintenance is necessary.
 - To access the controls for manual operation, hold the panel sides and lift the panel up to an angle until it remains fixed with a clicking sound.
 - Press the Manual control button to select the AUTO or COOL, the unit will operate under Forced AUTO or COOL mode (see User Manual for details).
- F. The test operation should last about 30 minutes.



Design, material, performance data and components
subject to change without notice.

HEAT CONTROLLER, INC.

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