

PIONEER®

CENTRAL SPLIT AIR CONDITIONER

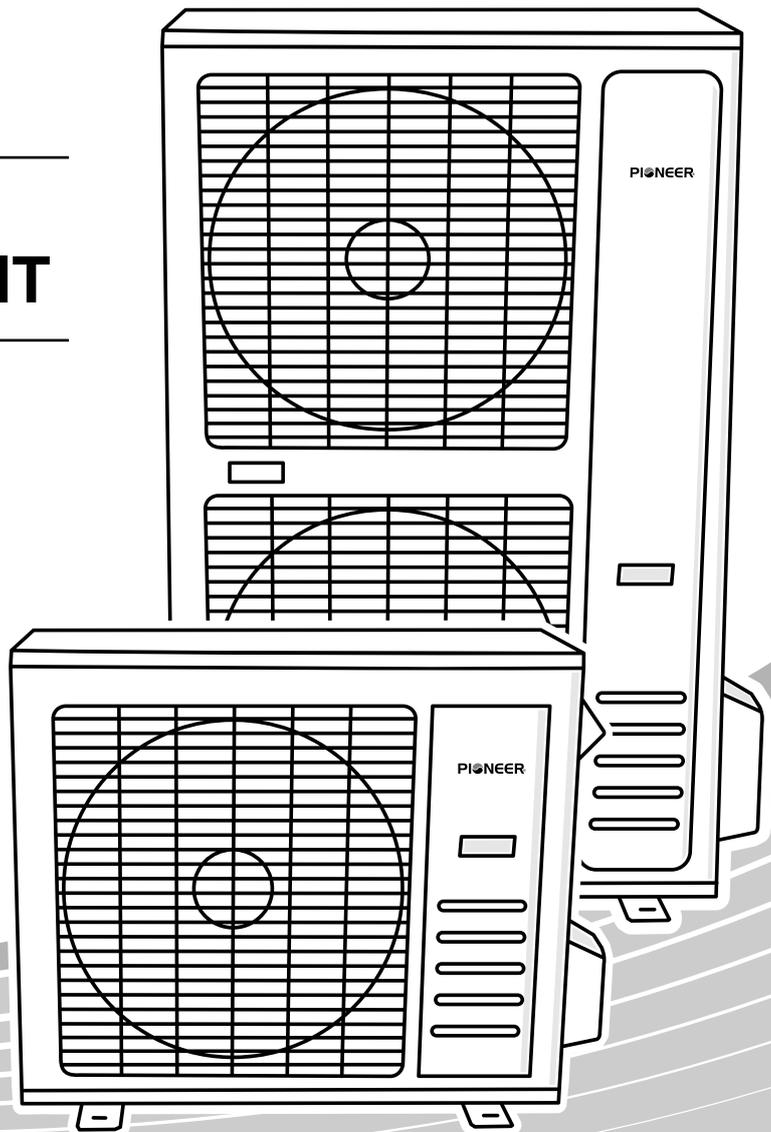
Installation Manual

HIGH EFFICIENCY CONDENSING UNIT

Models:

- YH024GHFI18RT2
- YH036GHFI18RT2
- YH060GHFI18RT2

-
- R-410A REFRIGERANT
 - 208/230 V, 1 Phase, 60Hz
 - 18 SEER



IMPORTANT NOTICE: Thank you very much for purchasing this Air Conditioner. Please read this manual carefully before installing or operating your new air conditioning system. Be sure to save this manual for future reference.

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NOTE:

- This air conditioner has been designed for the following temperatures. Operate the heat pump air-conditioner only within these ranges.

Mode	Outdoor Operation Temperature Range [°F (°C)]	
	Maximum	Minimum
Cooling Operation	114.8 (46)	5 (-15)
Heating Operation	75 (24)	-13 (-25)

- Storage Condition: Temperature -13~140°F (-25~60°C)
Humidity 30%~80%

Safety Precautions

1. This air conditioner uses refrigerant HFC (R410A).
2. Since the max. working pressure is 550 PSIG (3.8MPa) [R22:450 PSIG (R22:3.1MPa)], some of the piping, installation, and service tools may be uncommon.
3. This air conditioner uses a power supply of: 208/230V, 60Hz, 1Ph.
4. The outdoor unit must be matched with an indoor unit equipped with a TXV that can be conducted in heating mode.
5. The outdoor unit must be matched with an indoor unit using refrigerant R410A.
6. For the 24K outdoor unit, it can be connected with 18K~24K indoor units.
For the 36K outdoor unit, it can be connected with 30K~36K indoor units.
7. A specified filter drier is required on the liquid pipe when connecting the units.
8. Be sure that the servicing equipment and replacement components are applicable for R410A refrigerant.
9. Do not discharge R410A refrigerant into the air, and when recovering it, the cylinder service pressure rating must be over 550 PSIG. R410A refrigerant systems should be charged with liquid refrigerant, and the service pressure rating of the hoses used must be over 750 PSIG.
10. Leak detectors should be designed to be able to detect HFC refrigerant.
11. R410A refrigerant is only compatible with POE oils, which absorb moisture rapidly. Do not expose it to the air, as this could cause damage to certain plastics materials.
12. Replace all filter driers after completion of maintenance.

- Be sure to use a dedicated power circuit, and do not put other loads on the power supply.
- Be sure to read these SAFETY PRECAUTIONS carefully before installation.
- Be sure to comply with SAFETY PRECAUTIONS of installation manual, since it contains important safety instructions. Definitions for identifying hazard levels are provided below with their respective safety symbols.

⚠ **WARNING:** Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ **CAUTION:** Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

- Carefully store the indoor and outdoor unit manuals away for your future reference.

⚠ WARNING

- Installation should be performed only by qualified personnel.
Improper installation can cause water leakage, electrical shock, or fire.
- Install the air conditioner on a solid base that can support all of the unit's weight.
An inadequate base or incomplete installation may cause injury if the unit falls off the base.
- Use the specified type of wire for electrical connections safely between the indoor and outdoor units.
Firmly clamp the interconnecting wires so that their terminals can receive no external stresses.
- For wiring, use a cable long enough to cover the entire distance with no connection.
Do not connect multiple devices to the same AC power supply.
Otherwise, there is risk that due to bad contact or poor insulation, it can exceed the allowable current and cause a fire or electric shock.
- After installation is complete, perform a leak check to make sure that no refrigerant is leaking out.
If the refrigerant gas leaks internally, toward the heater, or externally towards any stove flames, it can generate harmful substances.
- Perform the installation securely referring to the installation manual.
Incomplete installation could cause personal injury due to fire, electric shock, the unit falling, or leakage of water.
- In accordance with installation instructions for electrical-related work, use a dedicated electrical line.
- If the power supply circuit capacity/electrical work is not proper, it may cause a fire or electric shock.
- Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely.
- If the electrical covers on the indoor unit or the service panel of the outdoor unit are not attached securely, it could result in a fire, or an electric shock due to dust, water, etc.

Safety Precautions

- Be sure to cut off the main power supply before the installation of indoor electronic PCB or wiring. Otherwise, there is a risk of electric shock.
- The device should be compliant with all state provisions for installation wiring.
- The outdoor unit installation location should be compliant to all safety principles, avoiding locations susceptible to people or other small animals coming into contact with electrical components. Keep the outdoor unit and the surrounding environment clean and tidy.
- When installing or relocating the unit, make sure that no substance other than the specified refrigerant (R410A) enters the refrigerant circuit.
Any presence of foreign substance, such as air, can cause abnormal pressure rises or explosions.



• **Configure Proper Grounding**

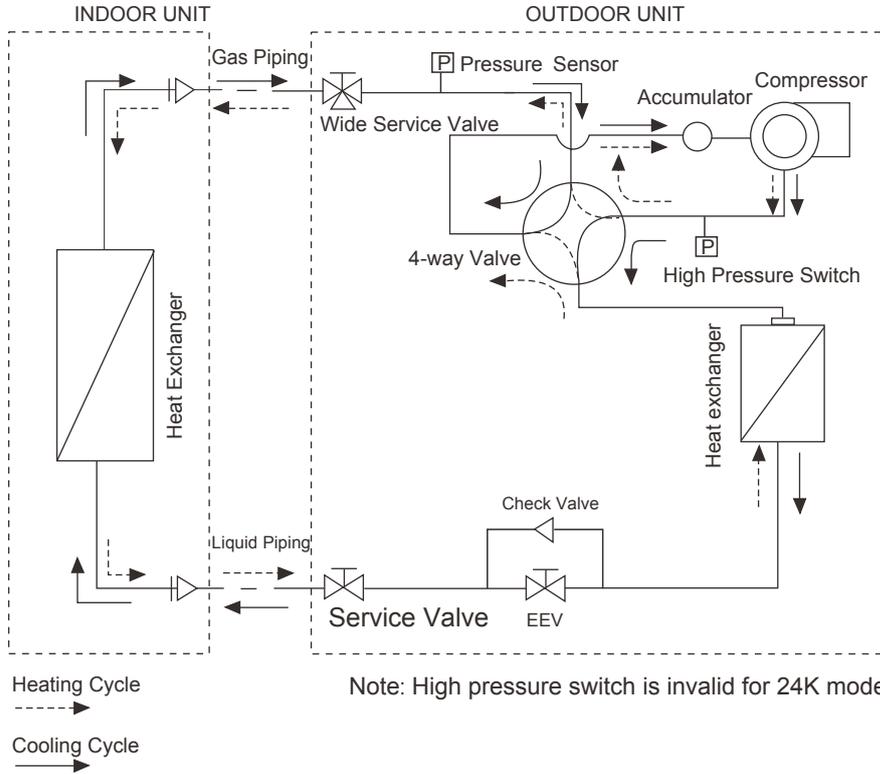
- Do not connect the earth-ground wire to a gas pipe, water pipe, lightning rod, or telephone earth wire. Defective grounding can cause an electric shock.
- Do not install the unit in a place where an inflammable gas could leak. If gas leaks and accumulates in the area surrounding the unit, it could cause an explosion.
- Fasten the flare nuts with a torque wrench to the values as specified in this manual. When fastened too tightly, a flare nut may break after a long period, and cause a leakage of refrigerant.
- Install an earth leakage circuit breaker depending on the installation place (anywhere that is humid). If an earth leakage breaker is not installed, it could result in electric shock.
- Perform the drainage/piping work securely, according to the installation manual.
- If there is a defect in the drainage/piping work, water from the unit could accumulate and household goods or items could get wet and/or damaged.

Safety Instructions

- Do not allow air to enter the refrigeration system or discharge refrigerant when moving the air conditioner.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid any hazards.
- The appliance must be installed in accordance with national wiring regulations.
- Servicing shall only be performed as recommended by the equipment manufacturer.
- Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent and capable in the handling of flammable refrigerants.
- Means for disconnection, such as circuit breaker, which can provide full disconnection in all poles, must be incorporated in the fixed wiring in accordance with the wiring rules.
- It is necessary to allow the disconnection of the appliance from the supply after installation. Ensure the disconnection of the appliance from the supply when servicing or performing maintenance, a disconnection with a locking system in the isolated position must be configured.
- The method of connection of the appliance to the electrical supply and interconnection of separate components, and the wiring diagram with a clear indication of the connections and wiring to external control devices and supply cord are detailed in the sections that follow.
- Details of type and rating of circuit breakers / ELB is detailed in the sections that follow.
- The dimensions of the space necessary for proper installation of the appliance, including the minimum permissible distances to adjacent structures, is detailed in the sections that follow.
- This appliance is intended for use by experts or trained users in shops, in light industry and on farms, or for commercial use by laypersons.
- Instructions on additional charging of refrigerant are detailed below.

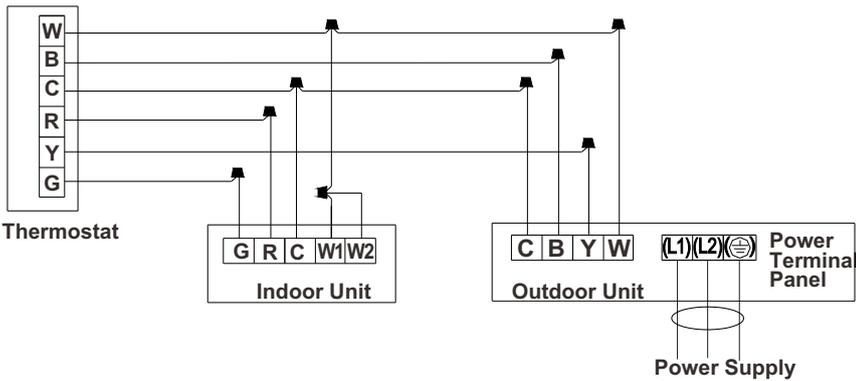
Diagram of Refrigerant Cycle & Wiring

Refrigerant Flow Diagram

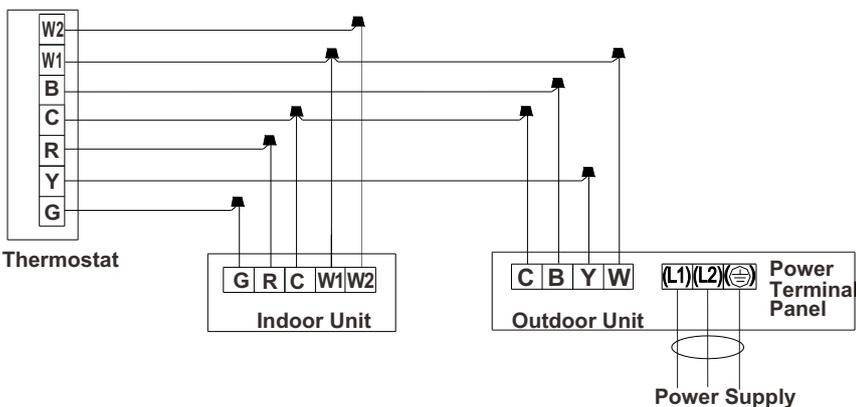


Electrical Wiring Diagram

Wiring single-stage auxiliary heating thermostat



Wiring twin-stage auxiliary heating thermostat



Installation Instructions

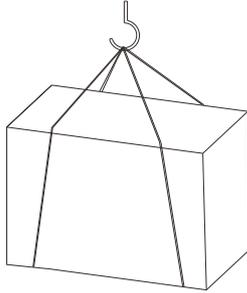
Transportation and Handling Before Installation

Transport the product as close to the installation location as practical prior to unpacking.

• Recommended Transportation Method

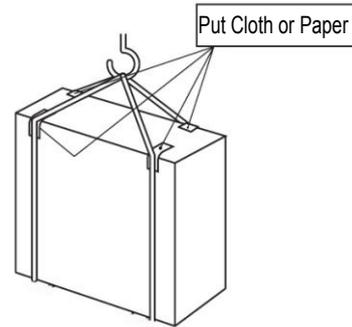
When handling the unit, ensure a steady balance of the unit, checking safety and lifting it up smoothly.

- (1) Do not remove any packing materials.
- (2) Hang the unit under packing condition with two ropes, as shown in the Figure below.



• Handling

If the unit has no protective packaging, protect it instead using cloth or paper.



Installation Location Selection

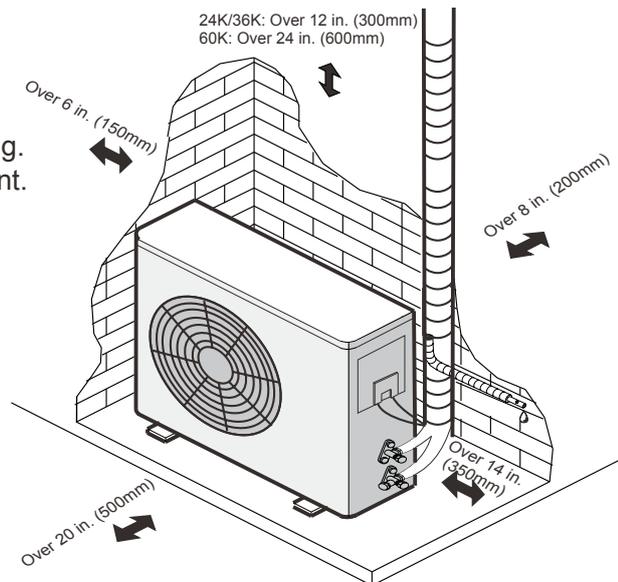
Prior to choosing the installation site, obtain all required approvals and select a location:

- That is not exposed to strong winds.
- Where airflow is sufficient and clean.
- Where it is not exposed to rains and/or direct sunshine.
- Where neighbors will not be bothered by operation sounds or hot air being exhausted.
- Where rigid walls or support is available, to prevent the increase of operation sounds or vibrations.
- Where there is no risk of combustible gas leakage.
- Where it is at least 10 ft away from the antenna of a TV set or radio. An amplifier may be required for the affected device.
- Install the unit horizontally and level.
- Install it in an area not affected by snowfall or blowing snow. If areas with heavy snow cannot be avoided, install a canopy, a pedestal, and/or some baffle boards.

⚠ CAUTION:

Avoid the following places for installation where air conditioner related issues are liable to occur.

- Where there is excessive machine oil.
- Salty locations, such as seashores.
- Where sulfide gas is generated, such as a hot spring.
- Where there is high-frequency or wireless equipment.



NOTE:

When operating the air conditioner in low outside temperatures, be sure to follow the instruction described below:

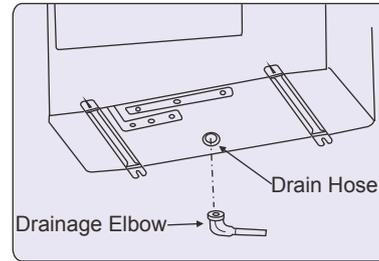
- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to winds.
- To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall.
- To prevent exposure to wind, it is recommended to install a baffle board on the air outlet side of the outdoor unit.

Installation Instructions

Drainage Elbow and Drain Hose Installation

Install Drainage Elbow and Drain Hose

- The condensate water may drain from the outdoor unit when the unit operates in heating mode. In order to avoid disturbing neighbors and to protect the environment, it is necessary to install a drainage elbow and a drain hose to properly drain out and route the condensate water away.
- Handle the drainage work before the indoor unit and outdoor unit are connected. Otherwise, it will be difficult to install the drainage elbow after the machine is mounted.
- Connect the drain hose (field-supplied, with inside diameter: 15mm) as shown in the figure for drainage.

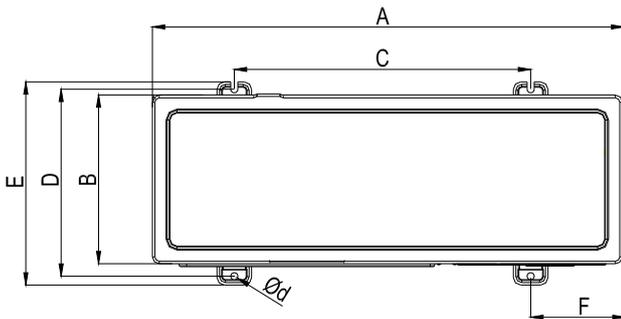


NOTE:

Do not use the drainage elbow in cold regions. Drainage may freeze and stop the fan from running.

Outdoor Unit Installation

- (1) Use the washers to fasten the machine at the foundation bolts.
- (2) When fastening the outdoor unit with foundation bolts, the fastening hole positions are shown in Fig.1.
- (3) Fasten the outdoor unit as shown in Fig.2.
- (4) Be sure to properly fasten the outdoor unit tightly and fully horizontally, to prevent noise when the machine is oblique or inclined by strong breezes or earthquake.
- (5) Do not drain off water to public places, to avoid skidding.
- (6) A strong base (made of concrete, etc.) should be made beforehand. The appliance should be placed no less than 10 cm high, to avoid getting wet or corroded. Otherwise, it can cause damage to the appliance or reduce its lifetime. (Fig.3)



[Unit: in. (mm)]

Model	A	B	C	D	E	F	d
24K	33-7/8 (860)	12-3/16 (310)	21-11/32 (542)	13-7/16 (341)	14-1/2 (368)	6-5/8 (168)	7/16*21/32 (11*17)
36K/60K	37-3/8 (950)	13-3/8 (340)	22-7/8 (580)	14-15/16 (380)	16-1/4 (414)	7-1/4 (185)	5/8 (15)

Fig.1

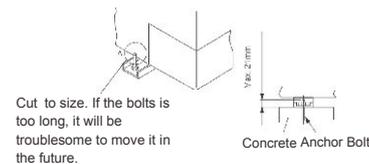


Fig.2

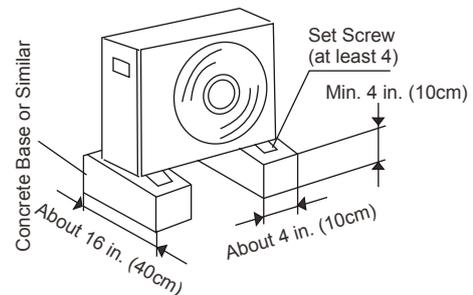


Fig.3

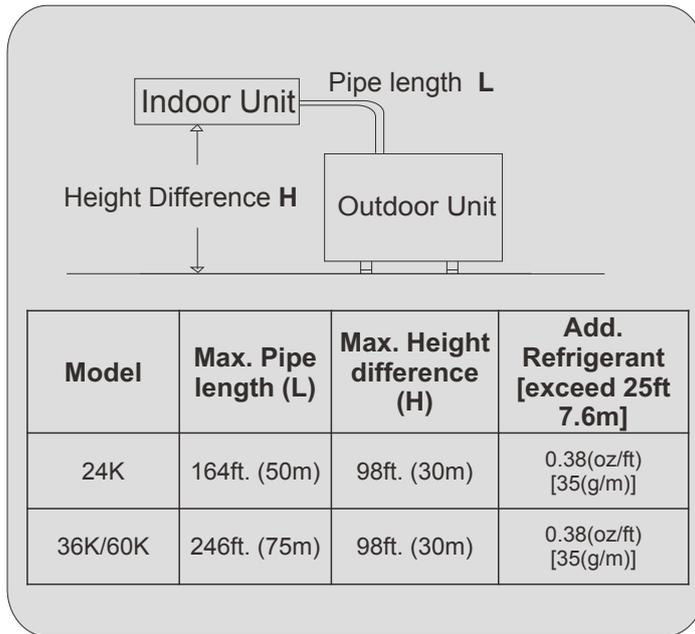
Installation Instructions

Refrigerant Piping

1. Piping Requirement

Model	Outer Diameter of Pipe [in. (mm)]	
	Gas	Liquid
24K	5/8 (15.88)	3/8 (9.52)
36K	3/4 (19.05)	3/8 (9.52)
60K	7/8 (22.22)	3/8 (9.52)

The shorter the refrigerant piping is, the better the performance will be. Thus the connecting pipe should be as short as possible.



Refrigerant - Additional Charge

The unit has been pre-loaded with refrigerant, but if exceeding 25 ft. (7.6m) of line-set, additional refrigerant (R410A) is required. Additional refrigerant charge = $(L-25) \times 0.38$ oz/ft

2. Piping material

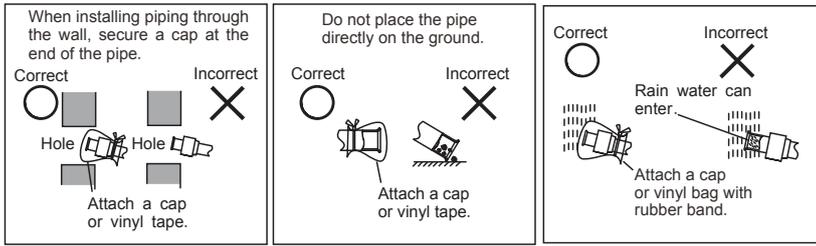
- (1) Prepare locally-supplied copper pipes.
- (2) Use clean copper pipes. Ensure that there is no dust or moisture inside of the pipes. Blow the inside of the pipes with nitrogen or dry air to remove any dust or foreign materials before connecting pipes.
- (3) Piping thickness and material of the pipe are shown as below.

Diameter [in. (mm)]	Thickness [in. (mm)]
∅ 1/4 (6.35)	1/32 (0.8)
∅ 3/8 (9.52)	1/32 (0.8)
∅ 1/2 (12.70)	1/32 (0.8)
∅ 5/8 (15.88)	1/32 (1.0)
∅ 3/4 (19.05)	1/32 (1.0)
∅ 7/8 (22.22)	1/32 (1.0)

Installation Instructions



CAUTION



3. Preparation of Refrigerant Piping

(1) Pipe Cutting

Cut the copper pipe properly using pipe cutter.

(2) Burr Removal

Completely remove all burrs from the cut cross section of the pipe. Point the end of the copper pipe downward to prevent burrs from dropping into the pipe.

4. Piping Connection

(1) Confirm that the valves are closed.

(2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant pipes. The refrigerant piping should be brazed with a phosphorous-copper alloy material such as Silfos-5 or equivalent. Precautions and steps during brazing service valve include:

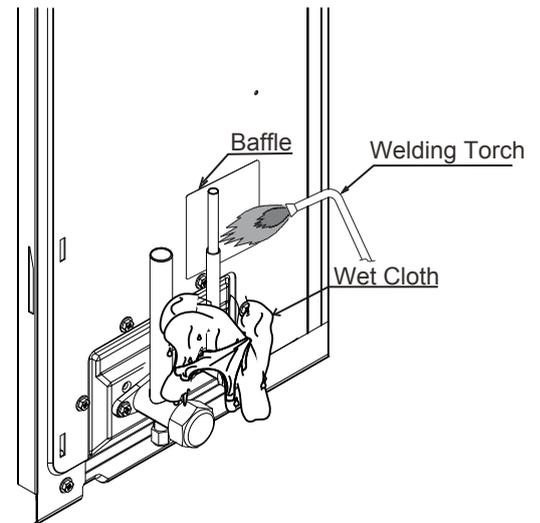
a. Remove the caps from both the liquid and gas service valve service ports at the outdoor unit.

b. Braze the liquid piping and gas piping to valves at the outdoor unit.

Precautions should be taken to prevent heat damage to service valve by wrapping a wet cloth around it.

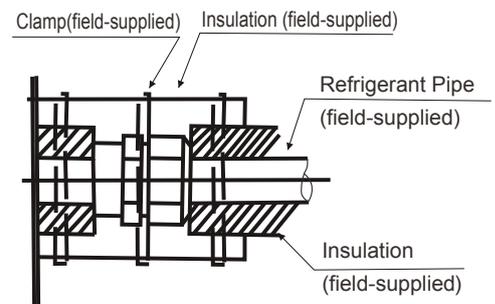
Also, a baffle can be set to protect all painted surfaces and insulation during brazing.

c. After brazing, cool joint using the wet rag.



(3) After finishing connection of the refrigerant pipes, keep it warm using the insulation material as depicted in the figure on the right.

- For the outdoor unit side, insulate every piping end, including valves.
- Cover piping joints with pipe-shielding material.
- Using piping tape, apply tape starting from entry points of outdoor unit.
 - Fix the end of piping tape with adhesive tape.
 - When piping has to be arranged through above ceiling, closet or area where temperature and humidity are high, wind additional commercially sold insulation, for prevention of condensation.



Piping Insulation Procedure

5. Airtight Test

• Use Nitrogen.

Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.

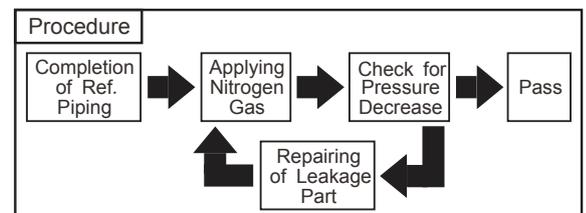
• Perform the air-tight test.

Don't open the gas line stop valves.

Apply nitrogen gas pressure of 550 PSIG (3.8 MPa).

Check for any gas leakage at the flare nut connections, or brazed parts by using a gas leak detector or foaming agent.

• If gas pressure doesn't decrease and all checks have passed: After the air tight test, release nitrogen gas.



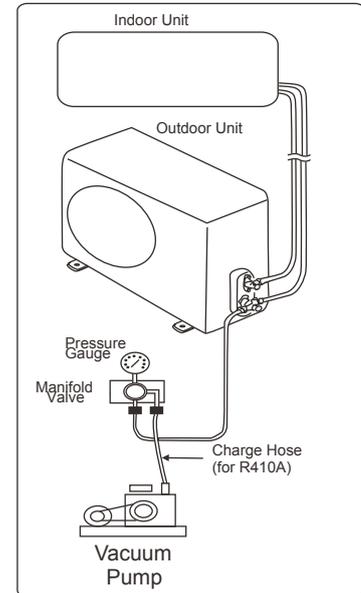
Air-tight Procedure

Installation Instructions

6. Vacuum Pumping and Charging Refrigerant

• Vacuum Pumping

- (1) Remove the service port cap of the stop valve on the gas pipe side of the outdoor unit.
- (2) Connect the manifold gauge and vacuum pump to the service port of the stop valve on the gas pipe side of the outdoor unit.
- (3) Run the vacuum pump. (Let it work for at least 15 minutes.)
- (4) Check the vacuum with the gauge manifold valve, then close the gauge manifold valve and stop the vacuum pump.
- (5) Leave it as-is for one or two minutes. Make sure the pointer of the manifold gauge remains in the same position. Confirm that the pressure gauge shows -14.7 psig (-0.101 MPa or -760 mmHg).
- (6) Remove the manifold gauge quickly from the service port of the stop valve.
- (7) After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe.
- (8) Open adjusted valve to add refrigerant (refrigerant must be liquid).
- (9) Tighten the cap to the service port .
- (10) Re-tighten the cap.
- (11) Leak/foam test with halogen leak detector to check the flare nut and brazing points of leak. Use foam that does not generate ammonia (NH₃) in the reaction.



CAUTION

- An excess or a shortage of refrigerant is the main cause of issues with the unit. Charge the correct refrigerant quantity according to the description of label at the inside of the manual.
- Check for refrigerant leakage in full detail. If a large refrigerant leakage occurs, it can result in difficulty breathing for inhabitants, and/or harmful gases can occur if a source of fire is used in the room.

• Additional Refrigerant Charge

The unit has been pre-charged with refrigerant.

Please refer to “Piping Requirement” to calculate the additional charge.

After vacuum pump procedure has finished, first exhaust air from the charge hose, next open the valves.

Charge refrigerant as “liquid” type through the liquid stop valve.

At the end, close valves, and record the charged refrigerant quantity.



Filling Using a Cylinder with an Attached Siphon

Stand the cylinder upright when filling.

(There is a siphon pipe inside, so the cylinder need not be upside-down to fill with liquid.)



Filling with Other Cylinders

Turn the cylinder upside-down when filling.

Installation Instructions

Wiring



WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit, and wait for at least 3 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped, before electrical wiring work or a periodical check is performed.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and in the worst-case scenario, a fire will occur.
- Prevent the wirings from touching the refrigerant pipes, plate edges, and electrical parts inside the unit. If not done so, the wires will be damaged and in the worst-case scenario, a fire will occur.
- Install an ELB (Electric Leakage Break) at the power source. If an ELB is not used, it can cause electric shock or fire at the worst-case scenario.
- This unit uses an inverter, which means that it must use an earth leak detector capable of handling harmonics in order to prevent malfunctioning of the earth leak detector itself.
- Do not use intermediate connection wires, stranded wires (see **Attentions when Connecting the Power Supply Wiring**), extension cables or control line connection, as the use of these wires may cause unwanted heat, electric shock, or fire.
- **The tightening torque of each screw shall be as follows.**
 - M4: 0.7 to 1.0 lbf·ft. (1.0 to 1.3 N·m)
 - M5: 1.5 to 1.8 lbf·ft. (2.0 to 2.5 N·m)
 - M6: 3.0 to 3.7 lbf·ft. (4.0 to 5.0 N·m)
 - M8: 6.6 to 8.1 lbf·ft. (9.0 to 11.0 N·m)
 - M10: 13.3 to 217 lbf·ft. (18.0 to 23.0 N·m)Keep the above tightening torque values in mind when performing wiring work.



CAUTION

- Wrap tape material along the wire and seal wiring holes, to prevent entrance of condensed water and insects.
 - Tightly secure the power source wiring using the cord clamp inside the unit.
- Note: Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

General Check

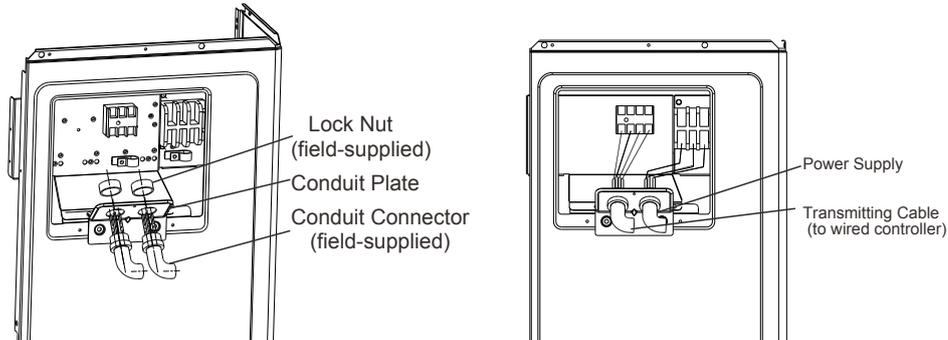
- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data. Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the voltage of power supply is within +10% of nominal voltage and earth phase is contained in the power supply wires. If not, electrical parts can be damaged.
- (3) Check to ensure that the capacity of power supply is enough. If not, the compressor will be not able to operate due to abnormal voltage drop at startup.
- (4) Check to ensure that the earth wire is connected.
- (5) Install a main switch, multi-pole main switch, with a space of 0.14 in. (3.5mm) or more, single -phase main switch with a space of 0.12 in. (3.0mm) or more between each phase.
- (6) Check to ensure that the electrical resistance is more than 2 MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is located and repaired.

Installation Instructions

Wiring steps:

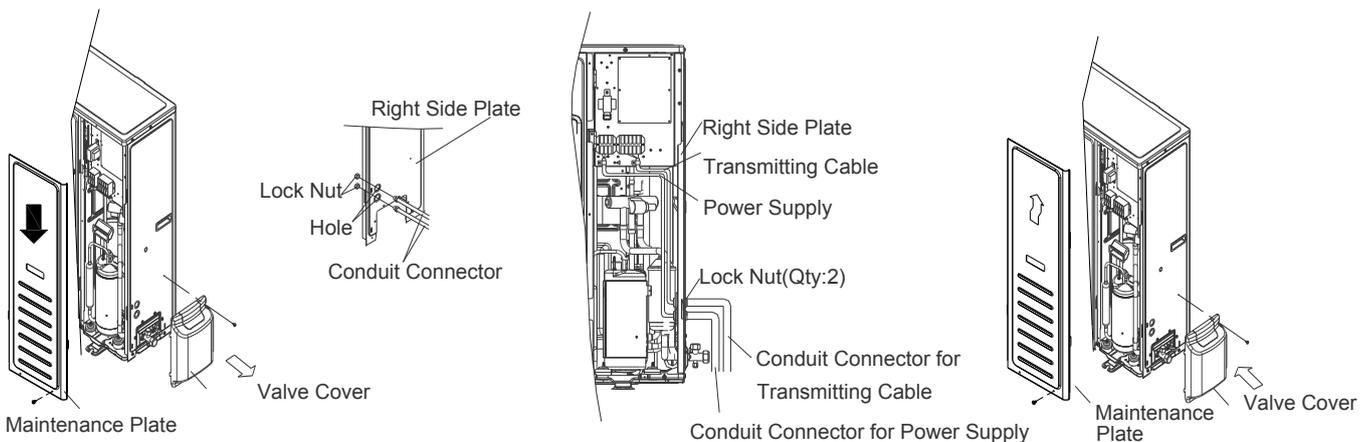
24K/36K BTU

- (1) Electrical Box Cover Removal
Unscrew the mounting screws to remove the electric box cover.
- (2) Fasten the power supply cable and the transmitting cable to the conduit holder using the lock nut.
- (3) Connect the power supply cable and the transmitting cable to the terminal.
- (4) Fasten the power supply cable and the connection cable using the cable clamp.
- (5) Be sure to seal all holes when applying the putty.
Arrange the cables side-by-side, flat. (Do not overlap the cables.)
- (6) Put the electric box cover back after completion of the work.



60K BTU

- (1) Remove the screws, maintenance plate, and the valve cover.
- (2) Pass transmitting cable and power supply through the two holes on the right side plate.
- (3) Fasten the conduit connection to the right side plate using the lock nut.
- (4) Connect the transmitting cable and power supply to the terminal.
- (5) Secure the transmitting cable and power supply together with the clamp tightly.
- (6) After completion of the wiring, seal the wiring hole with the putty.
- (7) Put the maintenance plate and the valve cover back after completion of the work.



Installation Instructions

Electrical Data

Model (Capacity)	Power Supply	ELB		Power Source Cable Size	Transmitting Cable Size	Circuit Breaker (A)
		Rated Current (A)	Nominal Sensitive Current (mA)			
24K	208/230V/1Ph/60Hz	25	30	3×12AWG	4×16AWG	25
36K	208/230V/1Ph/60Hz	35	30	3×10AWG	4×16AWG	35
60K	208/230V/1Ph/60Hz	60	30	3×8AWG	4×16AWG	60

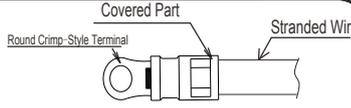
Max. Running Current (A): REFER TO NAMEPLATE

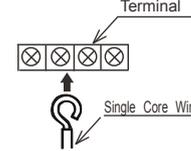
Note:

- (1) Follow local codes and regulations when selecting field wires. All of the above are the minimum wire size.
- (2) When transmitting cable length is longer than 262ft. (80m), the next larger wire size should be selected.
- (3) Install a main switch and ELB for each system separately. Select the high-response type ELB that activates within 0.1 second. Recommended capacity is based on outdoor machine switch capacity.

<Warnings when connecting the power supply wiring>

1. When connecting the terminal block using stranded wire, make sure to use the round crimp-style terminal for connection to the power supply terminal block. Place the round crimp-style terminals on the wires up to the covered part, secure in place.


2. When connecting the terminal block using a single-core wire, be sure to perform proper curing.



Test Run

Test run should be performed only after refrigerant piping, drain, wiring, etc. have been completed.



The air conditioner is provided together with a crankcase heater. Check to ensure that the switch on the main power source has been ON for more than 6 hours ahead of power on preheating, otherwise it might damage the compressor!

Do not operate the system until all of the following check points have been cleared.

- (A) Check to ensure that the stop valves of the outdoor unit are fully opened.
- (B) Check to ensure that the electric wires have been fully connected.
- (C) Check to ensure that the electrical resistance is more than 2MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

Test Run Function Identification

Operate the thermostat to turn ON the appliance, and then proceed with the test run.

Pay attention while the system is running.

Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are will be at temperatures higher than 194°F (90°C) .

Turn off the power after test run is finished.

Installation of the appliance is generally finished after the above operations are done. If you still have any trouble, please contact the local technical service center of our company for further information.

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The design and specifications of this product are subject to change without prior notice as development continues. Consult with the sales agency or manufacturer for details. Refer to the equipment nameplate for all other applicable specifications.



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