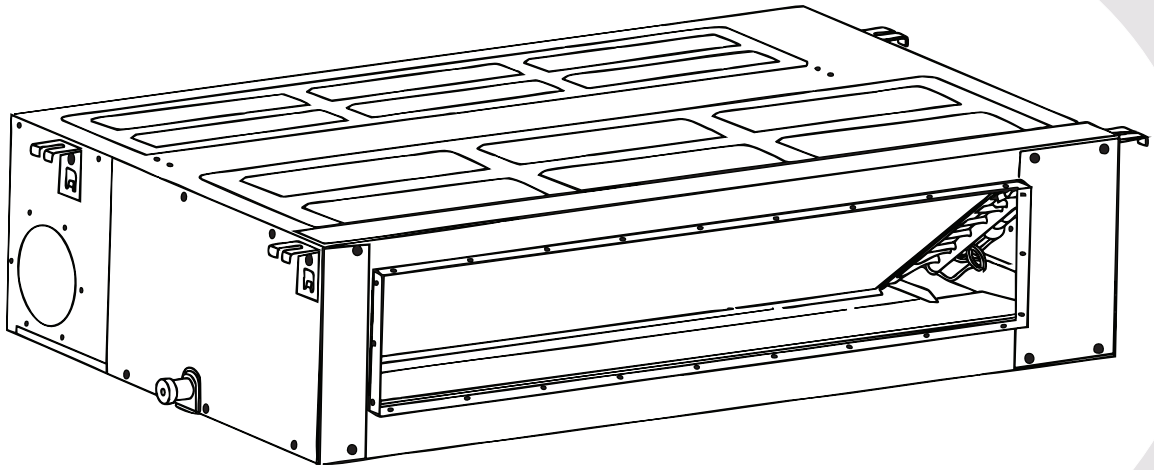
DUCTLED MINI SPLIT SYSTEM AIR CONDITIONER / HEAT PUMP

PIONEER®

RYB-20 Inverter Series

For 36,000-48,000 BTU/hr Systems

Quantum Ultra (R-454B) - RB Indoor and YN Outdoor



Installation & User Manual

IMPORTANT NOTICE:
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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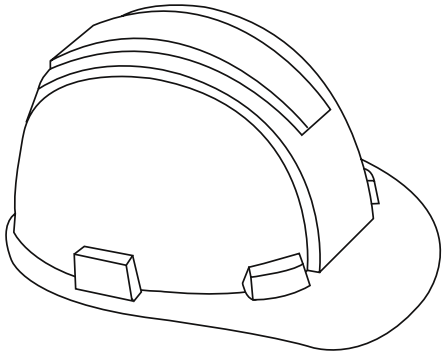

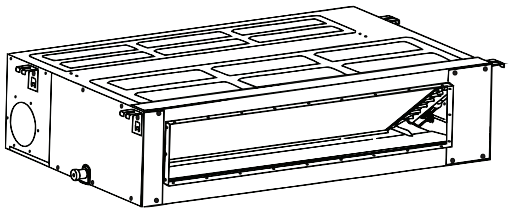

Read this Manual

The manual provides helpful hints on using and maintaining the air conditioner properly. Performing preventive care can save time and money over the lifespan of the air conditioner. These instructions may not cover every possible condition of use, so common sense and attention to safety is required when installing, operating, and maintaining this product.

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It is important to read this section before operating and installing the system. Incorrect installation due to ignoring instructions can cause serious damage or injury. The seriousness of potential damage and injuries is classified as either a warning or caution.

Explanation of Symbols

WARNING
This symbol indicates the possibility of personal injury or loss of life.

CAUTION
This symbol indicates the possibility of property damage or serious consequences.

⚠ WARNING

Children aged 8 and above, as well as individuals with lack of experience or reduced physical, sensory, or mental capabilities can use the appliance if supervision or instruction is given. Do not allow children to play with or near the appliance. Children or untrained personnel should be restricted from cleaning and performing maintenance on the appliance, unless they're given supervision.

⚠ WARNINGS FOR PRODUCT USE

- Turn off the air conditioner and disconnect the power before cleaning, installing, or repairing the system. Failure to do so can cause electric shock.
- If an abnormal situation arises (such as a burning smell), immediately turn off the unit and disconnect the power. Call the dealer for instructions to avoid electrical shock, fire, or injury.
- Do not insert fingers, rods, or other objects into the air inlet or outlet. This could cause injury because the fan rotates at high speeds.
- Do not use flammable sprays such as hair spray, lacquer, or paint near the unit. This could cause fire or combustion.
- Do not operate the air conditioner in locations near or around combustible gases. Emitted gas may collect around the unit and cause an explosion.
- Do not operate the air conditioner in a wet room such as a bathroom or laundry room. Too much exposure to water can cause electrical components to short circuit.
- Do not expose your body directly to cool air for prolonged durations of time.
- If the air conditioner is used together with burners or other heating devices, thoroughly ventilate the room to avoid oxygen deficiency.
- In certain functional environments (such as kitchens, server rooms, etc.), it is highly recommended to use specifically designed air-conditioning units.

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⚠ WARNINGS FOR PRODUCT INSTALLATION

- Turn off the air conditioner and disconnect its power supply before installing or repairing the system. Failure to do so can cause electric shock.
- An authorized dealer or specialist must perform the installation. Incorrect installation can cause water leakage, electrical shock, or fire.
- Perform the installation according to the instructions in this manual. Improper installation can cause water leakage, electrical shock, or fire.
- Contact an authorized service technician to maintain and repair the unit.
- Install the appliance in accordance with national wiring regulations. 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 the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight or the installation is done incorrectly, the unit may drop and cause serious injury or damage.
- For units with an auxiliary electric heater, do not install the unit within 3 feet (1 m) of any combustible materials.
- For units that have a wireless network function (USB device access replacement), professional staff must carry out the maintenance operations.
- Do not install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it could cause fire.
- Do not turn on the power until all work has been completed.
- When moving or relocating the air conditioner, consult experienced service technicians for the disconnection and reinstallation of the unit.

⚠ ELECTRICAL WARNINGS

- Only use the specified wire. If the wire is damaged, it must be replaced by the manufacturer, service agent, or a similarly qualified individual in order to avoid a hazard.
- Properly ground the product during installation to avoid electrical shock.
- Incorporate disconnections in the fixed wiring, according to the wiring rules.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electric shock.

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- For all electrical work, follow the local and national wiring standards, regulations, and installation manual. Connect the cables tightly, then clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can result in electrical shock or fire. Complete the electrical connections according to the Electrical Connection diagrams located on the panels of the indoor and outdoor units.
- Properly arrange all wiring to ensure the control board cover can close correctly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up and catch fire. It can also cause electrical shock.
- If connecting power to fixed wiring, incorporate an all-pole disconnection device in the fixed wiring. Ensure the device is in accordance with the wiring rules.

CLEANING & MAINTENANCE WARNINGS

- Turn off the device and disconnect its power supply before cleaning. Failure to do so can cause an electrical shock.
- Do not clean the air conditioner with excessive amounts of water.
- Do not clean the air conditioner with combustible cleaning agents. Combustible cleaning agents can cause fire or deformation.

⚠ CAUTION

- Turn off the air conditioner and disconnect the power if the unit will not be used for a long duration of time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electrical shock.
- Do not use the device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is considerably high.

Fuse Specifications

The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection. The specifications of the fuse are printed on the circuit board. For example: T3.15AL/250VAC, T5AL/250VAC, T3.15A/250VAC, T5A/250VAC, T20A/250VAC, T30A/250VAC, etc.

Only use the blast-proof ceramic fuse.

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⚠ WARNING FOR USING FLAMMABLE REFRIGERANTS

- Do not use means to accelerate the defrosting and cleaning processes, other than those recommended by the manufacturer.
- Store the appliance in a room without continuously operating ignition sources. For example: open flames, an operating gas appliance, or an operating electric heater.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odor.

R-454B refrigerant charge amount and minimum room area:

The machine you purchased may be one of the types listed in the table below. The indoor and outdoor units are designed to be used together. Check the machine that was purchased. Install the indoor unit at least 7-feet, 6-½-inches (2.3 m) above the floor. The height of the room cannot be less than the indoor unit's installed height.

Room Size Restriction

The appliances are connected via an air duct system to one or more rooms. The bottom of the air duct outlet must be at least 7-feet, 2-⅝-inches (2.2 m) above the floor. In UL/CSA 60335-2-40, the R-454B refrigerant is classified as mildly flammable, which limits the room area of the system service. Similarly, the total refrigerant amount must not exceed the maximum allowable refrigerant charge, is based on the room area the system services.

The following are explanations for the nouns in this section:

- Mc: The actual refrigerant charge in the system.
- A: The actual room area where the appliance is installed.
- Amin: The required minimum room area.
- Mmax: The allowable maximum refrigerant charge in a room.
- Qmin: The minimum circulation airflow.
- Anvmin: The minimum opening area for connected rooms.
- TAmin: The total area of the conditioned space (For appliances serving one or more rooms with an air duct system).
- TA: The total area of the conditioned spaced connected by air ducts.

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Refrigerant Charge & Room Area Limitations

For the purpose of determining the room area (A) when calculating the maximum allowable refrigerant charge (Mmax) in an unventilated space, the following shall apply:

Room area (A) refers to the floor projection enclosed by the walls, partitions, and doors of the installation space.

Spaces connected solely by drop ceilings, ductwork, or similar features should not be considered a single space.

For units mounted higher than 5-feet, 10-⅞-inches (1.8 m), spaces divided by partition walls no higher than 5-feet, 3-inches (1.6 m) should be considered a single space.

For fixed appliances, rooms on the same floor and connected by an open passageway can be considered a single room when determining compliance to Amin, provided the passageway meets all of the following criteria:

- It is a permanent opening.
- It extends to the floor.
- It is intended for people to walk through.

For fixed appliances, the area of adjacent rooms on the same floor connected by permanent wall or door openings — including gaps between walls and floors — can be considered a single room when determining compliance with.

The space must have appropriate openings according to Sec. 2. The minimum opening area for natural ventilation (Anvmin) must not be less than the following:

Height of outlet/m	A/m^2	Mc/Kg	Mmax/kg	Anvmin/m^2
2.2	5	6.0	1.628	0.108
2.2	6	6.0	1.954	0.100
2.2	7	6.0	2.279	0.092
2.2	8	6.0	2.605	0.084
2.2	9	6.0	2.930	0.076
2.2	10	6.0	3.256	0.068
2.2	11	6.0	3.582	0.060
2.2	12	6.0	3.907	0.052
2.2	13	6.0	4.233	0.044
2.2	14	6.0	4.493	0.038
2.2	15	6.0	4.651	0.034
2.2	16	6.0	4.803	0.031
2.2	17	6.0	4.951	0.027

Take the Mc=6.0kg as an example. For appliances serving one or more rooms via an air duct system, the room area shall be determined based on the total area of the conditioned space connected by those ducts. Note that the circulating airflow from the integral indoor fan will mix and dilute any leaking refrigerant before it enters any room.

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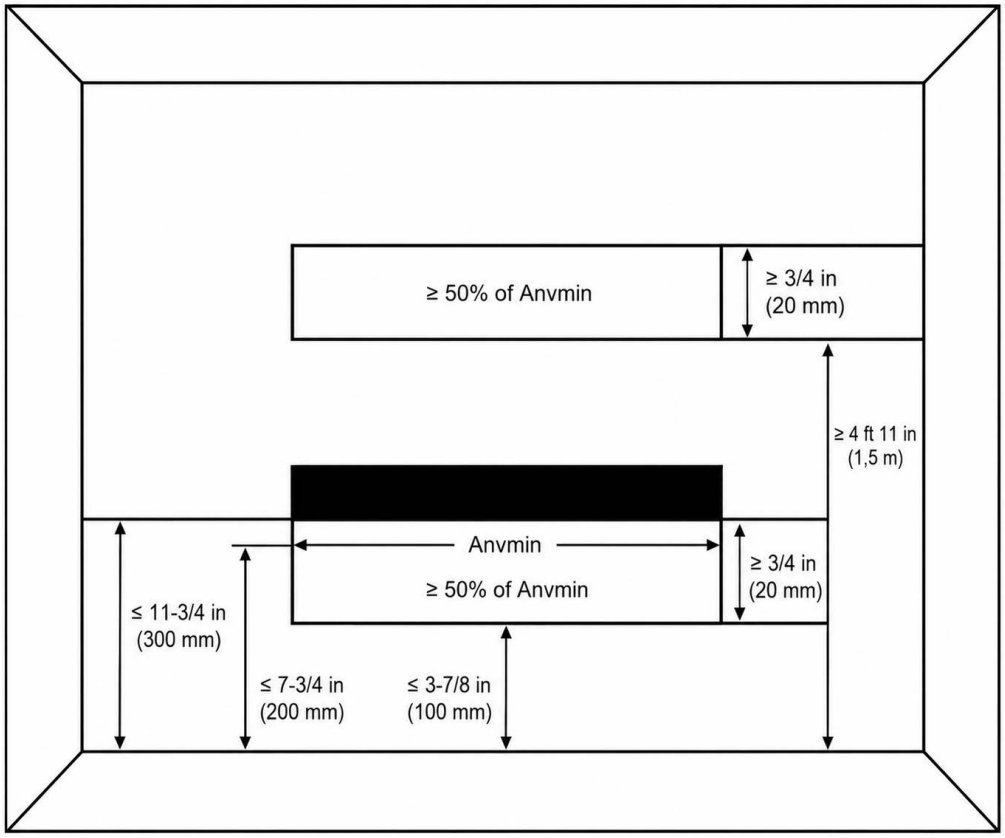
Opening Conditions for Connected Rooms

When the openings for connected rooms are required, apply the following conditions:

- The area of any openings more than 11-¾ inches (300 mm) above the floor should not be considered when determining compliance with Anvmin.
- At least 50% of the required opening area Anvmin should be below 7-¾ inches (200 mm) from the floor.
- Install the unit so the bottom of the lowest opening is no higher than the point of release and no more than 3-⅞ inches (100 mm) from the floor.
- Openings are permanent openings which cannot be closed.
- For openings extending to the floor, the height should not be less than ¾ of an inch (20 mm) above the surface of the floor covering.
- A second, higher opening must be provided. This opening should be at least 50% of the minimum area required for Anvmin and must be positioned at least 4-feet, 11-inches (1.5 m) above the floor. The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar features that provide an airflow path between connected rooms.
- The total area of the room where refrigerant can leak, including any connected adjacent rooms, must be at least TAmin.
- The room area in which the unit is installed should not be less than 20% of TAmin.



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A_{min} [ft² / m²]	h_{inst} [ft/m]					
m_c or m_{REL} [ozs/kg]	6.0~7.3/ 1.8~2.2	7.6/2.3	7.9/2.4	8.6/2.6	9.2/2.8	9.9/3.0
<=62.6/1.776	12/1.10					
63.4/1.8	60/5.53	57/5.29	55/5.07	51/4.68	47/4.35	44/4.06
70.5/2.0	67/6.15	64/5.88	61/5.64	56/5.20	52/4.83	49/4.51
77.5/2.2	73/6.76	70/6.47	67/6.20	62/5.72	58/5.31	54/4.96
84.6/2.4	80/7.38	76/7.06	73/6.76	68/6.24	63/5.80	59/5.41
91.7/2.6	86/7.99	83/7.64	79/7.32	73/6.76	68/6.28	64/5.86
98.7/2.8	93/8.60	89/8.23	85/7.89	79/7.28	73/6.76	68/6.31
105.8/3.0	100/9.22	95/8.82	91/8.45	84/7.80	78/7.24	73/6.76
112.8/3.2	106/9.83	102/9.41	97/9.01	90/8.32	84/7.73	78/7.21
119.9/3.4	113/10.45	108/9.99	104/9.58	96/8.84	89/8.21	83/7.66
126.9/3.6	120/11.06	114/10.58	110/10.14	101/9.36	94/8.69	88/8.11
134/3.8	126/11.68	121/11.17	116/10.70	107/9.88	99/9.17	93/8.56
141.0/4.0	133/12.29	127/11.76	122/11.27	112/10.40	104/9.66	97/9.01
148.1/4.2	139/12.90	133/12.34	128/11.83	118/10.92	110/10.14	102/9.46
155.1/4.4	146/13.52	140/12.93	134/12.39	124/11.44	115/10.62	107/9.91
162.2/4.6	153/14.13	146/13.52	140/12.96	129/11.96	120/11.11	112/10.37
169.2/4.8	159/14.75	152/14.11	146/13.52	135/12.48	125/11.59	117/10.82
176.3/5.0	166/15.36	159/14.69	152/14.08	140/13.00	130/12.07	122/11.27
Area formula	• **A_{min}** is the required minimum room area in ft²/m². • **M_c** is the actual refrigerant charge in the system in oz/kg • **M_{REL}** is the refrigerant releasable charge in oz/kg (applicable to the units with refrigerant sensors only) • **h_{inst}** is the height of the bottom of the appliance relative to the floor of the room after installation. **WARNING:** The minimum room area or minimum room of conditioner space is based on the releasable charge and total system refrigerant charge.					

When the unit detects a refrigerant leak, the minimum airflow of the indoor unit is the following:

Model	36K	48K
Nominal air volume	1176CFM 2000m³/h	1588CFM 2700m³/h

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1. Installation (Where refrigerant pipes are allowed)

- Any individual who is involved with working on or breaking into a refrigerant circuit must hold a valid certificate from an industry-accredited assessment authority. The certificate authorizes the individual's competence for handling refrigerants safely in accordance with the specifications of an industry recognized assessment.
- Maintenance and repairs requiring the assistance of other skilled personnel must be carried out under the supervision of the individual competent in the use of flammable refrigerants.
- Keep the installation of the pipe-work to a minimum.
- Protect the pipe-work from physical damage.
- Ensure the refrigerant pipes comply with national gas regulations.
- Ensure the mechanical connections are accessible for maintenance purposes.
- Do not allow foreign matter (oil, water, etc.) from entering the piping. In addition, when storing the piping, securely seal the opening by pinching, taping, etc.
- Competent individuals must carry out all working procedures that affect safety.
- Store the appliance in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- Test the joints using detection equipment with a capability of 5g/year of refrigerant or better. After installation, ensure the equipment is at a standstill and maintained under operating pressure, or at least the minimum standstill pressure.
- In cases that require mechanical ventilation, ensure the ventilation openings are kept clear of obstruction.
- Leak Detection System Installed: Power the unit except for service. For units with refrigerant sensors, if a leak is detected, the indoor unit will display an error code and buzz, the outdoor compressor will stop immediately, and the indoor fan will run. The refrigerant sensor's service life is 15 years. When the refrigerant sensor malfunctions, the indoor unit will display the "FHCC" error code. The refrigerant sensor cannot be repaired and can only be replaced by the manufacturer. Replace the sensor with one specified by the manufacturer. This is only applicable for units with refrigerant sensors.

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2. When using a flammable refrigerant, the requirements for the installation space and ventilation are determined by the following criteria:

- Mass charge amount (M) used in the appliance.
- Installation location.
- Ventilation type of the location or appliance.

- Protect the piping material and pipe routing from physical damage during operation and service. Ensure the piping material and pipe routing are in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints must be accessible for inspection prior to being covered or enclosed.

- Protect piping, fittings, and protection devices from adverse environmental effects. For example, water collecting and freezing in relief pipes or the accumulation of dirt and debris.

- Ensure the piping in the refrigerant system is designed and installed to minimize the likelihood of hydraulic shock damaging the system.

- Before applying any insulation, protect the steel pipes and components against corrosion with a rustproof coating.

- Take precautions to avoid excessive vibration or pulsation.

- The minimum floor area of the room is mentioned in the form of a table or single figure without reference to a formula.

- After completing the field piping for split systems, pressure test the field pipework with an inert gas. Then, vacuum test the pipework before refrigerant charging. Ensure the testing is completed according to the following requirements:

  a. The minimum test pressure for both the high and low sides must match their respective design pressures, unless the high side cannot be isolated from the low side. If the high side cannot be isolated from the low side of the system, the entire system must be pressure tested to the low-side design pressure.

  b. After removing the pressure source, maintain the test pressure for at least 1 hour, ensuring there is no decrease of pressure, which is indicated by the test gauge. Ensure the test gauge resolution does not exceed 5% of the test pressure.

  c. During the evacuation test, after achieving a vacuum level specified in the manual, isolate the refrigeration system from the vacuum pump and ensure the pressure does not rise above 1,500 microns within 10 minutes. The appropriate vacuum pressure level is specified in the manual, and must not be less than 500 microns or the value required for compliance with national and local codes and standards. The codes and standards may vary between residential, commercial, and industrial buildings.

- Field-made refrigerant indoor joints must be tightness tested according to the following requirements: The test method must have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak should be detected.

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3. Qualification of Workers
The working personnel must be qualified to perform any maintenance, service, and repair operations. Competent individuals must carry out working procedures that affect safety means. The competent individual must complete the training by national training organizations or manufacturers that are accredited to teach the relevant national competency standards set in legislation. The individual's competence must be documented by a certificate. All training must follow the ANNEX HH requirements of UL 60335-2-40 4th Edition.
Examples for such working procedures are:

- Breaking into the refrigerating circuit.
- Opening sealed components.
- Opening ventilated enclosures.

4. Cabling
Confirm the cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check should also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Servicing Information

1. Inspect the Area
Before working on systems containing flammable refrigerants, safety checks are required to ensure the risk of ignition is minimized.

2. Work Procedure
To minimize the risk of flammable gas or vapor presence, conduct work using controlled procedures.

3. General Work Area
Inform all maintenance staff and individuals working in the local area about the nature of the work being performed. Avoid working in confined spaces. Section off the area around the workspace. Ensure the area is safe by controlling the flammable materials.

4. Check for Refrigerant
Check the area with an appropriate refrigerant detector before and during work to ensure the technician is aware of potentially flammable atmospheres. Ensure the leak detection equipment is suitable for flammable refrigerants, i.e. non-sparking, adequately sealed, or intrinsically safe.

5. Fire Extinguisher
If conducting hot work on the refrigeration equipment or any associated parts is needed, appropriate fire extinguishing equipment must be available. Keep a dry powder or CO_2 fire extinguisher adjacent to the charging area.

6. No Ignition Sources
Individuals carrying out work involving exposed pipework on a refrigerant system are prohibited from using any sources of ignition that may lead to a risk of fire or explosion. All possible ignition sources, such as cigarette smoking, must be performed at a sufficient distance from the installation or maintenance site. Before conducting work on the equipment, the surrounding area must be surveyed to ensure there are no flammable hazards or ignition risks. No Smoking signs must be displayed.

7. Well-Ventilated Area
Ensure the area is open and well-ventilated before accessing the system or performing any work that generates heat. Ventilation must be maintained to a certain degree while work is being carried out. The ventilation should safely disperse any released refrigerant and expel it externally into the atmosphere.

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8. Inspect the Refrigeration Equipment
When changing electrical components, they must be fit-for-purpose and meet the correct specifications. Follow the manufacturer's maintenance and service guidelines at all times. If in doubt, consult the manufacturer's technical department for assistance.

For installations using flammable refrigerants, check the following:

- Ensure the charge size is appropriate for the room in which the refrigerant-containing parts are installed.
- Confirm the ventilation machinery and outlets are operating adequately and not obstructed.
- If an indirect refrigerating circuit is being used, check the secondary circuit for the presence of refrigerant.
- Confirm the equipment markings are visible and legible. Correct markings and signs that are illegible.
- Install the refrigeration pipe or components in a position that minimizes the risk of corrosion from harmful substances, unless constructed of corrosion-resistant materials and suitably protected.

9. Inspect the Electrical Devices
Repairing and maintaining electrical components must include initial safety checks and component inspections. If a fault exists that could compromise safety, do not connect the electrical supply to the circuit until the fault is resolved. If the fault cannot be immediately corrected but it is necessary to continue operation, a temporary solution must be implemented. If a temporary solution is implemented, it must be reported to the owner of the equipment, ensuring both parties are informed.

Initial safety checks must include the following:

- Confirm the capacitors are discharged. Ensure that this is done in a safe manner to avoid the possibility of sparking.
- Ensure that no live electrical components and wiring are exposed while charging, recovering, or purging the system.
- Confirm there is continuity of earth bonding.

10. Replace Sealed Electrical Components If Damaged.

11. Replace Intrinsically Safe Components If Damaged.

12. Cabling
Confirm the cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check should also take into account the effects of aging or continual vibration from sources such as compressors or fans.

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13. Detection of Flammable Refrigerants
Do not use potential sources of ignition for searching or detecting refrigerant leaks. Do not use a halide torch or detector using a naked flame. Ensure the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment must be set at a percentage of the refrigerant LFL, and calibrated to the refrigerant employed. Confirm the appropriate percentage of gas (25% maximum).

The following leak detection methods are deemed acceptable for refrigerant systems:

Electronic leak detectors: This detector can detect refrigerant leaks. However, in the case of flammable refrigerants, the sensitivity may not be adequate and need recalibration. Calibrate the detection equipment in a refrigerant-free area.

Leak detection fluids: The bubble method and fluorescent method agents are examples of leak detection fluids. These are suitable to use with most refrigerants. Avoid using detergents containing chlorine as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, remove or extinguish all naked flames.

If a refrigerant leak is found and requires brazing, recover all the refrigerant from the system or use the shut off valves to isolate the refrigerant in a part of the system remote from the leak.

14. Removal & Evacuation
Use conventional procedures when breaking into the refrigerant circuit. However, for flammable refrigerants, it is important to follow this best practice since flammability is a consideration.

Follow this procedure:

- Safely remove refrigerant following local and national regulations.
- Evacuate.
- Purge the circuit with inert gas (optional for A2L).
- Evacuate (optional for A2L).
- Continuously flush or purge with inert gas when using a flame to open the circuit.
- Open the circuit.

Recover the refrigerant charge into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, purge the system with oxygen-free nitrogen to render the appliance safe from flammable refrigerants. If needed, repeat this process several times. Do not use compressed air or oxygen to purge refrigerant systems.

For appliances containing flammable refrigerants, purge the refrigerant by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved. Then, vent to atmosphere and finally pull down to a vacuum (optional for A2L). Repeat this process until no refrigerant is within the system (optional for A2L). When using oxygen-free nitrogen, vent the system down to atmospheric pressure to enable work to take place. Ensure the outlet for the vacuum pump is not close to any potential ignition sources and ventilation is available.

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15. Charging Procedures

In addition to conventional charging procedures, follow these requirements:

- Use only appropriate tools when completing work. In case of uncertainty, consult the manufacturer of the tools for use with flammable refrigerants.
- Ensure the contamination of different refrigerants does not occur when using charging equipment. Hoses or lines must be as short as possible to minimize the amount of refrigerant contained in them.
- Keep the cylinders upright.
- Ensure the refrigerant system is earthed before charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Take extreme care to not overfill the refrigeration system.
- Prior to recharging the system, it must be pressure tested with oxygen-free nitrogen. Leak test the system after completing the charging but prior to commissioning. Carry out a follow-up leak test before leaving the site.

16. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to carrying out the task, take an oil and refrigerant sample in case an analysis is required prior to re-using the recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operations.

b) Isolate the system electrically.

c) Before attempting the procedure ensure that:

- Mechanical handling equipment is available for handling refrigerant cylinders.
- All personal protective equipment is available and being used correctly.
- A competent individual is supervising the recovery process at all times.
- Recovery equipment and cylinders conform to the appropriate standards.

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d) Pump down the refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that the refrigerant can be removed from various parts of the system.

f) Make sure the cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate it in accordance with the instructions.

h) Do not overfill cylinders (no more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process is completed, make sure the cylinders and equipment are removed from the site promptly and all isolation valves on the equipment are closed off.

k) Do not charge recovered refrigerant into another refrigeration system, unless it has been cleaned and checked.

17. Labeling
Label the equipment stating that it has been de-commissioned and emptied of refrigerant. Make sure to date and sign the label. For appliances containing flammable refrigerants, ensure there are labels on the equipment stating it contains flammable refrigerant.

18. Recovery
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice to remove refrigerants safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure the correct number of cylinders for holding the total system charge are available. Designate all the cylinders intended to be used for the recovered refrigerant and label them for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders must be complete with pressure-relief valves. The associated shut-off valves must be in working order. Evacuate empty recovery cylinders and, if possible, allow them to cool before recovery occurs.

The recovery equipment must be in working condition with a set of instructions concerning the equipment that is at hand. In addition, the recovery equipment must be suitable for the recovery of the flammable refrigerant. If in doubt, consult the manufacturer. In addition, a set of calibrated weighing scales must be available and in working order. Hoses must be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant must be processed according to local legislation in the correct recovery cylinder. In addition, the relevant waste transfer note must be arranged. Do not mix refrigerants in the recovery unit and especially not in the cylinders.

When removing compressors or oils, ensure they are evacuated to a level that prevents flammable refrigerant from remaining in the lubricant. The compressor body must not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it must be carried out safely.

Safety Precautions

1

19. Transportation, Marking, & Storage for Units

- Transport equipment containing flammable refrigerants (Compliance with the transport regulations).
- Mark the equipment using signs (Compliance with local regulations).
- Dispose of equipment using flammable refrigerants (Compliance with national regulations).
- Store the equipment/appliance (Compliance with the manufacturer's instructions).
- Store packed (unsold) equipment. Construct the storage package protection in a way that potential mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge. Local regulations determine the maximum amount of equipment permitted to be stored together.

Explanation of symbols displayed on the indoor or outdoor units

	**WARNING**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to this manual.
	**CAUTION**	
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.

Product Overview

2

Model Numbers

Note

Serial numbers are typically located behind the electronic control box cover cap of each unit.

Model	Full System	Indoor Unit	Outdoor Unit
36K	RYB036GMSI20RL	RB036GMSILDFHG	YN036GMSI20RUG
48K	RYB048GMSI20RL	RB048GMSILDFHG	YN048GMSI20RUG

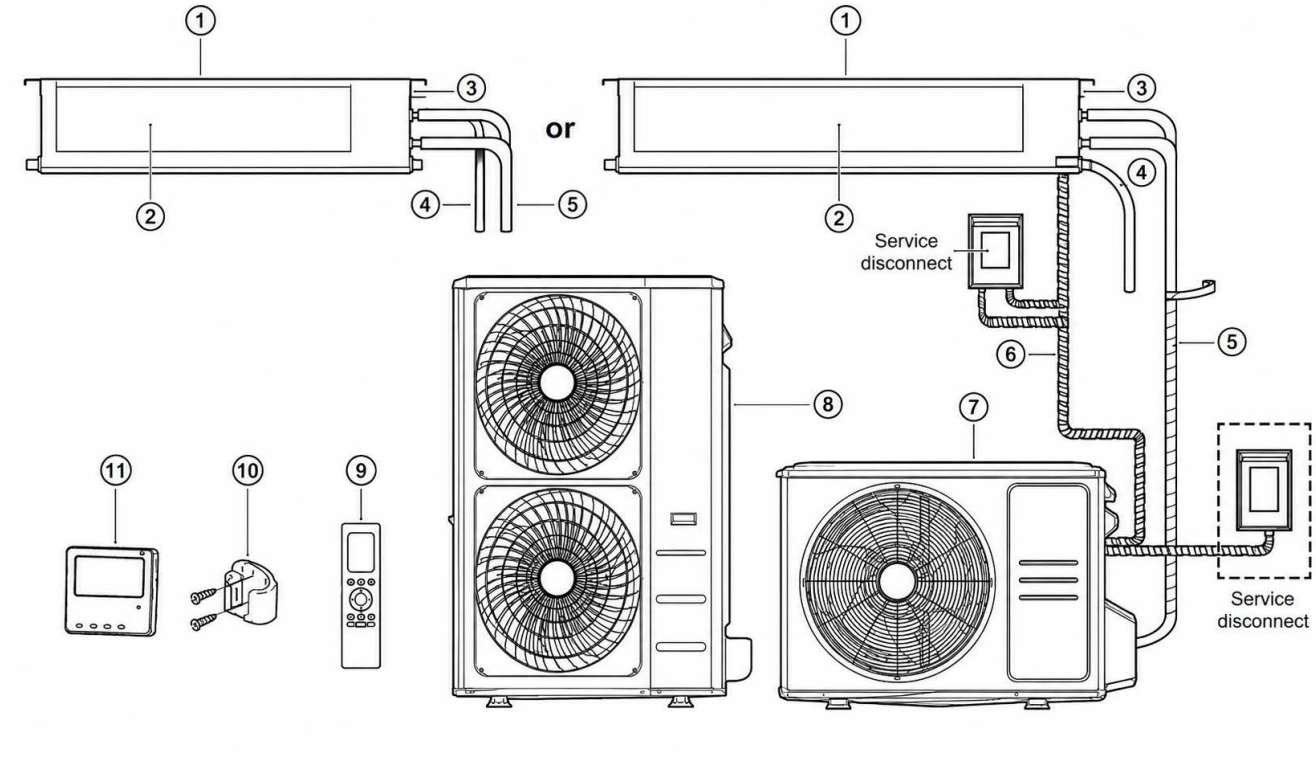
Product Overview

2

Part Names

Notes

- Illustrations in this manual are for explanatory purposes. The actual shape of the indoor unit may be slightly different. The actual shape shall prevail.
- Select a service disconnect meeting the requirements of the local, regional, and national codes.



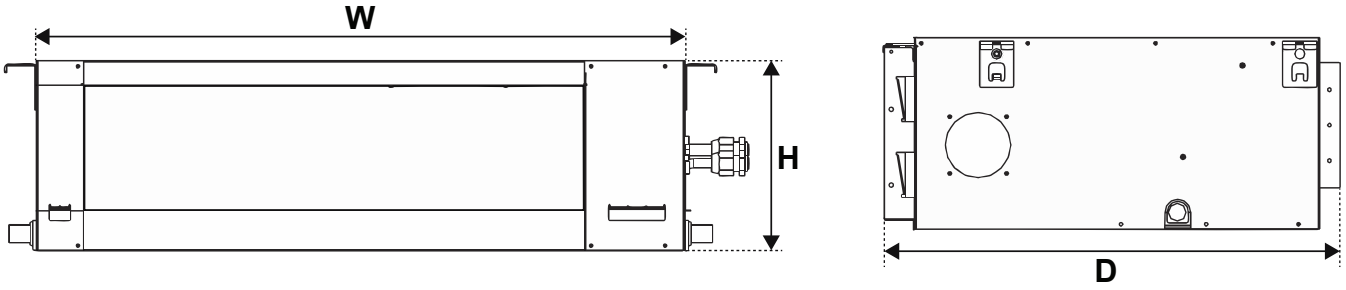
1. Air inlet
2. Air outlet
3. Electric control box
4. Drain pipe
5. Refrigerant Piping (purchase separately)
6. Communication cable (purchase separately)
7. Outdoor unit (A)
8. Outdoor unit (B)
9. Remote controller (purchase separately)
10. Remote controller holder (purchase separately)
11. Wired remote controller

Product Overview

2

Dimensions & Weight

Indoor Unit



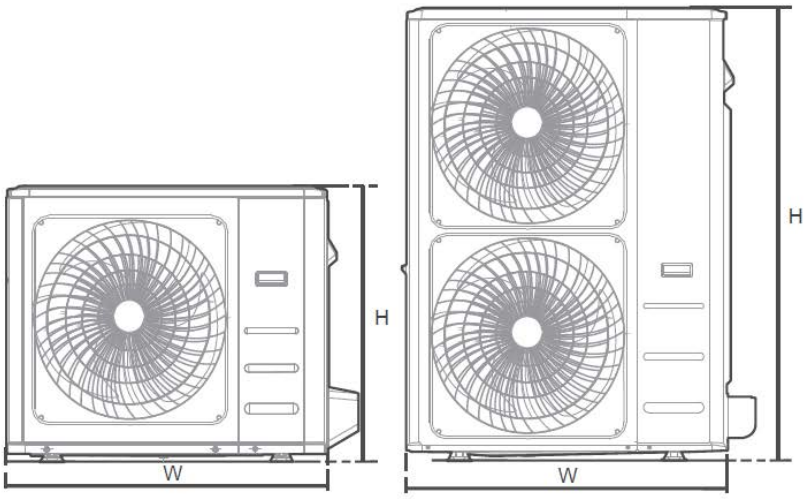
Indoor Unit	Dimensions		
	W	D	H
RB036GMSILDFHG	47-1/4 in	29-1/2 in	11-7/8 in
	1,200 mm	749 mm	302 mm
RB048GMSILDFHG	47-1/4 in	29-1/2 in	11-7/8 in
	1,200 mm	749 mm	302 mm

Indoor Unit	Net Unit Weight
RB036GMSILDFHG	106.3 lbs
	48.2 kgs
RB048GMSILDFHG	111.3 lbs
	50.5 kgs

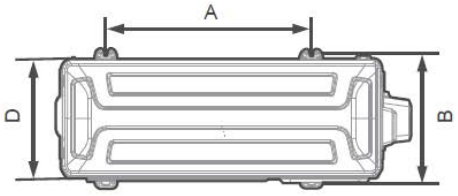
Product Overview

2

Outdoor Unit



Front View



Top View

Outdoor Unit	Dimensions				
	W	D	H	A	B
YN036GMSI20RUG	37-1/4 in	16-1/4 in	31-7/8 in	26-1/2 in	15-7/8 in
	946 mm	413 mm	810 mm	673 mm	403 mm
YN048GMSI20RUG	37-1/2 in	16-3/8 in	52-1/2 in	25 in	16 in
	952.5 mm	416 mm	1,333.5 mm	635 mm	406 mm

Outdoor Unit	Net Unit Weight
YN036GMSI20RUG	152.4 lbs
	69.1 kgs
YN048GMSI20RUG	208.8 lbs
	94.7 kgs

Product Overview

2

Operating Temperatures

The system is designed to run within a certain range of temperatures, which are listed below. The system has built-in protections that may stop the appliance when the ambient temperatures goes outside of these ranges.

Operating Temperatures	°F / °C
Temperature Setting Range	62~86°F
	17~30°C
Ambient Temperature Range for Cooling	5~131°F
	-15~55°C
Ambient Temperature Range for Heating	-13~86°F
	-25~30°C

Testing and rating agencies develop standard rating conditions to obtain full system-rated capacity and efficiency. Within certain limitations, variable speed compressors compensate the deviations from the rating conditions, especially the atmospheric conditions.

Heat pump systems function by exchanging energy between the indoor air and outdoor ambient air (atmospheric) in the form of heat. The system's net cooling or heating capacities and efficiencies change by atmospheric conditions, as well as the indoor air conditions, such as temperatures and humidity levels.

Professional individuals use detailed calculations to determine the capacity of the system required for a specific area or application, which are based on several internal and external factors.

To further optimize the performance of the unit, complete the following:

- Keep doors and windows closed.
- Use Timer On and Timer Off functions to limit energy usage.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

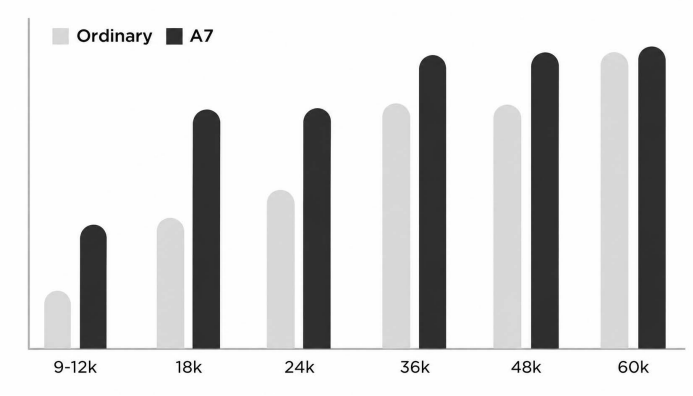
Product Overview

2

Features

Static Pressure Increase

The maximum medium static pressure (MSP) has been increased to 160Pa, which is industry-leading.
The maximum high static pressure (HSP) is 200pa, making it comparable to our competitors.

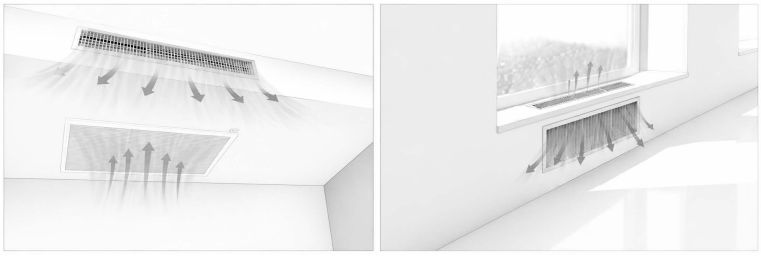


Real-Time Constant Air Volume

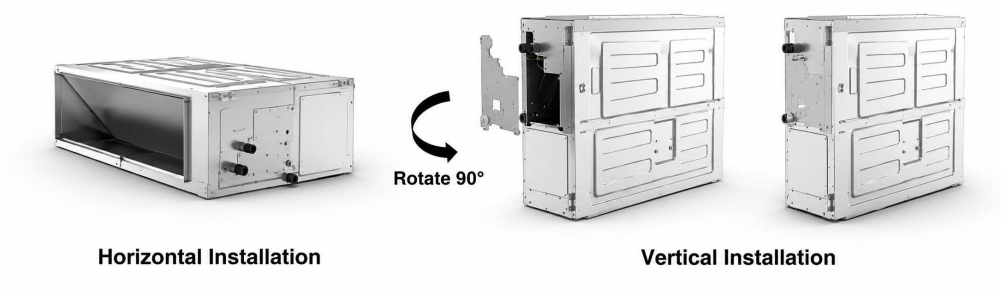
With the auto airflow match feature, the A7 duct automatically adjusts the airflow to fit various ducting designs. This ensures installation convenience, a comfortable experience, and cost savings.

Two Installation Methods

Two installation methods are available: ceiling-concealed and floor-concealed (optional).



The MSP duct machine requires no water tray replacement and features a water pump compatible with multiple installation methods.

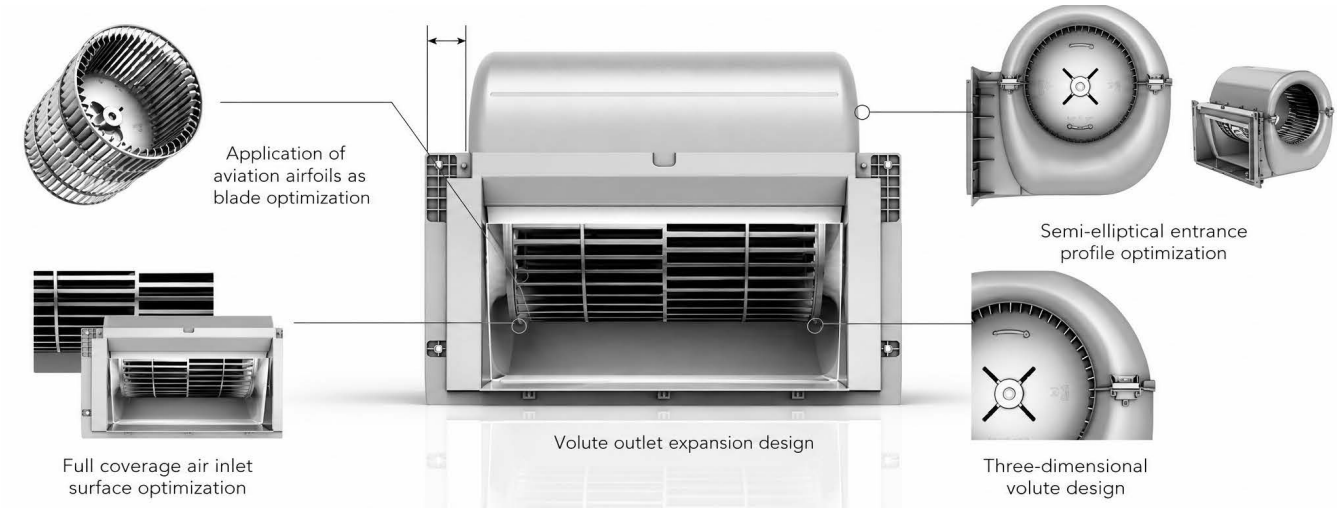


Product Overview

2

Duct Design Optimized

The redesigned ductwork significantly lowers ambient noise, improving occupant comfort during long periods inside.



Fan Motor Upgrade

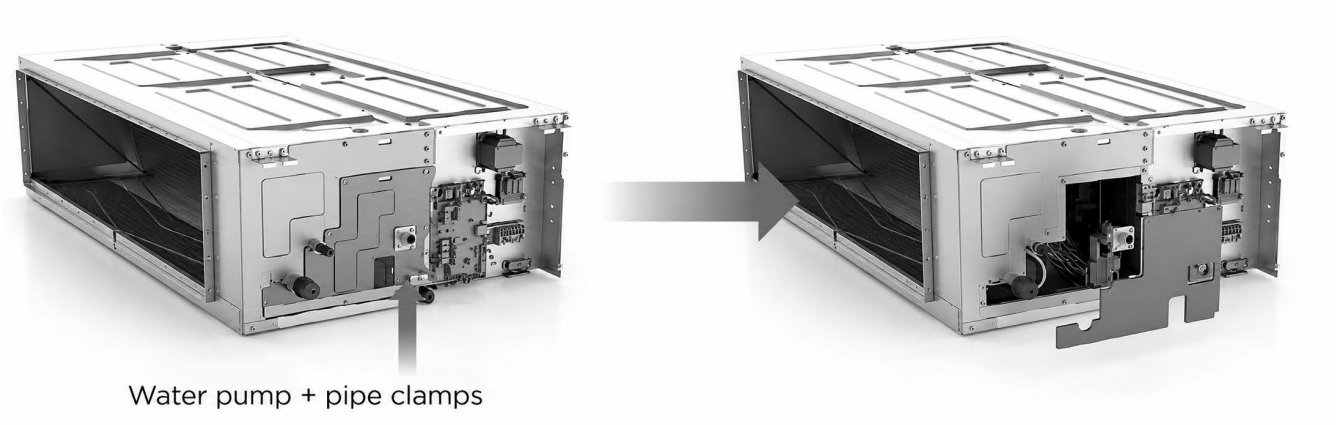
By combining three parts into one, the integrated motor bracket provides better stability and is easier to take apart and put back together.

Electric Control Upgrade

To provide more maintenance space, the electronic control box area has been increased by 10% and the driver board has been miniaturized by 40%. These upgrades make replacing the control box more convenient.

Drain Pump Upgrade

The service area for the A7 duct is 20% larger than that of the A6 duct. It is not necessary to pass through the opening when replacing the drain pump and temperature sensor.



Unpacking & Packing

3

Instructions for unpacking and packing the unit:

Unpacking:

Indoor Unit:

1. Cut the packing belt.
2. Unpack the package.
3. Take out the packing cushion and support.
4. Remove the packing film.
5. Take out the accessories.
6. Lift the machine out and lay it flat.

Outdoor Unit:

1. Cut the packing belt.
2. Take the unit out of the package.
3. Remove the foam from the unit.
4. Remove the packing film from the unit.

Packing:

Indoor Unit:

1. Put the indoor unit into the packing film.
2. Put the accessories in.
3. Place the packing cushion and support into the package.
4. Put the indoor unit into the package.
5. Close the package and seal it.
6. Use the packing belt if necessary.

Outdoor Unit:

1. Put the outdoor unit into the packing film.
2. Put the bottom foam into the box.
3. Put the outdoor unit into the package, then put the upper packaging foam on the unit.
4. Close the package and seal it.
5. Use the packing belt if necessary,

Note

Keep all the packaging items in case they're needed in the future.

Installation Overview

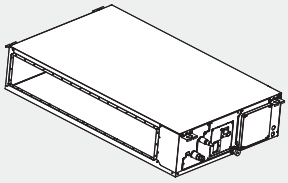
4

Installation Summary

1

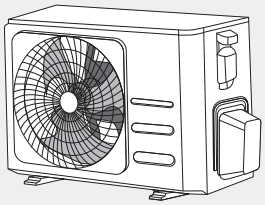
Select the installation locations

2



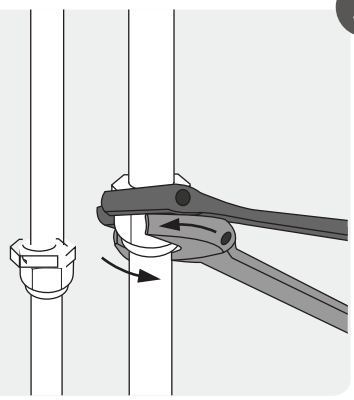
Install the indoor unit

3



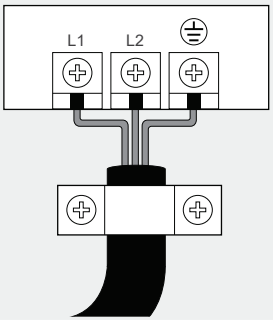
Install the outdoor unit

4



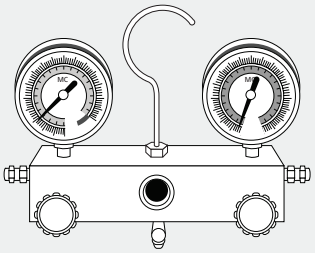
Connect the refrigerant pipes

5



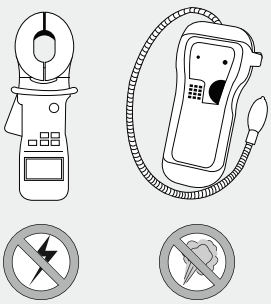
Connect the wires

6



Evacuate the refrigeration system

7



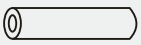
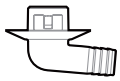
Perform a test run

Installation Overview 4

Accessories

The system comes with the following general accessories. Use all of the installation parts and accessories to properly install the air conditioner. The included items may vary slightly depending on the model. Pioneer reserves the right to modify the included components for product improvement without notice.

Improper installation may result in water leakage, electrical shock and fire, or equipment failure. The items that are not included with the air conditioner must be purchased separately.

Name of Accessories	Qty	Shape	Name of Accessories	Qty	Shape
Manual	2~4		Magnetic ring (Wrap the electric wires S1 & S2 (P & Q & E) around the magnetic ring twice)	1	 S1&S2 (P&Q&E)
Refringent in/out pipe protection cover	2				
Copper nut	2				
Wired remote controller (with packing)	1		Magnetic ring (Hitch it on the connective cable between indoor and outdoor units after installation.)	1	
Outlet pipe sheath	1				
Outlet pipe clasp	1		Display panel	1	
Seal ring	1		Remote controller & Battery (purchase separately)	1	
				2	
Drain joint	1		Remote controller holder (purchase separately)	1	

Connecting Pipe Sizes

Pipes are not included in the accessories and need to be purchased separately from the local dealer.

Name	Model	Pipe Specification	
		Liquid Side	Gas Side
Connecting pipe assembly	36K	Ø3/8 in (Ø9.52 mm)	Ø3/4 in (Ø19 mm)
	48K	Ø3/8 in (Ø9.52 mm)	Ø3/4 in (Ø19 mm)

Installation Overview

4

Optional Accessories

There are two types of remote controls: Wired and wireless.
Select a remote controller based on customer preferences and requirements. Install the remote control in an appropriate place. Refer to catalouges and technical literature for guidance on selecting a suitable remote controller.

Installation 5

5.1. Select the Installation Locations

Before installing the indoor and outdoor units, choose the appropriate locations.

Notes

- Before starting, refer to the label on the product box to make sure that the model number of the indoor unit matches the model number of the outdoor unit.
- We recommend understanding the guidelines for selecting ideal locations for the indoor and outdoor units.
- Refrain from exerting force on other parts of the unit, especially the refrigerant piping, water discharge piping, and plastic parts.

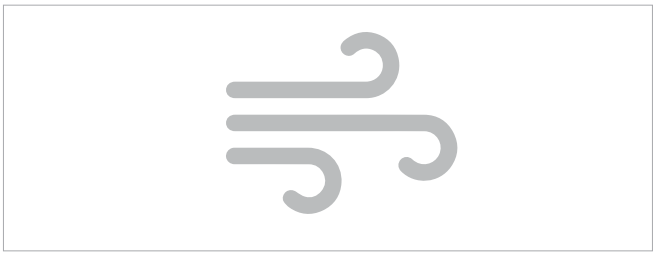
Indoor Unit

Select an indoor unit installation location that meets these standards:

☑ Sufficient space for installation and maintenance.

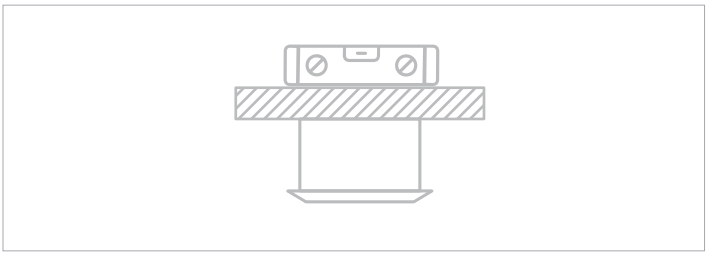
☑ Sufficient space to connect the refrigerant pipes and condensate drain hose.

☑ No direct radiation from heaters.



☑ The air inlet and outlet are not blocked.

☑ The airflow can fill the entire room.



☑ The ceiling is horizontal and its structure can sustain the weight of the indoor unit.

Installation

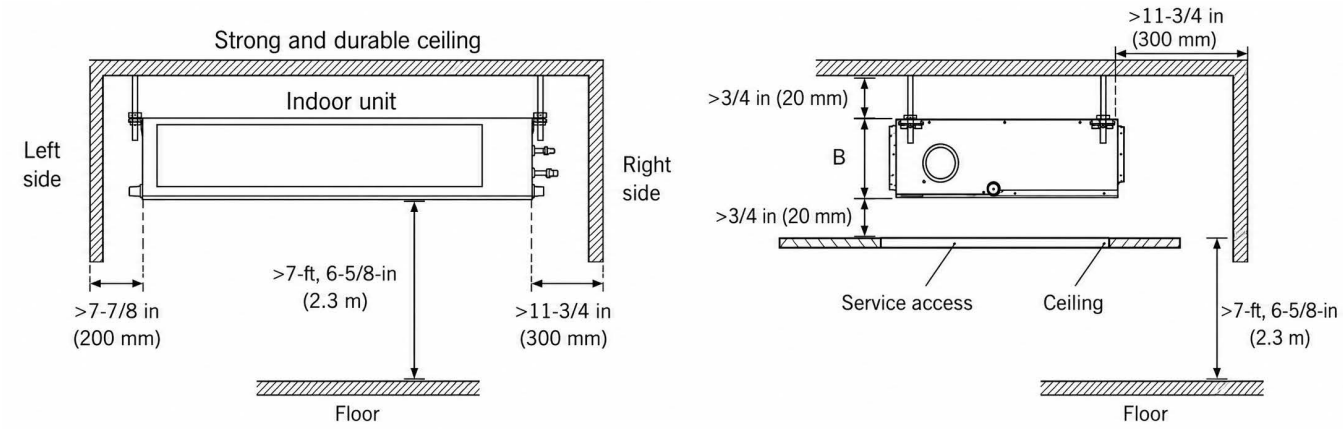
5

Do not install the unit in the following locations:

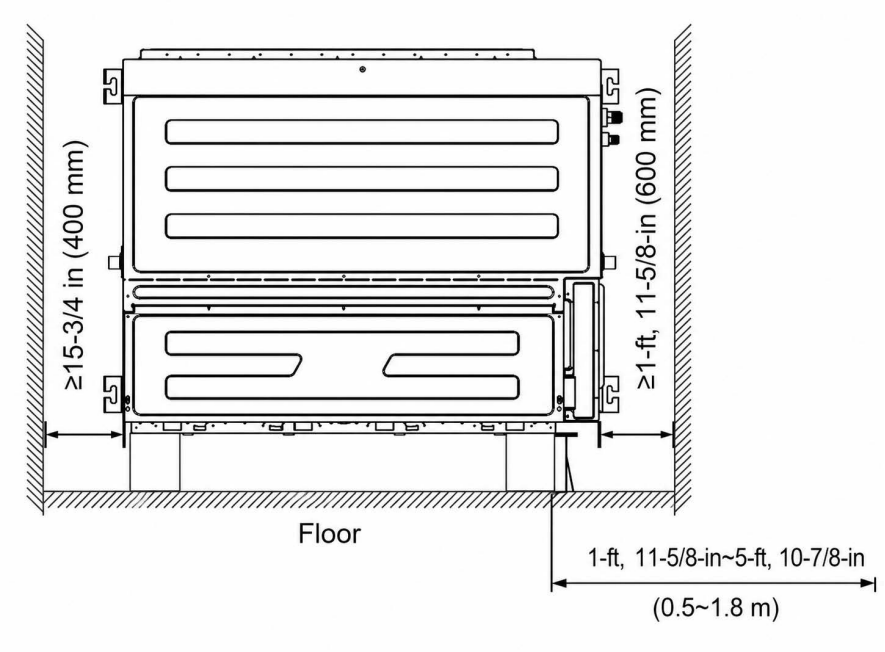
- Areas with oil drilling or fracking
- Coastal areas with high salt content in the air
- Areas with caustic gases in the air, such as hot springs
- Areas that experience power fluctuations, such as factories
- Enclosed spaces, such as cabinets
- Kitchens that use natural gas
- Areas with strong electromagnetic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

The distances between the mounted indoor unit must meet the following specifications:

Ceiling-Mounted



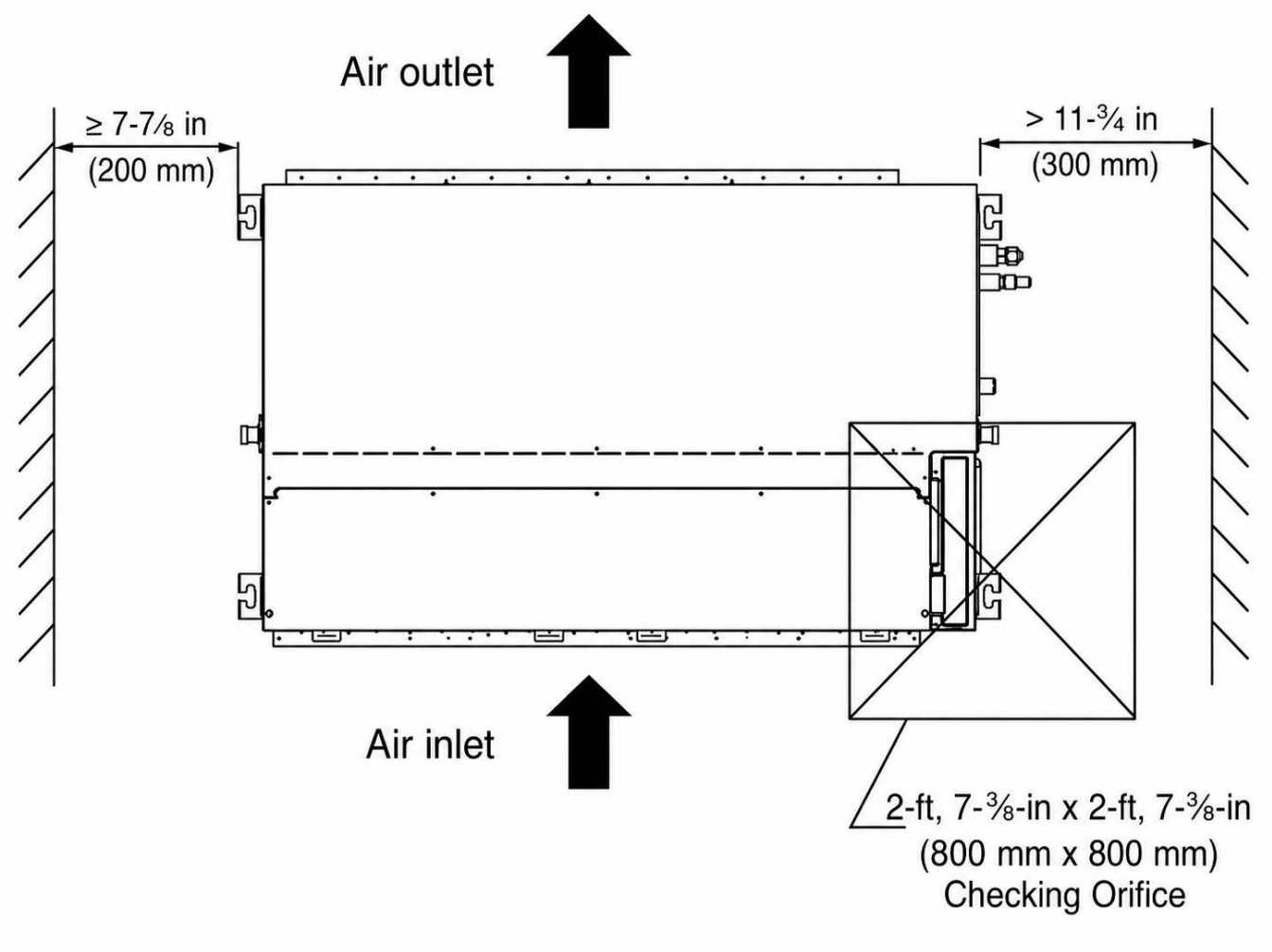
Wall-Mounted



Installation

5

Maintenance Space

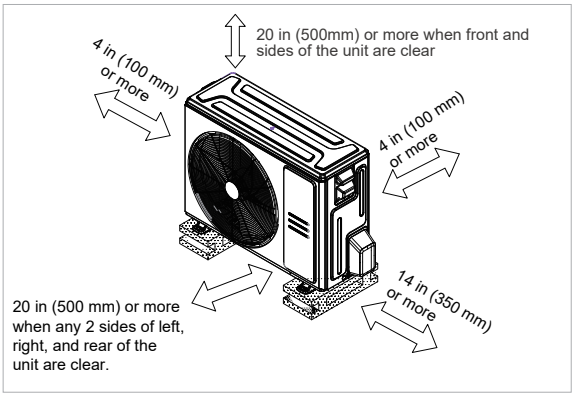


Installation

5

Outdoor Unit

Select an outdoor unit installation location that meets these standards:



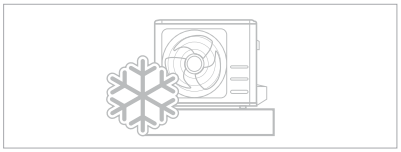
☑ Meets all spatial requirements shown in the installation clearance requirements above.

☑ Good air circulation and ventilation.

☑ Firm and solid—the location can support the unit and will not vibrate.

☑ Noise from the unit will not disturb other people.

☑ Protected from prolonged periods of direct sunlight or rain.



☑ Where snowfall is anticipated, take appropriate measures to prevent ice buildup and coil damage.

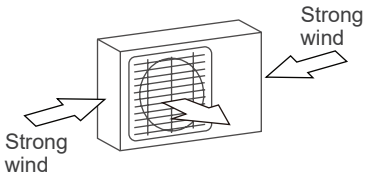
⚠ CAUTION:

Special Considerations for Extreme Weather

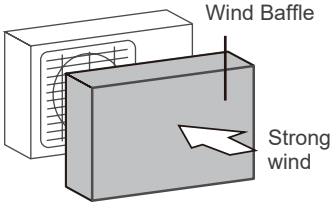
If the unit is exposed to heavy wind:
Install the unit so that the air outlet fan is at a 90-degree angle to the wind direction. If necessary, build a barrier in front of the unit to protect it from extremely strong winds.

If the unit is frequently exposed to heavy rain or snow:
Build a shelter above the unit to protect it from rain or snow, ensuring the airflow is not obstructed.

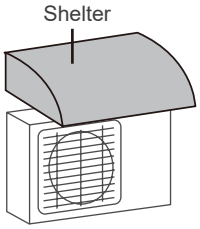
If the unit is frequently exposed to salty air (seaside):
Use an outdoor unit specifically designed for corrosion resistance.



90-degree angle to the direction of the wind



Build a wind baffle to protect the unit



Build a shelter to protect the unit

Installation

5

Do not the install the outdoor unit in the following locations:

- Near an obstacle that will block air inlets and outlets.
- Near public streets, crowded areas, or places where noise from the unit will disturb others.
- Near animals or plants that will be harmed by hot air discharge.
- Near any source of combustible gas.
- A location that is exposed to large amounts of dust.
- A location exposed to an excessive amount of salty air.

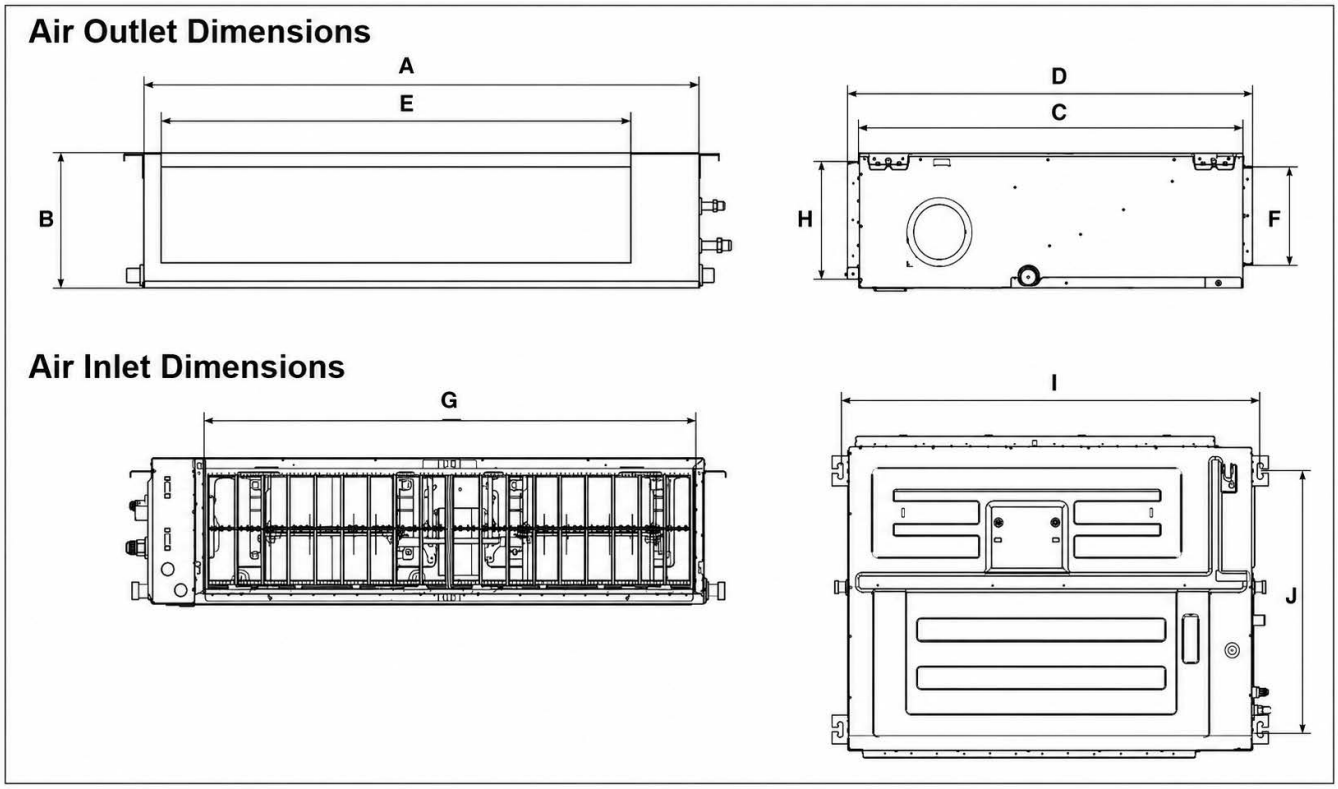
Installation

5

5.2. Indoor Unit Installation

A. Hang the Indoor Unit

1. Install the indoor unit's main body. Refer to the following diagrams to locate the four positioning screw holes on the ceiling and follow the guidelines for installing the ceiling bolt. Be sure to mark the locations for drilling the ceiling bolt holes.



MODEL	OUTLINE DIMENSIONS			
	A	B	C	D
36K/48K	3-ft, 11-1/4 in	11-3/4 in	2-ft, 5-1/2 in	2-ft, 7-1/4-in
	1.2 m	300 mm	750 mm	795 mm

AIR OUTLET OPENING SIZE		AIR RETURN OPENING SIZE		MOUNTED LUG SIZE	
E	F	G	H	I	J
3-ft, 4-3/8-in	9-1/4 in	3-ft, 7-in	10-1/2 in	4-ft, 3/4-in	2-ft, 1-1/4-in
1.03 m	233 mm	1.09 m	267 mm	1.24 m	640 mm

Installation

5

Hanging Methods

⚠ CAUTION

Ensure the unit and hole are the same size before moving on.

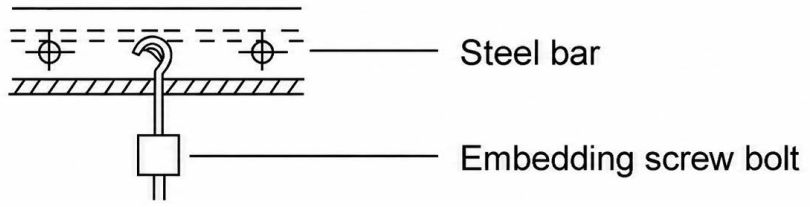
New Concrete Bricks

Inlay or embed the screw bolts.

(Blade shape insertion) (Slide insertion)

Original Concrete Bricks

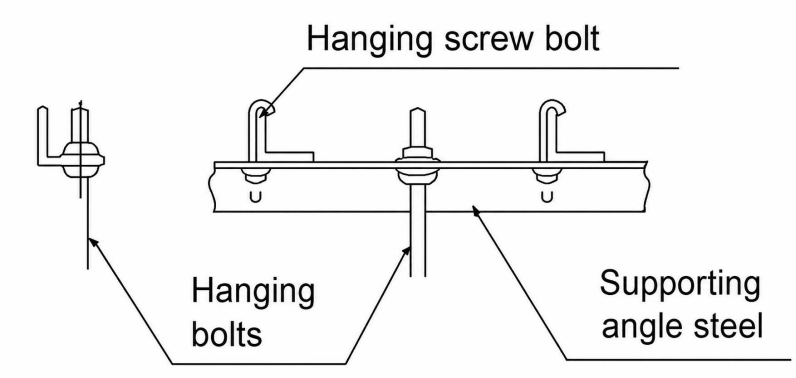
Use an embedding screw bolt, crock, and stick harness.



(Pipe hanging and embedding screw bolt)

Steel Roof Beam Structure

Install and use the supporting steel angle.

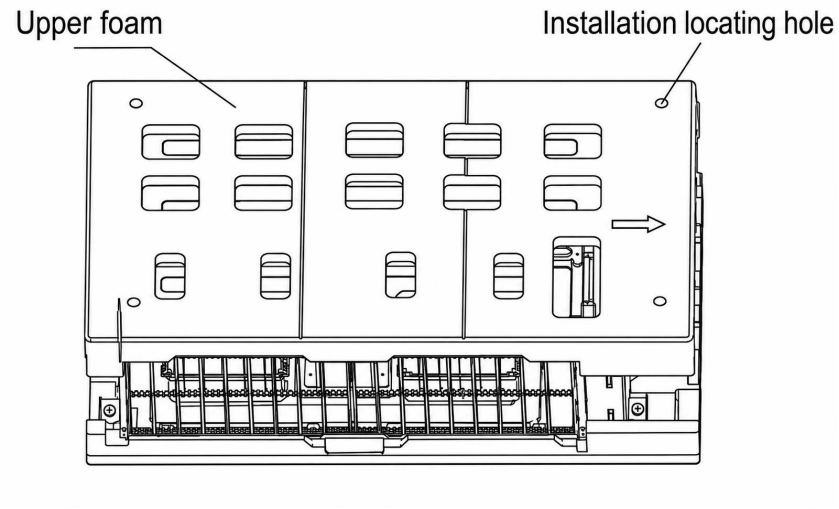


Installation

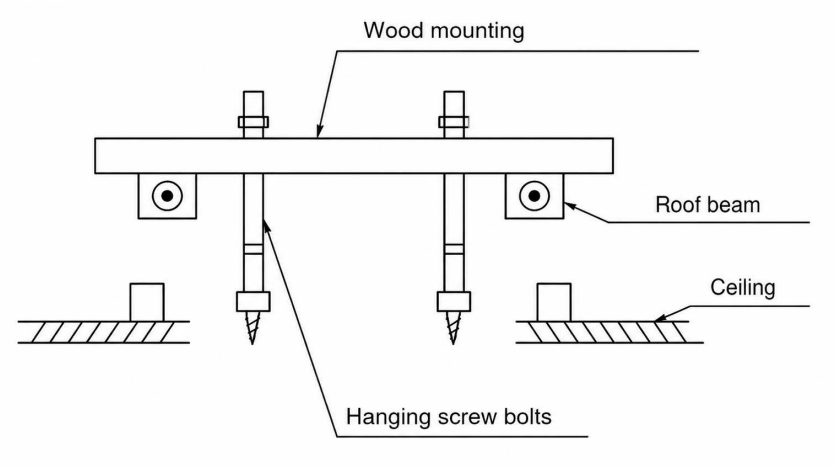
5

Wood

The upper foam's mounting holes are used for auxiliary positioning bolts. If the foam is damaged, the spacing between the actual lifting lugs should be the standard.



Place the wood mounting across the roof beam, then install the hanging screw bolts.



Installation

5

2. Install and fit the pipes and wires after finishing the main body installation. When choosing a starting point, first determine the direction of the pipes.

3. Install the hanging screw bolts:
a. Cut off the roof beam.
b. Strengthen the point at which the cut was made. Consolidate the roof beam.

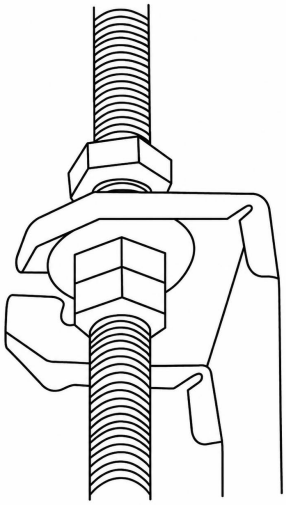
4. Prior to mounting the unit, ensure the refrigerant pipes, drainpipes, and indoor/outdoor lines are aligned with their respective connection points, particularly for ceiling-mounted applications.

5. Drill four holes, 3-⅞ inches deep (100 mm), into the ceiling at the hook positions. Be sure to hold the drill at a 90-degree angle to the ceiling.

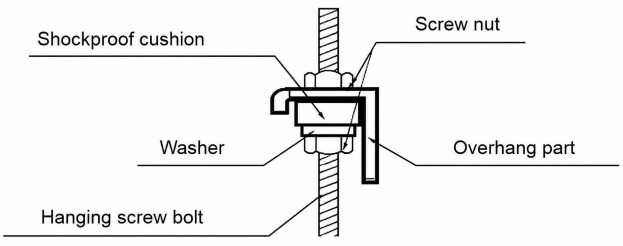
6. Secure the bolt using the provided washers and nuts.

7. Install the four suspension bolts.

8. Mount the indoor unit. At least two people are required to lift and secure it safely. Insert the suspension bolts into the unit's hanging holes. Fasten them using the provided washers and nuts.



9. Mount the indoor unit onto the hanging screw bolts with a block. Position the indoor unit flat using a level indicator to prevent leaks.



Note

Confirm the minimum drain tilt is 1/100 or more.

Installation

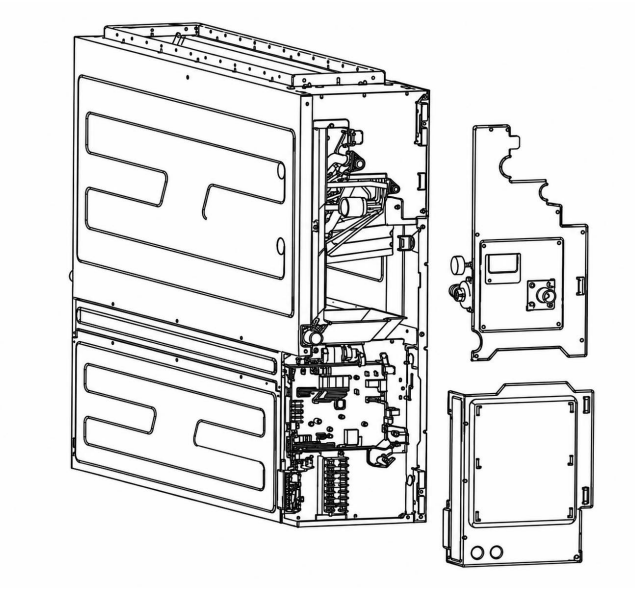
5

Wall-Mounted Installations

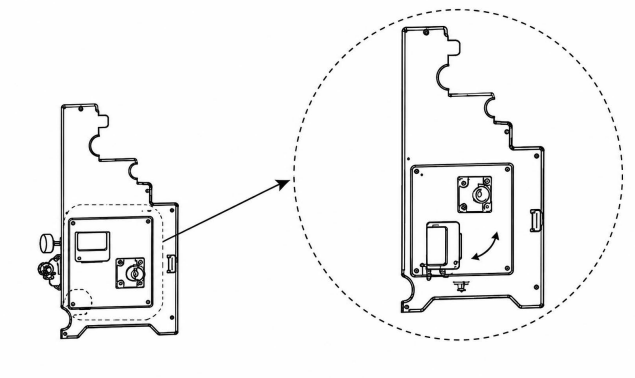
This unit supports wall-mounted installations. If the unit requires vertical mounting, follow these steps:

1. Remove the electrical control box cover, then unplug the drain pump and water level switch terminals from the main control board.

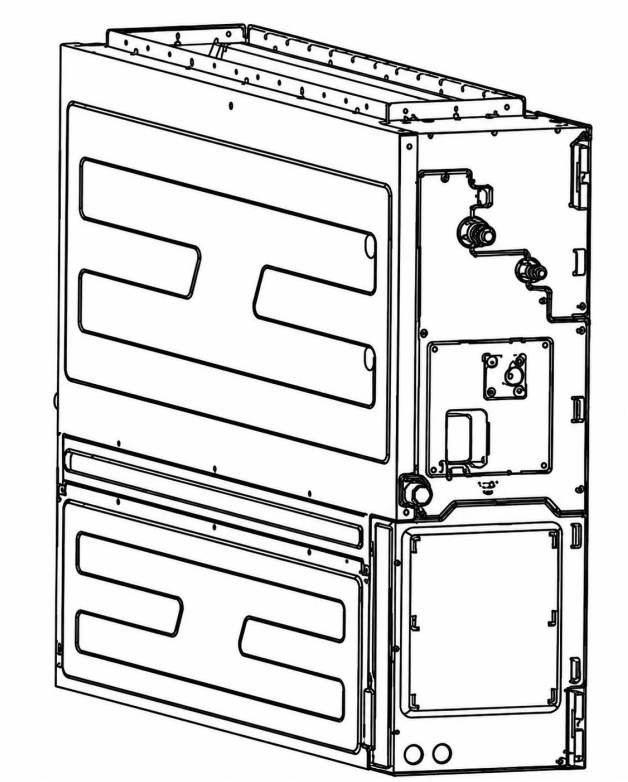
2. Disassemble the pump components.



3. Remove the four screws, then remove the water pump components by 90-degrees. Attach the screws to the water pump mounting plate again.



4. Install the pump parts to the machine and connect the wiring set.



Installation 5

B. Install the Air Duct

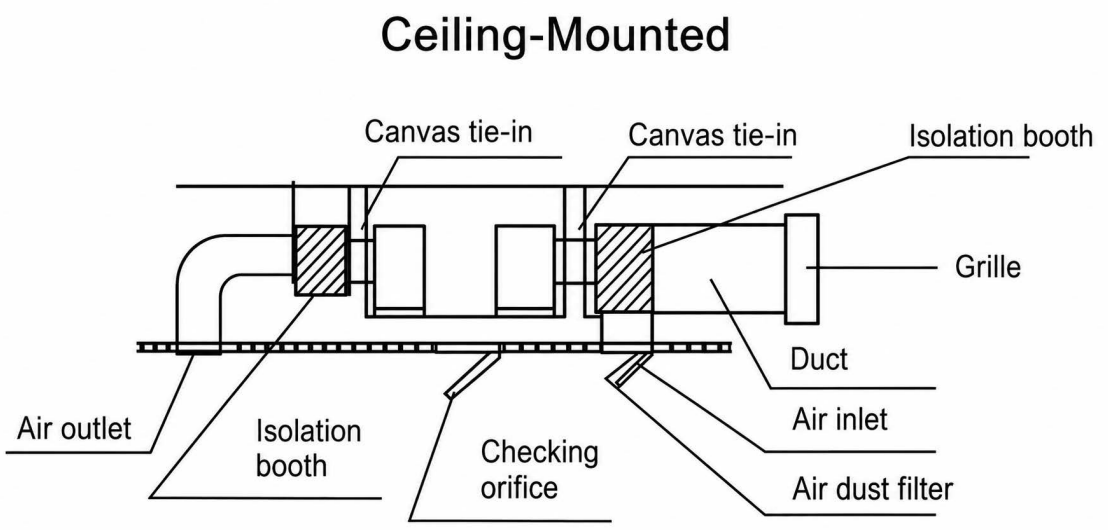
Notes

- The length of the air duct must be at least 3-feet, 3-⅜-inches (1 m) long. Attach the air inlet and outlet using the screws.
- Install a grille with the air duct inlet and secure it using screws.
- Do not place the connecting duct's weight on the indoor unit.
- When connecting the duct, use a nonflammable canvas tie-in to prevent vibration.
- Wrap the insulation foam around the exterior of the duct to prevent condensation. If the end-user requires noise reduction, add an internal duct underlayer.
- When the machine is wall-mounted, it should be concealed mounted and the air inlet and outlet should be installed with a grille. Attach the grille firmly with the screws.

⚠ CAUTION

Ensure that no part of the human body touches any internal components of the equipment after installation.

1. Install the filter according to the air inlet's size.
2. Install the canvas tie-in between the body and duct.
3. The air inlet and outlet ducts must be sufficiently spaced to prevent an air passage short-circuit.
4. Connect the duct according to the following diagrams:



Installation

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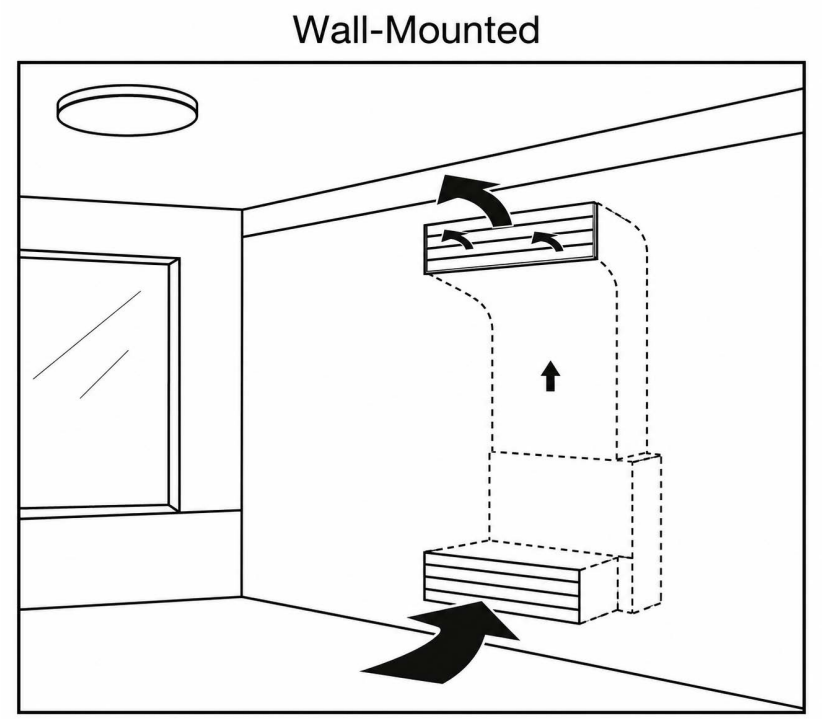
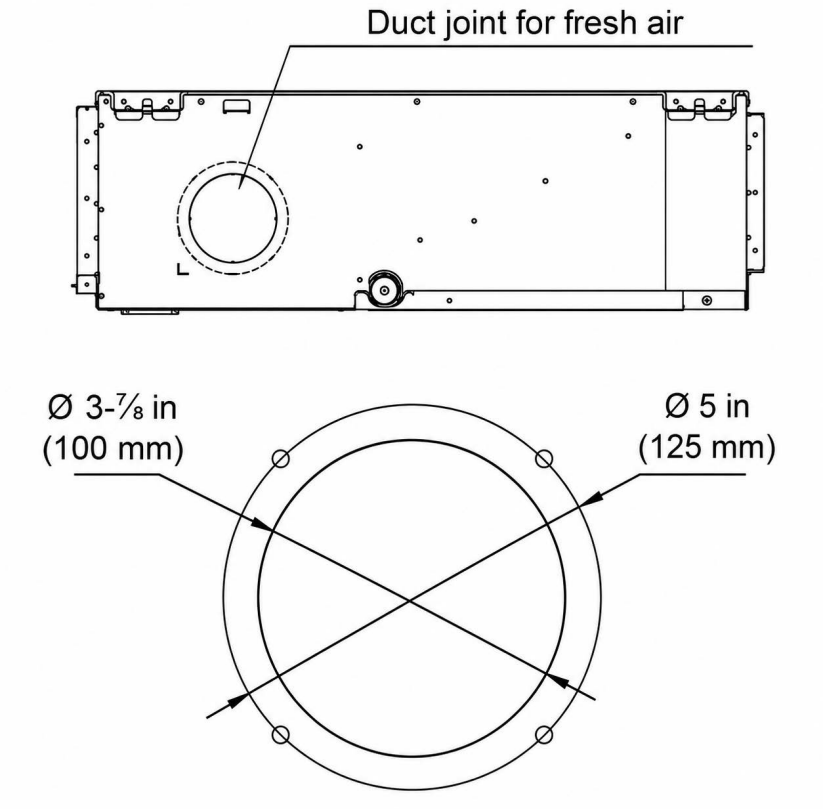


Fresh Air Duct Installation



Installation

5

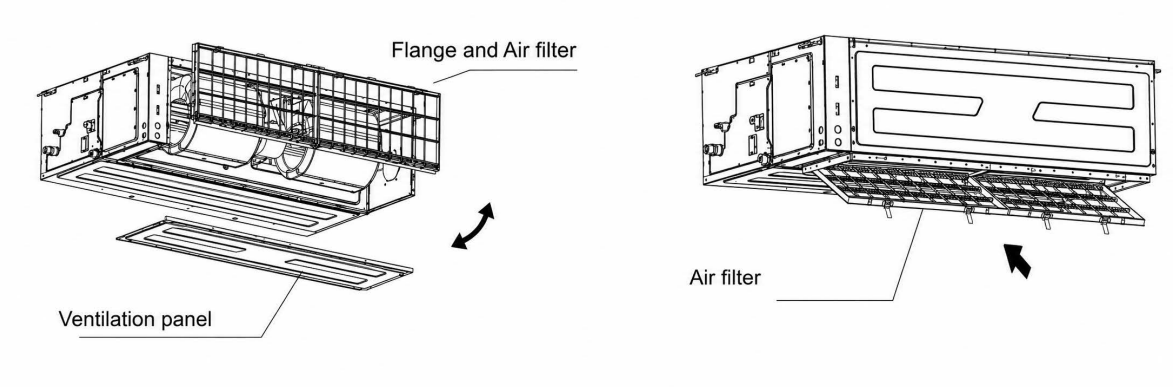
C. Install the Filter

Note

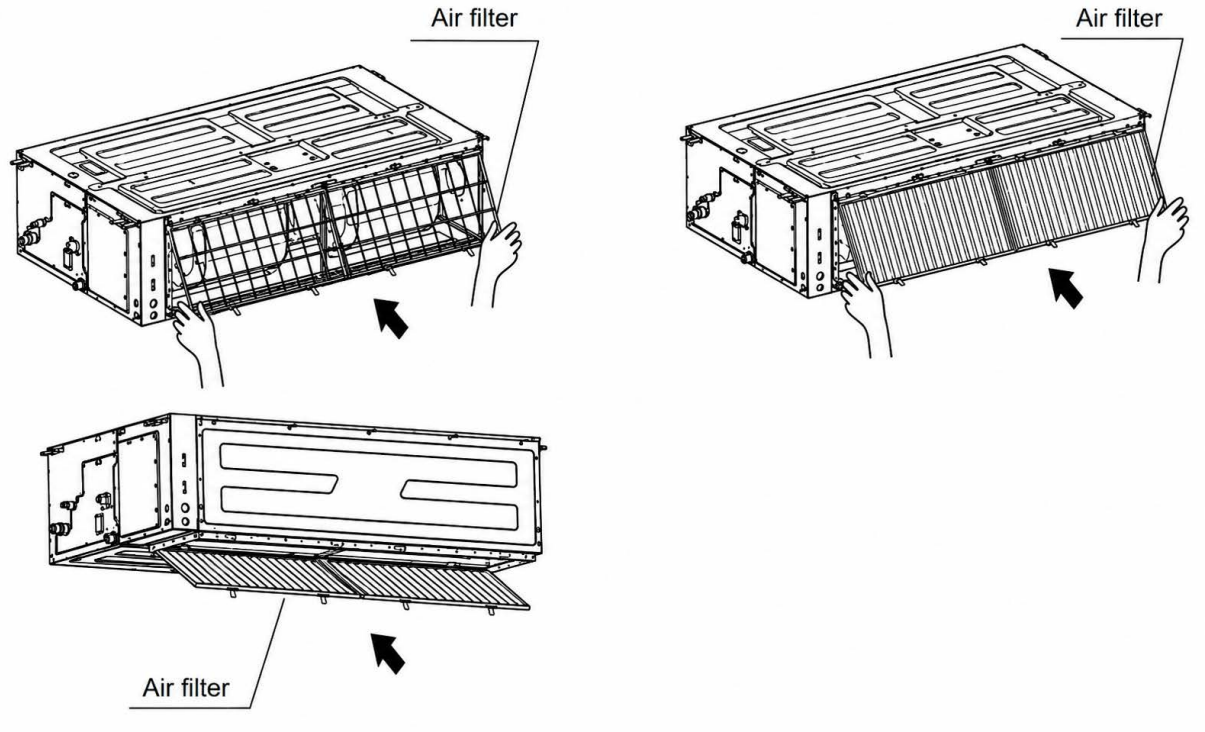
All the figures in this manual are for demonstration purposes only. The air conditioner you have purchased may be slightly different in design, though similar in shape.

1. The duct is set to rear return air by default, and can be modified to bottom return air as needed. Remove the ventilation panel, flange, and air filter.

2. Change the mounting positions of the ventilation panel and air return flange.



3. When installing the filter mesh, fit it into the flange as illustrated.



Installation 5

D. Drill the Wall Hole for the Piping

⚠ CAUTION

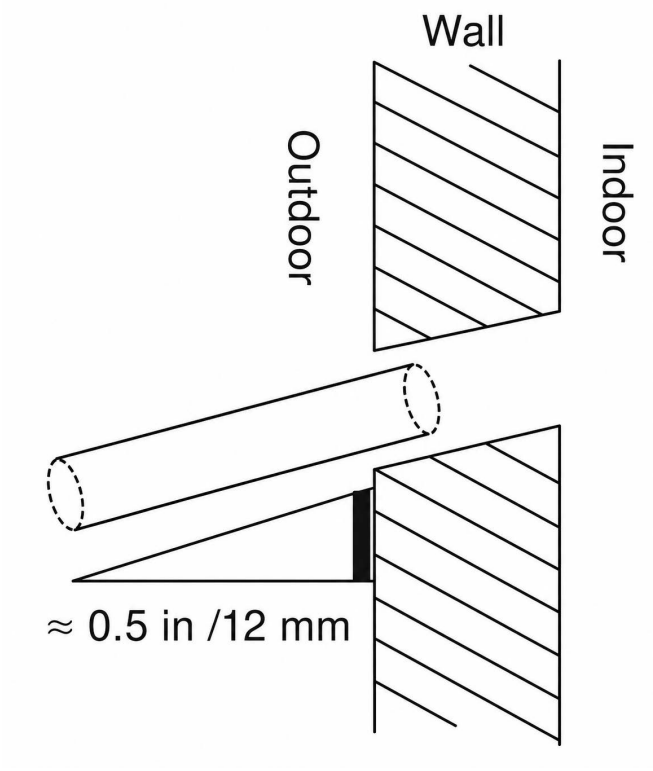
When drilling the wall hole, make sure to avoid wires, plumbing, and other sensitive components.

The hole being drilled in the wall is intended for the drainage and refrigerant piping.

1. Determine the wall hole's location based on the intended position of the outdoor unit.

2. Drill a hole through the wall using a 2-½ inches (63.5 mm) core drill. Make sure the hole is angled slightly downward so that the exterior opening is a ½ inch (12 mm) lower than the interior opening. This slope ensures proper water drainage.

3. Insert the protective wall cuff into the hole. This protects the edges of the hole and helps create a seal during the final installation steps.



Installation

5

E. Install the Condensate Drain Hose

The condensate drain hose, also called a drain line, directs water away from the unit. Improper installation may cause property damage.

⚠CAUTION

- Ensure the drain line installation complies with all local and national codes and regulations.
- Verify that the drain line is insulated to prevent condensation and potential water damage. If it is not, insulate it properly.
- If the drain line is bent or installed incorrectly, water may leak and cause a water-level switch malfunction.
- Do not pull the drain line forcefully. This could disconnect it.

Notes

- When using an extended drain line, tighten the indoor connection with an additional protection tube to prevent accidental disconnection.
- The drain line should slope downward at a gradient of at least 1/100 to prevent water from flowing back into the air conditioner.
- If the drain line outlet is higher than the pump joint, install a lift pipe for the indoor unit's exhaust outlet. Do not install the lift pipe higher than 2-feet, 5-½-inches (750 mm) from the ceiling board. The distance between the unit and lift pipe must be less than 11-¾ inches (300 mm). Improper installation may result in water backflow, potentially flooding the unit.
- To prevent air bubbles, keep the drain line level or slightly tilted up by 3 inches (less than 75 mm).
- Installation requires a polyethylene tube (exterior diameter = 1 in / 25 mm), which can be obtained at a local hardware store or dealer.

Installation

5

1. Plan the Drain Line Layout
Before beginning the installation, plan the drain line layout and connection.

2. Cut the Drain Line (If Needed)
If necessary, cut the drain line to fit your layout and connection.

3. Insulate the Drain Line (If Needed)

Verify that the drain line is insulated to prevent condensation and potential water damage. If it is not, insulate it properly. Insufficient insulation may allow dew to form due to low condensate temperatures, resulting in potential water damage.

Insulate the drain line before beginning the connection, excluding the joint sections. These will be insulated at the end of the procedure.

Ensure the insulation material is fitted tightly with no gaps. Do not over-tighten the insulation material. This may compress the air out of the material, causing poor insulation and early aging.

The insulation material must be made of flame-retardant material. Select a material that complies with local regulations.

The thickness of the insulation material must be more than ⅜ of an inch (10 mm).

Apply specialized adhesive to the insulation seams, then secure them with tape. Ensure the tape is at least 2 inches (51 mm) wide and applied firmly to prevent condensation.

4. Connect the Drain Hose

Attach the drain hose to the indoor unit's drain line connection.

Unlike wall-mounted systems, ceiling concealed units and other light commercial air conditioning systems require a PVC drain line. The flexible drain hoses are not suitable for these applications.

Use a rubber coupler to connect the drain hose to the PVC drain line, ensuring a secure, water-tight seal. The rubber coupler and PVC drain line are sold separately from the system.

Installation

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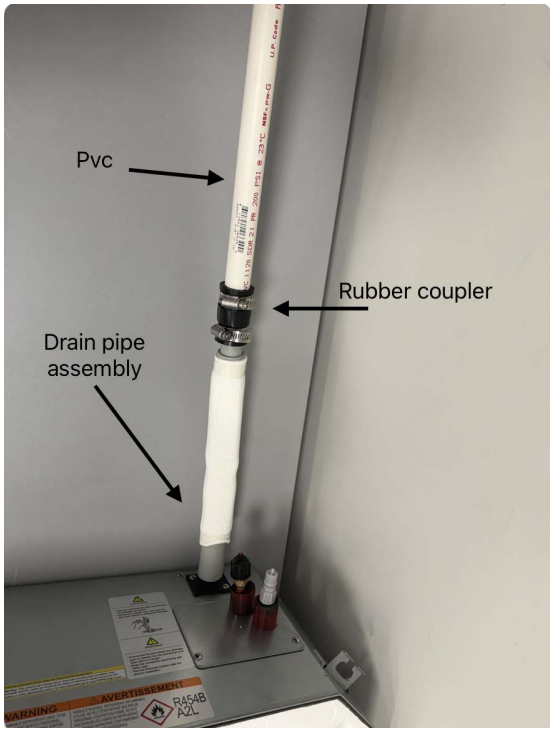
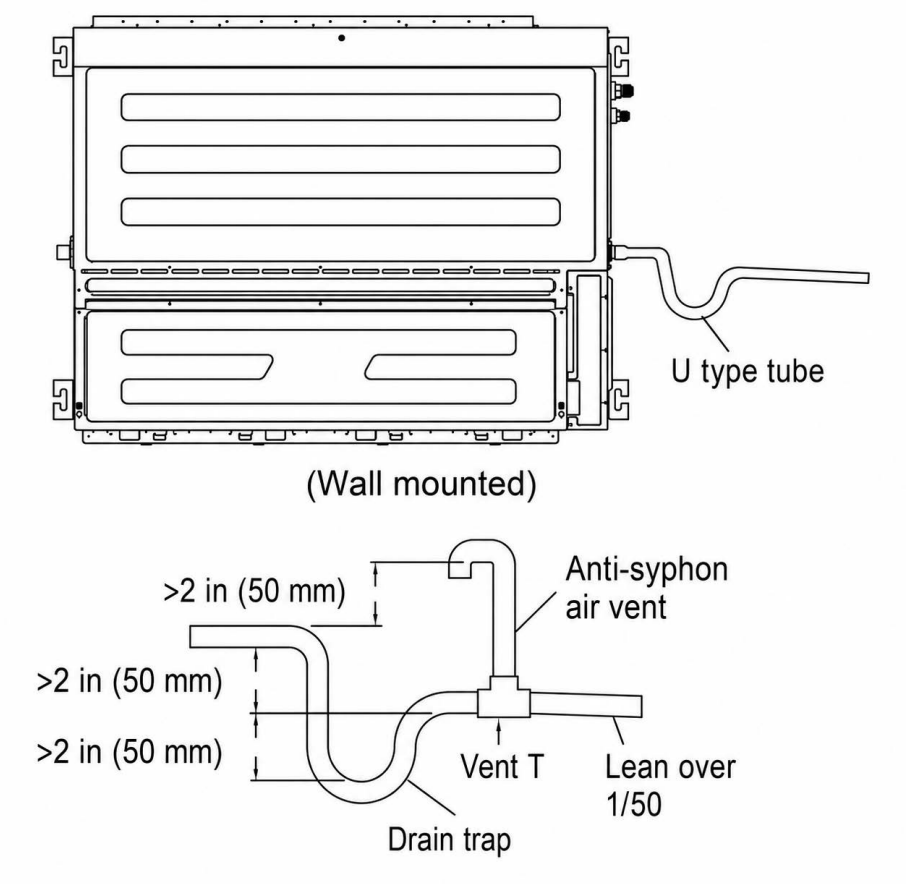
This is how the drain line assembly should look when attached to the PVC line with the rubber coupler:



Install the drain line assembly as illustrated:



Installation

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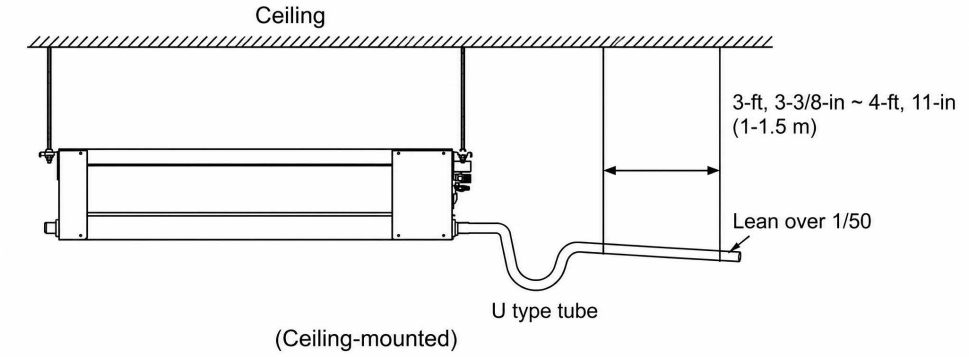
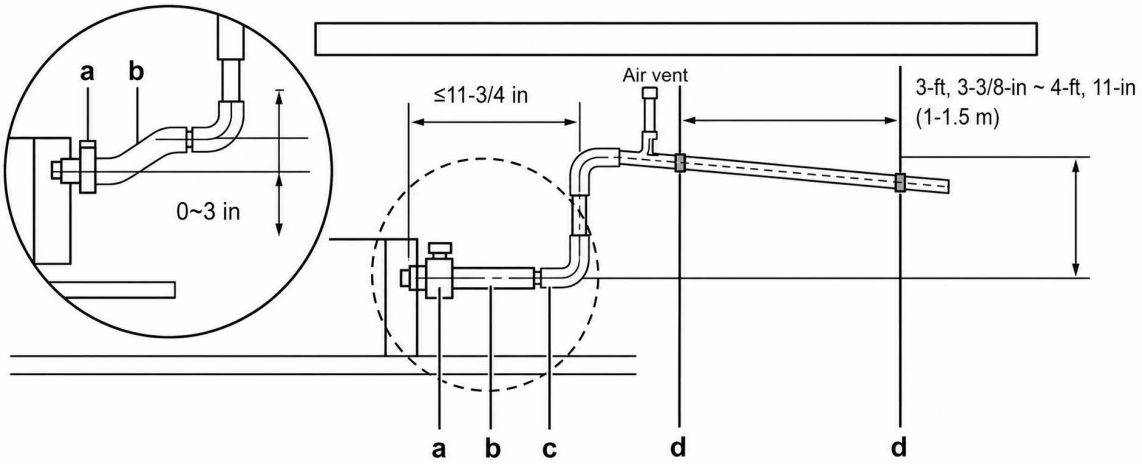
These units operate with a negative pressure at the drain connections, meaning a drain trap is required. The trap needs to be installed as close to the unit as possible. Make sure the top of the trap is below the connection to the drain pan, allowing complete drainage of the pan.

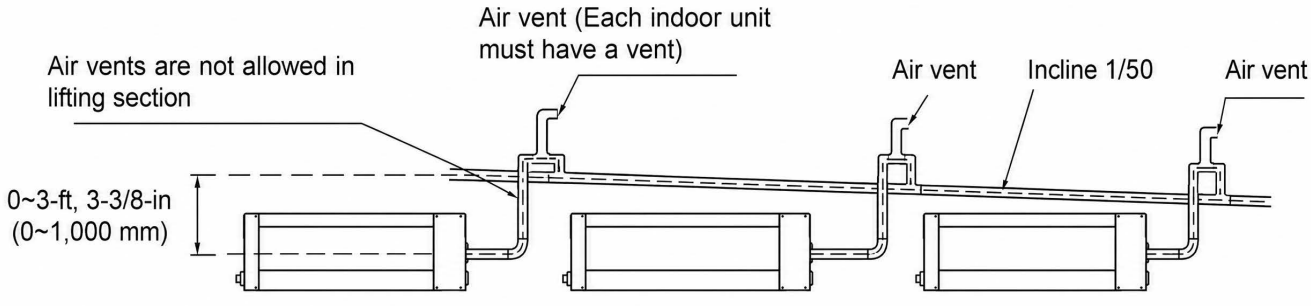


Install the drain line with a pump as illustrated:



a: Metal clamp (accessory)
b: Drain hose (accessory)
c: Rising drain piping - vinyl pipe with a nominal diameter of 1 inch / 25 mm and outer diameter of 1-¼ inches / 32 mm (field supply)
d: Hanging bars (field supply)

When connecting multiple drain hoses, install them as illustrated:



Installation

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5. Pass the Drain Line Through the Wall Hole

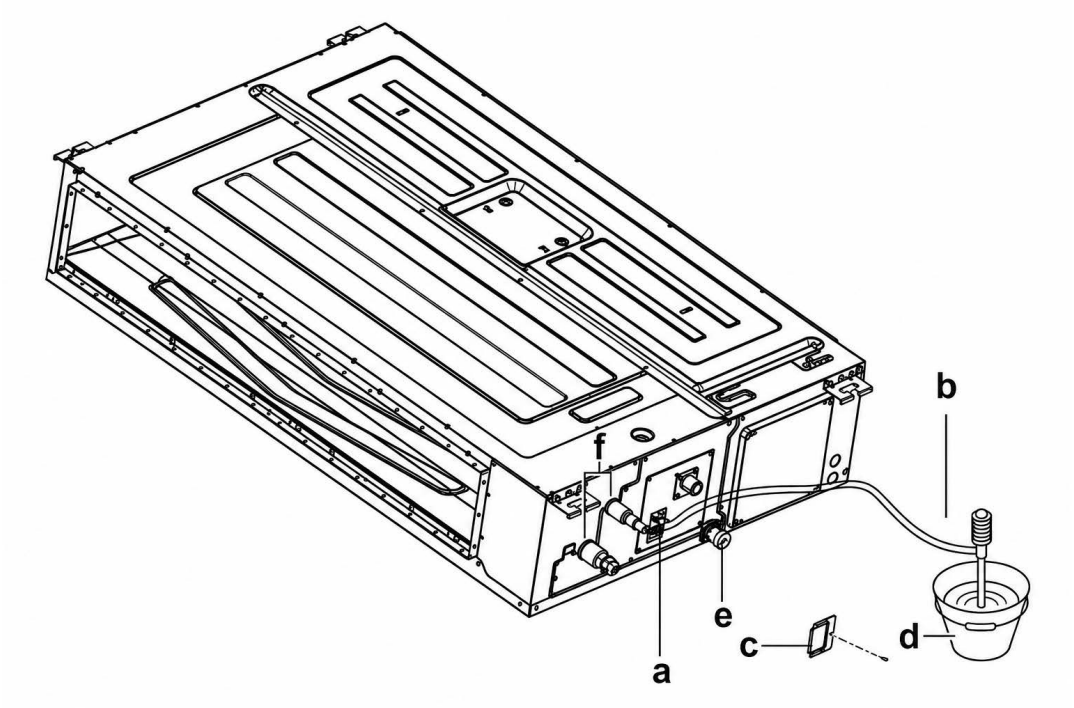
When passing the drain line through the wall hole, make sure the water drains to a safe location where it will not cause water damage or a slipping hazard.

The drain line outlet should be at least 1-⅞ inches (50 mm) above the ground. If it touches the ground, the unit may become blocked, potentially leading to a malfunction.

If the water is discharged directly into the sewer, ensure the drain has a U or S pipe to prevent odors from coming back into the house.

6. Complete a Drainage Test

This procedure differs depending on whether the electrical wiring is already finished. When the electrical wiring is not finished, temporarily connect the user interface and power supply to the unit.



a: Water inlet
b: Portable pump
c: Water inlet cover
d: Bucket (adding water through the water inlet)
e: Drain outlet for maintenance
f: Refrigerant pipes

Installation

5

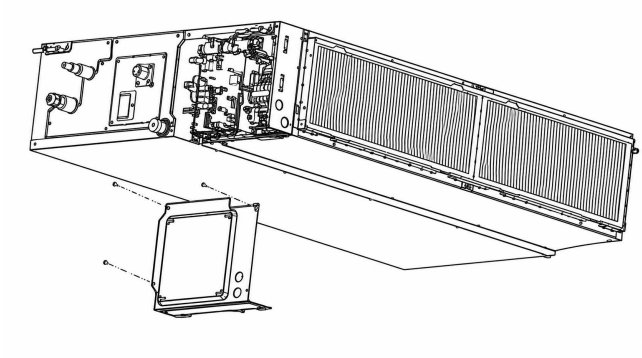
When the Electrical Wiring is Not Finished Yet

1. Temporarily connect the electrical wiring.

2. Remove the switch box cover.

3. Connect the single-phase power supply (50hz, 230V) to terminals 1 and 2 for proper power supply and earthing.

4. Reattach the switch box cover.



5. Turn on the power.

6. Start the cooling operation.

7. Gradually pour 1 liter of water through the air discharge outlet, then check for leaks.

8. Turn off the power.

9. Disconnect the electrical wiring.

10. Remove the control box cover.

11. Disconnect the power supply and earthing.

12. Reattach the control box cover.

When the Electrical Wiring is Finished

1. Start the cooling operation.

2. Gradually pour 1 liter of water through the air discharge outlet, then check for leaks.

7. Insulate the Joint Sections

The pipe joint insulation should be 2~4 inches (51~102 mm) longer than the gap to ensure a proper seal.

Insert the pipe joint insulation into the gap of the existing insulation.

Ensure the pipe joint insulation is securely fastened to the suction and liquid pipes to prevent gaps. Use glue to paste together the linking part. Do not over-tighten the insulation material. This may compress the air out of the material, causing poor insulation and early aging.

Installation

5

5.3. Outdoor Unit Installation

A. Install the Drain Joint (Optional)

The outdoor condensate drain hose is optional. It is only needed if the user does not want to use the default bottom drainage port.

If a drain hose is required, install the drain joint in the base pan hole of the outdoor unit before mounting. When mounting the outdoor unit on slabs, the installation of the drain joint and hose is not necessary.

There are two types of drain joints for the outdoor unit: one with a rubber seal and one without.

If the drain joint comes with a rubber seal (Figure A), follow these steps:

1. Fit the rubber seal on the end of the drain joint connecting to the outdoor unit.

2. Insert the drain joint into the hole of the unit's base pan.

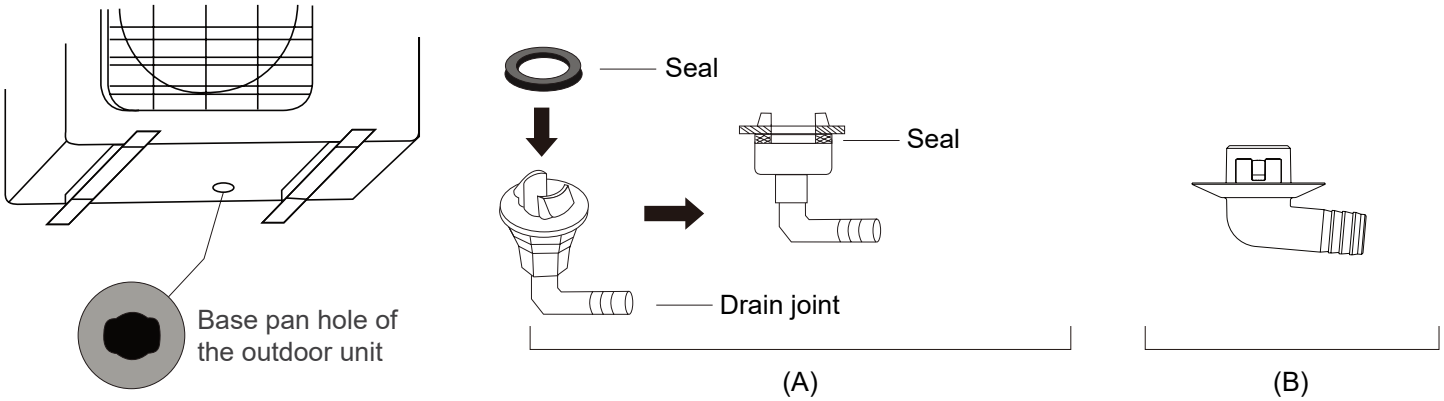
3. Rotate the drain joint 90-degrees until it clicks into place facing the front of the unit.

4. Connect a drain hose extension (not included) to the drain joint in order to redirect water from the unit during Heating mode.

If the drain joint does not come with a rubber seal (Figure B), follow these steps:

1. Insert the drain joint into the base pan hole, then press firmly to ensure it is properly installed and does not become loose.

2. Connect a drain hose extension (not included) to the drain joint in order to redirect water from the unit during Heating mode.



In Cold Climates

In cold climates, make sure the drain line is as vertical as possible to ensure swift water drainage. If water drains too slowly, it can freeze in the hose and flood into the unit.

Installation 5

B. Mount the Outdoor Unit

⚠ WARNING

When drilling into concrete, eye protection is recommended at all time.

Notes

Before mounting the outdoor unit, read these notes:

General Notes

- Before connecting any pipes or cables, install the outdoor unit on a pad or solid wall using suitable mounting brackets.
- Decide the best position on the wall or ground and leave enough space in order to carry out maintenance easily.
- Follow all national regulations when installing the unit.

Mounting on Slabs

- The installation of the drain joint and tubing is not necessary when mounting the unit on slabs.

Wall Mounting

- Before mounting the unit on the wall, make sure the wall is made of solid brick, concrete, or a similarly strong material. The wall must be able to support at least four times the weight of the unit.
- Fasten the supporting brackets to the wall using hardware that is particularly suited for the type of wall. Use the appropriate amount of hardware for the application. Installing four rubber pads is optional.
- If allowed, install the wall-mounted unit with rubber gaskets to reduce vibration and noise.

Choose the best location on the wall or ground, leaving enough space for easy maintenance. The outdoor unit can be mounted to the ground or on wall brackets. The following list shows different outdoor unit sizes and the distance between their mounting feet. Prepare the installation base for each unit according to the dimensions found on **Page 21** in the *Product Overview* section.

Installation

5

Ground/Concrete Mounting Platform

1. Mark the positions for the four bolts based on the dimensions.

2. Pre-drill holes for the bolts.

3. Clean the concrete dust away from the holes.

4. Place a nut on the end of each bolt.

5. Hammer the bolts into each hole.

6. Remove the nuts from the bolts and place the outdoor unit onto the bolts.

7. Put washers onto each expansion bolt, then replace each of the nuts.

8. Use a wrench to tighten each nut until snug.

Wall-Mounted Bracket

1. Mark the positions for the bracket holes based on the dimensions.

2. Pre-drill holes for the bolts.

3. Clean the concrete dust away from the holes.

4. Place a washer and nut on the end of each bolt.

5. Thread expansion bolts through the holes in the mounting bracket. Then, put the mounting bracket in position and hammer the expansion bolts into the wall.

6. Confirm the mounting bracket is level.

7. If the feet of the outdoor unit have rubber pads already installed and are using a local dealer's wall-mounting bracket, remove them before attempting to mount the condenser to the bracket. The mounting bracket has rubber isolating pads on it that will take the place of these.

8. Carefully lift the unit and place its mounting feet on the brackets.

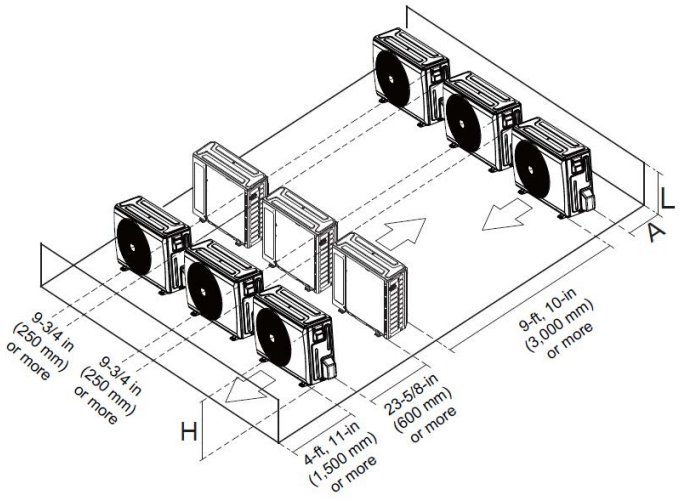
9. Bolt the unit firmly to the brackets.

Installation

5

Multiple Outdoor Units

If multiple outdoor units are being installed in a row, follow these guidelines:



	L	A
L ≤ H	L ≤ 1/2H	9-¾ in (250 mm) or more
	1/2H < L ≤ H	11-¾ in (300 mm) or more
L > H	Cannot be installed	

H: Unit height
L: Height of the wall behind the unit
A: Distance between the unit and wall

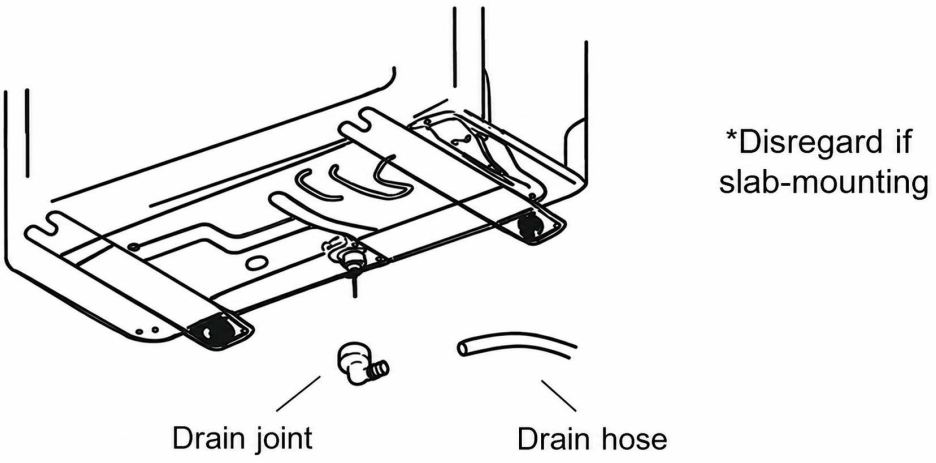
C. Install the Condensate Drain Hose (Optional)

The outdoor condensate drain hose is optional. It is only needed if the user does not want to use the default bottom drainage port. Installing a drain hose is unnecessary if the unit is slab-mounted.

Instructions for planning the drain line layout, cutting the hose, and adding insulation are on **Page 43** in the *Installation* section. Revisit this page if necessary.

1. Connect the condensate drain hose to the drain joint at the bottom of the unit.

2. Ensure the water drains to a suitable location.



Installation

5

5.4. Refrigerant Piping Connection

Prerequisite:

- Do not install the connecting pipe until both the indoor and outdoor units have been installed.

Refrigerant Piping Specifications

Refer to this table for refrigerant piping specifications, such as maximum length and drop height.

RYB-20	36K BTU	48K BTU
Liquid Pipe Diameter	Φ 3/8 in	Φ 3/8 in
Gas Pipe Diameter	Φ 3/4 in	Φ 3/4 in
Max. Length of Pipe with Standard Charge	25 ft / 7.6 m	25 ft / 7.6 m
Max. Length Between Indoor and Outdoor Unit	250 ft / 76 m	250 ft / 76 m
Adjustment Refrigerant Charge (For each additional foot after 25 ft.)	0.32oz/ft	
Max. Drop Height Between Indoor and Outdoor Unit	100 ft / 30.5 m	100 ft / 30.5 m
Type of Refrigerant	R-454B	

Notes

- Confirm the refrigerant piping is insulated. All refrigerant piping from Pioneer arrives pre-insulated. If you purchase refrigerant piping from another dealer that is not insulated, ensure that you insulate them correctly.
- Confirm the refrigerant piping is flared. All refrigerant piping from Pioneer arrives pre-flared. If you purchase refrigerant piping from another dealer that is not pre-flared, ensure that you flare them correctly.
- The length of the refrigerant piping will affect the performance and energy efficiency of the unit.
- Nominal efficiency is tested on units with a pipe length of 16 feet (4.9 m).
- The factory precharge supports up to 25 feet (7.6 m) of connected lineset.
- The total piping length should not be less than 10 feet (3 m).
- If the factory precharge is modified, make a note of the charge modification amount.

Installation

5

A. Plan the Piping Layout

Before beginning the installation, plan the refrigerant piping layout and connection.

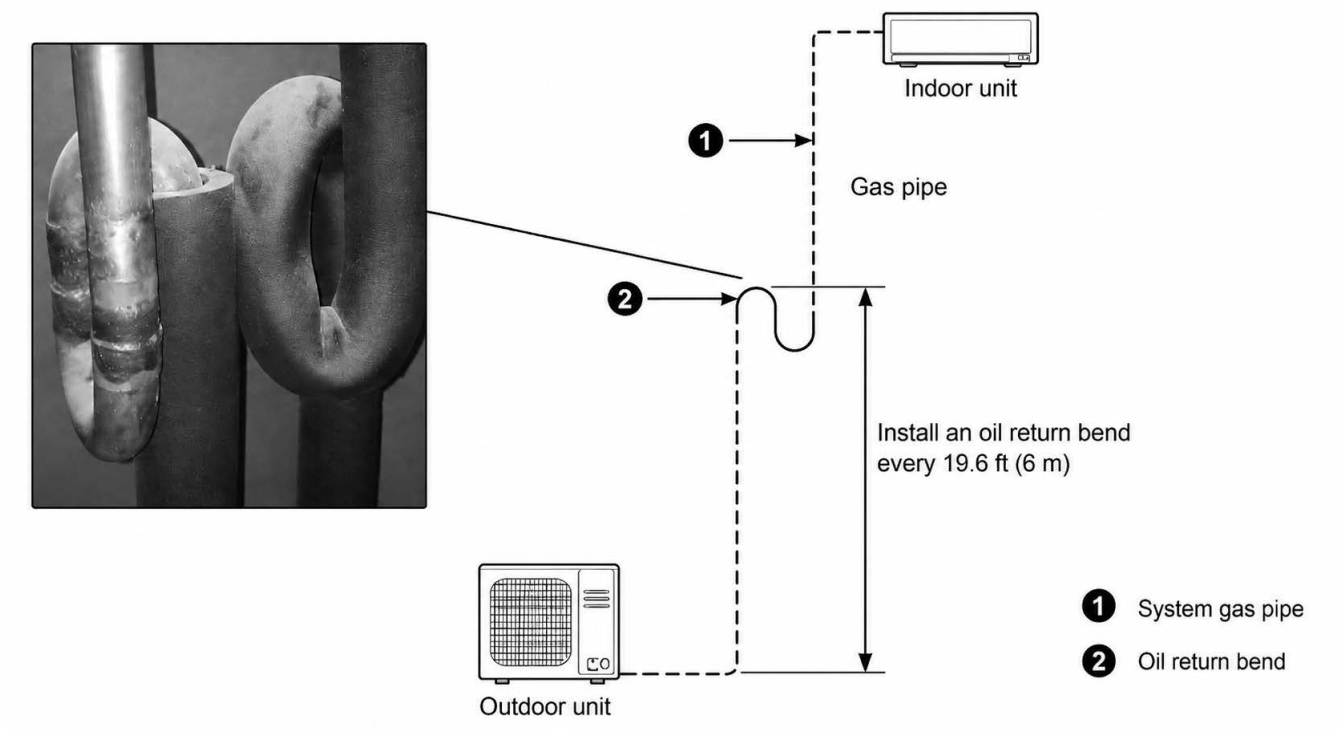
Oil Traps

⚠ CAUTION

If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of the oil return. Oil traps in the rising gas piping can prevent this.

Outdoor Unit is Beneath the Indoor Unit

Install an oil return bend every 19-feet, 8-¼-inches (6 m). There is no need to add a non-return bend at the lowest and highest positions of the vertical pipe.

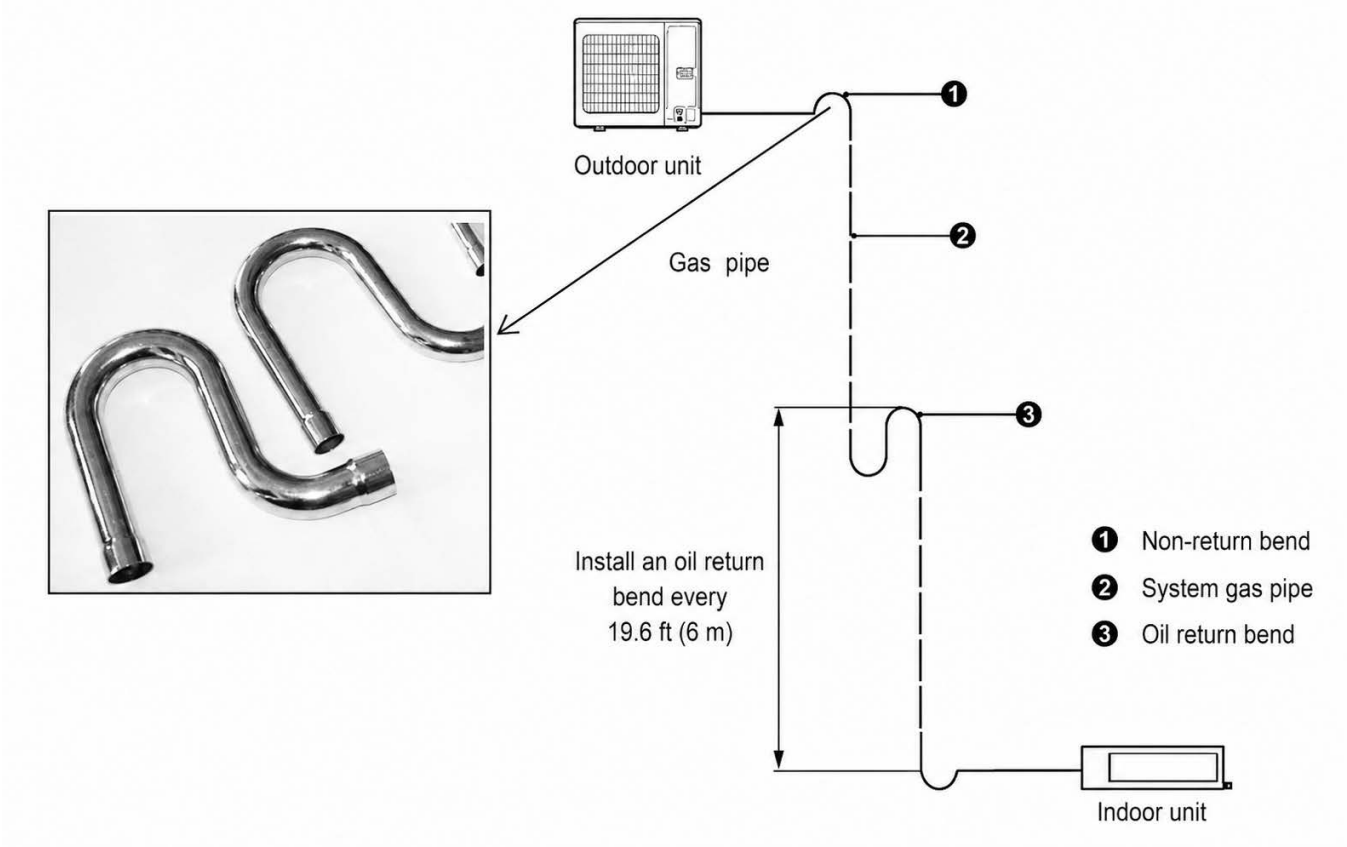


Installation

5

Outdoor Unit is Above the Indoor Unit

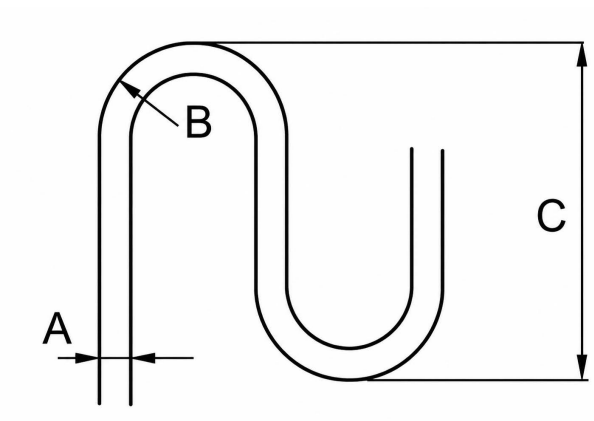
Install an oil return bend every 19-feet, 8-¼-inches (6 m). Add the oil return bend and non-return bend at the lowest and highest positions of the vertical pipe.



Oil Trap Dimensions

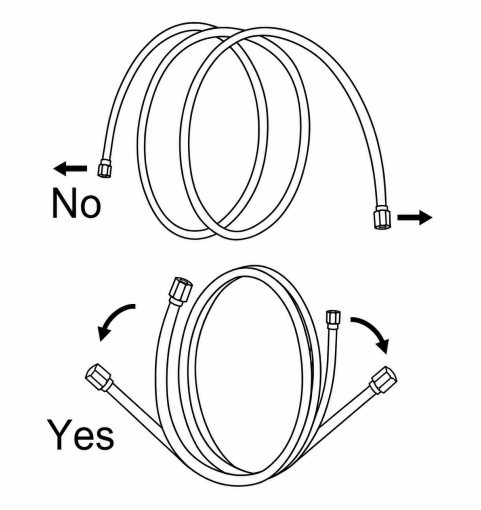
The dimensions for creating the oil return bend are as follows:

A	B	C
Ø 3/8 in	≥ 3/4 in (20 mm)	≤ 5-7/8 in (150 mm)
Ø 1/2 in	≥ 1 in (26 mm)	≤ 5-7/8 in (150 mm)
Ø 5/8 in	≥ 1-1/4 in (33 mm)	≤ 5-7/8 in (150 mm)



Installation 5

B. Unwind the Piping



Gently unwind the refrigerant piping against a flat surface instead of pulling the ends.

- Do not remove the seal caps from the pipe ends until it is time to connect them, to prevent contaminants from entering.
- Do not bend the pipe more than three times at any single point. Be extremely careful not to kink the piping.
- When bending refrigerant piping, the minimum bending radius is 4 inches (102 mm).

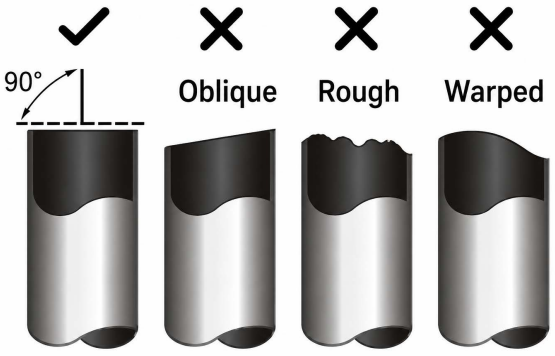
C. Adjust the Piping Length (Optional)

If needed, precisely cut the refrigerant pipes to the appropriate length to meet the installation requirements. This guarantees efficient operation and minimizes future maintenance.

Next, remove the burrs from the piping after cutting. This maintains an airtight seal on the refrigerant connections.

Once the piping is cut and the burrs are removed, flare the pipe ends. Proper flaring is essential to achieve an airtight seal. If pre-flared refrigerant piping arrives damaged, it can be re-flared.

Cut the Pipes



1. Measure the distance between the indoor and outdoor units.
2. Use a pipe cutter to cut the pipe a little longer than the measured distance.
3. Make sure the pipe is cut at a perfect 90-degree angle.

Note

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

Installation

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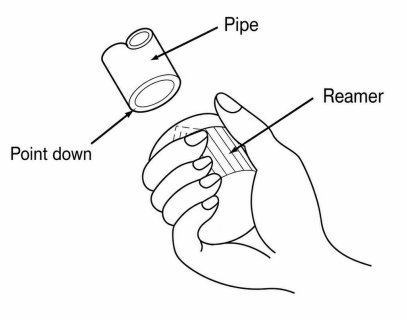
Remove Burrs

1. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.

2. Use a reamer or deburring tool to remove all the burrs from the cut section of the pipe.



Flare Pipe Ends

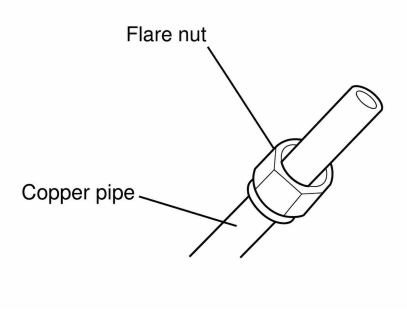
1. Seal the pipe ends with PVC tape to prevent foreign materials from entering.

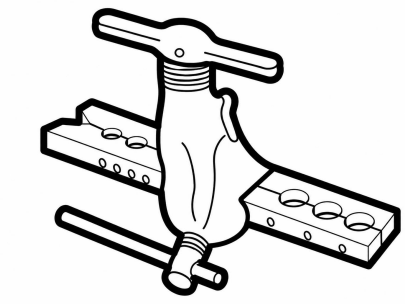
2. Confirm the pipe was sheathed properly with insulation material.

3. Place the flare nuts on both ends of the pipe. Make sure they are facing the correct direction, because it is not possible to change their direction after flaring.

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

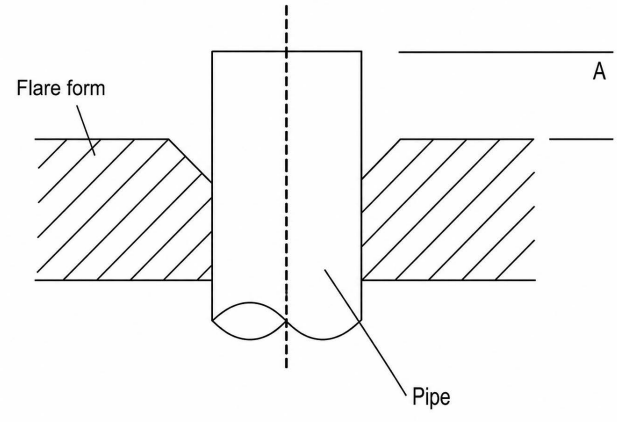
5. Clamp the flare form on the end of the pipe. The end of the pipe must extend beyond the edge of the flare form in accordance with the dimensions shown in the tables:





Piping Extension Beyond Flare Form

Pipe Diameter inch / mm	Flare Dimension A inch / mm	
	Min	Max
Ø1/4 / Ø6.4	0.33 / 8.4	0.34 / 8.7
Ø3/8 / Ø9.5	0.52 / 13.2	0.53 / 13.5
Ø1/2 / Ø12.7	0.64 / 16.2	0.65 / 16.5
Ø5/8 / Ø15.9	0.76 / 19.2	0.78 / 19.7
Ø3/4 / Ø19	0.91 / 23.2	0.93 / 23.7
Ø7/8 / Ø22.2	1.04 / 26.4	1.06 / 26.9



Installation

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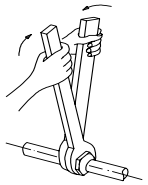
Pipe Diameter inch / mm	Torque N.m (lb.ft)	Sketch Map
Ø1/4 / Ø6.35	18~20 (13.3~14.8)	
Ø3/8 / Ø9.52	32~39 (23.6~28.8)	
Ø1/2 / Ø12.7	49~59 (36.1~43.5)	
Ø5/8 / Ø15.9	57~71 (42~52.4)	
Ø3/4 / Ø19	67~101 (49.4~74.5)	
Ø7/8 / Ø22	85-110 (62.7-81.1)	

6. Place the flaring tool onto the form.

7. Turn the flaring tool's handle clockwise until the pipe is fully flared.

8. Remove the flaring tool and flare form, then inspect the end of the pipe for cracks and flaring.

D. Connect the Pipes

Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit. Connect the low-pressure pipe, then the high-pressure pipe. Use both a spanner and torque wrench when connecting or disconnecting pipes to the unit.

Once the copper piping kit is unwound, refer to the instructions below:

Installation 5

Indoor Unit

1. Bring the ends of both the copper line and the indoor unit line together. Align the centers of the pipes that will be connected.

2. Remove the indoor unit piping cap and check that no debris is inside. Some gas may be heard escaping, but it is dry nitrogen to keep the lines clean.

3. Use any available leak guard or flare sealer on the piping flares.

4. Attach the flare nut and tighten as much as possible by hand. Torque correctly to the specifications found in the table below using two wrenches.

5. Repeat the process for the other copper line.

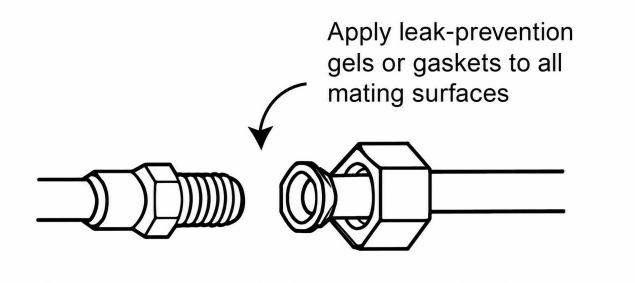
6. After connecting the copper pipes to the indoor unit, wrap the communication cable, drain line, and refrigerant piping together with binding tape. When bundling these items, do not intertwine or cross the communication cable with any other wiring. Keep the drain line at the bottom so that the water can flow freely. Ensure the bundle is exiting at a continuous downward pitch.

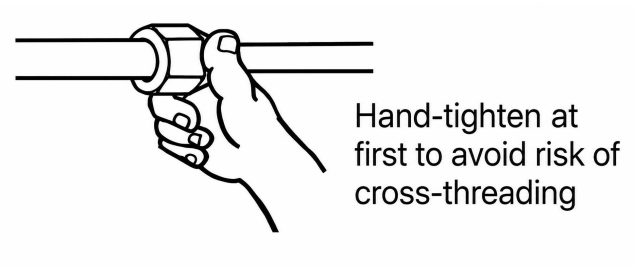
7. Thread this pipeline through the wall and connect it to the outdoor unit. The next page explains how to connect the pipes to the outdoor unit.

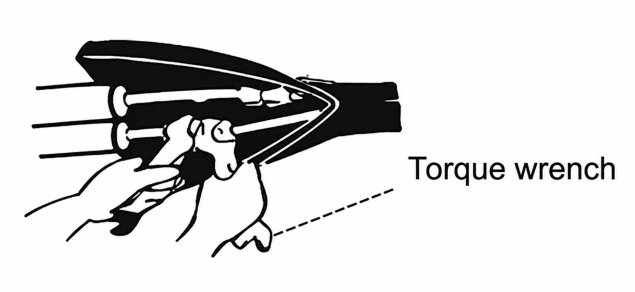
8. Optional: Attach the water receiver (supplied in the accessories box) to the indoor unit using a screw.

Do Not Use Excessive Torque

Excessive force can break the flare nut or damage the refrigerant piping. Do not exceed the torque requirements shown in the table.







Tightening Torque for Protection Caps & Flange Connection

Pipe Diameter	Tightening Torque [N x m]	Tightening Torque [ft-lbf]	Corresponding Stress (Using a 20 cm wrench)
Φ 1/4" (6.4 mm)	15 - 20	11 - 15	Wrist Strength
Φ3/8" (9.5 mm)	31 - 35	23 - 26	Arm Strength
Φ1/2" (12.7 mm)	45 - 50	33 - 37	Arm Strength
Φ 5/8" (15.9 mm)	60 - 65	44 - 48	Arm Strength

Tightening Torque [N x m] (ft-lbf)	
Service Port Nut	[7 - 9] (5-7)
Protection Caps	[25 - 30] (18-22)

Installation

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Outdoor Unit

1. Unscrew the cover from the packed valve side of the outdoor unit.

2. Remove the protective caps from the valve ends.

3. Align the flared pipe end with each valve and tighten the flare nut as tightly as possible by hand.

4. Use a spanner to grab the body of the valve. Do not grab the nut that seals the service valve.

5. While firmly gripping the body of the valve, use a torque wrench to tighten the flare nut according to the correct torque values.

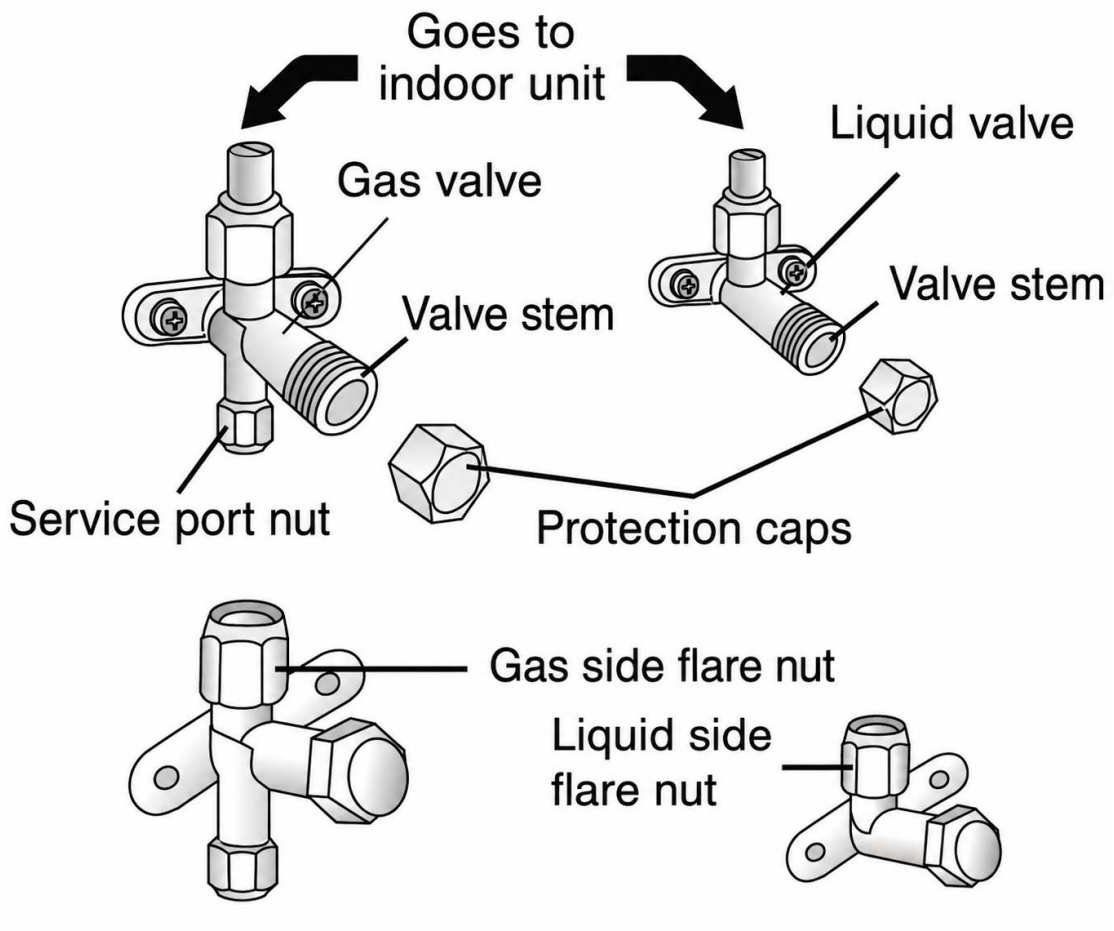
6. Loosen the flaring nut slightly, then tighten again.

7. Repeat the process for the remaining pipe.

8. Open the stop valves of the outdoor unit to start the flow of the refrigerant.

⚠CAUTION

After completing the refrigerant piping connection, check for refrigerant leaks. If a leak is detected, ventilate the area immediately and evacuate the system. Refer to **Page 69** in the *Installation* section for more information.



Installation 5

E. Charge Additional Refrigerant (If Needed)

CAUTION

Do not mix different types of refrigerant.

Some systems require additional charging depending on the pipe lengths. In North America, the standard pipe length is 25 feet (7.5 m). Charge the refrigerant from the service port on the outdoor unit's low-pressure valve. Calculate the additional refrigerant to be charged using the following formula:

	Liquid Side Diameter		
Refrigerant	Ø¼ in (Ø6.35 mm)	Ø⅜ in (Ø9.52 mm)	Ø½ in (Ø12.7 mm)
R-454B	(Pipe length - standard length) x 0.16oz/ft (Pipe length - standard length) x 15g/m	(Pipe length - standard length) x 0.32oz/ft (Pipe length - standard length) x 30g/m	(Pipe length - standard length) x 0.69oz/ft (Pipe length - standard length) x 65g/m

F. Insulate the Refrigerant Piping Joints

Notes

- Only insulate the refrigerant piping joints after the refrigerant circuit has been properly vacuumed. Refer to **Page 69** in the *Installation* section for more information.
- While Pioneer piping comes pre-insulated, installers must still insulate the joints after evacuating the refrigerant circuit.

The joint insulation should be 2~4 inches (51~102 mm) longer than the gap to ensure a proper seal.

Insert the joint insulation into the gap of the existing insulation.

Ensure the joint insulation is securely fastened to the suction and liquid pipes to prevent gaps. Use glue to paste together the linking part. Do not over-tighten the insulation material. This may compress the air out of the material, causing poor insulation and early aging.

Installation

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5.5. Communication Cable Connection

⚠ WARNINGS

Before performing any electrical work, read these warnings:

General Warnings

- All wiring must comply with local and national electrical codes and regulations. A licensed electrician must install all the wiring.
- All electrical connections must be made according to the electrical connection diagrams located on the panels of the indoor and outdoor units.
- If there is a serious safety issue with the power supply, stop work immediately. Explain the reasoning to the client and refuse to continue the installation until the safety issue is properly resolved.

Power Warnings

- The power voltage must be within 90-110% of the rated voltage. Insufficient power supply can cause a malfunction, electrical shock, or fire.
- Only connect the unit to an individual branch circuit. Do not connect other equipment to the same power circuit.

Wiring Warnings

- Firmly connect every wire. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
- Keep the wiring away from the copper tube, as the refrigerant circuit can become extremely hot.
- Do not let wires touch or rest against the refrigerant tubing, compressor, or any moving parts.
- Do not cross the electrical wiring with the signal wiring. This may cause distortion, interference, or possibly damage the circuit boards.
- Do not house wires of different voltages within the same wire tube. Avoid using metal wire tubes in environments prone to acid or alkali corrosion; use plastic wire tubes instead.
- Do not place wire connect joints inside the tubing. If a wire connect joint is necessary, use a connection box at the point of the joint.

Installation

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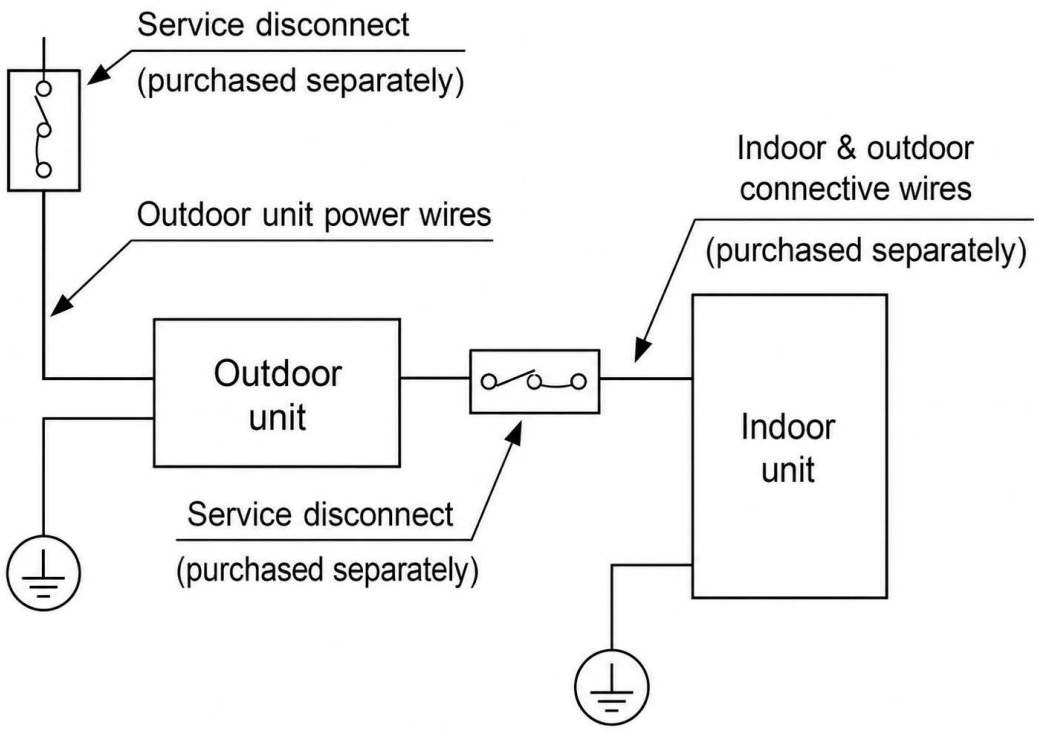
Prerequisites:

- ☑ Turn off the main power to the system. After powering off the system, wait 10 minutes or more before touching the electrical components in order to avoid electrical shock.
- ☑ Properly ground the system.
- ☑ If the unit has an auxiliary electric heater, install it at least 3-feet, 3-⅜-inches (1 m) away from any combustible materials.
- ☑ Install an external surge suppressor at the outdoor disconnect (recommended).
- ☑ When connecting power to fixed wiring, incorporate a properly rated, HACR-type circuit breaker or current leakage protection switch. It must disconnect all poles with a contact separation of at least 1/8 inch (3 mm). Use only an approved switch or circuit breaker with a capacity of 1.5 times the unit's maximum current.
- ☑ **Service Disconnect:** When the air conditioner's maximum current is more than 16A, use a service disconnect or leakage protection switch with a protective device (purchase separately). When the air conditioner's maximum current is under 16A, equip the power of the air conditioner with a plug (purchase separately).

  Select the service disconnect as required by local, regional, and national codes. In North America, wire the appliance according to NEC and CEC requirements.

  The cograph is for explanation purposes only. The machine may be slightly different. The actual shape shall prevail.



Installation

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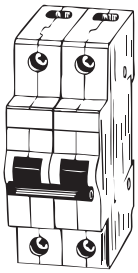
Communication Cable Specifications

The 4-lead communication cable provides two power supply wires, one signal wire, and one ground wire. The wires are individually insulated and bundled together inside the outer protective jacket. These wires are also pre-fitted with U-lugs on their ends.

Communication Cable Specifications (All Models): AWG #16 x 4 Core TC-ER cable.

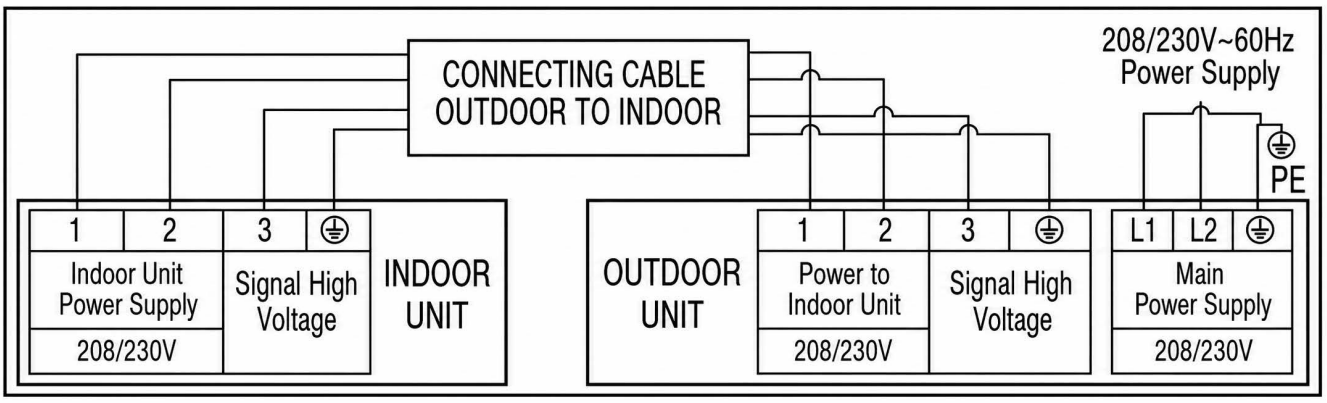
When connecting the communication cable consult the nameplate on the system for detailed electrical specifications.

The 230V systems require a double-pole breaker. The tandem-type will not work.



Double-Pole
230V Breaker

Connection Diagram



Installation

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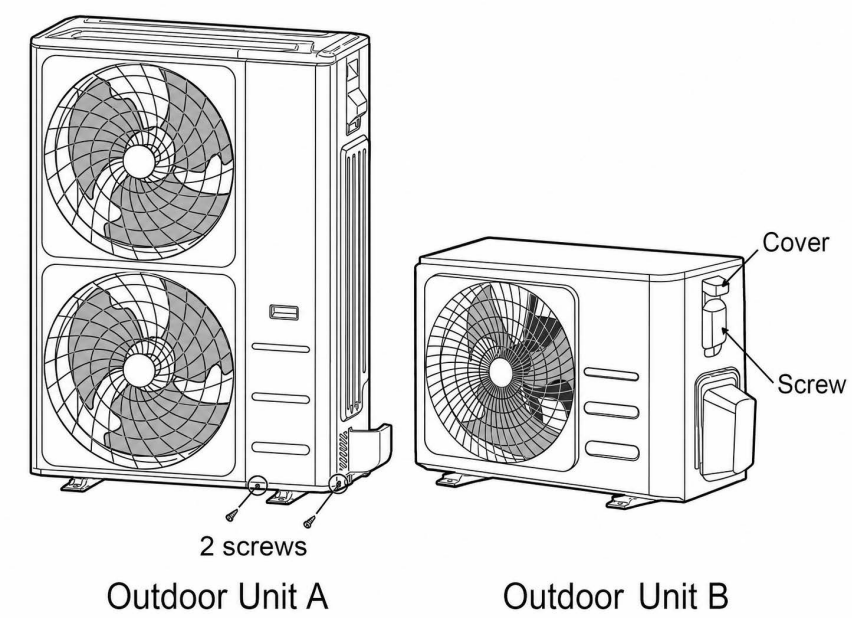
Note

Connect the outdoor unit wires before the indoor unit wires.

A. Outdoor Unit Wiring

1. Remove the two screws fixed on the front and side panels, then detach the panel to access the wire connections. (See the Outdoor Unit A figure).

Unscrew the electrical wiring cover and remove it (See the Outdoor Unit B figure).



2. Connect the U-lugs to the terminals, matching the numbers with those on the terminal block. There are three terminals (1, 2, 3) and ground (G). Firmly screw each U-lug to its corresponding terminal. Strictly follow the wiring diagram inside the electrical box cover when connecting the wires.

Select different wire colors according to the relevant regulations. Ensure the wire colors for the outdoor unit and terminals match those used for the indoor unit.

Do not connect the power wire to the signal wire terminal. If power and signal wires run parallel, place them in separate conduits and maintain a distance of at least 11-¾ inches (300 mm).

3. Secure the cable with the clamp. Ensure it is tight and does not pull on the U-lugs.

4. Reattach the panel or cover.

Installation

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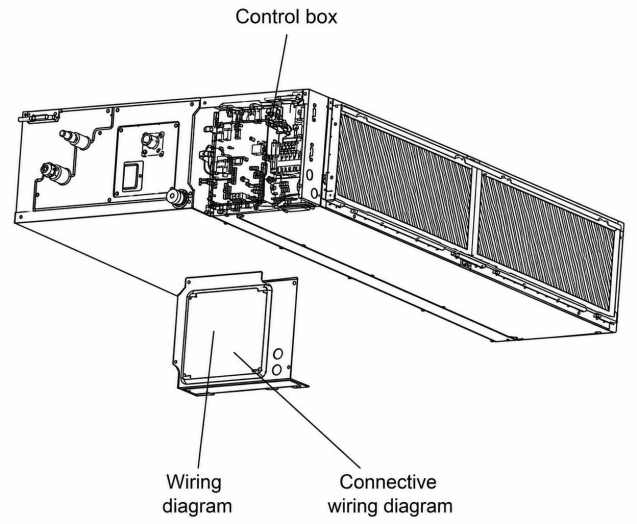
B. Indoor Unit Wiring

1. Remove the electronic control box's cover on the indoor unit.

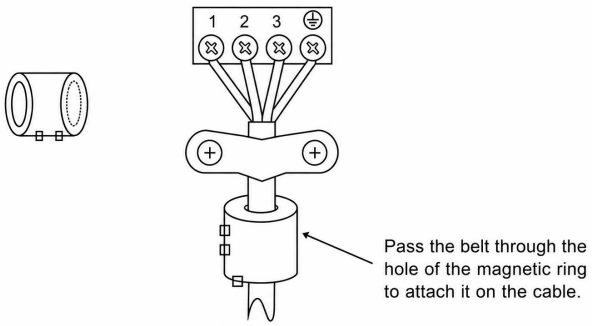
2. Connect the U-lugs to the terminals, matching the numbers with those on the terminal block. There are three terminals (1, 2, 3) and ground (G). Firmly screw each U-lug to its corresponding terminal. Strictly follow the wiring diagram inside the electrical box cover when connecting the wires.

Select different wire colors according to the relevant regulations. Ensure the wire colors for the outdoor unit and terminals match those used for the indoor unit.

Do not connect the power wire to the signal wire terminal. If power and signal wires run parallel, place them in separate conduits and maintain a distance of at least 11-¾ inches (300 mm).

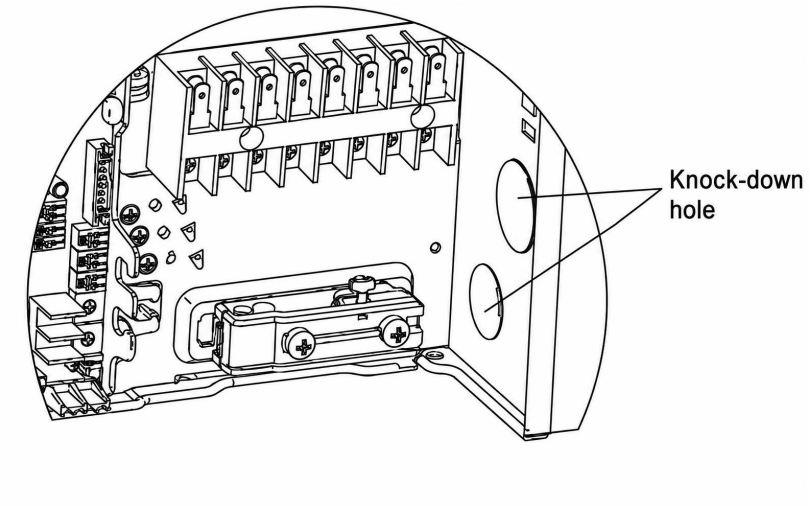


Magnetic ring (if supplied with the accessories)



3. Secure the cable with the clamp. Ensure it is tight and does not pull on the U-lugs.

4. Pass the wire through the knock-down hole on the electric control box.



Installation

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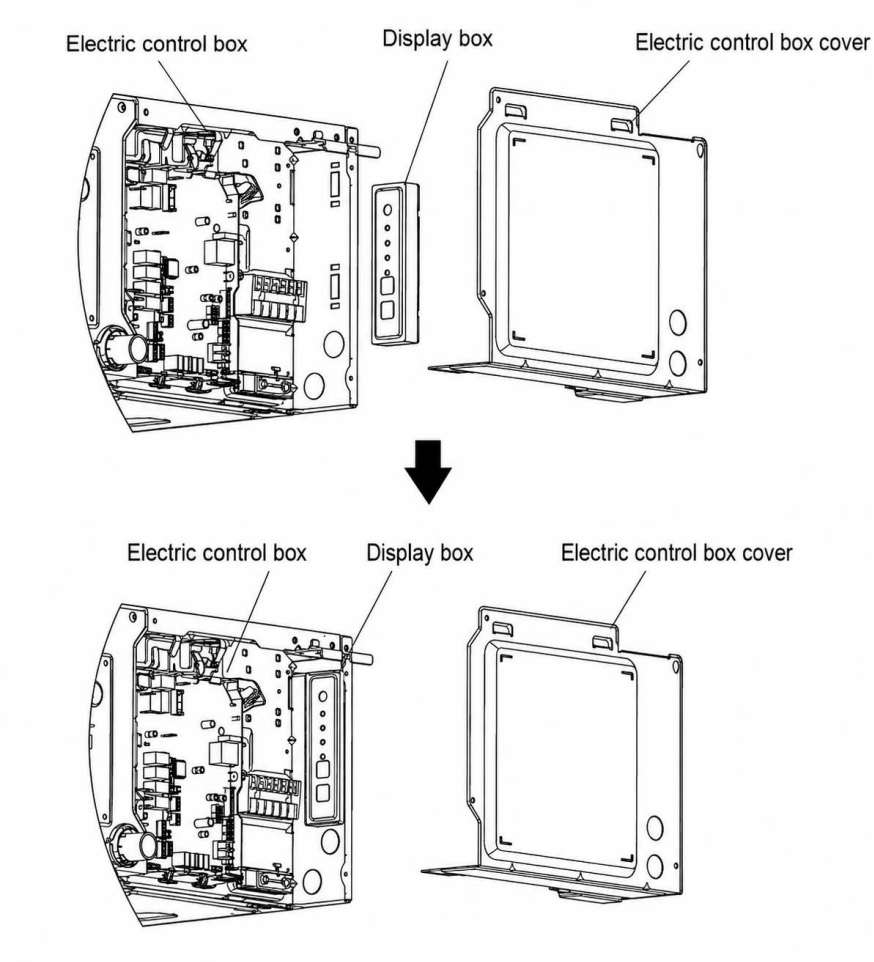
5. Reattach the electric box cover. If the indoor unit is equipped with a display box, it needs to be installed in the electric control box.



Installation

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C. Install the Electric Auxiliary Heat Module (Optional)

1. Install the supporter in the electric control box.

2. Install the converter control board to the supporter.

3. Connect the wire from the converter board to main board CN40.

Installation

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5.6. Evacuate the Refrigerant Circuit

⚠CAUTION

Qualified and well-trained personnel must complete the evacuation of the refrigerant circuit.

Prerequisites:

- ☑ Confirm the pipes connecting the indoor and outdoor units are properly attached.
- ☑ Ensure all electrical wiring is connected properly.

Note:
When opening valve stems, turn the supplied Allen wrench until the valve stem comes into contact with the stopper. Do not try to force the valve to open further.

Air and foreign matter in the refrigerant circuit can lead to abnormal rises in pressure, which can damage the air conditioner, reduce its efficiency, and cause injury.

Use a vacuum pump and manifold gauge to evacuate the refrigerant circuit, removing any non-condensable gas and moisture from the system.

Perform the evacuation after the initial installation and when relocating the unit.

1. Discharge the oxygen-free nitrogen. Evacuate the system to 8,000 microns (8 Torr) using all service valves.

2. Break the vacuum by introducing nitrogen into the port connections (liquid and gas lines) until achieving positive pressure.

3. Evacuate the system to a reading of 5,000 Microns (5 Torr).

4. Break the vacuum again by introducing nitrogen into the port connections (liquid and gas lines) until achieving positive pressure.

5. Evacuate the system to a reading of 500 Microns (0.5 Torr).

6. Hold the vacuum without movement for a minimum of 4 hours to ensure a moisture-free system.

7. If the vacuum fails to hold, repeat the steps until it does.

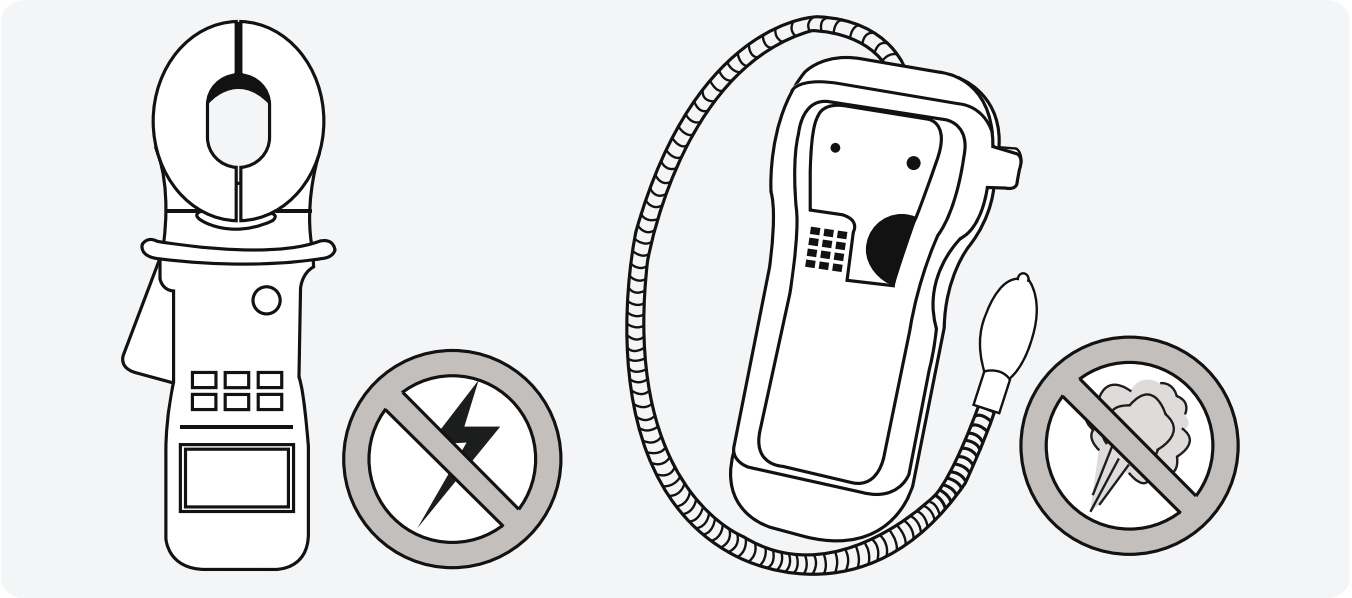
Reminder: Insulate the Refrigerant Piping Joints

Once the refrigerant circuit is evacuated, remember to insulate the refrigerant piping joints.

For instructions, refer to **Page 61** in the *Installation* section.

Leak Checks & Test Run

6



6.1. Electrical Leak Checks

After installation, confirm that the unit's electrical system is safe and operating properly. Electrical leak checks are required before and during the test run.

Before Test Run

- ☑ Check grounding work.
- ☑ Measure the grounding resistance with a grounding resistance tester. Grounding resistance must be less than 4Ω.

  This may not be required in some locations.

During Test Run

- ☑ Check for electrical leakage.
- ☑ During the test run, use an electroprobe and multimeter to perform a comprehensive electrical leakage test.
- ☑ If electrical leakage is detected, turn off the unit immediately and call a licensed electrician to find and resolve the cause of the leakage.

  This may not be required in some locations.

⚠ Warning – Risk of Electric Check

All electrical wiring must comply with the installation manual and local and national regulations. All work must be performed by a licensed electrician.

Leak Checks & Test Run

6

6.2. Gas Leak Checks

Confirm the system is not leaking gas. Gas leak checks are required before and during the test run.

Before Test Run

- ☑ Check all flare nut connections to ensure the system is leak-free.
- ☑ Confirm that both the gas and liquid valves (high/low) are **100% fully opened**.

During Test Run

- ☑ During operation, the pressure of the refrigerant circuit will increase. This may reveal leaks that were not present during the initial leak check. Take time to double-check that all copper pipe connection points are leak free.

After Test Run

- ☑ After confirming that all the pipe connection points do not leak, replace the valve cover on the outdoor unit.

Gas Leak Checks

There are two methods to check for gas leakage:

- ☑ **Soap & Water Method**
  Use a soft brush to apply soapy water or liquid detergent to all pipe connection points on the indoor and outdoor units. The presence of bubbles indicates a leak.
- ☑ **Leak Detector Method**
  If using a leak detector, refer to the device's operation manual for proper usage instructions.

Leak Checks & Test Run

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6.3. Test Run

Perform the test run only after the system is fully installed and the electrical and gas leak checks are complete.

Before Test Run

- ☑ **Electrical Safety Checks**
  Confirm the unit's electrical system is safe and operating properly.
- ☑ **Gas Leak Checks**
  Check all flare nut connections and confirm the system is not leaking.
- ☑ **Valve Checks**
  Confirm that both the gas and liquid valves (high/low) are **100% fully opened**.

Test Run Instructions

Perform the following test run for 30 minutes:

1. Connect power to the unit.

2. Press the On/Off button on the remote controller to turn it on.

3. Press the Mode button to scroll through the following functions, one at a time.
   - Cooling - Select the lowest temperature.
   - Heating - Select the highest temperature.

4. Let each function run for 5 minutes and perform the following checks:

Pass/Fail?

- **No electrical leaks or abnormal noises**
- **Unit is properly grounded**
- **All electrical terminals are properly covered**
- **Indoor and outdoor units are securely installed**
- **All pipe connections points do not leak**
- **Water drains from the drain line properly**
- **All piping is properly insulated**
- **Indoor unit responds to the remote controller**
- **Indoor unit louvers work properly**
- **System works in both Heating & Cooling mode**

After Test Run Completion

After the 10 boxes above have been checked and marked as passed, perform the following operation:

1. Use the remote control to return the system to a normal desired operating temperature.
2. Use insulation tape to wrap the indoor unit's refrigerant pipe connections that were left uncovered during the installation process.

If Ambient Temperatures Are Too High to Run a Heating Test:

If outside temperatures are too high to permit Heating mode on the remote controller, do the following:

1. Turn the unit on and put it in Heating mode using the emergency button.
2. Run the Heating mode test as normal and turn the unit back off using the button when complete.

Commission 7

The indoor ducted units can be programmed for different static pressures or real-time constant airflows. Use the following steps to set the static pressure or real-time constant airflow.

120L Wire Controller

Set Static Pressure Airflow

The factory default setting is SP1. The external static pressure can be manually changed to the fan curves 1, 2, 3, 4, 5, 6, 7, or 8.

1. Press and hold the On/Off and Fan buttons for 7 seconds.

2. Press the "Up" and "Down" buttons to scroll through the menu and select "8".

3. Press and hold the On/Off for 2 seconds. Press the "Up" and "Down" buttons to scroll through and select "1-8".

4. Press the Check or "OK" button and the display board shows "CS".

5. Press and hold the On/Off and Fan buttons for 2 seconds. Then, exit the test mode.

Set Real-Time Constant Airflow

Use the Automatic Airflow (AF) adjustment function to achieve real-time constant airflow.

1. Press and hold the On/Off and Fan buttons for 7 seconds.

2. Press the "Up" and "Down" buttons to scroll through the menu and select "8".

3. Press and hold the On/Off for 2 seconds. Press the "Up" and "Down" buttons to scroll through and select "AF".

4. Press the Check or "OK" button and the display board shows "CS".

5. Press and hold the On/Off and Fan buttons for 2 seconds. Then, exit the test mode.

Notes

- Before commissioning, check the machine's power connection, turn on the power, and ensure the machine is not operating.
- If there is no change after the airflow adjustment, perform the setting again.

Commission

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120N Wired Controller

Set Static Pressure Airflow

The factory default setting is SP1. The external static pressure can be manually changed to the fan curves 1, 2, 3, 4, 5, 6, 7, or 8.

1. Press and hold the Copy button for 3 seconds. The lower right corner shows P:00. Press "OK".

2. Press the "Up" button to scroll through the menu. The lower right corner shows SP. Press "OK".

3. Press the "Up" and "Down" buttons to scroll through the menu and select "1-8". Press "OK".

4. Press the Back button to exit test mode.

Set Real-Time Constant Airflow

Use the Automatic Airflow (AF adjustment function to achieve real-time constant airflow.

1. Press and hold the Copy button for 3 seconds. The lower right corner shows P:00. Press "OK".

2. Press the "Up" button to scroll through the menu. The lower right corner shows AF. Press "OK".

3. Press the Back button to exit test mode.

Notes

- T1, T2, T2b, T3, T4 are sub-menus for thermistors. Do not select to set the external static pressure.
- Before commissioning, check the machine's power connection, turn on the power, and ensure the machine is not operating.
- If there is no change after the airflow adjustment, perform the setting again.

Operating Instructions

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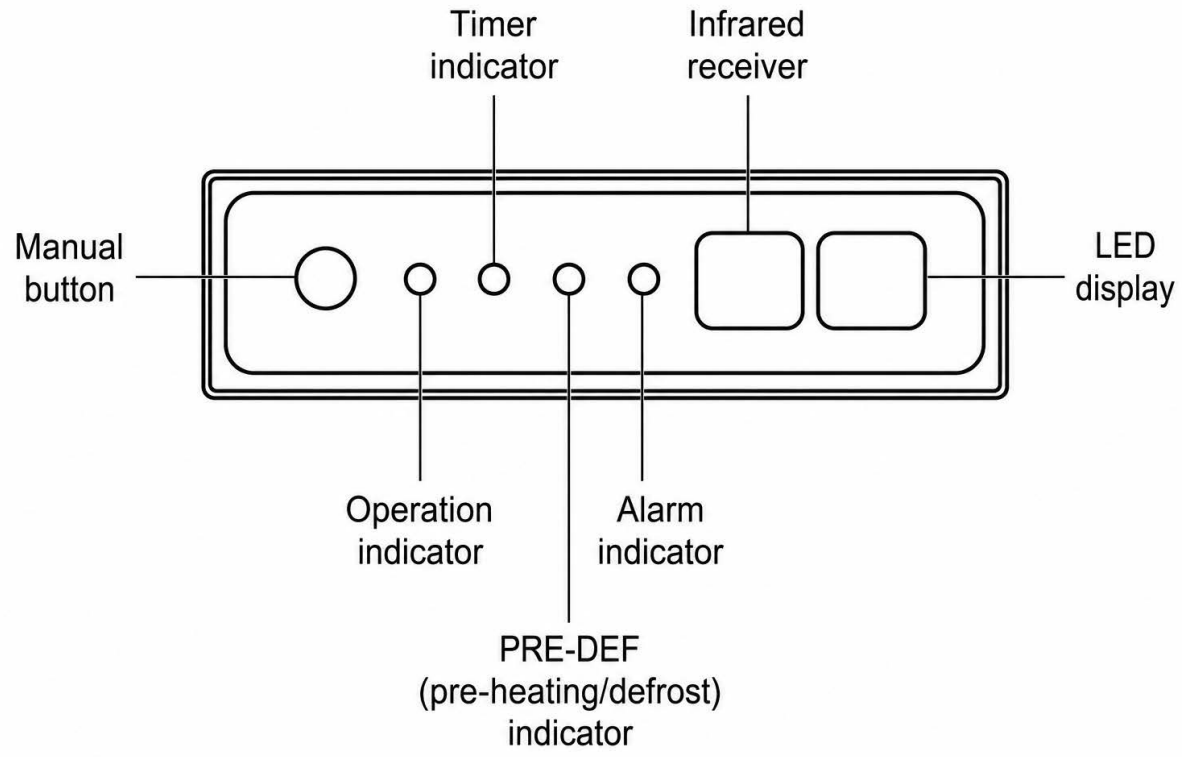
Notes

- Each time the air conditioner is powered on, a buzzing sound will be heard to indicate that the product has been powered on normally. If there is no sound, it is possible that the unit is operating abnormally. Power on the unit again or check the circuit.
- The actual functions are subject to the product that was purchased. Check the indoor display and remote control of the air conditioner. See the Remote Controller manual for information on more features.

Display Panel



Manual Button: This button selects the mode in the following order: Auto, Forced Cool, and Off.

Forced Cooling Mode: In Forced Cooling mode, the operation light flashes. The system will then turn to Auto mode after it has cooled with a high wind speed for 30 minutes. The remote control will be disabled during this operation.

Off Mode: When the display panel is turned off, the unit turns off and the remote control is re-enabled.

Operating Instructions

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Features

Heat Exchanger Dust Removal Function

This feature helps keep the outdoor coil cleaner and may extend the duration between regular maintenance intervals depending on the local conditions. When the unit is turned off, a delay occurs when the outdoor fan runs in reverse rotation for 70 seconds to blow off loose accumulated dust and debris.

Electric Auxiliary Heat Module (Optional)

The electric auxiliary heat module activates when the "Aux Heater" button is pressed. It then operates automatically based on control logic until the button is pressed again to deactivate it.

The Aux Heater function activates when the three conditions are all met simultaneously. Heating mode must be active while the defrost period is off.

1. T1 - Td ≤ 28°F (-2°C) (T1 - room temperature; Td -target temperature).

2. T2 ≤ 113°F (45°C) (T2 - indoor coil temperature).

3. The fan continues to operate.

When one of the following conditions is met, the Aux Heater function turns off:

1. T1 ≥ Td (T1 - room temperature; Td - target temperature).

2. T2 ≥ 129°F (54°C) (T2 - indoor coil temperature).

3. The indoor fan is off.

4. During a defrosting period.

5. The system is shut down.

6. There is an operation malfunction.

7. When the Aux Heater function is enabled with the remote off, the indoor fan is forced to operate at low speed for 30 seconds.

8. Once the Aux Heater is turned on, the anti-cold air function stops operating.

Refrigerant Leakage Detection

When the system detects a refrigerant malfunction, the indoor unit will automatically display the following error codes:

- EL0C: System lacks refrigerant.
- EHC1: Refrigerant sensor detects leakage.
- EHC2: Refrigerant sensor's operating condition is out of range and leakage is detected.
- EHC3: Refrigerant sensor's operating condition is out of range.
- ECC1: The other indoor unit refrigerant sensor detects leakage (multi-zone systems).

EHC1, EHC2, EHC3, and ECC1 error codes are only applicable for units with refrigerant sensors.

When EHC1 or EHC2 errors occur, the buzzer will continue to beep for 5-6 minutes before stopping. Pressing any button on the remote control will also stop the buzzer.

Auto-Restart

If a power failure occurs, the system will immediately stop. When power returns, the operation light on the indoor unit will flash. Press the On/Off button on the remote control to restart the unit. If the system has an auto-restart function, the unit will restart using the same settings.

Forced Cooling Mode

In this mode, the operation light flashes. The system will turn to Auto mode after it has cooled with a high wind speed for 30 minutes. The remote control will be disabled during this operation.

Operating Instructions

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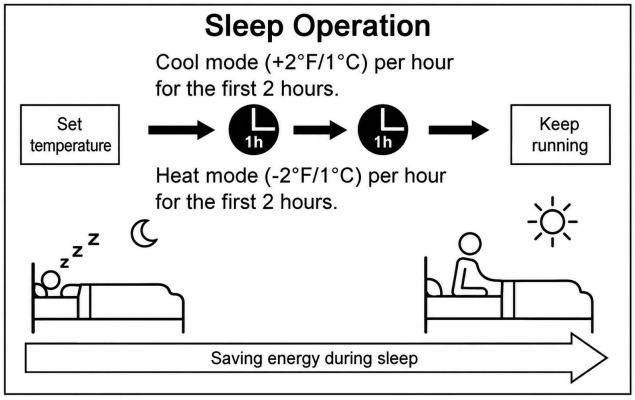
Sleep Operation

This function decreases energy use during sleeping hours. The function doesn't need the same temperature settings to stay comfortable. Use the remote control to activate this function. The Sleep function is not available in Fan or Dry mode.

Press the Sleep button to activate this function. When in Cooling mode, the unit will increase the temperature by 2°F (1°C) after 1 hour, then increase by an additional 2°F (1°C) after another hour. When in Heating mode, the unit will decrease the temperature by 2°F (1°C) after 1 hour, then decrease by an additional 2°F (1°C) after another hour. The feature will stop after 8 hours and the system will keep running with the final situation.



Maintenance

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⚠CAUTION

- Always turn off the system and disconnect its power supply before cleaning or performing maintenance.
- An authorized dealer or licensed service provider must perform the removal and maintenance of the filter.
- When removing the filter, do not touch metal parts in the unit. The sharp metal edges can cut you.
- Do not expose the filter to direct sunlight when drying. This can shrink the filter.
- An authorized dealer or licensed service provider must perform any maintenance on the indoor and outdoor unit.
- Do not wash the unit under running water, as this will create an electrical hazard.
- Only use a soft, dry cloth to wipe the unit clean. If the unit is especially dirty, use a cloth soaked in warm water to wipe it clean.
- Do not use chemicals or chemically treated cloths to clean the unit.
- Do not use paint thinner, polishing powder, or other solvents to clean the unit. They can cause the plastic surface to crack or deform.
- Do not use water to clean the inside of the indoor unit. This can destroy insulation and cause electrical shock.
- Do not use water hotter than 104°F (40°C) to clean the front panel. This can cause the panel to deform or become discolored.
- The cooling efficiency of the unit and your health could be damaged by the clogged AC. Make sure to clean the filter every two weeks.
- In households with animals, periodically wipe down the grille to prevent animal hair from blocking the airflow.
- Do not substitute a blown fuse with a higher or lower amperage rating fuse, as this may cause circuit damage or an electrical fire.

Maintenance

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Maintenance – Long Periods of Non-Use

If the air conditioner won't be used for an extended period of time.

Turn off the unit and disconnect the power

Turn on the Fan function until the unit dries out completely

Maintenance – Pre-Season Inspection

After long periods of non-use, or before periods of frequent use, do the following:

Check for damaged wires

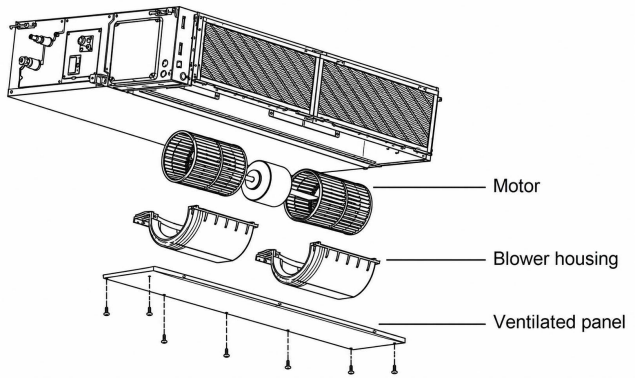
Check for leaks

Make sure nothing is blocking the air inlets and outlets

Motor & Drain Pump Maintenance

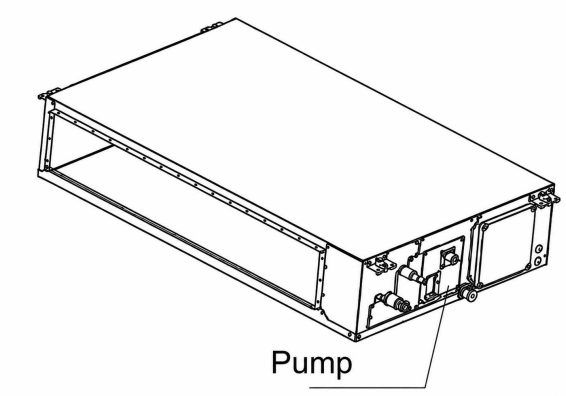
Motor Maintenance

1. Remove the ventilated panel.
2. Remove the blower housing.
3. Remove the motor.



Pump Maintenance

1. Remove the four screws from the drain pump.
2. Unplug the pump power supply and water level switch cable.
3. Detach the pump.



Troubleshooting

⚠CAUTION

If any of the following conditions occur, turn off the unit immediately:

- The power cord is damaged or abnormally warm.
- A burning odor is present.
- The unit is emitting loud or abnormal sounds.
- A power fuse blows or the circuit breaker frequently trips.
- Water or other objects fall into or out of the unit.

Do not attempt to fix these problems by yourself. Contact an authorized service provider immediately.

Common Issues

The following issues are not malfunctions and will not require repairs in most situations:

Issue	Possible Causes
Unit does not turn on when pressing the On/Off button	The unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within 3 minutes of being turned off.
	Cooling and Heating mode: If the operation light and PRE-DEF (pre-heating/defrost) indicators are lit up, the outdoor temperature is too cold, activating the unit's anti-cold wind feature in order to defrost the unit.
	In Cooling-only mode: If the Fan-Only indicator is lit up, the outdoor temperature is too cold, activating the unit's anti-freeze protection in order to defrost the unit.
Unit changes from Cooling/Heating mode to Fan mode	The unit may change its settings to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
Indoor unit emits white mist	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
Indoor and outdoor units emit white mist	When the unit restarts in Heating mode after defrosting, white mist may be emitted due to moisture generated from the defrosting process.
Indoor unit makes noises	A rushing air sound may occur when the louver resets its position.
	A squeaking sound is heard when the system is off or in Cooling mode. The noise is also heard when the drain pump (optional) is in operation.
	A squeaking sound may occur after running the unit in Heating mode, due to expansion and contraction of the unit's plastic parts.
Indoor and outdoor units make noises	Low hissing sound during operation: This is normal and caused by refrigerant gas flowing through both the indoor and outdoor units.
	Low hissing sound when the system starts, stops running, or defrosting: This noise is normal and caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.

Troubleshooting

Issue	Possible Causes
Outdoor unit makes noises	The outdoor unit will make different sounds based on its current operating mode.
Dust is emitting from either the indoor or outdoor unit	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
Unit emitting bad odor	The unit may absorb odors from the environment, which will be emitted during operations. Examples are furniture, cooking, cigarettes, etc.
	The unit's filters have become moldy and need to be cleaned.
Outdoor unit's fan does not operate	During operation, the fan speed is controlled to optimize product operation.

Note

If the problem persists, contact a local dealer or the nearest customer service center. Provide them with a detailed description of the unit malfunction and model number.

When trouble occurs, check the following points before contacting a repair company:

Problem	Possible Causes	Solution
Poor Cooling Performance	Temperature setting may be higher than ambient room temperature.	Lower the temperature setting.
	Heat exchanger on the indoor or outdoor unit is dirty.	Clean the affected heat exchanger.
	Air filter is dirty.	Remove the filter and clean it according to the instructions in this manual.
	Air inlet or outlet of either unit is blocked.	Turn the unit off, remove the obstruction, and turn it back on.
	Doors and windows are open.	Make sure that all doors and windows are closed while operating the unit.
	Excessive heat is generated by sunlight.	Close windows and curtains during periods of high heat or bright sunshine.
	Too many sources of heat in the room (people, computers, electronics, etc.).	Reduce the amount of heat sources.
	Low refrigerant due to leak or long-term use.	Check for leaks. Reseal if necessary and top off the refrigerant.

Troubleshooting

Problem	Possible Causes	Solution
Unit is not operating	Power failure.	Wait for the power to be restored.
	Power is turned off.	Turn on the power.
	Fuse is burned out.	Replace the fuse.
	Remote control batteries are dead.	Replace the batteries.
	The unit's 3-minute protection has been activated.	Wait 3 minutes after restarting the unit.
	The unit's timer is activated.	Turn the timer off.
Unit starts and stops frequently	There's too much or little refrigerant in the system.	Check for leaks and recharge the system with refrigerant.
	Incompressible gas or moisture has entered the system.	Evacuate and recharge the system with refrigerant.
	System circuit is blocked.	Determine which circuit is blocked and replace the malfunctioning piece of equipment.
	Compressor is broken.	Replace the compressor.
	Voltage is too high or low.	Install a manostat to regulate the voltage.
Poor heating performance	Outdoor temperature is extremely low.	Use an auxiliary heating device.
	Cold air is entering through doors and windows.	Make sure that all doors and windows are closed during use.
	Low refrigerant due to leak or long-term use.	Check for leaks. Reseal if necessary and top off refrigerant.
Indicator lamps continue to flash	The unit may stop operating or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait about 10 minutes. The problem may resolve itself. If not, disconnect the power. Then, connect the power again and turn the unit on. If the problem continues after performing the checks and diagnostics above, turn off the unit immediately and contact an authorized service center. The design and specifications are subject to change without prior notice for product improvements. Consult with the sales agency or manufacturer for details. Any updates to the manual will be uploaded to the service website, check for the latest version.	
Error codes appear and begin with the letters as the following in the window display of the indoor unit: • E (x), P (x), F (x) • EH (xx), EL (xx), EC (xx) • PH (xx), PL (xx), PC (xx)		

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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