Installationa and Operation Manual

18k -42k BTU
Multi - Zone
Outdoor Condenser
230 Volts
R- 454B Refrigerant



Model	For use in Models as listed Below			
	Wall Mounted	Cassette	Concealed Ducted	AHU
FPHMR18A3D	FAHMW07A3D FAHFW09A3D FAHFW12A3D	FPHFC09A3D FPHFC12A3D	FPHFD09A3D FPHFD12A3D	N/A
FPHMR27A3D	FAHMW07A3D FAHFW09A3D FAHFW12A3D FAHFW18A3D	FPHFC09A3D FPHFC12A3D FPHFC18A3D	FPHFD09A3D FPHFD12A3D FPHFD18A3D	N/A
FPHMR36A3D	FAHMW07A3D FAHFW09A3D FAHFW12A3D FAHFW18A3D FAHFW24A3D	FPHFC09A3D FPHFC12A3D FPHFC18A3D FPHFC24A3D	FPHFD09A3D FPHFD12A3D FPHFD18A3D FPHFD24A3D	FPHFA18A3D FPHFA24A3D
FPHMR42A3D	FAHMW07A3D FAHFW09A3D FAHFW12A3D FAHFW18A3D FAHFW24A3D	FPHFC09A3D FPHFC12A3D FPHFC18A3D FPHFC24A3D	FPHFD09A3D FPHFD12A3D FPHFD18A3D FPHFD24A3D	FPHFA18A3D FPHFA24A3D

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Original instructions

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NOTE:

- This heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air-conditioner within this range.

Model(Btu/h)	Mode	Outdoor working temperature	
		Maximum	Minimum
18K/27K/36K/42K	Cooling Operation	125°F(52°C)	5°F(-15°C)
	Heating Operation	75°F(24°C)	-13°F(-25°C)

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

Safety precautions

1. **This air conditioner uses new refrigerant HFO (R454B). R454B refrigerant is flammable.**
2. **Since the max. working pressure is less than 602psig (4.15MPa), some of the piping and installation and service tools are special.**
3. **This air conditioner uses power supply: 208/230V ~, 60Hz.**
4. **Specified filter drier is required when installing AHU units.**

Please read these SAFETY PRECAUTIONS carefully to ensure correct installation.

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

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

  ⚠ CAUTION: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.
- Please carefully file indoor and outdoor unit manual away for future reference.

⚠WARNING

- Installation should be performed by a qualified personnel.
  Improper installation may cause water leakage, electrical shock or fire.
- Install the air conditioner on a solid base that can support the unit weight.
  An inadequate base or incomplete installation may cause injury if the unit falls off the base.
- Use the specified type of wire for electrical connections safely between the indoor and outdoor units.
  And firmly clamp the interconnecting wires so their terminals receive no external stresses.
- For wiring, use a cable long enough to cover the entire distance with no connection.
  And do not connect multiple devices to the same AC power supply.
  Otherwise, it may be due to bad contact, poor insulation, exceed the allowable current and cause a fire or electric shock.
- After all installation is completed, check to make sure that no refrigerant is leaking out.
  If the refrigerant leaks in the interior, a heater or stove could cause the refrigerant to ignite
- Perform the installation securely referring to the installation manual.
  Incomplete installation could cause a personal injury due to fire, electric shock, the unit falling or leakage of water.
- In accordance with the installation instructions for electrical work, please be sure to use a dedicated circuit.
- If the power supply circuit capacity or electrical work is not in place, may cause a fire or electric shock.
- Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely.
- If the electrical covers on the indoor unit or the service panel of the outdoor unit are not attached securely, it could result in a fire or an electric shock due to dust water, etc.
- Please be sure to cut off the main power supply before the installation of indoor electronic PCB or wiring. Otherwise, it will cause electric shock. Circuits may stay energized as much as 5 mins after removing the power. Allow enough time for circuits to discharge before handling electrical parts, ensure all LEDs have gone out
- All wiring shall be in accordance with local and national codes.
- The outdoor unit installation location should pay attention to the protection, avoid people or other small animals contact with electrical components, please keep the outdoor unit of the surrounding environment clean and clear from obstructions.
- When installing or relocating the unit, make sure that no substance other than the specified refrigerant (R454B) enters the refrigerant circuit.
  Any presence of foreign substance such as air can cause abnormal pressure rise or an explosion.
- Assure that PARTIAL UNITS shall only be connected to an unit suitable for the same refrigerant.

Safety precautions

⚠ CAUTION

- Equipment Grounding,
  Do not connect ground wires to household piping such as water gas or electrical. If ground is not present a new grounding rod must be installed.
- Do not install the unit in a place where an flammable gas leaks.
  If gas leaks and accumulates in the area surrounding the unit, it could cause an explosion.
- Fasten a flare nut with a torque wrench as specified in this manual.
  When fastened too tight, a flare nut may break after a long period and cause a leakage of refrigerant.
- Install an earth leakage breaker depending on the installation place(where it is humid).
  If an earth leakage breaker is not installed, it could cause an electric shock.
- Perform the drainage/piping work securely according to the installation manual.
- If there is a defect in the drainage/piping work, water could drop from the unit and household goods could be wet and damaged.
- These units are PARTIAL UNIT AIR CONDITIONERs, complying with PARTIAL UNIT requirements of this standard, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this standard, UL 60335-2-40/CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236.
- Assure the maximum operating pressure is considered when connecting to any indoor units.
- According to ASHRAE 15, these units can stop compressor working in 10s when receiving the signal from the Refrigerant detection systems in indoor units.
  Please verify and assure the validity during installation.

Safety instructions

- Do not let air enter the refrigeration system or discharge refrigerant when moving the air conditioner.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the appliance is fixed wiring, the appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over voltage category III conditions, and these means must be incorporated in the fixed wiring in accordance with the wiring NEC codes and regulation.
- The appliance shall be installed in accordance with national wiring regulations.
- Servicing shall only be performed as recommended by the equipment manufacturer.
- The method of connection of the appliance to the electrical supply and interconnection of separate components is detailed in below part. The wiring diagram with a clear indication of the connections and wiring to external control devices and supply cord is detailed in below part.
- In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.
- It is necessary to allow disconnection of the appliance from the supply after installation. The disconnection may be achieved by incorporating a switch in the fixed wiring in accordance with the wiring rules. During service and when replacing parts, be sure to disconnect the appliance from its power source. If the disconnection is not foreseen, a disconnection with a locking system in the isolated position shall be provided.
- The information of dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures is detailed in below part.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- Instructions on addition charging of refrigerants are detailed in below part.

Safety Precautions

Precautions for using R454B refrigerant

The basic installation work procedures are the same as the conventional refrigerant (R22 or R410A). However, pay attention to the following points:

⚠ WARNING

1.Transport of equipment containing flammable refrigerants.

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment, permitted to be transported together will be determined by the applicable transport regulations.

2. Marking of equipment using signs

Signs for similar appliances (containing flammable refrigerants) used in a work area generally are addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location. All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs. The effectiveness of signs should not be diminished by too many signs being placed together. Any pictograms used should be as simple as possible and contain only essential details.

3.Disposal of equipment using flammable refrigerants

Compliance with national regulations

4.Storage of equipment/appliances

The storage of equipment should be in accordance with the manufacturer's instructions.

5.Storage of packed (unsold) equipment

- Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.
- The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
- The storage temperature should not exceed 60℃, as the refrigerant leakage may occur above 60℃, which can cause danger.

6.Information on servicing

6-1 Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions should be complied with prior to conducting work on the system.

6-2 Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of flammable gas or vapour being present while the work is being performed.

6-3 General work area

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

6-4 Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

6-5 Presence of fire extinguisher

- If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

6-6 No ignition sources

- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

6-7 Ventilated area

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.
- A degree of mechanical ventilation shall continue during the period that the work is carried out.
- The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

6-8 Checks to the refrigeration equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification.
- At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

Safety Precautions

⚠ WARNING

- The following checks shall be applied to installations using flammable refrigerants:
  - The charge amount is in accordance with the room size within which the refrigerant containing parts are installed; Refer to a chart.
  - The ventilation machinery and outlets are operating adequately and are not obstructed;
  - If an indirect refrigerating circuit is used, the secondary circuit shall be checked for the leak of refrigerant;
  - Marking of the equipment should be visible and legible. Illegal markings and signs hall be corrected;
  - Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

6-9 **Checks of electrical devices**

- Repair and maintenance of electrical components shall include initial safety checks and component inspection procedures.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
- This shall be reported to the owner of the equipment so all parties are advised.
- Initial safety checks shall include:
- Capacitors should have adequate time to discharge before touching electrical parts . NO MANUAL DISCHARGING
- That there no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

7. **Repairs of sealed components**
Sealed electrical components shall be replaced with OEM approved parts.

8. **Repairs of intrinsically safe components**
Intrinsically safe components must be replaced with OEM approved parts.

9. **Cabling**

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

10. **Detection of flammable refrigerants**

- Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.
- A halide torch (or any other detector using a naked flame) shall not be used.

11. **Leak detection methods**

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants:

- Leak detector must be A2L compatible.
- Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (maximum 25%) is confirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leak is suspected, all naked flames shall be removed/ extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- Removal of refrigerant shall be according to EPA Sec. 608.

Safety Precautions

⚠ WARNING

12. **Removal and evacuation**
- When opening a refrigerant circuit into the refrigerant circuit to make repairs – or for any other purpose –conventional procedures shall be used.
- However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.
- The following procedure shall be adhered to:
  - Safely recover the refrigerant. following local and national regulations;
  - Purge first then evacuate.
  - Purge the circuit with inert gas;
  - Evacuate;
  - Cut out the components from the system.
  - Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be "flushed" with dry nitrogen to render the unit safe.
- This process may need to be repeated for several times.
- Compressed air or oxygen shall not be used for this task.
- Flushing shall be achieved by breaking the vacuum in the system with Dry nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- Flushing shall be achieved by purging the Dry nitrogen through the refrigeration system from an entrance point to an exit point that will replace refrigerant, and oxygen trapped in the system. 3-5 minutes of purging is normal. Once repairs have been made a pressure test to 550 psi must be performed and must hold for 30 mins. Once pressure test is complete, release the nitrogen and evacuate the system to a 500 miron or below and should hold for 30 mins without raising. (triple evacuation will help with this process). Link to Porcess.

13. **Charging procedures**
- In addition to conventional charging procedures, the following requirements shall be followed:
  - Ensure that contamination of different refrigerants does not occur when using charging equipment.
  - Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
  - Cylinders shall be kept inverted
  - Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
  - Label the system when charging is complete (Indicate any added refrigerant and total charge and subsequent line set length).
  - Extreme care shall be taken not to overfill the refrigeration system.
  - Prior to recharging the system pressure shall be tested with Dry nitrogen.
- The system shall be leak tested on completion of charging but prior to commissioning.
- A follow up leak test shall be carried out prior to leaving the site.

14. **Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail.

It is recommended that all refrigerants are recovered safely.

Prior to the task, an oil and refrigerant sample shall be taken in case that an analysis is required prior to the re-use of recovered refrigerant. It is essential that electrical power is available before the task.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:
- Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- All personal protective equipment is available and being used correctly;
- The recovery process is supervised at all times by a competent person;
- Recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

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

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

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

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

⚠ WARNING

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

15. **Labelling**

Equipment shall be labelled stating that it has been de-commissioned and empty of refrigerant.
The label shall be dated and signed.
For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANTS.

16. **Recovery**

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerant is removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
- Ensure that the correct number of cylinders for holding the total system charge is available.
- All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
- Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery.

17. **Competence of service personnel**

Information and training
The training should include the substance of the following:
Information about the explosion potential of flammable refrigerants to show that flammables may be dangerous when handled without care.
Information about potential ignition sources, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters.
Information about the concept of sealed components and sealed enclosures according to UL 60335.
Information about the correct working procedures:

a) Commissioning
- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.

b) Maintenance
- Portable equipment shall be repaired outside on in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.
- Reassemble sealed enclosures accurately If seals are worn, replace them.
- Check safety equipment before putting into service.

c) Repair
- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- When brazing is required the following procedures shall be carried out in the right order.

- Remove the refrigerant. If the refrigerant is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.

⚠ WARNING

- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again
- Remove parts to be replaced by cutting, not by flame.
- Purge the braze point with nitrogen during the brazing procedure.
- Carry out a leak test before charging with refrigerant.

● Reassemble sealed enclosures accurately. If seals are worn, replace them.
● Check safety equipment before putting into service.

d) Decommissioning

• If the safety is affected when the equipment is putted out of service. the refrigerant charge shall be removed before decommissioning.
• Ensure sufficient ventilation at the equipment location.
• Be aware that malfunction of the equipment may be caused by refrigerant loss and a leak is possible.
• Do not manually discharge capacitors. Remove power form the unit and wait for 5 minutes or the LEDs have gone out on the PCBs.
• Remove the refrigerant.

e) Disposal

• Ensure sufficient ventilation at the working place.
• Remove the refrigerant.
• Evacuate the refrigerant circuit
• Purge the refrigerant circuit with nitrogen for 5 min.
• Evacuate again.
• Cut out the compressor and drain the oil.

•The pipe-work shall be complianced with national gas regulations.
•The maximum refrigerant charge amount is X kg (X see below).
•Where addition of charge is required to complete installation, according to the content in "Refrigerant piping" . After charged, finish the label (in accessory bag) and paste it near the nameplate.
•When moving or relocating the air conditioner, consult experienced service technicians for disconnection and reinstallation of the unit.
•Do not place any other electrical products or household belongings under indoor unit or outdoor unit.
•Condensation dripping from the unit might get them wet, and may cause damage or malfunction of your property.
•Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
•The appliance shall be stored 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 odour.
•To keep ventilation openings clear of obstruction.
•The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
•The appliance shall be stored in a room without continuously operating open flames (for example an operating as appliance) and ignition sources (for example an operating electric heater).
•Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
•Servicing shall only be performed as recommended by the equipment manufacturer.
•Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
•The appliance shall be installed and stored so as to prevent mechanical damage from occurring.
•Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.
•The installation of pipe-work shall be kept to a minimum.
•Mechanical connections shall be accessible for maintenance purposes.

⚠ WARNING

- That pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;
- That after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging.
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 0.18 oz. per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected. The joints must be welded or brazed.

Label in accessory bag

Contains Flammable Refrigerants
Contient des réfrigérants inflammables

Refrigerant:
Fluide frigorigène: R454B

Additional Charge:
Charge supplémentaire: ____ OZ

Total Charge (Installer Reference):
Charge totale (Référence du Programme d'installation): ____ OZ

Max. Refrigerant Charge Amount X[oz.(g)]

Model(Btu/h)	18K	27K	36K	42K
Max. Refrigerant charge [oz.(g)]	69.67(1975)	101.34(2873)	127(3600)	128.33(3638)

Minimum room size R-454B refrigerant is determined by total refrigerant charge in system. Use this chart to determine the minimum room size the indoor head can be installed in without an A2L Sensor.
Indoor heads are capable off adding an optional accessory A2L sensor. All cassettes, ducted and air handler units have an A2L sensor installed and are exempt from the room size restriction.
Prior to installing the unit use the formulas below to determine the total refrigerant charge for the unit. If the total charge is less than 64 oz. there is no room size restriction. If the total charge is over 64 oz. refer to the the Required Minimum Room Area chart to determine the minimum square footage of the room the indoor unit can be installed in. If rooms are connected by opening that people can walk through but with no door installed, those areas can be considered one space. If the total refrigerant charge exceeds the room area, the indoor unit shall not be installed without an A2L sensor.

⚠ WARNING

Required minimum room area Y [ft.^{2}(m^2)]

X[oz.(g)]	Ducted unit		Cassette unit		Wall-mounted unit	
	Return air outlet height [ft.(m)]	Y[ft.^{2}(m^2)]	Return air outlet height [ft.(m)]	Y[ft.^{2}(m^2)]	Return air outlet height [ft.(m)]	Y[ft.^{2}(m^2)]
<63.49(1800)	No restriction					
63.49(1800)		60(5.5)		60(5.5)		73(6.8)
67.02(1900)		63(5.8)		63(5.8)		77(7.1)
70.55(2000)		66(6.1)		66(6.1)		81(7.5)
74.08(2100)		69(6.4)		69(6.4)		85(7.9)
77.60(2200)		73(6.8)		73(6.8)		90(8.3)
81.13(2300)		77(7.1)		77(7.1)		93(8.6)
84.66(2400)		80(7.4)		80(7.4)		97(9.0)
88.18(2500)		83(7.7)		83(7.7)		102(9.4)
91.71(2600)		86(8.0)		86(8.0)		106(9.8)
95.24(2700)		90(8.3)		90(8.3)		109(10.1)
98.77(2800)		93(8.6)		93(8.6)		113(10.5)
102.29(2900)		95(8.9)		95(8.9)		118(10.9)
105.82(3000)		99(9.2)		99(9.2)		122(11.3)
109.35(3100)		103(9.5)		103(9.5)		125(11.6)
112.88(3200)		106(9.8)		106(9.8)		130(12.0)
116.40(3300)		109(10.1)		109(10.1)		134(12.4)
119.93(3400)	7.2(2.2)	112(10.4)	7.2(2.2)	112(10.4)	5.9(1.8)	138(12.8)
123.46(3500)		115(10.7)		115(10.7)		141(13.1)
126.99(3600)		120(11.1)		120(11.1)		146(13.5)
130.51(3700)		123(11.4)		123(11.4)		153(14.2)
134.04(3800)		126(11.7)		126(11.7)		162(15.0)
137.57(3900)		130(12.0)		130(12.0)		170(15.8)
141.10(4000)		133(12.3)		133(12.3)		179(16.6)
144.62(4100)		136(12.6)		136(12.6)		188(17.4)
148.15(4200)		139(12.9)		139(12.9)		197(18.3)
151.68(4300)		142(13.2)		142(13.2)		207(19.2)
155.21(4400)		146(13.5)		146(13.5)		217(20.1)
158.73(4500)		151(14.0)		151(14.0)		226(21.0)
162.26(4600)		159(14.7)		159(14.7)		236(21.9)
165.79(4700)		165(15.3)		165(15.3)		247(22.9)
169.32(4800)		173(16.0)		173(16.0)		258(23.9)
172.84(4900)		180(16.7)		180(16.7)		268(24.9)
176.37(5000)		187(17.3)		187(17.3)		279(25.9)

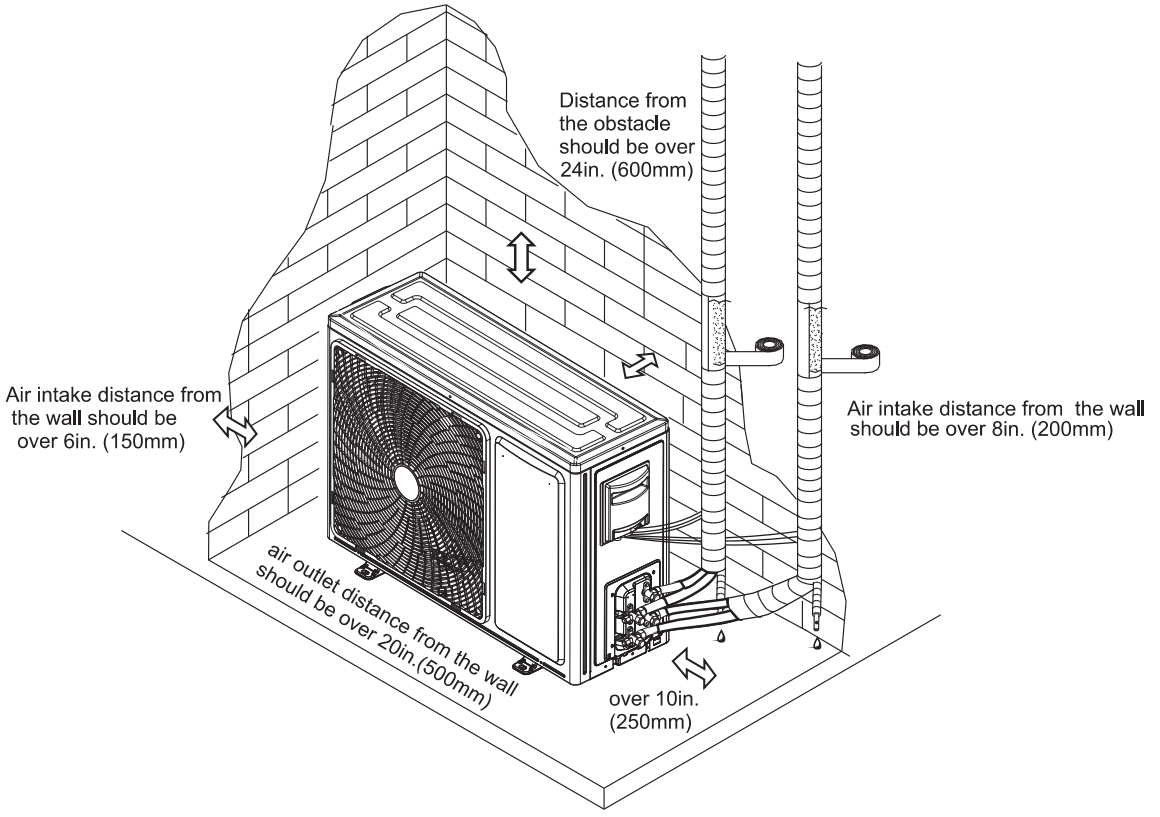
Safety Precautions

Explanation of symbols displayed on the indoor unit or outdoor unit.

  Refrigerant safety group A2L	**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 the installation manual.
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.

Installation instructions

Installation diagram



outdoor unit

- ***Figures in this manual are only a simple presentation of the unit, it may not match the external appearance of the unit you purchased.***
- ***Installation must be performed in accordance with the national wiring standards by authorized personnel only.***

Installation instructions

Transportation and handling before installation

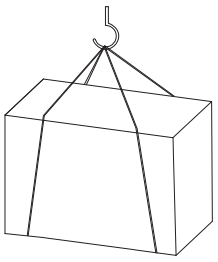
Transport the product as close to the installation location as practical before unpacking.

• Handling Method

When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly.

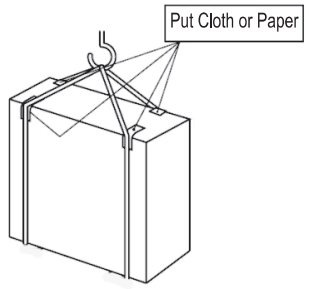
(1) Do not remove any packing materials.

(2) Hang the unit under packing condition with two ropes, as shown in Fig below.



• Handling

If have no package to move, Please protect with cloth or paper.



Installation locations selection

Before choosing the installation site, obtain user approval.

- Where it is not exposed to strong wind.
- Where airflow is good and clean.
- Where it is not exposed to rain and direct sunshine.
- Where neighbors are not annoyed by operation sound or hot air.
- Where rigid wall or support is available to prevent the increase of operation sound or vibration.
- Where there is no risk of combustible gas leakage.
- Where it is at least 3m away from the antenna of TV set or radio. An amplifier may be required for the affected device.
- Install the unit horizontally.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or some baffle boards.

⚠ CAUTION:

Avoid the following places for installation where air conditioner trouble is liable to occur.

- Where there is much machine oil.
- Salty places such as seaside.
- Where sulfide gas is generated such as a hot spring.
- Where there is high-frequency or wireless equipment.

NOTE:

When operating the air conditioner in low outside temperature, be sure to follow the instruction describe below.

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

Installation instructions

Outdoor unit installation

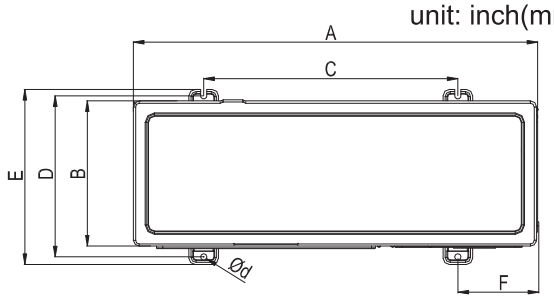
⚠NOTE:

·Be sure to fix the unit's legs with bolts when installing it.

·Be sure to install the unit firmly to ensure that it does not fall by earthquake or gust.

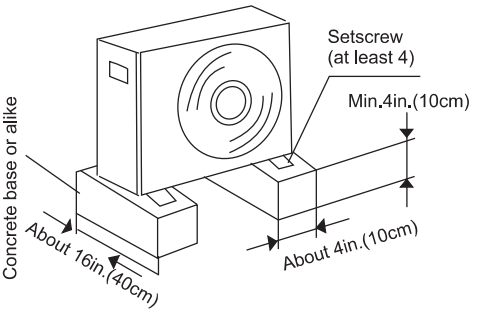
·The anchor bolts, nuts and washers for the installation are user prepared.

unit: inch(mm)



[Unit: in. (mm)]

Model (Btu/h)	A	B	C	D	E	F	d
18K	33-7/8 (860)	12-3/16 (310)	21-11/32 (542)	13-7/16 (341)	14-1/2 (368)	6-5/8 (168)	7/16*21/32 (11*17)
27K/36K/42K	38-3/8 (975)	14-3/16 (360)	23 (585)	15-1/2 (395)	16-3/4 (425)	7-5/8 (195)	7/16*21/32 (11*17)

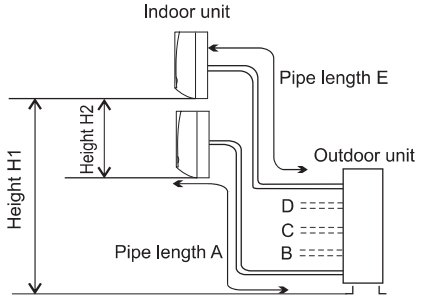


Refrigerant piping

1. Piping requirement

Model(Btu/h)	Outer Diameter of Pipe [in.(mm)]	
	Gas	Liquid
18K/27K/36K/42K	3/8 (9.52)	1/4 (6.35)

The maximum allowable length of refrigerant piping, and the maximum allowable height difference between the outdoor and indoor units, are listed below. The shorter the refrigerant piping is, the better the performance will be. So the connecting pipe should be as short as possible.



Item \ Model		Up to 2 indoor units	Up to 3 indoor units	Up to 4 indoor units	Up to 5 indoor units
		18K	27K	36K	42K
Piping to each indoor unit (A/B/C/D/E)	[ft.(m)]	≤82(25)	≤82(25)	≤82(25)	≤82(25)
Total length of piping between all units	[ft.(m)]	A+B ≤164 (50)	A+B+C ≤230(70)	A+B+C+D≤ 230(70)	A+B+C+D+E ≤262(80)
Max height between indoor unit and outdoor unit (H1)	[ft.(m)]	≤49(15)			
Max height between indoor units (H2)	[ft.(m)]	≤25(7.5)			

Additional refrigerant charge

The unit has been filled with refrigerant, but if L (total pipe length) exceeds standard length, additional refrigerant (R454B) change is required.

For 18K: Additional refrigerant charge=[L-50ft (15m)]×0.16 oz/ft (15g/m)

For 27K: Additional refrigerant charge=[L-75ft (22.5m)]×0.16 oz/ft (15g/m)

For 36K: Additional refrigerant charge=[L-100ft (30m)]×0.16 oz/ft (15g/m)

For 42K: Additional refrigerant charge=[L-125ft (37.5m)]×0.16 oz/ft (15g/m)

2. Piping material

(1) Prepare the copper pipe on the spot.

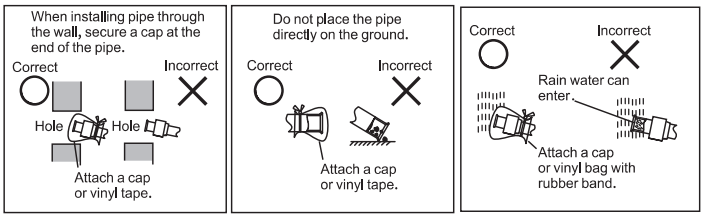
(2) Choose dustless, non-humid, clean copper pipe. Before installing the pipe, use nitrogen or dry air to blow away the dust and impurity on the tube.

Installation instructions

(3) Piping thickness and material use the pipe as below.

Diameter [inch(mm)]	Thickness [inch(mm)]
1/4(Φ6.35)	1/32(0.8)
3/8(Φ9.52)	1/32(0.8)
1/2(Φ12.7)	1/32(0.8)
5/8(Φ15.88)	1/32(1.0)

CAUTION



3. Processing of Refrigerant Piping

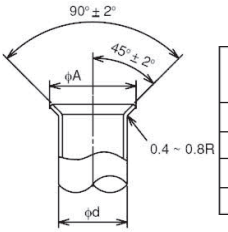
(1) Pipe cutting
- Cut the cooper pipe correctly with pipe cutter.

(2) Burrs removal
- Completely remove all burrs from the cut cross section of the pipe.
- Put the end of the copper pipe downward to prevent burrs from dropping in the pipe.

(3) Putting nut on
- Remove flare nuts attached to indoor and outdoor units, then put them on pipe having completed burr removal. (Not possible to put them on after flaring work).
- Flare nut for pipe depending on the diameter of pipe.

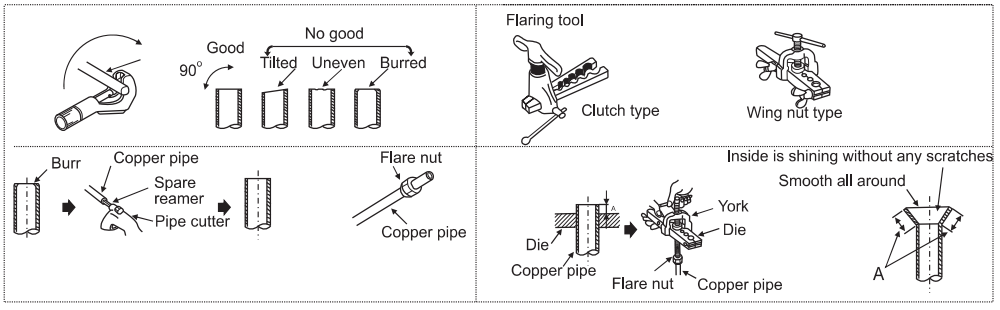
(4) Flaring work
- Perform flaring work using flaring tool as shown below.

(5) Check
- Compare the flared work with the figure below.
- If flare is noted to be defective, cut off the flared section and perform flaring work again.



inch(mm)

Diameter Φd	$A^{+0}_{-0.4}$
1/4(6.35)	11/32(9.1)
3/8(9.52)	1/2(13.2)
1/2(12.7)	10/16(16.6)
5/8(15.88)	3/4(19.7)



4. Piping connection

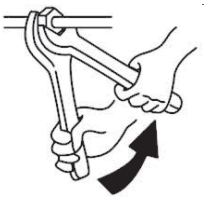
(1) R454B refrigerant is flammable, confirm that the valves are closed.

(2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping. Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc.
(If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length.)

(3) Tightening the flare nut use two spanners like figure right.

(4) Apply the refrigerant oil (field-supply) thinly at the seat surface of the flare nut and pipe before connecting and tightening.
And when tightening the flare nut, use two spanners.

(5) Outdoor refrigerant piping should connect with stop valve.



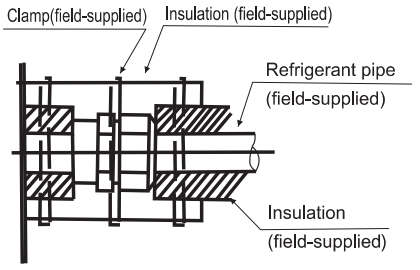
Double Spanner Work

Pipe Size [inch(mm)]	Torque
1/4(Φ6.35)	14.75ft-lb (20N·m)
3/8(Φ9.52)	29.5ft-lb (40N·m)
1/2(Φ12.7)	44.25ft-lb (60N·m)
5/8(Φ15.88)	59ft-lb (80N·m)

Tightening Torque for Flare Nut

Installation instructions

(6) After finishing connecting the refrigerant pipes, keep it warm with the insulation material like figure right.
·For outdoor unit side, surely insulate every piping including valves.
·Cover piping joints with pipe cover.
·Using piping tape, apply taping starting from the entry of outdoor unit. Fix the end of piping tape with adhesive tape.
-Fix the end of piping tape with adhesive tape.
-When piping has to be arranged through above ceiling, closet or area where temperature and humidity are high, wind additional commercially sold insulation for prevention of condensation.



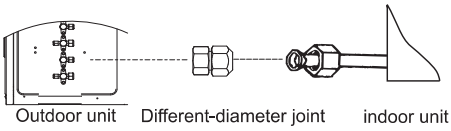
Piping insulation procedure

⚠ CAUTION

If the diameter of connection pipe does not match the port size of outdoor unit, select proper different-diameter joints in the accessory according to the following table.

Figure	Purpose
	Change pipe diameter from 1/4 inch (6.35mm) to 3/8 inch (9.52mm)
	Change pipe diameter from 3/8 inch (9.52mm) to 1/2 inch (12.7mm)
	Change pipe diameter from 3/8 inch (9.52mm) to 5/8 inch (15.88mm)

Note: The 18K model does not have this Different-diameter joint.

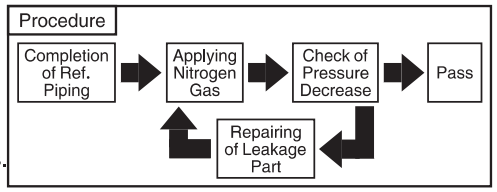


Connect pipes using different-diameter joint

5. Air tight test

-Do use Nitrogen.

Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the air-tight test.
Don't open the gas line stop valves.
Apply nitrogen gas pressure of 602psig (4.15MPa).
Check for any gas leakage at the flare nut connections, or brazed parts by gas leak detector or foaming agent.
Gas pressure doesn't decrease is OK.
After the air tight test, release nitrogen gas.

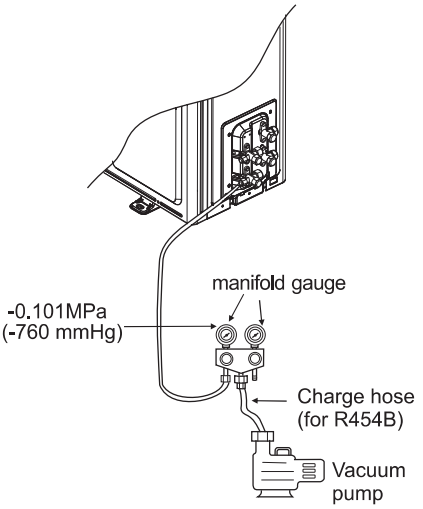


Air tight procedure

6. Vacuum pumping and charge refrigerant

● Vacuum pumping

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



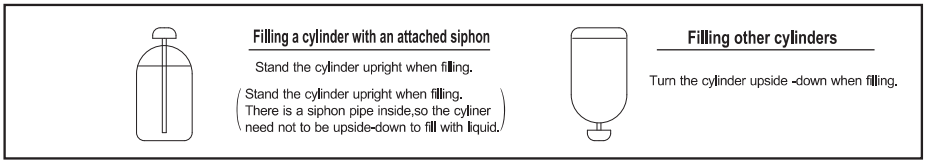
Installation instructions

⚠ WARNING

(1) Each pipelines needs to be evacuated individually.
(2) An excess or a shortage of refrigerant is the main cause of trouble to the unit. Charge the correct refrigerant quantity according to the description of label at the inside of the manual.
(3) Check refrigerant leakage in detail. If a large refrigerant leakage occurs, it will cause danger or even explosion if a fire was being used in the room.

● Additional refrigerant charge

The unit has been filled with refrigerant.
Please according “Piping Requirement” to calculate additional charge.
After vacuum pump procedure has been finished, first exhaust air from charge hose, then open valves, charge refrigerant as “liquid” type through Liquid stop valve.
At the end, please close valves and record the refrigerant charging quantity.



Wiring

⚠ WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for more than 3 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Avoid the wirings from touching the refrigerant pipes, plate edges and electrical parts inside the unit. If not do, the wires will be damaged and at the worst, a fire will occur.
- In Moist or Humid Locations; the installation of an ELB breaker is recommended. Always check local and national code requirements
- This unit uses an inverter, which means that it must be used an earth leak detector capable handing harmonics in order to prevent malfunctioning of the earth leak detector itself.
- For main power supply, Do not use intermediate connection wires, stranded wires(see **<Attentions when Connect the power supply wiring>**), extension cables or control line connection, because the use of these wires may cause fever, electric shock or fire.
- The tightening torque of each screw shall be as follows.
  M4: 0.7 to 1.0 lbf·ft. (1.0 to 1.3 N·m)
  M5: 1.5 to 1.8 lbf·ft. (2.0 to 2.5 N·m)
  M6: 3.0 to 3.7 lbf·ft. (4.0 to 5.0 N·m)
  M8: 6.6 to 8.1 lbf·ft. (9.0 to 11.0 N·m)
  M10: 13.3 to 17.0 lbf·ft. (18.0 to 23.0 N·m)
  Keep the above tightening torque when wiring work.

⚠ CAUTION

- With tape material along the wire wrapped, sealed wiring holes, prevent the condensed water and insects.
- Tightly secure the power source wiring using the cord clamp inside the unit.

NOTE: Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

Installation instructions

General Check

(1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data.
Make sure that the components comply with National Electrical Code (NEC).

(2) Check to ensure that the voltage of power supply is within +10% of nominal voltage and earth phase is contained in the power supply wires. If not, electrical parts will be damaged.

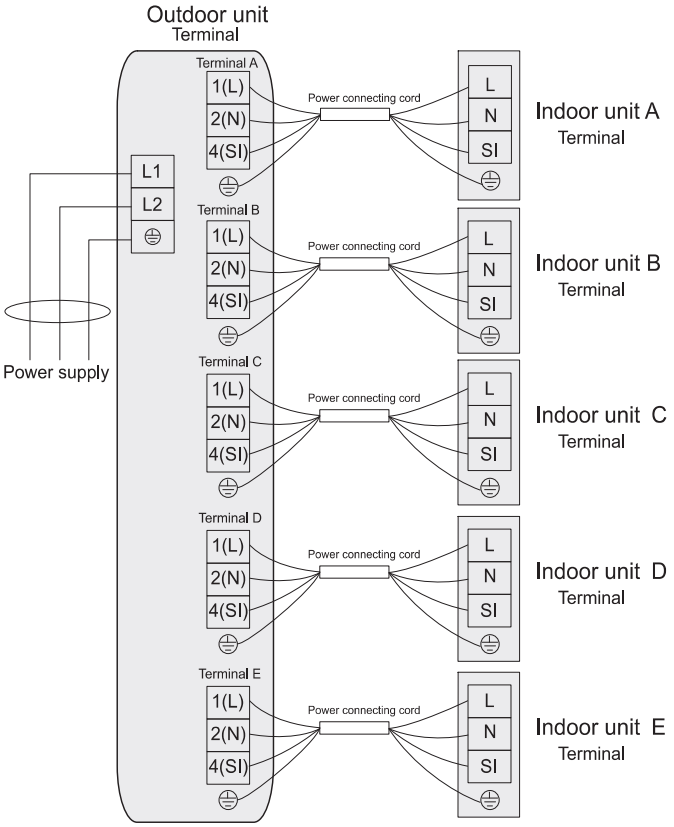
(3) Check to ensure that the capacity of power supply is enough.
If not, the compressor will be not able to operate cause of voltage drop abnormally at starting.

(4) Check to ensure that the earth wire is connected.

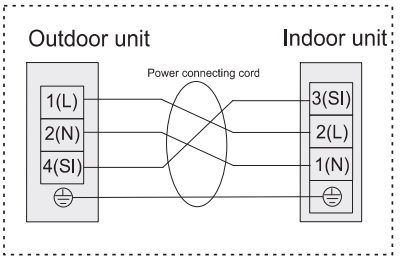
(5) Install a main switch ,multi-pole main switch with a space of 1/8 in. (3.5mm) or more, single phase main switch with a space of 1/8 in. (3.0mm) or more between each phase. Please use the special three-phase power switch for 3-Phase product.

(6) Check to ensure that the electrical resistance is more than 2 MΩ, by measuring the resistance between ground and the terminal of the electrical parts.
If not, do not operate the system until the electrical leakage is found and repaired.

Electrical wiring diagram



Note: For some indoor units

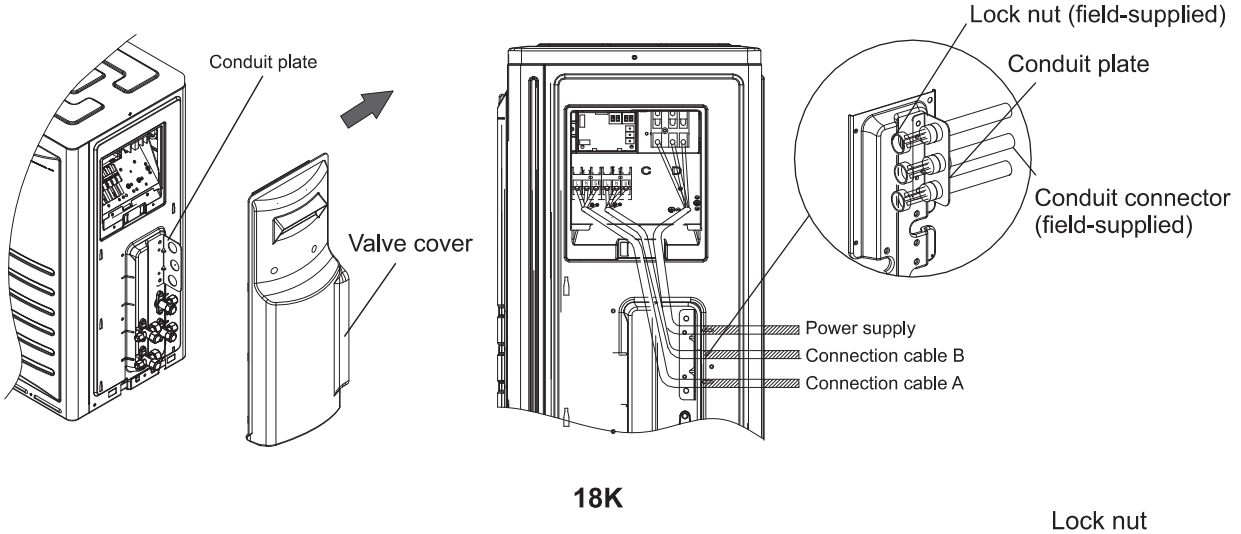


NOTES:
1. For 18K model, there is no INDOOR UNIT C, D and E.
2. For 27K model, there is no INDOOR UNIT D and E.
3. For 36K model there is no INDOOR UNIT E.
4. Since there is some diference between the terminal panel in the diagram and the real one, the wire connecting operation should be done according to the letters on the panel, please neglect the numbers on it.

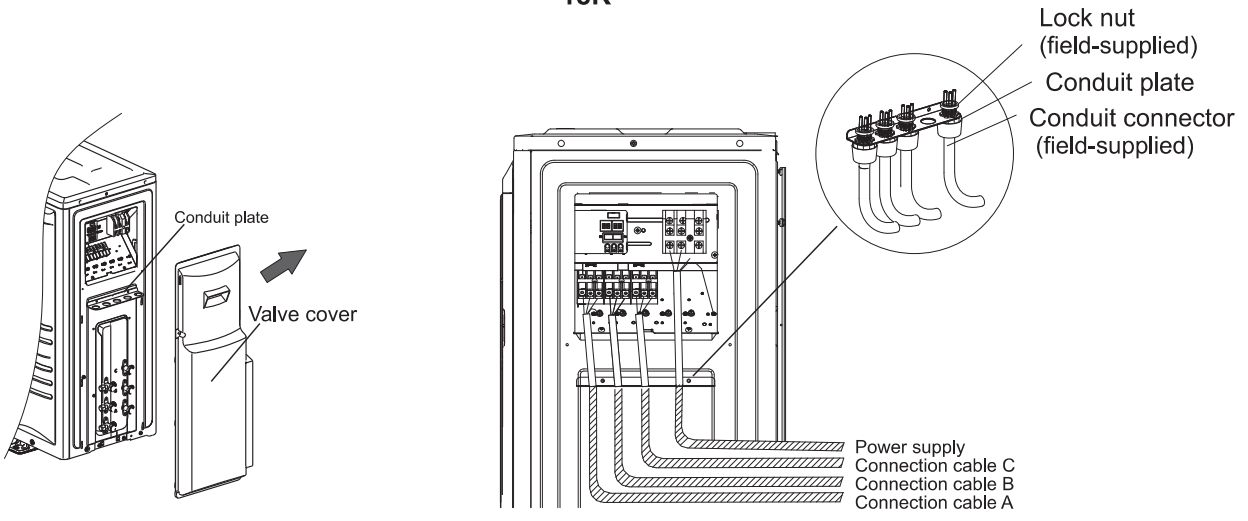
Installation instructions

Wires connect steps:

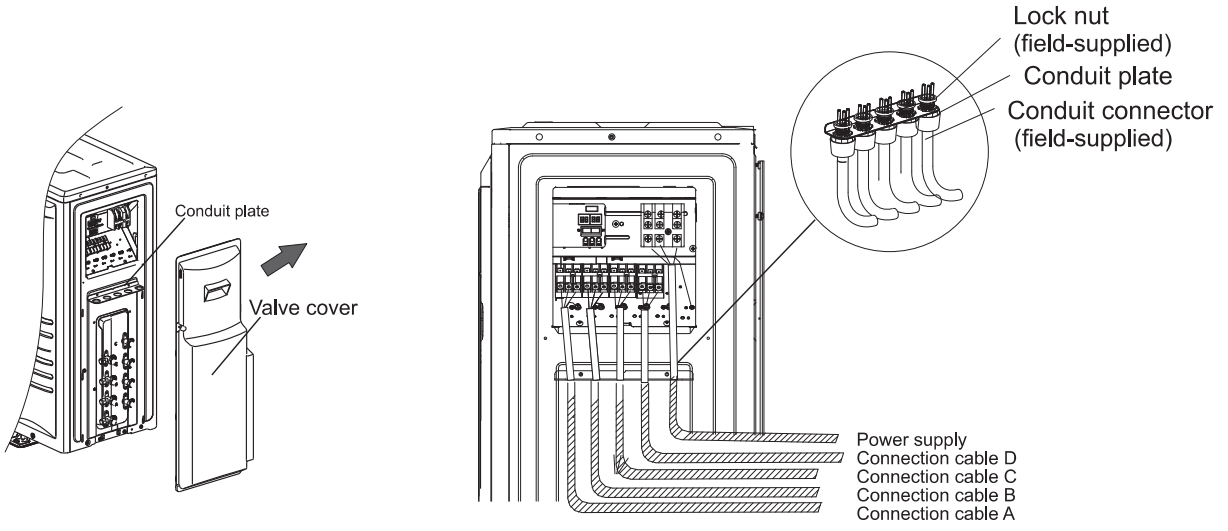
(1) Valve cover removal
Remove the two mounting screws.
Remove the valve cover as shown by the arrow mark.
(2) Fasten the power supply cable and the connection cable to the conduit holder using the lock nut.
(3) Connect the power supply cable and the connection cable to terminal.
(4) Fasten the power supply cable and the connection cable with the cable clamp.
(5) Be sure to seal the holes when applying the putty.
Place the cables side to side.(Do not overlap the cables.)
(6) Put the service cover and valve cover back after completion of the work.



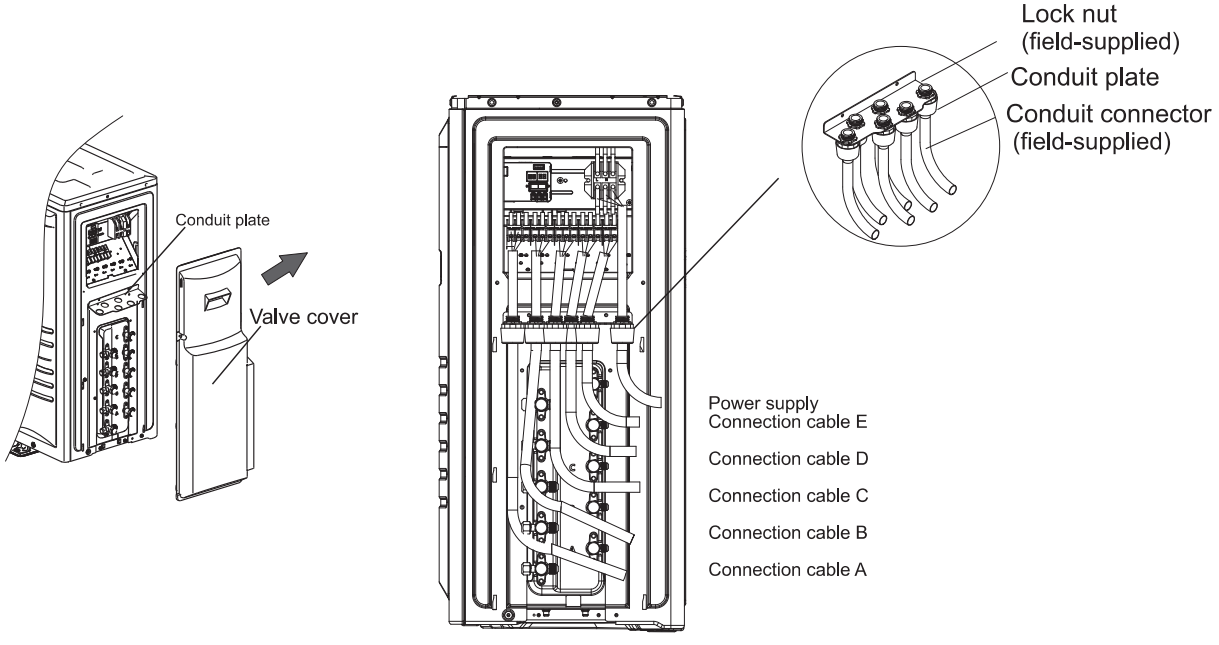
18K



27K


Lock nut
(field-supplied)
Conduit plate
Conduit connector
(field-supplied)
Conduit plate
Valve cover
Power supply
Connection cable D
Connection cable C
Connection cable B
Connection cable A

36K


Lock nut
(field-supplied)
Conduit plate
Conduit connector
(field-supplied)
Conduit plate
Valve cover
Power supply
Connection cable E
Connection cable D
Connection cable C
Connection cable B
Connection cable A

42K

Electrical Data

Model (Capacity: Btu/h)	Power Supply	Circuit Breaker		Transmitting Cable Size	MCA (A)
		MOP (A)	Nominal Sensitive Current (mA)		
18K	208/230V ~/60Hz	25	30	4*14AWG	21
27K	208/230V ~/60Hz	30	30	4*14AWG	27
36K	208/230V ~/60Hz	35	30	4*14AWG	34
42K	208/230V ~/60Hz	40	30	4*14AWG	37

Max. Running Current (A): REFER TO NAMEPLATE

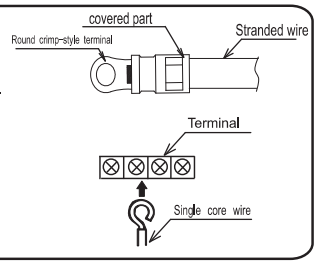
Note:

(1) Follow local codes and regulations when select field wires, and all the above are the minimum wire size.

(2) Install main switch and circuit breaker for each system separately. Select the high response type circuit breaker that is acted within 0.1second.

<Attentions when Connect the power supply wiring>

1. When connecting the terminal block using stranded wire, make sure to use the round crimp-style terminal for connection to the power supply terminal block. Place the round crimp-style terminals on the wires up to the covered part and secure in place.
2. Use Stranded wire to power the indoor units
3. When connecting the terminal block using a single core wire, be sure to perform curing.
4. Use Single core wire for main power suppl;y.



Installation instructions

Trial run

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

⚠CAUTION

The heat pump air conditioner is provided with a crankcase heater, check to ensure that the switch on the main power source has been ON for more than 6 hours ahead of power on preheating, when ambient temperature is below 32 degrees F. otherwise it might damage the compressor!

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

Test run function identification
Operate the thermostat to turn ON the appliance, and then proceed test run.
Pay attention to the following items while the system is running.
Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 194°F (90°C) .

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



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