USE AND INSTALLATION INSTRUCTIONS

Thank you very much for purchasing this Heat Pump Air Conditioner
Please read this use and installation instructions carefully before installing and using this appliance and keep
this manual for future reference.

⚠ WARNING

This product can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm.
For more information go to www.P65Warnings.ca.gov.

Contents

Caution Statements

Alert Symbols：

⚠ DANGER : The symbol refers to a hazard which can result in severe personal injury or death.

⚠ WARNING : The symbol refers to a hazard or an unsafe practice which may result in severe personal injury or death.

⚠ CAUTION : The symbol refers to a hazard or an unsafe practice which may result in minor personal injury, product or property damage.

NOTE : It refers to the remarks and instruction to the operation, maintenance and service.

- Installation, maintenance and repair of this unit must be performed by a qualified, licensed service personnel.
- Read these instructions thoroughly before installation or operation. Failure to follow these instructions may result in improper installation, service or maintenance, possibly resulting in fire, electrical shock, property damage, personal injury or death.
- Before installation, check if the voltage of the power supply at installation site is the same as the voltage shown on the nameplate.

⚠ DANGER

- Do not perform any alteration to this product, otherwise, it may cause water leakage, breakdown, short circuit, electric shock, fire, etc.
- An unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.
- Piping, welding and other such work should be carried out far away from the flammable and explosive materials, including the air conditioner refrigerant, to guarantee the security of the site.
- To protect the air conditioner from heavy corrosion, avoid installing the outdoor unit in the place, where sea water can splash directly onto it or in sulphurous air near a spa.

⚠ WARNING

- The appliance shall be installed in accordance with national wiring regulations;
- This unit must only be connected to other units that have been confirmed by the manufacturer.
- 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.
- The place where this product is installed must have the reliable electrical grounding facilities and protections. Please do not connect the grounding of this product to various kinds of air feeding ducts, drain pipes, lightning protection facilities as well as other piping lines to avoid electric shock and damage caused by other factors.
- Wiring must be done by a qualified electrician. All the wiring operations must be conducted according to the local and national electrical codes.
- You should consider the capacity of the electric current of your electrical meter and socket before installation.
- This product must be installed on a single dedicated electrical circuit. Circuit breaker protection must be installed in accordance with this manual. In moist and humid l ocations, an ELB type circuit breaker must be used.
- 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 operating electric heater.) Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- For duct connected appliances, false ceilings or drop ceilings can't be used as a return air plenum.

Caution Statements

⚠ WARNING

- Never use gasoline or other flammable gas near the air conditioner to avoid danger. When any abnormality like burnt smell, deformation, fire, smoke, etc. is found, you should stop using the air conditioner, immediately cut off the main power supply and contact the dealer.
- The first 6 inches of supply air plenum and duct work must be constructed of sheet metal as required by NFPA 90B.
- The supply air plenum or duct must have a solid sheet metal bottom piece directly after the air handler unit with no opening, registers or flexible air ducts located in it. If flexible supply air ducts are used, they may be located only in the side walls of the rectangular plenum, a minimum of 6 inches from the solid bottom.
- Do not install the air conditioner where excessively high heat-generating objects are placed.
- Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 600°C and electric switching devices.
- Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork. You can contact the manufacturer for the detail.

⚠ WARNING

PROPOSITION 65:

- This appliance contains fiberglass insulation. Respirable particles of fiberglass are known to State of California to cause cancer.
- All manufacturer products meet current federal OSHA Guidelines for safety. California Proposition 65 warnings are required for certain products, which are not covered by the OSHA standards.
- California's Proposition 65 requires warnings for products sold in California that contain or produce any of over 600 listed chemicals known to the State of California to cause cancer or birth defects such as fiberglass insulation, lead in brass, and combustion products from natural gas.
- All "new equipment" shipped for sale in California will have labels stating that the product contains and /or produces Proposition 65 chemicals. Although we have not changed our processes, having the same label on all our products facilitates manufacturing and shipping. We cannot always know "when, or if" products will be sold in the California market.
- You may receive inquiries from customers about chemicals found in, or produced by, some of our heating and air conditioning equipment, or found in natural gas used with some of our products. Listed below are those chemicals and substances commonly associated with similar equipment in our industry and other manufacturers.
  - Fiberglass Insulation
  - Carbon Monoxide(CO)
  - Formaldehyde
  - Benzene
- More details are available at the websites for OSHA (Occupational Safety and Health Administration), at www.osha.gov and the State of California's OEHHA (Office of Environmental Health Hazard Assessment), at www.oehha.org. Consumer education is important since the chemicals and substances on the list are found in our daily lives, Most consumers are aware that products present safety and health risks, when improperly used, handled and maintained.

⚠ CAUTION

- Do not use the main breaker as means of turning equipment off/on unless for service needs. Use supplied thermostat for operation.
- Do not stick anything into the air inlet and air outlet of both the indoor and outdoor units. This is dangerous because the fan is rotating at a high speed.
- Means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over voltage category III conditions must be incorporated in the fixed wiring in accordance with the wiring rules.
- Type and rating of circuit breakers / ELB are detailed below.
- The method of connection of the appliance to the electrical supply and interconnection of separate components are detailed below.
- The information of dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures is detailed below.
- The range of external static pressures for ducted appliances is detailed below.
- Make sure the blower motor support is tight (3-motor mounting bolts). Then check to see if wheel is tightly secured to motor shaft before operation unit.

NOTE:

- In general, it is recommended to use this air conditioner within the following temperature setting range.

Mode	Temperature setting range [°F(°C)]	
	Maximum	Minimum
Cooling/Heating operation	86 (30)	61 (16)

- **Storage condition: Temperature -13~140°F (-25~60°C)**
  Humidity 30%~80%
- **Heating and electric heater function are only valid for heat pump types.**
- **This air conditioner uses new refrigerant HFC (R454B). R454B refrigerant is flammable.**
- **Read this manual carefully before using this air conditioner. If you still have any difficulties or problems, consult your dealer for help.**
- **The air conditioner is designed to provide you with comfortable room conditions. Use this unit only for its intended purpose as described in this instruction manual.**
- **The minimum rated airflow:**

Capacity (Btu/h)	Min. rated airflow required [gph]
9K/12K	0.42×10^5
18K	0.58×10^5
24K	1.02×10^5
36K	1.26×10^5
48K	1.93×10^5

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. **Transportation equipment containing flammable refrigerants.**
Pay attention 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. **Equipment 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 accordance 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 containing flammable refrigerants**
In 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 so that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant.
- The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
- The storage temperature should not exceed 140°F / 60°C, as the refrigerant leakage may occur above 140°F / 60°C 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. To repair 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 following a controlled procedure so as to minimise the risk of flammable gas or vapour being leaked while the work is being performed.

6-3 **General working 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 controlling flammable material.

6-4 **Checking for leakage of refrigerant**
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potential flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

6-5 **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 CO_2 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 working, the area around the equipment should be checked 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 air or that it is adequately ventilated before tearing down the system or conducting any hot work.

⚠ WARNING

•A degree of ventilation shall be kept during the period that the work is carried out.
•The ventilation should safely disperse any released refrigerant and preferably discharge it externally into the atmosphere.

6-8 **Checks of the refrigeration equipment**

- Where electrical components are being changed, they shall be fit for the purpose and 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.
- 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;
  - 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:
- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- 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.

8. **Repairs of intrinsically safe components**
Intrinsically safe components must be replaced.

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:

- 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 the manual.

⚠ WARNING

12. **Removal and evacuation**

- When breaking 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 remove refrigerant following local and national regulations;
  - Evacuate;
  - Purge the circuit with nitrogen (optional for A2L);
  - Evacuate (optional for A2L);
  - Continuously flush or purge with nitrogen when using flame to open circuit;
  - Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be “flushed” with OFN 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 OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable working.
- This operation is absolutely vital if brazing operations on the pipe-work are to take place.
- Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

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 upright.
  - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigeration system.
  - Prior to recharging the system pressure shall be tested with OFN.
- 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).

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.

⚠ WARNING

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.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants.
- In addition, a set of calibrated weighing scales shall be available and in good working order.
- Hoses shall be complete with leak-free disconnect couplings and in good condition.
- Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.
- Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.
- Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
- The evacuation process shall be carried out prior to returning the compressor to the suppliers.
- Only electric heating to the compressor body shall be employed to accelerate this process.
- When oil is drained from a system, it shall be carried out safely.

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.

⚠ WARNING

- 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.
  - Evacuate the refrigerant circuit.
  - Purge the refrigerant circuit with nitrogen for 5 min.
  - Evacuate again (not required for A2L refrigerants)
  - 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.
- Discharge capacitors in a way that won't cause any spark.
- Remove the If the recovery 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.

e) Disposal

- Ensure sufficient ventilation at the working place.
- Remove the refrigerant. If the recovery 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.
- 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.
- Appliance shall be installed, operated and stored in a room with a floor area larger than Y (Y see below).
- The installation of pipe-work shall be kept to a a room with a floor area larger than Y (Y see below).
- 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 meets requirements as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- Any person involved with a refrigerant circuit should hold a valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with required specification.
- Service 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.
- 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.

⚠WARNING

- The installation of pipe-work shall be kept to a minimum.
- Mechanical connections shall be accessible for maintenance purposes.

- 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 afer 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, according to the following requirements;
  The minimum test pressure for the low side: 415psig(2.86Mpa)
  The minimum test pressure for the high side: 600psig(4.14Mpa)
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall 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 shall be detected. The joints must be welded or brazed.
- The appliances are equipped a REFRIGERANT DETECTION SYSTEM.
  The indoor unit must be powered except for service.
  And the selected controller shall be connected to this symbol wire and can display the caution information if the REFRIGERANT leakage is detected.
  When REFRIGERANT leakage is detected, the fan shall work. And the compressor shall stop.
  You must contact qualified personnel to repair.
- REFRIGERANT DETECTION SYSTEM include a means for self-testing to determine if a REFRIGERANT SENSOR or SENSING ELEMENT malfunction has occurred. If occurs, the fan shall work, and the compressor shall stop. The controller displays the caution information.
  You must contact qualified personnel to repair.
  REFRIGERANT DETECTION SYSTEM shall only be replaced by the appliance manufacture

Note:

- The indoor unit comes with refrigerant detection sensor as standard.

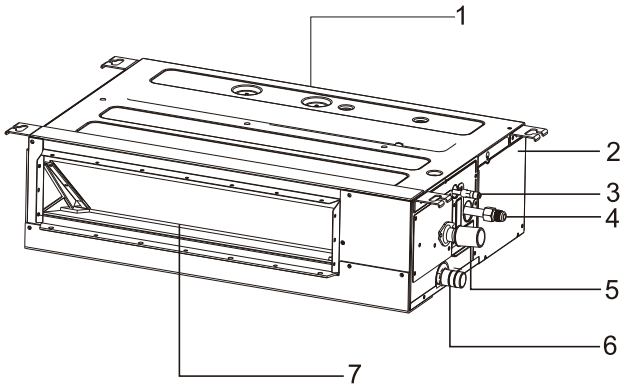
Explanation of symbols displayed on the indoor unit or outdoor unit.

  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.

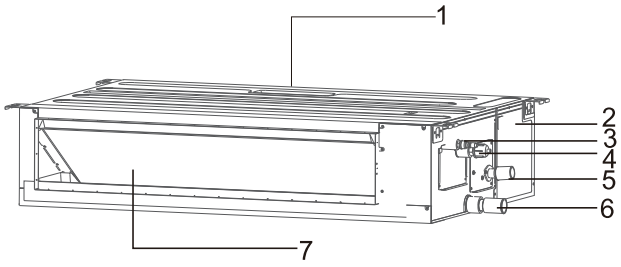
Composition of the Air Conditioner

Indoor unit

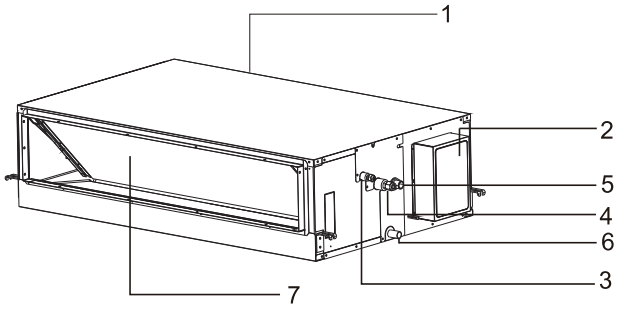
9K/12K



18K/24K



36K/48K



1. Air inlet
2. Electric box
3. Refrigerant pipe (Liquid)
4. Refrigerant pipe (Gas)
5. Drain pipe (Connect with pump)
6. Drain pipe
7. Air outlet

NOTE: **The figures in this manual are based on the external view of a standard model. Consequently, the shape may differ from the air conditioner model you have selected.**

Special Remarks

- **3-minute protection after the compressor stops**
  To protect compressor, the system implements a 3 minute delay once operation is stopped.
- **5 minute-protection**
  Compressor must run for at least 5 minutes once operation starts. During the 5 minutes, compressor will not stop even after set point is reached. The system will shut off if manually turned off using the remote controller.
- **Cooling operation**
  The fan of the indoor unit will never stop running in cooling operation. It continues to operate even if the compressor stops working.
- **Heating operation**
  Heating capacity depends on external factors like outdoor unit temperature. Heating capacity might decrease if outdoor ambient temperature is too low.
- **Anti-freezing function during cooling**
  When the air temperature from the indoor outlet is too low, the unit will run for some time under the fan mode, to avoid frost or ice forming on the indoor heat exchanger.
- **Anti cold air function**
  During heating mode, in order to prevent cold air blowing from indoor unit, indoor unit fan speed will run with low speed or stop, which is set according to the indoor coil temperature.
- **Defrosting**
  When the outdoor temperature is too low, ice may form on the outdoor heat exchanger, reducing heating performance. When this happens, the defrost cycle of the system will start. During the defrost cycle, the indoor unit fan stops (or runs at a very low speed in some cases), to prevent cold draft.
  Once the defrost cycle is complete, heating operation and the fan speed resume.
- **Discharging the residual heating air**
  When stopping the air conditioner in normal operation, the fan motor will run with low speed for a while to blow out the residual hot air.
- **Auto restart from power outage**
  When the power supply is recovered after power outage, all presets still be in effect and the system will run according to the previous settings.
- **Self-cleaning function**
  To enter this function in heating mode, you must first shut down the unit, use the remote control to set Cooling or Dry mode, press the CLEAN button to enter, and after that, set the controller to continue running in heating mode.

Trouble Shooting

⚠ CAUTION

When drain water overflows from the indoor unit, stop the operation and contact your dealer.
When you smell or see white smoke coming out of the unit, turn OFF the main power supply and contact your dealer.

1. If Trouble still Exists

If the trouble still exists even after checking the following, contact your dealer and inform them of the following items.

(1) Unit Model Name
(2) Content of Trouble

2. No Operation

Check whether the SET TEMP is set at the correct temperature.

3. Not Cooling or Heating Properly

- Check for obstruction of air flow of outdoor or indoor units.
- Check if there are too many heating sources in the room.
- Check if the air filter is clogged with dust.
- Check if the doors or windows are open.
- Check if the temperature condition is within the operation range.

4. This is Not Abnormal

- **Odour from Indoor Unit**
  Unpleasant odour diffuses from indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.
- **Sound from Deforming Parts**
  When start or stop the system, a sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.
- **Steam from Outdoor Heat Exchanger**
  During defrosting operation, ice on the outdoor heat exchanger melts resulting in steam.
- **Dew on Air Panel**
  When the cooling operation continues for a long period of time under high humidity conditions, dew can form on the air panel.
- **Refrigerant Flow Sound**
  While the system is being started or stopped, the refrigerant flow sound may be heard.

5. Mode Interfere

Multi-zone outdoor units can only support a single mode at one time (cooling or heating).
When the mode set at one or more indoor unit is different from the mode that outdoor unit is using, mode interfere will occur.

	Cooling	Dry	Heating	Fan
Cooling	√	√	×	√
Dry	√	√	×	√
Heating	×	×	√	×
Fan	√	√	×	√

√ --- Normal
× --- Mode interfere

Outdoor unit always run with the mode of first indoor unit that turned on. When the setting mode of following indoor unit is interfered with it, 3 beeps would be heard, and the indoor unit interfered with the normal running units would turn off automatically.
If auto mode is selected, the actual running mode of the unit will be dominated by the unit of which first select auto mode. (Auto mode is invalid for some models.)

Filter Cleaning

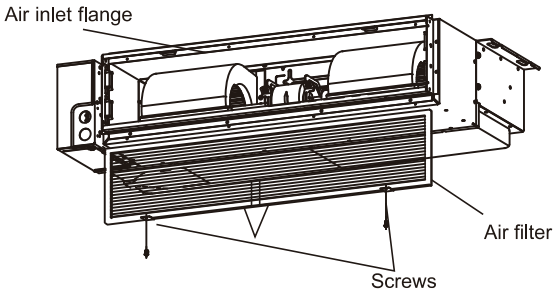
⚠ CAUTION

Turn OFF the main power switch before taking filter.

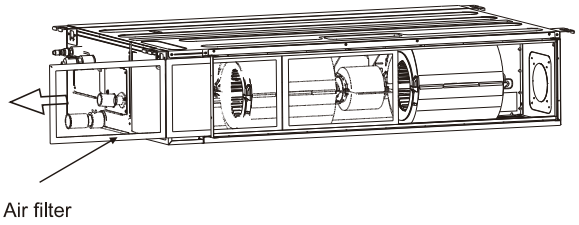
1. Take Out the Filter

Remove the fixed screws of the filter and pull the filter down along the rail of the flange as the figure below.

9K/12K/36K/48K



18K/24K



2. Clean the Filter

⚠ CAUTION

Do not use hot water with temperature more than 104°F (40℃).
Do not use light oil essence, diluent, powder or other similar solvents for cleaning.
Air filter can remove dust or other particles in the air, if blocked, the performance of air conditioner will be greatly reduced. Therefore, in long-term use, you must always clean the air filter.
If the indoor machine is installed in the place with more air dust, the frequency of cleaning the air filter should be increased.

3. Reinstall the Filter

Reinstall the air filter in the reverse order of the filter take out described above.

1. Safety Notice

⚠ WARNING

·Installation should be performed by a qualified personnel. (Improper installation may cause water leakage, electrical shock or fire.)

·Install the unit according to the instructions given in this manual. (Incomplete installation may cause water leakage, electrical shock or fire).

·Be sure to use the supplied or specified installation parts. (Use of other parts may cause the unit to get loosened, 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).

·Electrical work should be carried out in accordance with the installation manual and the local and national electrical wiring rules or code of practice. (Insufficient capacity or incomplete electrical work may cause electrical shock or fire).

·Be sure to use a dedicated power circuit. (Never use a power supply shared by another appliance).

·For wiring, use a cable long enough to cover the entire distance. Do not use an extension cord.

·Use the specified types of wires for electrical connections between the indoor and outdoor units. (Firmly clamp the interconnecting wires so their terminals receive no external stresses).

·Incomplete connections or clamping may cause terminal overheating or fire.

·After connecting all the wires be sure to fix the cables so that they do not put undue force on the electrical covers or panels. (Install covers over the wires, incomplete cover installation may cause terminal overheating, electrical shock or fire).

·When installing or relocating the system, be sure to keep the refrigerant circuit free from air (Air in the refrigerant circuit may causes an abnormal pressure rise or rupture, resulting in injury).

·If any refrigerant has leaked out during the installation work, ventilate the room.

·After all installation is completed, check to make sure that no refrigerant is leaking out. (The refrigerant produces a toxic gas if exposed to flames).

·When carrying out piping connection, take care not to let air substances other than the specified refrigerant get into refrigeration cycle. (Otherwise, it will cause lower performance, abnormal high pressure in the refrigeration cycle, explosion and injury).

·Make sure that the installation is properly grounded. Do not ground the unit to a utility pipe, lightning arrester, or telephone grounding. Incomplete grounding may cause electrical shock. (A high surge current from lightning or other sources may cause damage to the air conditioner).

·An earth leakage circuit breaker may be required depending on the site condition to prevent electrical shock.

·Disconnect the power supply before wiring, piping, or checking the unit.

·When moving the indoor unit and outdoor unit, please be careful, do not make the outdoor unit incline over 45 degree. Pay attention to the sharp edges of the air conditioner to avoid any injury.

·During wired controller installation, ensure that the length of the wire between the indoor unit and wired controller is within 131 ft. (40m).

⚠ CAUTION

- Do not install the air conditioner in a place where there is danger of exposure to inflammable gas leakage. (If the gas leaks and builds up around the unit, it may catch fire).
- Establish drain piping according to the instructions in this manual. (Inadequate piping may cause flooding).
- Tighten the flare nut according to the specifications with a torque wrench. (If the flare nut is tightened beyond specified torque, the flare nut may crack after a long time and cause refrigerant leakage).

2. Tools and Instruments for Installation

Number	Tool	Number	Tool	Number	Tool
1	Standard screwdriver	6	Pipe cutter	11	Churn drill
2	Vacuum pump	7	Cross head screw-driver	12	Pipe expander
3	Charge hose	8	Knife or wire stripper	13	Inner hexagon spanner
4	Pipe bender	9	Leveler	14	Measuring tape
5	Adjustable wrench	10	Hammer		

3. Installation of the Indoor Unit

⚠ CAUTION

During installation, do not damage the insulation material on the surface of the indoor unit.

3.1 Initial Check

⚠ CAUTION

- When moving the unit after unpacking, make sure to lift it by holding its lifting lugs. Do not exert any pressure on other parts, especially the refrigerant piping, drain piping and flange parts.
- Wear protective gears when installing the unit.

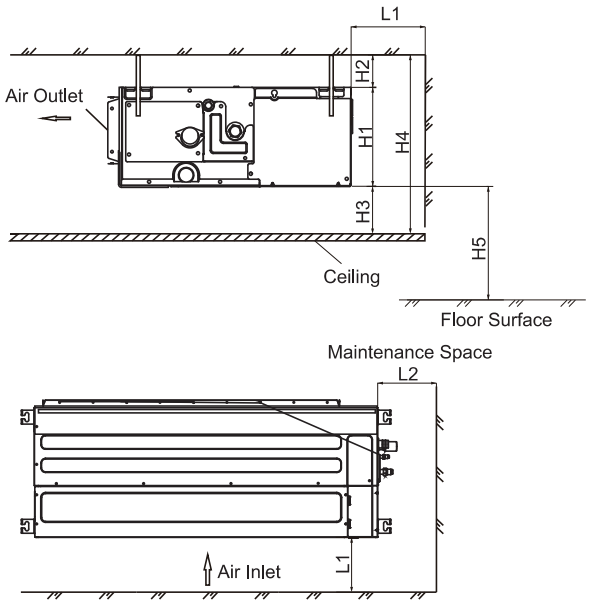
3.1.1 Selecting

(1) Select an installation site where the following conditions are fulfilled and that meets with your customer's.

- Optimum air distribution is ensured.
- The air passage is not blocked.
- Condensate can drain properly.
- The ceiling is strong enough to bear the weight of the indoor unit.
- A false ceiling does not seem to be at an incline.
- Sufficient clearance for maintenance and servicing is ensured.(See Fig.3.1.1)
- Piping between the indoor and outdoor units is within the allowable limits.(refer to the installation of the outdoor unit)
- The indoor unit, outdoor unit, power supply wiring and transmission wiring must be kept at least 1m away from televisions and radio, this prevents image interference and noise in electrical appliances.
  (Noise may be generated depending on the conditions under which the electric wave is generated, even if a one-meter allowance is maintained.)
- Do not install the indoor unit in a machinery shop or kitchen where vapor from oil or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the performance of the indoor unit, and may deform and in the worst case, break the plastic parts of the indoor unit.
- Use suspension bolts to install the unit, check whether or not the ceiling is strong enough to support the weight of the unit. If there is a risk that the ceiling is not strong enough, reinforce the ceiling before installing the unit.

(2) Minimum space required for installation.

[unit: in. (mm)]



H1: product height
H2≥ 0.39(10)
H3≥ 2(50)
L1≥ 5.9(150)
L2≥ 18(450)
H5≥ 98(2500)
H4: Size determination with at least a 1% downward slope of the drain pipe.

Fig. 3.1.1

NOTE:

1. Reserve necessary maintenance port when the ceiling is not detachable.
2. The location of the maintenance port should ensures remove electric box cover and internal components are all easy to perform.

3.1.2 Inspection of ceiling openings

(1) Reserve necessary maintenance port when the ceiling is not detachable.
(2) The location of the maintenance port should ensures remove electric box cover and internal components are all easy to perform.

When the height (H) from the ceiling to the bottom plate of the unit is ≥12 in.(300 mm), two access holes are required, as shown in Fig. 3.1.2.

Example 1: [unit: in. (mm)]

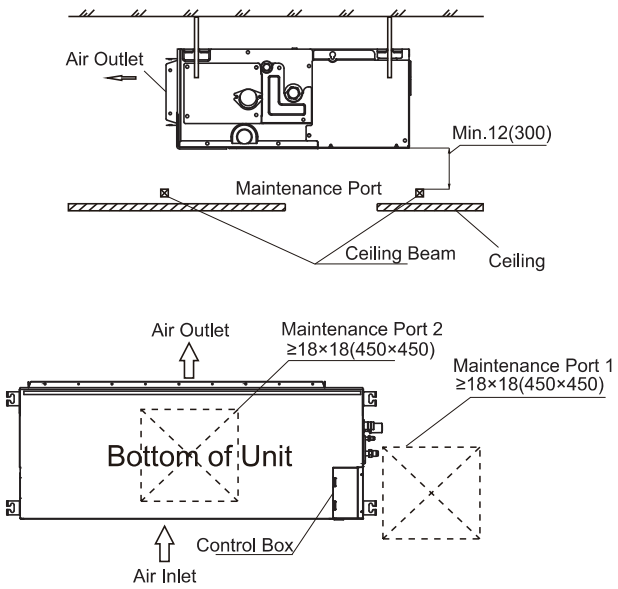
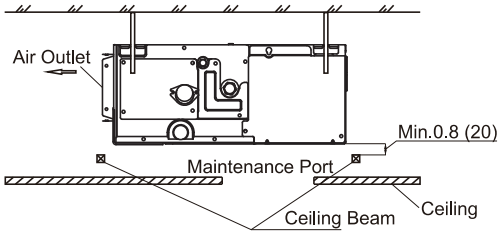


Fig. 3.1.2

When the height (H) from the ceiling to the bottom plate of the unit is <12 in.(300 mm), access holes are required, as shown in Fig. 3.1.3, Fig. 3.1.4.



Example 2: Installation of two access holes

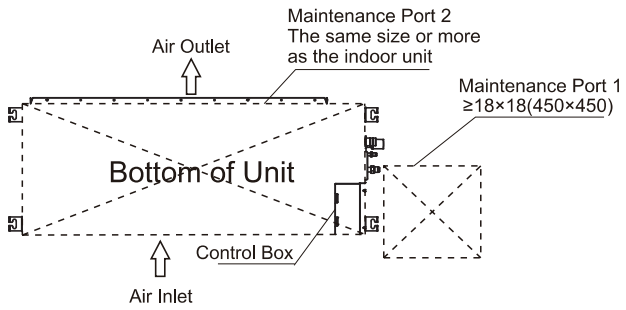


Fig. 3.1.3

Example 3: Installation of one access hole

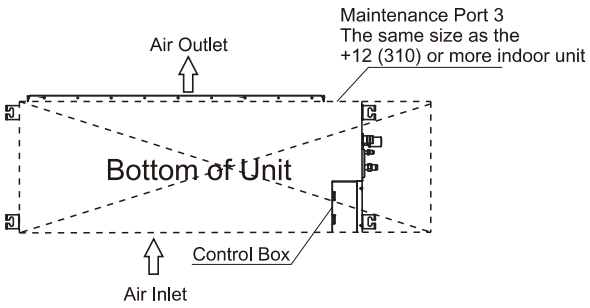


Fig. 3.1.4

3.1.3 For the bottom intake

For bottom intake, replace the chamber lid in the procedure listed in fig.

(1) Remove the chamber lid.

(2) Reattach the removed filter in the orientation shown in Fig. 3.1.5.

Reattach the removed chamber lid in the orientation shown in Fig. 3.1.6, refer to Fig. 3.1.6 for the direction of filter.

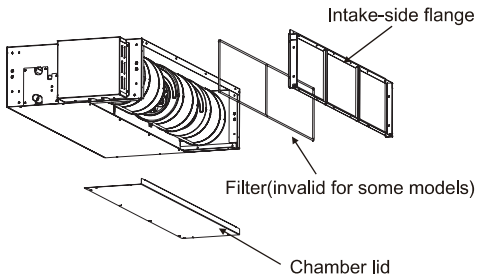


Fig. 3.1.5

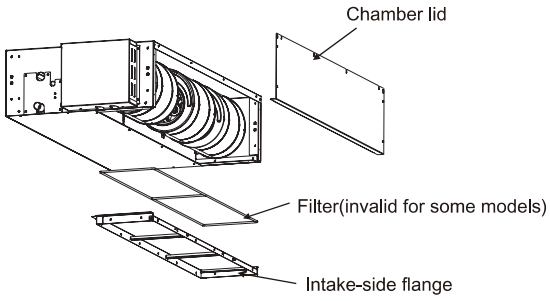


Fig. 3.1.6

3.2 Installation

3.2.1 Suspension bolts

(1) Consider the pipe direction, wiring and maintenance carefully, and choose the proper direction and location for installation.

(2) Install the suspension bolts as shown in Fig. 3.2.1 below.

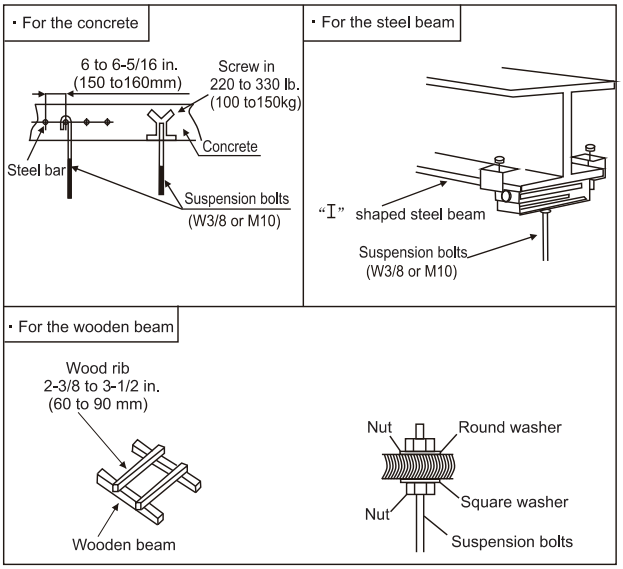
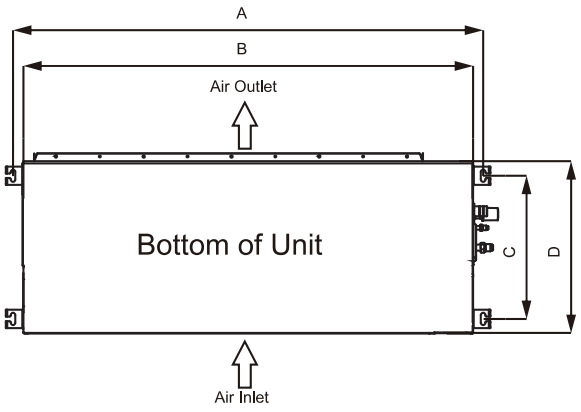


Fig. 3.2.1 Fixing the suspension bolts

3.2.2 The position of the suspension bolts and the pipes

(1) Mark the positions of the suspension bolts, the positions of the refrigerant pipes and the drain pipes.

(2) The dimension are shown below.



[unit: in. (mm)]

Capacity (Btu/h)	A	B	C	D
9K/12K	37-7/8 (961)	35-7/8 (910)	14-3/4 (375)	17-5/8 (447)
18K	33-1/2 (850)	31-1/2 (800)	24-3/8 (620)	27-1/2 (700)
24K	45-1/4 (1150)	43-1/4 (1100)	24-3/8 (620)	27-1/2 (700)
36K/48K	57-1/8 (1450)	55-1/8 (1400)	28-5/8 (727)	31-1/2 (800)

Fig. 3.2. 2 Suspension bolts

3.2.3 Install the indoor unit

The installation of the indoor unit is shown in Fig. 3.2.3.

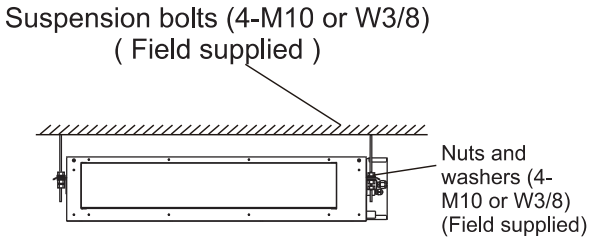


Fig. 3.2.3 The installation of the indoor unit

(1) How to fix the suspension bolts and the nuts
As shown in the figures 3.2.4, the nuts are fixed four bolts.

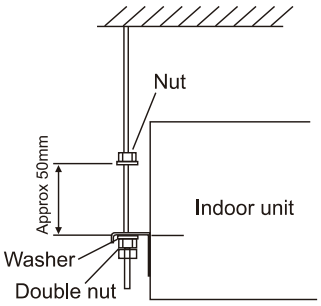


Fig. 3.2.4 Suspension bolts and nuts

(2) Install the indoor unit

- As shown in the following figure, place the left hanger bracket on the nuts and washers of the suspension bolts.
- Make sure that the left hanger bracket has been fixed on the nuts and washers securely, install the right hanger bracket suspension hook on the nuts and washers.
  (When installing the indoor unit, you can slightly remove the suspension bolts.)

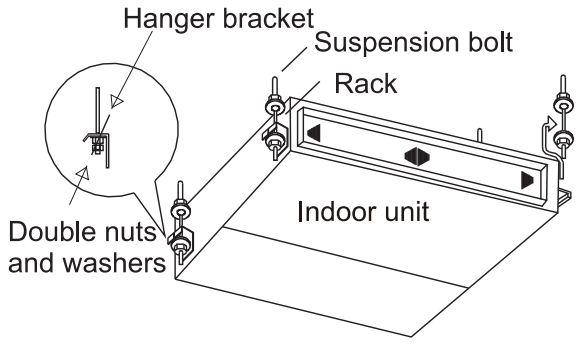


Fig. 3.2.5

3.2.4 Adjusting of the unit level

(1) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient.
(2) The unit should be installed that the drainage side is slightly 0~0.2 in. (0~5 mm) lower than other sides for adequate drainage.

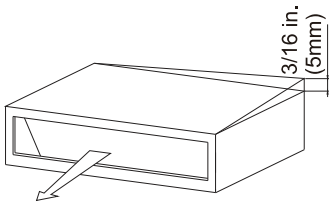


Fig. 3.2.6

(3) After the adjustment, tighten the nuts and swear the thread locker on the suspension to prevent the nuts from loosening.

⚠ CAUTION

(1) During the installation, please cover the unit with the plastic cloth to keep it clean.
(2) Make sure that the unit is installed level by using a level or a plastic pipe filled with water in instead of a level, adjust the top surface of the unit to the surface of the water at both ends of the plastic pipe and adjust the unit horizontally.(one thing to watch out for in particular is if it is installed so that the slope is not in the direction of the drain piping, as this might cause leaking.)

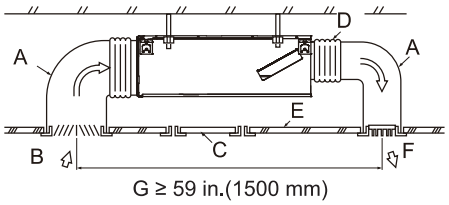
3.2.5 Installing the duct

⚠ CAUTION

- Make sure the external static pressure of the unit is within the range.
- Connect the duct and intake-side flange.
- Connect the duct and outlet-side flange.
- The connection of indoor unit and air duct must be well sealed and kept warm with insulation material.

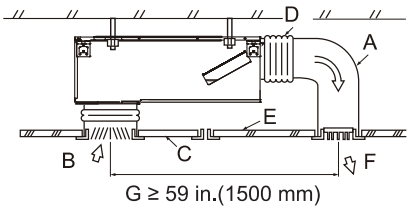
<Example> (For LSP/MSP Type)

A. In case of rear inlet

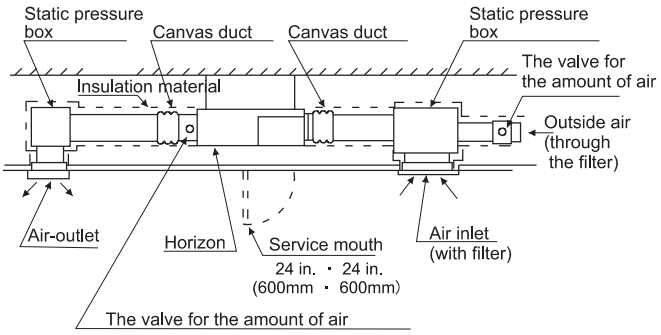


A Duct
B Air inlet
C Access door
D Canvas duct
E Ceiling surface
F Air outlet
G Leave distance enough to prevent short cycle

B. In case of bottom inlet



<Example> (For MSP/HSP Type)



4. Refrigerant Pipe

⚠ DANGER

Use the refrigerant according to outdoor nameplate. When carrying on the leakage check and test, do not mix in the oxygen, the acetylene and flammable and the virulent gas, for these gases are quite dangerous, and may possibly cause explosion. It is suggested that the nitrogen be used to perform these experiments.

4.1 Pipe 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 pipe dust and impurity.
(3) Choose the copper pipe according to Fig. 4.1.

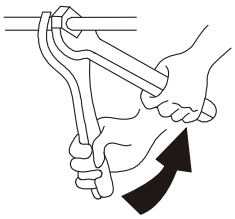
4.2 Pipe Connection

(1) The pipe diameter are shown in Fig. 4.1.

Capacity (Btu/h)	**Gas Pipe** [in. (mm)]	**Liquid Pipe** [in. (mm)]
9K/12K	Φ 3/8 (9.52)	Φ 1/4 (6.35)
18K	Φ 1/2 (12.7)	Φ 1/4 (6.35)
24K/36K	Φ 5/8 (15.88)	Φ 3/8 (9.52)
48K	Φ 3/4 (19.05)	Φ 3/8 (9.52)

Fig. 4.1 Pipe diameter

(2) As shown in Fig. 4.2, screw up the nuts with 2 spanners.



Pipe size [in. (mm)]	**Torque [lbf·ft. (N·m)]**
ø 1/4 (6.35)	14.8 (20)
ø 3/8 (9.52)	29.5 (40)
ø 1/2 (12.7)	44.3 (60)
ø 5/8 (15.88)	59.0 (80)
ø 3/4 (19.05)	73.8 (100)

Fig. 4.2 Tightening torque for the nut

(3) After finishing connecting the refrigerant pipes, keep it warm with the insulation material.

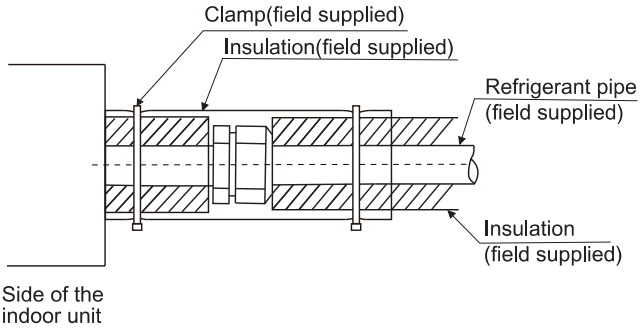
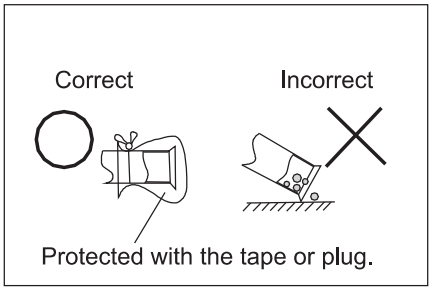


Fig. 4.3 Piping insulation procedure

- The pipe goes through the hole with the seal.
- Do not place the pipes on the floor directly.

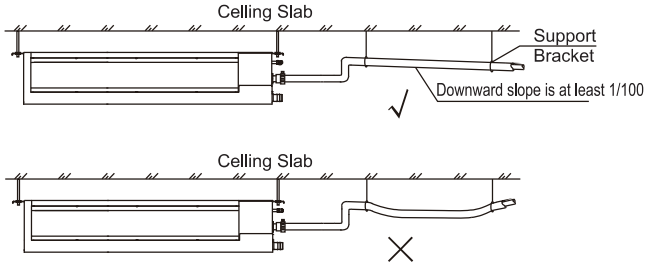


5. Drain Piping

5.1 Conduct Drain Piping Work

5.1.1 Draining piping connections

- Prepare polyvinyl chloride pipe with a 1-1/4 in. (32mm) outer diameter.
- The diameter of drain pipe connection hole should be same as that of the drain pipe.
- Keep the drain pipe short and sloping down wards at a gradient of at least 1/100 to prevent air pockets from forming.
- Attach a support bracket at 3.3~4.9 ft. (1~1.5m) intervals for the prevention of piping deflection.
- The highest point of the main drain pipe should be provided with a vent hole, and at least every 16.4 ft.(5m) on the main drain pipe should be provided with a vent hole.

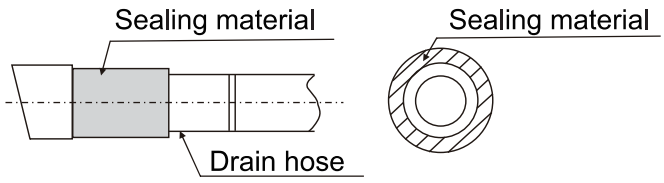


⚠ CAUTION

Water accumulating in the drain piping can cause the drain to clog.

⚠ CAUTION

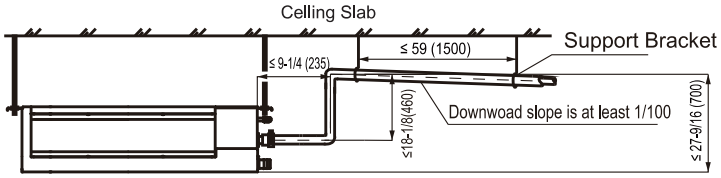
- Use the drain hose and the clamp. Insert the drain hose fully into the drain socket and firmly tighten the drain hose and warm-keeping material with the clamp.
- The two areas below should be insulated because condensation may happen there causing water leakage. Drain piping passing indoors and Drain sockets.
- Referring the figure below, insulate the drain socket and drain hose using the included large sealing pad.



5.1.2 Connection mode of the drain pipe with a drain drain pump unit

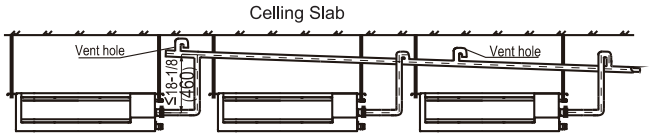
(1) The drain pipe for a single indoor unit

[unit: in. (mm)]



(2) The drain pipe for multiple indoor units through the main drain pipe

[unit: in. (mm)]



NOTE:

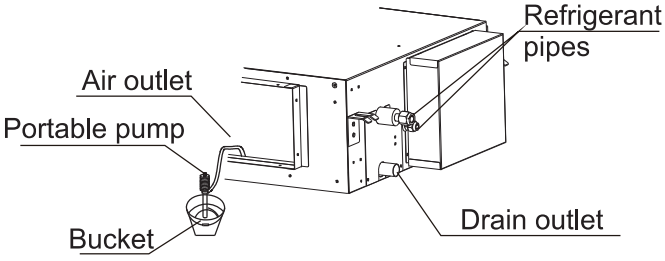
Select the diameter of the concentrated drain piping to suit the capacity of equipment connecting to the concentrated drain piping (see the equipment design sheet).

⚠ CAUTION

- Do not connect the drain pipes directly to sewage pipes to avoid ammonia odour. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Do not twist or bend the drain hose, doing so applies excessive force applied on it and may also cause leakage.

5.2 Check Draining of the Piping

- After piping work is finished, check if drainage flows smoothly.
- Gradually pour approximately 1000 cc of water from the outlet hole into the drain pan to check drainage flow.
- Check the drainage as shown below:



6. Electrical Wiring

6.1 General Check

⚠ CAUTION

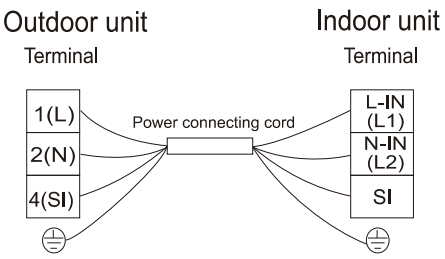
- Before proceeding with electrical connections, make certain that power supply are as specified on the unit rating plate. See unit wiring label for proper field high and low-voltage wiring. Make all electrical connections in accordance with the NEC and any local codes or ordinances that may apply. Refer to the NEC(USA) or CSA (Canada) for wire sizing. Use copper wire only.
- Every installation must include an NEC(USA) or CSA (Canada) approved over-current protection device.

⚠ WARNING

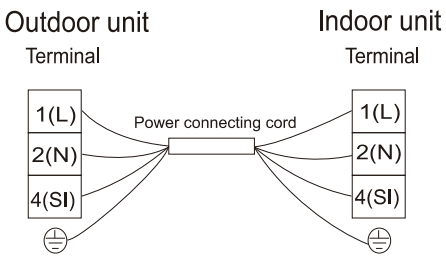
Disconnect all power before servicing or installing this unit.
To avoid the electrical shock, please ensure the air conditioner is proper grounded.
All routing of electrical wiring must be made through provided electrical knockouts.
Do not cut, puncture or alter the cabinet for electrical wiring.
Knockouts are provide on the indoor unit top panel and sides of the cabinet to allow for the entry of the supply voltage conductors. If the knockouts on the cabinet sides are used for electrical conduit, an adapter ring must be used in order to meet UL 60335 safety requirements. An MEC or CEC approved strain relief is to be used at this entry point. Some codes/municipalities require the supply wire to be enclosed in conduit.
Consult your local codes.

Electrical Wiring Diagram

9K/12K



18K/24K/36K/48K



Note:
Since there may be differences in some model's terminal blocks, wiring connection should be done according to letters on the terminal block. Please disregard numbers in this case.

6.2 Change of Static Pressure

The static pressure can be freely adjusted by using specific wired controller. (For more information, please refer to other technical files or contact local technical service center of our company.)

Capacity (Btu/h)	The Range of Static Pressure	Function Code Set
9K/12K	0-0.20 in. H_2O (0-50Pa)	0-50 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
18K	0-0.56 in. H_2O (0-140Pa)	0-140 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
24K	0-0.66 in. H_2O (0-165Pa)	0-165 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]
36K/48K	0-0.80 in. H_2O (0-200Pa)	0-200 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]

Note: The pressure loss of filter is included in the data above.

6.3 Electrical Installation

⚠WARNING

- This product must be installed on a single dedicated electrical circuit. Circuit breaker protection must be installed in accordance with this manual. In moist and humid locations, an ELB type circuit breaker must be used.
- Do not operate the system until all the check points have been cleared.

(A) Check to ensure that the insulation 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.

(B) Check to ensure that the stop valves of the outdoor unit are fully opened and then start the system.

- 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).

Capacity (Btu/h)	Transmitting Cable Size
9K~48K	4×14AWG

Note：

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

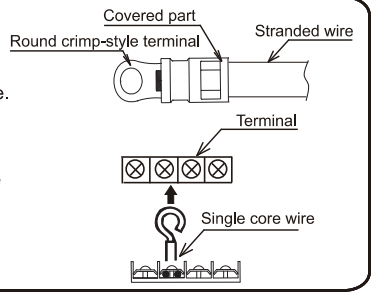
(2) Use copper supply wires.

(3) Install main switch and ELB for each system separately. When using an ELB, select the high response type ELB 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. When connecting the terminal block using a single core wire, be sure to perform curing.



7. Test Run

Please perform test run according to outdoor unit installation manual.