

INSTALLATION & MAINTENANCE MANUAL

airCore 700

SINGLE SPLIT
INVERTER SERIES
OUTDOOR UNITS

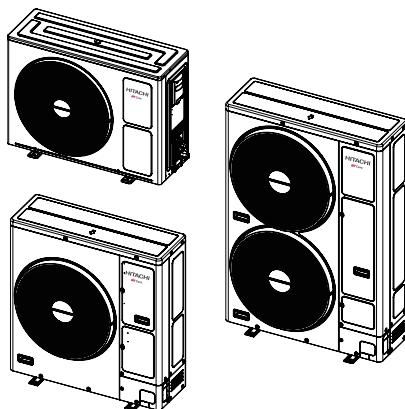
MODELS

PAS-2.0UFASNQ1	PAS-5.0UFASMQ1
PAS-2.5UFASNQ1	PAS-6.0UFASNQ1
PAS-3.0UFASNQ1	PAS-6.0UFASMQ1
PAS-4.0UFASNQ1	PAS-6.5UFASNQ1
PAS-4.0UFASMQ1	PAS-6.5UFASMQ1
PAS-5.0UFASNQ1	

EN INSTALLATION AND MAINTENANCE MANUAL
Original Instructions



Scan the code to get the electronic manual.



Cooling & Heating

IMPORTANT NOTICE

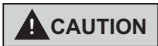
- Hitachi pursues a policy of continuous improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Hitachi cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for human comfort air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating purposes.
- Signal words (DANGER, WARNING, CAUTION and NOTE) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTE

NOTE indicates useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by persons conversant in English. If this is not the case, the distributor should add safety, caution and operating signs in the native language.
- No part of this manual may be reproduced without written permission.
- If you have any questions, contact your distributor or dealer of Hitachi.
- This unit shall be installed in accordance with local codes and regulations.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well as for other models.
- The installer and system specialist shall ensure safety against the refrigerant leakage according to local regulations or standards. The following standards may be applicable, if local regulations are not available. International Organization for Standardization, ISO5149 or European Standard, EN378 or Japan Standard, KHKS0010.
- This system has been designed and tested to operate within the outdoor temperature limits as stated below. The manufacturer cannot guarantee satisfactory performance if the unit is operated for prolonged periods outside of these limits.

Operation Temperature Range	Maximum	Minimum
Cooling Operation	52	-5
Heating Operation	15.5	-15

(°C)

In the heating operation at low outdoor ambient temperature, indoor unit fan may run at the lower speed, which is a normal phenomenon.

Storage condition: Temperature -5~50°C in the warehouse Humidity 10%~95%

- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

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1. Safety Summary

The appliance uses R32 flammable refrigerant.

This appliance uses power supply: 220-240V ~, 50Hz (2.0/2.5/3.0/4.0/5.0/6.0/6.5HP)
380-415V 3N~, 50Hz (4.0/5.0/6.0/6.5HP)

Read these **Safety summary** carefully before installing an air conditioner or heat pump. After completing the installation, make sure that the unit operates properly during the startup operation. Inform users that they should store this manual for future reference. Always use a licensed installer or contractor to install this product. Improper installation can result in water or refrigerant leakage, electric shock, fire, or explosion.

DANGER

- Refrigerant gas is heavier than air and replaces oxygen. A massive leak can lead to oxygen depletion, especially in basements, and an asphyxiation hazard could occur leading to serious injury or death.
- If refrigerant gas leaks during installation, ventilate the area immediately. Refrigerant gas may produce toxic gas if it comes into contact with fire. Exposure to this gas could cause severe injury or death.
- Do not install the unit in the following places. It may cause a fire, deformation, corrosion or failure.
 - Places where oil (including machinery oil) may be present in quantities.
 - Places where a lot of sulfide gas drifts such as in a hot spring.
 - Places where flammable gas may generate or flow.
 - Places where strong salty wind blows such as coast regions.
 - Places with an atmosphere of acidity or alkalinity.
- Do not install the unit in the place where silicon gas drifts. If the silicon gas attaches to the surface of heat exchanger, the fin surface repels water. As a result, drain water splashes outside of the drain pan and splashed water runs inside of electrical box. In the end, water leakage or electrical devices failure may occur.
- Do not ground units to water pipes, gas pipes, telephone wires, or lightning rods as incomplete grounding can cause a severe shock hazard resulting in severe injury or death. Additionally, grounding to gas pipes could cause a gas leak and potential explosion causing severe injury or death.
- Do not install unit in an area where flammable materials are present due to risk of explosions that can cause serious injury or death.
- Safely dispose all packing and transportation materials in accordance with federal/state/local laws or ordinances. Packing materials such as nails and other metal or wood parts, including plastic packing materials used for transportation may cause injuries or death by suffocation.
- Do not pour water in the indoor or outdoor unit. This product contains electrical components and if wet, can cause serious electrical shock.
- Do not open the service cover or access panel for the indoor or outdoor unit without turning OFF the main power supply.
- Do not touch or adjust safety devices inside the indoor unit or outdoor unit. If these devices are touched or readjusted, it may cause a serious accident.
- Use an ELB (Earth Leakage Breaker). In the event of fault, there is danger of an electric shock or a fire if it is not used.
- For installation, firmly connect the refrigerant pipe before the compressor starts operating. For maintenance, relocation and disposal, remove the refrigerant pipe after the compressor stops.
- Do not perform a short-circuit of the protection device such as the pressure switch when operating. It may cause a fire and explosion.

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- Assure that the maximum operating pressure is checked when connecting to Indoor UNIT.
- This unit shall only be connected to an appliance suitable for the same refrigerant and must only be connected to the appliance that have been confirmed as complying to corresponding requirements of IEC 60335-1 and IEC 60335-2-40.
- Only qualified personnel licensed or certified in their jurisdiction must carry out the installation work. Installation must be done in accordance with this installation manual. Improper installation may result in water leakage, electric shock, or fire.
- Pipe work and installation shall be in compliance with national codes (ASHRAE15 or IRC).
- Use only specified accessories and parts for installation work. Failure to use specified parts may result in water leakage, electric shock, fire, or the unit falling.
- Install the air conditioner or heat pump on a foundation strong enough that it can withstand the weight of the unit. A foundation of insufficient strength may result in the unit falling and causing injuries.
- Take into account strong winds, typhoons, or earthquakes when installing. Improper installation may result in the unit falling and causing accidents.
- Make sure that a separate power supply circuit is provided for this unit and that all electrical work is carried out by qualified personnel licensed or certified in their jurisdiction according to local, state, and national regulations. An insufficient power supply capacity or improper electrical construction may lead to electric shock or fire.
- Make sure that all wiring is secured, that specified wires are used, and that no external forces act on the terminal connections or wires. Improper connections or installation may result in fire.
- When wiring, position the wires so that the electrical wiring box cover can be securely fastened. Improper positioning of the electrical wiring box cover may result in electric shock, fire, or the terminals overheating.
- Before touching electrical parts, turn off the unit.
- The circuit must be protected with safety devices in accordance with local and national codes, i.e. a circuit breaker.
- Securely fasten the outdoor unit terminal cover (panel). If the terminal cover/panel is not installed properly, dust or water may enter the outdoor unit causing fire or electric shock.
- Do not use any sprays such as an insecticide, lacquer, hair spray or other flammable gases within approximately 1 meter from the system.
- If the circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it leads electric shock. Do not connect the ground wiring to a gas piping, water piping, lighting conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Before performing any brazing work, check to ensure that there is no flammable material around. When using the refrigerant be sure to wear leather gloves to prevent cold injuries.
- Perform the electrical work according to Installation Manual and all the relevant regulation and standards. If the instructions are not followed, an electrical shock and fire may occur due to insufficient capacity and inadequate performance.
- Ensure that the wiring terminals are tightened securely with the specified torques. If not, generating fire or an electric shock at the terminal connection part may occur.
- When a fire occurs, cut off the power supply immediately.

Precautions for R32

This air conditioner uses R32 flammable refrigerant. Air conditioner with R32 refrigerant, if not be treated carefully, may cause serious harm to the human body or surrounding things. Please read the following instructions carefully before installing, using and maintaining.

- Do not charge R32 into system other than those designated for R32.
- Do not charge R32 system with oil other than those designated for R32.
- Do not use a reclaim cylinder other than an R32 reclaim cylinder.
- Be sure to only use refrigerant piping approved for use with R32 refrigerant. The use of unapproved piping may result in explosive rupture.
- 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; Mechanical connections shall be accessible for maintenance purposes.
- Maintenance or repair of air conditioner using R32 refrigerant must be carried out after security check to minimize risk of incidents.
- 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).
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified.
- The appliance shall be stored and installed so as to prevent mechanical damage from occurring.
- The appliances are designed for use at altitudes less than 2000m, may cause serious harm to the human body or surrounding things if used at altitudes 2000m and above.
- Keep any required ventilation openings clear of obstruction, don't block air inlet or air outlet, Otherwise, the cooling or heating capacity will be weakened, even cause system stop operating or safety hazard.
- There are no potential ignition sources or any equipment that generates sparks around the outdoor unit.
- Do not pierce or burn.
- Be aware that refrigerants might not contain an odour.
- The pipe-work shall be securely mounted and guarded from physical damage.
- The national gas regulations shall also be observed when field-installed refrigerant pipes are required.
- The joints shall not be reused, unless after re-flaring the pipe.
- Joints made in the installation between parts of the refrigerating system, with outdoor part charged, shall be made in accordance with the following.
 - A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system part.
 - 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.
 - Refrigerant tubing shall be protected or enclosed to avoid damage.

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- 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, according to the following requirements:
 - The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
- Installation, maintenance, service, repairing, removing and disposal operations, shall only be performed by the qualified personnel or recommended by the manufacturer.
- Every working procedure that affects safety means shall only be carried out by competent persons. Examples for such working procedures are:
 - breaking into the refrigerating circuit;
 - opening of sealed components;
 - opening of ventilated enclosures.
- Precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping for the transport and installation.
- Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris.
- When installing or repairing the air conditioner and the connecting line is not long enough, the entire connecting line shall be replaced with the connecting line of the original specification; extension is not allowed.
- Refrigerating systems shall be so installed as to minimize the likelihood of hydraulic shock damaging the system.
- Outdoor units are not allowed to be placed in confined spaces (such as basements or Semi-basement) or places with poor ventilation. The air outlet in front of the outdoor unit should not be obstructed by obstacles, to avoid the risk by leak refrigerant as the R32 refrigerant used.
- When installing or relocating the air conditioner, do not let any other substances besides R32, such as air, enter the refrigerant circuit. The presence of air or foreign matter in the refrigerant circuit causes an abnormal pressure rise, which may result in equipment damage and even injury.
- Refrigerant R32 in the system must be kept clean, dry, and tight.
- Clean and Dry -- Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting into the system.
- Tight -- R32 does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection against harmful ultraviolet radiation. R32 can contribute to the greenhouse effect if it is released.
- Only use tools for R32, such as a gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.
- It is necessary to check whether there is refrigerant leakage before opening the box of outdoor machine; stop installing the air conditioner if leakage is found.
- The outdoor unit shall not be installed in any way that could occupy an aisle, exit, fire escape, catwalk or any other public area.
- The outdoor unit shall not be installed as far as possible from the doors and windows of the neighbors as well as the green plants.

- The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable local transport regulations.
- Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.
- 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 shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the non-existence of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. nonsparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating 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.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it can 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 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.
- 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 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.
- Anti-static precautions is necessary for installing and maintenance, for example, wear pure cotton clothes and gloves.
- If R32 refrigerant leakage occurs during the installation, operators shall immediately detect the concentration in outdoor environment until it reaches a safe level. If the leakage affects the performance of the machine, please immediately stop the operation, and the air conditioner must be vacuumed firstly and be returned to the maintenance station for processing.
- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the maintenance and service guidelines of this manual shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using R32:
 - The refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
 - The ventilation machinery and inlets and outlets are operating adequately and are not obstructed; and shall keep away from heat source, flammable or explosive conditions;
 - Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
 - Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which can 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.
- Repair and maintenance to 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

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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 no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.
- Sealed electrical components shall not be repaired.
- 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.
- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
- Air-tightness test shall be carried out as guaranteed. Charging oxygen, acetylene or other flammable and toxic gases during leakage inspection and air-tightness test may lead to explosions. It is recommended to use nitrogen gas for this test.
- The following leak detection methods are deemed acceptable for all refrigerant systems.
 - Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity can be inadequate, or can 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 (no more than 25 %) is confirmed.
 - The fluid used in leak detection is applicable to most refrigerants. But do not use chloride solvents to prevent the reaction between chlorine and refrigerants and the corrosion of copper pipeline.
 - 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 in a part of the system remote from the leak. Removal of refrigerant shall be according to this manual.
- 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 is 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 inert gas;
 - continuously flush with inert gas when using flame to open circuit;
 - open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The inert gases that can be used are specified. Compressed air or oxygen shall not be used for purging refrigerant systems.
- Purging of the refrigerant circuit shall be achieved by breaking the vacuum in the system with inert gas 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. The system shall be vented down to atmospheric pressure to enable work to take place.

- Ensure that the outlet of the vacuum pump is not close to any potential ignition sources and that ventilation is available.
- 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 in an appropriate position according to the instructions.
 - Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
 - Label the system when charging is complete (if not already labelled).
 - Extreme care shall be taken not to overfill the refrigerating system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. 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.
- Before carrying out decommissioning procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.
 - Become familiar with the equipment and its operation.
 - Isolate system electrically.
 - Before attempting the procedure, ensure that:
 - (a) mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - (b) all personal protective equipment is available and being used correctly;
 - (c) the recovery process is supervised at all times by a competent person;
 - (d) recovery equipment and cylinders conform to the appropriate standards.
 - Pump down refrigerant system, if possible.
 - If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
 - Make sure that the cylinder is situated on the scales before recovery takes place.
 - Start the recovery machine and operate in accordance with instructions.
 - Do not overfill cylinders (no more than 80 % volume liquid charge).
 - Do not exceed the maximum working pressure of the cylinder, even temporarily.
 - 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.
 - Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.
- Equipment shall be labelled stating that it has been de-commissioned and emptied 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 refrigerant.
- When removing refrigerant from a system, either for servicing or decommissioning, it is required to follow good practice so that all refrigerants are 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

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pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

- 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 the flammable refrigerant. Consult manufacturer if in doubt. 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.
- The recovered refrigerant shall be processed according to local legislation 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 compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. Draining of oil from a system shall be carried out safely.
- Disposal of equipment shall follow the national regulations.
- The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.
- The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations. Storage package protection should be constructed in such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

CAUTION

- Pay attention to the following points when the unit is installed in a hospital or other facilities where an electromagnetic wave generates from a medical equipment.
 - Do not install the unit in the place where an electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
 - Install the unit at least 3 meters away from an electromagnetic wave such as a radio.
- Do not install the unit in the place where the breeze directly catches animals and plants. It could adversely affect animals and plants.
- Do not touch the switch with wet fingers. Touching a switch with wet fingers can cause electric shock.
- 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.
- Do not allow children to play on or around the unit to prevent injury.
- Wear adequate personal protective equipment (protective gloves, safety glasses,...) when installing, maintaining or servicing the system.
- The heat exchanger fins are sharp enough to cut. To avoid injury, wear gloves or cover the fins while working around them.
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

- Install drain piping to ensure proper drainage. Improper drain piping may result in water leakage and property damage.
- Insulate piping to prevent condensation.
- Be careful when transporting the product.
- Take adequate measures to prevent the outdoor unit from being used as a shelter by small animals. Small animals making contact with electrical parts can cause malfunctions, smoke, or fire. Instruct the user to keep the area around the unit clean.
- Do not step or put any material on the product.
- Do not put any foreign material on the unit or inside the unit.
- Provide a strong and correct foundation so that:
 - (a) The outdoor unit is not on an incline.
 - (b) Abnormal sound does not occur.
 - (c) The outdoor unit will not fall down due to a strong wind or earthquake.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- In some cases, the packaged air conditioner may not be operated normally under the following cases.
 - In case that electrical power for the packaged air conditioner is supplied from the same power transformer as the device*.
 - In case that the power source wires for the device* and the packaged air conditioner are located close to each other.

Device*: (Ex) Lift, container crane, rectifier for electric railway, inverter power device, arc furnace, electric furnace, large-sized induction motor and large-sized switch. It consumes a large quantity of electrical power.

Regarding the cases mentioned above, surge voltage may be inducted in the power supply wiring for the packaged air conditioner due to a rapid change in power consumption of the device and an activation of switch.






Therefore, check the field regulations and standards before performing electrical work in order to protect the power supply for the packaged air conditioner.

NOTES:

- Dismantling the unit, treatment of the refrigerant, oil and additional parts must be done in accordance with the relevant local, state, and national regulations.
- As maximum allowable pressure is 4.15MPa, minimum allowable pressure is 2.21MPa, the wall thickness of field-installed pipes should be selected in accordance with the relevant local, state, and national regulations.

1. Safety Summary

Explanation of symbols displayed on the indoor unit or outdoor unit

	WARNING	These symbols show 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 handle this equipment with reference to the installation manual.
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

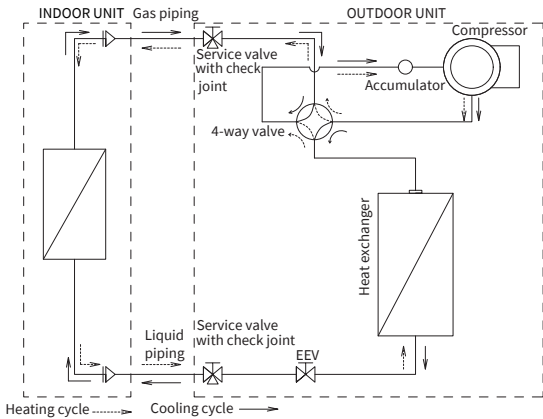
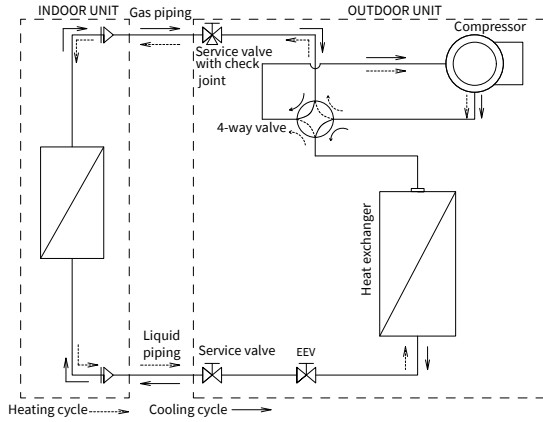
CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

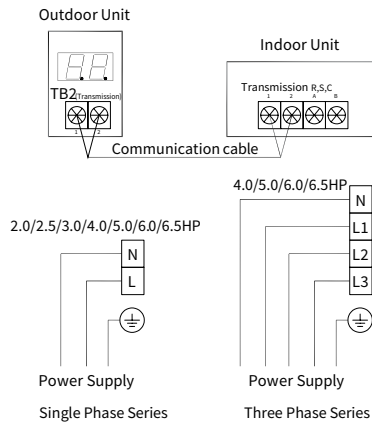
The standard utilization of the unit shall be explained in these instructions. Therefore, the utilization of the unit other than those indicated in these instructions is not recommended. Please contact your local agent, as the occasion arises.

Hitachi's liability shall not cover defects arising from the alteration performed by a customer without Hitachi's consent in a written form.

2. Refrigerant Flow Diagram



3. Electrical Wiring Diagram



4. Installation Instructions

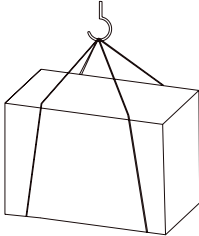
4.1 Transportation and Handling before Installation

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

- Handling Method

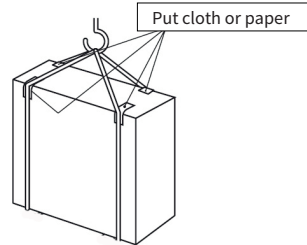
When handling the unit, ensure a balance of the unit, check safety and lift it up smoothly.

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



- Handling

If the product has no package to move, please protect it with cloth or paper.



4.2 Installation Locations Selection

Before choosing the installation site, obtain the user's 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.



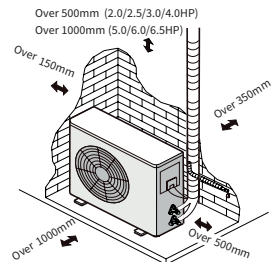
Avoid the following places for installation where air conditioner trouble is liable to occur.

- 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.

NOTES:

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

- Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to 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.



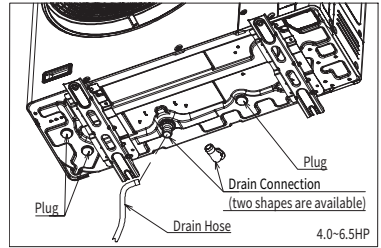
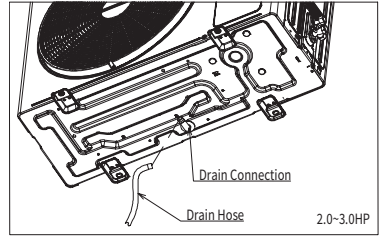
4.3 Drain Connection and Drain Hose Installation

Install Drain Connection and Drain Hose

- The condensate water may drain from the outdoor unit when the unit operates in heating mode. In order to avoid disturbing neighbors and protect the environment, it is necessary to install a drain connection and a drain hose to drain out the condensate water. (4~6.5HP: Plugs and drain connection are optional parts.)
- Please do the drainage work before the indoor unit and outdoor unit are connected. Otherwise, it will be difficult to install drain connection after the machine becomes immovable.
- Connect the drain hose (field-supplied) as shown in the figure for drainage.

NOTE:

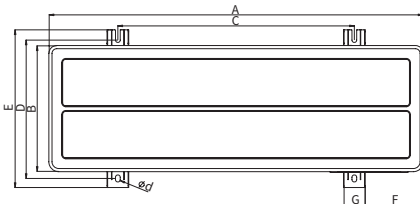
- Do not use the drain connection in a cold region. Drain may freeze to stop the fan runs.



4.4 Outdoor Unit Installation

- Use the washer provided in the accessory (except 2.0HP~3.0HP) to fasten the machine at the foundation bolts.
- When fastening the outdoor unit with the foundation bolts, the fasten holes position is shown in the Fig. 1.
- Fasten the outdoor unit as the Fig. 2.
- Make sure to fasten the outdoor unit tightly and horizontally to prevent noise when the machine is oblique or inclined by strong breeze or earthquake.
- Do not drain off water to public places to avoid skidding.
- A strong base (made of concrete, etc.) should be made. The appliance should be placed not less than 100mm high to avoid being wet or corroded. Otherwise, it may cause damage to the appliance or reduce its life time. (Fig. 3)

(Unit: mm)



Model	A	B	C	D	E	F	G	d	Height
2.0/2.5/3.0HP	900	320	545	354	390	156	59	11	669
4.0HP	950	320	600	358	400	140	70	12	1002
5.0/6.0/6.5HP	950	320	600	358	400	140	70	12	1383

Fig.1

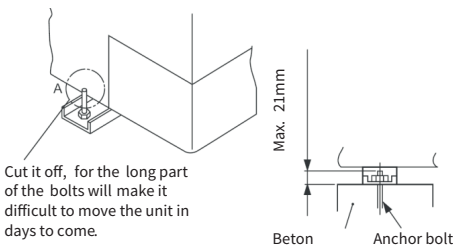


Fig.2

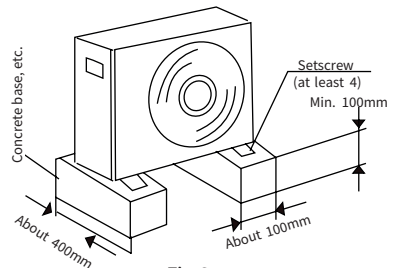


Fig.3

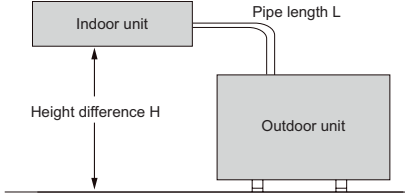
4. Installation Instructions

4.5 Refrigerant Piping

1. Piping requirement

Model	Outer diameter of pipe (mm)	
	Gas	Liquid
2.0/2.5/3.0HP	12.7	6.35
4.0/5.0/6.0/6.5HP	15.88	9.52

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



Refrigerant piping between indoor unit and outdoor unit

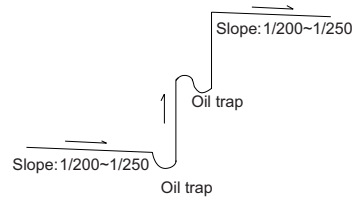
Model	Max. pipe length (L)	Max. height difference (H)	Add. refrigerant (exceed 30m)
2.0~2.5HP	50 (m)	30 (m)	18 (g/m)
3.0HP	75 (m)	30 (m)	18 (g/m)
4.0~6.5HP	75 (m)	30 (m)	35 (g/m)

Additional refrigerant charge

- The unit has been filled with refrigerant, but if the pipe exceeds 30m, additional refrigerant (R32) charge is required.
 For 2.0~3.0HP, additional refrigerant charge = $(L-30) \times 18 \text{g/m}$
 For 4.0~6.5HP, additional refrigerant charge = $(L-30) \times 35 \text{g/m}$

Oil trap

- When the indoor unit is lower than outdoor unit and height difference is larger than 5m, set an oil trap every 5m (height difference) on suction piping.



NOTES:

- To avoid storing too much oil in the oil trap, the oil trap should be as short as possible.
- The horizontal piping should slope down along the refrigerant flow direction, to bring the oil back to compressor, the slope is about 1/200 to 1/250.

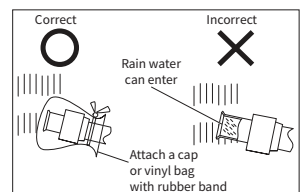
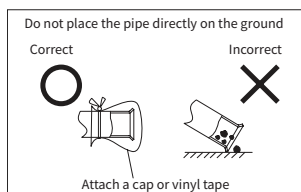
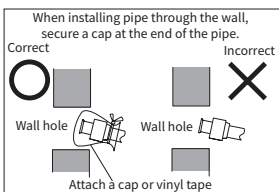
2. Piping material

- Prepare locally-supplied copper pipes.
- Select clean copper pipes. Make sure that there is no dust and moisture inside of the pipes. Blow the inside of the pipes with nitrogen or dry air to remove any dust or foreign materials before connecting pipes.
- Piping thickness and material of the pipe are shown right.

(Unit: mm)

Diameter	Thickness
φ6.35	0.7
φ9.52	0.8
φ12.7	0.8
φ15.88	1.0

CAUTION



3. Processing of refrigerant piping

- Pipe cutting

Cut the copper pipe correctly with a pipe cutter.

- Burrs removal

Completely remove all burrs from the cross section of the pipe.

Put the end of the copper pipe downward to prevent burrs from dropping in the pipe.

- Putting nut on

Remove flare nuts attached to indoor and outdoor units, then put them on burrs removed pipe. (Not possible to put them on after flaring work).

Flare nut for pipe depends on the diameter of pipe.

- Flaring work

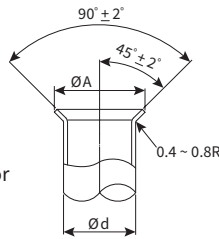
Perform flaring work with flaring tool as shown below.

- Check

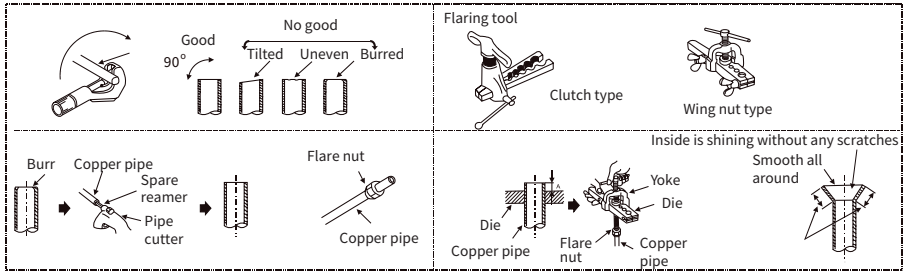
Compare the flared work with the figure below.

If flare is noted to be defective, cut off the flared section and perform flaring work again.

(Unit: mm)



Diameter ϕd	$A_{-0.4}^{+0}$
6.35	9.1
9.53	13.2
12.7	16.6
15.88	19.7

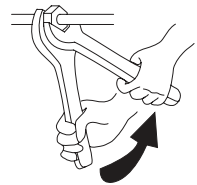


4. Piping connection

- Confirm that the valve is closed

- 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.)

- Tighten the flare nut with two spanners as shown in the right figure.



Use two wrenches as shown

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

- Outdoor refrigerant piping should be connected with stop valve.

- After finishing connecting the refrigerant pipes, keep it warm with the insulation material as shown in the right figure. For outdoor unit side, surely insulate every piping including valves. Cover piping joints with pipe cover.

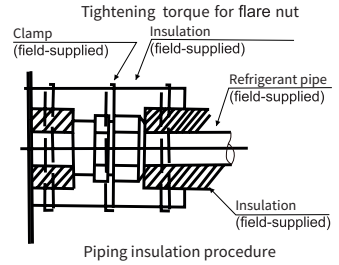
Using piping tape, apply taping starting from the entry of outdoor unit.

Double spanner work

Tube size	Torque (N·m)
$\phi 6.35\text{mm}$	20
$\phi 9.52\text{mm}$	40
$\phi 12.7\text{mm}$	60
$\phi 15.88\text{mm}$	80

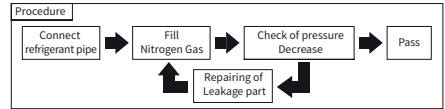
4. Installation Instructions

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, use wind additional commercially sold insulation for prevention of condensation.



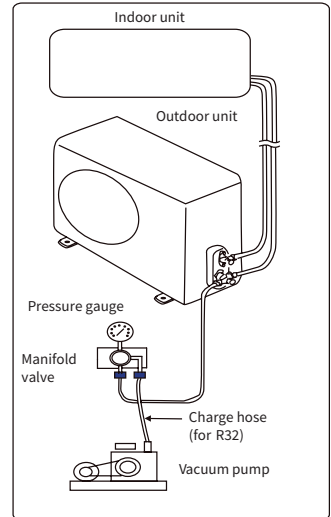
5. Air tight test

- Do use Nitrogen
- Connect the gauge manifold using charging hoses with a nitrogen cylinder to 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 4.15MPa.
- Check any gas leakage at flare nut connections, or brazed parts by gas leak detector or foaming agent.
- It is OK if gas pressure doesn't decrease.
- After the air tight test, release nitrogen gas.



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 that the pointer of the manifold gauge remains in the same position. Confirm that the pressure gauge shows -0.101MPa (or -760mmHg).
 - (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) Tighten the cap to the service port.
 - (9) Retighten the cap.
 - (10) Leak test foam with halogen leak detector to check the flare nut and brazing leaks. Use foam that does not generate ammonia (NH₃) in the reaction.



CAUTION

- An excess or a shortage of refrigerant is the main cause of trouble to the unit. Charge the correct quantity of refrigerant according to the description in the manual. Check refrigerant leakage in detail. If a large refrigerant leakage occurs, it will cause difficulty in breathing or harmful gas will occur if a fire is being used in the room.

- Additional refrigerant charge

The unit has been filled with refrigerant. Please calculate additional charge according to "Piping Requirement".

After finishing vacuum pump procedures, first exhaust air from charge hose, then open valves, charge refrigerant through gas stop valve.

At the end, please close valves and record the refrigerant charge quantity.

This product contains fluorinated greenhouse gas covered by the Kyoto Protocol.

Do not vent gas into the atmosphere.

Please fill in the refrigerant charge label that adhered in the proximity of the product charging port with indelible ink.

Contains fluorinate greenhouse gases.	
Refrigerant	R32
(A) GWP	675
Factory charge	: a kg
Additional charge	: <input type="text"/> kg
(B) Total charge	: <input type="text"/> kg
$tCO_2 = (A) \times (B) / 1000$: <input type="text"/> tCO ₂

For the value of "a", see the label.

4.6 Wiring



- Turn OFF the main power switch of the indoor unit and the outdoor unit and wait for more than 10 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 wiring from touching the refrigerant pipes, plate edges and electrical parts inside the unit. If not, the wires will be damaged and at the worst, a fire will occur.
- Install an ELB (Electric Leakage Breaker) in the power source. If ELB is not used, it will cause electric shock or fire at the worst.
- This unit uses an inverter, which means that it must be used an earth leak detector capable of handling harmonics in order to prevent malfunctioning of the earth leak detector itself.
- Do not use intermediate connection wires, stranded wires (see <Attentions when Connecting the Power Supply Wiring>), extension cables or control line connection, because the use of these wires may cause abnormal heat, electric shock or fire.
- The tightening torque of each screw is shown as follows.
 - M4: 1.0 to 1.3 N·m
 - M5: 2.0 to 2.5 N·m
 - M6: 4.0 to 5.0 N·m
 - M8: 9.0 to 11.0 N·m
 - M10: 18.0 to 23.0 N·m
- Keep the above tightening torque during wiring work.



- Use tape material to wrap the wire and seal wiring holes to prevent the condensed water and insects.
- Tightly secure the power source wiring by using the cord clamp inside the unit.

NOTE:

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

General Check

- 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 International Electro technical Commission.

4. Installation Instructions

- 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.
- Check to ensure that the capacity of power supply is enough. If not, the compressor will not be able to operate because of abnormal voltage drop at starting.
- Check to ensure that the earth wire is connected.
- Install a main switch, multi-pole main switch with a space of 3.5mm or more, single phase main switch with a space of 3.0mm or more between phases.
- 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.

Electrical wiring diagram

Model	Power supply	Max Running Current (A)	ELB		Power source cable size	Transmission cable size
			Rated current (A)	Nominal sensitive current (mA)	IEC 60335-1 ¹	IEC 60335-1 ¹
PAS-2.0UFASNQ1	220-240V ~, 50Hz	14	16	30	3×2.5mm ²	2×0.75mm ²
PAS-2.5UFASNQ1	220-240V ~, 50Hz	14	16	30	3×2.5mm ²	2×0.75mm ²
PAS-3.0UFASNQ1	220-240V ~, 50Hz	16	20	30	3×2.5mm ²	2×0.75mm ²
PAS-4.0UFASNQ1	220-240V ~, 50Hz	25	32	30	3×4.0mm ²	2×0.75mm ²
PAS-5.0UFASNQ1	220-240V ~, 50Hz	27.3	32	30	3×4.0mm ²	2×0.75mm ²
PAS-6.0UFASNQ1	220-240V ~, 50Hz	28.5	32	30	3×4.0mm ²	2×0.75mm ²
PAS-6.5UFASNQ1	220-240V ~, 50Hz	28.5	32	30	3×4.0mm ²	2×0.75mm ²
PAS-4.0UFASMQ1	380-415V 3N ~, 50Hz	12	16	30	5×2.5mm ²	2×0.75mm ²
PAS-5.0UFASMQ1	380-415V 3N ~, 50Hz	12	16	30	5×2.5mm ²	2×0.75mm ²
PAS-6.0UFASMQ1	380-415V 3N ~, 50Hz	12	16	30	5×2.5mm ²	2×0.75mm ²
PAS-6.5UFASMQ1	380-415V 3N ~, 50Hz	12	16	30	5×2.5mm ²	2×0.75mm ²

Max Running Current (A): REFER TO NAMEPLATE

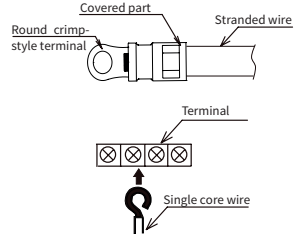
NOTES:

- The ground wire must be longer than the current-carrying conductor when installing the power cord.
- The wiring specifications of the weak current communication loop should not be less than RVV(S)P shielded wire or equivalent, the shielding layer needs to be grounded.
- Using the air conditioner power terminal to transfer the power cord is strictly prohibited.
- Follow local codes and regulations when selecting field wires, and all the above are the minimum wire size.
- Use the wires which are not lighter than the ordinary polychloroprene sheathed flexible cord. (Cord designation H07RN-F).
- The wire sizes marked with *1 in the above table are selected at the maximum current of the unit according to IEC 60335-1.
- When transmission cable is longer than 15 meters, a larger wire size should be selected.
- Install main switch and ELB for each system separately. Select the high response type ELB that is acted within 0.1second.
- In the case that power cables are connected in series, add each unit maximum current and select wires below.

Rated current of appliance (A)	Nominal cross-sectional area (mm ²)
> 0.2 and ≤16	1.5
> 16 and ≤25	2.5
> 25 and ≤32	4
> 32 and ≤40	6
> 40 and ≤63	10

<Attentions when Connecting the Power Supply Wiring>

- 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 them in place.
- When connecting the terminal block using a single core wire, be sure to perform curing.



4.7 Test Run

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

⚠ CAUTION

- The air conditioner is provided with electromagnetic heating function, check to ensure that the switch on the main power source has been ON for more than 4 hours ahead of power on preheating, otherwise it might damage the compressor!
- Do not operate the system until all the check points have been cleared.
 - (1) Check to ensure that the stop valves of the outdoor unit are fully opened.
 - (2) Check to ensure that the electric wires have been fully connected.
 - (3) 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 remote controller 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 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.

Test run setting

Step1: Setting DSW1 on the PCBA can enter the test run mode. See the table below for specific settings.

DSW1	DSW1-1	DSW1-2	DSW1-3	DSW1-4
Rated cooling	ON	OFF	OFF	OFF
Rated heating	ON	ON	OFF	OFF
Intermediate cooling	ON	OFF	ON	OFF
Intermediate heating	ON	ON	ON	OFF

Step2: Check temperature conditions. This operation will not be performed if the temperature condition is out of range.

NOTES:

- Check whether the temperature condition is within the test run range.
 Cooling: -5°C~52°C DB
 Heating: -15°C~15.5°C DB
 If the system does not perform a test run, check the indoor and outdoor temperature and humidity (The system does not operate in cooling mode at an outdoor temperature of -5°C DB or lower).
- After completing the test run through DSW1 of the outdoor unit PCBA, all DSW1 should be set to OFF.

5. Connection between Demand Response Enabling Device (DRED) and Outdoor Unit

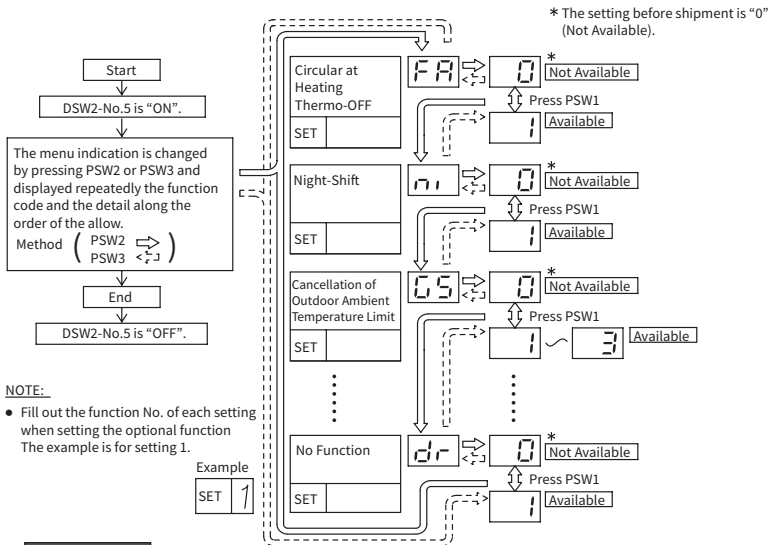
This function is supported by Australian Standard “Demand response capabilities and supporting technologies for electrical products”

- AS/NZS 4755.3.1:2014; or
- AS/NZS 4755.2 (when published); or
- the equivalent of the superseded AS/NZS 4755.3.1.2012 (for a limited period until 1 July 2025 or 12 months after the publication of AS/NZS 4755.2, whichever is the later date).

Air conditioners are required to comply with three DRMs-DRM1,DRM2,DRM3.

When using the DRED function, it is necessary to set **88** to 1 through function setting firstly. Afterwards, it is achieved by short-circuit DRM1 and SC,DRM2 and SC,DRM3 and SC.

The function setting should be performed during the outdoor unit stoppage.



WARNING

- When controlling the switch on PCB, pay attention not touch to other electrical parts. It will cause an electrical shock.

Function Setting Method

No.	7-Segment Display		Setting Item
	SEG2	SEG1	
38	88	0	The setting before shipment
		1	DR instruction setting

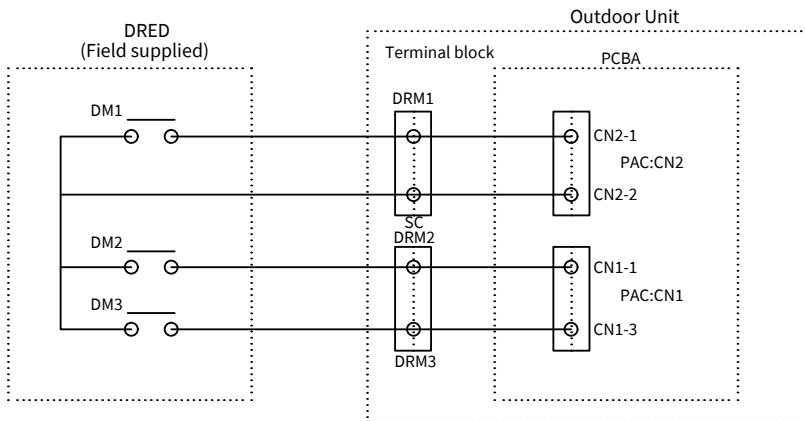
When the input terminals DRM1 and SC are short-circuited, the compressor is forcibly stopped and the indoor unit(s) is put under Thermo-OFF condition.

The remote control switch display remains the running mode with the stoppage code No. 10.

5. Connection between Demand Response Enabling Device (DRED) and Outdoor Unit

When the input terminals DRM2 and SC are short-circuited, the compressor is limited the load to 50%.

When the input terminals DRM3 and SC are short-circuited, the compressor is limited the load to 75%.



Wiring Diagram between DRED and Outdoor Unit



- Please carefully file indoor and outdoor unit manual away for future reference.

Memo

Memo

Packing List

Item	Q'ty
Outdoor unit	1
Installation and Maintenance Manual	1
Refrigerant charge amount label	1
Drain hose (only in 2.0~3.0HP units)	1
Washer (only in 4.0~6.5HP units)	4



1189719

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