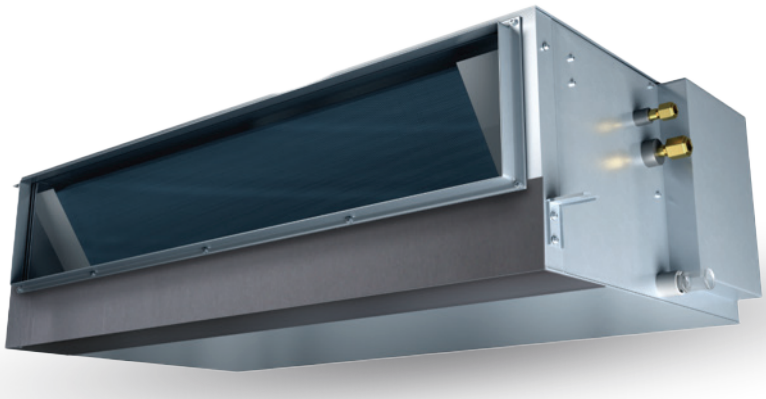
emerald

User guide and installation manual

Air Conditioning Ducted Ultra indoor unit

ACV160D



IMPORTANT NOTICE

Please read this manual before installing the product and retain for future use. Not following the instructions may result in the product not functioning as intended.

Dear user:

Thank you for choosing and using our product. To better understand and use this product, please be sure to read and observe the following related issues before use.

IMPORTANT NOTICE

Signal words (DANGER, WARNING and CAUTION) are used to indicate hazard seriousness. Definitions of the hazard levels are provided below with respective signal words.

⚠ DANGER	: Immediate hazards which WILL result in severe personal injury or death.
⚠ WARNING	: Hazards or unsafe practices which COULD result in severe personal injury or death.
⚠ CAUTION	: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.
NOTE	: Useful information for operation and/or maintenance.

- This manual should be considered as a permanent part of the air conditioning equipment. Please keep it properly.
- This manual describes and introduces this heat pump air conditioner in a unified manner, so it's applicable for your and other air conditioners.
- Emerald pursues a policy of continuous improvement in design and performance of products. The right is therefore reserved to change specifications without notice.
- Our company shall not be held responsible for any occasional damage to the air conditioner that arises during its operation in specific environment. This air conditioner is designed for standard air conditioning only. Do not use it for other purposes such as drying cloth, refrigerating foods or for any other cooling or heating processes. Please don't install the air conditioner in the following environments. Otherwise, fire, machine deformation or failure may arise.
  * Places with spatter of oil (including machine oil).
  * Places with sulfurated gases or silicon (e.g. hot spring, etc.)
  * Places with inflammable gases.
  * Coastal areas with much salt or places exposed to strong acids or bases that may cause corrosion to machine.
- The cover of the manual is only a schematic diagram and may differ slightly from the actual unit.
- Do not have the air outlet directly faced towards animals or plants, since this may bring about an adverse effect thereon.
- The installation and service engineering have to comply with local standards, laws and regulations.
- As an "appliance inaccessible to the public", the installation height of indoor unit of the air conditioner shall be at least 2.5m.
- This air conditioner can only be installed by dealers or professionals. The installation by user may lead to water leakage, electric shock or fire.
- In case of any question, please consult the dealer or the service center designated by our company.
- Refer to Installation & Maintenance Manual of outdoor unit for temperature operation range.
- Refer to the instruction manual for complete machine (outdoor unit) for information about the product standards to which the indoor unit is subject.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The models in this manual are partial units and shall only be connected to an appliance suitable for the same refrigerant.
- The models in this manual are partial units air conditioner, complying with partial unit requirements of the IEC/EN/AS/NZS 60335-2-40, and must only be connected to the outdoors manufactured by Emerald which have been confirmed as complying to IEC/EN/AS/NZS 60335-2-40.

⚠ DANGER

- Please don't perform installation works such as refrigerant piping connection, drain pipe connection, and wiring connection. Violations may result in system leakage, electrical failure or fire. In the case of fire, please turn off the power immediately; please don't touch electrical parts with the hands, or electric shock may arise.
- Do not pour water into the indoor or outdoor unit. This machine is an electric product that may develop serious electric failure when exposed to water.
- Do not open the service cover of indoor or outdoor units without turning OFF the main power supply; otherwise, this may bring about serious safety accident.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If they are touched or readjusted, serious accident may arise.
- Refrigerant R410A is non-flammable, non-toxic, and odorless, and may produce toxic gases when exposed to open flame. Since this refrigerant gas is heavier than air, it may result in lack of oxygen, thereby leading to breathing difficulties when the area near the ground is filled with this gas. If that's the case, please turn off the main switch immediately, cut off the power supply, and open the doors and windows for ventilation. Put out any open flame, and contact your service dealer. Performing leak detection and gas tightness test with oxygen, acetylene or other flammable and toxic gases may cause explosion, so nitrogen is recommended for this test.
- Refrigerant R32 is low burning velocity refrigerant, non-toxic, and odorless, and may produce toxic gases when exposed to open flame. Since this refrigerant gas is heavier than air, it may result in lack of oxygen, thereby leading to breathing difficulties when the area near the ground is filled with this gas. If that's the case, please turn off the main switch immediately, cut off the power supply, and open the doors and windows for ventilation. Put out any open flame, and contact your service dealer. Performing leak detection and gas tightness test with oxygen, Acetylene or other flammable and toxic gases may cause explosion, so nitrogen is recommended for this test.
- The standards for safe refrigerant leakage in construction and system operation are determined based on local regulations or standards.
- Use ELB above medium induction speed (ELB with an operating time of 0.1 seconds or less), or electric shock or fire may arise.
- For installation, the refrigerant piping must be firmly connected before the operation of compressor. For repair, the refrigerant piping must be moved, handled and removed after the stop of compressor.
- Please don't short-circuit the protective device (e.g., the pressure switch, etc.) during operation, since this may cause fire or explosion.
- This unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

⚠ WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one (1) meter from the system.
- If the earth leakage breaker (ELB) is frequently activated, please stop the system and contact your local dealer or customer services.
- Make sure the ground wire is securely connected. The improper grounding of machine may lead to electrical failure. Please don't connect the ground wire to gas pipes, tap water pipes, lightning rods or phone ground wires.
- Make sure there are no flammable materials around during brazing operation. Please wear leather gloves to prevent frostbite when filling refrigerant.
- Prevent rats or other small animals damaging the wiring and electrical components. Bitten unprotected parts may cause a fire.
- Firmly fix the connection wires. The external force of terminal may result in looseness of terminal that may cause a fire.
- Make sure the air conditioner is installed with enough strength of fixation; otherwise, the air conditioner may fall or topple over, which may bring about machine damage or personal injury.
- Please follow the installation instructions and related regulations and standards for electrical construction; otherwise, electrical failure or fire may occur due to inadequate capacity or inconsistent specifications.
- Never fail to use specified wiring and select correct wiring, since failure to do so may cause electrical failure or fire.
- Please make sure the outdoor unit is not covered with snow or ice before use.
- The A-weighted emission sound pressure level at workstations, where this not exceeds 70 dB(A).

IMPORTANT NOTICE

Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the 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 environmentally safe recycling.

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.

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

TABLE OF CONTENTS

Section 1 Operation Manual

1. Safety Summary 1
2. System Description 9
3. Remote Control Switch 9
4. Before Operation 10
5. Operation Method 10
6. Automatic Control 10
7. Troubleshooting 11
   - 7.1 If Trouble Still Remains 11
   - 7.2 No Operation 11
   - 7.3 Not Cooling or Heating Well 11
   - 7.4 This is Not Abnormal 11
8. Filter Cleaning 12
   - 8.1 Taking Out the Filter 12
   - 8.2 Clean the filter 12
   - 8.3 Installation of the Filter 12
   - 8.4 Reset of Filter Indication 12

Section 2 Installation & Maintenance Manual

1. Safety Summary 13
2. Structure 13
   - 2.1 Indoor Unit & Refrigerant Cycle 13
   - 2.2 Necessary Tools and Instrument List for Installation 13
3. Transportation and Handling 13
   - 3.1 Transportation 13
   - 3.2 Handling of Indoor Unit 13
4. Indoor Unit Installation 14
   - 4.1 Factory-Supplied Accessories 14
   - 4.2 Initial Check 15
   - 4.3 Installation 15
5. Refrigerant Piping Work 18
   - 5.1 Piping Materials 18
   - 5.2 Piping Connection 18

6. Drain Piping 19
7. Electrical Wiring 20
7.1 General Check 20
7.2 Electrical Wiring Connection 20
8. Test Run 21
9. Safety and Control Device Setting 22
10. Common 22
10.1 Field Minimum Wire Sizes for Power Source 22
10.2 Setting of DIP Switch 23

Section 1 Operation Manual

1. Safety Summary

No part of this publication may be reproduced, copied, filed or transmitted in any shape or form without the permission of Emerald.

Within the policy of continuous improvement of its products, Emerald reserves the right to make changes at any time without prior notification and without being compelled to introducing them into products previously sold. This document may therefore have been subject to amendments during the life of the product.

Emerald makes every effort to offer correct, up-to-date documentation. Despite this, printing errors cannot be controlled by Emerald and are not its responsibility.

As a result, some of the images or data used to illustrate this document may not refer to specific models.

No claims will be accepted based on the data, illustrations and descriptions included in this manual.

No type of modification must be made to the equipment without prior, written authorization from the manufacturer.

During normal air conditioning system design work or unit installation, greater attention must be paid in certain situations requiring particular care in order to avoid injuries and damage to the unit, the installation or the building or property.

Situations that jeopardize the safety of those in the surrounding area or that put the unit itself at risk will be clearly indicated in this manual.

To indicate these situations, a series of special symbols will be used to clearly identify these situations.

Pay close attention to these symbols and to the messages following them, as your safety and that of others depend on it.

⚠ DANGER

- Emerald is not able to foresee all the circumstances which may result in a potential danger.
- Do not pour water in the indoor or outdoor unit. These products are fitted with electric components
- If water comes into contact with electric components, it will cause a serious electric shock.
- Do not handle or adjust the safety devices inside the indoor and outdoor units. The handling or adjustment of these devices may result in serious accident.
- Do not open the service cover or access panel of the indoor and outdoor units without disconnecting the main supply.
- In the event of fire, switch off the mains, put out the fire immediately and contact your service supplier.
- Check that the earth cable is correctly connected.
- The storage of equipment should be in accordance with the manufacturer’s instructions.
- Do not install pipe work with diameters that are not specified for that model.
- 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 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.
- 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.

⚠ WARNING

- Only qualified personnel licensed or certified in the 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 means to accelerate the defrosting process (if possible) or to clean, other than those recommended by the manufacturer.
- Assure that the maximum operating pressure is checked when connecting to Outdoor UNIT.
- System contains oversize protective earthing (grounding) terminal which shall be properly connected.

⚠ CAUTION

- Refrigerant leaks may hinder respiration as the gas displaces the air in the room. It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should add safety, caution and operating signs in the native language.
- Fit the indoor unit, the outdoor unit, the remote controller and the cable at a minimum of 3 meters away from sources of strong radiation from electromagnetic waves, such as medical equipment.
- Do not use sprays, such as insecticides, varnishes or enamels or any other inflammable gas within a meter of the system.
- If the circuit breaker or supply fuse of the unit comes on frequently, stop the system and contact the service supplier.
- Do not carry out maintenance or inspection work yourself. This work must be carried out by qualified service personnel with suitable tools and resources for the work.
- Do not place any foreign material (branches, sticks, etc.) in the air inlet or outlet of the unit. These units are fitted with high-speed fans and contact with any object is dangerous.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Means for disconnection from the supply mains, which have a contact separation in all poles that provide full disconnection under overvoltage category III conditions, must be incorporated in the fixed wiring in accordance with the wiring rules.
- The appliance shall be installed in accordance with national wiring regulations. The maximum working pressure is 4.30 MPa. This maximum working pressure shall be considered when connecting the indoor unit to outdoor unit.
- Do not touch the switch with wet fingers. Touching a switch with wet fingers can cause electric shock.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Cleaning and user maintenance shall not be made by children without supervision.
- 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.
- Do not install the air conditioner or heat pump in the following locations:
  - Where a mineral oil mist or oil spray or vapor is produced, for example, in a kitchen. Plastic parts may deteriorate and fall off or result in water leakage.
  - Where corrosive gas, such as sulfurous acid gas, is produced. Corroding copper pipes or soldered parts may result in refrigerant leakage.
  - Near machinery emitting electromagnetic waves. Electromagnetic waves may disturb the operation of the control system and cause the unit to malfunction.
  - Where flammable gas may leak, where there is carbon fiber, or ignitable dust suspension in the air, or where volatile flammables such as thinner or gasoline are handled. Operating the unit in such conditions can cause a fire.
- 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.
- Servicing shall be performed only as recommended by the manufacturer and licensed or certified in their jurisdiction.
- This air conditioner has been designed for standard air conditioning for human beings. For use in other applications, please contact your Emerald dealer or service contractor.
- The air conditioning system should only be installed by qualified personnel, with the necessary resources, tools and equipment, who are familiar with the safety procedures

required to successfully carry out the installation.

- PLEASE READ THE MANUAL BEFORE STARTING WORK ON THE INSTALLATION OF THE AIR CONDITIONING SYSTEM.
- Failure to observe the instructions for installation, use and operation described in this documentation may result in operating failure including potentially serious faults or even the destruction of the air conditioning system.
- It is assumed that the air conditioning system will be installed and maintained by responsible personnel trained for the purpose. If this is not the case, the customer should include all the safety, caution and operating signs in the native language of the personnel responsible.
- Do not install the unit in places where silicon gas is present. Any silicon gas deposited on the surface of the heat exchanger will repel water. As a result, the condensate water will splash out of the collection tray and into the electrical box. Water leaks or electrical faults may eventually be caused.
- Do not install the unit in a place where the current of expelled air directly affects animals or plants as they could be adversely affected.
- 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.

NOTES:

- The air in the room should be renewed and the room ventilated every 3 or 4 hours.
- The indoor unit should be positioned where the unit and interunit wires (outdoor to indoor) are at least 3.3ft (1m) away from any televisions or radios. (The unit may cause interference with the picture or sound.) Depending on the radio waves, a distance of 3.3ft (1m) may not be sufficient to eliminate the noise.
- 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 4.30MPa, 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.

Explanation of symbols displayed on the indoor unit or outdoor unit. (Only when using R32).

	WARNING	This symbol shows that this equipment uses a flammable refrigerant (A2L). If the refrigerant is leaked, together with an external ignition source, there is a possibility of ignition.
	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 there is information included in the Operation Manual and/or Installation Manual.

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.

⚠ WARNING

- 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 the refrigerant system to avoid the leakage.
- Be aware that refrigerants might not contain an odour.
- 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.
- 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.
- 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.

- 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 refabricated.
  - Refrigerant tubing shall be protected or enclosed to avoid damage.
- 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.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified.
- 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.
- Maintenance or repair of air conditioner using R32 refrigerant must be carried out after security check to minimize risk of incidents.
- Ensure no following objects under the indoor unit:
  - Microwaves, ovens and other hot objects.
  - Computers and other high electrostatic appliances.
  - Sockets that plug frequently.
- 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.
- The appliance shall be stored and installed so as to prevent mechanical damage from occurring.
- 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 CO_2 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 indoor 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, inflammable 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 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 inflammable and toxic gases during leakage inspection and air-tightness test may lead to explosions. It 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.
- 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 the 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 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 notes by each product package information and standard follows ISO 780-2015.
- After completing the installation work, check that the refrigerant gas does not leak throughout the system.
- When installing the unit in a small room, take measures to keep the refrigerant concentration from exceeding allowable safety limits. Excessive refrigerant leaks, in the event of an accident in a closed ambient space, can lead to oxygen deficiency.
- 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 again 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 checkvalve, refrigerant charge base, vacuum gauge, or refrigerant recovery equipment.
- If the conventional refrigerant and refrigerator oil are mixed in R32, the refrigerant may deteriorate.
- Appliance shall be installed, operated and stored in a room with a floor area larger than Amin (m^2) [Amin (m^2) - see table below].
- The installation of pipe-work shall be kept to a room with a floor area larger than Amin (m^2) [Amin (m^2) - see table below].
- The minimum room area is required based on EN/IEC/AS/NZS 60335-2-40, and the indoor and outdoor units need to meet the requirements of enhanced tightness refrigerating systems.
- If the refrigerant charge of R32 (m_c) ≥ 1.84kg, the minimum room area is required based on EN/IEC/AS/NZS 60335-2-40. And the required minimum room area Amin to install the indoor unit with refrigerant charge m_c (kg) shall be in accordance with following: $Amin=(m_c/(2.5\times LFL^{(5/4)} \times h_0))^2$, but not less than $Amin=m_c/(h_0\times 0.2303)$.
- If the refrigerant charge of R32 (m_c) ≥ 15.96kg, the indoor and outdoor units need to meet the requirements of enhanced tightness refrigerating systems, and the refrigerant charge and room area should meet the requirements specified in the outdoor unit manual.
- where

  * Amin: minimum installation area of an Indoor unit for a given refrigerant charge m_c (kg) and considering the installation height h_0, in m^2.
  * h_0: release height, the vertical distance from the floor to the bottom (the point of release) of the indoor unit when the unit is installed, in m, and it shall not be less than 0.6m.
  * m_c: total system refrigerant charge that could be released to the indoor area in case of undetected refrigerant leak, in kg.
  * LFL: Lower Flammability Limit for R32, 0.307 kg/m^3.

Minimum required room area for each refrigerant amount charged

Low height ceiling ducted type (for single room)							
Installation Height: 2.2m							
m_c (kg)	Amin (m^2)	m_c (kg)	Amin (m^2)	m_c (kg)	Amin (m^2)	m_c (kg)	Amin (m^2)
≤1,842	-	5,40	18,46	9,00	51,28	12,60	100,50
2,00	3,95	5,60	19,85	9,20	53,58	12,80	103,72
2,20	4,34	5,80	21,30	9,40	55,94	13,00	106,98
2,40	4,74	6,00	22,79	9,60	58,34	13,20	110,30
2,60	5,13	6,20	24,33	9,80	60,80	13,40	113,67
2,80	5,53	6,40	25,93	10,00	63,30	13,60	117,09
3,00	5,92	6,60	27,58	10,20	65,86	13,80	120,56
3,20	6,48	6,80	29,27	10,40	68,47	14,00	124,08
3,40	7,32	7,00	31,02	10,60	71,13	14,20	127,65
3,60	8,20	7,20	32,82	10,80	73,84	14,40	131,27
3,80	9,14	7,40	34,67	11,00	76,60	14,60	134,94
4,00	10,13	7,60	36,56	11,20	79,41	14,80	138,66
4,20	11,17	7,80	38,51	11,40	82,27	15,00	142,43
4,40	12,26	8,00	40,51	11,60	85,18	15,20	146,26
4,60	13,40	8,20	42,57	11,80	88,14	15,40	150,13
4,80	14,59	8,40	44,67	12,00	91,16	15,60	154,06
5,00	15,83	8,60	46,82	12,20	94,22	15,80	158,03
5,20	17,12	8,80	49,02	12,40	97,34	15,96	161,25

- If the minimum room area and total system refrigerant charge do not comply with the above calculation formula, the optional part Refrigerant Sensor HOPT-ERD02 (Built-in sensor) and Refrigerant Shut-off Box HESE-2V15 need to be selected. Detailed installation instructions/periodic service/maintenance procedures/replace procedures can be found in the optional part manual and outdoor unit manual.

- For appliances connected via an air duct system to one or more rooms and installed in a room with an area less than Amin, unless provided with an effective flame arrestor, the following situations are not allowed to occur in rooms:
  - continuously operating open flames.
  - other potential ignition sources.
- For appliances connected via an air duct system to one or more rooms, potential ignition sources such as hot surfaces and electric switching devices shall not be installed in the ductwork.

NOTES:

- The LEAK DETECTION SYSTEM includes the Refrigerant Detector HOPT-ERD01, Refrigerant Sensor HOPT-ERD02 and the Refrigerant Shut-off Box HESE-2V15.
- If the LEAK DETECTION SYSTEM is installed, unit must be powered all the time except for service.
- For your safety, please contact distributor/service provider/ manufacturer for regular inspection of gas samples and concentrations as specified in this clause in accordance with local laws and regulations.
- The Refrigerant Detector HOPT-ERD01 and Refrigerant Sensor HOPT-ERD02 have a lifespan of 10 years and a system response will be activated at the end of its service life to notify the end user to replace the detector. It is prohibited to use detectors or sensors whose service life has expired.
- During the use of the Refrigerant Detector HOPT-ERD01 and Refrigerant Sensor HOPT-ERD02, do not use wet hands, alcohol or solvent cleaning, to avoid moisture.
- The Refrigerant Detector HOPT-ERD01 and Refrigerant Sensor HOPT-ERD02 are prohibited for personal modification and maintenance. If any part is damaged, do not continue to use it. Please contact the distributors/service provider/manufacturer for repair or replacement.
- Under the powered on and self-checking state, the fan of connected indoor unit may continue to run for 90s, which is normal for detecting the air conditioning unit.

2. System Description

The heat pump air conditioner is designed to offer cooling, heating, dry and fan operations. These operation modes are controlled by the remote control switch (optional).

3. Remote Control Switch

⚠ CAUTION

Press switches only with fingers. Do not press switches by any other item, as it may break switches.

Do not touch the CHECK switch. This switch is only for servicing. If touched, press the CHECK switch again to reset.

- Temperature Setting

  When TEMP switch is pressed, temperature increases by 1 degree. The minimum setting indication is 16°C and the maximum setting indication is 32°C.

- **Set and Actual Temperature**

  The set temperature is for the air temperature at the sensor (thermistor) of the indoor unit.

  The actual room temperature may be different from the air temperature of the sensor due to the difference of the sensing location.

- **Touching Type Switches**

  This control switch is of touching type. Slightly press the switch by finger. The operation can be checked by the display of the liquid crystal.

- **Multiple-Unit Control**

  16 indoor units, as a maximum number, can be controlled by one remote control switch. Refer to the Installation Manual for Remote Control Switch.

4. Before Operation

⚠ CAUTION

Supply electrical power to the system for approximately 12 hours before start-up after long shutdown. Do not start the system immediately after power supply, it may cause a compressor failure, because the compressor is not heated well.

Make sure that the outdoor unit is not covered with snow or ice. If covered, remove it by using hot water (approximately 50°C). If the water temperature is higher than 50°C, it will cause damage to plastic parts.

When the system is started after a shutdown longer than approximately 3 months, it is recommended that the system be checked by your service contractor.

Turn OFF the main switch when the system is stopped for a long period of time. If the main switch is not turned OFF, electricity is consumed, because the oil heater is always energized during compressor stopping.

5. Operation Method

Regarding the instructions of Wired Remote Control Switch or Wireless Remote Control Switch,read the operation manual attached to the control switch.

6. Automatic Control

The system is equipped with the following functions.

NOTE

Except for a long period of shutdown, keep the main power switch ON. The drain discharge mechanism is activated if the drain level is higher than the setting.

- **Three Minute Guard** (Enforced Stoppage)
  The compressor remains off for at least 3 minutes once it has stopped. If the system is started within approximately 3 minutes after it has stopped, the RUN indicator is activated. However, the cooling operation or the heating operation remains off and does not start until after 3 minutes has elapsed.
- **Three Minute Guard** (Enforced Operation)
  If all indoor units of the system are Thermo-OFF within approximately 3 minutes after compressor has started, compressor is operated during 3 minutes continuously. However, if all indoor units of the system are stopped by remote control switch, compressor is stopped.
- **Oil Return Operation**
  If an indoor unit is stopped more than 2 hours continuously, this function is operated during a few minutes.
  It has this function to prevent to accumulate in the heat exchanger of stoppage indoor unit at cooling operation.
- **Frost Prevention During Cooling Operation**
  When the indoor unit is operated at low discharge air temperature, the cooling operation may be changed to fan operation for a while to avoid frost formation on the indoor heat exchanger.
- **Hot Start During Heating Operation**
  To prevent cold air discharge in the room, the fan speed is controlled from the slow position and the low position and then to the set position according to the discharge air temperature.
- **Slow Air Control During Defrosting Operation**
  When the outdoor unit is performing the automatic defrosting operation, the indoor fan is stopped.
- **Cooling of indoor Unit**
  When the heating operation is stopped, the indoor fan operation is maintained at the slow position for the maximum of 2 minutes to lower temperature of the inside unit.
- **Automatic Defrosting Cycle**
  When the heating operation is stopped by pressing RUN/STOP switch, frosting on the outdoor unit is checked and the defrosting operation may be performed for the maximum of 10 minutes.
- **Prevention of Overload Operation**
  When the outdoor temperature is high during heating operation, heating operation is stopped due to activation of the outdoor thermistor until the temperature becomes low.

NOTE

If the system is stopped due to a power failure, it will not automatically start again although power is restored.

Repeat the start-up procedure from Step 1 to start the system. In the event of a very brief power failure (2 seconds maximum), the settings are memorized.

Therefore, the system starts automatically after approximately 3 minutes.

7. Troubleshooting

⚠ CAUTION

When overflow of drain water from the indoor unit occurs, stop the operation and contact your contractor.

When you smell or see white smoke coming from the unit, turn OFF the main power supply and contact your contractor.

7.1 If Trouble Still Remains

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

(1) Unit Model Name

(2) Description of Trouble

(3) Alarm Code Number on Liquid Crystal Display

7.2 No Operation

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

7.3 Not Cooling or Heating Well

- Check for obstruction of air flow of the outside or inside units.
- Check if too much heat source exists in the room.
- Check if the air filter is clogged with dust.
- Check to see if the doors or windows are opened or not.
- Check if the temperature condition is not within the operation range.

7.4 This is Not Abnormal

- **Smells from Indoor Units**

  Smell adheres on indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.
- **Sound from Deforming Parts**

  During system starting or stopping, an abrading 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 is melted, resulting in steam.
- **Dew on Air Panel**

  When the cooling operation continues for a long period of time under high humidity conditions (higher than 27°C/80% R.H.), dew can form on the air panel.
- **Refrigerant Flow Sound**

  While the system is being started or stopped, sound from the refrigerant flow may be heard.
- **Self-clean:**

  During self-cleaning, the sound of sputter may be heard, which is a normal physical phenomena, and will disappear after cleaning.

NOTE

Except for a long period of shutdown, keep the main switch ON, since the oil heater is energized when the compressor is stopping.

8. Filter Cleaning

Turn OFF the main power switch before taking out the filter. (The previous operation mode may appear.)

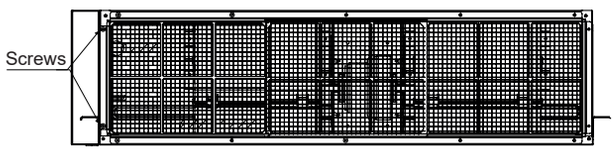
8.1 Taking Out the Filter

The indication, "FILTER" is shown on the display of the remote control switch after approximately 1,200 hour operation.

Take out the air filter according to the following steps.

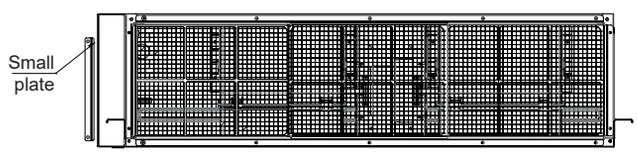
Step 1

Remove two screws from the small plate next to the electric box.



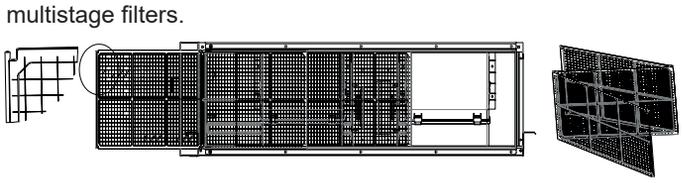
Step 2

Take out the small plate from the indoor unit.



Step 3

Take out the air filter from the air inlet grille. Slots are reserved for the tools in the front of the air filter. Air filter can be folded for multistage filters.



8.2 Clean the filter

Clean the air filter according to the following steps.

Step 1

Use a vacuum cleaner or let water flow onto the air filter for removing the dirt from the air filter.

⚠ CAUTION

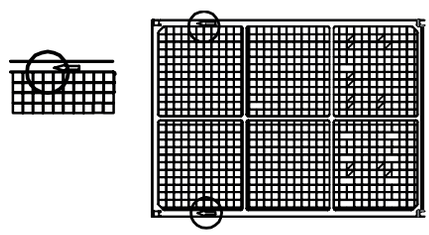
Do not use hot water higher than approximately 40°C.

Step 2

Dry the air filter in the shade after shaking off moisture.

8.3 Installation of the Filter

The installation method is contrary to the disassembly method. But Install air filter according to arrow direction.



8.4 Reset of Filter Indication

After cleaning the air filter, press the "FILTER" button. The FILTER indication will disappear and the next filter cleaning time will be set.

Section 2 Installation & Maintenance Manual

1. Safety Summary

⚠ WARNING

- **Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to the installation manual.**
- **Check that the ground wire is securely connected.**
- **Connect a fuse of specified capacity.**
- **Pay a special attention to the place, such as a basement, etc. where refrigerant can stay, since refrigerant is heavier than air.**

⚠ CAUTION

Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.

2. Structure

2.1 Indoor Unit & Refrigerant Cycle

Regarding the structural drawings and the refrigerant cycle diagrams, refer to Technical Catalogue.

2.2 Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool
1	Handsaw	11	Spanner
2	Screwdriver	12	Charging Cylinder
3	Vacuum Pump	13	Manifold Gauge
4	Refrigerant Gas Hose	14	Cutter for Wires
5	Megohmmeter	15	Gas Leak Detector
6	Copper Pipe Bender	16	Leveller
7	Manual Water Pump	17	Clamper for Solderless Terminals
8	Pipe Cutter	18	Hoist (for Indoor Unit)
9	Brazing Kit	19	Ammeter
10	Hexagon Wrench	20	Voltage Meter

NOTE

When in immediate contact with refrigerant, please use the installation tools and instruments dedicated to the new refrigerant.

3. Transportation and Handling

3.1 Transportation

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

⚠ CAUTION

Do not put any material on the product.

3.2 Handling of Indoor Unit

⚠ WARNING

Do not put any foreign material into the indoor unit and check to ensure that none exists in the indoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

⚠ CAUTION

Be careful not to damage the insulation materials of unit's surface when lifting.

4. Indoor Unit Installation

⚠ DANGER

- **Do not install the indoor unit in a flammable environment to avoid a fire or explosion.**
- **Do not mix refrigerant R410A and refrigerant R32.**
- **This unit is non electrical heater type indoor unit. It is prohibited to install an electrical heater in the field.**

⚠ WARNING

- **Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.**
- **Do not install the indoor unit outdoors. If installed outdoors, an electric hazard or electric leakage will occur.**

It is recommended that Indoor units be installated higher than 2.5m from the floor level.

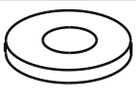
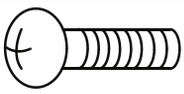
4.1 Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the indoor unit.

NOTE

If any of these accessories are not packed with the unit, please contact your contractor.

Table 4.1 Factory-Supplied Accessories

Accessory	Qty	Purpose
Washer 	8	For Unit Suspension
Screw 	16	For Fixing Flanges
Hose Clamp	1	For Drain Hose Connection

4.2 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown in Fig. 4.1.

Unit: mm

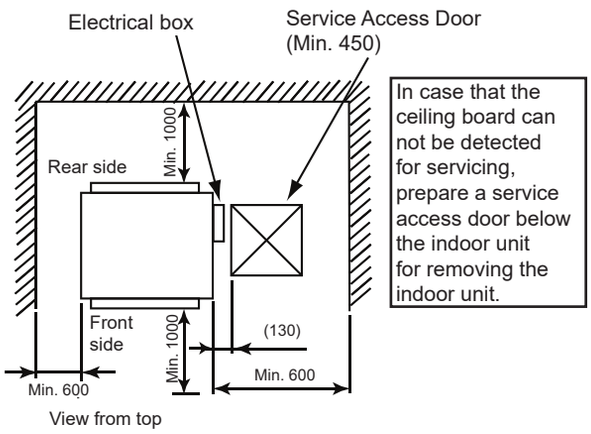


Fig. 4.1 Operation and Installation Space

- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.
- Do not install the indoor unit in a machine 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 indoor unit performance, and may deform and in the worst case, break the plastic parts of the indoor unit.
- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.

  (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.

  (B) Install the indoor unit and components as far as possible or at least 3 meters from the electromagnetic wave radiator.

  (C) Prepare a steel box and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then, connect the ground wire with the box and the tube.

  (D) Install a noise filter when the power supply emits harmful noises.
- To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment.

⚠ WARNING

Check to ensure that the number of below is within 0.42 kg/ m³. Otherwise it may lead to dangerous situation if the refrigerant in the Outdoor Unit leaks into the room where this Indoor Unit is installed.

$$\frac{\text{(Total Refrigerant Quantity per Outdoor Unit)}}{\text{(Volume of the room where this Indoor Unit is installed.)}} \leq 0.42\text{kg/m}^3$$

This value should be decided according to each country's regulation such as ISO5149, EN378 and ASHRAE Standard 15.

4.3 Installation

4.3.1 Suspension Bolts

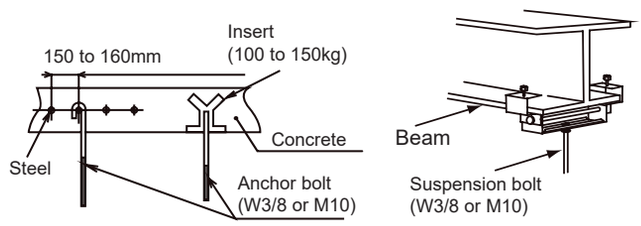
Step 1

Select final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.

Step 2

Mount suspension bolts, as shown in Fig. 4.2.

- For concrete slab
- For steel beam



- For wooden beam suspension

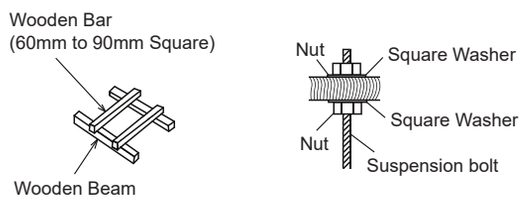


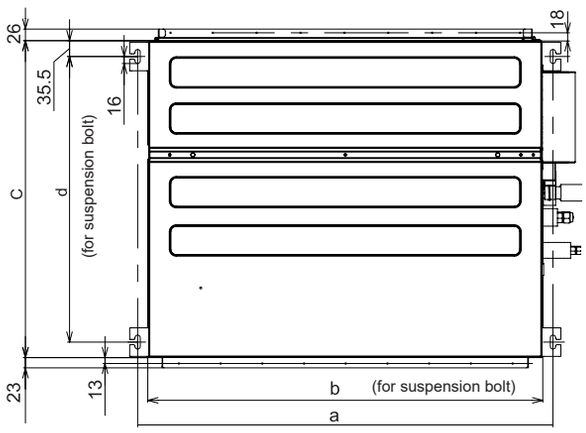
Fig. 4.2 Mounting of Suspension Bolts

4.3.2 Marking of the Positions of the Sling Bolts and Piping Connections

(1) Mark the positions of the sling bolts, refrigerant piping connections and drain connection.

(2) Installation dimensions are shown in Fig. 4.3.

Unit (mm)



Model	a	b	c	d
ACV160D	1450	1400	800	727

Fig. 4.3 Installation Dimensions

4.3.3 Mounting the Indoor Unit

Hang the indoor unit as shown in Fig. 4.4.

Field-Supplied Parts

*Sling Bolts	4-M10 or W3/8
*Nut	8-M10 or W3/8

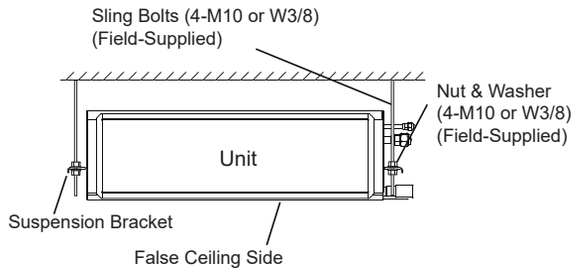


Fig. 4.4 Hanging Indoor Unit

(1) How to put Nuts or Sling Bolts

Put nuts on each of the four hanging bolts, as shown in Fig. 4.5.

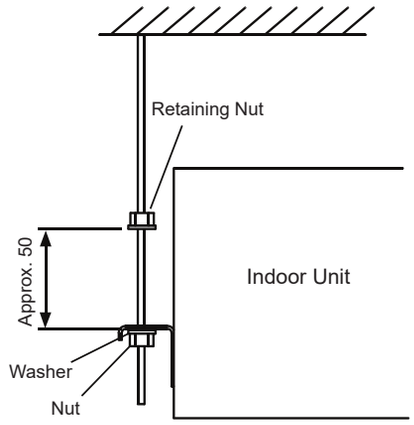


Fig. 4.5 Sling bolts and nuts

(2) Hanging the Indoor Unit

*Hook suspension bracket to the nut and washer of each hanging bolt, as shown, starting at the opposite side to service cover side.

*After checking that the nut and washer are correctly fixed by the retainers of the suspension bracket, hook the suspension bracket of the service cover side to the nut and washer.

(Put the sling bolts away from the unit when hooking.)

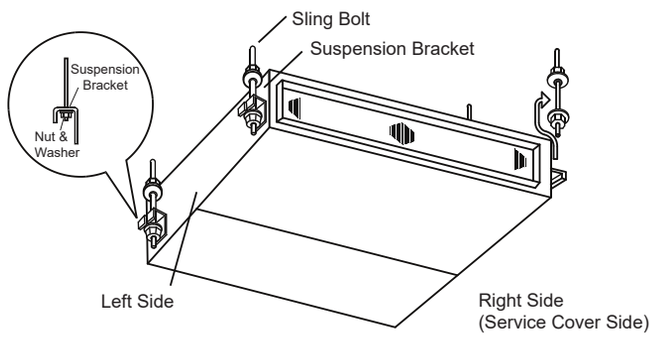


Fig. 4.6 Hanging Indoor Unit

4.3.4 Adjusting of the Unit Level

(1) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient.

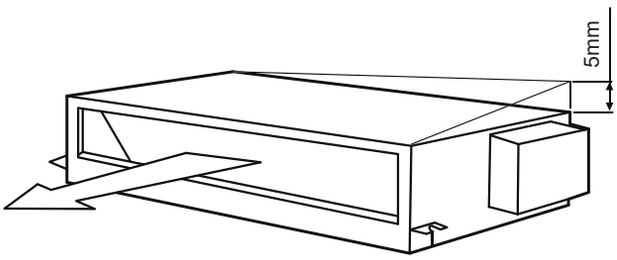


Fig. 4.7 Foundation Gradient

(2) The unit should be installed so that the rear side of the unit is slightly (0mm~5mm) lower than the front side, in order to avoid the incorrect position of the drain discharge.

(3) Tighten the bolts of the sling nuts with the suspension brackets after adjustment is completed.

Special plastic paint must be applied to the bolts in order to prevent them from loosening.

NOTE

Keep the unit as well as relevant equipment covered with the vinyl cover during installation work.

4.3.5 Connecting Supply Duct

(1) The supply duct should be connected with the indoor unit through canvas ducts, in order to avoid abnormal sound vibration (Refer to Fig. 4.8). The unit is equipped with a pre-drilled duct flange for the supply duct connection.

(2) Attach the vibration proof rubber to Sling Bolt in order to avoid abnormal sound vibration.

(3) Duct material should be non-flammable material.

(4) Perform the heat insulation work over the duct for dew protection.

⚠ CAUTION

- **If a lower sound level is further required, install silencer (field-supplied).**
- **Design duct arrangement as "Unit External Static Pressure=Pressure Drop of Duct+Pressure Drop of Air Outlet and Air Inlet".**

  If duct design is not appropriate, big sound and splash will occur.

Model	Static Pressure (Pa)
ACV160D	50(*)/200

* Before shipment

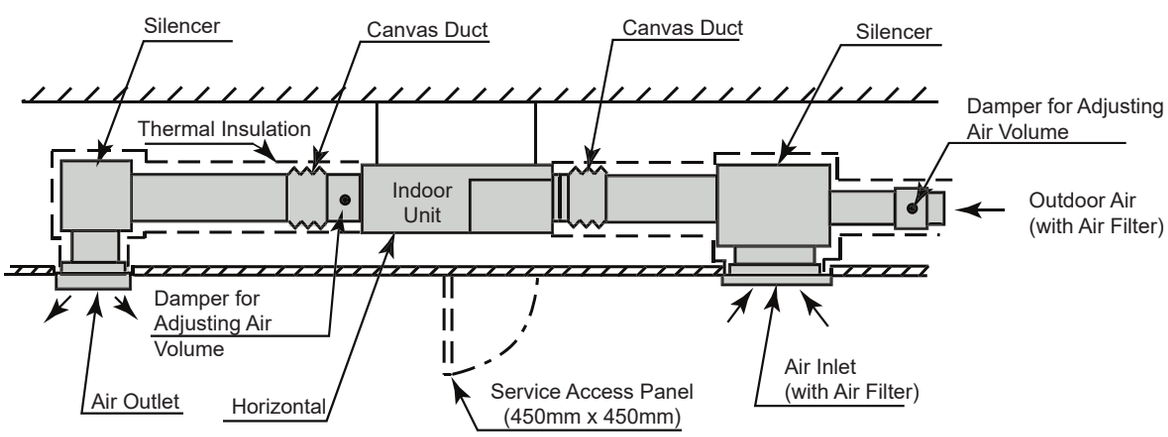


Fig. 4.8 Duct Connection

5. Refrigerant Piping Work

⚠ DANGER

Use refrigerant R32 or R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tightness test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that nitrogen be used for these tests.

5.1 Piping Materials

(1) Prepare locally-supplied copper pipes.

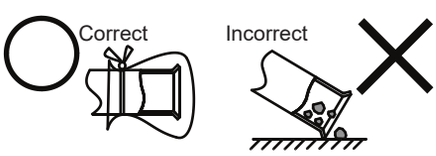
(2) Select clean copper tubes making sure there is no dust and moisture inside the tubes.

(3) Before connecting pipes, blow the inside of the tubes with nitrogen or dry air, to remove any dust or foreign materials.

5.2 Piping Connection

⚠ CAUTION

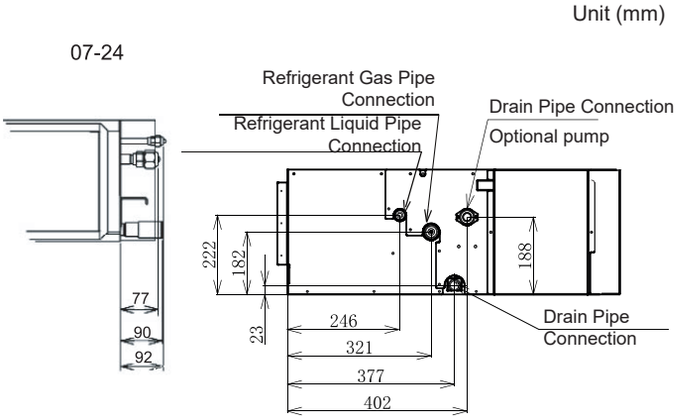
- **Cap the end of the pipe when the pipe is to be inserted through a hole.**
- **Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.**



- **An excess or a shortage of refrigerant is the main cause of trouble to the units.**
  Charge the correct refrigerant quantity.

(1) Position of piping connection is shown below.

Unit (mm)



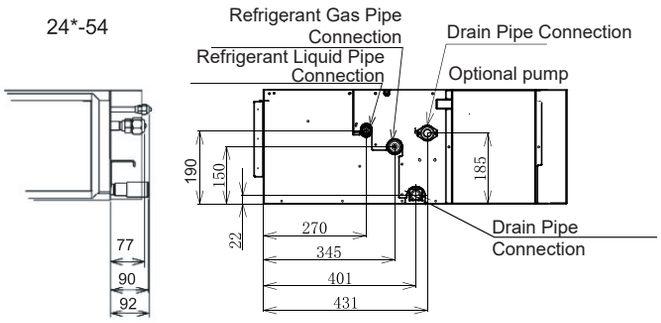


Fig. 5.1 Position of Piping Connection

NOTE

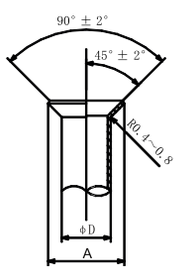
The position of the drain pipe connection is as shown in the above figure, and the lower connection hole shall be closed with the rubber plug.

mm (in.)

Model	Gas piping	Liquid pipe
160	Ø15.88 (5/8)	Ø9.53 (3/8)

※ Flaring Dimension

Perform the flaring work as shown below.



Diameter Ø D	$A^{+0}_{-0.4}$	
	R410A, R32	R407C
6.35	9.1	9.0
9.53	13.2	13.0
12.7	16.6	16.2
15.88	19.7	19.4
19.05	(*)	23.3

(*) It is impossible to perform the flaring work with 1/2H material. In this case, use an accessory pipe (with a flare).

(2) When tightening the flare nut, use two spanners as shown in Fig. 5.2.

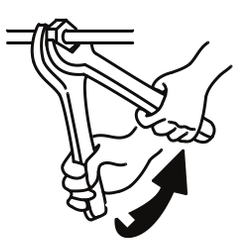


Fig. 5.2 Thightening Work of Flare Nut

(3) After connecting the refrigerant piping, seal the refrigerant pipes by using the Field-supplied insulation material as shown in Fig. 5.3.

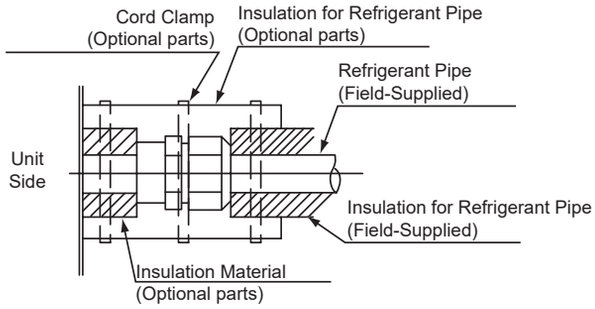


Fig. 5.3 Insulation on Pipes

(4) Evacuation and refrigerant charging procedures should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

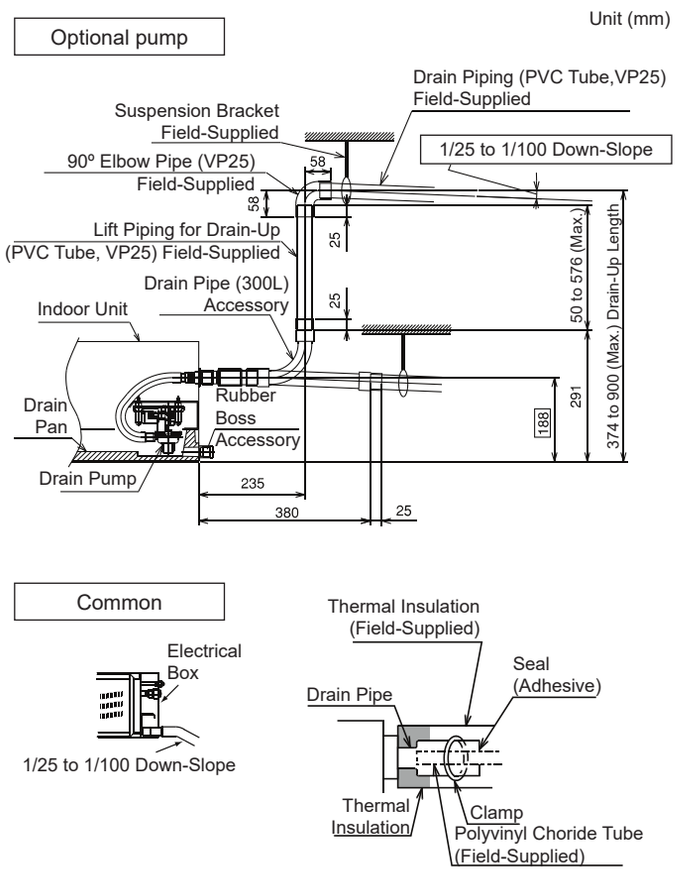
6. Drain Piping

(1) The position of the drain piping connection is shown in Fig. 6.1.

(2) Prepare polyvinyl chloride pipe with a 32mm outer diameter.

(3) Fasten the tube to the drain hose with the adhesive agent and the field-supplied clamp. The drain piping must be performed with a DOWN-SLOPE pitch of 1/25 to 1/100.

(4) Insulate the drain pipe after connecting the drain hose.



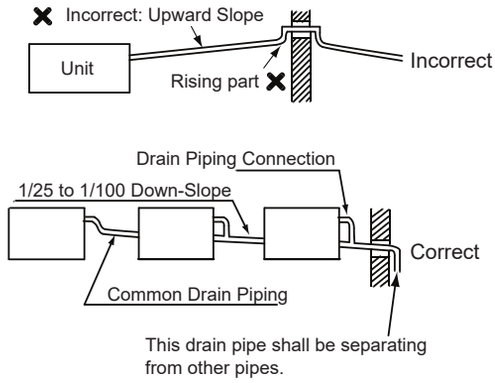


Fig.6.1 Drain Piping

NOTE

When the relative humidity of inlet or ambient air exceeds 80%, apply an (field-supplied) auxiliary drain pan beneath the indoor unit as shown in Fig. 6.2.

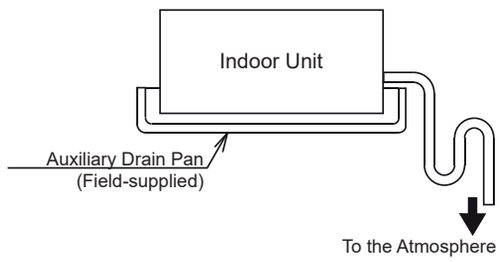


Fig. 6.2 Auxiliary Drain Pan

NOTE

(1) Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the unit and leakage to the room will occur when the unit operation is stopped.

(2) Do not connect the drain pipe with sanitary or sewage piping or any other drainage piping.

(3) When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common piping. The pipe size of the common drain pipe must be large enough according to the unit size and number of units.

(4) After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure. Checking with the Float Switch.

(a) Switch ON the power supply.

(b) Pour 2 or 2.5 liters of water into the drain pan.

(c) Check to ensure that the water flows smoothly and no water leakage occurs. When water cannot be found at the end of the drain piping, pour another 2 liters of water into the drain pan.

7. Electrical Wiring

⚠ WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for at least 10 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor and outdoor fans have stopped before electrical wiring or a periodical check.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If no protection is arranged, rats may gnaw at unprotected parts and at the worst, a fire will arise.
- Avoid the contact of wires with the refrigerant piping, sheet metal edges and electrical components in unit. Otherwise, the wire may be damaged or even cause fire.
- Use ELB above medium induction speed (earth leakage breaker with action time being equal to 0.1 seconds or less). The failure to do so may result in electric shock or fire.
- The wires must be firmly secured. External force applied to terminals may cause a fire.
- It is forbidden to connect a plurality of power lines into one power terminal block. At the indoor unit side of air conditioner, power wiring can be extended through a power distribution box. Be sure to calculate the wiring capacity carefully, since excessively low wiring capacity may frequently cause fire.

  Do not start the system before all check points are thoroughly checked.

⚠ CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of wired control using the cord clamp inside the electrical box.
- Tighten screws to the following torques.

M4:	1.0~1.3 N·m
M5:	2.0~2.4 N·m
M6:	4.0~5.0 N·m
M8:	9.0~11.0 N·m
M10:	18.0~23.0 N·m

7.1 General Check

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

(2) Check to ensure that the power supply voltage is within +10% of the rated voltage.

(3) Check the capacity of the electrical wires. If the power source capacity is too low, the system cannot be started due to the voltage drop.

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

(5) Power Source Main Switch

Install a multi-pole main switch with a space of 3.5mm or more between each phase, which shall fulfill the requirement of AS/NZS 3000.

7.2 Electrical Wiring Connection

The electrical wiring connection for the indoor unit is shown in Fig. 7.1.

(1) Connect transmission wiring between the indoor unit and outdoor unit to the terminal board 1 and 2 in electrical box through the connection hole on electrical box.

(2) Connect the power supply cable to the terminal board L and N in the electrical box, connect the earth wire to the earthing for power supply cable.

(3) Connect the transmission wiring between the indoor unit and the wired controller to the terminal board A and B in electrical box.

(4) Tightly clamp the wires with wire tie in the electrical box.

(5) Upon completion of wiring connection, seal the wire interface with sealing material to keep condensate water and insects off.

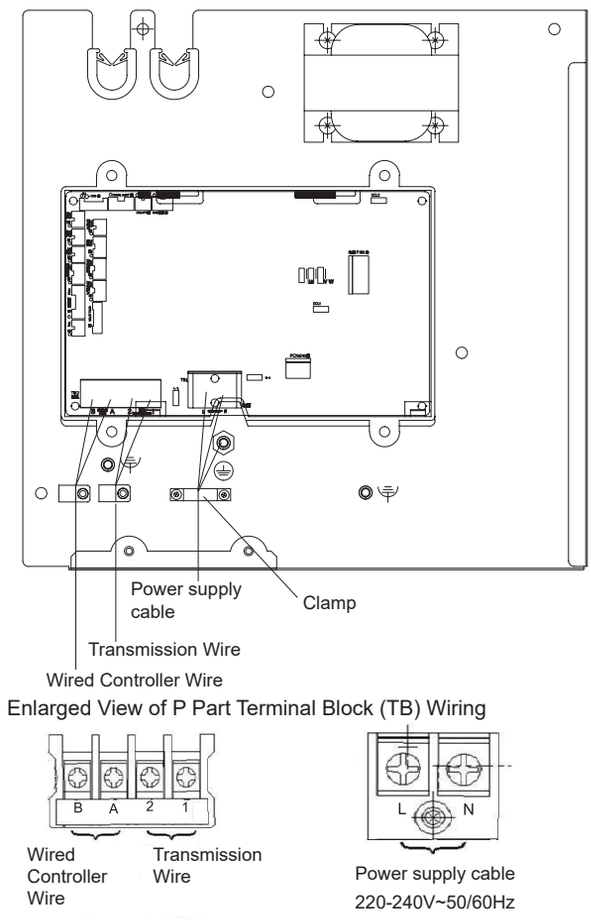


Fig.7.1 Electrical Wiring Connection

8. Test Run

Test run should be performed according to “Intallation & Maintenance Manual” of the outdoor unit.

⚠ WARNING

- **Do not operate the system until all the check points have been cleared.**
  - **(A) Check to ensure that the electrical resistance is more than 1 megohm, 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.**
  - **(C) Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the crankcase heater.**
- **Pay attention to the following items while the system is running.**
  - **(A) 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.**
  - **(B) DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.**

9. Safety and Control Device Setting

Indoor unit

Model			07~54
For Control Circuit Fuse capacity		A	10
Freeze Protection Thermostat	Cut-out	°C	0
	Cut-in	°C	14
Thermostat Differential		°C	2

10. Common

10.1 Field Minimum Wire Sizes for Power Source

⚠ WARNING

- Use an ELB (Earth Leakage Breaker). If not used, it will cause an electric shock or a fire.
- Run through the cables using conduit tube, and completely seal the end of the conduit tube with sealing materials.

Field Minimum Wire Sizes for Power Source

Model	Max current	Power source cable size	Transmitting cable size
		EN/AS/NZS 60335-1	EN/AS/NZS 60335-1
ACV160D	4.20A	2.5mm²	0.75mm²

Note:

(1) Field wiring shall be in conformity to local laws and regulations and be done by qualified professionals.

(2) Please refer to relevant standards for the size of above-noted power supply cable.

(3) Where power supply cable is connected through distribution box in series, be sure to determine the total current and select electric wires based on the table below.

(4) As a minimum, the chosen power supply cable shall be compliant with requirements on neoprene sheathed wire #57 as stated in IEC/AS/NZS 60245-1, while the power supply cord shall be made from copper conductor.

(5) The wire specification for weak-current communication circuit shall not be lower than that for RVVPS shielded wires or equivalent, and the shielding layer shall be grounded.

(6) All-pole disconnection switch with contact spacing no less than 3mm shall be applied between power supply and air conditioning unit.

(7) In the case of damaged power supply cable, please contact your dealer or professionals from the designated maintenance department in time for servicing and/or replacement.

(8) Power supply cable installation requires a longer ground wire than current-carrying wire.

(9) The terms "MAX. CURRENT" and "MAX. POWER INPUT" presented in any label or instruction manual of the product equal to "RATED CURRENT" and "RATED POWER INPUT" which are defined by IEC/EN/AS/NZS 60335 standards.

(10) The interconnecting wire between outdoor and indoor units shall be, as a minimum, H05RN-F according to the European standard EN/AS/NZS 60335-1.

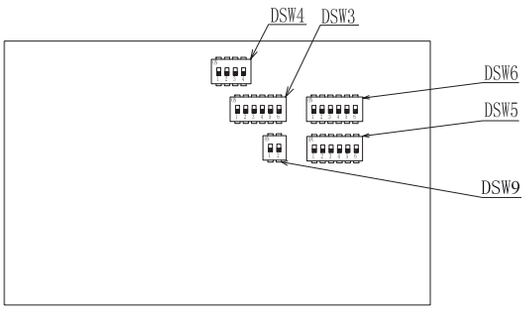
Recommended Wire	
Total current (A)	Wire (mm²)
i ≤ 6	2.5
6 < i ≤ 10	2.5
10 < i ≤ 16	2.5
16 < i ≤ 25	4
25 < i ≤ 32	6
32 < i ≤ 40	10
40 < i ≤ 63	16
63 < i	※1

※1: DO NOT connect wires in series when the current exceeds 63A.

10.2 Setting of DIP Switch

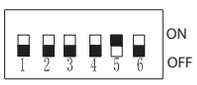
(1) DIP switch must be set with power sources of the indoor and outdoor units in OFF state. Otherwise, the settings are invalid.

(2) The location of DIP switch is shown in the figure below.



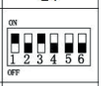
(3) The PCB of indoor unit is furnished with 5 DIP switches that must be set based on the following requirements before test run. The system must not be started before the completion of DIP setup.

(a) Indoor Unit Number Setting (DSW6)
All indoor units must be numbered (DSW6) as shown in the figure below.

DSW6 (Setting 0~63)	Ex.) Set machine No. 16
	8421 code 

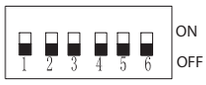
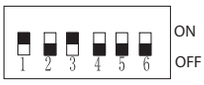
DSW6 are set to "0" before delivery. The range of indoor unit Number is between 0 and 63. For DSW6 six digit binary 8421 code, please refer to the table 10.1.

(b) Capacity Code Setting (DSW3)
No setup is required.
The code is set before delivery. This switch is used to set the capacity of indoor unit.

Capacity	07	09	12	15	19	24
Setting position						
Capacity	24*	30	38	42 , 48	54	
Setting position						

(c) Capacity Code Setting (DSW4)
No setup is required. The code is set before delivery.
Default Number 1 and 3 ON.

(d) Refrigerant Cycle Number Setting (DSW5).
The setup is needed. All are set to OFF before delivery.

DSW5 (Setting 0~63)	Ex.) Set refrigerant cycle number 5
	8421 

DSW5 are set to "0" before delivery. The range of refrigerant cycle Number is between 0 and 63. For DSW5 six digit binary 8421 code, please refer to the table 10.1.

Note:

Symbol "■" indicates the location of DIP switch.

The position indicated in the diagram is in the factory-set state.

⚠ CAUTION

The power supply shall be turned off before the setup of DIP switch. Otherwise, the settings will be invalid.

Table 10.1 8421 Code

Decimal No.	8421 Code					
	1	2	3	4	5	6
0	○	○	○	○	○	○
1	●	○	○	○	○	○
2	○	●	○	○	○	○
3	●	●	○	○	○	○
4	○	○	●	○	○	○
5	●	○	●	○	○	○
6	○	●	●	○	○	○
7	●	●	●	○	○	○
8	○	○	○	●	○	○
9	●	○	○	●	○	○
10	○	●	○	●	○	○
11	●	●	○	●	○	○
12	○	○	●	●	○	○
13	●	○	●	●	○	○
14	○	●	●	●	○	○
15	●	●	●	●	○	○
16	○	○	○	○	●	○
17	●	○	○	○	●	○
18	○	●	○	○	●	○
19	●	●	○	○	●	○
20	○	○	●	○	●	○
21	●	○	●	○	●	○
22	○	●	●	○	●	○
23	●	●	●	○	●	○
24	○	○	○	●	●	○
25	●	○	○	●	●	○
26	○	●	○	●	●	○
27	●	●	○	●	●	○
28	○	○	●	●	●	○
29	●	○	●	●	●	○
30	○	●	●	●	●	○
31	●	●	●	●	●	○
32	○	○	○	○	○	●
33	●	○	○	○	○	●
34	○	●	○	○	○	●
35	●	●	○	○	○	●
36	○	○	●	○	○	●
37	●	○	●	○	○	●
38	○	●	●	○	○	●
39	●	●	●	○	○	●
40	○	○	○	●	○	●
41	●	○	○	●	○	●
42	○	●	○	●	○	●
43	●	●	○	●	○	●
44	○	○	●	●	○	●
45	●	○	●	●	○	●
46	○	●	●	●	○	●
47	●	●	●	●	○	●
48	○	○	○	○	●	●
49	●	○	○	○	●	●
50	○	●	○	○	●	●
51	●	●	○	○	●	●
52	○	○	●	○	●	●
53	●	○	●	○	●	●
54	○	●	●	○	●	●
55	●	●	●	○	●	●
56	○	○	○	●	●	●
57	●	○	○	●	●	●
58	○	●	○	●	●	●
59	●	●	○	●	●	●
60	○	○	●	●	●	●
61	●	○	●	●	●	●
62	○	●	●	●	●	●
63	●	●	●	●	●	●

○: **OFF**

●: **ON**

After sales service

If your air conditioner can not operate normally, turn off the unit and cut off the power supply at immediately.

Contact your service center or technical department.

emerald.com.au/contact

Emerald Energy Pty Ltd
ABN 86 632 172 368
L2, 12a Rodborough Road Frenchs Forest NSW 2086

The information contained within this brochure is accurate as of the time of publish.

2025.09