OUTDOOR UNIT

CVT9-Y series

MANUAL
FOR INSTALLATION, USE AND MAINTENANCE



R-32

16127160021346-A 07-2026

Original instructions
Please read this manual carefully and keep it for future reference. All the pictures in this manual are for illustration purpose only.

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1. ABOUT THE DOCUMENTATION

NOTICE

- Make sure that the user has the printed documentation and ask him/her to keep it for future reference.

Target audience

Authorized installers + end users

NOTICE

- This appliance is intended to be used by expert or trained users in shops, in light industry, and on farms, or for commercial and household use by lay persons.
- The appliance is classified as appliance accessible to the general public.

⚠ WARNING

Please thoroughly read and ensure that you fully understand the safety precautions (including the signs and symbols) in this manual, and follow relevant instructions during use to prevent damage to health or property.

Documentation set

This document is part of a documentation set. The complete set consists of:

- General safety precautions:
  - Safety instructions that you must read before installing
- Indoor unit installation and operation manual:
  - Installation and operation instructions
- Repeater installation and operation manual:
  - Installation and operation instructions

Technical engineering data

Latest revisions of the supplied documentation may be available via your dealer.

The original documentation is written in English. All other languages are translations.

2. SAFETY SIGNS

2.1 Explanation of Safety Signs

The precautions and things to note in this document involve very important information. Please read them carefully.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury

⚠ WARNING

Indicates a hazardous situation which, 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

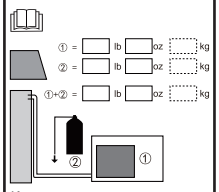
NOTICE

Is used to address practices not related to physical injury

⚠ SAFETY INSTRUCTIONS

Safety instruction (or equivalent) signs indicate specific safety-related instructions or procedures

2.2 Explanation of Symbols Displayed on the Unit

	DANGER This symbol shows that this appliance used a mild flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	WARNING This symbol shows that appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area.
	CAUTION This symbol indicates that the operation manual should be read carefully.
	CAUTION This symbol indicates that service personnel should be handling this equipment while referencing the installation manual.
	CAUTION This symbol indicates that additional information is available in documents such as the operating manual or installation manual.
 Key Example 1 REFRIGERANT CHARGE of the precharged part of the appliance Example 2 REFRIGERANT CHARGE added during installation	INFORMATION This symbol indicates that the entire system complies with the ENHANCED TIGHTNESS REFRIGERATING SYSTEMS requirements defined by IEC/EN Standards.

2.3 Safety instructions

2.3.1 Installation site

⚠ WARNING

Follow the service space dimensions in this manual for correct installation of the unit.

⚠ WARNING

Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. Possible risk: suffocation.

⚠ CAUTION

- Appliance NOT accessible to the general public, install it in a secured area, protected from easy access.
- This unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment.

⚠ CAUTION

Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.

⚠ WARNING

If one or more rooms are connected to the unit using a duct system, make sure:

- There are no operating ignition sources (example: open flames, an operating gas appliance or an operating electric heater) in case the floor area is less than the minimum floor area A (m²).
- No auxiliary devices, which may be a potential ignition source, are installed in the duct work (example: hot surfaces with a temperature exceeding 700°C and electric switching device);
- Only auxiliary devices approved by the manufacturer are used in the duct work.
- Air inlet AND outlet are connected directly to the same room by ducting. Do NOT use spaces such as a false ceiling as a duct for the air inlet or outlet.

2.3.2 Opening the unit

⚠ DANGER

RISK OF BURNING/SCALDING

⚠ DANGER

RISK OF ELECTROCUTION

- Do NOT leave the unit unattended when the service cover is removed.

2.3.3 Installing the SV box

⚠ WARNING

Fixing method of the SV box MUST be in accordance with the instructions from this manual.

2.3.4 Connecting the refrigerant piping

⚠ WARNING

Field piping method MUST be in accordance with the instructions from this manual.

⚠ WARNING

- Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
- Equipment piping in the occupied space shall be installed in such a way to protect against accidental damage in operation and service.

NOTE

- Do NOT use mineral oil on flared part.
- Do NOT reuse piping from previous installations.
- NEVER install a drier to this unit to guarantee its lifetime. The drying material may dissolve and damage the system.

⚠ CAUTION

Install the refrigerant piping or components in a position where they are unlikely to be exposed to any substance which may corrode components containing refrigerant.

⚠ WARNING

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately.

Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas might be produced if refrigerant gas comes into contact with fire.

⚠ WARNING

ALWAYS recover the refrigerant. Do NOT release them directly into the environment.

During leak test, NEVER pressurize the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

Do NOT vent gases into the atmosphere.

⚠ WARNING

- Precautions shall be taken to avoid exces-sive vibration or pulsation to refrigeration piping.
- Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects.
- Provision shall be made for expansion and contraction of long runs of piping.
- Piping in refrigerating systems shall be designed and installed such as to minimize the likelihood of hydraulic shock damaging the system.
- The indoor equipment and pipes shall be securely mounted and guarded such that accidental rupture of equipment or pipes cannot occur from events such as moving furniture or reconstruction activities.
- Joints made in installation between parts of refrigerant system shall be accessible for maintenance purposes.

⚠ WARNING

For installations with field applied joints that are exposed in the occupied space, these joints shall be at least one of the following:

-mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only);

-welded or brazed joints; or

-joints in enclosures that vent to the unit or to the outside.

2.3.5 Charging procedures

⚠ WARNING

Charging of refrigerant MUST be in accordance with the instructions from this manual.

In case of field charge, the effect on REFRIG-ERANT CHARGE caused by the different pipe length has to be quantified.

⚠ WARNING

Only use R32 as refrigerant. Other substanc-es may cause explosions and accidents.

When charging refrigerant, ALWAYS use protective gloves and safety glasses.

⚠ WARNING

Recharging Refrigerant: 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.

⚠ WARNING

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 minimize 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.
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

2.3.6 Electrical installation

⚠ WARNING

Electrical installation MUST be in accordance with the instructions from this manual.

⚠ WARNING

- Establish proper earth. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Install the required fuses or circuit breakers.
- Considering the failure of the SV valve box's refrigerant leakage monitoring due to unexpected power outage, the outdoor unit, the indoor units and the SV need to be connected to separate circuit breakers or fuses respectively to ensure that the safety shut-off valve remains in the closed position during SV Box power outage.
- Secure the electrical wiring with cable ties so that the cables do NOT come in contact with sharp edges or piping, particularly on the high-pressure side.
- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environ-mental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
- Do NOT use taped wires, stranded conductor wires, extension cords, they can cause overheating, electrical shock or fire.

⚠ WARNING

- All wiring MUST be performed by an authorized electrician and MUST comply with the applicable legislation.
- Make electrical connections to the fixed wiring.
- All components procured on-site and all electrical construction MUST comply with the applicable legislation
- ALWAYS use multicore cable for power supply cables.

⚠ WARNING

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.

⚠ CAUTION

- When connecting the power supply: connect the earth cable first, before making the current-carrying connections.
- When disconnecting the power supply: disconnect the current-carrying cables first, before separating the earth connection.
- The length of the conductors between the power supply stress relief and the terminal block itself MUST be as such that the current-carrying wires are tautened before the earth wire is in case the power supply is pulled loose from the stress relief.

2.3.7 Commissioning

⚠ CAUTION

Do NOT insert fingers, rods or other objects into the air inlet or outlet. Do NOT remove the fan guard. When the fan is rotating at high speed, it will cause injury.

2.3.8 Troubleshooting

⚠ CAUTION

- When carrying out an inspection on the switch box of the unit, ALWAYS make sure that the unit is disconnected from the mains. Turn off the respective circuit breaker.
- When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. NEVER shunt safety devices or change their values to a value other than the factory default setting. If you are unable to find the cause of the problem, call your dealer.

2.4 Important Information for the dealer and service personnel

⚠ WARNING

- Risk of Fire. Flammable Refrigerant Used.
- Installation, repair, maintenance, decommission and disposal Should Be Performed Only By Trained and Certified Service Personnel.
- Information of procedures additional to usual information for refrigerating appliance installation, repair, maintenance and decommission procedures is required when an appliance with FLAMMABLE REFRIGERANTS is affected.
- The training of these procedures is carried out by national training organisations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation.
- The achieved competence should be documented by a certificate.

⚠ WARNING

- The unit employs FLAMMABLE REFRIGERANT R32.
- 1.General
- The following information is provided for units that employ FLAMMABLE REFRIGERANTS.
- 2.Transport
- Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.
- 3.Marking of equipment using signs
- Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.
- All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs.
- The effectiveness of signs should not be diminished by too many signs being placed together.
- Any pictograms used should be as simple as possible and contain only essential details.
- 4.Disposal of equipment using flammable refrigerants
- See national regulations.
- 5.Storage of equipment
- The storage of the equipment should be in accordance with the applicable regulations or instructions, whichever is more stringent.

⚠ WARNING

- 6.Storage of packed (unsold) equipment 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.
- The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
- Every working procedure that affects safety means shall only be carried out by competent personnel.
- Examples for such working procedures are:

  – breaking into the refrigerating circuit;

  – opening of sealed components;

  – opening of ventilated enclosures.

Pipe-work shall be in compliance with national and local codes and standards.

The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;

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.

-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;

-taking into consideration the length and diameter of the connecting refrigerant piping, add refrigerant to complete the installation according to the information provided on the label for determining the required additional refrigerant charge, as well as the instructions in this manual on how to complete the refrigerant charge.

The minimum INSTALLED HEIGHT hinst shall comply with the corresponding requirements in this manual.

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;

⚠ WARNING

- A REFRIGERANT DETECTION SYSTEMS is installed. The unit must be powered except for service.
- REFRIGERANT SENSORS for REFRIGERANT DETECTION SYSTEMS Shall Only be replaced with sensors specified by the appliance manufacture.
- The detailed information on the following topics is included in the manual:

  -function, operation and required servicing measures;

  -specified end-of-life and replacement instructions;

  -other information about REFRIGERANT DETECTION SYSTEMS.
- Room shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces).
- Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work.
- The appliance contains more than m1 for any refrigerating circuit, an unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.
- The appliance connected via an air duct system to one or more rooms are installed in a room with an area less than Amin, or installed in a room with an EFFECTIVE DISPERSAL VOLUME VED less than the minimum, that room shall be without continuously operating open flames (for example an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for example an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrestor.
- Only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

  – for appliances connected via an air duct system to one or more rooms, the auxiliary devices which can be a potential ignition source shall not be installed in the ductwork;

  – for appliances connected via an air duct system to one or more rooms, only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

⚠ SAFETY INSTRUCTIONS

False ceilings or drop ceilings may be used as a return air plenum if a REFRIGERANT DETECTION SYSTEM is provided in the appliance and any external connections are also provided with a sensor immediately below the return air plenum duct joint.

⚠ CAUTION

- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following shall be completed prior to conducting work on the system:

  -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 around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

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

⚠ CAUTION

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

  – the refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;

  – the ventilation machinery and outlets are operating adequately and are not obstructed;

  – if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

  – 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.

⚠ WARNING

- Sealed electrical components shall be replaced.
- Intrinsically safe components must be replaced.
- 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.
- 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 (25 % maximum) is confirmed.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.
- NOTE Examples of leak detection methods are

  – bubble method,

  – fluorescent agent method.
- If a leak is suspected, all naked flames shall be removed/extinguished.

⚠ CAUTION

- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut-off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to the following.
- Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.
- When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

  -safely remove refrigerant following local and national regulations;

  -evacuate;

  -purge the circuit with inert gas (optional for A2L);

-evacuate (optional for A2L);

-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 if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.
- For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

⚠ CAUTION

- The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.
- An inert gas, specifically, is dry oxygen free nitrogen(OFN).
- The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times.
- This operation is absolutely vital if brazing operations on the pipework are to take place.
- 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.

⚠ CAUTION

- Before carrying out this 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.

  a) Become familiar with the equipment and its operation.

  b) Isolate system electrically.

  c) Before attempting the procedure, ensure that:

  -mechanical handling equipment is available, if required, for handling refrigerant cylinders;

  -all personal protective equipment is available and being used correctly;

  -the recovery process is supervised at all times by a competent person;

  -recovery equipment and cylinders conform to the appropriate standards.

  d) Pump down refrigerant system, if possible.

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

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

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

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

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

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

  k) Recovered refrigerant shall not be charged into another 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.

⚠ CAUTION

- 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. If in doubt, the manufacturer should be consulted. 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.

⚠ CAUTION

- 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. When oil is drained from a system, it shall be carried out safely.

2.5 Important Information for User

⚠ DANGER

ELECTRICAL HAZARD 540 VOLTS DC

- Failure to follow this warning could result in property damage, severe personal injury, or death.
- WAIT FIVE (5) MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 540 VDC,then verify DC Voltage is less than 36 VDC at inverter TEST POINTS P-N.

NOTICE

- This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.
- These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation.
- Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.
- The manufacturer recommends installing only approved matched indoor and outdoor systems.
- Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.
- This document contains a wiring diagram.
- This is customer property and is to remain with this unit.

⚠ WARNING

- This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair air conditioning product may result in personal injury and/or property damage.

⚠ WARNING

HOT SURFACE

- May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury.
- Do not touch the high-temperature components such as compressor.

⚠ WARNING

HAZARDOUS VOLTAGE

- Failure to follow this warning could result in property damage, severe personal injury, or death.
- Disconnect all electric power, Including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

⚠ WARNING

REFRIGERANT OIL

- These units use R32 refrigerant. Use only R32 approved service equipment. These units use a POE oil that readily absorbs moisture from the atmosphere. To limit this 'hygroscopic' action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and when opening the system for component always change the driers when opening the system for component replacement.

⚠ CAUTION

CONTAINS REFRIGERANT

- Failure to follow proper procedures can result in personal illness or injury or severe equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.
- Flammable refrigerant used.

⚠ WARNING

- This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www. P65 Warnings.ca.gov.

⚠ CAUTION

EARTHING REQUIRED

- Failure to inspect or use proper service tools may result in equipment damage or personal injury. All parts of this product that are capable of conducting electrical current are earthed. If earthing wires, screws, straps, clips, nuts, or washers used to complete a path to earth are removed for service, they must be returned to their original position and properly fastened.

⚠ WARNING

SERVICE VALVES

- Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the Liquid Line Service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge.

⚠ WARNING

BRAZING REQUIRED

- Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. If using existing refrigerant lines make certain that all joints are brazed, not soldered.
- If refrigerant gas leaks during installation, ventilate the area immediately.
- Comply with national gas regulations.

⚠ WARNING

HIGH CURRENT LEAKAGE

- Earthing is required before connecting electrical supply.
- Failure to follow this warning could result in property damage, severe personal injury, or death.

⚠ WARNING

RISK OF FIRE

- Mild flammable refrigerant used. Follow handling instructions carefully in compliance with national regulations.

⚠ DANGER

FIRE, EXPLOSION

- Store in a well ventilated room without continuously operating flames or other potential ignition.

⚠ WARNING

- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the 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.
- Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.
- Servicing shall only be performed as recommended by the equipment manufacturer.

⚠ WARNING

- Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.
- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.
- Risk of electric shock. Can cause injury or death. Disconnect all remote electric power supplies before servicing.
- Risk of fire mild. Flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.
- Risk of fire. Dispose of properly in accordance with federal or local regulations.
- Risk of fire. Consult repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.
- Risk of fire – auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.

2.6 About the Refrigerant

⚠ WARNING

The appliance uses R32 refrigerant.



⚠ WARNING

These instructions are exclusively intended for qualified contractors and authorized installers.

- Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors.These heating contractors must be trained in accordance with EN/IEC 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.
- Work on electrical equipment may only be carried out by a qualified electrician.
- Before initial commissioning, all safety - related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

⚠ WARNING

- Appliance shall be installed, operated and stored in a room that meets special requirements and has an area limit as shown in sections 2.7.2.
- 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 that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn the unit.
- Be aware that refrigerants may be odorless.
- Appliance shall be installed and operated in a room with an EFFECTIVE DISPERSAL VOLUME larger than 'A' m^3 ('B' ft^3).
- When stored in an unpowered state, the appliance must be stored in a room with a floor area larger than 'X'm^2('y' ft^2).

2.7 About the refrigerant charge limit

2.7.1 Room area limitations

In EN/IEC 60335-2-40, R32 refrigerant is classified as class A2L, which is mildly flammable. Therefore, R32 refrigerant is suitable for systems needing additional refrigerant charge and which will limit the area of the rooms being served by the system.

Similarly, the total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

⚠ WARNING

- The space considered shall be any space which contains refrigerant-containing parts or into which refrigerant could be released.
- The room area (A) of the smallest, enclosed, occupied space shall be used in the determination of the refrigerant quantity limits.
- The minimum room area or minimum room area of conditioned space is based on releasable charge and is not related to total system refrigerant charge.

⚠ WARNING

- For more detailed instructions on the installation height of the indoor unit, please refer to the corresponding installation manual.
- Indoor units cannot be installed lower than 1.8 m from the lowest point of the floor. If the installation height of the VRF indoor unit is less than 1.8 m, please contact your installer or dealer to receive more information and professional advice.

The room area calculation requirements

For determination of room area (A) when used to calculate the refrigerant charge limit, the following shall apply.

The room area (A) shall be defined as the room area enclosed by the projection to the base of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

Units mounted higher than 1.8 m and spaces divided by partition walls that are no higher than 1.6 m shall be considered a single space. Rooms on the same floor and connected by an open passageway between the spaces can be consid ered a single room when determining compliance to Amin, if the passageway complies with all of the follow ing

1. It is a permanent opening.
2. It extends to the floor.
3. It is intended for people to walk through.

The area of the connected rooms, on the same floor connected by permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin provided all of the following conditions are met as

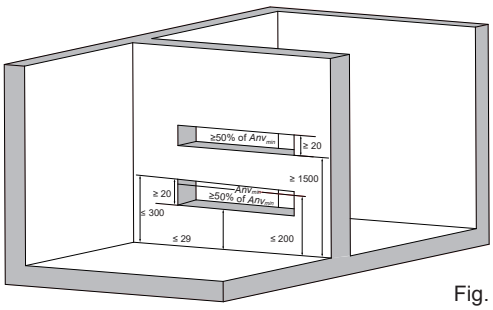


Fig. 2-1

1. Low Level Opening

a) The opening shall not be less than Anvmin which is 0.012 m² for enhanced tightness refrigerating systems.

b) The area of any openings above 300 mm from the floor shall not be considered in determining compliance with Anvmin.

c) At least 50 % of the opening area of Anvmin shall be below 200 mm from the floor.

d) The bottom of the opening is not more than 100 mm from the floor.

e) The opening is a permanent opening that cannot be closed.

f) For openings extending to the floor the height shall not be less than 20 mm above the surface of the floor covering.

2. High Level Opening

a) The opening shall not be less than 50 % of Anvmin.

b) The opening is a permanent opening that cannot be closed.

c) The opening shall be at least 1.5 m above the floor.

d) The height of the opening is not less than 20 mm.

3. Minimum ventilation airflow volume is 240 m^3/h.

NOTICE

The requirement for the upper opening can be met by drop ceilings, ventilation ducts or similar arrangements that provide an airflow path between the connected rooms.

Keep any required ventilation openings clear of obstruction.

INFORMATION

Our units meet the requirements for enhanced tightness refrigerating systems using A2L refrigerants.

2.7.2 Refrigerant charge limit

The charge limit must be determined separately for each SV box branch pipe port.

The total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

This is possible because of the shut-off valves in the SV box. The maximum amount of refrigerant that can escape in case of a leak is determined by the piping length and indoor heat exchanger size. This is directly linked to the downstream indoor unit capacity of this piping section.

In case a leak is detected in an indoor unit, the shut-off valves in the SV box of the respective port will close. The piping section with the leak is now shut off from the rest of the system and the amount of refrigerant that can leak is significantly reduced.

1.Determine the smallest room served per branch pipe port of the SV box.

Note :

In case indoor units connected to the same branch pipe port are split over different rooms: the area of the smallest room needs to be considered.

In case 2 branch pipe ports are combined to a single branch pipe port, they have to be considered as a single branch pipe port.

2. Calculate the allowable maximum refrigerant amount (mmax) and the releasable refrigerant (mrel) for each branch pipe port of the SV box.

3. If the releasable refrigerant (mrel) is less than the allowable maximum refrigerant amount (mmax). Then proceed to next step; otherwise, the system needs to be adjusted.

The maximum refrigerant amount (mmax) for each port of the SV box is determined by the smallest room served by that port. Change the installation ((see choices below)) can adjust the maximum refrigerant amount under each port of the SV box.

- Increase the area of smallest room connected to the same branch pipe port.

Reduce the indoor capacity connected to the same branch pipe port to equal or below the limit.

- Reduce the piping connected between SV box and indoor unit.
- Split indoor capacity over 2 separate branch pipe ports.

4. Calculate the additional refrigerant amount for other components (such as liquid pipes, SV box, outdoor units, indoor units, etc.). For detailed information, see 5.9 Refrigerant Charging.

5. Determine the total refrigerant charge amount in the system.

Total refrigerant charge=Factory charge (a) + addition al charge (b)

(a) The factory charge value can be found on the nameplate.

(b) The b value is calculated in step 4.

6.According to EN/IEC 60335-2-40, the total refriger ant charge amount in the system MUST always be less than 79.82 kg. This means that in case the calculated total refrigerant charge is equal to or more than 79.82 kg. you must divide the system into smaller independent systems, or Increase other safety measures, contact your dealer for details.

Flow chart (for each SV box branch pipe port)

– For evaporating units and condensing units, the instructions or markings shall include wording to assure that the maximum operating pressure is considered when connecting to any condenser unit or evaporator unit.

– For evaporating units, condensing units and condenser units, the instructions or markings shall include refrigerant charging instructions.

– A warning to ensure that partial units shall only be connected to an appliance suitable for the same refrigerant.

– This unit <model V9 R32 Series> is a partial unit air-conditioner, complying with partial unit requirements of IEC 60335-2-40, and must only be connected to other units that have been confirmed as complying to corresponding partial unit requirements of IEC 60335-2-40.

– The electrical interfaces shall be specified with purpose, voltage, current, and safety class of construction.

– The SELV connection points, if provided, are to be clearly indicated in the instructions. The connection point should be marked with the “read the instructions” symbol per ISO 7000-0790 (2004-01) and the Class III symbol according to IEC 60417-5180 (2003-02).

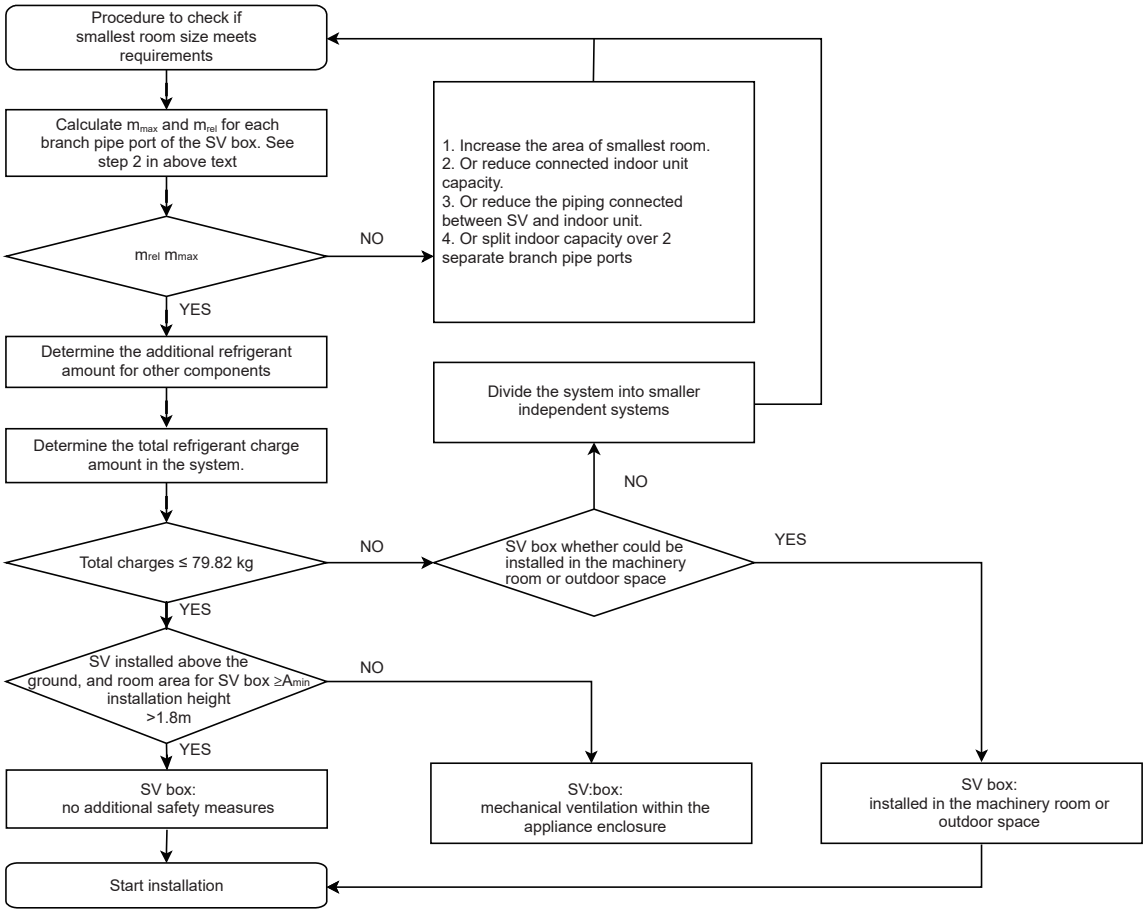


Fig. 2-2

3. IMPORTANT INFORMATION

⚠ WARNING

- This appliance can be used by children ages 8 and above and persons with reduced physical, sensory or mental capabilities or who lack experience and knowledge only if they are supervised or have been given instruction concerning the use of the appliance in a safe way and understand the hazards involved.
- Children shall not play with the appliance. Children shall not clean or maintain the appliance without supervision.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the use of the appliance by a person responsible for their safety.

  – Children should be supervised to ensure that they do not play with the appliance.

  – The split units shall only be connected to an appliance compatible with the same refrigerant.

  – The units 252T-450T are split unit air conditioners, complying with split unit requirements of this International standard, and must only be connected to the units that have been confirmed as complying with the corresponding split unit requirements of this International standard.

⚠ WARNING

The unit is equipped with a refrigerant leak detection system for safety. To be effective, the unit MUST be electrically powered at all times after installation, except for maintenance.

⚠ WARNING

- The unit is equipped with a refrigerant leak detection system for safety.
- To be effective, the unit MUST be electrically powered at all times after installation, except for maintenance.

NOTICE

- NEVER inspect or service the unit by yourself. Ask a qualified service person to perform this work.
- Do NOT wipe the controller operation panel with benzene, thinner, chemical dust cloth, etc. The panel may get discolored or the coating peeled off. If it is heavily dirty, soak a cloth in water-diluted neutral detergent, squeeze it well and wipe the panel clean. Wipe it with another dry cloth.

⚠ WARNING

- Ask your dealer to assist in the installation of the air conditioner.
  Incomplete installation performed by yourself may result in a water leakage, electric shock, and fire.
- Ask your dealer to assist in the installation of the air conditioner.
  Incomplete installation performed by yourself may result in a water leakage, electric shock, and fire.
- Ask your dealer for assistance with improvement, repair, and maintenance.
  Incomplete improvement, repair, and maintenance may result in a water leakage, electric shock, and fire.
- To avoid electric shock, fire or injury, please turn off the power supply and call your dealer for instructions if you detect any abnormalities such as a burning smell
- Never let the indoor unit or the remote controller get wet.
  This could lead to electric shock or fire.
- Never press the button of the remote controller with a hard, pointed object.
  The remote controller may be damaged.
- Never replace a fuse with a fuse that has an incompatible rated current or other wires when a fuse blows out.
  The use of wire or copper wire may cause the unit to break down or cause a fire.
- Exposing your body to the air flow of the air conditioner for long periods of time may be harmful to your health
- Do not insert fingers, rods or other objects into the air inlet or outlet.
  When the fan is in operation, it will cause injury.

3.1 System Layout Requirements

3.1.1 Unit Installation Requirements

The outdoor unit shall be located in a well-ventilated location other than the occupied space, such as in the open air.

For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

3.1.2 Piping Installation Requirements

Low temperature solder alloys, such as lead/tin alloys, are not acceptable for pipe connections.

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 flaring part shall be re-fabricated.

Equipment pipes in the occupied space in question must be installed in such a way that it is protected against accidental damage.

NOTICE

- Do not use potential sources of ignition in searching for or detection of refrigerant leaks.
- Do not re-use joints and copper gaskets which have been used already.
- Do not pierce or burn refrigerant cycle parts.
- Be aware that the refrigerant inside the system is odorless.

4. SYSTEM INFORMATION

4.1 System Layout

Case 1: Outdoor unit is connected with VRF indoor unit

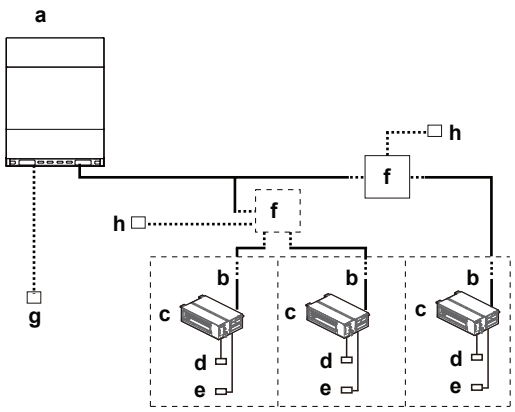


Figure 4-1

a Heat pump outdoor unit
b Refrigerant piping
c VRF indoor unit
d Wired controller (optional)
e Display box (optional)
f SV box
g Centralized control (optional)
h Alarm (Customer self-provision)

5. OPERATING INSTRUCTIONS

5.1 Operating Range

Table 5.1

Indoor unit type	Common indoor unit	
Mode	Cooling mode	Heating mode
Outdoor temperature	-15~55°C	-30~30°C
Indoor temperature	16~32°C	15~30°C
Indoor humidity	≤ 80% (a)	
(a) Condensate might form on the unit's surface if the humidity is above 80%		

NOTICE

The safety device will be triggered if the temperature or humidity exceeds these conditions, and the air conditioner may not run.

5.2 Operating System

5.2.1 System operations

The operating program varies with different combinations of outdoor unit and controller.

To protect this unit, please turn on the main power supply 12 hours before you start to operate this unit.

If there is a power outage while the unit is running, the unit will automatically restart its operation when the power supply resumes.

5.2.2 Cooling, heating, fan only and, auto operations

The indoor units in the air conditioner can be controlled separately, but the indoor units in the same system cannot operate in the heating and cooling modes at the same time.

When the cooling and heating modes conflict, the mode is determined based on the setting of the “Menu mode” of the outdoor unit.

Table 5.2

Automatic priority mode	Automatic selection of heating or cooling priority based on the ambient temperature.
Cooling priority mode	When you select the cooling mode as the priority mode, the heating operations of the indoor unit stop running, while the cooling mode will operate as usual;
No.63 (VIP indoor unit) + voting priority mode	If the indoor unit 63 has been set and turned on, the operating mode of unit 63 will be regarded as the priority operating mode of the system. If the indoor unit 63 has not been set or not turned on, the mode that the majority of indoor units are currently using will be the priority operating mode of the system.
In response to heating only mode	Indoor units which are set to heating mode will operate normally, while indoor units in the cooling or fan mode will display the “E0 mode conflict error”.
In response to cooling only mode	Indoor units which are set to cooling and fan modes will operate normally, while indoor units in the heating mode will display the “E0 mode conflict error”.
Heating priority mode	Indoor units which are set to cooling or fan mode will stop running, while indoor units in the heating mode will run as usual.
Change over	Only applicable to R32 series indoor unit, must set the No.63 (VIP indoor unit). The operation mode of non-VIP indoor units cannot be selected by the wired controller even if the outdoor unit is not running.
Voting priority mode	The mode that the majority of indoor units are currently using will be the priority operating mode of the system.
First on priority mode	The operating mode of the first running indoor unit will be regarded as the priority operating mode of the system.
Capability requirements priority mode	The mode of the indoor unit that is running to meet the most demands at a point in time is adopted as a priority mode of the system.

5.2.3 Heating operations

Heating usually takes longer than cooling.

Perform the following operations to prevent the heating capacity from dropping or to prevent the system from outputting cold air.

Defrost operation

While heating is in use, as the outdoor temperature decreases, frost may form on the heat exchanger in the outdoor unit, making it more difficult for the heat exchanger to heat the air. This decreases the heating capacity, and the system will need to be defrosted to provide sufficient heat to the indoor unit. At this point, the indoor unit’s display screen will show the defrost opera-tion.

The indoor fan motor will automatically stop running to prevent cold air from coming out of the indoor unit when heating begins. This process will take some time. This is not a malfunction.

INFORMATION

- When there is a drop in the external temperature, the heating capacity decreases. If this happens, please use another heating device and the unit at the same time. (Make sure the room is well ventilated if you are using equipment that produces fire.) Do not place any equipment that may produce a flame where the air outlets of the unit are or below the unit itself.
- Once the unit starts, it takes some time for the room temperature to rise, as the unit uses a hot air circulation system to heat the room.
- If the hot air rises to the ceiling, causing the ground area to become cold, it is recommended that you use a circulating device (to circulate the indoor air). Please contact the agent for details.

5.2.4 Operating system

1. Press the “switch” button on the controller.
Result: The running light turns on and the system starts to operate.

2. Repeatedly press the mode selector on the controller to select the required operation mode.

Stop

Press the “switch” button on the controller again.
Result: The running light is now off, and the system stops running.

NOTICE

Once the unit has stopped running, do not disconnect the power immediately. Wait for at least 10 minutes.

Adjust

Refer to the controller user manual for information about how to set the required temperature, fan speed and air flow direction.

5.3 Dry Program

5.3.1 System operations

The function of this program uses the minimum temperature drop (minimum indoor cooling) to lower the humidity in the room.

In the drying process, the system automatically determines the temperature and fan speed (the settings cannot be implemented through the user interface).

5.3.2 Dry operations

Start

1. Press the switch button on the controller.
Result: The running light turns on and the system starts operating.

2. Repeatedly press the mode selector on the controller.

3. Press the button to adjust the air flow direction (this function is not available for all indoor units).

Stop

4. Press the switch button on the user interface again.
Result: The running light is now off, and the system has stopped running.

⚠ WARNING

Do not touch the air outlet or the horizontal blade when the fan is operating in swing mode. Your fingers could become caught in the unit or the unit could be damaged.

5.4 Cutting off Power Supply

If there is a power outage while the unit is running, the unit will automatically restart when the power supply resumes.

Misoperation
If misoperation happens, please disconnect the power from the system and then reconnect it after a few minutes.

5.5 Protection Procedure

5.5.1 Protection Functions

A protection feature prevents the air conditioner from being activated within 4 minutes when it restarts immediately after operation.

5.5.2 Protective Equipment

This protective equipment will enable the air conditioner to stop when the air conditioner is forced to run.

The protective equipment may be activated in the following circumstances:

Cooling

- The air inlet or air outlet of the outdoor unit is blocked.
- Strong wind is continuously blowing into the air outlet of the outdoor unit.

Cooling

- Too much dust and rubbish are stuck to the dust filter of the indoor unit.
- The air outlet of indoor unit is blocked.

⚠ CAUTION

When the protective equipment activates, please turn off the power, and restart operations after the problem is solved.

6. MAINTENANCE AND REPAIR

6.1 About Refrigerant

This product contains fluorinated greenhouse gases as stipulated in the Kyoto Protocol. Do not discharge the gas into the atmosphere.

Refrigerant Type: R32

Law requires that refrigerant must be checked regularly for leakages. Please contact the installation personnel for more information.

⚠ WARNING

- The refrigerant in the air conditioner is safe, and usually does not leak.
- Do not use the air conditioner again until the maintenance personnel has confirmed that the refrigerant leakage has been sufficiently resolved.

NOTICE

Do not check or repair the unit on your own. Please get qualified professionals to conduct any checks or repairs.
Do not use substances like gasoline, diluent, or chemical dust cloths to wipe the operations panel of the controller. Doing so could remove the surface layer of the controller. If the unit is dirty, immerse a cloth in diluted and neutral detergent, wring it out, and then use it to clean the panel. Lastly, wipe it with a dry cloth.Cleaning and user maintenance shall not be made by children.

⚠ WARNING

- When the fuse melts, do not use any unspecified fuses or other wires to replace the original fuse. The use of electrical wires or copper wires may cause the unit to malfunction or cause a fire.
- Do not insert your fingers, sticks, or other items into the air inlet or outlet. Do not remove the fan mesh cover. When the fan rotates at a high speed, it could cause bodily injury.
- It is very dangerous to check the unit when the fan is rotating.
- Make sure you turn off the main switch before any maintenance work begins.
- Check the supporting and base structure of the unit for any damages after a long period of use. The unit could fall and cause personal injury if there is any damage.

6.2 Maintenance After the Unit Has Been Shut Down for a Long Period

For example, in early summer or winter.

- Check for and remove all objects that could clog the air inlets and outlets of the indoor and outdoor units.
- Clean the air filter and external shell of the unit. Please contact the installation or maintenance personnel. The installation/operation manual of the indoor unit includes maintenance tips and cleaning procedures. Make sure that the clean air filter is installed in its original position.
- Turn on the main power supply 12 hours before operating this unit to ensure that the unit runs smoothly. The user interface is displayed once the power is turned on.

6.3 Maintenance Before the Unit Is Shut Down for a Long Period

For example, at the end of winter and summer.

Run the indoor unit in the fan mode for about half a day to dry the internal parts of the unit.

Turn off the power supply.

Clean the air filter and external shell of the unit. Contact the installation or maintenance personnel to clean the air filter and external shell of the indoor unit. The installation/ operation manual of the specialized indoor unit includes maintenance tips and cleaning procedures. Make sure that the clean air filter is installed in its original position.

6.4 About the Refrigerant

This product contains fluorinated greenhouse gases as stipulated in the Kyoto Protocol. Do not discharge the gas into the atmosphere.

Refrigerant Type: R32

Law requires that refrigerant must be checked regularly for leakages. Please contact the installation personnel for more information.

⚠ WARNING

- The refrigerant in the air conditioner is safe, and usually does not leak.
- Do not use the air conditioner again until the maintenance personnel has confirmed that the refrigerant leakage has been sufficiently resolved.

6.5 After-sales Service and Warranty

6.5.1 Warranty period

This product contains the warranty card that was completed by the agent during installation. The customer must check the completed warranty card and retain it properly.

If you need to repair the air conditioner during the warranty period, please contact the agent and provide the warranty card.

6.5.2 Recommended maintenance and inspection

Using the unit for many years will eventually cause a dust layer to develop, which will cause the performance of the unit to degenerate to a certain extent.

As professional skills are needed to dismantle and clean the unit, and to ensure optimal maintenance of this unit, please contact your agent for more details.

When you request the agent for assistance, please remember to state:

- The complete model name of the air conditioner.
- Date of installation.
- Details of the fault symptoms or errors, and any defects.

⚠ WARNING

- Do not attempt to modify, dismantle, remove, reinstall or repair this unit, as the improper dismantling or installation may result in electric shock or fire. Please contact an agent.
- If the refrigerant accidentally leaks, make sure that there is no open flame around the unit. The refrigerant itself is completely safe, non-toxic and non-flammable, but it will produce toxic gases when it accidentally leaks and comes in contact with flames generated by existing heaters, and burning devices in the room. Request the assistance of qualified maintenance personnel to verify that the point of leakage has been repaired or rectified before you restore the operations of the unit.

6.5.3 Shorter maintenance and replacement cycle

In the following situations, the “maintenance cycle” and “replacement cycle” may be shortened.

If the unit is used in the following situations:

- Temperature and humidity fluctuations are outside the normal ranges.
- Large power fluctuations (voltage, frequency, waveform distortion etc.) (must not use the unit if the power fluctuations exceed the allowed range).
- Frequent collisions and vibrations.
- The air may contain dust, salt, harmful gas, or oil such as sulphite and hydrogen sulphide.
- The unit is frequently turned on and off of unit or the operating time is too long (in places where the air conditioning is on for 24 hours a day).

7. TROUBLESHOOTING

The warranty does not cover the damage caused by dismantling or cleaning of the internal components by unauthorized agents.

⚠ WARNING

- When any unusual situations arise (burning smell, etc.), stop the unit immediately and turn off the power.
- As a result of a certain situation, the unit has caused damage, an electric shock, or a fire. Please contact the agent.

The system maintenance must be carried out by qualified maintenance personnel:

Table 7.1

Symptom	Measures
The safety device, such as a fuse, circuit breaker or a leakage circuit breaker is triggered frequently or the ON/OFF switch is not working properly.	Turn off the main power switch.
The operating switch is not functioning normally.	Turn off the power supply.
The unit number is displayed on the user interface, and the operating indicator is flickering, and an error code is shown on the screen as well.	Notify the installation personnel and report the error code.

Other than the above-mentioned situations, and where the fault is not obvious, if the system continues to malfunction, carry out the following steps to investigate.

Table 7.2

Symptom	Measures
The system does not run at all.	Check if there is a power failure. Wait for the power supply to be restored. If a power failure occurs when the unit is still running, the system will restart automatically once the power is restored. Check if the fuse is broken or if the circuit breaker is working. If necessary, replace the fuse or reset the circuit breaker.
The system works fine in the fan-only operating mode but stops running once it enters the heating or cooling mode.	Check if the air inlets or outlets of the outdoor or indoor units are blocked by any obstacles. Remove the obstacles, and maintain good ventilation in the room.
The system is running but there is poor cooling or heating effect.	Check if the air inlets or outlets of the outdoor or indoor units are blocked by any obstacles. Remove the obstacles, and maintain good ventilation in the room. Check if the filter is blocked (please refer to the “Maintenance” section in the manual of the indoor unit). Check the temperature settings. Check the fan speed settings on the user interface. Check if the doors and windows are open. Close the doors and windows to shut out the wind from the external environment. Check if there are too many people in the room when the cooling mode is in operation. Check if the heat source of the room is too high. Check if there is direct sunlight shining into the room. Use curtains or blinds. Check that the angle of air flow is appropriate.

7.1 Error Code: Overview

If an error code appears on the controller, please contact the installation personnel and inform them of the error code, device model, and serial number (you can find the information on the nameplate of the unit).

Table 7.3 Outdoor unit error code

Error code	Error description	Manual restart required
A01	Emergency stop	NO
A11	Refrigerant leak on indoor unit	YES
Ad1	Refrigerant shut-off device fault	NO
xA61	Address (x) of the slave unit error	NO
AAx	No.x driver mismatch,	NO
C13	Outdoor unit address is repeated	NO
C2A	outdoor unit and shut-off device communication failure	NO
C21	Communication error between indoor and master unit	NO
C26	Number of indoor units detected by master unit has decreased or less than the setting amount	NO
C28	Number of indoor units detected by master unit has increased or more than the setting amount	NO
xC31	Communication error of address X slave outdoor unit	NO
C32	Number of slave units detected by master unit has decreased	NO
C33	Number of slave units detected by master unit has increased	NO
xC41	Communication error between main control chip and No.(x) inverter driver chip	NO
1C46	main control board and fan MCU communication failure	NO
CA1	main control board add central board communication failure	NO
E41	Outdoor ambient temperature sensor (T4) error (open/short)	NO
F31	Subcooling heat exchanger outlet temperature sensor(T6B) error(open/short)	NO
F41	Main heat exchanger pipe temperature sensor (T3) error(open/short)	NO
F51	Subcooling heat exchanger inlet temperature sensor(T6A) error(open/short)	NO
F62	Inverter module temperature (NTC) protection	NO
xF71	No.(x) compressor discharge temperature sensor (T7C) error (open/short)	YES
xF72	No.(x) compressor discharge temperature (T7C) protection	NO
EC1	Any indoor unit refrigerant leak sensor fault	NO
F75	Compressor discharge insufficient superheat protection	NO
F81	Gas stop-valve temperature sensor (Tg) error (open/short)	NO
F91	Liquid pipe temperature sensor (T5) error (open/short)	NO
FA1	Outdoor heat exchanger inlet temperature sensor (T8) error (open/short)	NO
Fb1	T9 Heat sink outlet temperature sensor Fault (Open/Circuit)	NO
FC1	Outdoor heat exchanger outlet temperature sensor (TL) error (open/short)	NO
xFd1	No.(x) Compressor suction temperature sensor (T7) error (open/short)	NO
P11	High pressure sensor error	NO
P12	Discharge pipe high pressure protection	NO
P13	Discharge pipe high pressure switch protection	NO
P21	Low pressure sensor error	YES
P22	Suction pipe low pressure protection	NO
P24	Suction pipe low pressure abnormal rise	NO
xP32	No. (x) compressor high DC bus current protection	NO
P55	DC bus ripple over protection	NO
xP56	No. (x) Inverter module DC bus low voltage error	NO
xP57	No. (x) Inverter module DC bus high voltage error	NO
xP58	No. (x) Inverter module DC bus excessively high voltage error	NO
P71	EEPROM error	YES
Pb1	HyperLink overcurrent error	NO
Pd1	Anti-condensation protection	NO
Pd2	Pd1 protection occurs 2 times in 60 minutes	YES
1b01	Electronic expansion valve (EEVA) error	YES
2b01	Electronic expansion valve (EEVB) error	YES
3b01	Electronic expansion valve (EEVC) error	YES
4b01	Electronic expansion valve (EEVD) error	YES
5b01	Electronic expansion valve (EEVE) error	NO
6b01	Electronic expansion valve (EEVQ) error	NO
bA1	HyperLink cannot control indoor unit’s electronic expansion valve	NO

Note: ‘x’ is a placeholder for the fan or compressor address, with 1 representing fan A or compressor A and 2 representing fan B or compressor B.

Table 7.4 Installation and debugging error code

Error code	Error description	Manual restart required
U11	Outdoor unit type setting error	YES
U12	Capacity setting error	YES
U21	The system contains the 1st generation indoor unit or the indoor units address are repeated	YES
U22	Only hydraulic module available for system indoor units	YES
U23	Common indoor unit and constant temperature and humidity modular AHU in the system	YES
U24	Common indoor unit and reheat type fresh air modular AHU in the system	YES
U25	Non-common indoor unit in the system	YES
U26	Indoor unit and outdoor unit mismatch	YES
U31	No test run or unsuccessful test run, please re-enter the test run	YES
U32	Outdoor temperature out of operating range	YES
U33	Indoor temperature out of operating range	YES
U34	Outdoor and indoor temperature out of operating range	YES
U35	Liquid side stop valve is not opened	YES
U37	Gas side stop valve is not opened	YES
U38	No address	YES
U3A	The communication cable is connected incorrectly	YES
U3b	The installation environment is abnormal	YES
U3C	Auto mode error	NO
U41	Common indoor unit exceeds the allowable connection range	YES
U42	Fresh Air Processing indoor unit exceeds the allowable connection range	YES
U43	AHU kit (discharge air temperature control) is out of the allowable connection range	YES
U44	AHU kit (return air temperature control) is out of the allowable connection range	YES
U45	Constant temperature and humidity modular AHU (with outlet air temperature control) combination ratio out of range	YES
U46	Reheat type fresh air modular AHU (with outlet air temperature control) combination ratio out of range	YES
U48	The total capacity of the indoor unit is out of the allowable connection range	YES
U51	Detected more than one outdoor unit in the individual VRF system	YES
U53	Detected different series outdoor units in the same VRF system	YES
U54	Number of SV on heat pump outdoor unit ≥ 1	YES

Table 7.5 Compressor driver error code

Error code	Error description	Manual restart required
xLB7	Other check exceptions	NO
xLBE	High voltage switch operation	NO
xL74	Compressor X V Phase Lower Pipe Open Circuit	NO
xL75	Compressor X W Phase Upper Pipe Open Circuit	NO
xL76	Compressor X W Phase Lower Pipe Open Circuit	NO
xL73	Compressor X V Phase Upper Pipe Open Circuit	NO
xL01	xL1* or xL2* error occurs 3 times in 60 minutes	YES
xL11	Software overcurrent	NO
xL1E	Hardware overcurrent	NO
xL2E	Module overtemperature protection	NO
xL43	The current sampling bias is abnormal	NO
xL45	Motor code mismatch	NO
xL47	Module type mismatch	NO
xL4E	EEPROM error	NO
xL51	Out-of-step error	NO
xL52	Locked-rotor protection	NO
xL5E	Startup failed	NO
xL65	IPM short circuit	NO
xL66	FCT test fault	NO
xL6E	Motor phase loss protection	NO
xL71	Compressor X U Phase Upper Pipe Open Circuit	NO
xL72	Compressor X U Phase Lower Pipe Open Circuit	NO
xL3E	Compressor X Bus Voltage Too Low Fault	NO
xL31	Compressor X Bus Voltage Too High Fault	NO
xL55	Constant Airflow Mode Invalid	NO
xL62	Compressor X Motor Winding Abnormal	NO
L67	Temperature Humidity Sensor Fault	NO
xL68	Compressor X Chip and Program Mismatch	NO

Note: ‘x’ is a placeholder for the compressor address, with 1 representing compressor A and 2 representing compressor B.

Table 7.6 Fan motor error code

Error code	Error description	Manual restart required
xJ01	xJ1* or xJ2* error occurs 10 times in 60 minutes	YES
xJ11	Software overcurrent	NO
xJ1E	Hardware overcurrent	NO
xJ2E	Inverter module high temperature protection	NO
xJ43	The current sampling bias is abnormal	NO
xJ4E	EEPROM error	NO
xJ51	Out-of-step error	NO
xJ52	Locked-rotor protection	NO
xJ5E	Startup failed	NO
xJ6E	Motor phase loss protection	NO
xJ3E	Fan X Bus Voltage Too Low Fault	NO
xJ31	Fan X Bus Voltage Too High Fault	NO
xJ45	Fan X Motor Code Mismatch	NO
xJ47	Fan X Module Type Mismatch	NO
xJ55	Fan X Constant Airflow Invalid	NO
xJ62	Fan X Motor Winding Abnormal	NO
xJ65	Fan X IPM Short Circuit Fault	NO
xJ68	Fan X Chip and Program Mismatch	NO
xJ66	Fan X FCT Sensor Fault	NO
xJ71	Fan X U Phase Upper Tube Open Circuit	NO
xJ76	Fan X W Phase Lower Tube Open Circuit	NO
xJ72	Fan X U Phase Lower Tube Open Circuit	NO
xJ73	Fan X V Phase Upper Tube Open Circuit	NO
xJ75	Fan X W Phase Upper Tube Open Circuit	NO
xJ74	Fan X V Phase Lower Tube Open Circuit	NO

Note: ‘x’ is a placeholder for the fan address, with 1 representing fan A and 2 representing fan B.

Table 7.7 Status code

Status code	Code description	Manual restart required
d0x	Oil return running, x represents oil return operation steps	NO
dfx	Defrost running, x represents defrosting operation steps	NO
d31	Refrigerant judgment: no result	NO
d32	Refrigerant quantity judgment: significantly excessive	NO
d33	Refrigerant quantity judgment: slightly excessive	NO
d34	Refrigerant quantity judgment: normal	NO
d35	Refrigerant quantity judgment: slightly insufficient	NO
d36	Refrigerant quantity judgment: significantly insufficient	NO
d37	Indoor unit connected to system is not common	NO
d38	Too low proportion of running indoor units	NO
d39	Failed to detect refrigerant amount during backup	NO
d41	System exist no power indoor unit, HyperLink is controlling this indoor unit’s valve	NO
d42	Communication error between the outdoor unit and the optional board	NO

7.2 Fault Symptom: Non Air Conditioning Issues

The following fault symptoms are not caused by the air conditioning:

7.2.1 Fault symptom: System cannot run

The air conditioner does not start immediately after pressing the switch button on the controller. If the operating indicator lights up, the system is working normally. To prevent overloading of the compressor motor, restart the air conditioner 12 minutes after the switch button is pressed to prevent it from shutting down immediately after it turns on. The same start-up delay occurs after the mode selector is pressed.

7.2.2 Fault symptom: Fan speed is not consistent with the setting

Even if the fan speed regulation button is pressed, the fan speed does not change. During heating, when the indoor temperature reaches the set temperature, the outdoor unit will shut down, and the indoor unit switches to the quiet fan speed mode. This is to prevent cold air from blowing directly at the room user. The fan speed will not change even when another indoor unit is heating, if the button is pressed.

7.2.3 Fault symptom: Fan direction is not consistent with the settings

The air direction is not consistent with the user interface display. The air direction does not swing. This is because the unit is controlled by the centralized controller.

7.2.4 Fault symptom: A unit is emitting white smoke (indoor unit)

When cooling during high humidity, if the interior pollution of the indoor unit is severe, the indoor temperature distribution will be uneven. The interior of the indoor unit should be cleaned. Ask the agent for detailed information on how to clean the unit. This operation must be carried out by qualified maintenance personnel.

Surface immediately after cooling has stopped and when the indoor humidity is relatively low. This is due to the steam produced by the warm refrigerant gas on its return path to the indoor unit.

7.2.5 Fault symptom: A unit is emitting white smoke (indoor unit, outdoor unit)

After defrosting, switch the system to the heating mode. The moisture produced by the defrosting operation will become steam which is discharged out of the system.

7.2.6 Fault symptom: The air conditioner is producing noise (indoor unit)

A “zeen” sound is heard the moment the system is powered on. This noise is produced by the electronic expansion valves inside the indoor unit as they begin to work. The sound volume will be reduced in about 1 minute.

A soft and continuous “shah” sound can be heard when the system is in cooling mode or has stopped running. This noise can be heard when the drainage pump is running (optional accessory).

A loud creaking “pishi-pishi” sound can be heard once the system stops after it has heated up the room. The expansion and contraction of plastic parts caused by temperature changes will also make this noise.

Once the indoor unit stops, a soft “sah” or “choro-choro” sound can be heard. This noise can be heard when another indoor unit is still running. A small amount of refrigerant flow must be maintained to prevent oil and refrigerant residues in the system.

7.2.7 Fault symptom: Noise from air conditioner (indoor unit, outdoor unit)

A soft, continuous hissing sound can be heard when the system is in cooling or defrosting operation. This is the sound of the refrigerant gas flowing in the indoor and outdoor units.

A hissing sound is heard the moment the system starts or stops operation or after the defrosting operation has been completed. This is the noise produced when the refrigerant flow is stopped or changed.

7.2.8 Fault symptom: Noise from air conditioner (outdoor unit)

When the tone of the operating noise changes. This noise is caused by frequency changes.

7.2.9 Fault symptom: Dust and dirt in the unit

When using the unit for the first time, this is because there is dust inside the unit.

7.2.10 Fault symptom: The unit is emitting a strange odor

This unit will absorb the odors of rooms, furniture, cigarettes and others, and then disperse the odors again.

Sometimes small animals stray into the unit, which can also cause odors.

7.2.11 Fault symptom: outdoor unit fan does not run

In the course of operation. Control the speed of the fan motor to optimize the product operations.

7.2.12 Fault symptom: Hot air is felt when the indoor unit stops

Different types of indoor units are operating in the same system. When another unit is running, part of the refrigerant will still flow through this unit.

8. CHANGING INSTALLATION SITE

Please contact the agent to dismantle and reinstall the units. You need specialized skills and technology to move the units.

9. DISPOSAL

The unit uses hydrogen fluorocarbons. Please contact the agent when you want to dispose the unit. Based on the requirements of the law, the collection, transportation and disposal of refrigerants must be in accordance with the regulations governing the collection and destruction of hydrofluorocarbons.

INSTALLATION MANUAL

1 OVERVIEW

1.1 Notice to Installation Personnel

1.1.1 Overview

If you are uncertain about how to install or run the unit, please contact the agent.

⚠ WARNING

- Make sure the installation, testing and materials used comply with applicable laws.
- Plastic bags should be disposed of properly. Keep away from children. Potential risk: Asphyxia.
- Do not touch the refrigerant piping, water piping or internal parts while the unit is operating or immediately after it has finished operating. The unit could be very hot or cold. Let it return to a normal temperature first. If you need to touch the unit, wear protective gloves.
- Do not touch leaked refrigerant.
- Solenoid valves shall not block in liquid refrigerant unless adequate relief is provided to the refrigerant system low pressure side.
- Piping in refrigerating systems shall be so designed and installed as to minimize the likelihood of hydraulic shock damaging the system.

⚠ CAUTION

- Please wear the appropriate personal protective tools during installation, maintenance or repair of the system (protective gloves, safety glasses, etc.).
- Do not touch the air inlet or aluminum fin of the unit.

NOTICE

- The figure shown in this manual is for reference only and may be slightly different from the actual product.
- The appliance shall be stored so as to prevent mechanical damage from occurring.
- Improper installation or connection of equipment and accessories may cause electrical shock, short circuits, leaks, fires, or other damage to the equipment. Use only accessories, equipment and spare parts made or approved by the manufacturer.
- Take appropriate measures to prevent small animals from entering the unit. Contact between small animals and electrical components may cause the system to malfunction, leading to smoke or fire.
- Do not place any object or equipment on top of the unit.
- Do not sit, climb, or stand on the unit.
- The operation of this equipment in a residential environment could cause radio interference.

1.1.2 Installation site

- Provide sufficient space around the unit for maintenance and air circulation.
- Make sure the installation site can bear the weight and vibrations of the unit.
- Make sure the area is well ventilated.
- Make sure the unit is stable and level.

Do not install the unit in the following locations:

- An environment in which there is a potential risk of explosions.
- Where there is equipment emitting electromagnetic waves. Electromagnetic waves may disrupt the control system, and cause the unit to malfunction.
- Where there are existing fire hazards such as leakage of flammable gases, carbon fibers, and combustible dust (such as diluents or gasoline).
- Where corrosive gases (such as sulfurous gases) are produced. Corrosion of copper pipes or welded parts may lead to refrigerant leakage.

1.1.3 Refrigerant

⚠ WARNING

- During the test, do not exert a force greater than the maximum allowed pressure on the product (as shown on the nameplate).

⚠ CAUTION

- Specialized tools are required for the installation of air conditioner with new refrigerant (R32).
- Electrical components that can arc or spark, which are not considered ignition sources due to compliance with 22.116.1 points b), c), d), or f) shall only be replaced with parts specified by the appliance manufacturer. Replacement with other parts may result in the ignition of refrigerant in the event of a leak.

THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT(R32) WHICH DOES NOT DESTROY THE OZONE LAYER.

The characteristics of R32 refrigerant are: it is a hydrophilic, oxidizing membrane or oil, and its pressure is approx 1.5 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.

To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are different from those for the conventional refrigerant.

This means that exclusive tools are required for the new refrigerant (R32):
For connecting pipes, use new and clean piping designed for R32, and please take care so that water or dust does not enter.
In addition, do not use the existing piping because there are problems with pressure-resistance force and impurities in it.

⚠ WARNING

- Take appropriate precautions to prevent refrigerant leakage. If the refrigerant gas leaks, ventilate the area immediately. Possible risks: An excessively high concen-tration of refrigerant in an enclosed area can lead to anoxia (oxygen deficiency). The refrigerant gas may produce a toxic gas if it comes in contact with fire.
- Refrigerant must be recovered. Do not release it into the environment. Use the vacuum pump to draw the refrigerant out from the unit.

NOTICE

- Make sure the refrigerant piping is installed in accordance with the applicable law.
- Make sure the piping and connections are not placed under pressure.
- After all the piping has been connected, check to make sure there are no gas leaks. Use nitrogen to conduct the leak check for gas.
- Do not charge refrigerant before the wiring layout is completed.
- Only charge the refrigerant after the leak tests and vacuum drying have been completed.
- When charging the system with refrigerant, do not exceed the allowable charge to prevent liquid slugging.
- Sealed electrical components shall not be repaired.
- Solenoid valves shall be correctly positioned in the piping to avoid hydraulic shock.
- The refrigerant charge shall be recovered into the correct recovery cylinders.

- Do not charge more than the specified amount of refrigerant. This is to prevent the compressor from malfunctioning.
- The refrigerant type is clearly marked on the nameplate.
- The unit is charged with refrigerant when it is shipped from the factory. But depending on the piping dimensions and length, the system may require additional refrigerant.
- Only use tools specific to the type of system refrigerant to make sure the system can withstand the pressure, and prevent foreign objects from entering the system.
- Follow the steps below to charge the liquid refrigerant: Open the refrigerating cylinder slowly. Charge the liquid refrigerant. Charging with gas refrigerant may hamper normal operations.

⚠ CAUTION

Once refrigerant charging is completed or suspended, close the refrigerant tank valve immediately. The refrigerant may volatilize if the refrigerant tank valve is not closed in time.

1.1.4 Electricity

⚠ WARNING

- Make sure you switch off the power of the unit before you open the electric control box, and access any circuit wiring or components inside. At the same time, this prevents the unit from being accidentally powered up during installation or maintenance work.
- Once you open the cover of the electric control box, do not let any liquid spill into the box, and do not touch the components in the box with wet hands.
- Cut off the power supply more than 10 minutes prior to access the electrical parts. Measure the voltage of the main circuit capacitor or electrical component terminals to make sure the voltage is less than 36 V before you touch any circuit components. Refer to the connections and wiring on the nameplate for the master circuit terminals and connections.
- The installation must be completed by professionals, and must comply with local laws and regulations.
- Make sure the unit is properly grounded, in compliance with local laws.
- Use only copper core wires for installation.
- Wiring must be carried out in accordance with what is stated on the nameplate.
- The unit does not include a safety switch device. Make sure a safety switch device that can completely disconnect all polarities is included in the installation, and that the safety device can be completely disconnect-ed when there is excessive voltage (such as during a lightning strike).
- Make sure the wiring ends are not subjected to any external force. Do not pull or squeeze the cables and wires. At the same time, make sure the wiring ends are not in contact with the piping or sharp edges of the sheet metal.
- Do not connect the grounding wire to public pipes, telephone earth wires, surge absorbers and other places that are not designed for grounding. Improper grounding could lead to electrical shock.
- Use a dedicated power supply cord for the unit. Do not share the same power source with other equipment.
- A fuse or circuit breaker must be installed, and these must conform to local laws.
- Make sure an electric leakage protection device is installed to prevent electrical shock or fire. The model specifications and characteristics (anti high-frequency noise characteristics) of the electric leakage protection device are compatible with the unit to prevent frequent tripping.
- Make sure a lightning rod is installed if the unit is placed on the roof or other places that can be easily struck by lightning.

⚠ WARNING

- Make sure all terminals of the components are firmly connected before you close the cover of the electric control box. Before you power on and start the unit, check that the cover of the electric control box is tight and secured properly with screws. Do not let any liquid spill into the electric control box, and do not touch the components in the box with wet hands.
- The appliance shall be installed in accordance with national wiring regulations.
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid hazards.
- An all-pole disconnection switch with a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- The dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures.
- The temperature of the refrigerant circuit will be high. Please keep the interconnection cable away from the copper tube.

NOTICE

- Do not install the power cord near equipment that is susceptible to electromagnetic interference, such as TV, and radios to prevent interference.
- Use a dedicated power supply cord for the unit. Do not share the same power source with other equipment. A fuse or circuit breaker must be installed, and these must conform to local laws.

ⓘ INFORMATION

The installation manual is only a general guide on the wiring and connections, and is not specifically designed to contain all information regarding this unit.

1.2 Installation space requirements

⚠ WARNING

If the appliance contains R32 refrigerant, the floor area of the room in which the appliance is stored should comply with the applicable legisla-tion.

1.3 System layout requirements

The system uses R32 refrigerant which is rated as A2L and is mildly flammable.

To comply with the requirements of enhanced tightness refrigerating systems of the EN/IEC 60335-2-40, this system is equipped with shut-off valves in the SV box and an alarm in the remote controller. The SV box designed a mechanical ventilation scheme as a safety measure. In case the requirements of this manual are followed, no additional safety measures are needed.

A big range of charge and room area combinations is allowed thanks to the countermeasures that are implemented in the system by default.

Follow the installation requirements below to ensure that the complete system is compliant to legislation.

1.3.1 Outdoor unit installation

The outdoor unit has to be installed outside or machinery room.

A terminal for external output is available in the outdoor unit. This SV output can be activated and used when additional countermeasures are needed. The SV output is a contact on mainboard that closes in case a refrigerant leak is detected, failure or disconnection of an R32 sensor.

1.3.2 Indoor unit installation

For installation of the indoor unit, refer to the installa-tion and operation manual delivered with the indoor unit. For compatibility of indoor units refer to the latest version of the technical data book of this unit.

The total amount of refrigerant in the system shall be less than or equal to the maximum allowed total refrigerant amount. The maximum allowed total refrigerant amount depends on the area of the rooms being served by the system and the rooms in the lowest underground floor. For more information, see Chapter 5.9.

The openings supplying makeup air to the room shall be located such that the supplied makeup air mixes with the leaked refrigerant.

1.3.3 SV box installation

Depending on the total amount of refrigerant in the system, different safety measures can be applied: mechanical ventilation within the appliance enclosure or installation in a machinery room.

For more information refer to the installation manual delivered with the SV box.

1.3.4 Piping installation

Piping must be installed according to chapter 5.4. Only mechanical joints (e.g. braze + flare connections) that are compliant with the latest version of ISO14903 can be used.

For piping installed in the occupied space, please make sure that the piping is protected against acciden-tal damage.

⚠ WARNING

Pipework shall be protected from physical damage.

NOTICE

Installation of pipework shall be kept to a minimum.

1.4 Notice to Users

- If you are unsure how to run the unit, please contact the installation personnel.
- This unit should not be operated by people who lack sufficient physical strength, cognitive sense or mental ability, or who lack experience and knowledge (including children). For their own safety, they should not use this unit unless they are supervised or guided by someone who is in charge of their safety. Children must be monitored to ensure that they do not play with this product.

⚠ WARNING

To prevent electrical shock or fire:

- Do not wash the electric box of the unit.
- Do not operate the unit with wet hands.
- Do not place any items that contain water on the unit.

NOTICE

- Do not place any object or equipment on top of the unit.
- Do not sit, climb, or stand on the unit.

2. PACKING BOX

2.1 Overview

This chapter mainly introduces the subsequent operations after the outdoor unit has been delivered to the installation site and unpacked.
This specifically includes the following information:

- Unboxing and handling the outdoor unit.
- Taking out the accessories of the outdoor unit.
- Dismantling the transport rack.

Remember the following:

- At the time of delivery, check the unit for any damage. Report any damage immediately to the carrier's claim agent.
- Transport the packaged unit as close as possible to its final installation site to prevent damage during the handling process.
- Take note of the following items when transporting the unit:

  Fragile. Handle with care.

  Keep the unit with its front facing upwards so as not to damage the compressor.
- Select the unit transportation path in advance.
- As shown in the following figure, it is better to use a crane and two long belts to lift the unit. Handle the unit carefully to protect it, and note the position of the center of gravity of the unit.

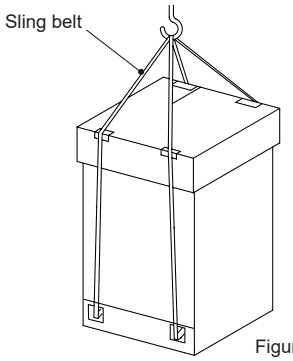


Figure 2.1

Center of gravity position is shown in Figure 2.2:

Table 2.1 Unit: mm

Size	A	B	C	D
252T-450T	960	840	485	378

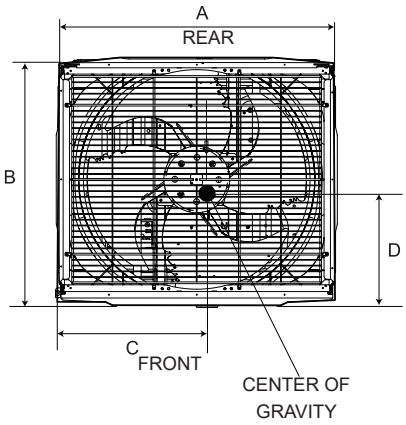


Figure 2.2

NOTICE

- Use a leather belt that can adequately support the weight of the unit, and has a width ≤ 20 mm.
- Images are for reference only. Please refer to the actual product.
- Do not remove any packaging while hoisting the unit. Where the unit is not packed or the package is damaged, use a gasket or package to protect the unit.
- The belt must have enough strength to bear the weight of the unit; keep the machine balanced and ensure the unit is lifted safely and stably.

Forklift method

- To move the unit with a forklift, insert the forks into the opening at the bottom of the unit, as shown in Figure 2.3
- For anti-corrosion models, put a pad on the forks to prevent damage to the bottom frame paint of the unit.

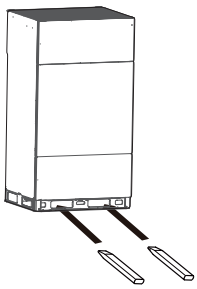


Figure 2.3

2.2 Unboxing the Outdoor Unit

Take the unit out of the packing materials:

- Be careful not to damage the unit when you use a cutting tool to remove the wrapping film.
- Remove the four nuts on the wooden back stand.

⚠ WARNING

Plastic film should be disposed of properly. Keep away from children. Potential risk: Asphyxia.

2.3 Taking Out Accessories of the Outdoor Unit

- The accessories for the unit are stored in two parts. Documents like the manual are located at the top of the unit. Accessories like the pipes are located inside the unit. The unit contains the following accessories:

Table 2.2 Accessories

Name	Qty.	Appearance	Function
Installation and operation manual	2		——
L-shaped pipe connection	2		To connect gas and liquid pipes
Magnetic ring	2		Improve the EMI effect of communication

L-shaped pipe size

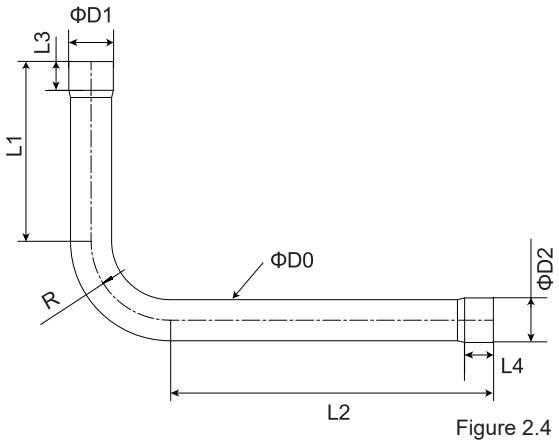


Figure 2.4

Table 2.3 Unit: mm

Size	PIPE	ΦD0(OD)	L1	L2	L3	L4	ΦD1(ID)	ΦD2(ID)	R
252T-335T	Gas pipe	25.4	130	230	20	20	25.4	25.4	50
	Liquid pipe	12.7	160	265	15	15	12.7	12.7	25
400T-450T	Gas pipe	28.6	125	225	20	20	28.6	28.6	55
	Liquid pipe	15.9	155	255	15	15	15.9	15.9	30

2.4 Pipe Fittings

- The schematic after the L-shaped pipe (from accessories) is properly connected to the unit is shown below:

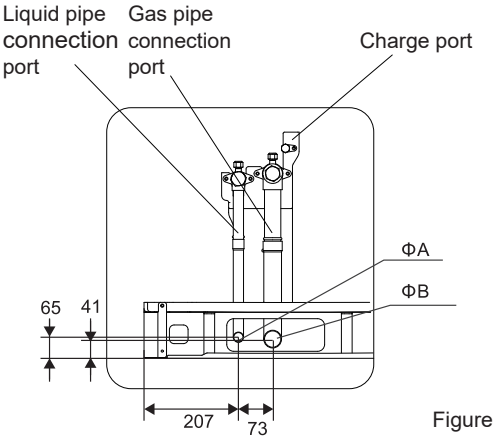


Figure 2.5

Table 2.4 Unit: mm

SIZE	252T-335T	400T-450T
ΦA(ID)	Φ12.7	Φ15.9
ΦB(ID)	Φ25.4	Φ28.6

⚠ CAUTION

- Charge valve can only be used for charging refrigerants and for removing refrigerant oil with impurities in the system.
- Charge valve is prohibited for vacuum extraction

3. OUTDOOR UNIT COMBINATION

3.1 Overview

This chapter contains the following information:

- List of branch joint fittings.
- Recommended combination for outdoor units.

3.2 Branch Joints

Table 3.1 For combinable series

Description	Model
Outdoor Unit Branch Joint Assembly	FQZHW-02N1E
	FQZHW-02N1G
	FQZHW-03N1E
	FQZHW-03N1G
Indoor Unit Branch Joint Assembly	FQZHN-01D
	FQZHN-02D
	FQZHN-03D
	FQZHN-04D
	FQZHN-05D
	FQZHN-06D
	FQZHN-07D

On the choice of branch joints, refer to section “4.3.3 Selecting piping diameters”.

3.3 Recommended Outdoor Unit Combination

⚠ CAUTION

- The total capacity of the indoor unit shall be between 50%–130% of the combined capacity of the outdoor unit.
- In the system where all indoor units are running at the same time, the total capacity of the indoor units should be less than or equal to the combined capacity of the outdoor unit to prevent overloading in poor operating conditions or narrow operating space.
- The total capacity of the indoor units can be up to a maximum of 130% of the combined capacity of the outdoor unit for a system where not all the indoor units are operating at the same time.
- If the system is being used in a cold region (ambient temperature is -10°C or below) or a very hot, heavy-load environment, the total capacity of the indoor units should be less than the combined capacity of the outdoor unit.
- The heating capacity of the heat pump will reduce when the outdoor ambient temperature is lowered. Therefore, when installing a heat pump in an area with low temperatures, it is recommended to use the indoor unit with an auxiliary heater.

Table 3.2 Recommended outdoor unit combination

Size	280T	252T	335T	400T	450T	Max Qty of indoor units
280T	●					13
252T		●				16
335T			●			20
400T				●		23
450T					●	26

4. PREPARATIONS BEFORE INSTALLATION

4.1 Overview

This chapter mainly describes the precautions and things to note before the unit is installed at the site.

This mainly includes the following information:

- Choosing and Preparing the Installation Site.
- Selecting and Preparing the Refrigerant Piping.
- Selecting and Preparing the Electrical Wiring.

4.2 Choosing and Preparing the Installation Site

4.2.1 Site requirements for installation of the outdoor unit

- Provide sufficient space around the unit for maintenance and air circulation.
- Make sure the installation site can bear the weight and vibrations of the unit.
- Make sure the area is well ventilated.
- Make sure the unit is stable and level.
- Choose a place where the rain can be avoided as much as possible.
- The unit should be installed in a location where the noise generated by the unit will not create an inconvenience to people.
- Choose a site that will comply with the applicable laws.

Do not install the unit in the following locations:

- An environment where there is a potential risk of explosions.
- Where there is equipment emitting electromagnetic waves. Electromagnetic waves may disrupt the control system, and cause the unit to malfunction.
- Where there are existing fire hazards like leakage of flammable gases, carbon fibers, and combustible dust (such as diluents or gasoline).
- Where corrosive gases (such as sulphurous gases) are produced. Corrosion of copper pipes or welded parts may lead to refrigerant leakage.
- Where mineral oil mist, spray, or steam may exist in the atmosphere. Plastic parts may age, fall off or cause water leakage.
- Where there is a high salt content in the air such as places near the sea.

⚠ CAUTION

- Electric appliances that should not be used by the general public must be installed in a safe location to prevent others from getting close to these electric appliances.
- Both indoor and outdoor units are suitable for the installation of commercial and light industrial environment.
- An excessively high concentration of refrigerant in an enclosed area can lead to anoxia (oxygen deficiency).

NOTICE

- This is a class A product. This product may cause radio interference in the home environment. The user may need to take the necessary measures if such a situation does arise.
- The unit described in this manual may cause electronic noise generated by radio frequency energy. The unit conforms to the design specifications and provides reasonable protection to prevent such interference. However, there is no guarantee that there will be no interference during a specific installation process.
- Therefore, it is suggested that you install the units and wires at an appropriate distance from devices like sound equipment and personal computers.

- Do take into considerations adverse environmental conditions such as strong winds, typhoons or earthquakes as improper installation may cause the unit to overturn.
- Take precautions to make sure water will not damage the installation space and environment in the event of a water leakage.
- If the unit is installed in a small room, refer to section 4.2.3 “Safety measures to prevent refrigerant leak” to make sure the refrigerant concentration does not exceed the permissible safety limit when there is a refrigerant leak.
- Make sure the air inlet of the unit is not facing the predominant wind direction. Incoming wind will disrupt the operations of the unit. If necessary, use a deflector as an air baffle.
- Add water discharge piping on the base so that the condensed water will not damage the unit, and prevent the pooling of water when work is in progress.

4.2.2 Site requirements for installation of outdoor unit in cold regions

NOTICE

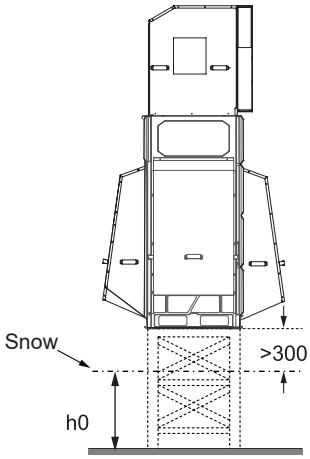
- Snow protection equipment must be installed in areas with snowfall. Refer to the following figure, (malfunctions are more common when there are insufficient snow protection facilities). In order to protect the unit from accumulated snow, increase the height of the rack, and install a snow shield at the air inlets and outlets.
- Do not obstruct the air flow of the unit when you install the snow shield.

* The snow shield is an optional accessory, which customers may purchase at their discretion.

Make note of the following when installing the unit in areas affected by cold weather or snow:

- Avoid directly exposing the air outlet or air inlet to the wind.
- The local maximum snowfall should be taken into consideration when deciding the foundation height of outdoor unit.
- The foundation or base height of the outdoor unit is required to be the expected maximum snowfall thickness h0 + 300mm, preventing the snow from contacting the bottom of the unit.

Unit: mm



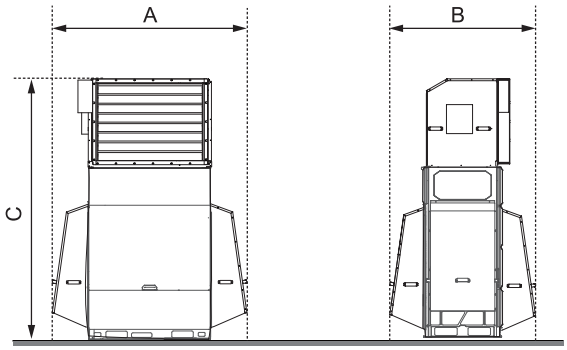


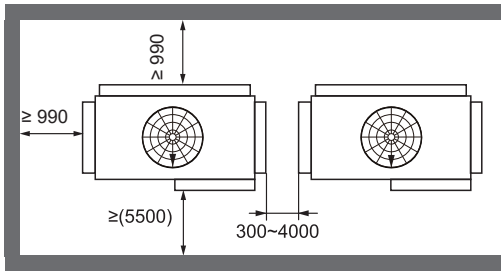
Figure 4.1

Table 4.1

Unit: mm

Size	A	B	C
252T-450T	1690	1200	2685

- When a snow shield needs to be installed, to ensure smooth air intake and supply of the outdoor unit, conduct site planning and construction as follows:
- Installation of outdoor units in a row (unit: mm)



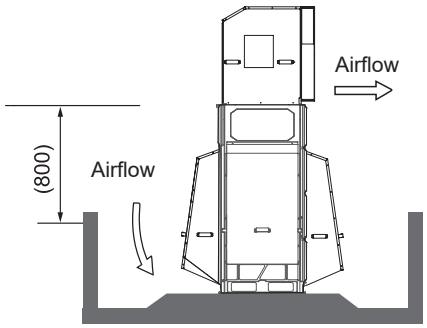
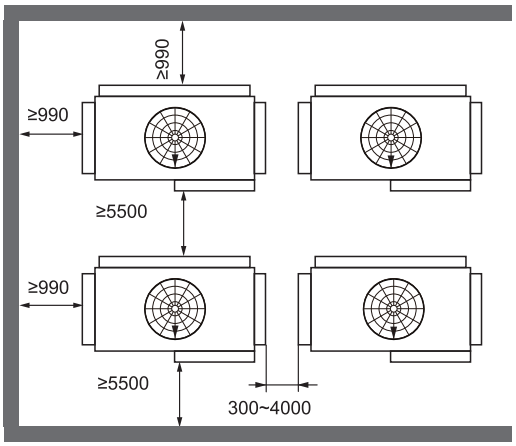


Figure 4.2

- Installation of outdoor units in two rows (unit: mm)



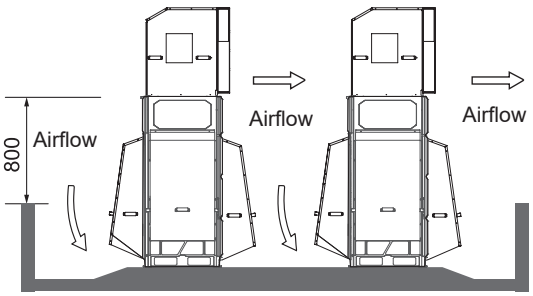
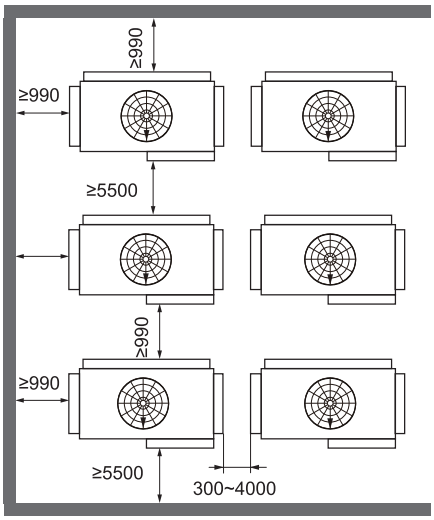


Figure 4.3

- Installation of outdoor units in three rows (unit: mm)



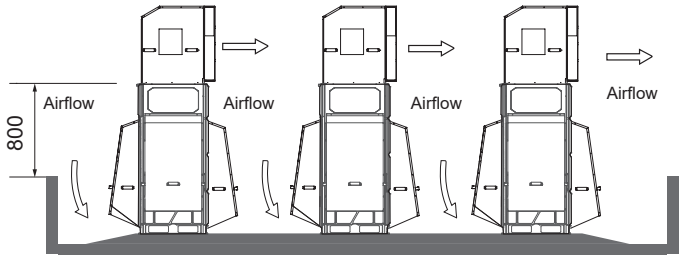


Figure 4.4

4.2.3 Safety measures to prevent refrigerant leaks

Safety measures to prevent refrigerant leak
The installation personnel must make sure the safety measures to prevent leaks comply with local regula-tions or standards. If the local regulations do not apply, the following criteria can be applied.
The system uses R32 as the refrigerant. R32 itself is a completely non-toxic, and non-combustible refrigerant. However, do ensure that the air conditioning unit is installed in a room with sufficient space. This is so that when there is a serious leak in the system, the maximum concentration of the refrigerant gas in the room will not exceed the stipulated concentration, and is consistent with the relevant local regulations and standards.

About the maximum concentration level
The calculation for the maximum concentration of the refrigerant is directly related to the occupied space that the refrigerant may leak to and the refrigerant's level of charge.
The measurement unit for concentration is kg/m3 (weight of gaseous refrigerant that has a volume of 1 m3 in the occupied space).
The highest permissible concentration must comply with the relevant local regulations and standards. Based on the applicable European standards, the maximum permissible concentration level of R32 in the space occupied by humans is limited to 0.44 kg/m3. If this limit is exceeded, necessary measures shall be taken. Please confirm as follows:

a. Calculate the total refrigerant charging amount. Total refrigerant charging amount = refrigerant charging amount of the unit itself + charging amount calculated according to the pipe length.
b. Calculate the indoor volume (based on the minimum volume).
c. Calculated refrigerant concentration = (total charging amount/indoor volume).

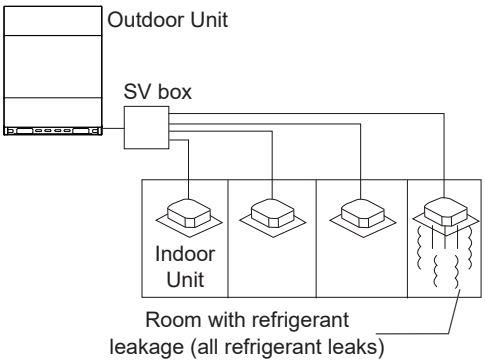


Figure 4.5

Countermeasures when exceeding the max concentration

a. Please install a mechanical ventilation device.
b. If it is impossible to change air frequently, please install a leak detection alarm device connected with the mechanical ventilation device.

4.3 Selecting and Preparing the Refrigerant Piping

4.3.1 Refrigerant piping requirements

NOTICE

- Seal: R32 does not contain fluorine, does not destroy the ozone layer, and does not deplete the ozone layer that protects the earth from harmful ultraviolet radiation. However, if it is released, R32 can also cause a slight greenhouse effect. Therefore, you must pay special attention when you check the quality of the installation seal.
- Since refrigerant piping consists of pressure piping, it falls under the PED Directive (2014/68/EU).
- Refer to sections 4.3.4 and 5.4.7 for further clarification on the requirements of the applied regulations..
- Foreign objects in the pipes (including lubricant used during pipe bending) must be ≤ 30 mg/10 m.
- Calculate all piping lengths and distances.

NOTICE

The R32 refrigerant pipeline system must be kept strictly clean, dry and sealed.

- Cleaning and drying: prevent foreign objects (including mineral oil or water) from mixing into the system.

⚠ WARNING

The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code. Inspection prior to being covered or enclosed,or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

4.3.2 Allowable length and height difference for refrigerant piping

Refer to the following table and figure (for reference only) to determine the appropriate size.

NOTICE

- The equivalent length of each elbow and U-shape branch joint is 0.5 m, and the equivalent length of each branch header is 1 m.
- Install the indoor units such that they are as equidistant as possible on both sides of the U-shape branch joint.
- When the outdoor unit is above the indoor unit, and the level difference exceeds 20 m, it is recommended that an oil return bend be set up at every 10 m interval on the gas pipe of the main piping. The recommended specifications of the oil return bend are shown in Figure 4.7.
- The allowable length of the farthest indoor unit to the first branch joint in the system should be equal to or less than 40 m unless specified conditions are met, in which case the permitted length is up to 120 m. Please refer to requirement 2.
- For all branch joints, it is necessary to use special fittings and adapters supplied as accessories by Clivet. In the event of purchasing branch joints not manufactured by Clivet, only molded / hydroformed fittings must be used—or in any case, fittings obtained through manufacturing processes other than the bending of straight tubes—for which the supplier provides a Declaration of Conformity containing the minimum data required for the PED characterization of the component itself (at a minimum: PS, TSmin, TSmax, PED Group of permitted fluids, compliance with Directive 2014/68/EU and, if applicable, with Standards EN 378-2:2016 and EN 14276-2:2020, and installation instructions).
- Do not install any taps / shut-off valves / check valves that are not explicitly indicated in the refrigeration diagram, Figure 4.6.

Piping diagram

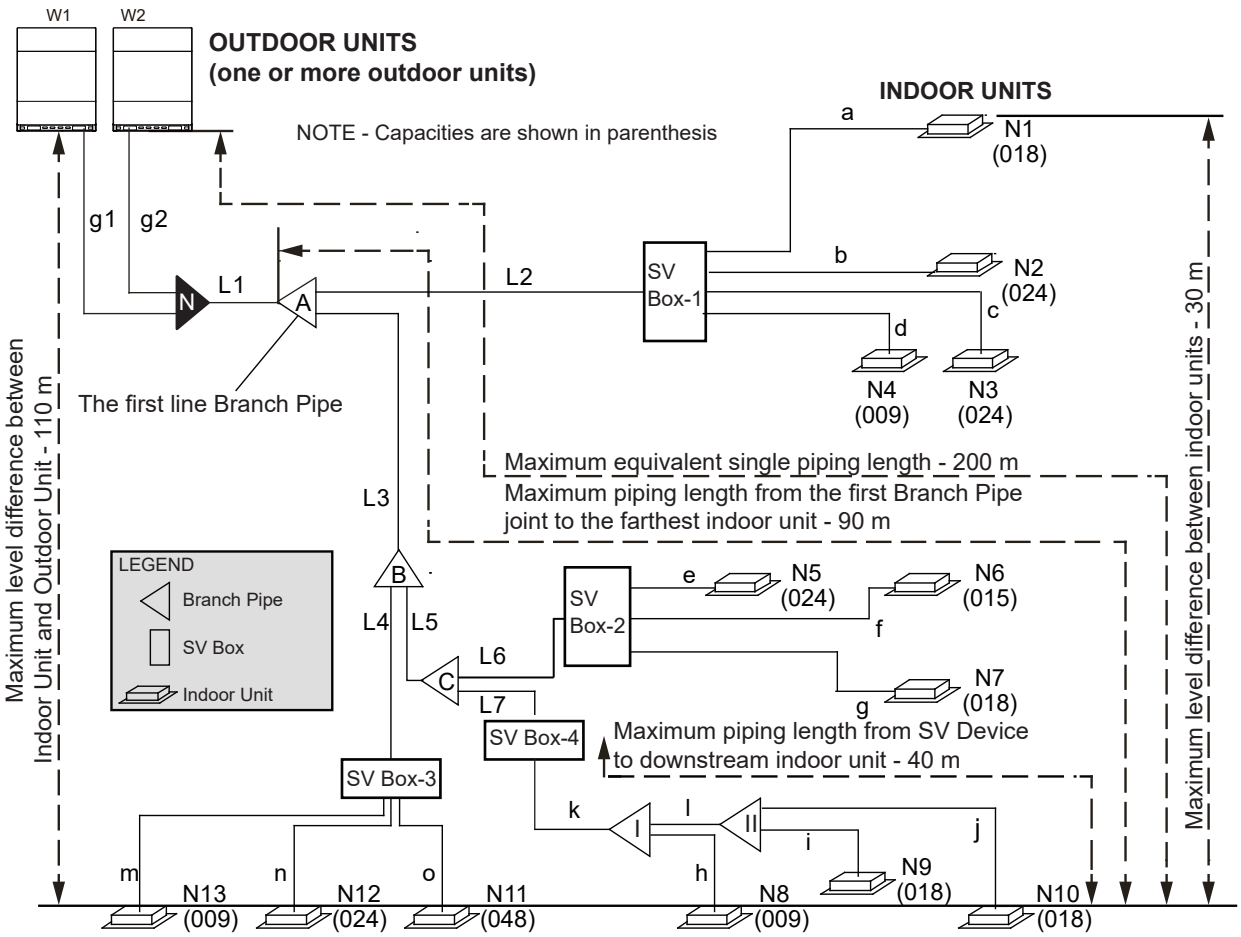


Figure 4.6

Table 4.2 Summary of permitted refrigerant piping lengths and level differences

Pipe and component Names	Designation
Outdoor Unit Connection Pipe	g1, g2
Outdoor Unit Branch Pipe Assembly	L, M
Main Pipe	[1]L1
Indoor Unit Main Pipe	L2, L3, L4, L5, L6, L7
Branch Pipe Assembly between Main Pipe and SV Box	A, B, C
Mode Selection SV Box	Box-1,Box-2,Box-3,Box-4
Branch Pipe Assembly between SV Box and Indoor Unit	I, II
Indoor Unit auxiliary pipe between SV Box and downstream Branch Pipe joint	j
Indoor Unit auxiliary pipe from Indoor Unit to the nearest Branch Pipe joint or direct connected SV Box	a,b, c, d, e, f, h, i, l, m, n
Indoor Unit	N1, N2, N3, etc.

Table.4.3

Piping Length			Permitted value	Piping
Piping Length	Total piping length		[1] 1200 m	L1+(L2+L3+L4+L5+L6+L7)×2+a+b+c+d+e+f+g+h+i+j+k+l+m+n+o
	Single piping length	Actual length	220 m	L1+L3+L5+L7+k+l+j
		Equivalent length	[2]260 m	
	Piping length from the first branch joint to the farthest indoor unit		[3] 40(120) m	L3+L5+L7+k+l+j
	Piping length from SV Box to the downstream indoor unit of itself		40 m	k+l+j
Level Difference	Level difference between indoor unit and outdoor unit	Outdoor unit up	[4] 110 m	- - -
		Outdoor unit down	[5] 110 m	- - -
	Level difference between indoor units		40 m	- - -

Requirement:

The first branch in all systems must be centrally located between all SV Boxes.

[1] When counting the total piping length, double the actual length of the distribution pipes betweenfirst Branch Pipe joint and SV Box : Installation. Total piping length = L1+(L2+L3+L4+L5+L6+L7)×2+a+b+c+d+e+f+g+h+i+j+k+l+m+o ≤ 1200 m.

[2] Each Branch Pipe is equivalent to 508 mm.

[3] The maximum allowable piping length from the first Branch Pipe joint to the farthest indoor unit must be ≤ 40 m, but if the following conditions are met, the maximum allowable length can be extended to 120m.

- The piping length from each indoor unit to the nearest Branch Pipe joint or direct connected SV Box must be less than 40 m(b to r).
- The difference in length between the outdoor unit to the farthest indoor unit, and the outdoor unit to the nearest indoor unit is ≤ 40 m. Example: The farthest indoor unit is N10, The nearest indoor unit is N11 (L1+L3+L5+L7+k+l+j) minus (L1+L3+L4+o) ≤ 40 m.
- Increase the distribution pipe diameter between the first Branch Pipe and SV Box L2-L7. If the pipe diameter is the same as the main outdoor pipe, pipe, it does not need to be increased.

Pipe Size Allowable Increase Diameters (Unit:mm):

9.52 to 12.7	12.7 to 15.9	15.9 to 19.1	19.1 to 22.2	22.2 to 25.4	25.4 to 28.6	28.6 to 31.8	31.8 to 38.1

[4] The largest level difference between indoor unit and outdoor unit should not exceed 110m (if the outdoor unit is above) or 110m (if the outdoor unit is below). Additionally: (i) If the outdoor unit is above and the level difference is greater than 20m, it is recommended that an oil return bend with dimensions as specified in Figure 4.7 be set every 10m in the gas pipe of the main pipe.

[5] When the outdoor unit is lower than indoor units and the level difference is more than 40 m, the main liquid pipe pipe need to increase by one size.

WARNING! Tube expansions not explicitly specified in this manual are not permitted.

Table 4.4 Unit: mm

D	Φ19.1	Φ22.2	Φ25.4	Φ28.6	Φ31.8	Φ38.1	Φ41.3	Φ44.5	Φ50.8	Φ54.0	Φ63.5
R	≥31		≥45		≥60		≥80		≥90		
H	≥300						≥500				

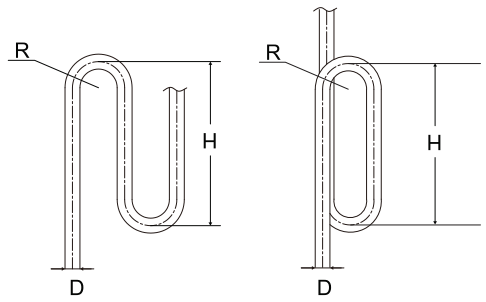


Figure 4.7

4.3.3 Piping diameter

1) Select the diameter of the main piping

- The main pipe (L1) and first indoor branch joint (A) should be sized according to Table 4.4 and Table 4.5.

Table 4.5

Size	Equivalent length of all liquid piping < 90 m		
	Gas side (mm)	Liquid side (mm)	The first indoor branch joint
252T	Φ19.1	Φ9.52	FQZHN-01D
	Φ22.2	Φ9.52	FQZHN-02D
335T-400T	Φ25.4	Φ12.7	FQZHN-02D
450T	Φ28.6	Φ12.7	FQZHN-03D

Table 4.6

Size	Equivalent length of all liquid piping ≥ 90 m		
	Gas side (mm)	Liquid side (mm)	The first indoor branch joint
252T	Φ22.2	Φ12.7	FQZHN-02D
280T	Φ25.4	Φ12.7	FQZHN-02D
335T-400T	Φ28.6	Φ15.9	FQZHN-03D
450T	Φ31.8	Φ15.9	FQZHN-03D

2) Select the branch joint diameters for the indoor unit

Based on the total capacity of the indoor unit, select the branch joint for the indoor unit from the following table.

Table 4.7

Total capacity of indoor units A (×100W)	Gas side (mm)	Liquid side (mm)	Branch joint
A<168	Φ15.9	Φ9.52	FQZHN-01D
168≤A<224	Φ19.1	Φ9.52	FQZHN-01D
224≤A<330	Φ22.2	Φ9.52	FQZHN-02D
330≤A<470	Φ28.6	Φ12.7	FQZHN-03D
470≤A<710	Φ28.6	Φ15.9	FQZHN-03D
710≤A<1040	Φ31.8	Φ19.1	FQZHN-03D
1040≤A<1540	Φ38.1	Φ19.1	FQZHN-04D
1540≤A<1900	Φ41.3	Φ19.1	FQZHN-05D
1900≤A<2350	Φ44.5	Φ22.2	FQZHN-05D
2350≤A<2500	Φ50.8	Φ22.2	FQZHN-06D
2500≤A<3024	Φ50.8	Φ25.4	FQZHN-06D
3024≤A	Φ54.0	Φ28.6	FQZHN-07D

If the size of the branch joint pipe selected according to the above table is larger than that of the main pipe according to Table 4.4 or Table 4.5, the size of the branch joint pipe should be reduced to make it the same as the main pipe.

The pipe thickness of the refrigerant piping shall comply with the applicable legislation. The minimal pipe thickness for R32 piping must be in accordance with the table below, PED Directive 2014/68/EU.

Table 4.8

Piping outer diameter (mm)	Thickness greater than or equal to (mm)	Category EN 14276-2
Φ6.35	0.80	Cat X
Φ9.52	0.80	
Φ12.7	1.00	
Φ15.9	1.00	
Φ19.1	1.00	
Φ22.2	1.00	Cat Y
Φ28.6	1.00	
Φ34.9	1.25	
Φ41.3	1.50	

Material: Only seamless phosphorus-deoxidized copper
The choice of piping material and the management of system documentation must strictly follow the guidelines prescribed by the PED Directive (2014/68/EU), which vary according to the PED category under which the

selected piping enters, as shown in Table 4.8.

Piping with a thickness greater than or equal to those listed in Table 4.8 may be used.

The design pressure of the R32 refrigerant is 4.2 MPa (42 bar).

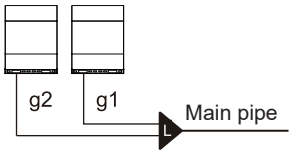
If the required pipe size is not available, you can use other diameters by considering the following factors:

- If the standard size is not available in local market, a pipe that is one size larger should be used.
- In some circumstances, the pipe size needs to be one size larger than the standard size; this is the “Size up Size” (for example: when the equivalent length of all the liquid piping is larger than 90 m, the pipe size needs to be one size up; when the piping length from the farthest indoor unit to the first indoor unit is more than 40 m, the indoor main pipe size needs to be one size up to allow a piping length of up to 120 m. If the “Size up Size” is not available in the local market, the standard size pipe must be used.
- Pipe sizes bigger than the corresponding “Size up Size” cannot be used under any circumstances.
- Calculation for the additional refrigerant must be adjusted according to section 5.9 on the determination of the additional refrigerant volume.

3) Select the branch joint diameters for the outdoor unit

Select the branch joint of the outdoor unit from the table below.

Table 4.9 For combinable series

Outdoor unit Qty.	Illustration
2 units	

NOTICE

For systems with multiple units, the branch joints of the outdoor unit are sold separately.

Table 4.10 For combinable series

Outdoor unit Qty.	Total parallel capacity of outdoor units	Outdoor connection pipes diameter	Branch joint kit
2 units	90kW (450T +450T)	252T-335T 400T-450T	L: FQZHW-02N1E

4) Indoor unit auxiliary connection pipe

Table 4.11

Indoor unit capacity A (×100W)	Gas side (mm)	Liquid side (mm)
A≤56	Φ12.7	Φ6.35
56<A≤160	Φ15.9	Φ9.52
160<A≤224	Φ19.1	Φ9.52
224<A≤280	Φ22.2	Φ12.7
280<A≤400	Φ25.4	Φ12.7
400<A≤560	Φ28.6	Φ15.9

⚠ CAUTION

- If the indoor unit capacity exceeds the range in the table above, select the pipe diameter according to the manual of the indoor unit.
- The size of the indoor branch pipe shall not be larger than that of the main pipe. If the size of the main pipe selected according to the above table is larger than that of the main pipe, the size of the branch pipe shall be reduced to make it the same as that of the main pipe.

5) An example of refrigerant piping selection

The example below illustrates the piping selection procedure for a system consisting of two outdoor units (450T+450T) and 11 indoor units. The system’s equivalent length of all liquid pipes is less than 90 m; the piping between the farthest indoor unit and the first indoor branch joint is less than 40 m in length, and each indoor auxiliary pipe (from each indoor unit to its nearest branch joint) is less than 10 m in length.

- For combinable series

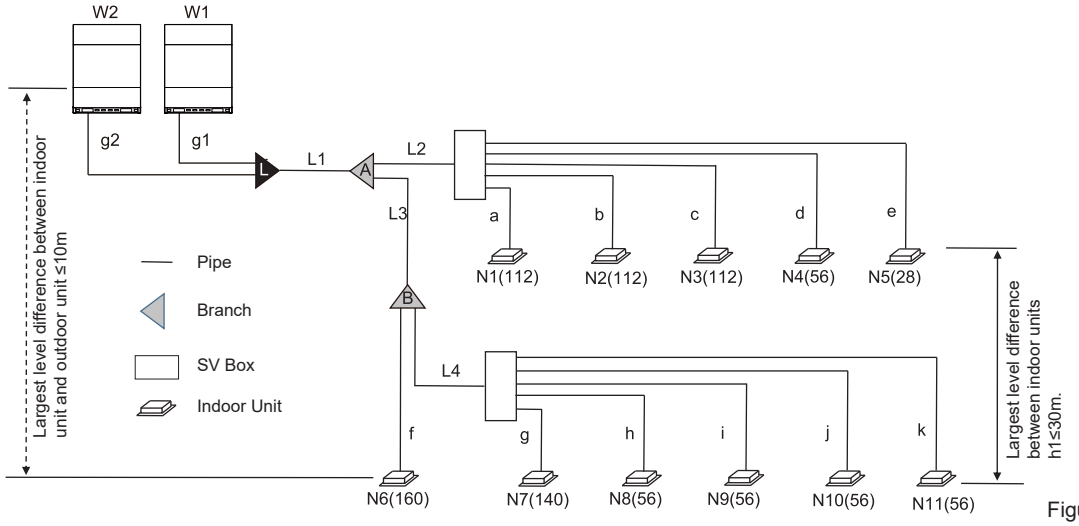


Figure 4.8

- **Select indoor main pipes and indoor branch B**

  The indoor units (N6 to N11) downstream of indoor branch B have atotal capacity of 16+14+5.6+5.6+5.6+5.6=52.4kW. Indoor main pipe L3 is Φ28.6/Φ15.9. Indoor branch joint B is FQ ZHN-03D.

  The indoor units (N1 to N5) downstream of indoor branch have total capacity of 11.2+11.2+11.2 +5.6+5.6+2.8=42kW. Indoor main pipe L2 is Φ28.6/ Φ15.9.

- **Select the indoor auxiliary connection pipe a to k**

  The capacity of indoor units N1/N2/N3/N6 and N7 is above 56kW but less than 16kW, so the indoor auxiliary connection pipe a/b/c/f and g is Φ15.9/Φ 9.52.

  The capacity of indoor units N4/N5/N8/N9/N10 and N11 is less than 5.6kW, so the indoor auxiliary connection pipe d/e/h/i/j and k is Φ12.7/Φ6.35.

- **Select main pipe (L1) and first indoor branch A**

  The indoor units (N1 to N11) downstream of indoor branch joint A have a total capacity of 42+52.4 =94.4kW. The system's equivalent length of all liquid pipes is less than 90m. The total capacity of the outdoor units is 16 + 16= 32HP. Main pipe L1 is Φ 31.8/Φ19.1. First Indoor branch A is FQ ZHN-03D.

- **Select outdoor connection pipes (g1 and g2) and outdoor branch (L)**

  There are two outdoor units in the system. The master unit is 16HP, the slave unit is 16HP.Outdoor connection pipes g1 and g2 is Φ28.6/Φ12.7, Outdoor branch L is FQ ZHN-03D.

- For individual series

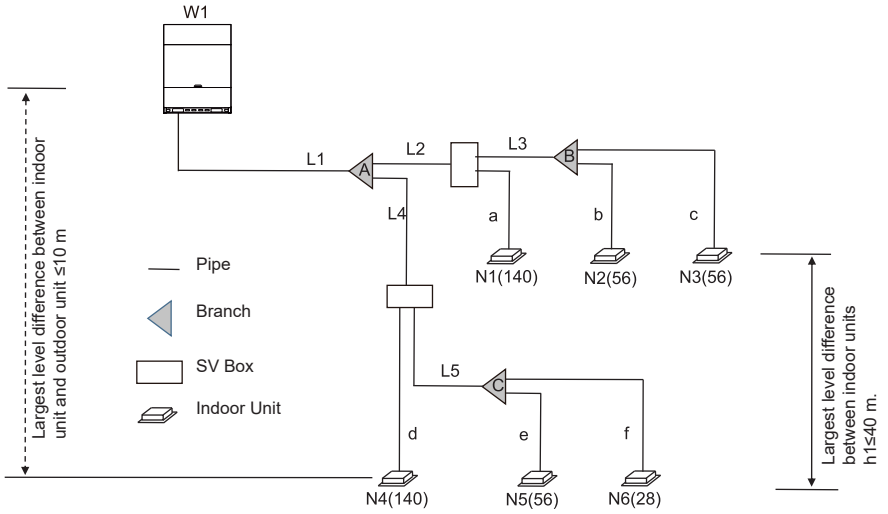


Figure 4.9

Select indoor main pipes and indoor branch B to C

- The indoor units (N2 and N3) downstream of indoor branch B have a total capacity of 5.6+5.6=11.2kW. Indoormain pipe L3 is Φ15.9 / Φ9.52. Indoor branch joint B is FQZHN-01D.
- The indoor units (N1 to N3) downstream of indoor have a total capacity of 14+5.6+5.6=25.2kW. Indoor main pipe L2 is Φ22.2 / Φ9.52.
- The indoor units (N5 to N6) downstream of indoor branch C have a total capacity of 5.6+2.8=8.4kW. Indoor main pipe L5 is Φ15.9 / Φ9.52. Indoor branch joint C is FQZHN-01D.
- The indoor units (N4 to N6) downstream of indoor have a total capacity of 14+5.6+2.8=22.4kW. Indoor main pipe L4 is Φ22.2/Φ9.52.

Select the indoor auxiliary connection pipe a to f

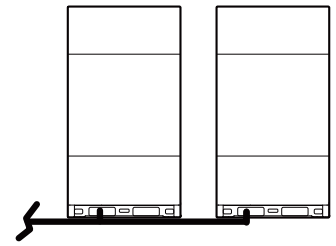
- The capacity of indoor units N1 and N4 is above 56 kW but less than 16kW, so the indoor auxiliary connection pipe (a/d) is Φ15.9/Φ9.52.
- The capacity of indoor units N2/ N3/N5 and N6 is less than or equal to 5.6kW, so the indoor auxiliary connection pipe b/c/e/and f is Φ12.7/Φ6.35.

Select main pipe (L1) and first indoor branch A

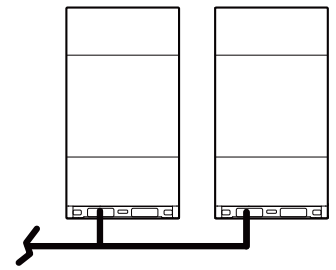
- The system's equivalent length of all liquid pipes is less than 90 m, and the total capacity of the outdoor units is 16HP. Main pipe L1 is Φ28.6/Φ12.7, first Indoor branch A is FQZHN-03D

4.3.4 Arrangement and layout of multiple outdoor units

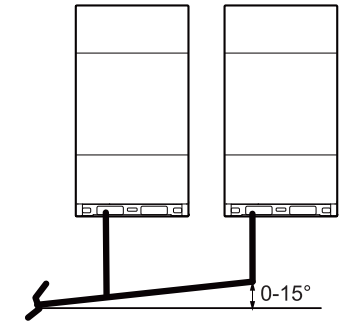
- The piping between the outdoor units must be level and lower than the outdoor unit piping connection.



√ Correct

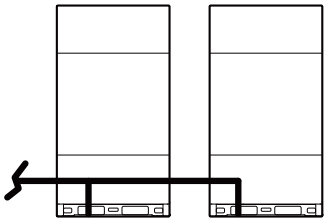


√ Correct

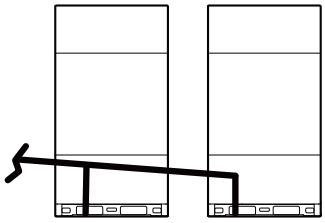


√ Correct

Branch lower than the outdoor unit piping connec-tion and the direction inclination angle is between 0-15°



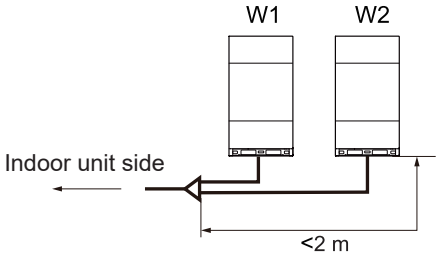
× Incorrect



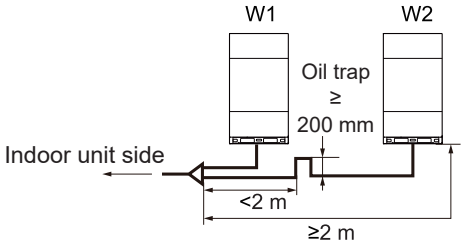
× Incorrect

If the piping length between outdoor units is 2 m or more, the oil trap for the gas pipe should be provided so that accumulation of refrigerant oil does not occur.

- Less than 2 m

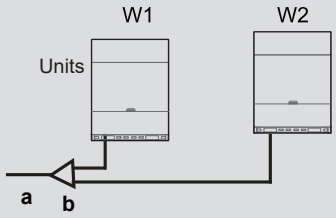


- 2 m or more



NOTICE

In systems with multiple outdoor units, the units should be placed in order from the largest capacity unit to the smallest capacity unit. The largest capacity unit must be placed on the first branch, and be set as the master unit, while the others should be set as slave units. The capacity of outdoor units W1, W2 must meet the following conditions: W1 ≥ W2.



a To indoor unit

b Outdoor branch joint assembly (first branch joint)

4.3.5 Requirements for designing and making of pressure piping

The PED Directive (2014/68/EU) is the European regulation that establishes safety requirements for the design, manufacture, and testing of pressure equipment. Depending on the PED category under which the piping falls, specific measures must be implemented for the correct management of the system.

Table 4.8 identifies the PED category according to the diameter of the piping used.

- Refrigerant circuit piping connecting the outdoor unit and indoor units falling under Cat. X (according to EN 14276-2:2020), equivalent to PED Art. 4.3 or PED Cat. I (according to the PED Directive (2014/68/EU)).
- As pressure piping, the connecting refrigerant circuit is subject to the PED Directive (2014/68/EU) and, consequently, to the relevant harmonized standards EN 378-2:2016 and EN 14276-2:2020; furthermore, as it is made of copper, it is also subject to EN 12735-1:2020.

Materials and components to be used in the construction of the connecting refrigerant circuit between the outdoor unit and indoor units:

- The selection of piping and fittings must strictly follow the instructions provided in section 4.3.
- Piping must be marked EN 12735-1:2020.
- The use of fittings that are molded, hydroformed, or otherwise obtained through manufacturing processes other than the bending of straight rods is subject to the provision by the supplier of a Declaration of Conformity containing the minimum data required for the PED characterization of the component itself (at a minimum: PS, TSmin, TSmax, PED group of permitted fluids, compliance with Directive 2014/68/EU and, where applicable, standards EN 378-2:2016 and EN 14276-2:2020, and installation instructions).
- Tube expansions not explicitly permitted in this manual must be avoided.
- Do not install any taps / shut-off valves / check valves that are not explicitly indicated in the refrigeration diagrams in this manual.

Refrigerant circuit piping connecting the outdoor unit and indoor units falling under Cat. Y (according to EN 14276-2:2020), equivalent to PED Cat. II (according to the PED Directive (2014/68/EU)).

All conditions previously specified for Cat. X piping must be ensured, and furthermore:

- The installer of the connecting piping is required to request the 3.1 Certificate (according to EN 10204:2005) for the materials used in the construction of the connection (straight or coiled pipes, welding rods, etc.) and to retain these certificates for at least 10 years.
- The installer of the connecting piping is required to request the Declarations of Conformity for the components used in the construction of the connection (fittings, valves, taps, etc.) and to retain these Declarations of Conformity for at least 10 years; the Declaration of Conformity must contain the minimum information for the PED characterization of the component (PS, TSmin, TSmax, PED group of permitted fluids, compliance with Directive 2014/68/EU and, where applicable, standards EN 378-2:2016 and EN 14276-2:2020, and installation instructions).
- Traceability of all components used must be ensured: this means every component used in the construction of the connecting piping must have a unique serial number, barcode, QR code, or batch/lot number; the regulation does not specify the method, but mandates the unique traceability of every single part used.

4.4 Selecting and Preparing the Electrical Wiring

4.4.1 Safety device requirements

1. Select the wire diameters (minimum value) individually for each unit based on Table 4.11 and Table 4.12, where the rated current in Table 4.11 refers to MCA in Table 4.12. If the MCA exceeds 63A, the wire diameters should be selected according to the national wiring regulation.
2. The maximum allowable voltage range variation between phases is 2%.
3. Select circuit breakers that have a contact separation in all poles not less than 3 mm providing full disconnection, where MFA is used to select the current circuit breakers and residual current operation breakers:

Table 4.12

Rated current of appliance (A)	Nominal cross-sectional area (mm^2)	
	Flexible cords	Cable for fixed wiring
≤ 3	0.5 and 0.75	1 to 2.5
> 3 and ≤ 6	0.75 and 1	1 to 2.5
> 6 and ≤ 10	1 and 1.5	1 to 2.5
> 10 and ≤ 16	1.5 and 2.5	1.5 to 4
> 16 and ≤ 25	2.5 and 4	4 to 6
> 25 and ≤ 32	4 and 6	6 to 10
> 32 and ≤ 50	6 and 10	10 to 16
> 50 and ≤ 63	10 and 16	16 to 25

Table 4.13

System	Outdoor Unit				Power Current			Compressor		Fan Motor	
	Voltage. (V)	Frequency. (Hz)	Min. (V)	Max. (V)	MCA. (A)	TOCA. (A)	MFA. (A)	MSC. (A)	RLA. (A)	Power. (kW)	FLA. (A)
252T	380-415	50	342	456.5	17.0	33.0	20	-	17	0.56	1.7
280T	380-415	50	342	456.5	18.8	33.0	25	-	17.5	0.56	1.7
335T	380-415	50	342	456.5	23.0	33.5	32	-	18.5	0.56	1.8
400T	380-415	50	342	456.5	26.2	44.5	32	-	23.0	0.92	2.8
450T	380-415	50	342	456.5	31.4	44.5	40	-	25.0	0.92	3.0

The unit's own power input terminal is equipped with a fuse for short-circuit and abnormal overload protection of the unit. The fuse selection reference table is as follows:

Table 4.14

Unit capacity (Kw)	Maximum load current (A)	Fuse (A)
252T	17.0	40
280T	18.8	40
335T	23.0	40
400T	26.2	63
450T	31.4	63

INFORMATION

Phase and frequency of power supply system: 3 ~ 50 Hz, Voltage: 380-415 V.

Abbreviations:
MCA: Minimum Circuit Amps; MOP: Rating of Overcurrent Protective Device; MSC: Maximum Starting Current (A); RLA: Rated Load Amps; FLA: Fan Load Amps.

- Units are suitable for use in electrical systems where voltage supplied to unit terminals is not below or above listed range limits. The maximum allowable voltage variation between phases is 2 %.
- Select wire size based on the value of MCA.
- MSC indicates the maximum current on compressor start-up in amps.
- RLA is based on the following conditions: indoor temperature 27 °C DB, 19 °C WB; outdoor temperature 35 °C DB.
- The fuse must be correctly selected and installed according to the corresponding unit capacity (Kw)Table 4.13; otherwise, it will not provide protection.

1. OUTDOOR UNIT INSTALLATION

1.1 Overview

This chapter includes the following information:

- Open the unit
- Outdoor unit installation
- Welding refrigerant piping
- Refrigerant piping check
- Refrigerant charging
- Electrical Wiring

1.2 Opening the Unit

5.2.1 Opening the outdoor unit

- Remove the screw of the handle;

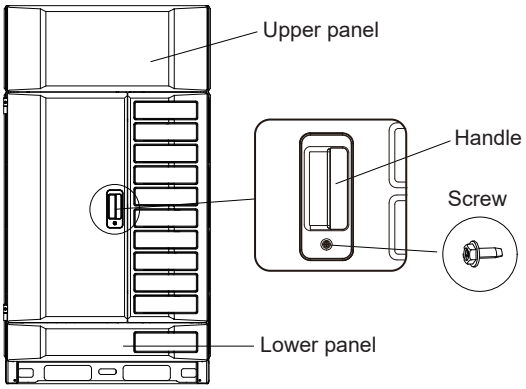


Figure 5.1

- Open the door.

Use the hook to keep the door in the proper position.

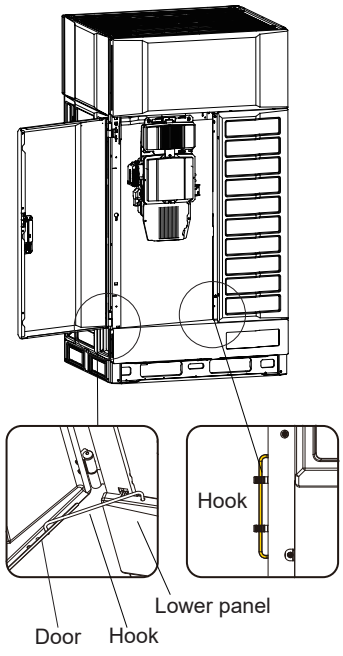


Figure 5.2

- To remove the door, loosen the screw firstly, then lift the door upward.

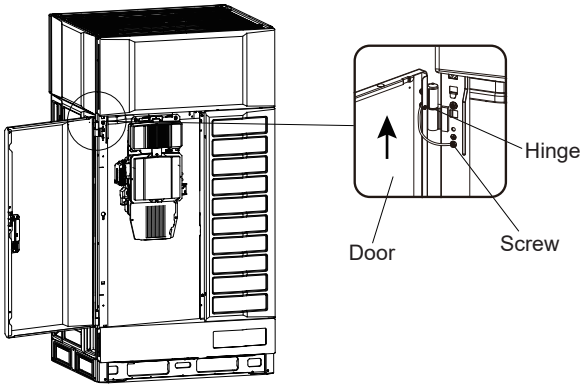
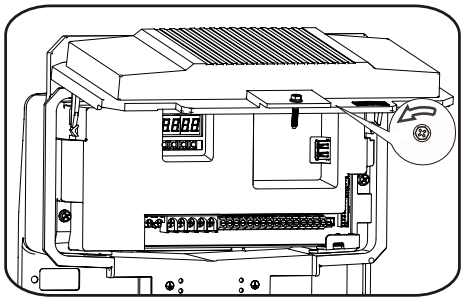


Figure 5.3

5.2.2 Opening the electric control box

- Loosen the screw, and lift the top cover upwards.



- Remove the screws, and the bottom cover.

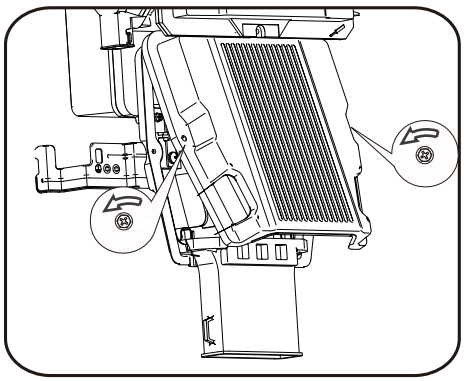


Figure 5.4

NOTICE

- The main control cover features a flip-open design and can be rotated to a certain angle, where it is held in place by the support arms on the protective cover and remains suspended.
- The installation of communication and power cables only involves the topmost and bottom-most compartments on the front side of the electrical control box. Opening any other compartments must be performed by professional maintenance personnel authorized by our company.

⚠ WARNING

- Maintenance involving the drive frequency conversion compartment must be carried out by repair personnel authorized by our company.
- If the electrical control box needs to be completely removed, it is necessary to unscrew the single-phase valve on the refrigerant heat sink connecting pipe at the lower part of the electrical control box, while also disconnecting all cables connecting the electrical control box to the interior of the air conditioner.
- The images displayed in this view may not match the actual product due to reasons such as product model variations or product upgrades. Please refer to the physical product for accuracy!

1.1 Installing the Outdoor Unit

5.3.1 Preparing the structure for installation

- The base of the outdoor unit must use a solid concrete surface such as cement or a steel beam frame as a base.
- The base must be completely level to ensure that every point of contact is even.
- During installation, make sure the base supports the vertical folds of the front and back under plates of the chassis directly as the vertical folds of the front and back under plates are located where the actual support for the unit load is.
- No gravel layer is required when the base is built on a roof surface, but the sand and cement on the concrete surface must be level, and the base should be chamfered along the edge.
- A water drainage ditch should be set around the base to drain water around the equipment. Potential risk: slipping.
- Check the load-bearing capacity of the roof to make sure it can support the load.
- When you choose to install the piping from the bottom, the base height should be above 200 mm.
- Make sure the base where the unit is installed is strong enough to prevent vibrations and noise.

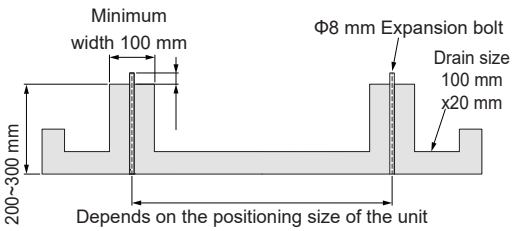


Figure 5.5

Use four ground bolts (M8) to secure the unit in place. The best option is to screw in the ground bolt until it is embedded in the base surface by at least 3 threads.

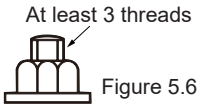
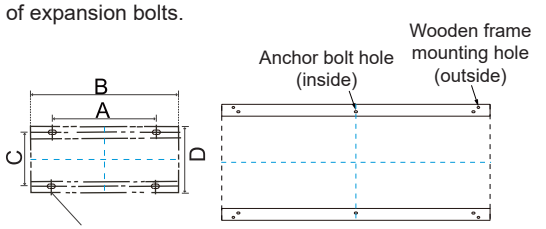


Figure 5.6

Please refer to the figure below for the installation position of expansion bolts.



14×22mm U-shape hole

Figure 5.7

Table 5.1

Unit: mm

Size	A	B	C	D	U-shaped hole
252T-450T	705	960	710	850	Φ14×22

5.3.2 Outdoor unit installation space

Make sure there is sufficient space around the unit for maintenance work, and the minimum space for air inlet and air outlet is reserved (see below to select a feasible method).

NOTICE

- Ensure there is enough space for maintenance. The units in the same system must be placed at the same height.
- Outdoor units must be spaced so that sufficient air may flow through each unit. Sufficient airflow across heat exchangers is essential for outdoor units to function properly.

- For single installation

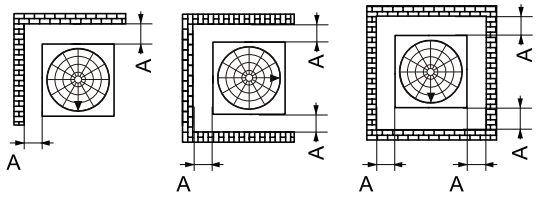
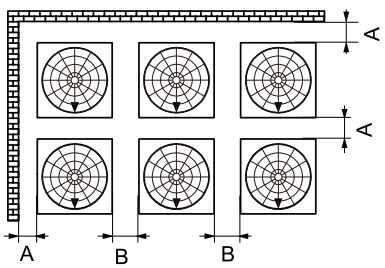


Figure 5.8

- Installation with walls in two directions



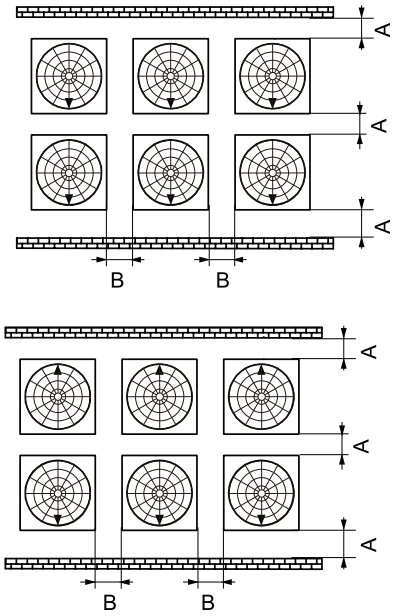


Figure 5.9

- Installation with walls in three directions

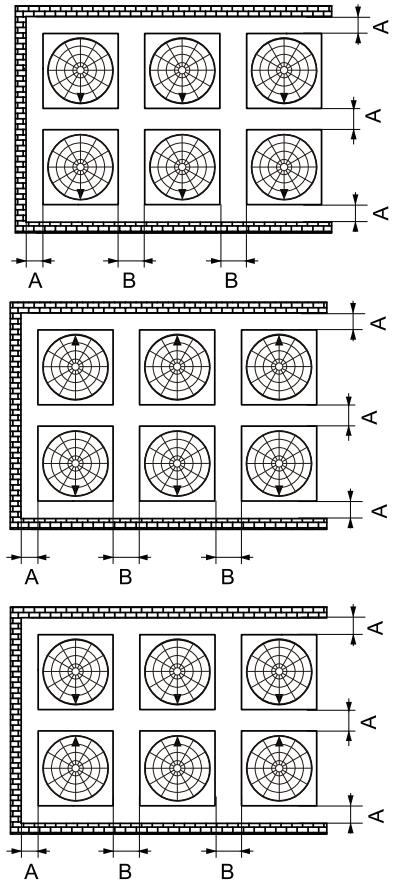


Figure 5.10

- Installation with walls in four directions

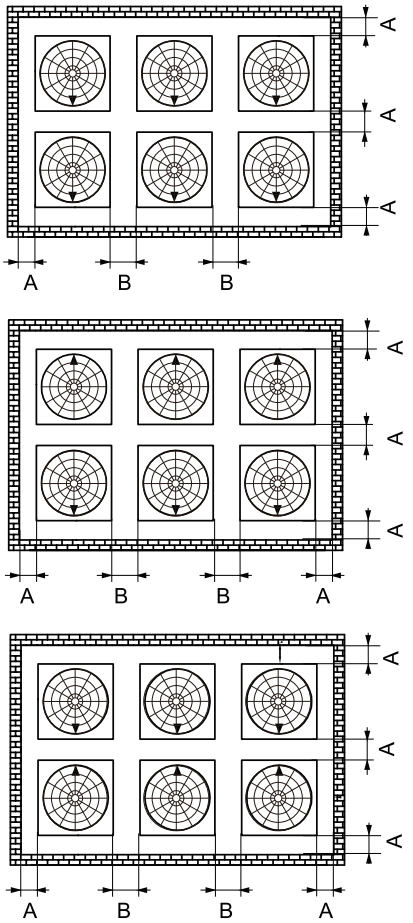


Figure 5.11

⚠ CAUTION

- The arrow ▼ indicates the front of the unit in the above figures.
- A ≥ 1 000 mm, B ≥ 300 mm.
- The dimensions in the above figures provide sufficient space for operation and maintenance under normal operating conditions (refrigeration mode at an outdoor tempera-ture of 35 °C).
- If the outdoor temperature is higher and ventilation short circuiting may occur, choose the most suitable dimensions by calculating the return air flow.
- Keep the inlet and outlet of each outdoor unit open and avoid interference.
- If there is an obstacle in the space over the unit, the four sides of the unit should be open.

Unit: mm

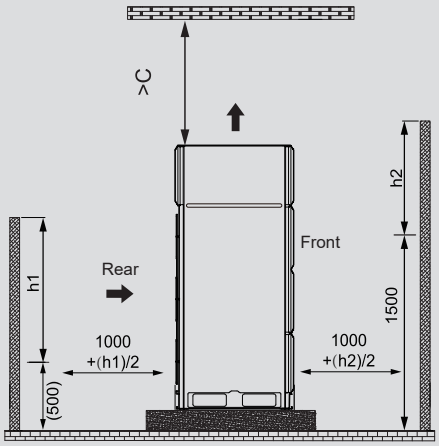


Figure 5.12

- If there are no walls in front of or behind the unit, it is necessary to reserve a space of 1000 mm on both sides.
- If the front wall is higher than 1500 mm, a space of at least (1000 mm + (h2)/2) is required at the front.
- If the rear wall is higher than 500 mm, a space of at least (1000 mm + (h1)/2) is required at the back.
- When the space above the unit is less than 1500 mm, an air ducting device shall be installed to prevent ventilation from short circuiting.
- When the space over the unit is greater than 1500 mm, an air ducting device shall be installed if the air circulation is not smooth at the top of the unit.

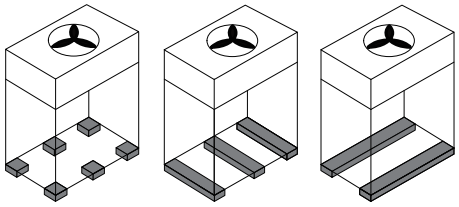
⚠ WARNING

- Do not install the outdoor unit in a confined space.

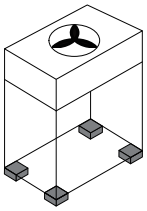
5.3.3 Vibration reduction of outdoor unit

The outdoor unit shall be firmly fixed, and a thick rubber plate or corrugated shock-absorbing rubber cushion with a thickness of more than 20 mm and a width of more than 100 mm shall be placed between the unit and the foundation. The shock-absorbing rubber cushion must not be placed in a way that only supports the four corners of the unit. The setting requirements are shown in the figure below.

Don't use adhesive to fix appliances.



√ Correct



× Incorrect

1.1 Pipe Welding

5.4.1 Things to note when connecting the refrigerant piping

⚠ CAUTION

- During the test, do not exert a force greater than the maximum allowed pressure on the product (as shown on the nameplate).
- Take appropriate precautions to prevent refrigerant leakage and ventilate the area immediately if the refrigerant leaks, as high concentration of R32 refrigerant in an enclosed area can cause poisoning or fire.
- Refrigerant must be recovered. Do not release it into the environment. Use profes-sional fluorine extraction equipment to extract the refrigerant from the unit.

NOTICE

- The execution of joints is regulated by the PED Directive (2014/68/EU).
- Depending on the PED category of the piping (see Table 4.8), the regulation defines how to proceed at a legislative level regarding the required documentation. Refer to Chapter 5.4.7 for further details.
- Make sure the piping and connections are not placed under pressure.
- After all the piping connections have been completed, check to make sure there is no gas leak. Use nitrogen to conduct the leak check for gas.

5.4.2 Connect refrigerant piping

Before the refrigerant piping is connected, make sure the indoor units and outdoor units are installed proper-ly. Refrigerant piping connection procedures include:

- Connecting refrigerant piping to the outdoor unit
- Connecting refrigerant piping to the indoor unit (refer to the installation manual of the indoor unit)
- Connecting the VRF piping assembly
- Assembly for connecting refrigerant piping branch joint
- Bear in mind the following guidelines:
  - Braze
  - Stop valve is used correctly

5.4.3 Outdoor refrigerant connecting pipe position

The outdoor refrigerant connecting pipe position is shown in the following figure

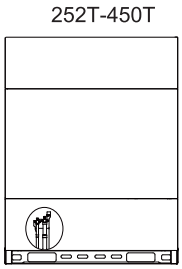


Figure 5.14

5.4.4 Connecting refrigerant piping to the outdoor unit

NOTICE

- Note the precautions when connecting the field piping for the refrigerant. Add brazing material.
- Use the attached piping fittings when working on the pipeline engineering on site.
- After installation, make sure the piping does not come in contact with each other or the chassis.

The fittings provided as accessories can be used to complete the connection from the stop valve to the field piping.

5.4.5 Connecting VRF piping assembly

⚠ CAUTION

- Incorrect installation will cause the unit to malfunction.
- Pipe-work shall not be installed in an unventi-lated space, if that space is smaller than Amin in Annex GG, except for A2L refrigerants where installed pipe-work has no connecting joints or is connected with at least one of the following:

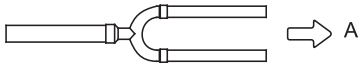
  i) joints in compliance with ISO 14903,
  ii) joints in enclosures which vent to the unit or to the outside,
  iii) joints in enclosures which vent to a room with a room area of at least Amin as specified in GG.2.1.

⚠ CAUTION

- Mechanical connections made in accordance with EN/IEC60335-2-40 22.118 shall be accessible for maintenance purposes.
- Flared components should not be reused.
- Steel pipes and components shall be protect-ed against corrosion with a rustproof coating before applying any insulation.

The branch joints should be as level as possible, and the angular error must not exceed 10°.

U type branch joint



A-direction view

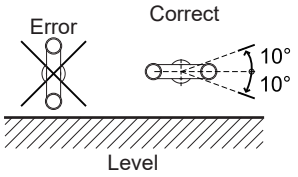


Figure 5.15

The branch joints come in different pipe diameters, which can be easily matched with different pipe diameters. When connecting pipes, select the pipe section with the appropriate pipe diameter, cut it in the middle with a pipe cutter and remove burrs, as shown in the figure below.

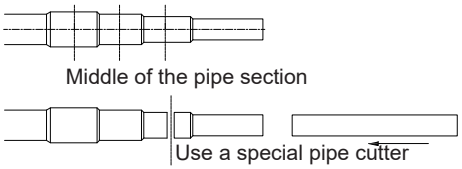


Figure 5.16

The length of the straight pipe section between the contiguous branch pipes shall be no less than 500 mm.

The straight pipe section behind the branch pipe end shall be no less than 500 mm. The length of straight pipe between two right angle bends shall be no less than 500 mm.

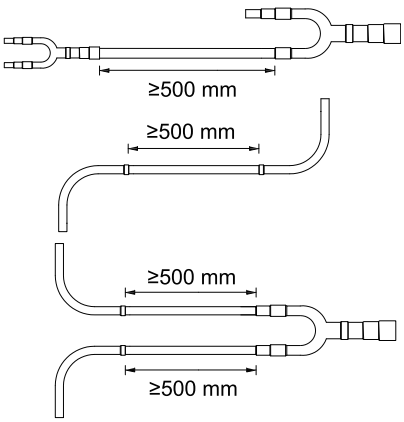


Figure 5.17

When there are multiple outdoor units, the branch joints must not be higher than the refrigerant piping as shown below:

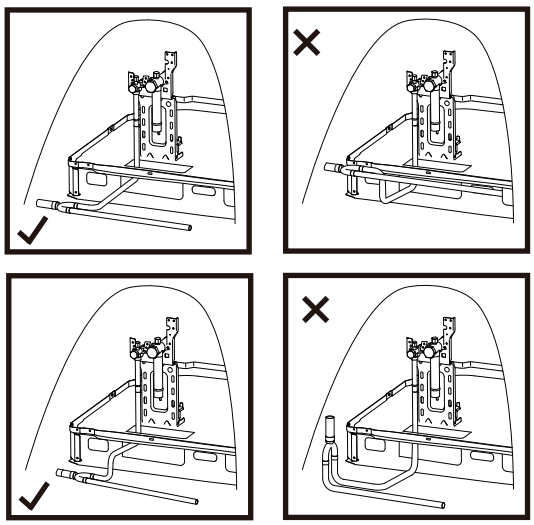


Figure 5.18

5.4.6 Brazing

- During brazing, use nitrogen as protection to prevent the formation of a large amount of oxide film in the pipes. This oxide film will have adverse effects on the valves and compressors in the cooling system, and may hamper normal operations.
- Use the reducing valve to set the nitrogen pressure to 0.02-0.03 MPa (a pressure that can be felt by the skin).

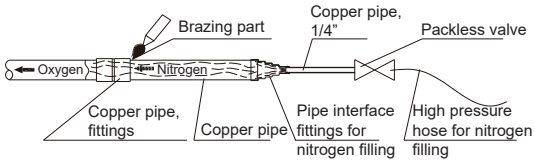


Figure 5.19

- Do not use antioxidants when brazing the pipe joints.
- Use copper-phosphorus alloys (BCuP) when brazing copper and copper, and no flux is required. When brazing copper and other alloys, flux is required. Flux produces an extremely harmful effect on the refrigerant piping system. For example, using a chlorine-based flux is used may corrode the pipes, and when the flux contains fluorine, it will degrade the frozen oil.
- During brazing, protect the valve mounting plate and wires from burning.
- Use dedicated gauges and hoses with R32 equipment.
- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.
- For installations with field applied joints that are exposed in the occupied space, these joints shall be at least one of the following:
  -mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only);
  -welded or brazed joints; or
  -joints in enclosures that vent to the unit or to the outside.

5.4.7 Connecting stop valves

The PED Directive (2014/68/EU) is the European regulation that establishes safety requirements for the design, manufacture, and testing of pressure equipment, including joints between piping. Depending on the PED category under which the piping falls, specific measures must be implemented for the correct management of the system and its associated brazed joints.

- The brazing filler metal (brazing rods) must comply with EN ISO 17672:2024.
- The operator performing the brazed joints must be qualified according to EN ISO 13585:2025 (for Cat. X joints, an internal qualification by the operator's company is sufficient, whereas for Cat. Y joints, the qualification must be performed by a Notified Third-Party Organization).
- The joints (joint type, diameter, thickness) executed by the operator during the installation of the connecting piping must be qualified via a BPS (Brazing Procedure Specification) according to EN ISO 17779:2026 (for Cat. X joints, it is sufficient for the BPS to be qualified internally by the operator's company, whereas for Cat. Y joints, the BPS must be approved by a Notified Third-Party Organization).
- Each BPS must be validated by a corresponding BPQR (Brazing Procedure Qualification Record), which is a report certifying the positive outcome of laboratory tests on the brazed samples (for Cat. X joints, it is sufficient for the BPQR to be issued internally by the operator's company, whereas for Cat. Y, the BPQR must be issued by a Notified Third-Party Organization which grants a BPAR Certificate (Brazing Procedure Approval Record).

5.4.8 Connecting stop valves

Stop valves

- The following figure shows the names of all parts required for the installation of the stop valves.
- Stop valves are closed when unit is shipped from the factory.

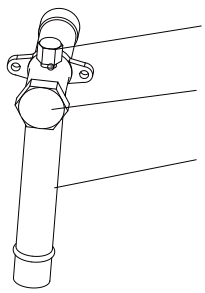
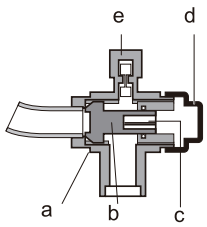


Figure 5.20



a Sealing component
b Axis
c Hexagonal hole
d Stop valve lid
e Maintenance access

Figure 5.21

Open the stop valve

1. Insert the hex wrench into the stop valve, and rotate the stop valve counter-clockwise.
2. Stop turning when the stop valve cannot be rotated further.

Result: Valve is now open.

The fastening torque of the stop value is shown in Table 5.2. Insufficient torque may cause the refrigerant to leak.

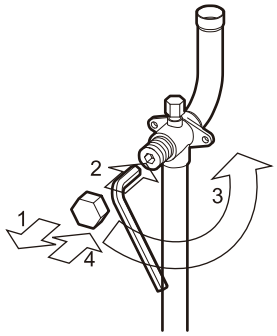


Figure 5.22

Closing the stop valve

1. Remove the stop valve lid.

2. Insert the hex wrench into the stop valve, and rotate the stop valve clockwise.

3. Stop turning when the stop valve cannot be rotated further.

Result: Valve is now closed.

Direction to close:

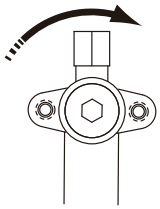


Figure 5.23

Fastening torque Table 5.2

Stop valve size (mm)	Tightening torque / N.m (turn clockwise to close)
	Axis
	Valve body
Φ12.7	9-30
Φ15.9	12-30
Φ19.1	
Φ22.2	16-30
Φ25.4	24-30
Φ28.6	
Φ31.8	25-35
Φ35.0	

5.4.9 Connecting ball valves

Ball valves

- The following figure shows the names of all parts required for the installation of the ball valves.
- Ball valves are closed when unit is shipped from the factory.

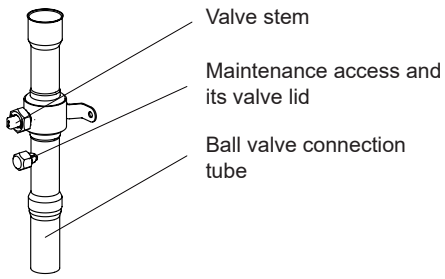


Figure 5.24

Using of a ball valve

1. The valve stem horizontal, the ball valve is closed. Turn the valve stem counterclockwise by 90° to open the ball valve.

2. The valve stem vertical, the ball valve is open. Turn the valve stem clockwise by 90° to close the ball valve.

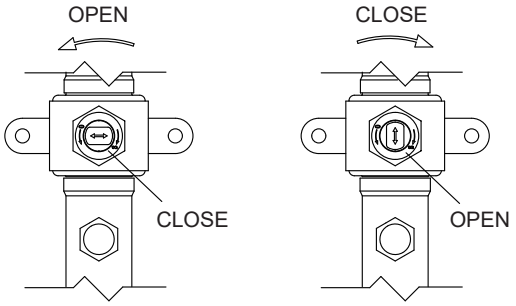


Figure 5.25

5.4.9 Connect the L-shaped pipe(from accessories)

1. Make sure that the valves are fully closed.

2. Cut or twist off the small sealing pipe, and press the needle valve to release the gas, ensure that there is no refrigerant in the pipe.

3. During brazing, protect the valve by cooling, and the temperature of the valve seal must not exceed 120C

4. Remove the large sealing pipe with the welding torch, and connect the L-shaped pipes.

Note: Check port used to measurey stem pressure and charge refrigerant. it is not allowed to be used for vacuuming or releasing refrigerant.

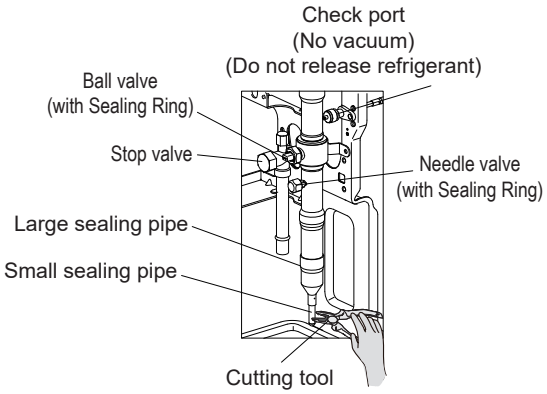


Figure 5.26

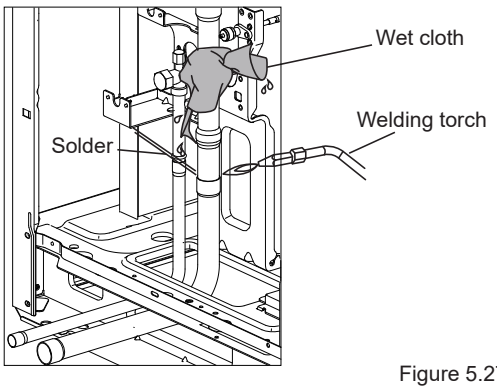


Figure 5.27

1.1 Flushing Pipes

To remove dust, other particles and moisture, which could cause compressor malfunction if not flushed out before the system is run, the refrigerant piping should be flushed using nitrogen. Pipes should be flushed once the piping connections have been completed except for the final connections to the indoor units. That is, flushing should be performed once the outdoor units have been connected but before the indoor units are connected.

⚠ CAUTION

Only use nitrogen for flushing. Using carbon dioxide risks leaving condensation in the piping. Oxygen, air, refrigerant, flammable gases and toxic gases must not be used for flushing. Use of such gases may result in fire or explosion.

The liquid and gas sides can be flushed simultaneously; alternatively, one side can be flushed first and then Steps 1 to 9 repeated for the other side. The flushing procedure is as follows:

1. Cover the inlets and outlets of the indoor units to prevent dirt from getting blown in while flushing the pipe. (Pipe flushing should be carried out before connecting the indoor units to the piping system.)

2. Attach a pressure reducing valve to a nitrogen cylinder.

3. Connect the pressure reducing valve outlet to the inlet on the liquid (or gas) side of the outdoor unit.

4. Use blind plugs to block all liquid (gas) side openings, except for the opening at the indoor unit which is furthest from the outdoor units (“Indoor unit A” in Figure 5.27).

5. Start to open the nitrogen cylinder valve and gradually increase the pressure to 0.5Mpa.

6. Allow time for nitrogen to flow as far as the opening at indoor unit A.

7. Flush the first opening:

a) Using suitable material, such as a bag or cloth, press firmly against the opening at indoor unit A.

b) When the pressure becomes too high to block with your hand, suddenly remove your hand allowing the gas to rush out.

c) Repeatedly flush in this manner until no further dirt or moisture is emitted from the piping. Use a clean cloth to check for dirt or moisture being emitted. Seal the opening once it has been flushed.

8. Flush the other openings in the same manner, working in sequence from indoor unit A towards the outdoor units. Refer to Figure 5.28.

9. Once flushing is complete, seal all openings to prevent dust and moisture from entering.

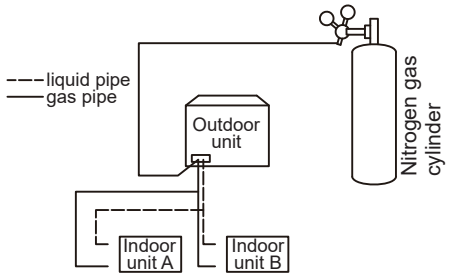


Figure 5.28

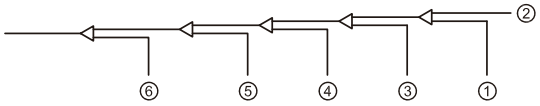


Figure 5.29

1.2 Gas Tightness Test

To prevent faults caused by refrigerant leakage, a gas tightness test should be performed before system commissioning.

⚠ CAUTION

- Only dry nitrogen should be used for gas tightness testing. Oxygen, air, flammable gases and toxic gases must not be used for gas tightness testing. Use of such gases may result in fire or explosion.

⚠ CAUTION

- Make sure that all the outdoor unit stop valves are firmly closed.
- An inert gas should use dry nitrogen.

The gas tightness test procedure is as follows:

1. Charge the indoor piping with nitrogen at 0.3Mpa through the needle valves on the liquid and gas stop valves and leave for at least 3 minutes (do not open the liquid or gas stop valves). Observe the pressure gauge to check for large leakages. If there is a large leakage, the pressure gauge will drop quickly.

2. If there are no large leakages, charge the piping with nitrogen at 1.5Mpa and leave for at least 3 minutes. Observe the pressure gauge to check for small leakages. If there is a small leakage, the pressure gauge will drop noticeably.

3. If there are no small leakages, charge the piping with nitrogen at 4.2 MPa and leave for at least 24 hours to check for micro leakages. Micro leakages are difficult to detect. To check for micro leakages, allow for any change in ambient temperature over the test period by adjusting the reference pressure by 0.01Mpa per 1 °C of temperature difference. Adjusted reference pressure = Pressure at pressurization + (temperature at observation

– temperature at pressurization) x 0.01Mpa. Compare the observed pressure with the adjusted reference pressure. If they are the same, the piping has passed the gas tightness test. If the observed pressure is lower than the adjusted reference pressure, the piping has a micro leak.

4. If leakage is detected, refer to the section of the manual titled “Leak detection”. Once the leak has been found and

fixed, the gas tightness test should be repeat-ed.

5. If not continuing straight to vacuum drying once the gas tightness test is complete, reduce the system pressure to 0.5-0.8MPa and leave the system pressur-ized until ready to carry out the vacuum drying procedure.

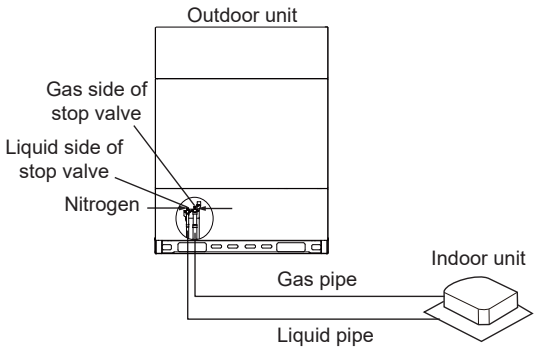


Figure 5.30

Leak detection

The general methods for identifying the source of a leak are as follows:

1. Audio detection: relatively large leaks are audible.

2. Touch detection: place your hand at joints to feel for escaping gas.

3. Soapy water detection: small leaks can be detected by the formation of bubbles when soapy water is applied to a joint.

1.3 Pressure leak test and vacuum drying

About checking the refrigerant piping

It is very important that all refrigerant piping work is done before the units (outdoor, SV box or indoor) are powered on. When the units are powered on, the expansion valves will initialize, this means that the valves will close.

Method: After power ON

- If the system has already been powered on, it is necessary to manually enter the vacuum mode on the outdoor unit during the airtightness test and vacuuming. The vacuum mode setting menu is “n1-5”, this setting will open field expansion valves to guarantee a refriger-ant piping pathway and make it possible to perform the leak test and the vacuum drying.

NOTICE

- Make sure that all indoor units and SV box connected to the outdoor unit are powered on.
- Wait to apply setting until the outdoor unit has finished the initialization.

About leak test and vacuum drying

Checking the refrigerant piping involves:

- Checking for any leakages in the refrigerant piping.
- Performing vacuum drying to remove all moisture, air or nitrogen in the refrigerant piping.
- If there is a possibility of moisture being present in the refrigerant piping (for example, water may have entered the piping), first carry out the vacuum drying procedure below until all moisture has been removed.
- All piping inside the unit has been factory tested for leaks. Only field installed refrigerant piping needs to be checked.
- All piping inside the unit has been factory tested for leaks. Only field installed refrigerant piping needs to be checked.
- Therefore, make sure that all the outdoor unit stop valves are firmly closed before performing leak test or vacuum drying.

NOTICE

- Make sure that all (field supplied) field piping valves are OPEN (not outdoor unit stop valves!) before you start leak test and vacuuming.

5.7.1 Equipment Connection Guide

Connect the vacuum pump through a manifold to the service port of all stop valves to increase efficiency.

NOTICE

- Use a vacuum pump with a non-return valve or a solenoid valve that can evacuate to a gauge pressure of –0.1 Mpa (−1.007 bar).
- Make sure the pump oil does not flow oppositely into the system while the pump is not working.
- Using a vacuum pump with a discharge in excess of 4 L/s and a precision level of 0.02mm Hg is recommended.

5.7.2 Pressure leak test

⚠ CAUTION

- Only dry nitrogen should be used for pressure leak test. Oxygen, air, flammable gases and toxic gases must not be used for pressure leak test. Use of such gases may result in fire or explosion.
- Make sure that all the outdoor unit stop valves are firmly closed.
- During the pressure leak test, it is required that the outdoor unit, SV box, and indoor unit remain powered on and always stay in vacuum mode.

The pressure leak test procedure is as follows:

1) Manually enter the vacuum mode on the outdoor unit. The vacuum mode setting menu is “n1-5”.

2) Charge the indoor piping with nitrogen at 0.3 Mpa (3 bar)through the needle valves on the liquid and gas stop valves and leave for at least 3 minutes (do not open the liquid or gas stop valves). Observe the pressure gauge to check for large leakages. If there is a large leakage, the pressure gauge will drop quickly.

3) If there are no large leakages, charge the piping with nitrogen at 1.5 Mpa (15 bar) and leave for at least 3 minutes. Observe the pressure gauge to check for small leakages. If there is a small leakage, the pressure gauge will drop noticeably.

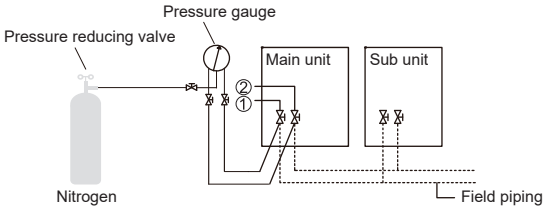
4) If there are no small leakages, charge the piping with nitrogen at 3.85 Mpa (38.5 bar) and leave for at least 24 hours to check for micro leakages. Micro leakages are difficult to detect. To check for micro leakages, allow for any change in ambient temperature over the test period

by adjusting the reference pressure by 0.01 Mpa (0.1bar)

per 1 °C of temperature difference. Adjusted reference pressure = Pressure at pressurization + (temperature at observation temperature at pressurization) x 0.01 Mpa (0.1 bar). Compare the observed pressure with the adjusted reference pressure. If they are the same, the piping has passed the pressure leak test. If the observed pressure is lower than the adjusted reference pressure, the piping has a micro leak.

5) Once the leak has been found and fixed, the pressure leak test should be repeated.

6) If not continuing straight to vacuum drying once the pressure leak test is complete, reduce the system pressure to 0.5-0.8 Mpa (5.0-8.0 bar) and leave the system pressurized until ready to carry out the vacuum drying procedure.



①Low pressure pipe stop valve
②High pressure pipe stop valve

Figure 5.31

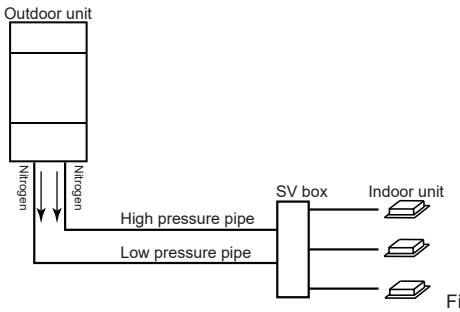


Figure 5.32

5.7.3 Vacuum drying

⚠ CAUTION

- Do NOT purge the air with refrigerants. Use a vacuum pump to evacuate the installation.
- During the vacuum drying test, it is required that the outdoor unit, SV box, and indoor unit remain powered on and always stay in vacuum mode.
- It is strictly forbidden to vacuum from the Charge Valve of the ODU.

Vacuum drying should be performed in order to remove moisture and non-condensable gases from the system. Removing moisture prevents ice formation and oxidization of copper piping or other internal components.

Vacuum drying also provides additional leak detection (in addition to the gas tightness test).

During vacuum drying, a vacuum pump is used to lower the pressure in the piping to the extent that any moisture present evaporates. At 5mm Hg (755mm Hg below typical atmospheric pressure) the boiling point of water is 32°F. Therefore, a vacuum pump capable of maintaining a pressure of -756mm Hg or lower should be used. Using a vacuum pump with a discharge in excess of 4 L/s and a precision level of 0.02mm Hg is recommended.

The vacuum drying procedure is as follows:

1) Manually enter the vacuum mode on the outdoor unit. The vacuum mode setting menu is “n-12”.

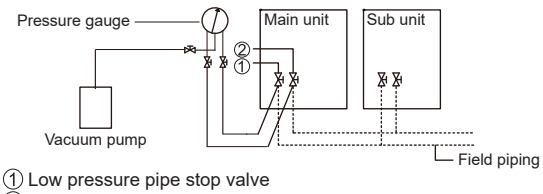
2) Connect the vacuum pump through a manifold with a pressure gauge to the service port of all stop valves.

3) Start the vacuum pump and then open the manifold valves to start vacuuming the system.

4) Continue vacuum drying for at least 2 hours and until a pressure difference of -0.1Mpa (-1bar) or more has been achieved. Once the pressure difference of at least -0.1Mpa (-1bar) has been achieved, continue vacuum drying for 2 hours. Close the manifold valves and then stop the vacuum pump. After 1 hour, check the pressure gauge. If the pressure in the piping has not increased, the procedure is finished. If the pressure has increased, repeat the steps 1 to 3 until all moisture has been remove.

5) After vacuum drying, keep the manifold connected to the main unit stop valves, in preparation for refrigerant charging.

6) After the Vacuum drying is completed, manually set menu “n-14” on the outdoor unit to exit the vacuum mode.



① Low pressure pipe stop valve
② High pressure pipe stop valve

Figure 5.33

1.4 Piping Insulation

After the leak test and the vacuum drying are complet-ed, the pipe must be insulated. Considerations:

- Make sure the refrigerant piping and branch joints are completely insulated.
- Make sure the liquid and gas pipes (for all units) are insulated.
- Use heat-resistant polyethylene foam for the liquid pipes (able to withstand temperature of 158°F(70°C)), and polyethylene foam for the gas pipes (able to withstand temperatures of 248°F(120°C)).
- Reinforce the insulation layer of the refrigerant piping based on the installation environment.

5.8.1 Selection of insulation material thickness

Condensed water may form on the surface of the insulation layer.

Table 5.3 Unit: mm

Piping size	Humidity<80%RH Thickness	Humidity≥80%RH Thickness
(Φ6.4~38.1 mm)	≥ 15 mm	≥ 20 mm
Φ41.3~54.0 mm	≥ 20 mm	≥ 25 mm

5.8.2 Pipe wrapping

To avoid condensation and water leakage, the connecting pipe must be wrapped with tape to ensure isolation from the air.

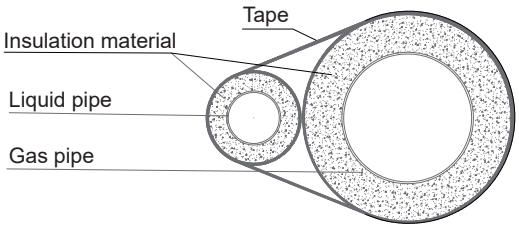


Figure 5.34

When wrapping insulation tape, each circle should press half of the previous circle of tape. Do not wrap the tape too tightly to avoid reducing the thermal insulation effect.

After completing the pipe insulation work, seal the holes in the wall with sealing material.

5.8.3 Protective measures for the pipeline

The refrigerant pipe will swing, expand or shrink during operations. If the pipe is not fixed, the load will be concentrated in a certain part, which may cause the refrigerant pipe to deform or rupture.

The suspended connecting pipes shall be well supported, and the distance between supports shall not exceed 1 m.

The outdoor pipes shall be protected against accidental damage. If the length of the pipe exceeds 1 m, a gusset plate must be added for protection.

Precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping.

Refrigerant tubing shall be protected or enclosed to avoid damage.

1.5 Refrigerant Charging

⚠ WARNING

- Use only R32 as the refrigerant. Other substances may cause explosions and accidents.
- R32 contains fluorinated greenhouse gases, and the GWP value is 675. Do not discharge the gas into the atmosphere.
- When charging the refrigerant, make sure you wear protective gloves and safety glasses. Be careful when you open the refrigerant piping.

NOTICE

- If the power supply of some units is off, the charging program cannot be completed normally.
- If this is a multi-unit outdoor system, the power supply for all outdoor units should be turned on.
- Make sure the power supply is turned on 12 hours before operations so that the crankcase heater is properly energized. This is also to protect the compressor.
- Make sure all connected indoor units have been identified.
- Charge the refrigerant only after the system has not failed the gas tightness tests and vacuum drying.
- Volume of refrigerant charged must not exceed the designed amount.

Calculating the additional refrigerant charge quanti-ty for liquid piping (R1 kg)

The additional refrigerant charge required depends on the lengths and diameters of the outdoor and indoor liquid pipes. The table below shows the additional refrigerant charge required per meter of equivalent pipe length for different diameters of pipe. The total additional refrigerant charge is obtained by summing the additional charge requirements for each of the outdoor and indoor liquid pipes, as in the following formula, where T1 to T8 represent the equivalent lengths of the pipes of different diameters. Assume 0.5m for the equivalent pipe length of each branch joint.

Table 5.4

Liquid piping Diameter (mm OD)	Additional refrigerant charge per meter of equivalent length of liquid piping (kg)
Φ6.35	0.019
Φ9.52	0.049
Φ12.7	0.096
Φ15.9	0.153
Φ19.1	0.236
Φ22.2	0.317
Φ25.4	0.424

Additional refrigerant charge R1 (kg) = (T1@Φ6.35) ×0.019+ (T2@Φ9.52) × 0.049 + (T3@Φ12.7) × 0.096 + (T4@Φ15.9) × 0.153 + (T5@Φ19.1) × 0.236 + (T6@Φ 22.2) ×0.317+ (T7@Φ25.4) ×0.424.

Calculating the additional refrigerant charge quantity for outdoor unit (R2 kg)

The additional refrigerant charge is required depending on the capacity of connected outdoor units, In case of a multi-outdoor-unit system, add the sum of the individual outdoor unit charge amount. Select the refrigerant quantity for each outdoor unit from the following table.

Table 5.5

Size	252T	280T	335T	400T	450T
Additional refrigerant Charge(kg)	0	0	0	0	0

The additional refrigerant charge (R2 kg) = W1+W2
W1: master unit additional refrigerant charge amount;
W2: Slave unit 1 additional refrigerant charge amount;

The example below illustrates the piping selection procedure for a system consisting of two outdoor units (450T+450T). Based on the capacity of each outdoor unit, Select the refrigerant quantity from the table 5.4, W1=8.7 kg; W2=8.7 kg;. The additional refrigerant charge quantity for outdoor unit R2 =W1 +W2 =17.4 kg

Calculating the additional refrigerant charge quantity for SV Box(R3 kg)

The required additional refrigerant charge depends on the number of SV Boxes. For systems with multiple SV Boxes, the additional amounts for each box need to be summed up. The additional amount for each box is 0.5 kg.

Calculating the total additional refrigerant charge quantity (R kg).

Total additional refrigerant charge amount (R) is equal to the sum of R1 to R3, calculate the amount of refriger-ant to be charged according to the formula below:
R (kg) = R1+ R2+R3.

Maximum additional refrigerant charge quantity

Ensure that the total additional charge quantity should not exceed the max. additional refrigerant charge quantity.

NOTICE

- Strictly follow the conditions shown in the above calculation method for refrigerant charging amount, and determine that the additional amount shall not exceed the maximum refrigerant additional amount shown in the table 5.6. If the calculated value of additional refrigerant exceeds the limits shown in the table 5.6, the total length of the pipeline construction scheme shall be shortened and the refrigerant charging amount shall be recalculated to meet the requirements shown in the table 5.6.

NOTICE

- The maximum refrigerant addition shown in the table 5.6 is based on the recommended combina-tion.

Table 5.6

GR.	Factory Refrigerant charge(kg)	Maximum Additional Refrigerant charge (kg)	Maximum Refrigerant (kg)
252T	6.7	19.3	26
280T	6.7	22.3	29
335T	6.7	32.4	39.1
400T	8.5	34.7	43.2
450T	8.5	34.8	43.3

NOTICE

- The refrigerant charge of the system must be less than 79.82 kg. This means that in case the calculated total refrigerant charge is equal to or more than 79.82 kg you must divide your multiple outdoor system into smaller independent systems, each containing less than 79.82 kg refrigerant charge. For factory charge, refer to the unit name plate.

Refrigerant charge amount of outdoor unit before shipment (R0 kg)

For factory charge of outdoor unit, refer to the outdoor unit name plate. In case of a multi-outdoor-unit system, calculate the total refrigerant charge before shipment of the outdoor units to be combined.

Calculate the refrigerant charge of the system (Rt kg)

The total refrigerant of the system (Rt) = refrigerant before shipment (R0) + additional refrigerant in the field (R). The refrigerant charge of the system must be less than 79.82 kg. If the calculated total refrigerant charge is equal to or more than 79.82 kg you must divide your multiple outdoor system into smaller independent systems, each containing less than 79.82 kg refrigerant charge.

The procedure for adding refrigerant is as follows:

1. Calculate additional refrigerant charge R (kg).
2. Place a tank of R32 refrigerant on a weighing scale. Turn the tank upside down to ensure the refrigerant is charged in a liquid state.
3. After vacuum drying, the blue and red pressure gauge hoses should still be connected to the pressure gauge and the master unit stop valves.
4. Connect the yellow hose from the pressure gauge to the R32 refrigerant tank.
5. Open the valve where the yellow hose meets the pressure gauge, and open the refrigerant tank slightly to let the refrigerant eliminate the air. The system shall be vented down to atmospheric pressure to enable work to take place. Caution: open the tank slowly to avoid freezing your hand.
6. Set the weighing scale to zero.
7. Open the three valves on the pressure gauge to begin charging refrigerant.
8. When the amount charged reaches R (kg), close the three valves. If the amount charged has not reached R (kg) but no additional refrigerant can be charged, close the three valves on the pressure gauge, run the outdoor units in cooling mode, and then open the yellow and blue valves. Continue charging until the full R (kg) of refrigerant has been charged, then close the yellow and blue valves. Note: Before running the system, be sure to complete all the pre-commissioning checks and be sure to open all stop valves as running the system with the stop valves closed would damage the compressor.

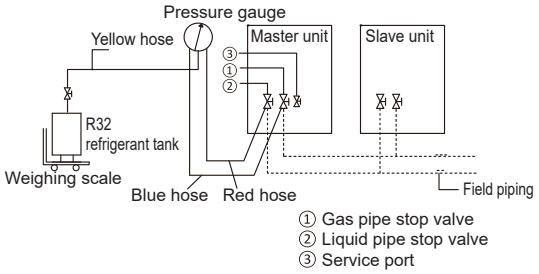


Figure 5.35

1.6 Electrical Wiring

5.10.1 Electrical wiring precautions

⚠ WARNING

- The combined indoor unit must have a R32 refrigerant sensor.
- Take note of the risk of electrical shock during installation.
- All the electric wires and components must be installed by installation personnel with the proper electrician certification, and the installation process must comply with applicable regulations.
- Use only wires with copper cores for the connections.
- A main switch or safety device that can discon-nect all polarities must be installed, and the switching device can be completely disconnect-ed when the corresponding excessive voltage situation arises.
- Wiring must be carried out in strict accordance with what is stated in the product nameplate.
- Do not squeeze or pull the unit connection, and make sure the wiring is not in contact with the sharp edges of the sheet metal.
- Make sure the grounding connection is safe and reliable. Do not connect the earth wire to public pipes, telephone earth wires, surge absorbers and other places that are not designed for grounding. Improper grounding may cause electrical shock.
- Make sure the fuses and circuit breakers installed meet the corresponding specification requirements.
- Make sure an electric leakage protection device is installed to prevent electrical shock or fires.
- The model specifications and characteristics (anti high-frequency noise characteristics) of the electric leakage protection device are compatible with the unit to prevent frequent tripping.
- Before powering on, make sure the connections between the power cord and terminals of the components are secure, and the metallic cover of the electric control box is closed tightly.

NOTICE

- Some power equipment may have an inverted phase or intermittent phase (such as a generator). For this type of power source, a reverse-phase protection circuit should be installed locally in the unit, as operating in the inverted phase may damage the unit.
- Do not share the same power supply line with other devices.
- The power cord may produce electromagnetic interference so you should maintain a certain distance from the equipment that may be susceptible to such interference.
- Separate the power supply for the indoor and outdoor units.
- For systems with multiple units, make sure a different address is set for each outdoor unit.
- Fixed wiring insulation must be protected, for example, by insulating sleeving having an appropriate temperature rating.
- Supply cords for indoor appliances shall be at least those of ordinary tough rubber sheathed cords (code designation 60227 IEC 53), supply cords for outdoor appliances shall be shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57).

5.10.2 Wiring layout

The wiring layout comprises the power cords and communication wiring between the indoor and outdoor units. These include the earth lines and the shielded layer of the earth lines of the indoor units in the communication line. See below for the wiring layout of the outdoor unit.

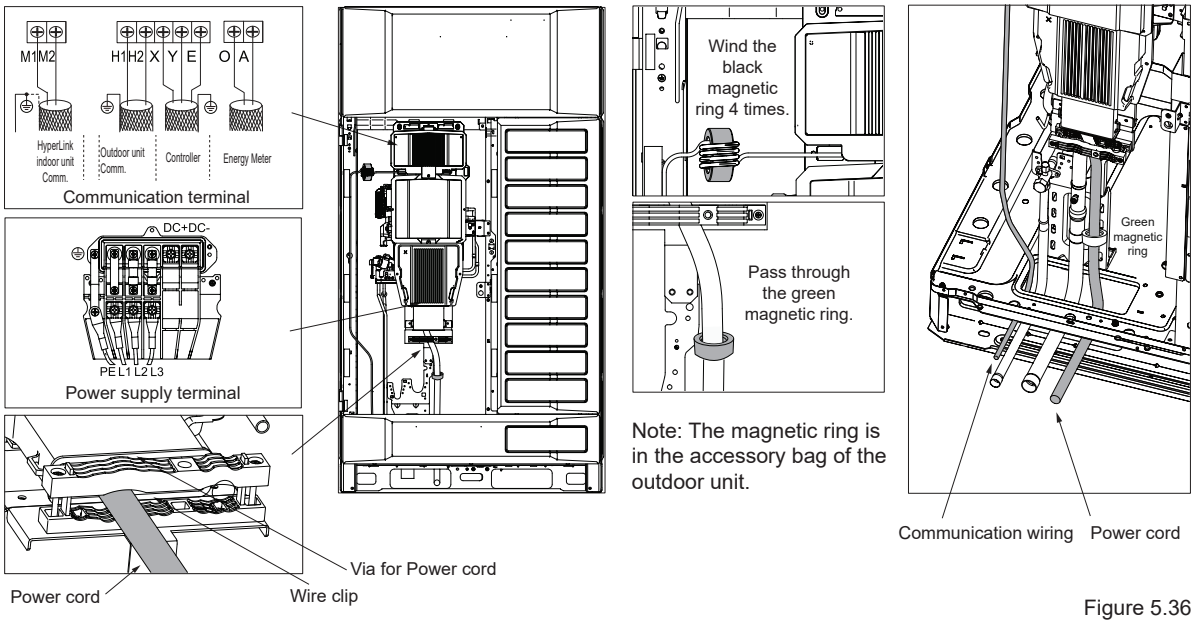


Figure 5.36

NOTICE

- A black magnetic ring of the communication wire and a green magnetic ring of the power wire are both included in the unit accessory package.
- The communication wire between the indoor and outdoor units must be through the black magnetic ring four times, while the power wire should pass directly through the magnetic ring and be secured with a cable tie at the designated position to prevent the magnetic ring from falling off or pulling on the wire.
- Power cords and communication wiring must be laid out separately, they cannot be placed in the same conduit. Use a power supply conduit to isolate if the current of the power supply is less than 10 A. If the current is greater than 10 A but less than 50 A, the spacing must exceed 500 mm at all times. Otherwise, it may lead to electromagnetic interference.
- Arrange the refrigerant piping, power cords and communication wiring in parallel, but do not tie the communication lines together with the refrigerant piping or power cords.
- Power cords and communication wiring should not come in contact with the internal piping so as to prevent the high temperature of the piping from damaging the wires.
- Once the wiring layout is completed, close the lid tightly to prevent the wiring and terminals from being exposed when the lid is loose.

5.10.3 Connecting the power cord

NOTICE

- Do not connect the power supply to the communication terminal block. Otherwise, the whole system may fail.
- You must first connect the earth line (note that you should use only the yellow-green wire to connect to the earth, and you must turn off the power supply when you are connecting the earth line) before you connect the power cord. Before you install the screws, you must first comb through the path along the wiring to prevent any part of the wiring from becoming exceptionally loose or tight because the lengths of the power cord and earth line are not consistent.
- The wire diameter must comply with specifications, and the terminal should be tightly screwed. At the same time, do not subject the terminal to any external force.
- Tighten the terminal with an appropriate screwdriver. Screwdrivers that are too small may damage the terminal head, and cannot tighten it.
- Excessive tightening of the terminal may cause the screw thread to deform and slip, making it impossible to connect the components securely.
- Only use a ring terminal to connect the power cord. Non-standard cable connections will lead to poor contact which may in turn cause exceptional heating and burning. The figure below demonstrates both correct and incorrect connections.
- This appliance incorporates an earth connection for functional purposes only.

1. Use round-type terminals of the correct specifications to connect the power cable.

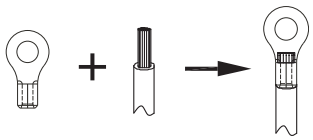


Figure 5.37

⚠ WARNING

- When inserting the strong-current cables and communication lines into the wiring holes, they must be equipped with wiring across rings to avoid becoming worn.

2. The external power cables are inserted into the wiring holes of the chassis and the electric control box, and the power cables “L1, L2, L3” and earth wire are connected to the power wiring board marked with “L1, L2, L3” and the grounding screw next to the power wiring board correspondingly.

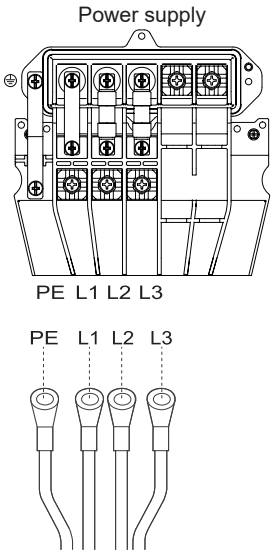


Figure 5.38

⚠ WARNING

- Terminals must be used for connection. Use round-type terminals of the correct specifications to connect the power cables. Do not directly connect the cable ends. Use the correct terminal, or it may cause over heating and fire.

3. Fasten and fix the cables with wire clips to avoid stress on the terminals.

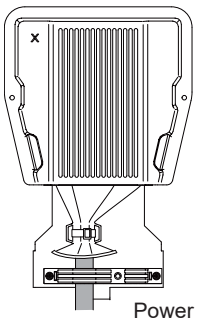


Figure 5.39

4. Confirm again that the power phase sequence is correct and properly restore the protecting cover of the power cable.

⚠ WARNING

- Select a proper torque according to the screw size.
- Torque which is too small may cause poor contact, resulting in heating of the terminals and fire. Torque that is too large may damage the screws and power supply terminals.

The size of the screws and recommended torque are as follows:

Table 5.7

Screw specification	Standard value (kgf.cm)/(Nm)
M4	12.2/1.2
M6	25/2.5
M8	61.2/6.0

⚠ CAUTION

- During installation, the earth line shall be longer than the current carrying conductor to ensure that when the fixing device is loose, the earth line is still not stressed and can be reliably grounded.
- After installation, close the cover of the electric control box, tighten the screws and seal the wiring hole with a tightening tape. Otherwise, the heat dissipation of the electric control box may be affected, which could shorten the service life of the unit.
- When inserting the strong-current cables and communication lines into the wiring holes, they must be equipped with wiring across rings. Otherwise, they may become worn out by the sheet mental and cause electric leakage or short circuiting.
- The electric control box is fully enclosed. After installation, close the cover of the electric control box, tighten the screws and seal the wiring hole with a tightening tape. Otherwise, the heat dissipation of the electric control box may be affected, which could shorten the service life of the unit.

Outdoor unit wiring diagram

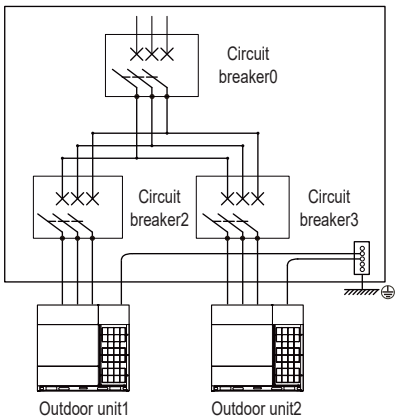


Figure 5.40

⚠ WARNING

- Do not connect the earth line of the lightning rod to the unit shell. The earth lines of the lightning rod and the power cable must be configured separately.
- Each unit shall be equipped with a circuit breaker for protection against short circuiting and abnormal overload. In addition, the indoor and outdoor units shall be equipped with individual main circuit breakers to connect or disconnect the main power supply of the indoor and outdoor units.

5.10.4 Connecting the communication wiring

⚠ WARNING

- Do not connect the communication line when the power is on.
- Connect the shielding nets at both ends of the shielded wire to the sheet metal " ⏚ " of the electronic control box.
- Do not connect the power cable to the terminal of the communication line, otherwise, the mother-board will be damaged.
- It is forbidden to reverse the connection of the two communication ports (to up indoor unit) and (to down indoor unit) of the repeater.

⚠ WARNING

- On-site wiring must comply with the relevant regulations of the local Country/region and must be completed by professionals.
- The communication lines of the indoor and outdoor units can only be led out and connected from the master outdoor unit.
- The outdoor unit is often a parallel type of multi module, and the communication lines between the outdoor units must be connected in a series.
- When a single communication line is not long enough, the joint must be crimped or soldered, and the copper wire at the joint shall not be exposed.

Before connecting the communication wiring, please select the appropriate communication mode according to the type of indoor unit and refer to the following table.

⚠ WARNING

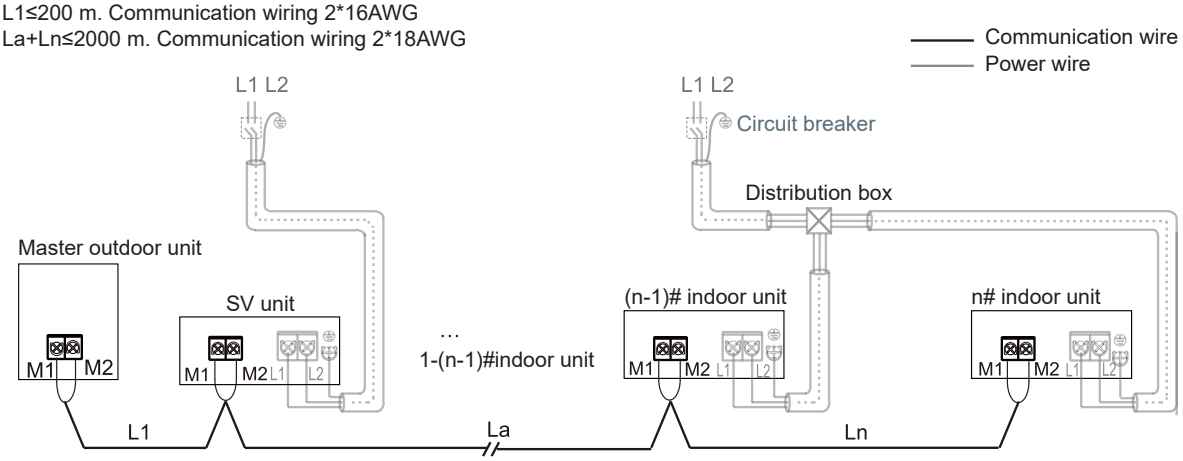
- For the system, the EMI effect of the communication line M1M2 can be improved by adding a magnetic ring. The installation is shown in the figure 5.36. The magnetic ring needs to be fixed with the communi-cation line.

Table 5.8 Communication wiring material

Communication wiring	Material	Wiring length	Wiring diameter
Between outdoor unit and SV	Ordinary PVC-sheathed flexible cable	L ≤ 200 m	≥ 2 x 16 AWG
Between SV and SV			
Between outdoor and outdoor		L ≤ 2 000 m	
Between SV and indoor unit			≥ 2 x 18 AWG

When the power supply of indoor units in the same system is separated, if the total length L of the communication line is greater than200 meters or the total number of indoor units exceeds10, a repeater needs to be added to compensate for the MDV_LINK communication of the main control board of the outdoor unit, thereby enabling the power-off valve function of the indoor unit.

L1≤200 m. Communication wiring 2*16AWG
La+Ln≤2000 m. Communication wiring 2*18AWG



⚠ CAUTION

- Keep the power on/off for all indoor units.
- If the HyperLink (M1 M2) communication is available and is required in the system, you will need to enable the function on the master outdoor unit.For details,refer to saction Table 6.3.
- The communication wiring (M1 M2) must through the magnetic ring from the main board to the indoor units refer to figure 5.36.

- XYE, H1H2 communication wiring

For combinable series

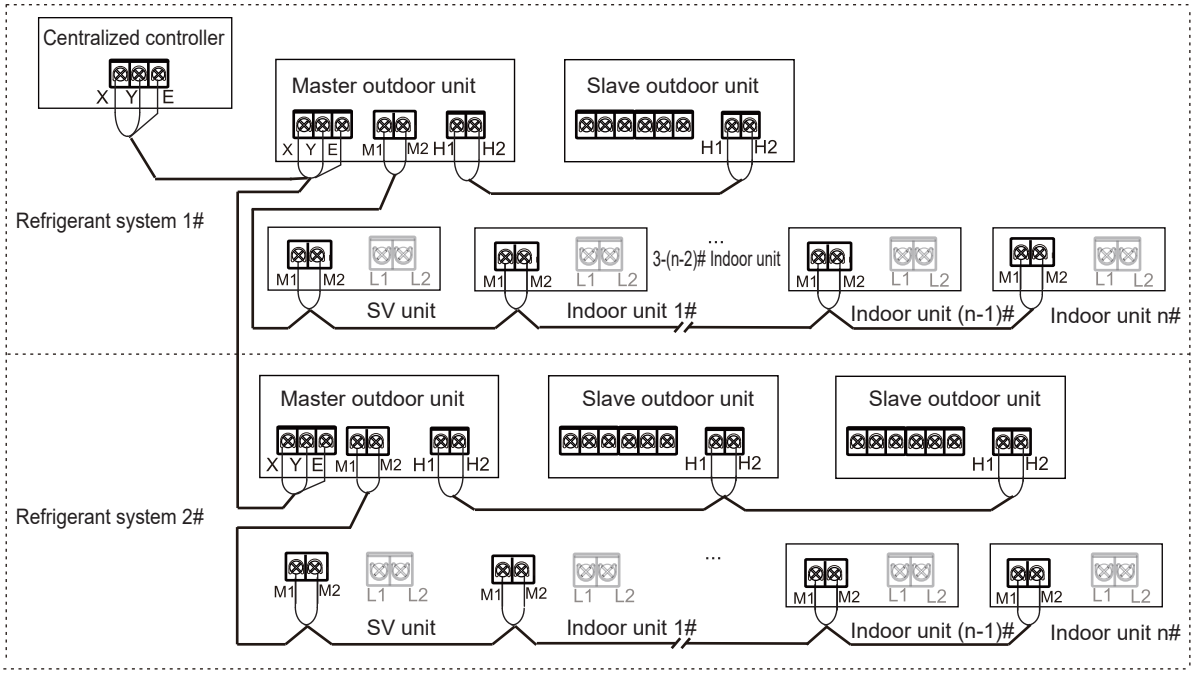


Figure 5.42

⚠ CAUTION

- The H1H2 communication lines of the outdoor unit should be connected in a chain starting from the master unit to the last slave unit. The XYE communication lines of the outdoor unit should be connected to the master unit.
- The cross-sectional area of each core of the communication wiring between outdoor unit and SV unit is not less than 16AWG, and the length must not exceed 200 m.
- The cross-sectional area of each core of the communication wiring between indoor unit and SV unit is not less than 18AWG, and the length must not exceed 2000 m.
- Connect the shielding nets at both ends of the shielded wire to the sheet metal " ⏚ " of the electronic control box.

1. CONFIGURATION

1.1 Overview

This chapter describes how the system configuration can be implemented once the installation is complete and other relevant information.

It contains the following information:

- Implement field settings
- Using the Check function

INFORMATION

The installation personnel should read this chapter.

1.2 Digital Display and Button Settings

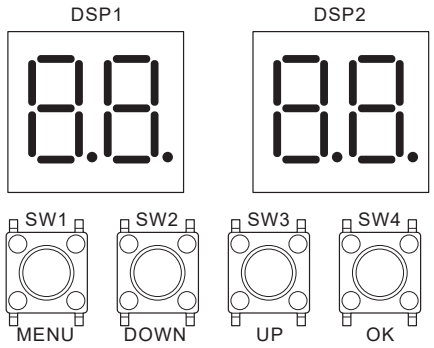


Figure 6.1

6.2.1 Digital display output

Table 6.1

Outdoor unit state	Parameters displayed on DSP1	Parameters displayed on DSP2
Standby	Unit's address	The number of indoor units in communication with the outdoor units
Normal operation	Running speed of the compressor in rotations per second	
Error or protection	Placeholder and error or protection code	
In menu mode	Display menu mode code	
System check	Display system check code	

6.2.2 Function of buttons SW3 to SW6

Table 6.2

Button	Function
SW3 (UP)	In menu mode: previous and next buttons for menu modes. Not in menu mode: previous and next buttons for system check information.
SW2 (DOWN)	
SW1 (MENU)	Enter / exit menu mode.
SW4 (OK)	Confirm to enter specified menu mode.

6.2.3 Menu mode

Only master unit has the full menu functions, slave units only have error code checking and cleaning functions.

1. Press and hold the SW1 “MENU” button for 5 seconds to enter menu mode, and the digital display displays “n1”.

2. Press the SW3 / SW2 “UP / DOWN” button to select the first level menu “n1”, “n2”, “n3”, “n4” or “nb”.

3. Press the SW4 “OK” button to enter the specified first level menu, for example, enter “n4” mode.

4. Press the SW3 / SW2 “UP / DOWN” button to select the second level menu from “n41” to “n47”.

5. Press the SW4 “OK” button to enter the specified second level menu, for example, enter “n43” mode.

6. Press the SW3 / SW2 “UP / DOWN” button to select the specified menu mode code.

7. Press the SW4 “OK” button to enter the specified menu mode.

CAUTION

- Operate the switches and push buttons with an insulated stick (such as a closed ball-point pen) to avoid touching live parts.

Menu mode selection flowchart:

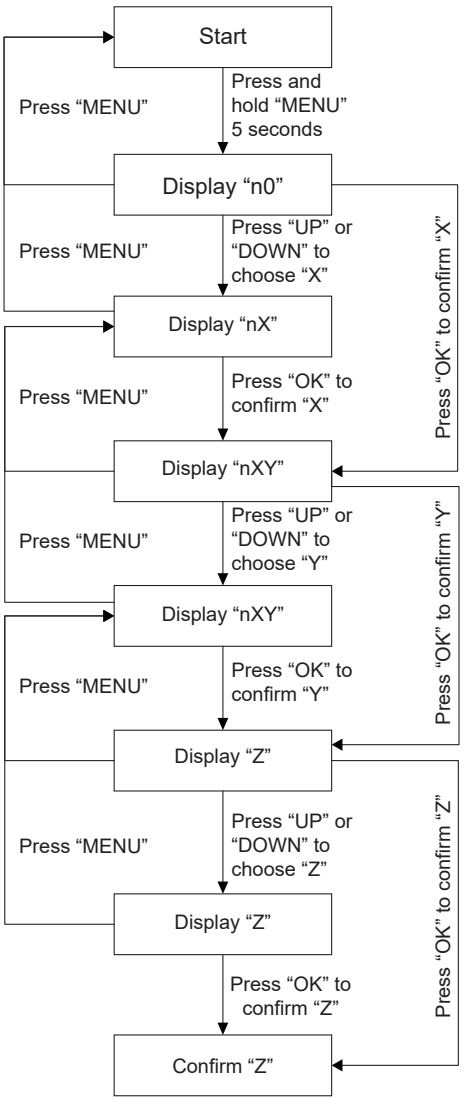


Table 6.3

First level menu	Second level menu	Specified menu mode	Description	Default
n0	0	0	Query history error	-
		1	Cleaning history error	
	1	0	Query indoor unit's address	
		1	Query SV Box unit's address	
		2	Query the address of indoor unit in power-off condition	
		3	Query indoor unit address of refrigerant leakage	
		4	Query SV Box address of refrigerant leakage	
		5	Query indoor unit address with an unconfigured pipeline number	
	2	1	Driver's version (compressor and fan displayed in turn)	
	4	-	Accumulated running time of compressor	
n1	0	-	Shield C26 and C28 error in 3 hours	-
	1	0	Cooling Test	
		1	Heating Test	
		2	Test running	
		4	System refrigerant quantity detection	
	2	0	Refrigerant recovery to outdoor unit	
		1	Refrigerant recovery to indoor unit	
		2	Balance system refrigerant	
	5	-	Vacuum mode	
	6	-	Set No.63(VIP) indoor unit address	
n2	0	0	Automatic priority mode	√
		1	Cooling priority mode	-
		2	VIP indoor unit voting priority mode	
		3	In response to heating mode only	
		4	In response to cooling mode only	
		5	Heating priority mode	
		6	Change over	
		7	Voting priority mode	
		8	First on priority mode	
		9	Capability requirements priority mode	
	1	0	Non silent mode	√
		1	Silent mode 1	-
		2	Silent mode 2	
		3	Silent mode 3	
		4	Silent mode 4	
		5	Silent mode 5	
		6	Silent mode 6	
		7	Silent mode 7	
		8	Silent mode 8	
		9	Silent mode 9	
		A	Silent mode 10	
		B	Silent mode 11	
		C	Silent mode 12	
		D	Silent mode 13	
		E	Silent mode 14	
	2	0	0Pa static pressure	√
		1	20Pa static pressure	-
		2	40Pa static pressure (Customized)	
		3	60Pa static pressure (Customized)	
		4	80Pa static pressure (Customized)	
		5	100Pa static pressure (Customized)	
		6	120Pa static pressure (Customized)	

First level menu	Second level menu	Specified menu mode	Description	Default
n2	3	40	Power limitation mode, Maximum current =MCA * setting value	-
		41		
		42		
		~		
		98		
		99		
		100		√
	4	0	Meta function unavailable	-
		1	Meta function available	√
	5	0	Celsius unit	√
		1	Fahrenheit unit	-
	6	0	Anti-auto snow-blowing mode	√
		1	Auto snow-blowing mode 1	-
		2	Auto snow-blowing mode 2	
	7	0	Auto dust-clean function unavailable	√
		1	Auto dust-clean function available	-
	8	0	Dry contact closing effective	√
		1	Dry contact opening effective	-
	9	0	Mode Switching temperature: 10°C	√
		1	Mode Switching temperature: 16°C	-
		2	Mode Switching temperature: 21°C	
n3	2	0	0m level difference between indoor unit and outdoor unit	√
		1	20m level difference between indoor unit and outdoor unit	-
		2	40m level difference between indoor unit and outdoor unit	
		3	60m level difference between indoor unit and outdoor unit	
		4	80m level difference between indoor unit and outdoor unit	
		5	100m level difference between indoor unit and outdoor unit	
		6	110m level difference between indoor unit and outdoor unit	
	3	0	Method 1: The ODU stops immediately and shows a fault	0
		1	Method 2: The ODU stops after performing refrigerant recovery and shows a fault	
		2	Method 3: Only the leaked IDU stops and shows a fault, and the ODU does not stop or report a failure	
		3	Method 4: The leaked IDU stops and shows a fault, and the ODU stops and shows a fault after running 12 hours	
		4	Method 4: The leaked IDU stops and shows a fault, and the ODU stops and shows a fault after running 24 hours	
		5	Method 5: The leaked IDU stops and shows a fault, and the ODU stops and shows a fault after running 48 hours	
	4	0	Normal	√
		1	High sensible heat mode	-
		2	Low temperature mode	
	7	0	Internal ambient temperature sensor	√
		1	External ambient temperature sensor	-
n4	0	-	Set address of outdoor unit	-
	1	-	Set Network address of outdoor unit	0
	2	-	Set number of indoor units	1
	3	-	Set number of SV Box	1
	4	0	Auto addressing	-
		1	Clear address	
	5	0	V8 communication protocol (RS-485 (P Q) communication)	2
		1	Non-V8 communication protocol (RS-485 (P Q E) communication)	
		2	HyperLink (M1 M2) communication-IDUs uniform power supplied	
		3	HyperLink (M1 M2) communication -IDUs separate power supplied	
n5	0	0	Compressor and fan backup running unavailable	-
		1	Compressor and fan backup running available	√
	1	0	Sensors backup running unavailable	-
		1	Sensors backup running available (Manual)	√
		2	Sensors backup running available (Automatic)	-

First level menu	Second level menu	Specified menu mode	Description	Default
n5	2	1	Backup operation time setting (2 days)	-
		0	Backup operation time setting (1 day	
		2	Backup operation time setting (3 days)	
		3	Backup operation time setting (4 days)	
		4	Backup operation time setting(5 days)	
		5	Backup operation time setting(6 days)	
		6	Backup operation time setting(7 days)	√
n8	7	0	Low noise defrosting mode unavailable	
		1	Low noise defrosting mode available	-
	A	0	Non	-
		1	Branch Pipe shut-off	-
		2	Main Pipe shut-off	√
n9	1	0	Rotation function unavailable	-
		1	Compressor rotation function available	
		2	Outdoor unit rotation function available	√
		3	Compressor + outdoor unit rotation function available	-
	5	-	Release central controller emergency stop	
	7	0	Digital electricity meter	√
		1	Pulse electricity meter	-
	9	0	Non forced test running	√
		1	Forced test running	-
nc	0	0	Dry contact 1 function selection (Cooling only)	-
		1	Dry contact 1 function selection (Heating only)	
		2	Dry contact 1 function selection (Force incapacity requirements)	
		3	Dry contact 1 function selection (Force stop)	√
		5	Dry contact 1 function selection (Refrigerant Leakage)	-
	1	0	Dry contact 2 function selection (Cooling only)	-
		1	Dry contact 2 function selection (Heating only)	
		2	Dry contact 2 function selection (Force incapacity requirements)	
		3	Dry contact 2 function selection (Force stop)	√
		5	Dry contact 2 function selection (Refrigerant Leakage)	-
	2	0	Dry contact 3 function selection (Operation signal)	-
		1	Dry contact 3 function selection (Alarm signal)	√
		2	Dry contact 3 function selection (Compressor running signal)	-
		3	Dry contact 3 function selection (Defrosting signal)	
		4	Dry contact 3 function selection (Refrigerant leakage signal)	

6.2.4 Inspection checklist

Every time you press the UP or DOWN button, the common parameters(Some of the parameters in the following table) will be displayed.After displaying the common parameters, long press the OK button for 5 seconds to display all parameters in sequence. Complete parameters are shown the following table.

DISP	CONTENT	DISCRIPTION
--	“Standby(ODU address + IDU quantity)/ frequency/special status”	
0	ODU address	0~3
1	ODU capacity	Unit: Kw
2	Quantity of ODUs	1~4 (1)
3	Setting quantity of IDUs	Actual quantity
4	Total capacity of ODU system	Displayed on master ODU only (2)
5	Operating mode	[0] OFF ; [2] Cooling ; [3] Heating
6	Target frequency of this ODU	Displacement frequency (3)
7	Target frequency of ODU system	Displacement frequency=DISP. *10
8	Actual frequency of compressor A	Actual frequency
9	Actual frequency of compressor B	Actual frequency
10	Fan speed 1	Unit: RPM
11	Fan speed 2	Unit: RPM
12	High pressure of unit	Actual pressure=DISP. /100 Unit: Mpa
13	Low pressure of unit	Actual pressure=DISP. /100 Unit: Mpa
14	T2/T2A average	Actual temperature=DISP. Unit: C°
15	TES	Actual temperature=DISP. Unit: C°
16	TCS	Actual temperature=DISP. Unit: C°
17	T3	Actual temperature=DISP. Unit: C°
18	T4	Actual temperature=DISP. Unit: C°
19	T5	Actual temperature=DISP. Unit: C°
20	T6A	Actual temperature=DISP. Unit: C°
21	T6B	Actual temperature=DISP. Unit: C°
22	T7C1	Actual temperature=DISP. Unit: C°
23	T7C2	Actual temperature=DISP. Unit: C°
24	T71	Actual temperature=DISP. Unit: C°
25	T72	Actual temperature=DISP. Unit: C°
26	T8	Actual temperature=DISP. Unit: C°
27	Ntc_max	Actual temperature=DISP. Unit: C°
28	T9	Actual temperature=DISP. Unit: C°
29	TL	Actual temperature=DISP. Unit: C°
30	Tg	Actual temperature=DISP. Unit: C°
31	Discharge superheat degree	Actual temperature=DISP. Unit: C°
32	EEVA position	Actual Value=DISP. *24
33	EEVB position	Actual Value=DISP. *24
34	EEVC position	Actual Value=DISP. *4
35	EEVD position	Actual Value=DISP. *4
36	EEVQ position	Actual Value=DISP. *4
37	Primary current	Actual current=DISP./10 Unit: A
38	Inverter compressor A current	Actual current=DISP./10 Unit: A
39	Inverter compressor B current	Actual current=DISP./10 Unit: A
40	DC voltage	Actual voltage Unit: V
41	AC voltage	Actual voltage Unit: V
42	Quantity of online IDUs	Actual quantity
43	Quantity of cooling mode IDUs	Actual quantity

DISP	CONTENT	DISCRIPTION
44	Quantity of heating mode IDUs	Actual quantity
45	Capacity of cooling mode IDUs	Unit: Kw
46	Capacity of heating mode IDUs	Unit: Kw
47	Pow er rationing settings	40%~100%，DISP. *10
48	Silent mode setting	0~14, 14 represents the most silent
49	Static pressure mode	[0] 0Pa
		[1] 20Pa
		[2] 40Pa
		[3] 60Pa
		[4] 80Pa
		[5] 100Pa
		[6] 120Pa
50	Refrigerant volume	[0] No result
		[1] Critically insufficient
		[2] Significantly insufficient
		[3] Normal
		[4] Slightly excessive
		[5] Significantly excessive
51	Dirty blockage rate	0~10, 10 represents the w orst
52	Frequency limitation state	
53	Last error code	
54	Softw are version	

(1) Available for master unit.
(2) Only available for master unit, displayed on slave units has no sense.
(3) Need to convert to current compressor output volume, example: compressor output volume is 55，Target frequency = Actual frequency * 55 / 60.

6.2.5 Field setting

6.2.5.1 SV box Settings

INFORMATION

For the method of setting the SV box address, please refer to the wiring nameplate of the SV box.

Table 6.5 SV box address Settings

Dip switch  ENC	0	The display shows the U38 error code, which means the SV BOX address is not set.
	1 to F	SV BOX address range from 1 to F.

INFORMATION

Set SW 1-2 to ON of SV box, in case of connected indoor unit capacity over 16kW with 2 ports.

Table 6.6 SV EEV synchronous control setting

	Dip switch	EEV synchronous control setting
 SW1	SW1-1: 0	Default, EEVC/D-0 and EEVC/D-1 independent control.
	SW1-1: 1	SV box EEVC/D-0 and EEVC/D-1 synchronous control.
	SW1-2: 0	Default, EEVC/D-2 and EEVC/D-3 independent control.
	SW1-2: 1	SV box EEVC/D-2 and EEVC/D-3 synchronous control.

	Dip switch	EEV synchronous control setting
 SW2	SW2-1: 0	Default, EEVC/D-4 and EEVC/D-5 independent control.
	SW2-1: 1	SV box EEVC/D-4 and EEVC/D-5 synchronous control.
	SW2-2: 0	Default, EEVC/D-6 and EEVC/D-7 independent control.
	SW2-2: 1	SV box EEVC/D-6 and EEVC/D-7 synchronous control.

6.2.5.2 Binding settings for indoor unit address and SV box port number

This series of products uses R32 refrigerant, which is flammable. When used with an SV box, it can cut off the refrigerant flow in case of refrigerant leakage in an indoor unit, thereby reducing the amount of refrigerant leakage. The system provides the following cutoff schemes:

1. Non-one-to-one cutoff scheme: when refrigerant leakage occurs in a single indoor unit, the system shuts down, and all valves of the SV box ports close. (This is the factory default scheme.)

2. One-to-one cutoff scheme: when refrigerant leakage occurs in a single indoor unit, the system does not shut down, and the cutoff valve of the SV box port corresponding to the leaking indoor unit closes. (This function requires manual configuration via menu N33.)

⚠ CAUTION

- Each indoor unit must be bound to the pipeline number with SV box.

⚠ CAUTION

- The automatic matching function of the indoor unit address and SV box port number is greatly affected by the installation environment and the temperature during commissioning, which may lead to incorrect binding of the indoor unit address and SV box port.
- For safety reasons, if you need to enable the one-to-one cutoff scheme, be sure to use the MDT software to bind the indoor unit address and SV box port number.
- Please be sure to bind via MDT after commissioning (after the port auto binding function is executed). Otherwise, the manually bound matching relationship will be cleared after the test run.
- If the system is connected to a centralized controller and the indoor unit address is reset after the indoor unit address and SV box port are bound, please rebind them using one of the following two methods.
- If the system has been serviced, for example, if the outdoor unit main board or indoor unit main board has been replaced, please rebind using one of the following two methods.

⚠ DANGER

When using the one-to-one cutoff scheme, please ensure that each indoor unit is correctly bound to the corresponding SV box port number to prevent fire hazards caused by incorrect cutoff when the indoor unit refrigerant leaks.

- **Automatic matching function of the indoor unit address and SV box port number**

1. For a brand-new system, after all installations are completed, perform a test run. For detailed operation methods, refer to section 7.4 Commissioning implementation. After the test run is completed, the program will automatically execute the automatic binding algorithm for the indoor unit address and port number; just wait for it to complete.

2. If the outdoor unit main board is replaced or the indoor unit address is reset, enter outdoor unit menu N11 and set the value to 12 to execute this function.

- **Binding the indoor unit address and SV box port number by using the MDT software**

1. Preparations

(1) Before using this method, please prepare a laptop with MDT software installed. The MDT software version must be 2.1.1.5 or later.

(2) When installing the SV box pipeline, clearly record the SV box and corresponding port number to which each indoor unit is installed. (It is recommended to record the SV box address code and its port number as tags at the end of the pipeline near the indoor unit side for future troubleshooting.)

(3) Use this method for numbering after the test run and automatic port binding function are completed.

2. Steps for binding using the MDT software

(1) Open the MDT software in version 2.1.1.5 or higher. After logging in, enter the main interface. Click the Midea icon in the upper left corner five consecutive times to obtain special settings permissions. Shown as figure 6.2 below.

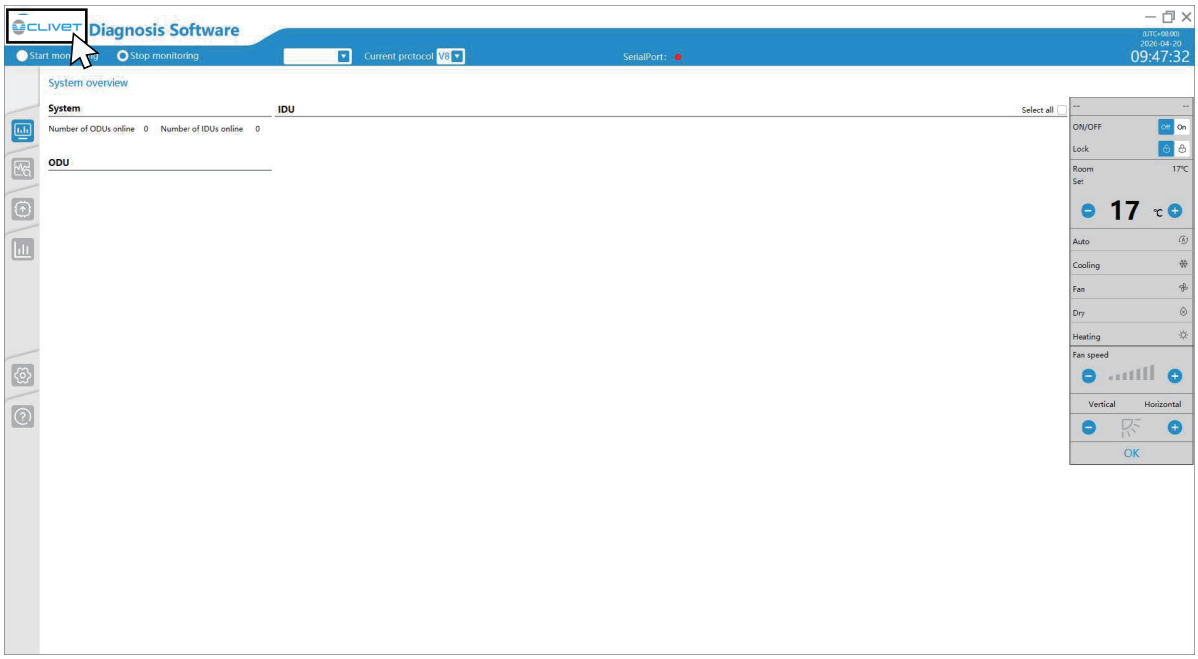


Figure 6.2

(2) Click the settings icon in the lower left corner of the main interface, select the Get Control option, and enter the dynamic password to obtain control permissions. Please contact your local Midea technical support for the dynamic password. Shown as figure 6.3 below.

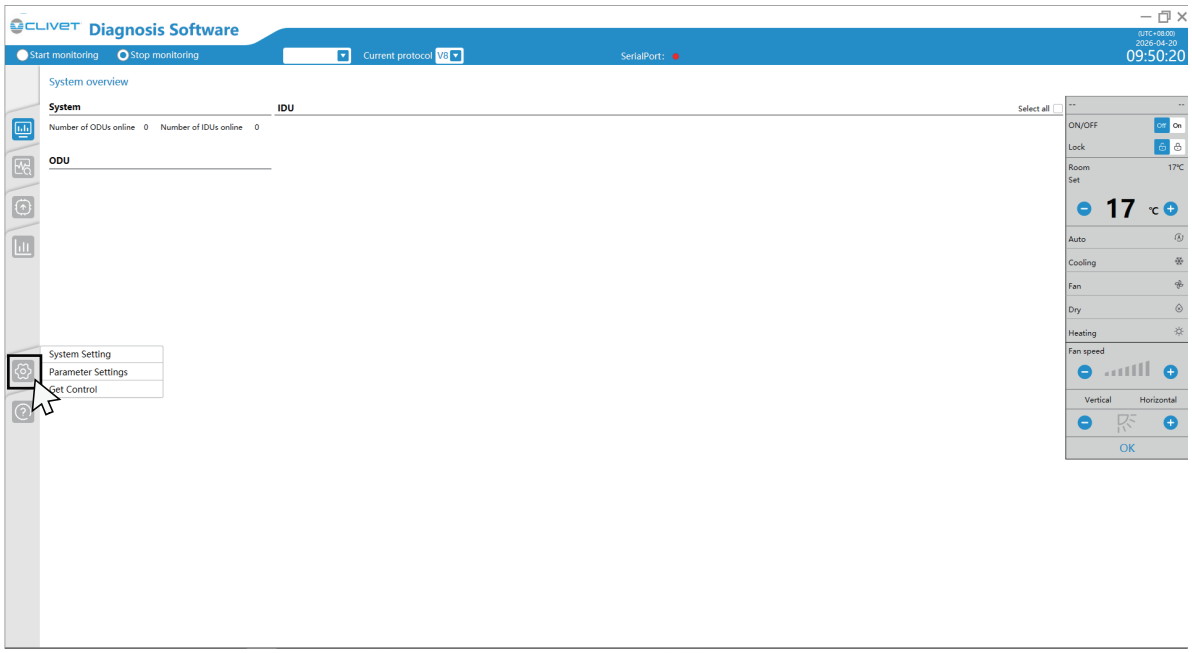


Figure 6.3

(3) Click the parameter icon in the upper left corner of the main interface, select the Developer Control option, and enter the developer control interface. Shown as figure 6.4 below.

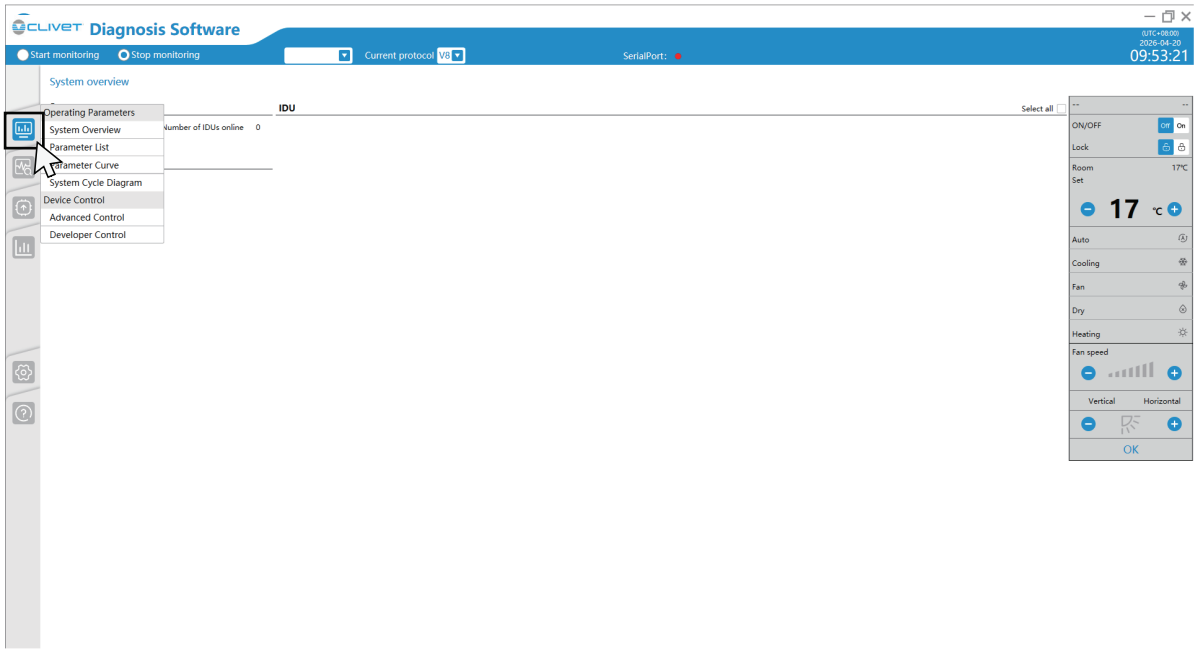


Figure 6.4

(4) In the developer control interface, click ODU Control on the right side of the interface, and find the three parameter items: Bind middleware internal machine address settings, Bind middleware address settings, and Bind middleware pipe number settings from the parameter list. Shown as figure 6.5 below.

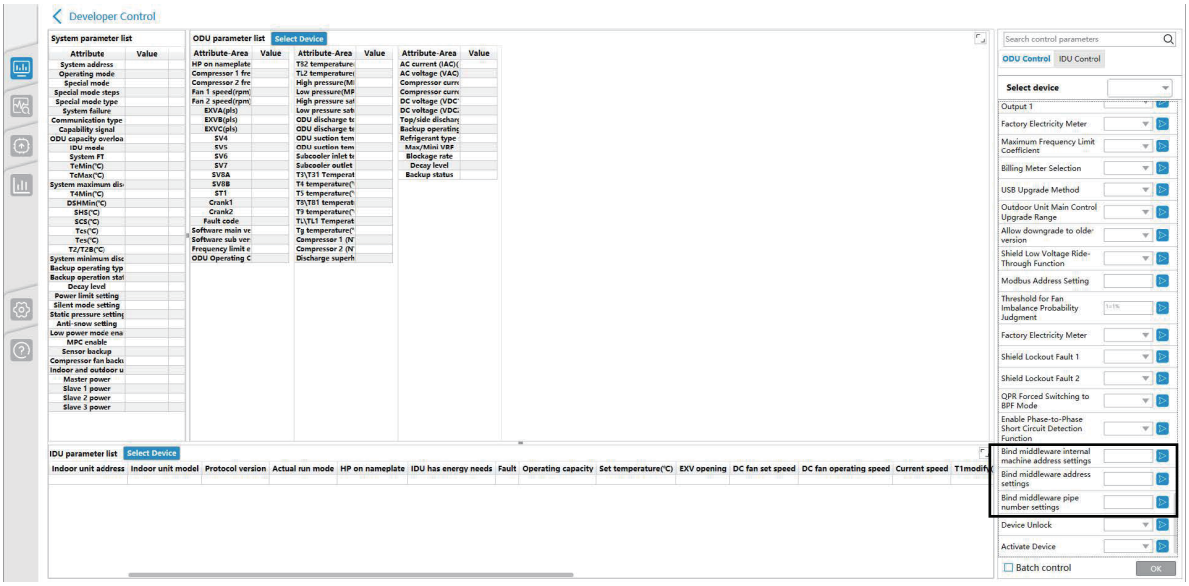


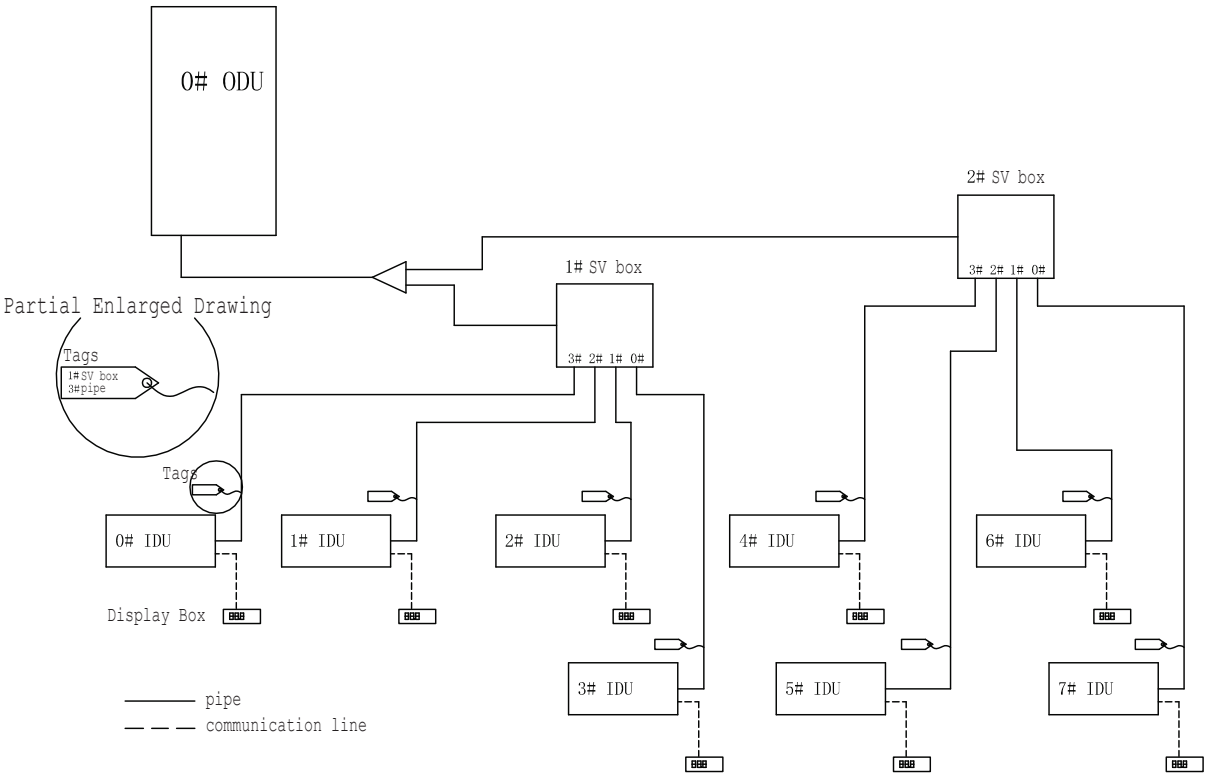
Figure 6.5

(5) Enter the indoor unit address number as recorded during installation, the SV box address number, and port number connected to this indoor unit into the three corresponding parameter boxes mentioned above. Select 0# for the outdoor unit device address, check Batch Control, and then click Send. The indoor unit address, SV BOX address, and SV box port number correspond to the three parame-ters of the Bind middleware internal unit address settings, Bind middleware address settings, and Bind middleware pipe number settings of the MDT software.

(6) Follow the above steps to bind all indoor units in the system to the corresponding SV box port number.

(7) Check whether the above binding relationship is correct by checking the SV box main board menu.

- **System installation in one-to-one cutoff scheme and examples of indoor unit addresses and SV box port number**



(1. According to this manual, the SV box manual, and the indoor unit manual, complete the system installation and set the SV box address on the SV box main board.

2. Before drop ceiling installation, record the SV box address and port number as tags at the end of the pipeline. It is recommended to do this for each SV box port number, as shown in the partial enlarged drawing of figure6.6 above.

3. Perform a system test run.

4. Check the address of each indoor unit through the display receiving board.

5. Record the correspondence between the SV box port number and the indoor unit address in the table. For the system shown in the above figure, information that should be recorded is listed in the table below.

SV Box Address No.	SV Box Port Number	Indoor Unit Address
1#	0#	3#
	1#	2#
	2#	1#
	3#	0#
2#	0#	7#
	1#	6#
	2#	5#
	3#	4#

6. Use the MDT software to bind all indoor unit addresses and SV box port number according to the method described above.

1 COMMISSIONING

1.1 Overview

After installation, and once the field settings have been defined, the installation personnel must verify the correctness of the operations. Follow the steps below to perform the test run.

This chapter describes how the test run can be carried out once the installation is complete, and other relevant information.

The test run usually includes the following stages:

1. Review the section titled “Checklist Before Test Run”.

2. Implement the test run.

3. If necessary, correct the errors before the test run completes with exceptions.

4. Run the system

1.2 Things to Note During Test Run

⚠ WARNING

During the test run, the outdoor unit operates at the same time as the SV boxes and indoor units connected to it. It is very dangerous to debug the SV boxes or indoor units during the test run.

Do not insert fingers, sticks, or other items into the air inlet or outlet. Do not remove the fan mesh cover. When the fan rotation is set at a high speed, it may cause bodily injury.

NOTICE

Note that the required input power may be higher when this unit is run for the first time. This phenomenon is due to the compressor which needs to run for 50 hours before it can achieve a stable operating and power consumption state. Make sure the power supply is turned on 12 hours before operations so that the crankcase heater is properly energized. This is also to protect the compressor.

ⓘ INFORMATION

The test run can be carried out when the ambient temperature is within the required range as in Figure 7.1.

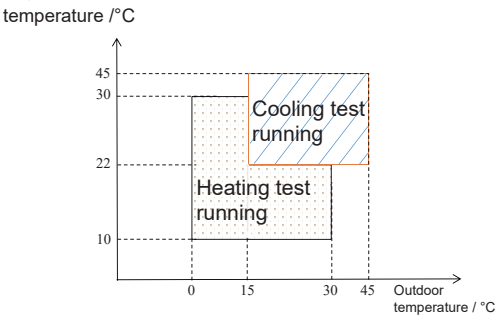


Figure 7.1

During the test run, the outdoor units, SV boxes and indoor units will start at the same time. Make sure all the preparations for the outdoor units, SV boxes and indoor units have been completed.

1.3 Checklist Before Test Run

Once this unit is installed, check the following items first. After all the following checks have been completed, you must shut down the unit. This is the only way to start the unit again.

☐	**Installation** Check if the unit is installed correctly to prevent strange noises and vibrations when the unit starts.
☐	**Field wiring** Based on the wiring schematic and the relevant regulations, make sure the field wiring is based on the instructions described in section 5.10 on connecting wires.
☐	**Earth line** Make sure the earth line is connected correctly, and the grounding terminal is tight.
☐	**Insulation test of the main circuit** Use the megameter of 500V, apply a voltage of 500V DC between the power terminal and the earth terminal. Check that the insulation resistance is above 2 MΩ. Do not use the megameter on the transmission line.
☐	**Fuses, circuit breakers, or protection devices** Check that the fuses, circuit breakers, or locally installed protection devices comply with the size and type specified in section 4.4.1 on the requirements for safety devices. Make sure you use fuses and protection devices.
☐	**Internal wiring** Visually inspect if the connections between the electrical component box and the interior of the unit is loose, or if the electrical components are damaged.
☐	**Piping dimensions and insulation** Make sure the installation piping dimensions are correct, and that insulation work can be carried out normally.
☐	**Stop valve** Make sure the stop valve is open on both the liquid, low pressure and high pressure gas sides.
☐	**Equipment damage** Check for damaged components and extruded piping inside the unit.
☐	**Refrigerant leak** Check for refrigerant leaks inside the unit. If there is a refrigerant leak, try to repair the leak. If the repair is not successful, please call the local agent. Do not come into contact with the refrigerant leaking from the refrigerant piping connections. It may cause frostbite.
☐	**Oil leak** Check if there is oil leaking from the compressor. If there is an oil leak, try to repair the leak. If the repair is not successful, please call the local agent.
☐	**Air inlet/outlet** Check for paper, cardboard or any other material that may obstruct the air inlet and outlet of the equipment.
☐	**Add additional refrigerant** The amount of refrigerant to be added to this unit should be marked on the “Confirmation Table” which is located on the front cover of the electrical control box.
☐	**Installation date and field settings** Make sure the installation date is recorded on the label of the electric control box cover, and the field settings are recorded as well.

1.1 Commissioning implementation

Close all front panels in order to not let it be the cause of misjudgment.

Make sure all field settings you want are set; see chapter 6.

Turn ON the power to the outdoor unit, indoor unit, and SV box.

INFORMATION

Make sure the power supply is turned on 12 hours before operations so that the crankcase heater is properly energized. This is also to protect the compressor.

Step 1: Power on

Cover the lower panel of the outdoor unit, and power on all indoor units, SV box and outdoor units.

Step 2: When the outdoor unit is first powered on, it displays "-. -. -. -.", which means the unit is not commissioned. Long press the "DOWN" and "UP" buttons simultaneously for 5s on the main outdoor unit to enter commissioning mode.

Step 3: Set the number of indoor units in a system

The digital display of the main outdoor unit displays "01 01", where 1st and 2nd digits always on, 3rd and 4th digits flashing. The 3rd and 4th digits represent the number of indoor units, the initial value is 1, short press the "DOWN" or "UP" button to change the number. Once the number of indoor units has been set, short press the "OK" button to confirm and automatically proceed to the next step.

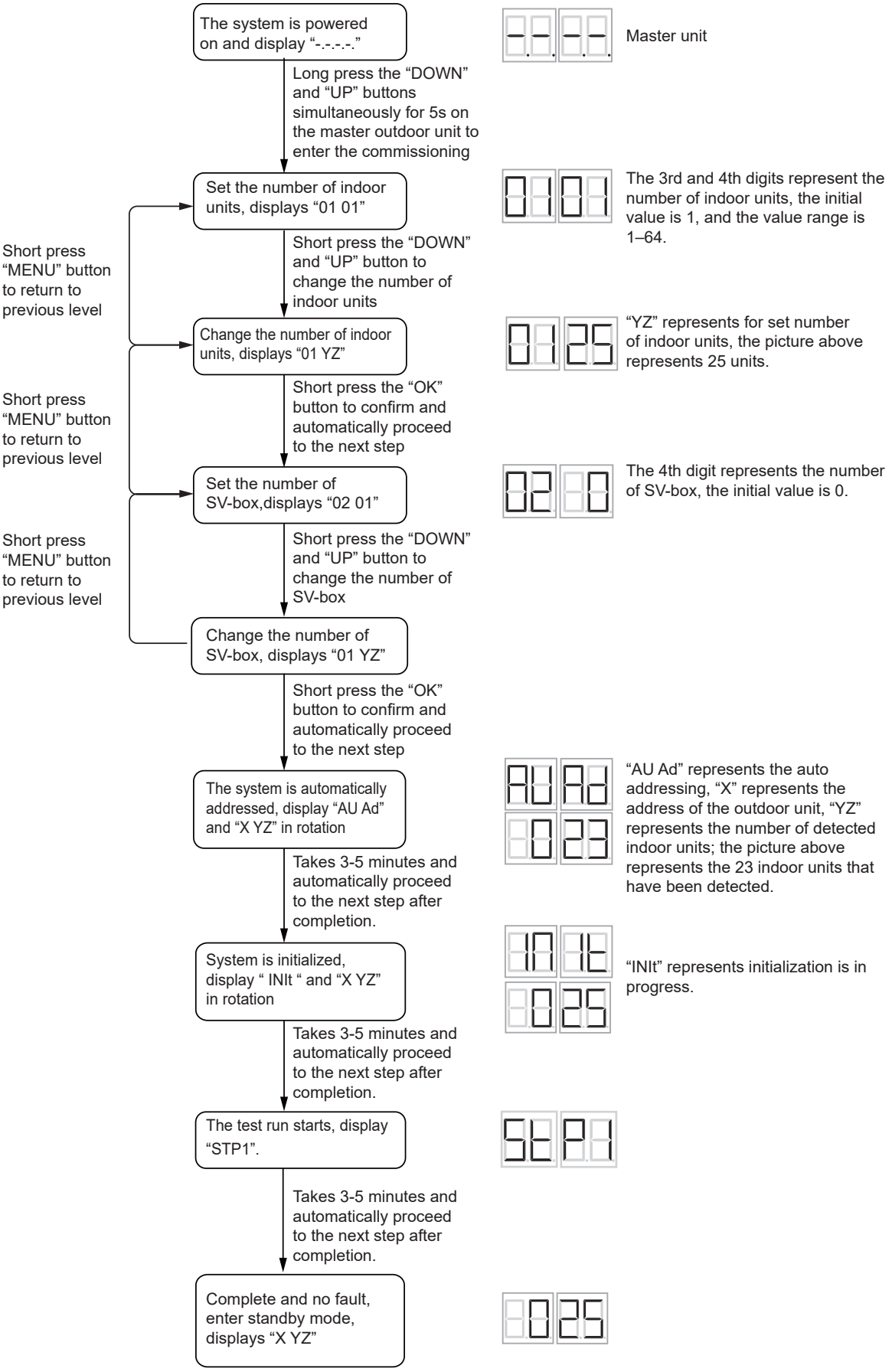
Step 4: Set the number of SV box in a system

The digital display of the main outdoor unit displays "02 01", where 1st and 2nd digits always on, 3rd and 4th digits flashing. The 3rd and 4th digits represent the number of SVs, the initial value is 1, short press the "DOWN" or "UP" button to change the number. Once the number of indoor units has been set, short press the "OK" button to confirm and automatically proceed to the next step.

Step 5: Complete

Upon completion of the automatically addressed, the system will enter the standby mode, and the digital display will show "X YZ" where X represents the outdoor unit address and YZ represents the number of indoor unit(s) detected. Then, the unit can start properly.

commissioning flow chart



1.1 Rectifications after Test Run is Completed with Exceptions

The test run is considered complete when there is no error code on the user interface or the outdoor unit display. When an error code is displayed, rectify the operation based on the description in the error code table. Try to conduct the test run again to check that the exception has been corrected.

INFORMATION

Refer to the installation manual of the indoor unit for details on other error codes related to the indoor unit.

1.2 Operating This Unit

Once the installation of this unit is completed, and the test run of the outdoor and indoor units is done, you can start to run the system.

The indoor unit user interface should be connected to facilitate the operations of the indoor unit. Please refer to the installation manual of the indoor unit for more details.

1. MAINTENANCE AND REPAIR

INFORMATION

Arrange for the installation personnel or service agent to carry out maintenance once every year.

1.1 Overview

This chapter contains the following information:

- Take electrical hazards preventive measures during system maintenance and repair.
- Recovery operation for refrigerant.

1.2 Safety Precautions for Maintenance

NOTICE

Before you carry out any maintenance or repair work, touch the metal parts of the unit to dissipate static electricity and protect the PCB.The appliance shall be disconnected from its power source during service and when replacing parts.

8.2.1 Prevent electrical hazards

When maintaining and repairing the inverter:

1. Do not open the cover of the electrical component box within 5 minutes after the power is switched off.

2. Verify that the power supply is switched off before you use the measuring instrument to measure the voltage between the main capacitor and the main terminal to ensure that the capacitor voltage in the main circuit is less than 36 VDC. The position of the main terminal has been shown in the Wiring nameplate (The port of CN38 on the compressor drive board).

3. Before you come in any contact with the circuit board or components (including the terminals), make sure that static electricity in your own body is eliminated. You can touch the sheet metal of the outdoor unit to achieve this. If conditions permit, please wear an anti-static bracelet.

4. During maintenance, pull out the plug connecting to the power cord of the fan to prevent the fan from rotating when it is windy outside. Strong winds will cause the fan to rotate and generate electricity which can charge the capacitor or terminals, leading to an electric shock. At the same time, do take note of any mechanical damage. The blades of a fan rotating at high speed are very dangerous and cannot be operated by one person alone.

5. Once the maintenance is completed, remember to reconnect the plug to the terminal; otherwise, a fault will be reported for the main control board.

6. When the unit is power on, the fan of the unit with auto snow-blowing function will run periodically, so make sure the power supply is off before touching the unit.

Please refer to the wiring schematic on the back of the box cover of the electrical component box for the relevant details.

1.3 On-site Maintenance for Refrigerant Release

8.3.1 When there are no faults in the system or faults other than fault code A11:

1. When the unit is in a stationary state, set it to the vacuum-pumping mode (n1-5).

2. Release the refrigerant simultaneously from the three locations: the gas line, liquid line and needle valve.

3. Use a vacuum pump to evacuate the system.

WARNING



RISK OF EXPLOSION

Pump down – Refrigerant leakage. If you want to pump down the system, and there is a leak in the refrigerantcircuit:

- Do NOT use the unit's automatic pump down function, with which you can collect all refrigerant from the system into the outdoor unit. Possible consequence: Self-combustion and explosion of the compressor because of air going into the operating compressor.
- Use a separate recovery system so that the unit's compressor does NOT have to operate.

1. TECHNICAL DATA

1.1 Dimensions

NOTE

- Product dimensions may vary slightly due to different panels and the tolerance is ±1-3/16 in(30mm). The actual product shall prevail.
- Product pictures in this manual are for reference only.

FRONT VIEW Unit: mm

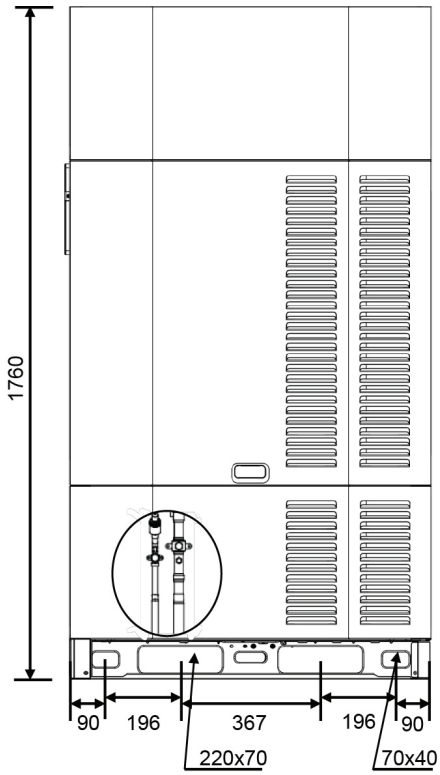


Figure 9.1

Hole for forklift Hole for belt lifting

SIDE VIEW

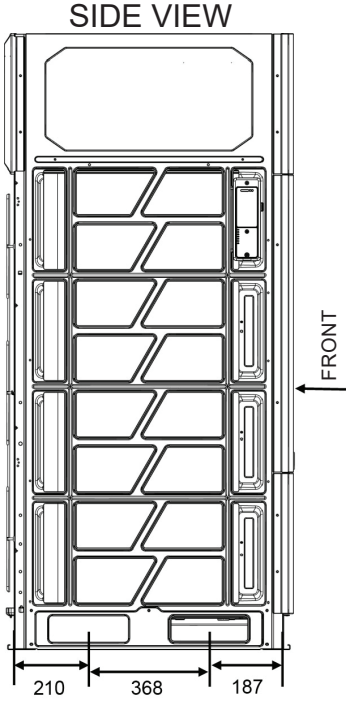


Figure 9.2

TOP VIEW

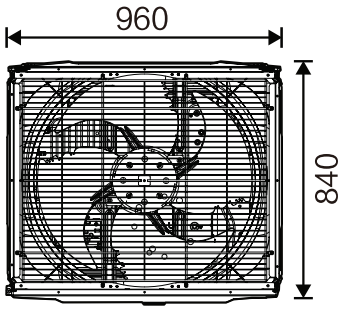
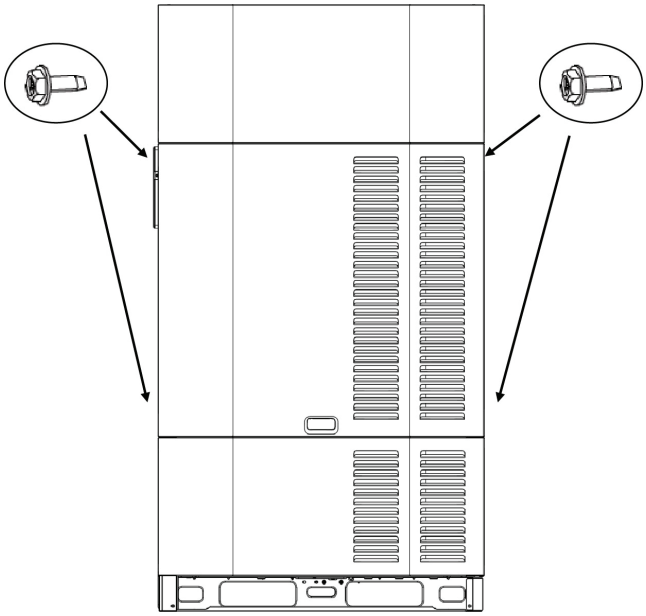


Figure 9.3

Access to internal parts



Remove the panel fixing screws

1.1 Component Layout and Refrigerant Circuits

252T-450T

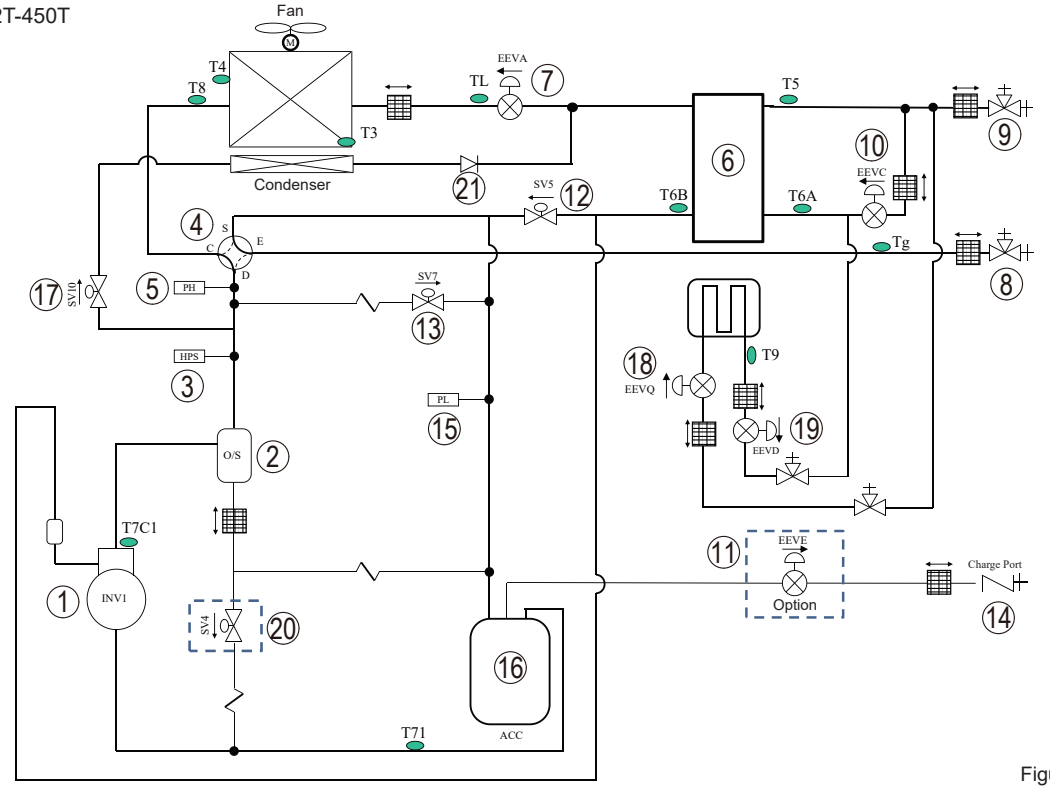


Figure 9.4

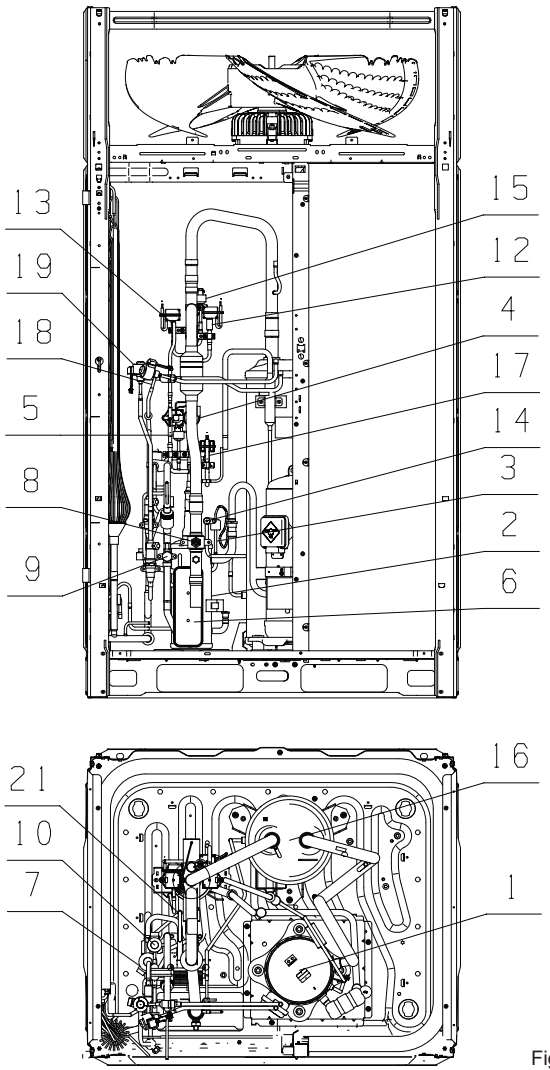


Figure 9.5

	Legend
T3	Main exchanger pipe temperature sensor
T4	Outdoor ambient temperature sensor
T5	Liquid stop valve inlet temperature sensor
T6A	Subcooling heat exchanger inlet temperature sensor
T6B	Subcooling heat exchanger outlet temperature sensor
T71	Suction temperature sensor
T7C1	Discharge temperature sensor
T8	Condenser inlet temperature sensor
T9	Heat sink outlet temperature sensor
Tg	Gas pipe temperature sensor
TL	Condenser outlet temperature sensor

	Legend	
NO.	Part name	
1	DC Inverter compressor	
2	Oil separator	
3	High pressure switch	
4	4-way valve	
5	High pressure sensor	
6	Subcooling heat exchanger	
7	Electronic expansion valve	EEVA
8	Stop valve (gas side)	
9	Stop valve (liquid side)	
10	Electronic expansion valve	EEVC
11	Electronic expansion valve (option)	EEVE
12	Single pass solenoid valve	SV5
13	Single pass solenoid valve	SV7
14	Charge port	
15	Low pressure sensor	
16	Gas-liquid separator	
17	Single pass solenoid valve	SV10
18	Electronic expansion valve	EEVQ
19	Electronic expansion valve	EEVD
20	Single pass solenoid valve (option)	SV4
21	One-Way Valve	

1.1 Outdoor Unit Ducting

The following principles shall be followed when installing the air guide device:

Before installing outdoor unit ducting, be sure to remove the unit's steel mesh cover; otherwise, airflow will be adversely affected.

Each duct should contain no more than one bend.

Vibration isolation should be added to the connection between the unit and the ducting to avoid vibration/noise.

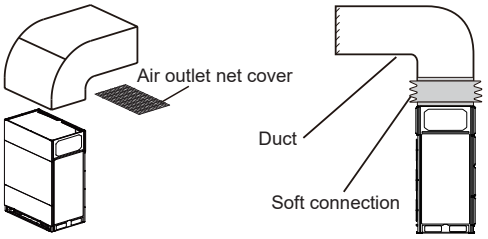


Figure 9.6

- The addition of louvers will affect the air output of the unit, so the use of louvers is not recommended. If you want to use a louver, please keep the shutter angle below 15° and ensure that the effective opening rate of the shutter is more than 90%.
- If more than one outdoor unit needs ducting, each outdoor unit should have independent ducting. A single ducting cannot be shared by multiple outdoor units.
- According to the actual static pressure of the outdoor unit ducting, select an appropriate static pressure mode. Refer to section 6.2.

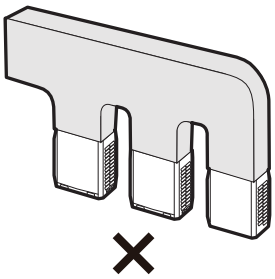


Figure 9.7

Option A: Transverse ducting

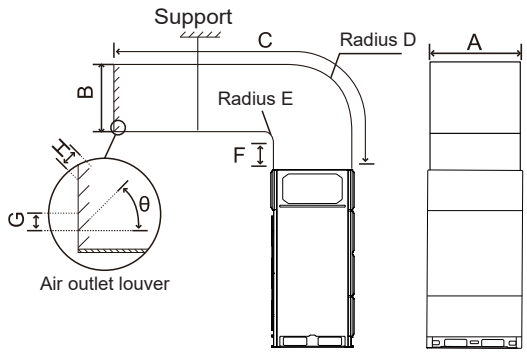


Figure 9.8

Table 9.1 Unit: mm

252T-450T			
A	800	F	≥250
B	770≤B≤800	Θ	≤15°
C	≤3000	G	≥100
D	E+770	H	≤90
E	≥300		

Option B: Transverse ducting

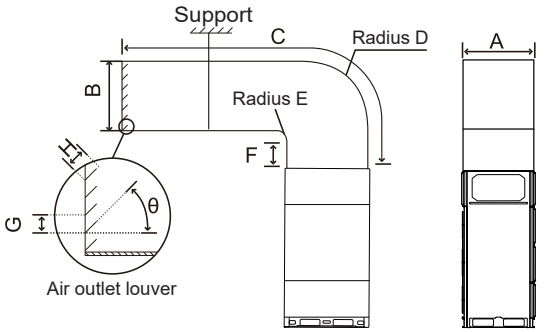


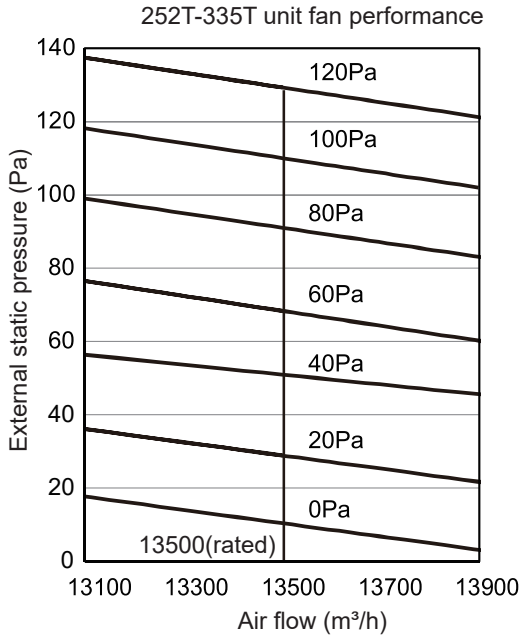
Figure 9.9

Table 9.2 Unit: mm

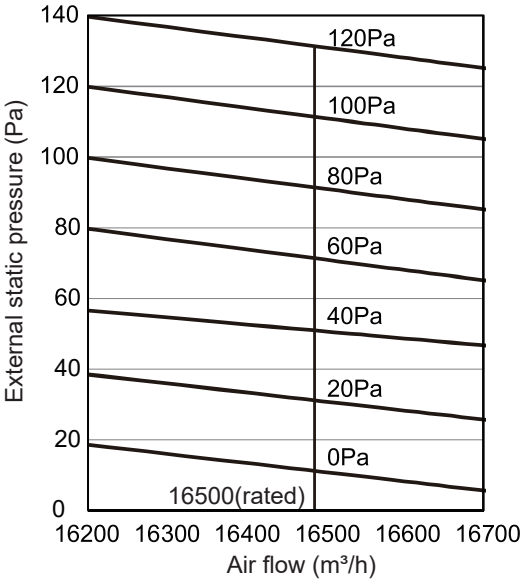
252T-450T			
A	770	F	≥250
B	820	Θ	≤15°
C	≤3000	G	≥100
D	E+800	H	≤90
E	≥300		

ducts connected to an appliance shall not contain a potential ignition source

1.2 Fan Performance



400T-450Tunit fan performance



NOTICE

Static pressure exceeds 20Pa needs to be customized.

1.1 Erp information

252T

Cooling mode:

Information requirements for air-to-air conditioners								
Model(s):CVT9-Y 252T Test matching indoor units form, cassette: 1×Q4DN-3-XY D4+3×Q4DN-3-XY D71								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
Type: compressor driven								
Driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	25.2	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	340.0	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27/19°C dry/wet bulb					Declared energy efficiency ratio or gas utilisation efficiency/ auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=+35°C	P_{dc}	25.2	kW		T_j=+35°C	EER_d	4.00	--
T_j=+30°C	P_{dc}	18.6	kW		T_j=+30°C	EER_d	5.84	--
T_j=+25°C	P_{dc}	11.8	kW		T_j=+25°C	EER_d	9.87	--
T_j=+20°C	P_{dc}	7.62	kW		T_j=+20°C	EER_d	19.60	--
Degradation co-efficient for air conditioners(*)	C_{dc}	0.25	--					
Power consumption in modes other than “active mode”								
Off mode	P_{OFF}	0.006	kW		Crankcase heater mode	P_{CK}	0.006	kW
Thermosat-off mode	P_{TO}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	--	12600	m^3/h
Sound power level, outdoor	L_{WA}	78	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details (*)If C_{dc} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

252T

Heating mode:

Information requirements for heat pumps								
Model(s): CVT9-Y 252T Test matching indoor units form, cassette: 1×Q4DN-3-XY D4+3×Q4DN-3-XY D71								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
If the heater is equipped with a supplementary heater: no								
Driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$	25.2	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	192.2	%
Declared heating capacity for part load at indoor teperature 20°C and outdoor temperatures T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=-7°C	P_{dh}	12.1	kW		T_j=-7°C	COP_d	3.15	--
T_j=+2°C	P_{dh}	7.38	kW		T_j=+2°C	COP_d	4.78	--
T_j=+7°C	P_{dh}	5.5	kW		T_j=+7°C	COP_d	6.54	--
T_j=+12°C	P_{dh}	6.5	kW		T_j=+12°C	COP_d	8.76	--
T_{biv}=bivalent temperature	P_{dh}	13.7	kW		T_{biv} =bivalent temperature	COP_d	2.5	--
T_{OL}=operation temperature	P_{dh}	13.7	kW		T_{OL} =operation temperature	COP_d	2.5	--
Bivalent temperature	T_{biv}	-10	°C					
Degradation co-efficient for heat pumps(**)	C_{dh}	0.25	--					
Power consumption in modes other than “active mode”					Supplementary heater			
Off mode	P_{OFF}	0.006	kW		Back-up heating capacity(*)	elbu	0	kW
Thermosat-off mode	P_{TO}	0.006	kW		Type of energy input			
Crankcase heater mode	P_{CK}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air heat pump: air flow rate, outdoor measured	--	12600	m^3/h
Sound power level,outdoor	L_{WA}	78	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details								
(*)								
(**)If C_{dh} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split heat pumps, xthe test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

280T

Cooling mode:

Information requirements for air-to-air conditioners								
Model(s): CVT9-Y 280T Test matching indoor units form, cassette:3×Q4DN-3-XY D7+1×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
Type: compressor driven								
Driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	28	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	332.2	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27/19°C dry/wet bulb					Declared energy efficiency ratio or gas utilisation efficiency /auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=+35°C	P_{dc}	28	kW		T_j=+35°C	EER_d	3.55	--
T_j=+30°C	P_{dc}	20.7	kW		T_j=+30°C	EER_d	5.56	--
T_j=+25°C	P_{dc}	13.1	kW		T_j=+25°C	EER_d	9.88	--
T_j=+20°C	P_{dc}	7.8	kW		T_j=+20°C	EER_d	19.6	--
Degradation co-efficient for air conditioners(*)	C_{dc}	0.25	--					
Power consumption in modes other than “active mode”								
Off mode	P_{OFF}	0.006	kW		Crankcase heater mode	P_{CK}	0.006	kW
Thermosat-off mode	P_{TO}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	--	12600	m^3/h
Sound power level, outdoor	L_{WA}	79	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details (*)If C_{dc} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

280T

Heating mode:

Information requirements for heat pumps								
Model(s): CVT9-Y 280T Test matching indoor units form, cassette: 3×Q4DN-3-XY D7+1×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
If the heater is equipped with a supplementary heater: no								
Driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$	28	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	192.2	%
Declared heating capacity for part load at indoor teperature 20°C and outdoor temperatures T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=-7°C	P_{dh}	14.15	kW		T_j=-7°C	COP_d	3	--
T_j=+2°C	P_{dh}	8.63	kW		T_j=+2°C	COP_d	4.79	--
T_j=+7°C	P_{dh}	5.76	kW		T_j=+7°C	COP_d	6.6	--
T_j=+12°C	P_{dh}	6.4	kW		T_j=+12°C	COP_d	8.5	--
T_{biv}=bivalent temperature	P_{dh}	16	kW		T_{biv} =bivalent temperature	COP_d	2.55	--
T_{OL}=operation temperature	P_{dh}	16	kW		T_{OL} =operation temperature	COP_d	2.55	--
Bivalent temperature	T_{biv}	-10	°C					
Degradation co-efficient for heat pumps(**)	C_{dh}	0.25	--					
Power consumption in modes other than “active mode”					Supplementary heater			
Off mode	P_{OFF}	0.006	kW		Back-up heating capacity(*)	elbu	0	kW
Thermosat-off mode	P_{TO}	0.006	kW		Type of energy input			
Crankcase heater mode	P_{CK}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air heat pump: air flow rate, outdoor measured	--	12600	m^3/h
Sound power level,outdoor	L_{WA}	78	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details								
(*)								
(**)If C_{dh} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split heat pumps, xthe test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

335T

Cooling mode:

Information requirements for air-to-air conditioners								
Model(s): CVT9-Y 335T Test matching indoor units form, cassette: 3×Q4DN-3-XY D4+3×Q4DN-3-XY D71								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
Type: compressor driven								
Driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	33.5	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	324.2	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27/19°C dry/wet bulb					Declared energy efficiency ratio or gas utilisation efficiency/ auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=+35°C	P_{dc}	33.5	kW		T_j=+35°C	EER_d	3.45	--
T_j=+30°C	P_{dc}	24.8	kW		T_j=+30°C	EER_d	5.46	--
T_j=+25°C	P_{dc}	15.7	kW		T_j=+25°C	EER_d	9.6	--
T_j=+20°C	P_{dc}	8.5	kW		T_j=+20°C	EER_d	19.1	--
Degradation co-efficient for air conditioners(*)	C_{dc}	0.25	--					
Power consumption in modes other than “active mode”								
Off mode	P_{OFF}	0.006	kW		Crankcase heater mode	P_{CK}	0.006	kW
Thermosat-off mode	P_{TO}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	--	14400	m^3/h
Sound power level, outdoor	L_{WA}	82	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details (*)If C_{dc} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

335T

Heating mode:

Information requirements for heat pumps								
Model(s): CVT9-Y 335T Test matching indoor units form, cassette: 3Q4DN-3-XY D45+3×Q4DN-3-XY D71								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
If the heater is equipped with a supplementary heater: no								
Driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$	33.5	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	189	%
Declared heating capacity for part load at indoor teperature 20°C and outdoor temperatures T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=-7°C	P_{dh}	16.28	kW		T_j=-7°C	COP_d	3	--
T_j=+2°C	P_{dh}	9.91	kW		T_j=+2°C	COP_d	4.64	--
T_j=+7°C	P_{dh}	6.4	kW		T_j=+7°C	COP_d	6.53	--
T_j=+12°C	P_{dh}	6.2	kW		T_j=+12°C	COP_d	8.4	--
T_{biv}=bivalent temperature	P_{dh}	18.4	kW		T_{biv} =bivalent temperature	COP_d	2.5	--
T_{OL}=operation temperature	P_{dh}	18.4	kW		T_{OL} =operation temperature	COP_d	2.5	--
Bivalent temperature	T_{biv}	-10	°C					
Degradation co-efficient for heat pumps(**)	C_{dh}	0.25	--					
Power consumption in modes other than “active mode”					Supplementary heater			
Off mode	P_{OFF}	0.006	kW		Back-up heating capacity(*)	elbu	0	kW
Thermosat-off mode	P_{TO}	0.006	kW		Type of energy input			
Crankcase heater mode	P_{CK}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air heat pump: air flow rate, outdoor measured	--	14400	m^3/h
Sound power level,outdoor	L_{WA}	82	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details								
(*)								
(**)If C_{dh} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split heat pumps, xthe test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

400T

Cooling mode:

Information requirements for air-to-air conditioners								
Model(s): CVT9-Y 400T Test matching indoor units form, cassette: 2×Q4DN-3-XY D4+4×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
Type: compressor driven								
Driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	40	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	322.2	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27/19°C dry/wet bulb					Declared energy efficiency ratio or gas utilisation efficiency /auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=+35°C	P_{dc}	40	kW		T_j=+35°C	EER_d	3.3	--
T_j=+30°C	P_{dc}	29.47	kW		T_j=+30°C	EER_d	5.24	--
T_j=+25°C	P_{dc}	18.95	kW		T_j=+25°C	EER_d	9.22	--
T_j=+20°C	P_{dc}	8.8	kW		T_j=+20°C	EER_d	20.7	--
Degradation co-efficient for air conditioners(*)	C_{dc}	0.25	--					
Power consumption in modes other than “active mode”								
Off mode	P_{OFF}	0.006	kW		Crankcase heater mode	P_{CK}	0.006	kW
Thermosat-off mode	P_{TO}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	--	15600	m^3/h
Sound power level, outdoor	L_{WA}	84	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details (*)If C_{dc} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

400T

Heating mode:

Information requirements for heat pumps								
Model(s): CVT9-Y 400T Test matching indoor units form, cassette: 2×Q4DN-3-XY D4+4×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
If the heater is equipped with a supplementary heater: no								
Driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$	40	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	189	%
Declared heating capacity for part load at indoor teperature 20°C and outdoor temperatures T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=-7°C	P_{dh}	19.46	kW		T_j=-7°C	COP_d	3.06	--
T_j=+2°C	P_{dh}	11.85	kW		T_j=+2°C	COP_d	4.65	--
T_j=+7°C	P_{dh}	7.7	kW		T_j=+7°C	COP_d	6.47	--
T_j=+12°C	P_{dh}	7.8	kW		T_j=+12°C	COP_d	8.3	--
T_{biv}=bivalent temperature	P_{dh}	22	kW		T_{biv} =bivalent temperature	COP_d	2.5	--
T_{OL}=operation temperature	P_{dh}	22	kW		T_{OL} =operation temperature	COP_d	2.5	--
Bivalent temperature	T_{biv}	-10	°C					
Degradation co-efficient for heat pumps(**)	C_{dh}	0.25	--					
Power consumption in modes other than “active mode”					Supplementary heater			
Off mode	P_{OFF}	0.006	kW		Back-up heating capacity(*)	elbu	0	kW
Thermosat-off mode	P_{TO}	0.006	kW		Type of energy input			
Crankcase heater mode	P_{CK}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air heat pump: air flow rate, outdoor measured	--	15600	m^3/h
Sound power level,outdoor	L_{WA}	84	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details								
(*)								
(**)If C_{dh} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split heat pumps, xthe test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

450T

Cooling mode:

Information requirements for air-to-air conditioners								
Model(s):CVT9-Y 450T Test matching indoor units form, cassette: 1×Q4DN-3-XY D7+5×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
Type: compressor driven								
Driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	45	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	317	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27/19°C dry/wet bulb					Declared energy efficiency ratio or gas utilisation efficiency/ auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=+35°C	P_{dc}	45	kW		T_j=+35°C	EER_d	3.1	--
T_j=+30°C	P_{dc}	33.16	kW		T_j=+30°C	EER_d	5.1	--
T_j=+25°C	P_{dc}	21.32	kW		T_j=+25°C	EER_d	8.98	--
T_j=+20°C	P_{dc}	9.4	kW		T_j=+20°C	EER_d	21.6	--
Degradation co-efficient for air conditioners(*)	C_{dc}	0.25	--					
Power consumption in modes other than “active mode”								
Off mode	P_{OFF}	0.006	kW		Crankcase heater mode	P_{CK}	0.006	kW
Thermosat-off mode	P_{TO}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	--	15600	m^3/h
Sound power level, outdoor	L_{WA}	85	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details (*)If C_{dc} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

450T

Heating mode:

Information requirements for heat pumps								
Model(s): CVT9-Y 450T Test matching indoor units form, cassette: 1×Q4DN-3-XY D7+5×Q4DN-3-XY D80								
Outdoor side heat exchanger of air conditioner: air								
Indoor side heat exchanger of air conditioner: air								
If the heater is equipped with a supplementary heater: no								
Driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heating capacity	$P_{rated,h}$	45	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	187.4	%
Declared heating capacity for part load at indoor teperature 20°C and outdoor temperatures T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
T_j=-7°C	P_{dh}	21.89	kW		T_j=-7°C	COP_d	2.86	--
T_j=+2°C	P_{dh}	13.33	kW		T_j=+2°C	COP_d	4.62	--
T_j=+7°C	P_{dh}	8.57	kW		T_j=+7°C	COP_d	6.8	--
T_j=+12°C	P_{dh}	8.2	kW		T_j=+12°C	COP_d	8.9	--
T_{biv}=bivalent temperature	P_{dh}	24.75	kW		T_{biv} =bivalent temperature	COP_d	2.5	--
T_{OL}=operation temperature	P_{dh}	24.75	kW		T_{OL} =operation temperature	COP_d	2.5	--
Bivalent temperature	T_{biv}	-10	°C					
Degradation co-efficient for heat pumps(**)	C_{dh}	0.25	--					
Power consumption in modes other than “active mode”					Supplementary heater			
Off mode	P_{OFF}	0.006	kW		Back-up heating capacity(*)	elbu	0	kW
Thermosat-off mode	P_{TO}	0.006	kW		Type of energy input			
Crankcase heater mode	P_{CK}	0.006	kW		Standby mode	P_{SB}	0.006	kW
Other items								
Capacity control	variable				For air-to-air heat pump: air flow rate, outdoor measured	--	15600	m^3/h
Sound power level,outdoor	L_{WA}	85	dB					
GWP of the refrigerant		675	kg $CO_{2\ eq}$ (100years)					
Contact details								
(*)								
(**)If C_{dh} is not determined by measurement, then the default degradation coefficient of heat pumps shall be 0.25.								
Where information relates to multi-split heat pumps, xthe test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.								

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