Hydro Unit
Installation manual

VHED***S6-5P

- Thank you for purchasing this Lennox Product.
- Before operating this unit, please read this manual carefully and retain it for future reference.

LENNOX Powered by SAMSUNG

Contents

Safety Information

⚠ WARNING

- Hazards or unsafe practices that may result in severe personal injury or death.

⚠ CAUTION

- Hazards or unsafe practices that may result in minor personal injury or property damage.
- Carefully follow the precautions listed below because they are essential to guarantee the safety of the equipment.

⚠ WARNING

- Always disconnect the air conditioner from the power supply before servicing it or accessing its internal components.
- Verify that installation and testing operations are performed by qualified personnel.
- Verify that the air conditioner is not installed in an easily accessible area.

Symbol	Meaning
	Flammable gas
	Flammable materials
Refrigerant Safety Group A2L	Refrigerant safety group
	Read operating manual
	Refer to operating manual
	Read service manual

⚠ WARNING

The installation and testing of this appliance must be performed by a qualified technician.

- The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe installation of the appliance.

Always install the air conditioner in compliance with current local, state, and federal safety standards.

Do not use means to accelerate the defrost operation or to clean, other than those recommended by Lennox.

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

General information

⚠ WARNING

- Carefully read the content of this manual before installing the air conditioner and store the manual in a safe place in order to be able to use it as reference after installation.
- For maximum safety, installers should always carefully read the following warnings.
- Store the operation and installation manual in a safe location and remember to hand it over to the new owner if the air conditioner is sold or transferred.
- The use of other types of units with different control systems may damage the units and invalidate the warranty. The manufacturer shall not be responsible for damages arising from the use of non compliant units.
- The manufacturer shall not be responsible for damage originating from unauthorized changes or the improper connection of electric and requirements set forth in the "Operating limits" table, included in the manual, shall immediately invalidate the warranty.
- The air conditioner should be used only for the applications for which it has been designed: the indoor unit is not suitable to be installed in areas used for laundry.
- Do not use the units if damaged. If problems occur, switch the unit off and disconnect it from the power supply.
- In order to prevent electric shocks, fires or injuries, always stop the unit, disable the protection switch and contact Lennox's technical support if the unit produces smoke, if the power cable is hot or damaged or if the unit is very noisy.

Safety Information

- Always remember to inspect the unit, electric connections, refrigerant tubes and protections regularly. These operations should be performed by qualified personnel only.
- The unit contains moving parts, which should always be kept out of the reach of children.
- After unpacking the air conditioner, keep all packaging materials well out of the reach of children, as packaging materials can be dangerous to children.
  - If a child places a bag over its head, it may result in suffocation.
- Do not attempt to repair, move, alter or reinstall the unit. If performed by unauthorized personnel, these operations may cause electric shocks or fires.
- Do not place containers with liquids or other objects on the unit.
- The packing material and exhaust batteries of the remote controller(optional) must be disposed of in accordance with current laws.
- The air conditioner contains a refrigerant that has to be disposed of as special waste. At the end of its life cycle, the air conditioner must be disposed of in authorised centres or returned to the retailer so that it can be disposed of correctly and safely.
- Wear protective equipment (such as safety gloves, goggles, and headgear) during installation and maintenance work. Installation/repair technicians may be injured if protective equipment is not properly equipped.
- This unit is a partial unit air conditioner, complying with partial unit requirements of this International Standard, and must only be connected to other units that have been confirmed as complying with corresponding partial unit requirements of this International Standard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.
  Children should be supervised to ensure they do not play with the appliance.

Installing the unit

⚠ WARNING

IMPORTANT: When installing the unit, always remember to connect first the refrigerant tubes, then the electrical lines.

- Always disassemble the electric lines before the refrigerant tubes.
- Upon receipt, inspect the product to verify that it has not been damaged during transport. If the product appears damaged, DO NOT INSTALL it and immediately report the damage to the carrier or retailer (if the installer or the authorized technician has collected the material from the retailer.)
- During the transportation of the indoor unit, the pipelines shall be covered with brackets for protection. Do not move the product by holding the refrigerant or drain pipe connections.
  - It may cause gas leakage.
- After completing the installation, always carry out a functional test and provide the instructions on how to operate the air conditioner to the user.
- Do not use the air conditioner in environments with hazardous substances or close to equipment that release free flames to avoid the occurrence of fires, explosions or injuries.
- Do not install the product on a ship or a vehicle (such as a campervan). Salt, vibration or other environmental factors may cause the product to malfunction, electric shock or fire.
- Excessive indoor humidity or clogged condensate drain lines may cause water to drip from indoor units. Do not install the indoor unit where dripping could result in property damage, such as over electronic equipment or other sensitive instruments.
- Our units should be installed in compliance with the spaces shown in the installation manual, to ensure accessibility from both sides and allow repairs or maintenance operations to be carried out. The unit's components should be accessible and easy to disassemble without endangering people and objects. For this reason, when provisions of the installation manual are not complied with, the cost required to access and repair the units (in SAFETY CONDITIONS, as set out in prevailing regulations) with harnesses, ladders, scaffolding or any other elevation system will NOT be considered part of the warranty and will be charged to the end customer.
- If any gas or impurities, except R-32 refrigerant, come into the refrigerant pipe, a serious problem may occur and it may cause injury.
  Use the supplied accessories, specified components and tools for the installation.
  - Do not use the pipe and the installation product used for the R-410A refrigerant.
  - Failure to use the specified components can cause the product to fall, water leakage, electrical shock, and fire. (The pipe and flare components used for R-410A refrigerant must not be used)

Power supply line, fuse or circuit breaker

⚠ WARNING

- Always make sure that the power supply is compliant with current safety standards. Always install the air conditioner in compliance with current local safety standards.
- Always verify that a suitable grounding connection is available.
- Verify that the voltage and frequency of the power supply comply with the specifications and that the installed power is sufficient to ensure the operation of any other domestic appliance connected to the same electric lines.
- Always verify that the cut-off and protection switches are suitably dimensioned.
- Verify that the air conditioner is connected to the power supply in accordance with the instructions provided in the wiring diagram included in the manual.
- Always verify that electric connections (cable entry, section of leads, protections...) are compliant with the electric specifications and with the instructions provided in the wiring scheme. Always verify that all connections comply with the standards applicable to the installation of air conditioners.
- Devices disconnected from the power supply should be completely disconnected in the condition of overvoltage category.
- Fix the outdoor unit firmly so that the electric part of the outdoor unit is not exposed.
  - Failing to do so may result in electric shock or fire.
- Do not pull or excessively bend the power line. Do not twist or tie the power line. Do not hook the power line over a metal object, place a heavy object on the power line, insert the power line between objects, or push the power line into the space behind the appliance.
  - This may result in electric shock or fire.
- Use the power line with the power specifications of the product or higher and use the power line for this appliance only. In addition, do not use an extension line.
  - Extending the power line may result in electric shock or fire.
  - Do not use an electric transformer. This may result in electric shock or fire.
  - If the voltage/frequency/rated current condition is different, it may cause fire.

⚠ CAUTION

- Make sure that you earth the cables.
  - Do not connect the earth wire to the gas pipe, water pipe, lighting rod or telephone wire. If earthing is not complete, electric shock or fire may occur.
- Install the circuit breaker.
  - If the circuit breaker is not installed, electric shock or fire may occur.
- Make sure that the condensed water dripping from the drain hose runs out properly and safely.
- Install the power cable and communication cable of the indoor and outdoor unit at least 1m away from the electric appliance.
- Install the indoor unit away from lighting apparatus using the ballast.
  - If you use the wireless remote control, reception error may occur due to the ballast of the lighting apparatus.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons to avoid a hazard.
- Do not use the indoor unit for the preservation of food items, plants, equipment, and artwork. This may cause deterioration of their quality.
- Do not install the indoor unit if it has any drainage problems.
- This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.
- LEAK DETECTION SYSTEM installed. Unit must be powered except for service.

Precautions for using R-32 refrigerant

General

- This product uses mildly flammable gas classified as A2L. The following precautions and instruction manuals must be followed during installation, operation, servicing and decommissioning of the product.
- The appliance shall be stored in a room without continuously operating ignition sources, like open flames or a gas appliance or an electric heater.
- All national and local regulations shall be observed at all times.
- All pipe-work including piping material, pipe routing and installation shall include protection from physical damage in operation and service, and comply 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 before being covered or enclosed.
- All field piping and joints shall be pressure tested with an inert gas according to prevalent industry standards before refrigerant charging and system commissioning.

Safety Information

- Where additional field charging is required. The installer shall write with a permanent marker the field charge added on the ODU label provided, such that the Total Charge = Factory 'Pre-charge' + field charge.
- For ducted systems, any auxiliary systems that are potential ignition sources shall not be installed in the duct work. Examples of ignition sources are hot surfaces with temperatures exceeding 1292 °F (700 °C) and electric switching devices.
- Any auxiliary device installed must be approved by Lennox and must be suitable for operating with the refrigerant marked on the label.
- For mechanical ventilation the lower edge of the air extraction opening shall not be more than 3.94 inch (100 mm) above the floor. The exhaust location outside the building must be at least 9.84 ft (3 m) away from the building opening and mechanical air intake openings.
- To handle, purge, and dispose of the refrigerant, or break into the refrigerant circuit, the worker should have a certificate from an industry-accredited authority.
- Non-ducted systems may be installed in areas such as false ceilings not being used as return air plenum if the conditioned air does not mix with the air in the false ceilings.
- For ducted appliances false ceilings or drop ceilings may be used as return air plenum if a refrigerant leak detection system is provided in the system and any external connections are also provided with a sensor immediately below the return air plenum duct joint.
- Installation, servicing, and any type of maintenance or repair must be performed by certified personnel who are competent to carry out such activity following national and local regulations.

General information on Servicing

- Do not work in a confined space. Ensure adequate ventilation is provided at the workspace during the entirety of the duration of the work to safely disperse any released refrigerant.
- All maintenance staff and others working in the local area shall be instructed on the nature of the work being performed and instructed to follow all instructions provided by Lennox, national and local authorities.
- The area shall be checked with an approved refrigerant detector before and during any work on the system.
- Have a dry CO_2 fire extinguisher adjacent to the charging area and workspace.
- The service personnel shall not use any ignition sources in a manner that may lead to the risk of fire or explosion.
- Potential ignition sources shall be kept away from the work area where the flammable refrigerant can be released into the surrounding area.
- The work area should be checked to ensure that there are no flammable hazards or ignition risks. The "No Smoking" sign shall be attached.
- Under no circumstances shall potential sources of ignition be used upon detection of leakage.

The following checks shall be applied to installations and maintenance operations.

- The actual total refrigerant charge is in accordance with the room size.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- Markings on the equipment are visible and legible.
- Refrigerant pipes or components are installed in a position where they are unlikely to be exposed to any substance that may corrode refrigerant containing components.

Initial checks of electrical devices shall include the following.

- that capacitors are discharged safely to avoid sparking.
- that no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity to earth bonding.
- Check that cabling is not worn, corroded or damaged in any manner.

Electrical repair safety measures

- All electrical components used or replaced must be to Lennox's specifications.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- Sealed electrical components and intrinsically safe components shall be replaced and not repaired.
- Cabling should be protected from excessive vibration, pressure, sharp edges, and other adverse environmental factors.

Detection of flammable refrigerants

- Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Make sure that the detector is not a potential source of ignition.
- Leak detection equipment shall be set at a percentage of the LFL (Lower flammable limit) of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.

- The use of detergents containing chlorine shall be avoided for cleaning because the chlorine may react with the refrigerant and corrode the piping.
- If leakage is suspected, naked flames shall be removed.
- If a leakage is found while brazing, the entire refrigerant shall be recovered from the product or isolated (e.g. using shut-off valves). It shall not be directly released into the environment. Oxygen-free nitrogen (OFN) shall be used for purging the system before and during the brazing process.
- The work area shall be checked with an appropriate refrigerant detector before and during work.
- Ensure that the leakage detector is appropriate for use with flammable refrigerants.

Removal and Evacuation

- When removing refrigerant for servicing it is recommended to remove the entire quantity.
- When removing refrigerant follow local and national regulations and follow best practices including;
  - evacuate;
  - purge the circuit with inert gas (optional for A2L);
  - evacuate (optional for A2L);
  - continuously flush or purge with inert gas when using a flame to open the circuit; and
  - open the circuit.
- Use proper recovery cylinders appropriate for the type of refrigerant.
- Follow prescribed industry best practices for purging and evacuation.
- Oxygen free nitrogen shall be used for purging the system.

Charging procedure

- Follow industry standard refrigerant charging best practices.
- Before recharging the system shall be pressure tested with oxygen free nitrogen gas.
- Ensure that contamination of different refrigerants does not occur when charging.
- Cylinders shall be kept in the appropriate position as per instructions.
- The refrigerant system should be grounded before charging the system.
- Label the system when charging is completed.
- Take extreme care not to overfill the refrigeration system.
- The system shall be leak tested on completion of charging before commissioning.

Decommissioning

- Only qualified licensed professionals shall perform refrigerant recovery and decommissioning.
- Isolate the system electrically.
- All recovery equipment and cylinders shall conform to appropriate standards. Only approved cylinders, with pressure relief valves, for the type of refrigerant shall be used.
- Recover refrigerant following industry standard procedure for flammable refrigerants.
- When draining compressors oil care must be taken that there is no flammable refrigerant in the unit and that the unit is not hot. Oil should be handled according to local and federal regulations.
- After decommissioning, the system shall be labeled stating that it has been decommissioned. The label shall be dated and signed. The label should state that it "contains flammable refrigerant".
- Ensure that there are labels on the equipment indicating the equipment contains flammable refrigerant.
- Recovered refrigerant shall not be mixed or reused. It shall be processed according to national, state and local regulations.

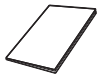
About Refrigerant Detection System(RDS)

- This system includes a refrigerant detection system (RDS) and automatic leak mitigation controls.
- When a leak is detected, the RDS will stop the compressor and display an error code.
- The RDS sensor does automatic self-test each hour and does not require any periodic maintenance.
- The sensor should be replaced upon end of life when error code E700 is displayed.
- For complete replacement instructions, please refer to the Service Manual.
- The RDS sensor must only be replaced with sensors as specified by Lennox. Sensor replacement must be performed by a certified technician.

Installation Procedure

Step 1 Checking and preparing accessories

The following accessories are supplied with the indoor unit. The type and quantity may differ, depending on the specifications.

Installation manual	Drain plug
	
Drain cap	**Wi-Fi Kit**
	
Temp. Sensor for Water Tank	
	

Step 2 Checking the installation information

Installation information on a Hydro HE

- This product should be connected with outdoor unit of the VRF
- The combinations of the installation.
  - This product should be combined among 50~130% of outdoor unit's capacity.
  - When this product would be combined with heat pump outdoor units for 130~180% combination rate, it need to meet the conditions below.

    a The combination rate for indoor units : Under the 100% of the A2A indoor units + Under the 80% of the Hydro unit.

    b A2A indoor units should be operated for cooling mode only, and Hydro unit should be operated for heating mode(including floor heating) only.

    c It is not possible to operate A2A indoor units and Hydro unit at the same time.

- Recommended specification of the strainer

Model type	HE			
Model name	VHED036S6-5P	VHED048S6-5P	VHED096S6-5P	VHED144S6-5P
Work pressure	1.0 MPa (145 psi)			
Work temperature	-4 ~ 95 °F (-20 ~ 35 °C)			
Water pipe connection part	NPT1" (25A)		NPT1-1/4" (32A)	
Mesh size	50 Mesh			
Material (Strainer/Mesh)	AISI316/SUS304			

Step 3 Choosing the installation location

Installation location requirements

- Install the indoor unit on place that can support its weight.
- Maintain sufficient clearance around the indoor unit.
- Before installing the indoor unit, be sure to check whether the chosen location is well-drained.
- The indoor unit must be installed such that it is beyond public access and is not touchable by users.
- Rigid wall without vibration.
- Where it is not exposed to direct sunshine.
- A location where animals cannot access and urinate on the product. Ammonia may be generated.
- The amount of refrigerant to add differs, depending on the installation conditions (e.g., the total piping length and the indoor unit combination), and the minimum indoor-unit installation area depends on the final amount of refrigerant.
  Be sure to install by referring to the minimum indoor-unit installation area depending on the final refrigerant amount, provided in the refrigerant amount table in the outdoor unit installation manual.

⚠ WARNING

- Because your air conditioner contains R-32 refrigerant, make sure that it is installed, operated, and stored in a room whose floor area is larger than the minimum required floor area specified.

- Refer to the "R-32 system arrangement requirements" section in the user manual for the combined outdoor units, and use a permanent marker pen to write down the indoor-unit installation area for the final refrigerant amount in the "Minimum Room Area" section on the "Rating label" on the indoor unit.

  ※ This information is mandatory for "Annex 101.DVF Caution/Warning Standards" and must be filled in. If it is not filled in, the installer will be held responsible for any breakage or damage.

⚠ CAUTION

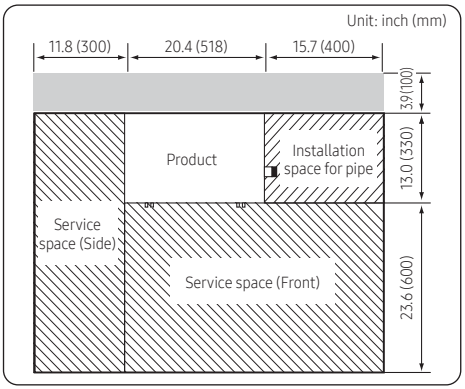
- As a rule, the unit cannot be installed at a height of less than 2.0 ft (0.6 m).

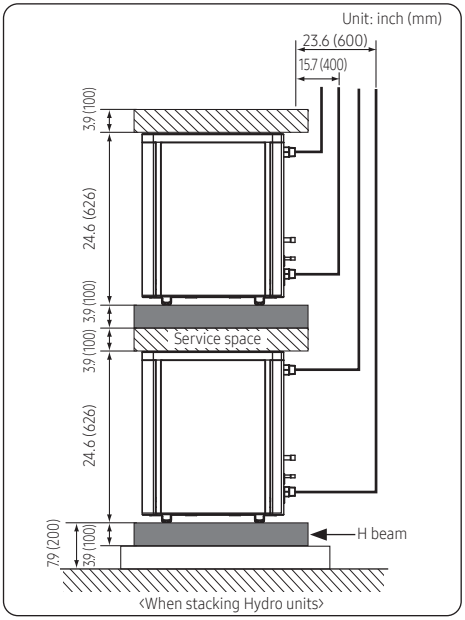
Do not install the air conditioner in following places.

- Place where there is mineral oil or arsenic acid. Resin parts flame and the accessories may drop or water may leak. The capacity of the heat exchanger may reduce or the air conditioner may be out of order.
- A place with exposure to mineral oil, oil vapour or cooking area where there is spray (If oil adheres to the heat exchanger, performance degradation, spray or condensation scattering may occur. If oil adheres to a plastic component, the component may deform or get damaged. Such issues may result in a system failure or refrigerant leak.)
- A place with aromatic diffusers, aromatherapy, scented candles or perfumes as the chemicals may react to the product's materials and may result in system failure or refrigerant leaks.
- The place where corrosive gas such as sulphuric acid gas generates from the vent pipe or air outlet.
- The copper pipe or connection pipe may corrode and refrigerant may leak.
- The place where there is a machine that generates electromagnetic waves. The air conditioner may not operate normally due to control system.
- The place where there is a danger of existing combustible gas, carbon fibre or flammable dust.
- The place where thinner or gasoline is handled.
- Gas may leak and it may cause fire.
- The place where is close to heat sources.
- Do not use the indoor unit for preservation of food items, plants, equipment, and art works. This may cause deterioration of their quality.
- Do not install the indoor unit if it has any drainage problem.

Space requirements for installation

- When installing the product, make sure to secure minimum clearance with obstacles as shown below.
- When you install one product on top of the other one, secure at least 23.6 inch (600 mm) of space on the water pipe side.



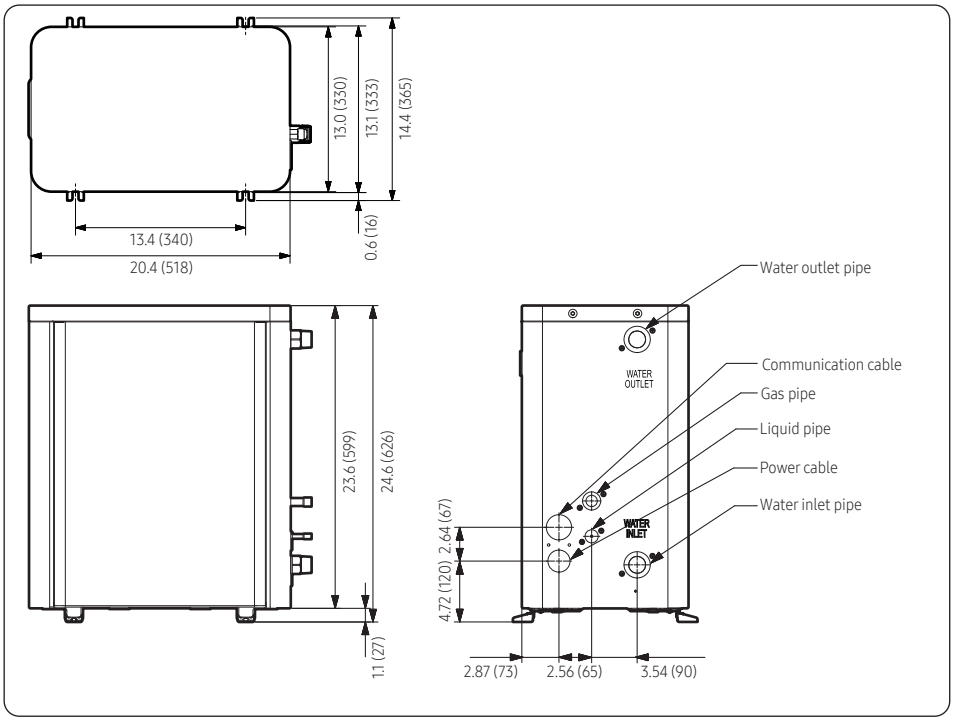


<When stacking Hydro units>

Installation Procedure

Indoor unit dimensions

Unit: inch (mm)



Model of the Hydro unit		VHED036S6-5P VHED048S6-5P	VHED096S6-5P	VHED144S6-5P
Refrigerant side	Liquid side connection part	Ø9.52 (3/8")	Ø9.52 (3/8")	Ø12.7 (1/2")
	Gas side connection part	Ø15.88 (5/8")	Ø22.23 (7/8")	Ø28.58(1-1/8")
Water side connection part		NPT1" (25A)	NPT1" (25A)	NPT1-1/4" (32A)

Step 4 Installing the indoor unit

⚠ WARNING

- If this product is installed in residential area, apply anti-vibration product to prevent the vibration from transferring to the building.
- Manufacturer is not responsible for the damage occurred by not following the installation standards.

1 Considering the vibration and weight of the Hydro unit, strength of the base ground must be strong enough to prevent noise and the top part of the base ground has to be flat.

2 Base ground should be 1.5 times larger than the bottom of the Hydro unit.

3 It is necessary to add wire mesh or steel bar during concrete construction for the base ground to prevent damages or cracks.

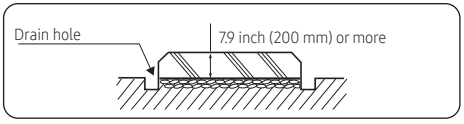
4 Place the Hydro unit on the base construction and completely fix it with the bolt, nut and washer. (The bearing force has to be over 3.5 kN)

5 Fix the Hydro unit firmly with 4 foundation bolts.

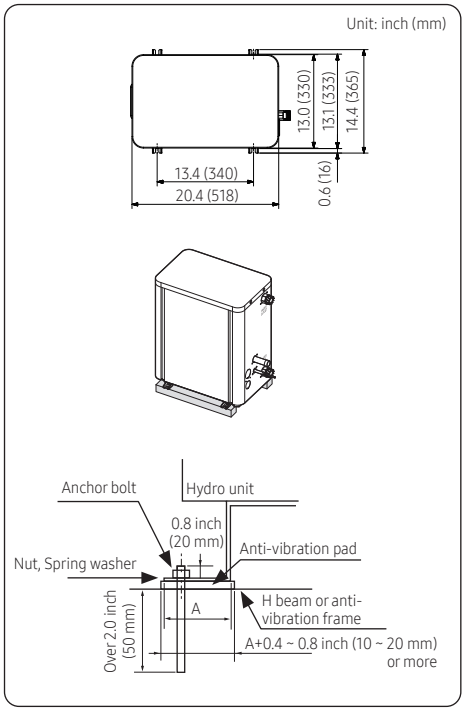
6 When concrete construction for Hydro unit installation is completed, install an anti-vibration pad(t=0.79 inch (20 mm) or more) or an anti-vibration frame(vibration transmissibility=5 % and below) to prevent vibration of the outdoor unit from transferring to the base ground.

7 When constructing base ground, Hydro unit must be supported within the range of following dimensions.

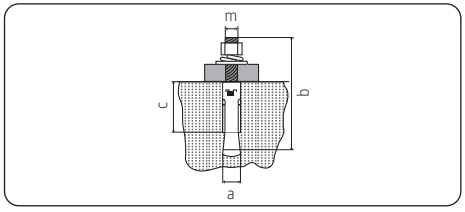
Base ground construction



Hydro unit installation



Anchor specification



Size	Diameter of drill bit (a)	Anchor length (b)	Sleeve length (c)	Insert depth	Fastening torque
3/8" (M10)	0.6 inch (14 mm)	3.0 inch (75 mm)	1.6 inch (40 mm)	2.0 inch (50 mm)	22.1 lbf·ft (30 N·m)

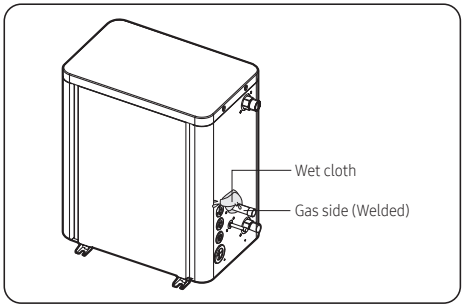
Installation Procedure

Step 5 Purging inert gas from the indoor unit

From the factory, the unit is supplied and set with a pre-charge of nitrogen gas. Therefore, all inert gas must be purged before connecting the assembly piping.

Unscrew the pinch pipe at the end of each refrigerant pipe.

Result : All inert gas escapes from the indoor unit.



NOTE

- The designs and shape are subject to change according to the model.
- To prevent dirt or foreign objects from getting into the pipes during installation, do NOT remove the pinch pipe completely until you are ready to connect the piping.

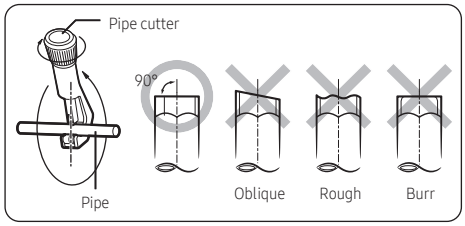
⚠ CAUTION

- Connect the indoor and outdoor units using pipes with flared connections(not supplied). For the lines, use insulated, unwelded, degreased and deoxidized copper pipe (Cu DHP type to ISO 1337 or UNI EN 12735-1), suitable for operating pressures of at least 4.2MPa(609.1 psi) and for a burst pressure of at least 20.7MPa(3002.2 psi). Copper pipe for hydro-sanitary applications is completely unsuitable.
- For sizing and limits (height difference, line length, max. bends, refrigerant charge, etc.) see the outdoor unit installation manual.
- All refrigerant connection must be accessible, in order to permit either unit maintenance or removing it completely.

Step 6 Cutting and flaring the pipes

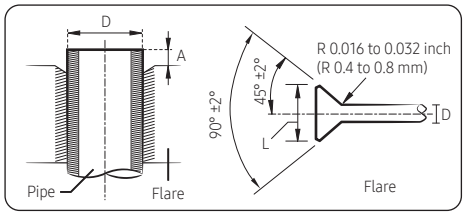
1 Make sure that you have the required tools available: pipe cutter, reamer, flaring tool, and pipe holder.

2 If you wish to shorten the pipes, cut them with a pipe cutter, ensuring that the cut edge remains at a 90° angle to the side of the pipe. Refer to the illustrations below for examples of edges cut correctly and incorrectly.



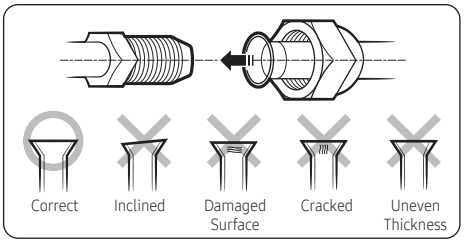
3 To prevent any gas from leaking out, remove all burrs at the cut edge of the pipe, using a reamer.

4 Slide a flare nut on to the pipe and modify the flare.



Outer Diameter (D)		Depth (A)		Flare dimension (L)	
mm	inch	mm	inch	mm	inch
Ø6.35	1/4	1.3	0.051	8.7 to 9.1	0.34 to 0.36
Ø9.52	3/8	1.8	0.071	12.8 to 13.2	0.50 to 0.52
Ø12.70	1/2	2.0	0.079	16.2 to 16.6	0.64 to 0.65
Ø15.88	5/8	2.2	0.087	19.3 to 19.7	0.76 to 0.78
Ø19.05	3/4	2.2	0.087	23.6 to 24.0	0.93 to 0.94

5 Check that the flaring is correct, referring to the illustrations below for examples of incorrect flaring.

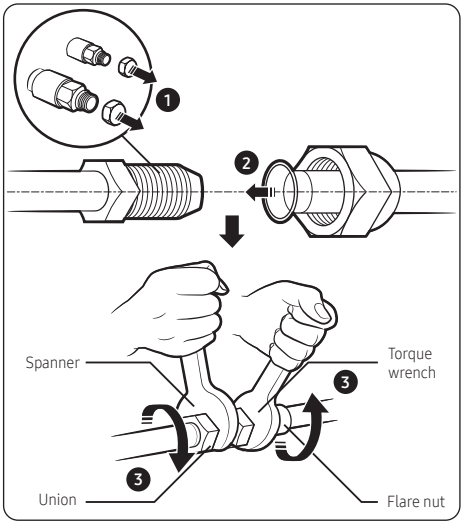


Step 7 Connecting the assembly pipes to the refrigerant pipes

There are two refrigerant pipes of different diameters :

- A smaller one for the liquid refrigerant.
- A larger one for the gas refrigerant. The inside of copper pipe must be clean and have no dust.

1 Remove the pinch pipe on the pipes and connect the assembly pipes to each pipe, tightening the nuts, first manually and then with a torque wrench, a spanner applying the following torque.



Outer Diameter		Torque	
mm	inch	N·m	lbf·ft
Ø6.35	1/4	14 to 18	10.3 to 13.3
Ø9.52	3/8	34 to 42	25.1 to 31.0
Ø12.70	1/2	49 to 61	36.1 to 45.0
Ø15.88	5/8	68 to 82	50.2 to 60.5
Ø19.05	3/4	100 to 120	73.8 to 88.5

(1 N•m=10 kgf•cm)

NOTE

- If the pipes must be shortened, see Step 6 Cutting and flaring the pipes on page 12.

2 Be sure to use an insulator thick enough to cover the refrigerant tube to protect the condensate water on the outside of the pipe falling onto the floor and to improve the efficiency of the unit.

3 Cut off any excess foam insulation.

4 Make sure that there are no cracks or waves on the bent area.

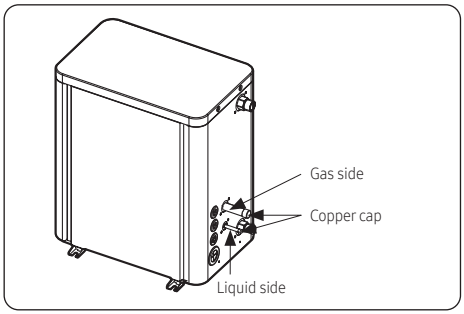
5 It would be necessary to double the insulation thickness (0.39 inch (10 mm) or more) to prevent condensation even on the insulator when if the installed area is warm and humid.

6 Do not use joints or extensions for the pipes connecting the indoor and outdoor units.

⚠ CAUTION

- Connect the indoor and outdoor units using pipes with flared connections(not supplied). For the lines, use insulated, unwelded, degreased and deoxidized copper pipe (Cu DHP type to ISO 1337 or UNI EN 12735-1), suitable for operating pressures of at least 4.2MPa(609.1 psi) and for a burst pressure of at least 20.7MPa(3002.2 psi). Copper pipe for hydro-sanitary applications is completely unsuitable.
- For sizing and limits (height difference, line length, max. bends, refrigerant charge, etc.) see the outdoor unit installation manual.
- All refrigerant connection must be accessible, in order to permit either unit maintenance or removing it completely.
- If the pipes require brazing, make sure that oxygen free nitrogen (OFN) is flowing through the system.
- Nitrogen blowing pressure range is 0.02 to 0.05 MPa.

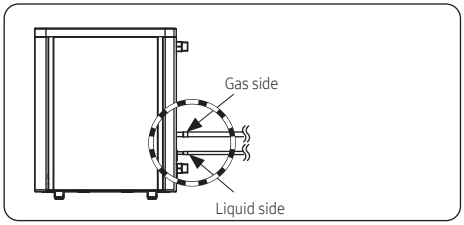
Installation Procedure



Step 8 Performing the gas leak test

To identify potential gas leaks in the indoor unit, inspect the connection area of each refrigerant pipe using a leak detector for R-32.

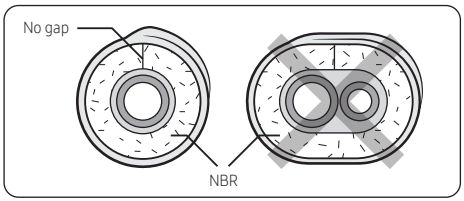
Before vacuuming and circulating the refrigerant gas, pressurize the whole system with nitrogen (using a cylinder with a pressure reducer) at a pressure of 4.0 MPa (594.7 psi) (gauge) to immediately detect leaks on the refrigerant fittings.



Step 9 Insulating the refrigerant pipes

Once you have checked that there are no leaks in the system, you can insulate the piping and hose.

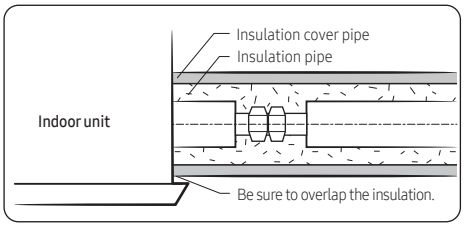
1 To avoid condensation problems, place Acrylonitrile Butadien Rubber separately around each refrigerant pipe.



NOTE

- Always make the seam of pipes face upwards.

2 Wind insulating tape around the pipes and drain hose avoiding compressing the insulation too much.



⚠ CAUTION

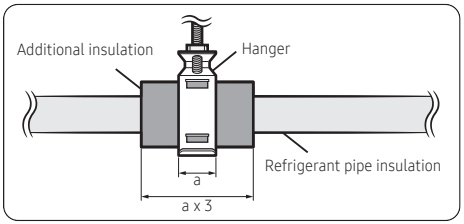
- Be sure to wrap insulation tightly without any gaps.

3 Finish wrapping insulating tape around the rest of the pipes leading to the outdoor unit.

4 The pipes and electrical cables connecting the indoor unit with the outdoor unit must be fixed to the wall with suitable ducts.

⚠ CAUTION

- Must fit tightly against body without any gap.
- Make sure that all refrigerant connection must be accessible for easy maintenance and detachment.
- Install the insulation not to get wider and use the adhesives on the connection part of it to prevent moisture from entering.
- Wind the refrigerant pipe with insulation tape if it is exposed to outside sunlight.
- Install the refrigerant pipe respecting that the insulation does not get thinner on the bent part or hanger of pipe.
- Add the additional insulation if the insulation plate gets thinner.
- All refrigerant connection must be accessible, in order to permit eithernit maintenance or removal.



5 Select the insulation of the refrigerant pipe.

- Insulate the gas side and liquid side pipe, noting the insulation thickness that must differ according to the pipe size.
- Standard: Less than an indoor temperature of 86 °F (30 °C), with humidity at 85%. If installing in a high humidity environment, use one grade thicker insulator by referring to the table below. If installing in an unfavorable environment, use a thicker one.
- The heat-resistance temperature of the insulator must be more than 248 °F (120 °C).

Pipe	Outer diameter		Insulation Type (Cooling, Heating)				Remarks
			General [86 °F (30 °C), 85%]		High humidity [86 °F (30 °C), over 85%]		
			EPDM, NBR				
	mm	inch	mm	inch	mm	inch	
Liquid pipe	6.35 ~ 9.52	1/4~3/8	9	3/8	9	3/8	Heating resisting temperature over 248 °F (120 °C)
	12.7 ~ 50.80	1/2~2	13	1/2	13	1/2	
Gas pipe	6.35	1/4	13	1/2	19	3/4	
	9.52 ~ 25.4	3/8~1	19	3/4	25	1	
	28.58 ~ 44.45	1 1/8~1 3/4	19	3/4	32	1 1/4	
	50.8	2	25	1	38	1 1/2	

- When installing insulation in the places and conditions below, use the same insulation that is used for high humidity conditions.

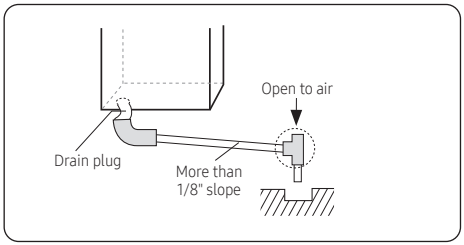
<Geological condition>
High humidity locations such as shorelines, hot springs, lake or riversides, and ridges (when part of the building is covered by earth and sand)
<Operation purpose condition>
Restaurant ceiling, sauna, swimming pool etc.
<Building construction condition>
Ceilings frequently exposed to moisture and cooling are not covered. For example, pipes installed at a corridor of a dormitory and studio or near an exit that opens and closes frequently. Places (where the pipes are installed) that are highly humid due to a lack of ventilation.

- Refrigerant pipe before EEV kit and MSB/SVB or without EEV kit and MSB/SVB
  - You can contact the gas side and liquid side pipes but the pipes should not be pressed.
  - When contacting the gas side and liquid side pipe, use 1 grade thicker insulator.
- Refrigerant pipe after EEV kit and MSB/SVB
  - Install the gas side and liquid side pipes, leave 0.39inch (10mm) of space.
  - When contacting the gas side and liquid side pipe, use 1 grade thicker insulator.

Installation Procedure

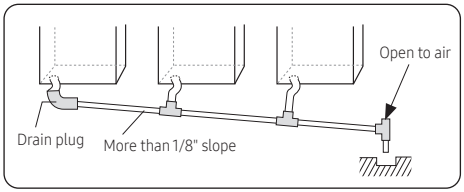
Step 10 Installing the drain hose and drain pipe

- Use a spirit level to make sure that product is horizontally leveled.
- Choose one of the 2 drain holes on the bottom of the product and insert the provided drain plug, then connect the drain pipe.
- From the 2 drain holes, block the unused hole with the provided rubber plug.
- Install the drain pipe at the rear side of the unit to get a sufficient space for repairs and service on the front side.
- Do not install a trap on the pipe and install the drain pipe horizontally with a slope of 1/8" or more to prevent water from flowing backwards.
- For smooth drainage, install an air vent that is open to air.
- Insulate the drain pipe and drain plug with insulation over 0.4 inch (10 mm).
- Install self-regulating heat cable on the drain pipe to prevent it from being frozen.
- Install the safety equipment for a heating appliance.



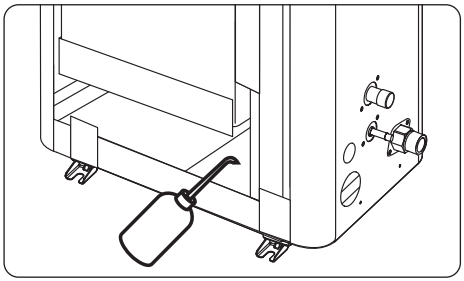
When concentrated drainage is installed

- Install a concentrated drain pipe with an air vent that is open to air.



Step 11 Performing the drainage test

1 Pour water into the base pan in the indoor unit as shown in figure.



⚠ CAUTION

- The leak test must be performed for at least 24 hours.

2 Confirm that the water flows out through the drain hose.

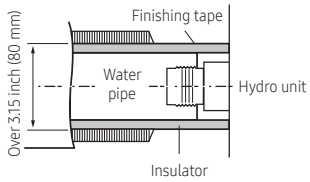
a Pour about 2 liters of water into the indoor unit drain pan.

Step 12 Installing the water pipe

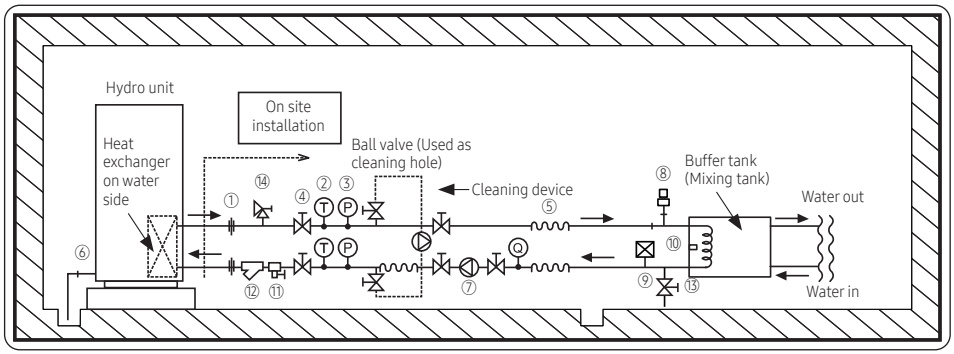
- Use closed type water pipe and closed type expansion tank when constructing water piping system.
- Water pipe installation system

1 Install the water pipe as shown in the below illustration. All the parts, other than Hydro unit, must follow on site installation specification.

<Water pipe connection part>



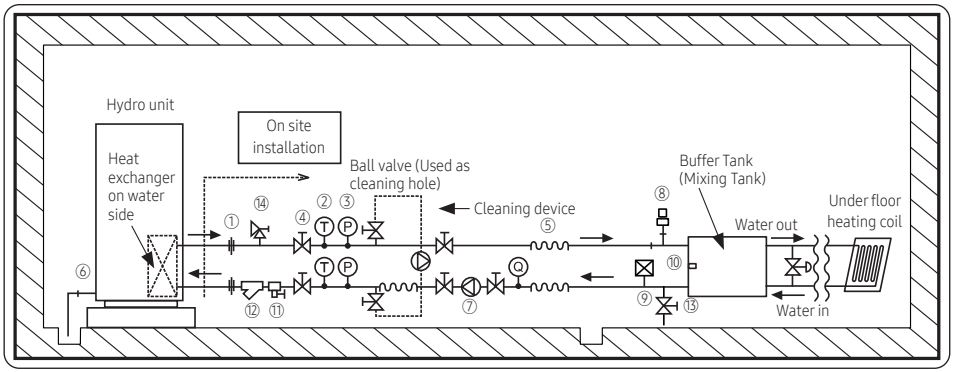
- Installing hot water supply



①	Water pipe joint (union, flange)	⑤	Flexible joint	⑨	Expansion tank
②	Thermometer	⑥	Drain (within the product)	⑩	Temperature sensor for hot water tank
③	Manometer	⑦	Pump	⑪	Drain valve
④	Ball valve	⑧	Air vent	⑫	Strainer
⑬	Water Valve	⑭	Pressure relief valve (Pressure safety valve)		

Installation Procedure

- Installing under floor heating



①	Water pipe joint (union, flange)	⑤	Flexible joint	⑨	Expansion tank
②	Thermometer	⑥	Drain (within the product)	⑩	Temperature sensor for thermal storage tank
③	Manometer	⑦	Pump	⑪	Drain valve
④	Ball valve	⑧	Air vent	⑫	Strainer
⑬	Water Valve	⑭	Pressure relief valve (Pressure safety valve)	⑮	Differential Pressure bypass Valve

When more than two water pipes are used for heating (e.g. Floor + Fan Coil Unit), Buffer Tank (Mixing Tank) or bypass valve should be used to maintain the water flow rate.

- On site installation specification

Model name	Strainer	Flow meter	Thermometer	Manometer	Air vent	Pump	Ball valve	Drain valve
VHED036S6-5P	#50 NPT	0 ~ 50 ℓ/min (0 ~ 13.2 gal/min)	0~212 °F (0~100 °C)	0 ~ 1 Mpa (0 ~ 145 psi)	0.6 m³/h (158.5gal/h) [Condition: 0.15MPa (21.8psi)]	36 ℓ/min (9.5 gal/min)	NPT1"	15 A
VHED048S6-5P						48 ℓ/min (12.7 gal/min)		
VHED096S6-5P		0 ~ 100 ℓ/min (0 ~ 26.4 gal/min)				92 ℓ/min (24.3 gal/min) (Refer topressuredrop graph)		
VHED144S6-5P	#50 NPT	0 ~ 150 ℓ/min (0 ~ 39.6 gal/min)	0~212 °F (0~100 °C)	0 ~ 1 Mpa (0 ~ 145 psi)	0.6 m³/h (158.5 gal/h) [Condition: 0.15 MPa (21.8 psi)]	150 ℓ/min (39.6 gal/min) (Refer topressuredrop graph)	NPT1-1/4"	15 A

2 Do not exceed the torque value stated in the below table. If you apply more torque, it may cause damage to the product.

Diameter of water pipe (Outer diameter, mm)		Tightening torque	
mm	inch	N·m	lbf·ft
10 ~ 20	0.39 ~ 0.79	25	18.4
21 ~ 30	0.83 ~ 1.18	50	36.9
31 ~ 50	1.22 ~ 1.97	100	73.8
51 ~ 80	2.0 ~ 3.15	220	162.3
81 ~ 115	3.19 ~ 4.53	600	442.5

3 Use certified parts for water pipe system and the water pressure of the water pipe system connected to outdoor unit must remain under 1.0 MPa (145.0 psi). Use copper or stainless pipe water pipe.

4 Water pipes must be equipped with valves and other instrumentations as shown in the diagram. Strainer must be installed within 3.3 ~ 6.6 ft (1 ~ 2 m) from the entrance pipe of the Hydro unit.
- When strainer is not installed, sand, dust or rust debris may cause product breakage.
- Make sure that the strainer mesh is made of stainless steel.

5 Water inlet pipe is located at the bottom part of the heat exchanger and the water outlet pipe is at the top part of the heat exchanger.

6 Hydro unit must be installed indoor at room temperature and the water inlet and outlet must be insulated as shown in the 'Water pipe installation system' diagram on page 17.

7 Insulation work must be done properly and thoroughly to prevent condensation from forming on the surface of the product and drain pipes of indoor/outdoor units. When the necessary work is not done thoroughly, you will waste energy caused by thermal loss. In cold applications pipes may freeze and burst causing property damage.

8 If you stop the product for long time or in night time, water pipe circuit may freeze naturally when the temperature around the Hydro unit is under 32 °F (0 °C). When water pipe circuit freezes, it will cause damage to the plate type heat exchanger and therefore preventive measure must be taken according to the situation.
- Drain remaining water in the water pipe
- Install self-regulating heat cable on the water pipes
- If the product is installed in a place where surround temperature drops below 32 °F (0 °C), use anti-freeze accordingly for freezing point depression.

9 Install number of auto air discharge valve at a point where air may remain within the pipe (such as vertical water pipe). If the air within the pipe is not discharged, it may cause performance decrease or corrosion on the product or pipes.

10 Following is the operation range of water.

Section		Outlet water temperature	Flow rate			
		VHED***S6-5P	VHED036S6-5P	VHED048S6-5P	VHED096S6-5P	VHED144S6-5P
Standard condition	Heating	95 °F (35 °C)	36 l/min (9.5 GPM)	48 l/min (12.7 GPM)	92 l/min (24.3 GPM)	150 l/min (39.6 GPM)
Operation range	Heating	68 ~ 122 °F (20 ~ 50 °C)	18~36 l/min (4.8~9.5 GPM)	24~48 l/min (6.3~12.7 GPM)	46~92 l/min (12.2~24.3 GPM)	75~150 l/min (19.8~39.6 GPM)

- When the amount of cooling water is out of the operation range, stop the Hydro unit and take care of the cause before re-start the operation.
- Temperature of discharged water is very high so be careful not to come in contact with the body. Also, cover the external water pipe with appropriate insulator for insulation and preventing burns.

Installation Procedure

11 Water scale may occur on the plate type heat exchanger depending on the water quality and the type of plate heat exchanger so regular chemical cleaning is necessary. When installing water pipes, install a heat source water shut-off valve and also install the flushing pipe with a ball valves (for chemical cleaning) on the pipe installed between the shut-off valve and the outdoor unit.

12 Before trial operation, connect the cleaning pipes installed on inlet and outlet as shown in above illustration. Then, take appropriate measures (such as blind flange etc) to stop the circulation water from entering the outdoor unit plate type heat exchanger, and use circulating pump to remove foreign substance within the water pipes and clean the strainer. If you do not clean the strainer, foreign substances may accumulates on plate type heat exchanger and may break the heat exchanger or cause problem to it.

13 Make sure that water quality within the water pipe meets the standard of cooling water quality for refrigerating and air conditioning equipment.

- Water containing high level of foreign substances can cause water heat exchanger and pipe corrosion or creation of water scale. (Use the appropriate heat source water according to the below table)
- If the make-up water is provided from any other source than local water supply, make sure to check the quality of water.
- Strainer (which needs to be purchased separately) must be installed to the 'Water IN' pipes of the water pipe. If sand, dust or rust debris enters to water system, it may cause corrosion on metallic materials or blockage of the water heat exchanger and damage the heat exchanger.
- If the existing thermal storage tank or pipes are used, foreign substances may block the plate type heat exchanger of the Hydro unit so, water quality and foreign substances must be managed.

14 Check that the total water volume in the installation, excluding the internal water volume of Hydro unit, is 20 L (5.3 gal) minimum.

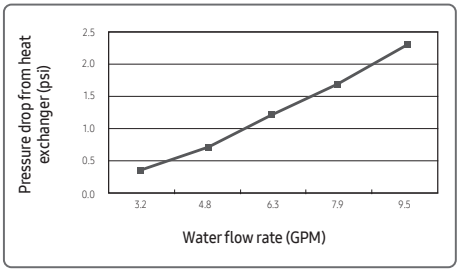
Classification	Item	Closed type system		Effects		Recommended number for water quality inspection
		Circulating water	Supplemented water	Corrosion	Scale	
Standard value	pH [77 °F (25 °C)]	7.0 ~ 8.0	7.0 ~ 8.0	O	O	Once a year
	Electric conductivity [77 °F (25 °C)] (mS/m)	30 or below	30 or below	O	O	
	Chloride ion (mg Cl-/L)	50 or below	50 or below	O		
	Sulfate ion (mg S042-/L)	50 or below	50 or below	O	O	
	M alkali level [pH 4.8](mg CaCo3/L)	50 or below	50 or below		O	
	Total hardness (mg CaCo3/L)	70 or below	70 or below		O	
	Calcium hardness (mg CaCo3/L)	50 or below	50 or below		O	
	Ionized silica (mg SiO2/L)	30 or below	30 or below		O	
Reference	Iron (mg Fe/L)	1.0 or below	0.3 or below	O	O	
	Copper (mg Cu/L)	1.0 or below	1.0 or below	O		
	Sulfate ion (mg S2-/L)	Not to be detected	Not to be detected	O		
	Ammonium ion (mg NH4+/L)	0.3 or below	0.1 or below	O		
	Residual chlorine (mg Cl/L)	0.25 or below	0.3 or below	O		
	Free carbon dioxide (mg CO2/L)	0.4 or below	0.4 or below	O		
	Stability index	-	-	O	O	

NOTE

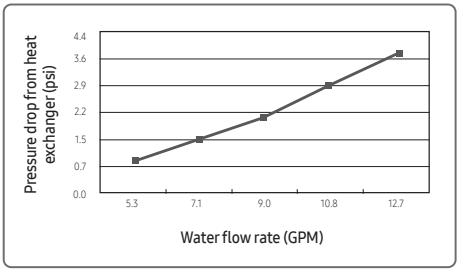
- Circle (O) marks in the chart show the factor relevant to corrosion or water scale.
- When the water temperature is over 104 °F (40 °C), steels without protective coating may corrode when exposed to water. Applying corrosion prevention material or degassing can be effective measure to prevent corrosion.
- For the cooling water and the make-up water, used under closed circuit water system with closed circuit cooling tower, should satisfy the standard shown in above table.
- Supplied water or make-up water should be tap water, industrial water. Purified water, neutralized water and softened water should not be supplied.
- 15 items in the above table is a typical factor for corrosion and/or water scale.
- When water pipe circuit freezes, it will cause breakage on the plate type heat exchanger. Therefore appropriate preventive measure must be taken according to the situation.
  - Drain remaining water in the water pipe
  - Constantly operate the water pump to circulate the water within the water pipe
  - Install a self-regulating heat cable on the water pipe
- Open the valve of the water pipe connected to the outdoor unit after flushing (cleaning foreign substances in water pipe) is completed.
- Check that air is vented from the water pipe and circulation amount is secured before opening the service valve on the refrigerant side of the outdoor unit.
- If water flow stops during outdoor unit operation, it may cause breakage on plate type heat exchanger.

Pressure drop graphs

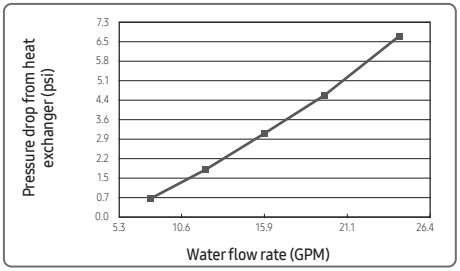
- VHED036S6-5P



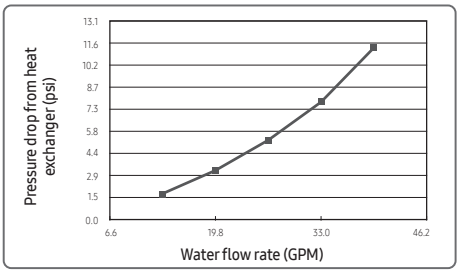
- VHED048S6-5P



- VHED096S6-5P



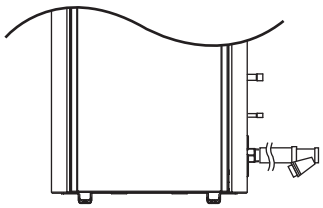
- VHED144S6-5P



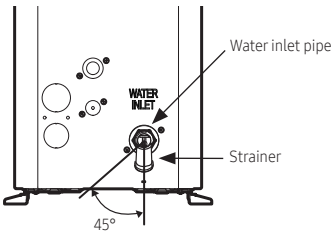
Installation Procedure

Connecting strainer

- Use a strainer with 50 mesh (Diameter of each hole must be under 0.016 inch (0.4mm), excluding punching plate)
- Connect the strainer after checking the direction of the strainer on the water inlet hole as shown in the illustration.
- Wind the Teflon tape more than 15 times on the thread of the water pipe before connecting it.
- Service port must face downward and angle should be within 45° on the left and the right side.
- After installing the strainer, makes sure that there is no water leakage on the connection part.
- For normal operation of the product, clean the strainer regularly (more than once a year).



<Front view>



<Side view>

Step 13 Connecting the power and communication cables

Power and communication cable connection

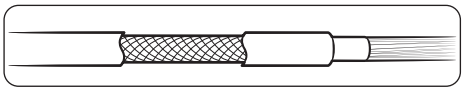
- Before wiring work, you must turn off all power source.
- Connect the power and communication cable among the units within maximum length to set the voltage drop under 10%.
- The auxiliary circuit breaker (ELCB, MCCB, ELB) should be considered with a larger capacity if many indoor units are connected from one breaker.
- Connect F3, F4(for communication) to the communication cable of the wired remote control.
- Tighten the electric wires with a proper tool within the torque limit to connect and fix them firmly, and then organize the wires to prevent outside pressure being exerted on the covers and other parts. Failure to do so may result in overheating, electric shock, and fire.

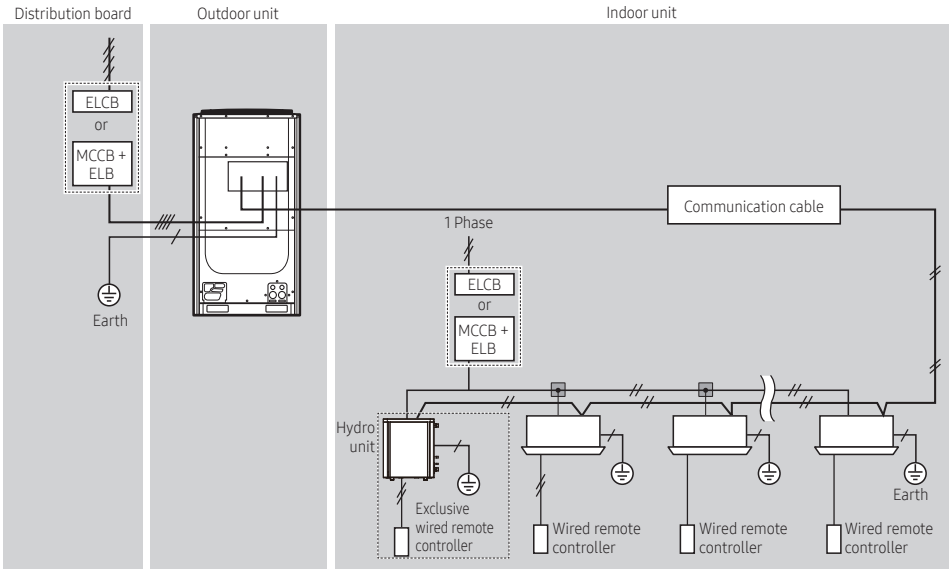
	Tightening torque	
	N·m	lbf·ft
M3.5	0.8 to 1.2	0.59 to 0.89
M4	1.2 to 1.8	0.89 to 1.1

(1 N•m = 10 kgf•cm)

To protect the product from water and possible shock, you should keep the power and the communication cables of the indoor and outdoor units in the iron pipe.

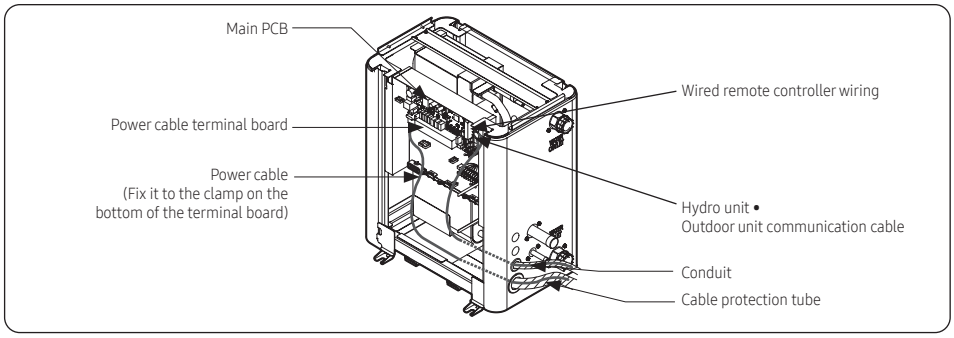
- Connect the power cable to the auxiliary circuit breaker (ELCB, MCCB, ELB).
- Keep distances of 1.97 inch (50 mm) or more between power cable and communication cables.
- Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord. (Code designation IEC:60245 IEC 57 / CENELEC: H05RN-F or IEC:60245 IEC 66 / CENELEC: H07RN-F)
- Screws on terminal block must not be unscrewed with the torque less than 0.87 lbf·ft (12 kgf•cm).
- When installing the indoor unit in a computer room, use the double shielded (tape aluminum / polyester braid + copper) cable of FROHH2R type.





Power supply and communication cable configuration

- Withdraw a main power cable and a grounding cable through the cable outlet on the right side of the Hydro unit.
- When connecting external contact signal wire, connect them to the PCB terminal board through the cable outlets in the right side of the outdoor unit.
- Wires must be installed after putting them in separate cable protection tubes.
- Fix a cable tube at the cable outlet using a CD connector.

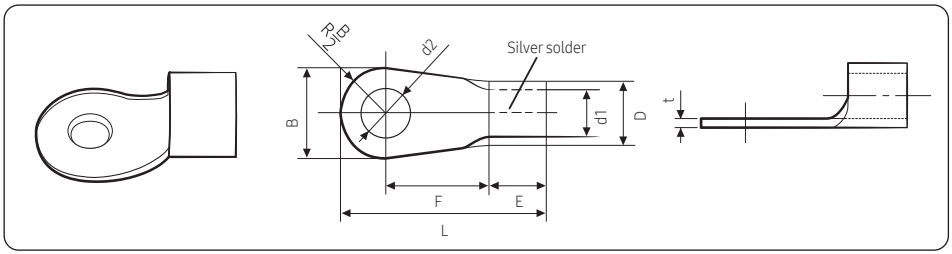


Installation Procedure

Selecting the crimping terminal lug

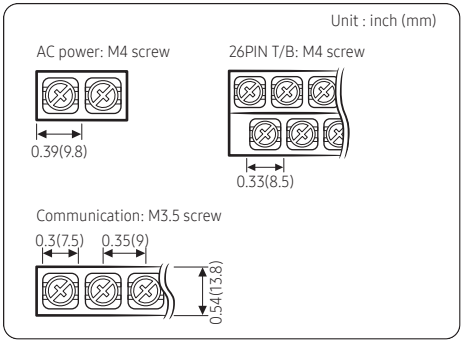
1 Select the crimping terminal lug based on the norminal dimension of the power cable.

2 Cover the connection part of the power cable and crimping terminal lug to insulate it.



Norminal dimensions for cable [AWG (mm²)]		18 AWG (0.82)		14AWG (2.08)		12AWG (3.31)
Norminal dimensions for screw [inch(mm)]		0.157 (4)	0.157 (4)	0.157 (4)	0.157 (4)	0.157 (4)
B	Standard dimension [inch(mm)]	0.260 (6.6)	0.315 (8)	0.260 (6.6)	0.335 (8.5)	0.374 (9.5)
	Allowance [inch(mm)]	± 0.008 (0.2)		± 0.008 (0.2)		± 0.008 (0.2)
D	Standard dimension [inch(mm)]	0.134 (3.4)		0.165 (4.2)		0.220 (5.6)
	Allowance [inch(mm)]	+0.012 (0.3) -0.008 (0.2)		+0.012 (0.3) -0.008 (0.2)		+0.012 (0.3) -0.008 (0.2)
d1	Standard dimension [inch(mm)]	0.067 (1.7)		0.094 (2.4)		0.134 (3.4)
	Allowance [inch(mm)]	± 0.008 (0.2)		± 0.008 (0.2)		± 0.008 (0.2)
E	Min. [inch(mm)]	0.161 (4.1)		0.236 (6)		0.236 (6)
F	Min. [inch(mm)]	0.236 (6)		0.236 (6)		0.236 (6)
L	Max. [inch(mm)]	0.630 (16)		0.689 (17.5)		0.787 (20)
d2	Standard dimension [inch(mm)]	0.169 (4.3)		0.169 (4.3)		0.169 (4.3)
	Allowance [inch(mm)]	+0.008 (0.2) 0 (0)		+0.008 (0.2) 0 (0)		+0.008 (0.2) 0 (0)
t	Min. [inch(mm)]	0.028 (0.7)		0.031 (0.8)		0.035 (0.9)

Specifications of the terminal blocks



Power supply (single phase)	MCCB	ELB
Min : 187V Max : 253V	XA	XA, 30 mA 0.1 s
Power cable	**Earth cable**	**Communication cable**
14 AWG (2.08 mm²) or more Temperature rating 194 °F (90 °C) / 167 °F (75 °C)	14 AWG (2.08 mm²) or more Temperature rating 194 °F (90 °C) / 167 °F (75 °C)	18~14 AWG (0.82 to 2.08 mm²)
12 AWG (3.31 mm²) or more Temperature rating 140 °F (60 °C)	12 AWG (3.31 mm²) or more Temperature rating 140 °F (60 °C)	

Decide the power cable specification and maximum length by formula **2**.

1 Decide the capacity of ELB and MCCB by below formula.

$$\text{The capacity of ELB, MCCB } X[A] = 1.25 \times 1.1 \times \Sigma Ai$$

NOTE

- X : The capacity of ELB, MCCB
- ΣAi : Sum of rating currents of each indoor unit.

Rated currents

Unit	Model	Rating current (A)
VHED***S6-5P	*036*	0.05
	048	0.05
	096	0.05
	144	0.05

2 Decide the power cable specification and maximum length within 10% voltage drop among indoor units.

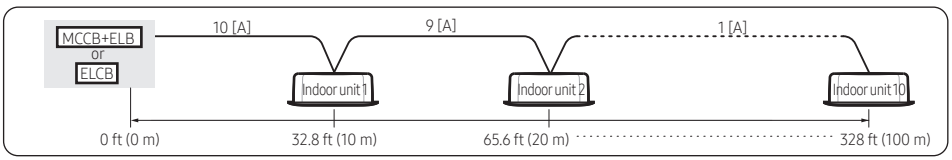
$$\sum_{k=1}^{n} \left(\frac{Coef \times 35.6 \times L_k}{1000 \times A_k} \times i_k \right) < 10\% \text{ of input voltage[V]}$$

NOTE

- Coef: 1.55
- L_k: Distance among each indoor unit[m], A_k: Power cable specification[inch²(mm²)]
- i_k: Running current of each unit[A]

Example of Installation

Total power cable length L = 328 ft(100 m), Initial pull-in current = 10[A], Running current of each units = 1[A], Total 10 indoor units were installed

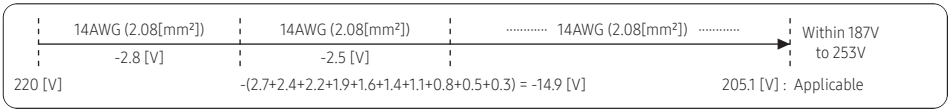


Installation Procedure

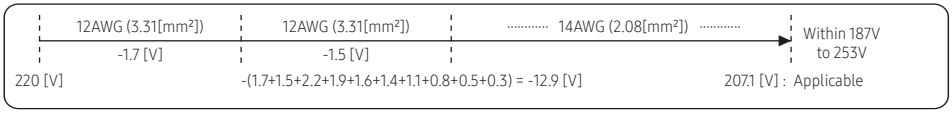
- Apply following equation.

$$\sum_{k=1}^{n} \left(\frac{Coef \times 35.6 \times L_k}{1000 \times A_k} \times i_k \right) < 10\% \text{ of input voltage[V]}$$

- Calculation
  - Installing with 1 sort wire.



- Installing with 2 different sort wire.

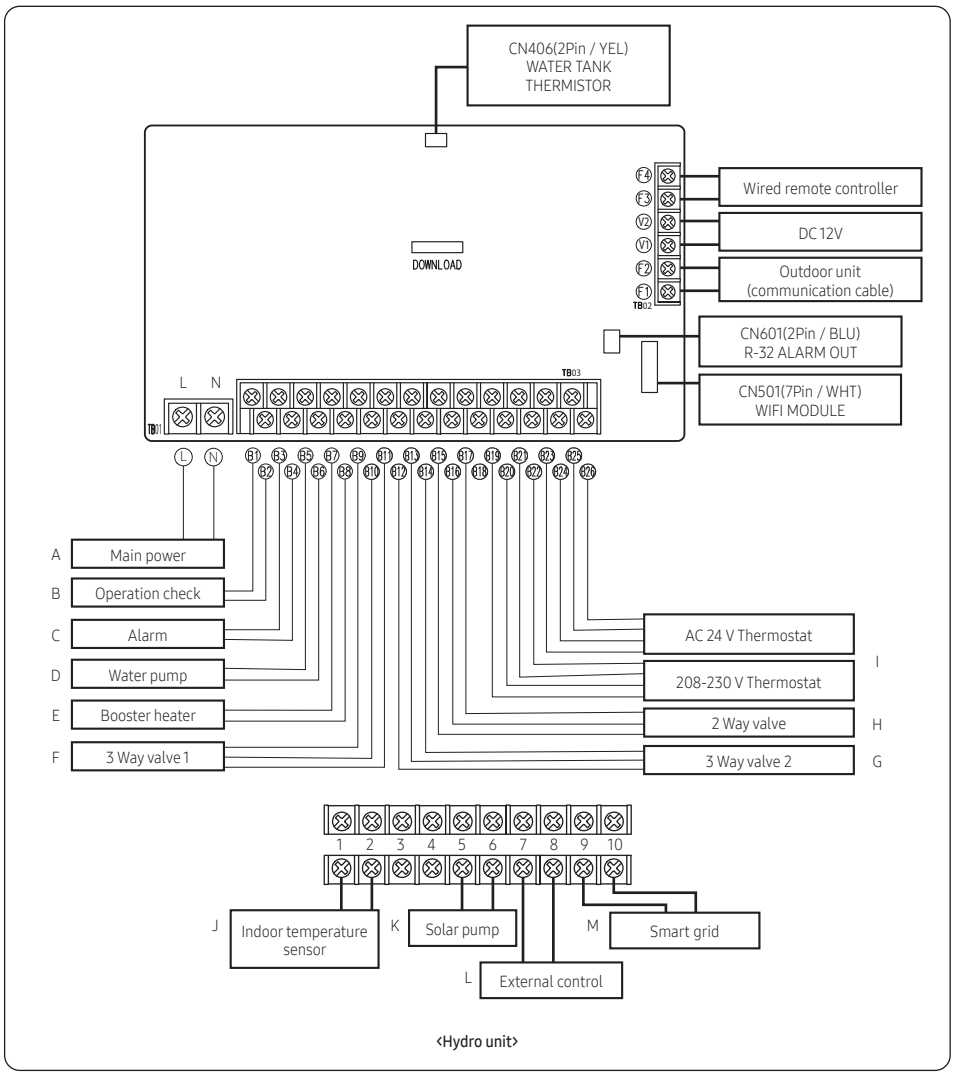


⚠ CAUTION

- Select the power cable in accordance with relevant local and national.
- Wire size must comply with local and national code.
- You should connect the power cable into the power cable terminal and fasten it with a clamp.
- The unbalanced power must be maintained within 10% of supply rating among whole indoor units.
- If the power is unbalanced greatly, it may shorten the life of the condenser. If the unbalanced power is exceeded over 10% of supply rating, the indoor unit is protected, stopped and the error mode indicates
- Connect the power cable to the auxiliary circuit breaker. An all pole disconnection from the power supply must be incorporated in the fixed wiring [≥0.12 inch (3mm)].
- You must keep the cable in a protection tube.
- Maximum length of power cables are decided within 10% of power drop. If it exceeds, you must consider another power supplying method.
- The circuit breaker(MCCB, ELB) should be considered more capacity if many indoor units are connected from one breaker.
- Use round pressure terminal for connections to the power terminal block.
- For wiring, use the designated power cable and connect it firmly, then secure to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will strip the head and make proper tightening impossible.
- Over-tightening the terminal screws may break them.

Step 14 Optional: Connecting external contact

External contact connection diagram



<Hydro unit>

Installation Procedure

Explanation		Terminal No.	Input / Output	AC/DC	Maximum allowable current
A	Main power	L, N	Input	AC	FUSE : 2.5A
B	Operation check	B1, B2	Contact output	-	0.5 A
C	Alarm	B3, B4	Contact output	-	0.5 A
D	Water pump	B5, B6	Contact output	-	0.5 A
E	Booster heater	B7, B8	Contact output	-	0.5 A
F	3 Way valve 1	B9 ~ B11	Output	AC	0.5 A
G	3 Way valve 2	B12 ~ B14	Output	AC	0.5 A
H	2 Way valve	B15 ~ B17	Output	AC	0.5 A
I	AC 230, AC 24 V Thermostat	B19 ~ B26	Input	AC	-
J	Separately installed indoor temperature sensor (MRW-TA)	1,2	Input	DC	-
K	Solar pump	5,6	Input(DRY CONTACT)	DC	-
L	External control	7,8	Input(DRY CONTACT)	DC	-
M	Smart grid	9,10	Input(DRY CONTACT)	DC	-
N	Communication cable (RS485)	F1, F2	Input, Output	DC	-
O	Wired remote controller	V1	DC12V	DC	200 mA
		V2	GND	DC	-
		F3, F4	Input, Output	DC	10 mA

- For instruction regarding on wiring power, communication and wired remote controller, refer to "Step 13 Connecting the power and communication cables" on page 22.
- External control: Operation On or Off by external contact signal
- Smart grid: Set by remote controller FSV
  FSV#5041 : Default is 0 (Disable), 1 (use)
  FSV#5042 : 0 (default) While the external contact is maintained as High, disable all heat source (heater).
  1 Use Booster Heater only
  FSV#5043 : 0 (default) Smart grid function is activated when the external contact is maintained as High
  1 activated when external contact is maintained as Low
- The accessories that connect to CN406 (WATER TANK THERMISTOR), CN601 (R-32 ALARM OUT), and CN501 (WIFI MODULE) are included in the box within the SET.

- Refer to the below table for the terminal numbers that needs on the site for connecting external contact.

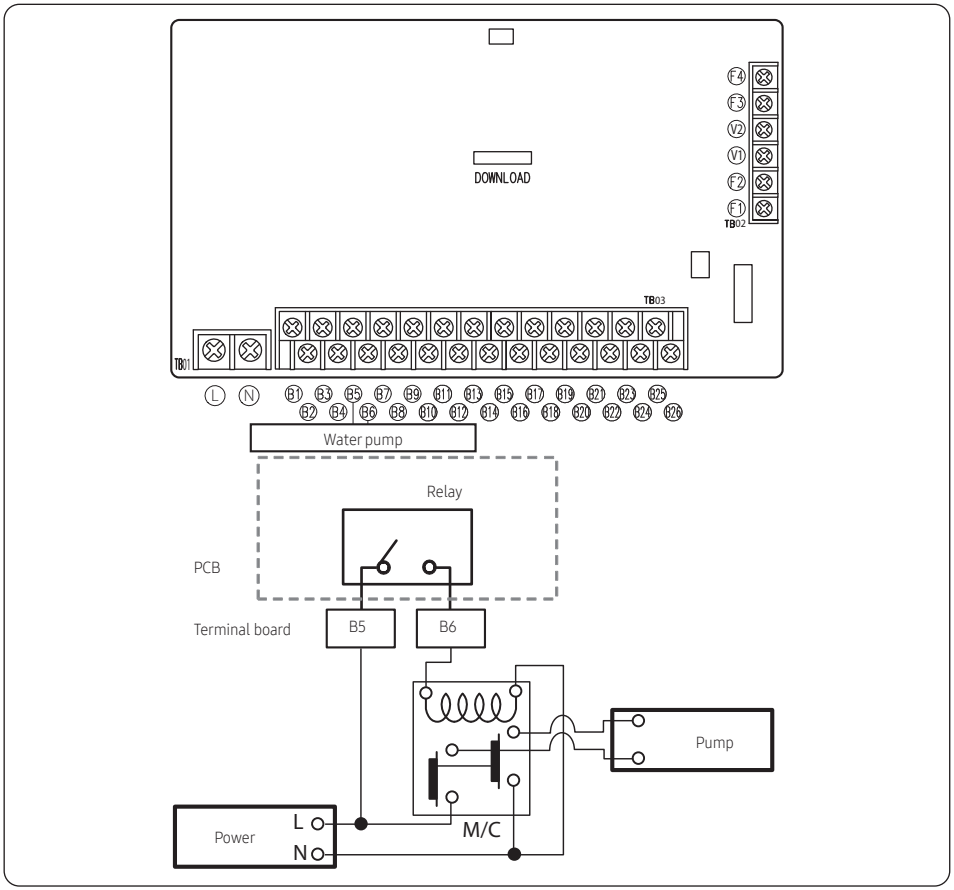
Terminal No.	External contact	Function	Remarks
B1, B2	Operation check	Output operation status	Optional
B3, B4	Alarm	Output alarm status	Optional
B5, B6	Water pump	Output operation signal for a water pump	Mandatory
B7, B8	Booster heater	Output operation signal for booster heater of DHW tank	Optional
B9~B11	3 Way valve 1	Output 3 way valve direction signal for indoor heating / DHW selection	Optional
B12~B14	3 Way valve 2	Output for solar pump interconnection/defrost signal interconnection	Optional
B15~B17	2 Way valve	Output 2 way valve switching signal for blocking cold water fall in floor cooling	Optional
B19, B20	AC230, Thermostat 1	Input thermostat signal for cooling (AC 208-230 V)	Optional
B21, B22	AC230, Thermostat 2	Input thermostat signal for heating (AC 208-230 V)	Optional
B23, B24	AC24, Thermostat 1	Input thermostat signal for cooling (AC 24V)	Optional
B25, B26	AC24, Thermostat 2	Input thermostat signal for heating (AC 24V)	Optional
1,2	Indoor temperature sensor	Connect indoor temperature sensor (Connection status can be checked on the wired remote controller.)	Optional
5,6	Solar pump	Input contact signal for solar heat pump operation	Optional
7,8	External control	Input external contact control signal (Refer to seg 14 of 02 series remote controller installation option.)	Optional
9,10	Smart grid	Input contact signal for smart grid	Optional
CN406	WATER TANK_THERMISTOR	Connect temperature sensor of DHW TANK When there is more than one unit, at least one of them should be connected directly to the temperature(FSV #3011)	Optional
CN601	R-32 ALARM OUT	Output signal when R-32 When the refrigerant leaks	Optional
CN501	WIFI MODULE	-	Optional

- You may need to set different field specifications for the wired remote controller depending on the function.

Installation Procedure

Water pump connection

- Connect a water pump to B5, B6 of the PBA terminal block.



⚠ CAUTION

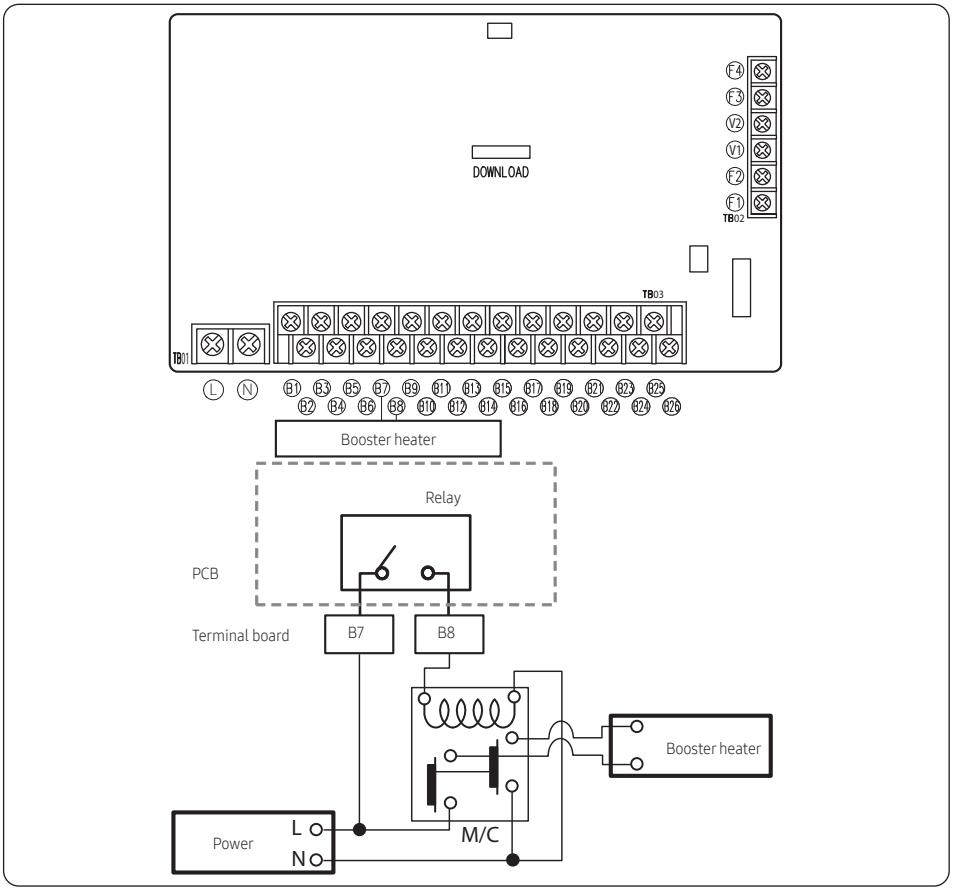
- Terminal of this product is for water pump and the maximum allowable current is 0.5 A

Specification table

Part	Specification
Terminal block (Output)	B5, B6
Connection type	Water pump (No-voltage contact)

Booster heater connection

- Connect a booster heater to B7, B8 of the PBA terminal block.



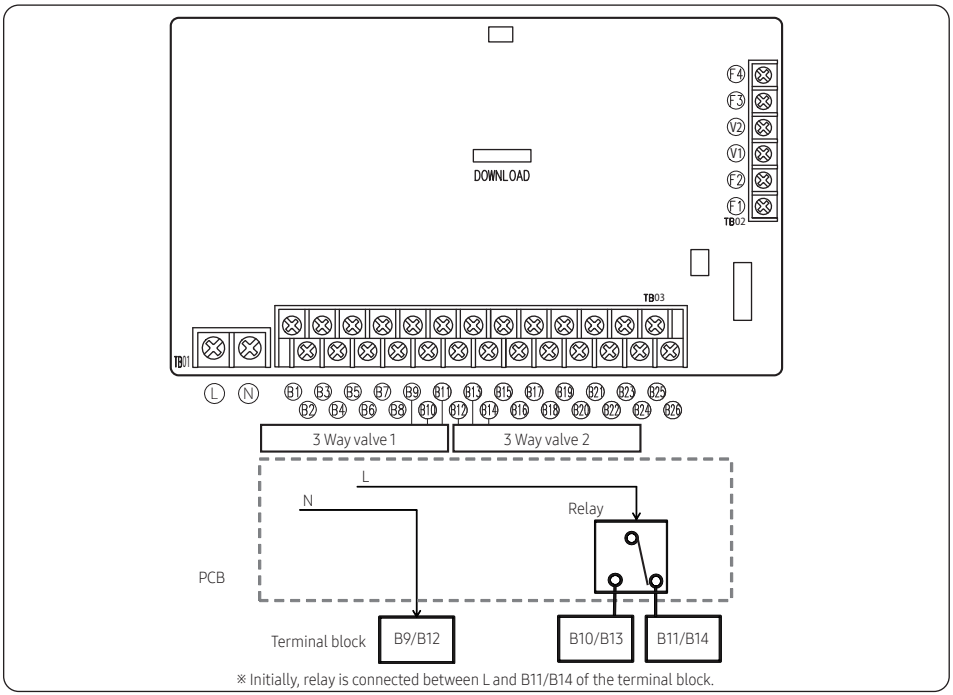
Specification table

Part	Specification
Terminal block (Output)	B7, B8
Connection type	Booster heater (No-voltage contact)

Installation Procedure

3 Way valve connection

- Check the type of 3 Way valve and connect it to the terminal board as shown in the illustration.
- Use a rated wire and connect it as shown in the illustration.
- 3 Way valve 1: When the valve is connected to B9 and B11, its direction should be indoor side.
- 3 Way valve 2: When the valve is connected to B12 and B14, its direction should be tank side.



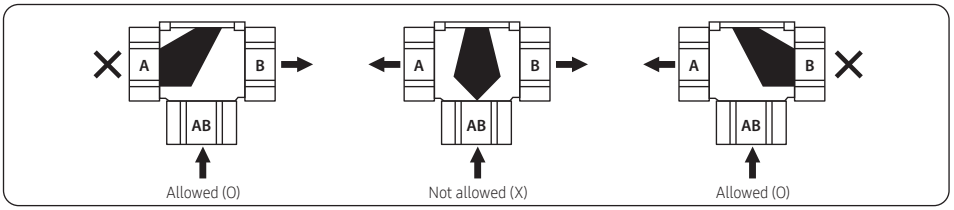
※ Initially, relay is connected between L and B11/B14 of the terminal block.

⚠ CAUTION

- Before completing installation of 3 Way valve, check the opening direction of the port.

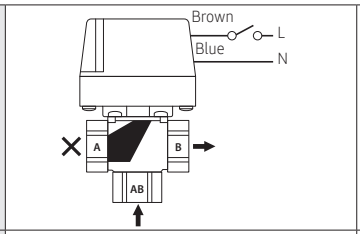
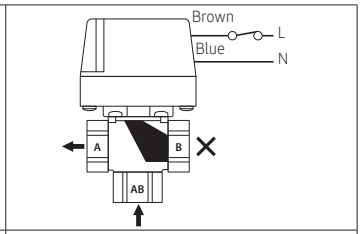
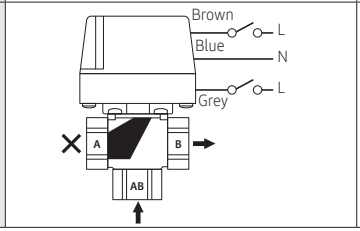
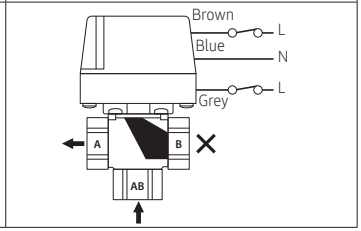
Part	Specification
Output (B9 ~ B11, B12 ~ B14)	AC 208-230 V (Max 0.5A / 120W)

Allowed connection

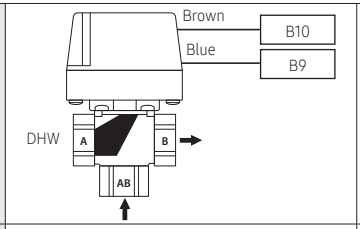
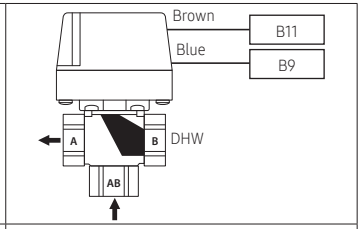
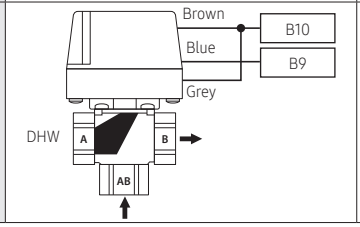
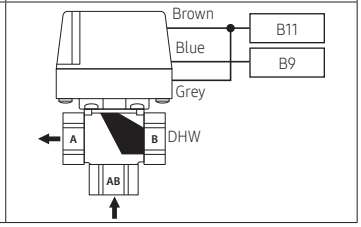


Example of installation (Danfoss H-series valve)

- Connecting the valve

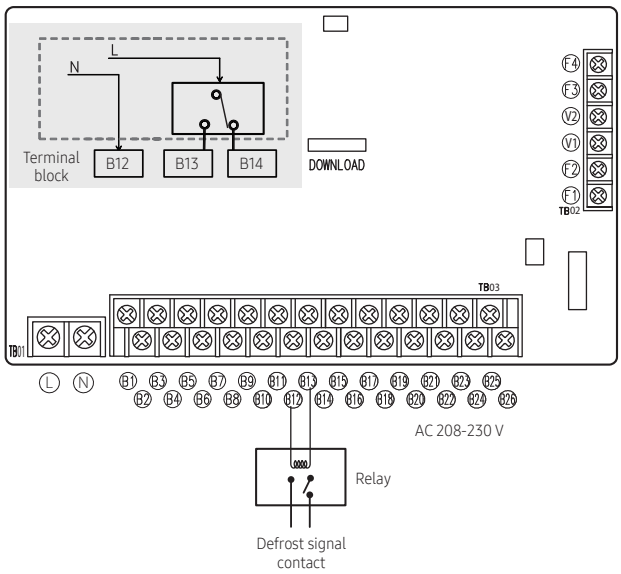
3-port diverter valves		
3-port mid-position valves		

- Example of wiring

3-port diverter valves		
3-port mid-position valves		

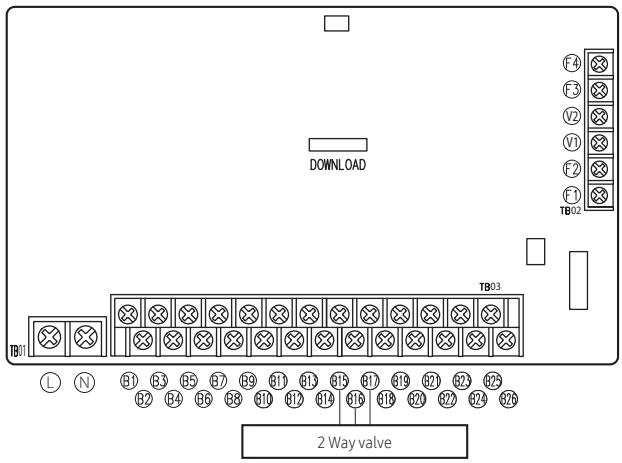
Installation Procedure

- Connect B12/B13 (3 Way valve 2) of the terminal block to use the defrost mode contact output.



Connecting 2 Way valve

- Connect a 2 Way valve to B15, B16 and B17 of the PBA terminal block.
- 2 Way valve is interlocked with 3 Way valve 1.



※ Initially, relay is connected between L and B17 of the terminal block.

⚠ CAUTION

- Terminal of this product is for 2 Way valve and the maximum allowable current is 0.5 A

Specification table

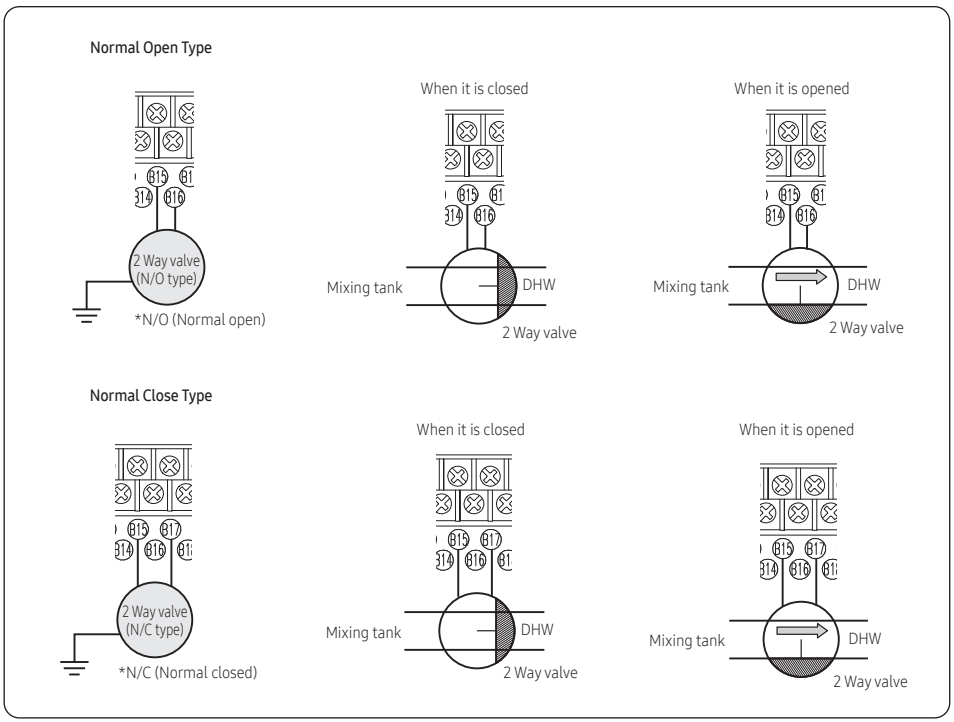
Part	Specification
Terminal block (Output)	B15: Output power N B16: Output power L (switch type) B17: Output power L (switch type)
Connection type	Directly connect 2 Way valve (below 0.5 A)
Output (B15~B17)	AC 208-230 V (Max 0.5A / 120W)

Installation Procedure

Wiring 2 Way valve

When floor cooling and fan coil unit cooling operate at the same time, 2 way valve prevent temperature drop of the floor.

- Use a rated wire to connect it as shown in the illustration and fix it with a cable tie.
- Initial setting of the valve is 'closed (no flow)'.

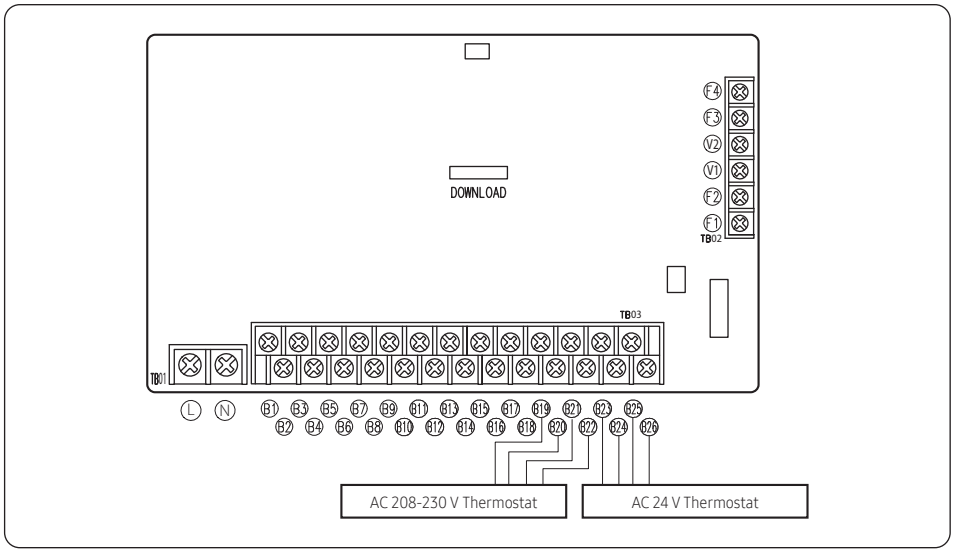


⚠ CAUTION

- Wiring is different for a N/C (Normal closed) valve and N/O (Normal open) valve.

AC 208-230 V or AC 24V thermostat

- Connect the indoor thermostat to B19~B26 of the PBA terminal block.
- Connect a thermostat to the designated terminal as stated in the rated table.
- Only 1 type of thermostat can be connected. (B19~B22 or B23~B26)
- Product will not operate when signal for cooling and heating mode is inputted at the same time.



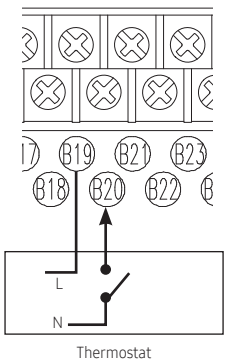
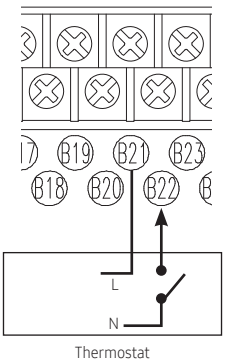
⚠ CAUTION

Specification table

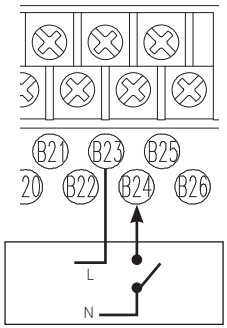
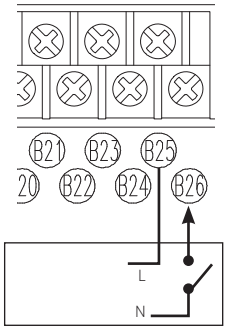
Part	Specification
Terminal block (AC 208~230V)	B19(L), B20(N) : Cooling Mode Thermostat, INPUT AC POWER(AC208~230V) B21(L), B22(N) : Heating Mode Thermostat, INPUT AC POWER(AC208~230V)
Terminal block (AC 24V)	B23(L), B24(N) : Cooling Mode Thermostat, INPUT AC POWER(AC24V) B25(L), B26(N) : Heating Mode Thermostat, INPUT AC POWER(AC24V)

Installation Procedure

AC 208-230 V thermostat

Cooling mode	Heating mode
 Thermostat	 Thermostat

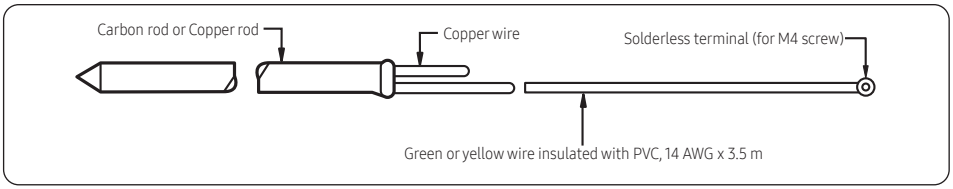
AC 24 V thermostat

Cooling mode	Heating mode
 Thermostat	 Thermostat

Grounding work

A ground rod must be installed if the grounding terminal on the power circuit does not exist or meet the standard. Additional accessories required for installation must be purchased separately since they are not supplied with Hydro unit.

1 Prepare a ground rod that matches the one shown in the illustration.



2 Select a appropriate place to install a ground rod.

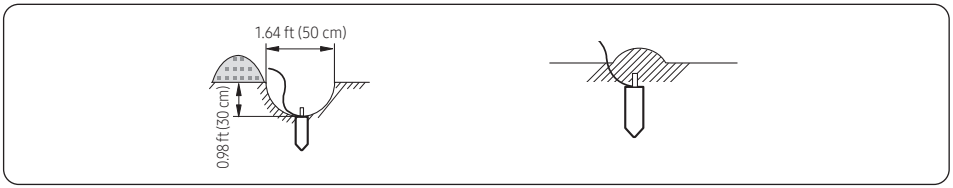
- It is better to select a damp and firm ground than sandy ground or ground with gravels which is high-resisting.
- Avoid place with underground structure or facilities. (Gas pipe, water pipe, phone lines, or underground cable)
- Place has to be at least 6.56 ft (2 m) away from the lightening rod.

※ Ground wire for phone lines cannot be used for grounding Hydro unit.

3 Install a green or yellow ground wire.

- Refer to the illustration on step 1 for the specification of a ground rod.
- If the ground wire is too short, it can be extended but connected part (where extended wire is connected) must be wrapped with insulation tape. (Do not bury the connected part underground.)
- Fix the ground wire.

※ Ground wire must be fixed firmly when it is installed at a place with lots of passerby.



4 Check the ground resistance with a earth resistance tester to see if installation is done properly.

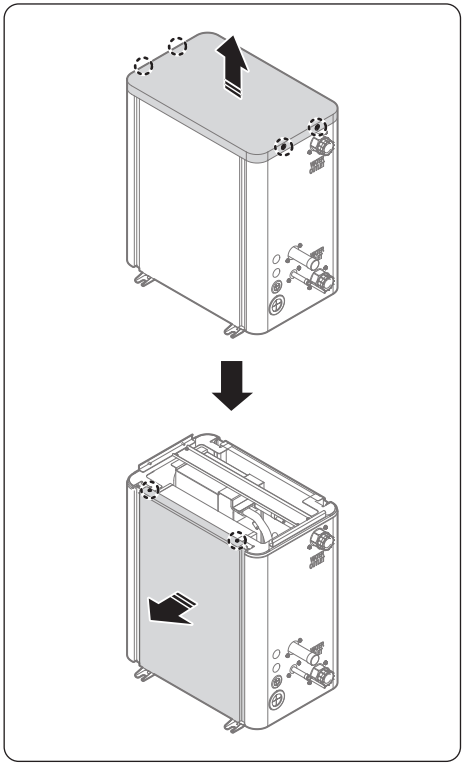
- If the resistance value exceeds requirement, place the ground rod deeper or add more ground rods.

5 Connect the ground wire to the terminal block of Hydro unit.

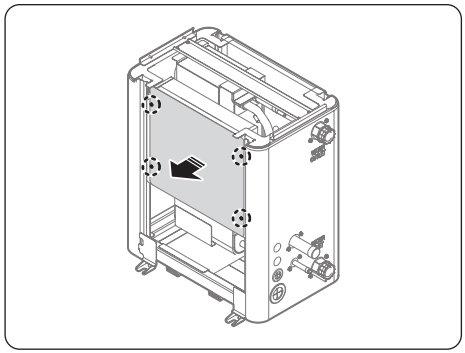
Installation Procedure

Step 15 Wi-Fi module Installation guide

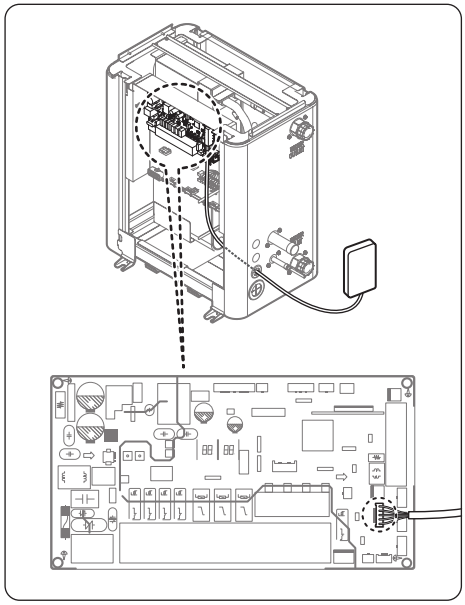
1 Disassemble six screws and remove the Cover.



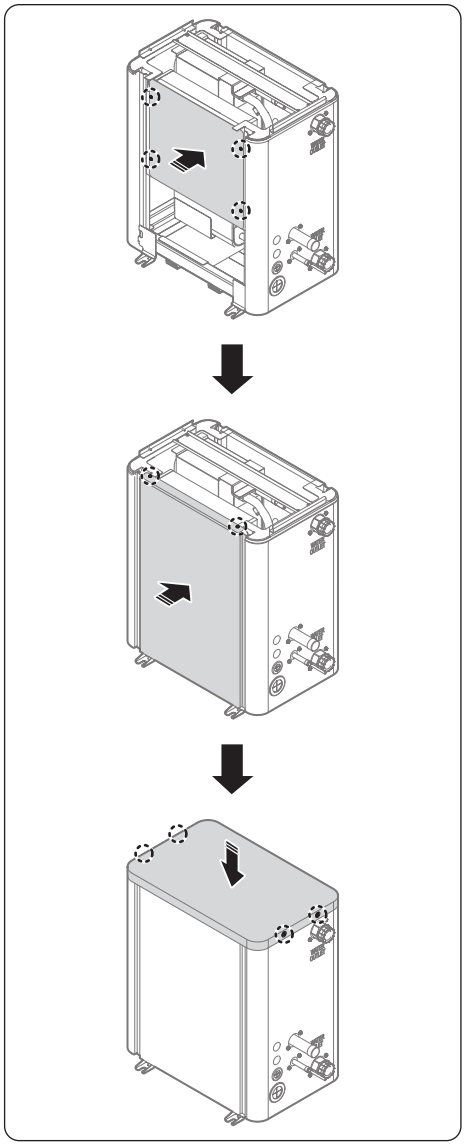
2 Disassemble four screws and remove the Cover control.



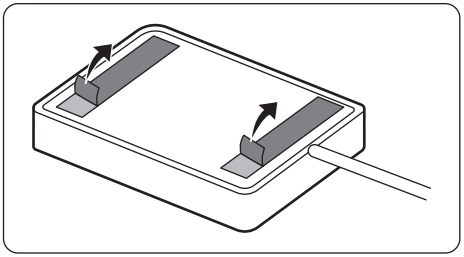
3 Connect the Wi-Fi wire connector through the wire hole.



4 Assemble cover pipe and Cover control.



5 Use the double-sided tape attached to the back of the Wi-Fi kit and attach it indoors with a good Wi-Fi connection.



Installation Procedure

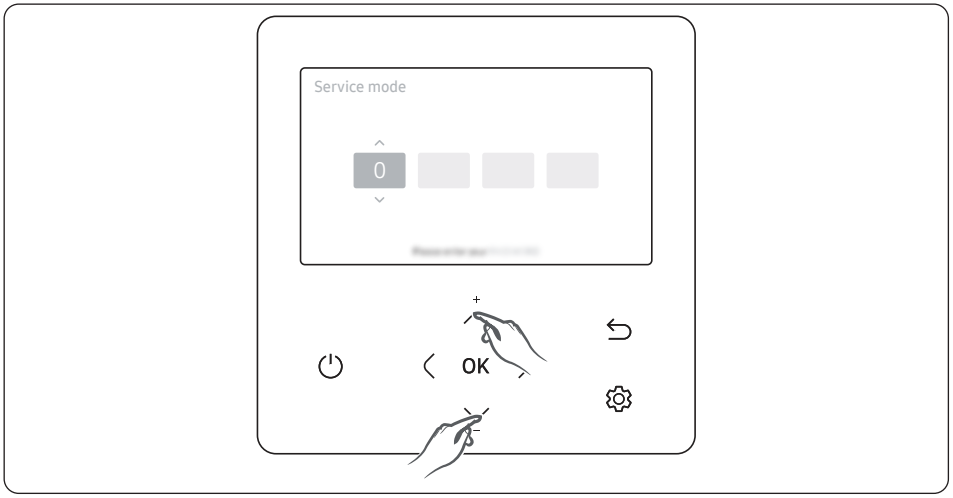
Step 16 Setting the indoor unit addresses with the remote control

You cannot set both indoor unit addresses and the installation options in a batch: set both respectively.

Common steps for setting the addresses and options

Wired remote control

To set the indoor unit option code use the wired remote control and follow the directions below.



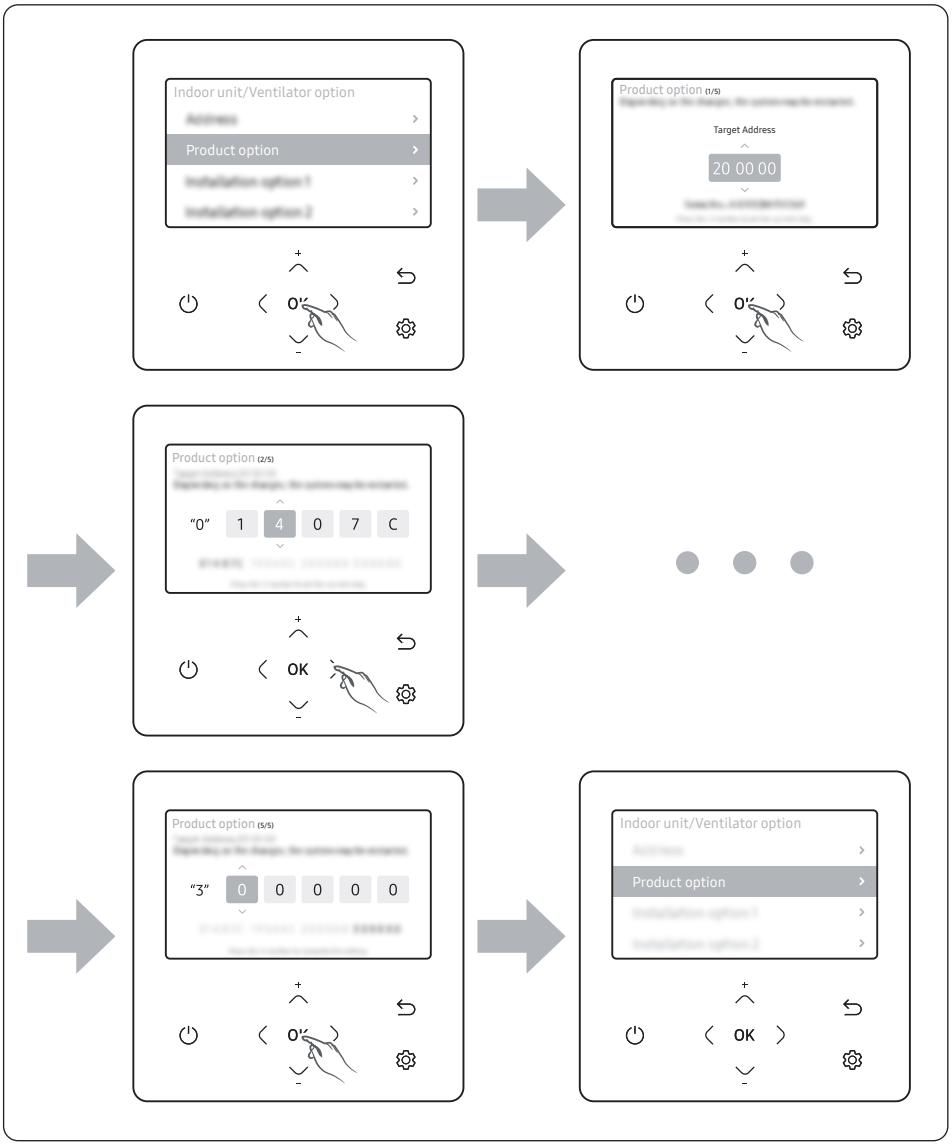
1 If you want to use the various additional functions for your Wired Remote Control, press the ∧ and ∨ buttons at the same time for more than 3 seconds.
   - The password entry screen appears.

2 Enter the password, "0202," and then press the **OK** button.
   - The settings screen for installation/Service mode appears.

3 See the list of additional functions for the Wired Remote Control on the next page, and then select the Product option menu.
   - Once you have entered the settings screen, the current setting appears.
   - Refer to the chart for data setting.
   - Using the ∧ / ∨ buttons, change the settings and press the 〉button to move to the next setting.
   - Press the **OK** button to save the new setting.
   - Press the ⮌ button to move to the Home screen.

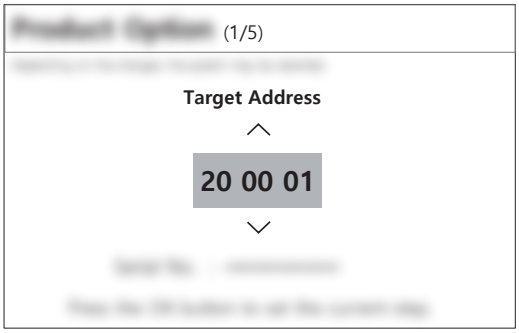
NOTE

- While setting the data, you can press the ⮌ button to move to the Home screen after checking the saving status at a pop-up screen.

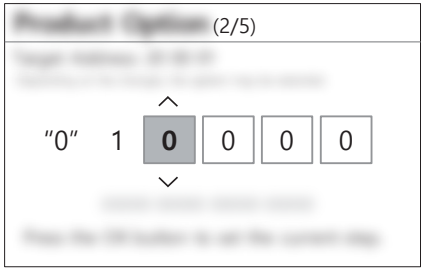


Installation Procedure

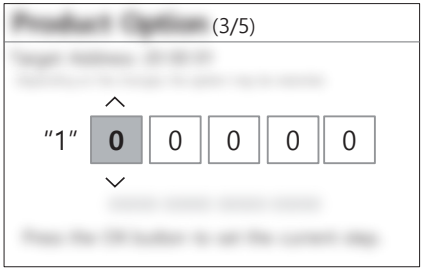
[Product option 1page]



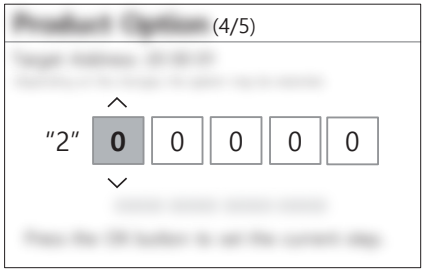
[Product option 2page]



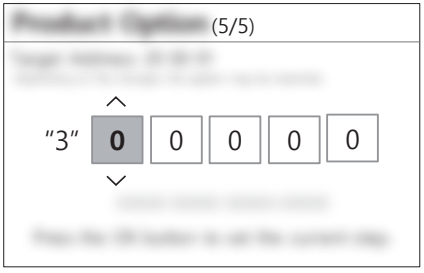
[Product option 3page]



[Product option 4page]

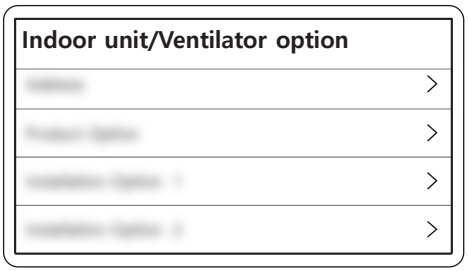


[Product option 5page]

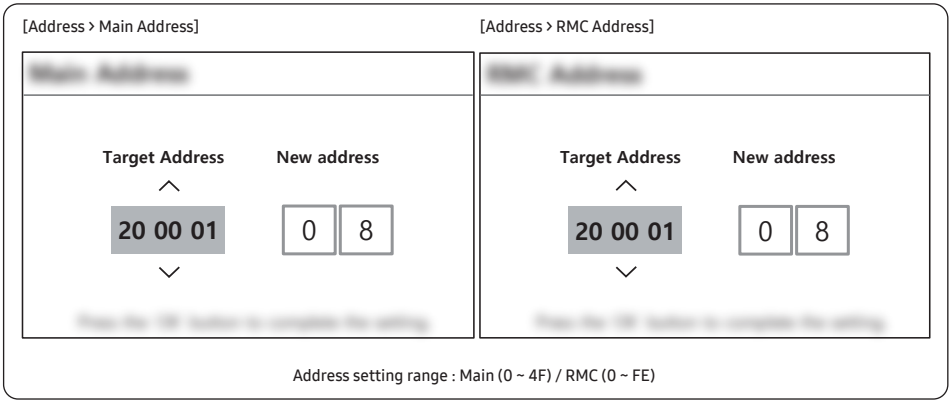


Set the indoor unit address and installation option with the remote control option. Set each option separately since you cannot set the ADDRESS setting and indoor unit installation setting option at the same time. You need to set twice when setting the indoor unit address and installation option.

Setting an indoor unit address



1	Address - Move to 'Address' page.
2	Product Option - Move to 'Product option' page.
3	Installation Option 1 - Move to 'Installation option 1' page.
4	Installation Option 2 - Move to 'Installation option 2' page.



Address setting range : Main (0 ~ 4F) / RMC (0 ~ FE)

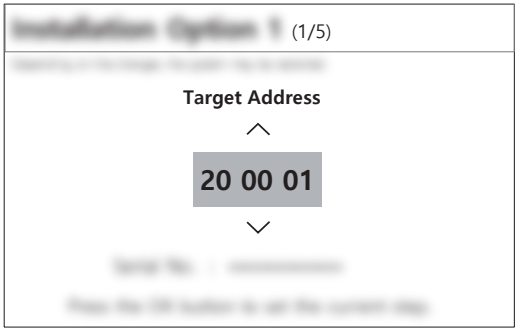
NOTE

- Press the ⮌ button anytime during setup to exit without setting.
- Address will not be applied if you don't press **OK** button.
- Setting the Main/RMC Address of an Indoor unit is available only with a Main wired remote control.

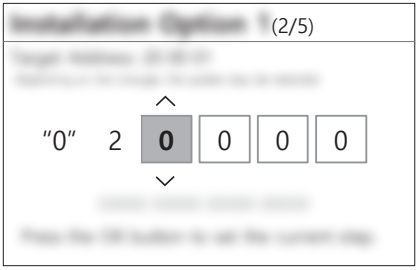
Installation Procedure

Setting an indoor unit installation option

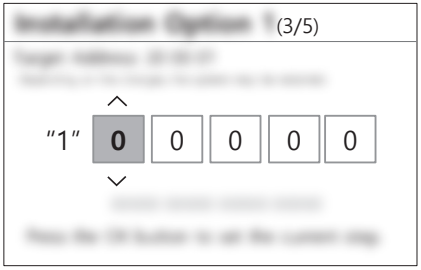
[Installation option 1-1page]



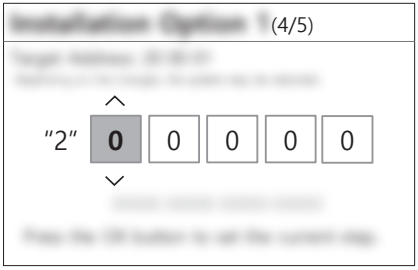
[Installation option 1-2page]



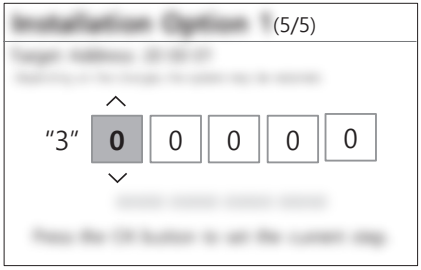
[Installation option 1-3page]



[Installation option 1-4page]



[Installation option 1-5page]



Setting the indoor unit addresses (MAIN/RMC/MSB/SVB)

1 Make sure that the power is supplied to the indoor unit.
   - If the indoor unit is not plugged in, it must include a power supply.
2 Make sure that the panel or display is connected to the indoor unit so that it can receive options.
3 Set an address (MAIN/RMC/MSB/SVB port) for each indoor unit using the remote control, according to your air conditioning system plan.
   - The indoor unit addresses (MAIN/RMC/MSB/SVB port) are set to 0A0000-100000-200000-300000 by default.

NOTE

- Also set the MSB/SVB and Indoor units address on Lennox Service Software.
- From SEG13 to SEG18 is for setting MSB/SVB address.

Installation Procedure

Setting the installation options in a batch

Option No. for an indoor unit address: 0AXXXX-1XXXXX-2XXXXX-3XXXXX

Option	SEG1		SEG2		SEG3		SEG4		SEG5		SEG6	
Function	Page		Mode		Setting main address		100-digit of an indoor unit address		10-digit of an indoor unit address		The single digit of an indoor unit	
Indication and details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details
	0		A		0	No main address	0 to 9	100-digit	0 to 9	10-digit	0 to 9	A single digit
					1	Main address setting mode						

Option	SEG7		SEG8	SEG9		SEG10	SEG11		SEG12	
Function	Page		-	Setting RMC address		-	Group channel		Group address	
Indication and details	Indication	Details	-	Indication	Details	-	Indication	Details	Indication	Details
	1			0	No RMC address		RMC1	0 to F	RMC2	0 to F
				1	RMC address setting mode					

Option	SEG13		SEG14	SEG15		SEG16		SEG17		SEG18	
Function	Page		-	Setting MSB/SVB PORT address		10-digit of MSB/SVB address		1-digit of MSB/SVB		MSB/SVB PORT address	
Indication and details	Indication	Details	-	Indication	Details	Indication	Details	Indication	Details	Indication	Details
	2			0	No MSB/SVB PORT	0~1	10-digit	0~9	1-digit	A~F	PORT Location
				1	MSB/SVB PORT address setting mode						

※ MSB/SVB Port address settings initialization : Configure SEG15/16/17/18 as 1/0/0/0.

⚠ CAUTION

- If you enter A to F to the SEG5 or SEG6, the indoor unit main address is not changed.
- If you enter 0 to the SEG3, the indoor unit maintains the previous main address although you enter the option value for the SEG5 or SEG6.
- If you enter 0 to the SEG9, the indoor unit maintains previous RMC address although you enter the option value for the SEG11 or SEG12.
- You cannot set the SEG11 or SEG12 to F value at the same time.
- If the indoor unit is connected to the MSB/SVB, you can set the SEG 15~18.
- Ex.) If you want to set the indoor unit to 'A' port of MSB/SVB #1.(0A0000 – 100000 – 20101A -30000)

Setting the indoor unit installation option (suitable for the condition of each installation location)

1 Make sure that the power is supplied to the indoor unit.
   - If the indoor unit is not plugged in, it must include a power supply.

2 Make sure that the panel or display is connected to the indoor unit so that it can receive options

3 Set an address for each indoor unit using the remote control, according to your air conditioning system plan.
   - The indoor unit addresses are set to 020010-120000-2000A0-300000 by default.

02 series installation option

SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
0	2	-	-	Use of central control	-
SEG7	**SEG8**	**SEG9**	**SEG10**	**SEG11**	**SEG12**
1	-	-	-	EEV Step when heating stops	-
SEG13	**SEG14**	**SEG15**	**SEG16**	**SEG17**	**SEG18**
2	Use of external control	Setting the output of external control	-	Whether to use R-32 sensor	-
SEG19	**SEG20**	**SEG21**	**SEG22**	**SEG23**	**SEG24**
3	-	Heating setting compensation	Adjusted EEV step of stopped unit during oil return /defrost mode.	-	Whether to use BLE Onboarding

- If you set an option to a value that is out of range specified above, the option is automatically set to 0 by default.
- The SEG5 option (Use of central control) is set to 1 (Use) by default. Therefore, you don't need to set the SEG5 option additionally. Note that even if the central control system is not connected, no errors occur. If you want a specific indoor unit not to be controlled by the central control system, set the SEG option of that indoor unit to 0 (Disuse).
- The external output of SEG15 is generated via VSTAT10P-1 connection. (Refer to the manual of VSTAT10P-1.)

Installation Procedure

02 series installation option (Detailed)

Option No. : 02XXXX-1XXXXX-2XXXXX-3XXXXX

Option	SEG1		SEG2		SEG3	SEG4	SEG5		SEG6
Explanation	PAGE		MODE		-	-	Use of central control		-
Indication and Details	Indication	Details	Indication	Details	-	-	Indication	Details	-
	0		2				0	Disuse	
							1	Use	

Option	SEG7		SEG8	SEG9	SEG10	SEG11		SEG12
Explanation	PAGE		-	-	-	EEV Step when heating stops		-
Indication and Details	Indication	Details	-	-	-	Indication	Details	-
	1					0	Default	
						1	Adjusted EEV Step setting	

Option	SEG13		SEG14		SEG15		SEG16	SEG17		SEG18
Explanation	PAGE		Use of external control		Setting the output of external control		-	Whether to use R-32 sensor		-
Indication and Details	Indication	Details	Indication	Details	Indication	Details	-	Indication	Details	-
	2		0	Disuse	0	External control (Thermo On)		0	Disuse	
			1	ON/OFF control	1	External control (Operation On)				
			2	OFF control	4	Cooling operation signal(*1)		8	Use	
			3	Window ON/OFF control						

Option	SEG19		SEG20	SEG21		SEG22		SEG23	SEG24	
Explanation	PAGE		-	Heating setting compensation		Adjusted EEV step of stopped unit during oil return /defrost mode.		-	Whether to use BLE Onboarding	
Indication and Details	Indication	Details	-	Indication	Details Heating Setting Compensation	Indication	Details	-	Indication	Details
	3			0	Default	0	Default		0	Disuse
				1	35.6 °F (2 °C)	1	Adjusted EEV position Type 1			
				2	41 °F (5 °C)	2	Adjusted EEV position Type 2		2	Use
						3	Adjusted EEV position Type 3			

* Advanced function: Controlling cooling/heating current or power saving with motion detect.

(*1) When indoor unit is in cooling mode, The output signal is "ON"

05 series installation option

SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
0	5	Use of wired remote controller for R-32 leakage alarm	-	-	-
SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
1	-	-	Compensation option for Long pipe or height difference between indoor units	MTFC (*3)	-
SEG13	SEG14	SEG15	SEG16	SEG17	SEG18
2	-	-	-	-	-
SEG19	SEG20	SEG21	SEG22	SEG23	SEG24
3	-	-	-	-	Water tank sensor setting

Installation Procedure

05 series installation option (Detailed)

Option No. : 05XXXX-1XXXXX-2XXXXX-3XXXXX

Option	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
Explanation	PAGE	MODE	Use of wired remote controller for R-32 leakage alarm	-	-	-
Indication and Details	Indication / Details: 0	Indication / Details: 5	Indication / Details: 0 = No use, 1 = Use	-	-	-

Option	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
Explanation	PAGE	-	-	Compensation option for Long pipe or height difference between indoor units	MTFC (*3)	-
Indication and Details	Indication / Details: 1	-	-	0 = Default; 1 = (*1) Height difference is more than 98.42 ft (30 m) or (*2) Distance is longer than 360.89 ft (110 m); 2 = (*1) Height difference is 49.21~98.42 ft (15~30 m) or (*2) Distance is 164.04~360.89 ft (50~110 m)	0 = Default; 2 = Use	-

Option	SEG13	SEG14	SEG15	SEG16	SEG17	SEG18
Explanation	PAGE	-	-	-	-	-
Indication and Details	Indication / Details: 2	-	-	-	-	-

Option	SEG19	SEG20	SEG21	SEG22	SEG23	SEG24
Explanation	PAGE	-	-	-	-	Water tank sensor setting
Indication and Details	Indication / Details: 3	-	-	-	-	0 = Default (Direct connected water tank sensor); 1 = Shared sensing value of water tank

(*1) Height difference : The difference of the height between the corresponding indoor unit and the indoor unit installed at the lowest place. For example, When the indoor unit is installed 131.23 ft (40 m) higher than the indoor unit installed at the lowest place, select the option "1".

(*2) The difference between the pipe length of the indoor unit installed at farthest place from an outdoor unit and the pipe length of the corresponding indoor unit from an outdoor unit.
For example, when the farthest pipe length is 328 ft (100 m) and the corresponding indoor unit is 131.23 ft (40 m) away from an outdoor unit, select the option "2". (328 ft (100 m) - 131.23 ft (40 m) = 196.85 ft (60 m))

(*3) For MTFC option, MTFC(Multi Tenant Function Controller) kit is required.

Changing the addresses and options individually

When you want to change the value of a specific option, refer to the following table and follow the steps in **Common steps for setting the addresses and options** on page 42.

Option	SEG1		SEG2		SEG3		SEG4		SEG5		SEG6	
Function	Page		Mode		Type of the option to change		Tens position of the option number		Units position of the option number		New value	
Indication and details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details
	0		D		Option type	0 to F	Tens position value	0 to 9	Units position value	0 to 9	New value	0 to F

Example: Changing the "Whether to use R-32 sensor" (SEG17) option of the installation options to 0 disuse.

Option	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
Function	Page	Mode	Type of the option to change	Tens position of the option number	Units position of the option number	New value
Indication	0	D	2	1	7	0

⚠ CAUTION

- If your indoor units support both cooling and heating, the mixed operation (two or more indoor units operate in different modes simultaneously) is not available when the indoor units are connected to the same outdoor unit. If you set an indoor unit as the master indoor unit by using the remote control, the outdoor unit automatically operate in the current mode of the master indoor unit.

Installing external outputs

- An external output signal occurs if the R-32 sensor in the indoor unit detects a refrigerant leak, or the sensor has a malfunction or short circuit.
- Based on this signal, safety measures required for the indoor unit, such as ventilation system activation and alarm activation, can be taken.
- VSTAT10P-1 (External Contact Control Module) can be used to link the GAS LEAK output.

NOTE

- The VSTAT10P-1 can be connected to the required load on connectors 3 and 4.
- The load is AC (208 ~ 230), AC 2.25Amax
- When an error occurs due to a gas leak or R-32 sensor error, 3 and 4 are in a short state (the relay operates).

Installation Procedure

Product maintenance

1 Water quality management
- The plate type heat exchanger is impossible to disassemble for cleaning or to replace parts. To prevent corrosion or water scale on the plate type heat exchanger, you must manage the cooling water quality in compliance with national standards.
- If the temperature of water is higher than room temperature, make sure to keep the concentration of chloride ion below 100 ppm to prevent corrosion and the water hardness should be below 150 mCaCO3/L to prevent water scale. When scale inhibitor is used, make sure to use the ones that does not cause corrosion to stainless steel and copper.

2 Amount of water flow management
- Insufficient amount of water flow will lead to accidents related to frozen plate type heat exchanger. Check to make sure if there is any decrease in amount of water flow due to blocked strainer, problem on air ventilation or circulation pump after checking the temperature/pressure difference between the inlet and outlet of the plate type heat exchanger. If the temperature/pressure difference exceeds optimal range, stop the operation until cause is taken care before re-start the operation.

3 Precautions on plate type heat exchanger maintenance
- Make sure to tell the user to keep this installation manual.

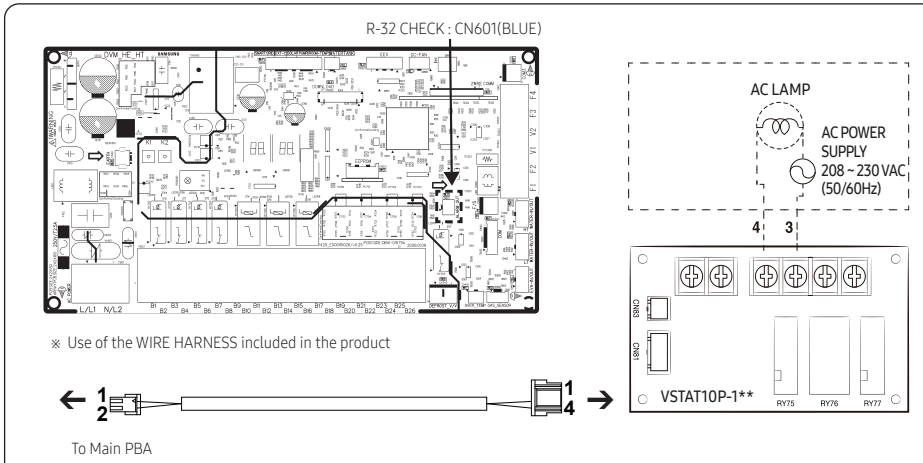
a When the product was not operated for long period of time, check the followings.
- Check the water to see if the water quality meets the standard.
- Clean the strainer.
- Check if the amount of water flow is appropriate. (The Flow switch starts to operate at a minimum flow rate of 12 liters per minute.)
- Check to see if there is any problems on the water pressure, amount of water and the water temperature at inlet/outlet.

b The plate type heat exchanger is impossible to disassemble for cleaning or to replace parts. Therefore it has to be cleaned by following methods.
- Check if there is any cleaning hole for chemical cleaning at the inlet water pipe. For water scale cleaning use diluted (down to 5 %) citric acid, oxalic acid, acetic acid, phosphoric acid. However, do not use a cleaning solution containing hydrochloric acid, sulfuric acid or nitric acid since they are highly corrosive.
- Check if there is valve on the inlet/outlet of the plate type heat exchanger.
- Connect a exclusive pipe for cleaning to the inlet/outlet pipe of the plate type heat exchanger and fill the detergent at the temperature of 122~140 ˚F (50~60 ˚C) and circulate the detergent for about 2~5 hours. Cleaning time can be different depending on the temperature of detergent or degree of water scale. Judge the degree of water scale removal by the color of water detergent.
- After cleaning, discharge the detergent within the plate type heat exchanger and fill the plate type heat exchanger with a water mixed with 1~2 % of sodium hydroxide (NaOH) or sodium bicarbonate (NAHCO3). Circulate the water mixture for 15~20 minutes to neutralize.
- After neutralizing the pipes, rinse the plate type heat exchanger with distilled water.
- If you are using the detergent sold at local retail stores, make sure that it doesn't cause any corrosion to the stainless steel.
- For detail information on cleaning method (and proper use of detergent), contact the detergent manufacturer.

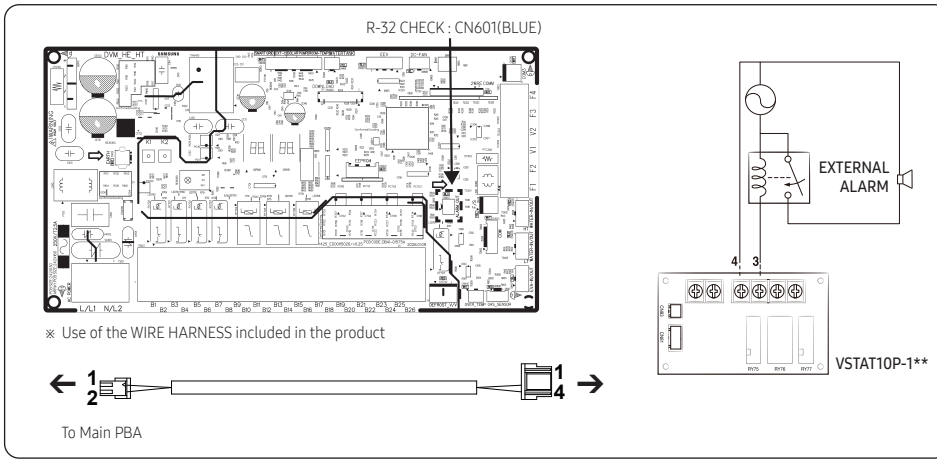
c After cleaning, check to see if it is possible to operate normally.

AC LAMP/EXTERNAL LAMP Installation Guide (Optional)

For controlling AC LAMP (On/Off)



For controlling EXTERNAL ALARM (On/Off)



Installation Procedure

Performing final check and trial operation

To complete the installation, perform the following checks and tests to ensure that the air conditioner operates correctly.

1 Check the followings.
- Strength of the installation site
- Tightness of pipe connection to detect a gas leak
- Electric wiring connections
- Heat-resistant insulation of the pipe
- Drainage
- Earth conductor connection
- Correct operation (follow the steps below)

After finishing the installation of the air conditioner, you should explain the following to the user. Refer to appropriate pages in the User's Manual.

1 How to start and stop the air conditioner

2 How to select the modes and functions

3 How to adjust the temperature

NOTE

- When you complete the installation successfully, hand over the User's Manual and this Installation Manual to the user for storage in a handy and safe place.

SmartThings app

To use the SmartThings app, connect the product to the network in the sequence described below.
The images shown may differ depending on your smartphone model, OS version and manufacturer.
You need to set up the Wi-Fi access point only when connecting the product to a Wi-Fi network. Once the product is connected, you can use the SmartThings app via Wi-Fi, 3G, LTE, 5G or more wireless networks.
You can easily install the SmartThings app or use the product with your smartphone by scanning the SmartThings QR code on the label.

1 Checking the power connections

Check if the power is connected to the product and the access point.

2 Setting up and connecting to a Wi-Fi access point using your smartphone

1 To connect the product to a Wi-Fi network, turn on Wi-Fi at "Settings > Wi-Fi", and then select the access point to connect to

- Only alphanumeric characters are supported for wireless access point names (SSIDs). If an SSID has a special character, rename it before connecting to it.
- This product supports only Wi-Fi 2.4 GHz.

2 Turning off "Switch to mobile data" at "Settings > Wi-Fi" on your Smartphone

- If "Switch to mobile data" or "Adaptive Wi-Fi" is turned on, you cannot connect to the network. Be sure to turn off these functions before connecting to the network.

NOTE

- The setup may differ depending on your smartphone model, OS version and manufacturer.

3 Checking the Internet connectivity

- After connecting to Wi-Fi, check that your smartphone is connected to the Internet.

NOTE

- A firewall may prevent your smartphone from connecting to the Internet. Contact your Internet service provider for troubleshooting.

3 Downloading the SmartThings app and registering your Samsung account

1 Downloading the SmartThings app

- Search for "SmartThings" on the Play Store or App Store and download the SmartThings app to your smartphone.
- If the SmartThings app is already installed on your smartphone, update it to the latest version.

NOTE

- The SmartThings app supports Android OS 7.0 or later (with at least 2 GB RAM) and iOS 12.0 or later. The app is optimized for iPhone 6s or later and Samsung smartphones (Galaxy S and Note series).
  The updates of the SmartThings app or the functions supported by it may be discontinued for the previously supported OS versions due to reasons such as usability and security.
- The SmartThings app may change without prior notice to improve product usability and performance.

SmartThings app

2 Registering your Samsung account

- A Samsung account is required to use the SmartThings app. To create your Samsung account and log in to your account, follow the instructions displayed on the SmartThings app. You do not need to install an additional app.

NOTE

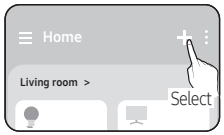
- If you already have a Samsung account, log in to the account. If you have a smartphone that is a Samsung device and you have a Samsung account, your smartphone is automatically logged in to your account.
- If you log in from a smartphone produced for another country, you need to log in with its country code when you create your Samsung account, and the SmartThings app may not be used on some smartphones.

4 Connecting the SmartThings app to your product

1 Selecting the product to connect to

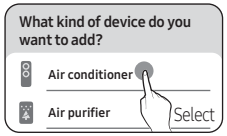
1) Start the SmartThings app about one minute after turning on the product to connect to.
2) After the SmartThings app is started, select 'ADD NOW' when a pop-up window saying that a product to connect to is found appears.

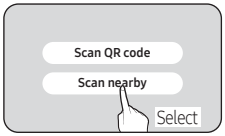
3) If the pop-up window does not appear, select "+", and then "Add Device".



You can add a product you want to connect to by selecting it manually or by selecting "Scan nearby".

- Select manually: Samsung devices › Air conditioner
- Scan: Scan nearby › Air conditioner





2 Connecting the SmartThings app to your product

- Follow the instructions displayed on the SmartThings app to connect to your product.
- For information on how to use the SmartThings app, select the How To menu on the app.

NOTE

- If any pop-up window appears on the top of the smartphone while connecting to your product, do not select it.
- If a pop-up window saying that the device is already registered appears during connecting to your product, get permission using "REQUEST PERMISSION" from a user already connected to the product, or create a new account using "REGISTER MY ACCOUNT" to independently connect to the product.
- If a Samsung account-related country error occurs while connecting to your product, log out of your current Samsung account, log in to your previous Samsung account, and then delete all devices that have been connected previously. Then, log in to your current Samsung account again, and then configure the settings.

- If a failure message appears while adding a device, see "Setting up and connecting to a Wi-Fi access point using your smartphone" on page 57. The connection may fail temporarily due to an installation location problem of the access point or other problems.
- If a message appears on the SmartThings app, follow its instructions.

NOTE

- For the security protocols for wireless/wired access points, WPA-PSK and WPA2-PSK are recommended. For the authentication methods, AES is recommended. New Wi-Fi authentication specifications and Wi-Fi non-standard authentication methods are not supported.
- The product supports the IEEE802.11 b/g/n (2.4 GHz) communication protocol. (Samsung recommends IEEE802.11n.)
- If your Internet service provider permanently has registered the MAC address (a unique identification number) of your PC or modem, you may not be able to connect your product to the Internet. Contact your Internet service provider and ask how to connect devices other than your PC (such as an air conditioner and an air purifier) to the Internet.

Open Source Announcement

The software included in this product contains open source software.

The following URL http://opensource.samsung.com/opensource/SMART_TP1_0/seq/0 leads to open source license information as related to this product.

Security updates information

Security updates are provided to strengthen the security of your device and protect your personal information. For more information on security updates, visit https://security.samsungda.com.

* The website supports only some languages.

Appendix

Troubleshooting

If a problem occurs to the air conditioner, the following error codes will appear on the display of the indoor unit or outdoor unit.

Error detection and re-operation

- If an error occurs during operation, an error code will appear and all the operations are stopped except the display panel.
- If you re-operate the air conditioner by a remote controller or switch, it will operate normally at first, then detect an error.

Abnormal condition	Error code
Error on indoor sensor (Short or Open)	
1. Error on Eva-in sensor (Short or Open)	E122
2. Error on Eva-out sensor (Short or Open)	E123
3. Indoor room temperature sensor error (Short or Open)	E121
4. R-32 refrigerant leakage detection sensor error (Short or Open)	E116
5. Water inlet temperature sensor (Tw1) (Short or Open)	E901
6. Water outlet temperature sensor (Tw2) (Short or Open)	E902
7. Water outlet temperature sensor (Tw3) (Short or Open)	E903
8. Water tank temperature sensor (Short or Open)	E904
Error on outdoor unit sensor	
1. Error on outdoor temperature sensor (Short or Open)	E221
2. Error on cond sensor	E237
3. Error on discharge sensor	E251
Other outdoor unit sensor error that is not on the above list	
1. When there is no communication between the indoor-outdoor units for 2 minutes	E101
2. Communication error received from the outdoor unit	E102
3. 3 miniute tracking error on outdoor unit	E202
4. Communication error after tracking due to unmatching number of installed units	E201
5. Error due to repeated communication address	E108
6. Communication address not confirmed	E109
Self diagnosis error display	
1. Error due to opened EEV (2nd detection)	E151
2. Error due to closed EEV (2nd detection)	E152
3. Eva in sensor is detached	E128
4. Eva out sensor is detached	E129
5. Thermal fuse error (Open)	E198

Abnormal condition	Error code
1. COND mid sensor is detached	E241
2. Refrigerant leakage (2nd detection)	E554
3. Abnomally high temperature on Cond (2nd detection)	E450
4. Low pressure s/w (2nd detection)	E451
5. Abnomally high temperature on discharged air on outdoor unit (2nd detection)	E416
6. Indoor operation stop due to unconfirmed error on outdoor unit	E559
7. Error due to reverse phase detection	E425
8. Comp stop due to freeze detection (6th detection)	E403
9. High pressure sensor is detached	E301
10. Low pressure sensor is detached	E306
11. Outdoor unit copression ration error	E428
12. Outdoor sump down_1 prevetion control	E413
13. Compressor down due to low pressure sensor prevention control_1	E410
14. Simultaneous opening of cooling/heating MSB SOL valve (1st detection)	E180
15. Simultaneous opening of cooling/heating MSB SOL valve (2nd detection)	E181
16. Indoor unit R-32 sensor short/open	E116
17. MSB or SVB unit R-32 sensor short/open	E686
18. 2nd refrigerant leak detection error (Error-causing MSB or SVB unit)	E687
19. Refrigerant leak sensor failure error (Error-causing MSB or SVB unit)	E688
20. Refrigerant leak sensor replacement notification error (Error-causing MSB or SVB unit)	E689
21. Refrigerant leak sensor lifetime expiration error (Error-causing MSB or SVB unit)	E690
22. 1st refrigerant leak detection error	E696
23. 2nd refrigerant leak detection error (Error-causing indoor unit)	E697
24. Refrigerant leak sensor failure error	E698
25. R-32 detection sensor replacement alarm	E699
26. R-32 detection sensor unavailable alarm	E700
27. 2nd refrigerant leak detection error (Not Error-causing indoor unit)	E797
28. Setting error of wired remote controller for R-32 leakage alarm	E693
29. Communication error between wired remote controller and indoor unit	E601
30. Wired remote control incompatible device connection error	E633
31. Communication error between wired remote controller and indoor unit	E641
32. Overheating error of TW3	E981
33. Setting error of sharing water tank temperature sensor	E917
34. Disinfection operation incomplete error	E919
35. Water freeze prevention error	E907
Other outdoor unit self-diagnosis error that is not on the above list	
Flowating s/w (2nd detection)	E153
EEPROM error	E162
EEPROM option error	E163
Error due to incompatible indoor unit	E164

Appendix

Regulatory Notice

FCC Notice

⚠ FCC CAUTION:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This appliance contains the transmitter module.

This device complies with Part 15 of FCC Rules. Operation is Subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received including interference that cause undesired operation.

For products available in the US and Canadian markets, only channels 1~11 are available.

You cannot select other channels.

FCC STATEMENT:

This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment to an outlet that is on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RADIATION EXPOSURE STATEMENT:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated so there is at least 8 inches (20 cm) between the radiator and your body. This device and it's antennas must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

IC Notice

This appliance contains the transmitter module.

The term "IC" before the radio certification number only signifies that Industry Canada technical specifications were met. Operation is subject to the following two conditions : (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

For products available in the US and Canadian markets, only channels 1~11 are available.

You cannot select other channels.

IC RADIATION EXPOSURE STATEMENT:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated so there is at least 8 inches (20 cm) between the radiator and your body. This device and it's antennas must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

SAVE THESE INSTRUCTIONS





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