Carrier

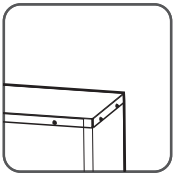
Please read carefully before installation to ensure that installation is performed correctly.
This manual can be downloaded from the website.
http://www.carrier.co.kr/support/aircon_manual.asp

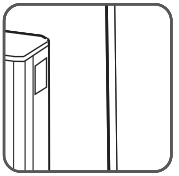
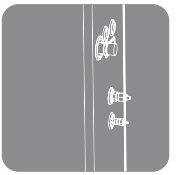
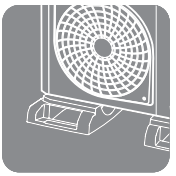
P/N : 60WHD025-540020

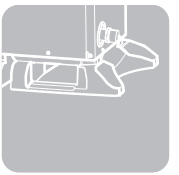
| Inverter Hybrid Boiler |

(Original instruction)

Installation Manual



Hydro Unit(Indoor Unit)
30AWH-025QI

Outdoor Unit
30AWH-025QO

Features of Product

Carrier's 110 years innovation and inverter technology provides the following advantages.

Dual inverter cascade	The dual inverter cascade compression technology provides high efficiency solution and reduces energy consumption significantly compared to convertional fossil fuel and heater boilers.
ECO Green system	ECO friendly R410A and R134a refrigerants are used in the cascade system.
Applicable in extremely cold climate	It is possible to produce stable hot water up to 80℃ at -15℃ ambient temperature and possible to produce hot water up to 80℃ at -20℃ ambient temperature.
Smart remote control (optional)	The operation, setting control and operation monitoring can be managed by a smart phone (Android).
Intelligent energy saving operation	Both of inverter compressors in outdoor unit and a hydro unit are self controlled inaccordance with ambient temperature and flow temperature.
Self-diagnosis function	In case of malfunction, the self-diagnosis function displays error messages on the wired remote controller.
Inverter control operation	Carrier's advanced energy saving inverter technology always ensures a comfortable indoor environment.
Improved convenient operation	Repeat hours, quiet mode, outing mode are adopted for user convenience.
Requires minimum installation area	Compact split system using high efficiency brazed plate heat exchanger requires minimized space and provides easy installation and maintenance
Built-in cooling fan	The built-in cooling fan in the indoor unit enables quiet operation.
Provides external output contacts (optional)	External output contact(s) is available as an option, if a connection with an external device is necessary.

Table of Contents

Wait!! This product uses 3-phase, 400V 50Hz electricity. You must furnish a separate power supply if 400V electricity is not available. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory Or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

- **These instructions are intended to prevent damages resulting from unexpected accidents by ensuring the operation of the equipment in a safe and correct manner. So, please observe the instructions.**

Explanation of illustrated marks

Warning — Failure to observe this notice may cause death or serious injury.

Caution — Failure to observe this notice may cause injury or damage to property

Explanation of illustrated marks

Prohibited — This symbol indicates prohibition. The thing that is prohibited is specified in the symbol using a picture or phrase.

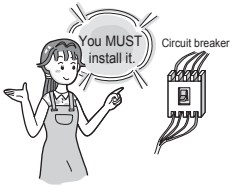
Mandatory — This symbol indicates the mandatory obligations or requirements. The thing that is mandatory is specified in the symbol using a picture or phrase.

Caution — This symbol indicates caution. The thing that must be paid attention to is specified in the symbol using a picture or phrase.

When performing installation

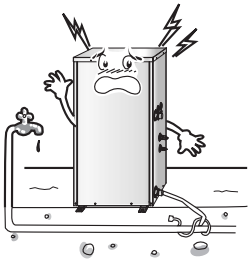
Warning

Mandatory — You must use correctly rated breaker or fuse.(non-installation may cause an electric shock)



Caution : Expenses incurred in relation to circuit breaker work will be charged to the user, as such expenses are not included in the basic installation expenses.

Mandatory — Grounding work is mandatory. However, do not use a gas pipe, water pipe or a telephone line for grounding. (Improper grounding work may cause a failure or electric shock.)



Installation

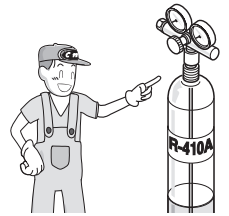
Warning

Mandatory

Electrical work should be performed by a qualified technician in accordance with the instructions specified in this installation guide. In addition, a designated circuit diagram should be used. (Inappropriate power cable and/or faulty electrical work may cause a fire or electric shock.)

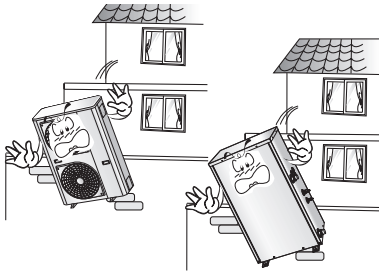
Mandatory

A designated amount of refrigerant should be charged in the product in the event of installation or relocation. (Overcharging or use of a mixture with other refrigerant except specified refrigerant can cause abnormality in the refrigerant cycle, which may lead to a fire or explosion.)



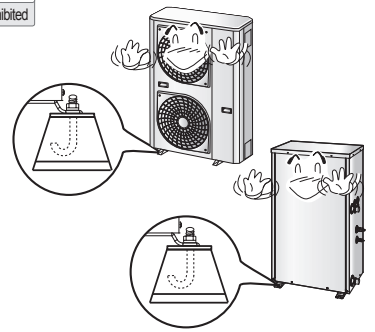
Mandatory

Fix the product firmly on the groud floor in preparation for a strong wind or earthquake. (may cause death, injury or property damages)



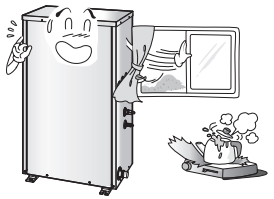
Prohibited

Do not reinstall or modify a fixed safety device.



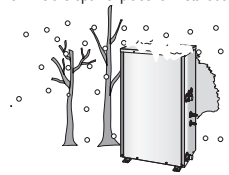
Mandatory

Ventilate the indoor room in case of gas leakage during installation or relocation. (Toxic gas is generated when the leaked refrigerant gas reacts to fire, which may cause an accident.)



Mandatory

You must install the indoor unit in an indoor place in which the temperature does not go below 0℃. (Exposure to snow, rain or a temperature below 0℃ may cause moisture generation or freezing inside the product, which may result in damages to the product space. An indoor place in which the temperature stays in a range from 15 to 25℃ is the optimal place for installation.)

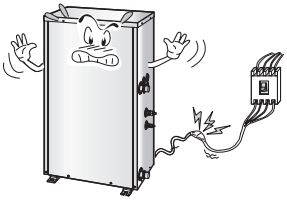


Installation

Warning

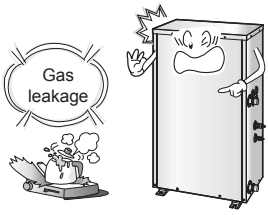
Prohibited

Do not modify or extend the power cable in the middle. (may cause an explosion or fire)



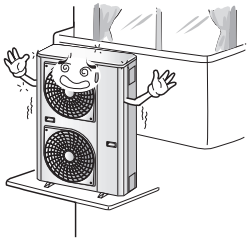
Prohibited

Do not install the product near any fire sources or in a potential flammable gas leakage area. (Gas that has leaked and accumulated around the product may cause an explosion or fire.)



Prohibited

Do not install the outdoor unit on a moving base or a place where it can fall down. (The outdoor unit may fall down to the ground and may cause damages to individuals or to property. In addition, an outdoor unit that has fallen down may not be repairable.)



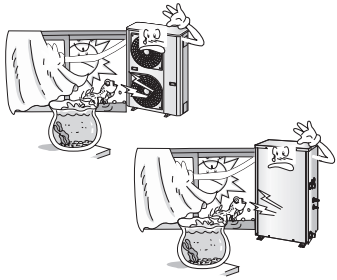
Mandatory

Installation should only be performed by a qualified professional installation agency. (may cause a failure, electric shock, fire or leakage.)

Caution: Extra installation and relocation fees and expenses are charged to the customer.

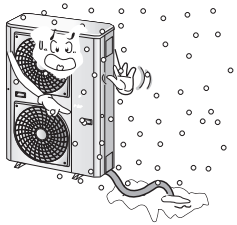
Prohibited

Do not install the product in a place that is exposed to direct sunlight or moisture



Mandatory

In an area with a pedestrian path, connect the drain hose to the drainage (The condensate can freeze, which may disturb with the passage)

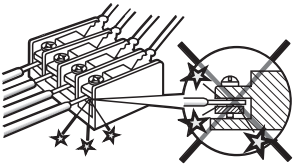


Installation

Warning

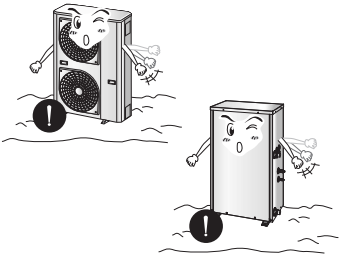
Prohibited

Do not allow the wire connection to be loosely fastened.



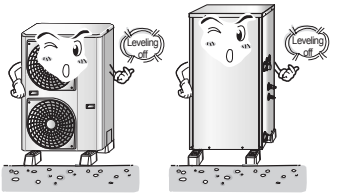
Mandatory

Install the product in a place that can withstand the load of the product. (may cause vibration and/or leakage)



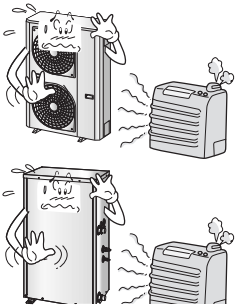
Mandatory

Make sure the product is level when installing it. (Imbalance may cause vibration and leakage)



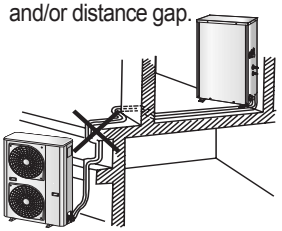
Prohibited

Do not install the product in a place that is too close to a heat source. (may cause damage to the product)



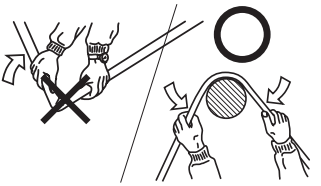
Prohibited

Avoid excessive turning or bending of the piping connection , as well as excessive height and/or distance gap.



Prohibited

Avoid excessive bending of piping connection or drain hose

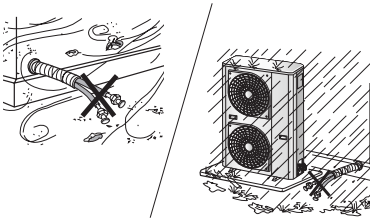


Installation

Warning

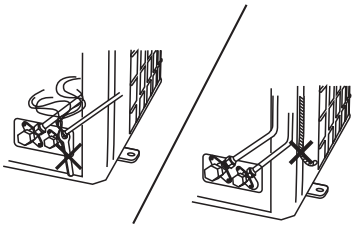
Prohibited

Do not allow dust to come into the end of the pipe or expose the pipe to moisture before connection work.



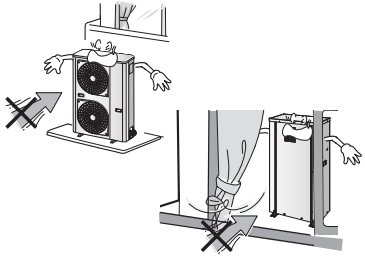
Do not disassemble

Do not disconnect the refrigerant connection after installation.
This may cause refrigerant leakage.



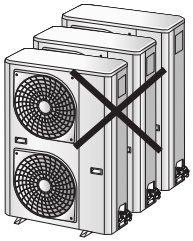
Prohibited

Do not install the product in a place in which the air outlet of the indoor/ outdoor unit faces the wind.



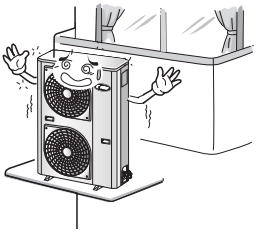
Prohibited

Do not install the outdoor units too close each other in parallel.



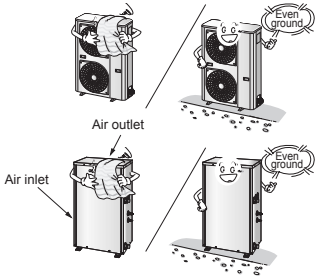
Prohibited

Partial insulation of the piping connection should be avoided.
Poor insulation may cause condensate to fall on pedestrians.



Prohibited

Do not allow the air inlet and outlet of the indoor/outdoor unit to become blocked by an obstacle.
Do not install the product on a soft ground floor or on ground with weeds.

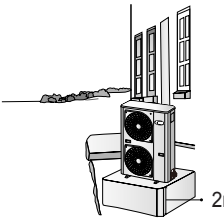


Installation

Warning

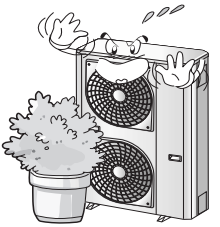
Mandatory

Do not install the outdoor unit in a place where air discharged from the outdoor unit may disturb pedestrians.
(When installing on the road, install the outdoor unit at a height of 2m or higher.)



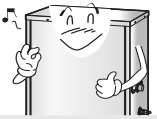
Mandatory

Install the product in a well-ventilated location with no obstacles, in which the noise generated from the product does not affect your neighbors.



Mandatory

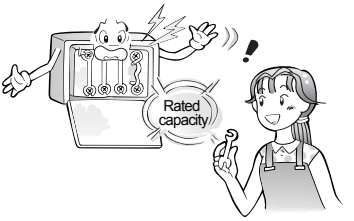
Power supply to the product should be a dedicated circuit at a correct voltage.
(Supplying power to the outdoor unit through a separate power cable branching off from the terminal block of the indoor unit and connection to a different voltage from the rated voltage may cause a failure and fire.)



⚠ **Caution : Use a dedicated power supply.**

Mandatory

Use a circuit breaker and fuse with the specified capacity.
(Use of an inappropriate circuit breaker or fuse or use of a steel or copper wire may cause a failure of the product or fire.)

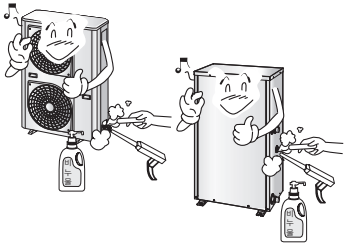


Installation

Caution

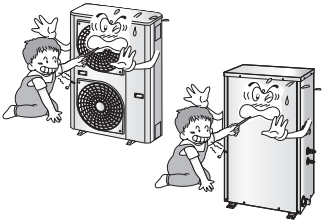
Mandatory

Check gas leakage after installation, relocation or repair of the product.
(may cause a failure)



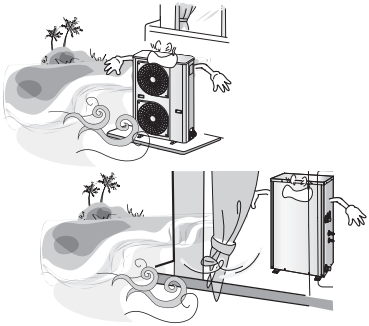
Prohibited

Take appropriate action to prevent children from touching the product or inserting a tool into the product.
(may cause damage to the child or the product)



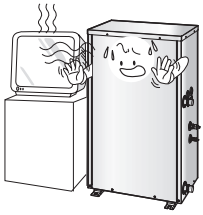
Mandatory

Do not install the product where it will be exposed to sea wind directly.
(Salinity may cause corrosion or failure.)



Mandatory

Provide for sufficient protection devices against electrical noise when installing the product in a hospital or communication base station.
(Inverter equipment, personal generator, high frequency medical equipment, and electronic communication equipment may cause abnormalities or failures to the product.
On the other hand, the product may adversely affect medical equipment or broadcasting equipment, as it generates disturbance noises.)



Installation

Warning

Precautions for installation of domestic hot water tank

Check leakage of the tank itself before installation if existing tank is used.

Be careful not to let your body touch the heating pipe directly.
(It may cause a burn.)

An expansion tank with insufficient capacity may provide poor heating performance.

The structure should be able to withstand the tank load when installing the boiler.
(including the load of water in the tank)

The domestic hot water tank should be level.

Piping should be arranged horizontal or vertical simply and accurately.

Do not allow foreign substances to enter the domestic hot water tank

Do not use eye bolts for transportation as materials for piping connection.

Clean the pipes before starting the plumbing work.

Insulation should be applied to all exposed pipes to prevent freezing and bursting and heat loss.
(Without heat retaining treatment, damages to the insulation, electric short or freezing and bursting may occur by dew condensation, which may result in human or property damages.)

Make sure the sizes of the hot water suppy and return piping are identical.

As the maximum use pressure of the domestic hot water tank is 1kgf/㎠, the expansin tank may be installed at elevations up to 10m.

If the room to be heated is located higher than the domestic hot water tank, use a circulation pump with a check valve or a lifting check valve to prevent natural convection.

Installation

Warning

Precautions for installation of domestic hot water tank

Mandatory Make sure there is no leakage on piping or overflow from the expansion tank. (Pipe leakage or overflow of expansion tank may cause the supply of dissolved oxygen, which will accelerate the corrosion of pipe.)

Mandatory Refilling water in the domestic hot water tank should be carried out through the expansion tank.

Mandatory You must install a water softener when using groundwater with minerals, such as limestone or calcium, or when using saline water near the beach. (Failure to do so may cause or accelerate a corrosion of the product or its parts.)

Mandatory You must put anticorrosive agent to prevent the corrosion of domestic hot water tank and pipes.

Mandatory Make sure the domestic hot water tank is grounded.

Mandatory Use a professional service provider when disposing of the boiler after replacement. (Illegal or arbitrary disposal may cause safety accidents, injuring the elderly or children)

Installation

Warning

When using anticorrosive agent, please observe the following:

① Do not mix with oxidizing agent.
② Keep away from heat, flame, spark or other ignition sources.
③ A person who is not aware of the hazardousness of anticorrosive agent must not handle or distribute anticorrosive agent.
④ Keep out of reach of children or the elderly.
⑤ Do not use the empty container of anticorrosive agent for other purposes.
⑥ Dispose of or return the empty container or vessel of anticorrosive agent to your nearest dealer.
⑦ Rinse the empty container 3 times or more with water.
⑧ Be careful not to inhale, consume or allow your eyes or body to come into contact with anticorrosive agent as it has hazardous and dangerous characteristics as specified in the Article 41 of the Industrial Safety and Health Act.

How to use anticorrosive agent

① After installing the boiler, shake and fill the anticorrosive agent into the boiler before filling water.
② Rinse the anticorrosive agent container with water.
③ The use life of anticorrosive agent is 1 year (refill it once a year).
④ Fill anticorrosive agent after installing the domestic hot water tank. When refilling anticorrosive agent, close the water supply valve and open the drainage valve to discharge the water in the tank, fill anticorrosive agent and then open the water supply valve to fill with water.

When installing a remote controller

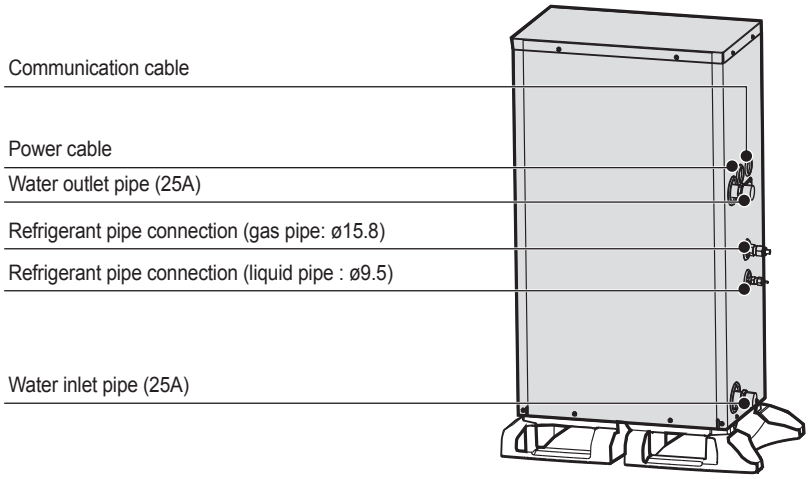
Warning

① You must call the authorized service center or a professional installation agency for installation.
- Poor installation may cause a fire, electric shock, explosion or damage.

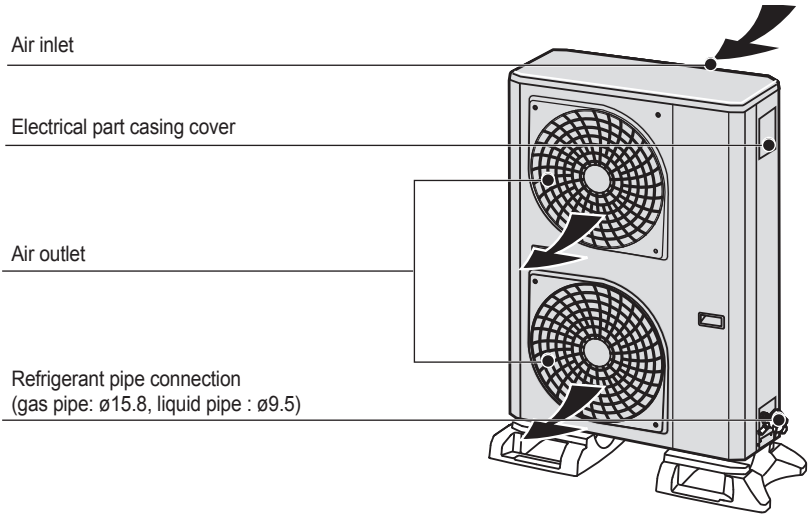
② Contact the authorized service center or a professional installation agency to reinstall the installed product.
- Poor installation may cause a fire, electric shock, explosion or damage.

③ Do not disassemble, repair or modify the product arbitrarily.
- This may cause a fire or electric shock.

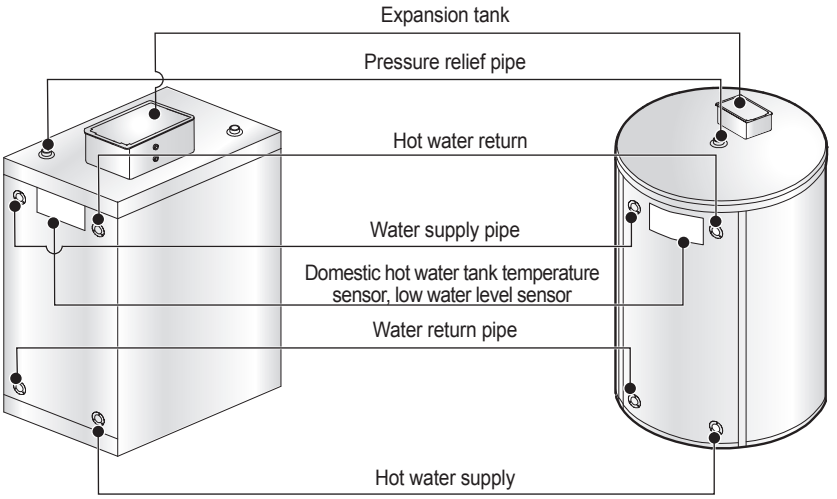
Indoor Unit



Outdoor unit



Domestic hot water tank



1 Domestic hot water tank

- The domestic hot water tank stores thermal heat generated by heat pump.

2 Expansion tank

- The expansion tank is a device that absorbs the volume expansion of water consistent with the increase of water temperature.
- Valves should not be used when installing an expansion tank, and insulation should be provided to prevent freezing and bursting.

3 Freeze and burst protection

- When the flow temperature goes below 6℃, the circulation pump (heating pump, domestic hot water pump) is automatically activated and circulates water in the piping to prevent damage to the boiler caused by freezing.

Scope of operation

1 Scope of operation

① The temperature range within which normal operation of the product can be ensured is as follows:

Ambient temperature of the outdoor unit:	-20℃ ~ 40℃
Ambient temperature of the hydro unit	5℃ ~ 40℃

environment out of the temperature limits for a long time, the system may detect an error and stop operation.

2 Time delay

- When restarting the system, the compressor starts 3 minutes after the power is restored. (however, the time delay is 5 minutes in the event of a shutdown through self diagnosis)

3 Minimum operating time

- It takes 7 minutes for the compressor to stop its operation once it is activated in a normal condition.

4 Heating features

- A warm-up time is required prior to the start of heating operation when the outdoor temperature is 10℃ or below.
- The heating performance may be deteriorated if the outdoor temperature is very low. We recommend that you use an auxiliary heating source if the room temperature is insufficient in the winter season.

5 Defrost operation

- If the heat exchanger of outdoor unit becomes frosted during the heating operation, the fan of outdoor unit will stop while defrosting heat exchanger of outdoor unit.
- When the heat exchanger is completely defrosted, the heating operation is put back on track automatically.

6 Power outage recovery function

- When the power is cut during operation, the product recalls the most recent operating conditions and automatically applies these when the power is restored.

7 Normal operation

- You can hear the sound of refrigerant flowing in the product when the product is in operation or stops operation.
- The outdoor unit fan may not operate during the heating operation, which may be observed in the defrost mode.

Troubleshooting

Case	What to check	Handling
When the product does not work	• Is the circuit breaker activated, or the fuse out?	• Check the circuit breaker or replace the fuse.
	• Are you experiencing a blackout situation?	• Start the product when the power is restored.
	• Has an "Er" sign on the room temperature display, or "##" sign on the domestic hot water tank display been displayed for more than 1 hour?	• Contact the authorized service center.
	• Is the voltage too low?	• Check the voltage specifications.
When the heating is insufficient	• Is the temperature set appropriately?	• Adjust settings again where necessary.
	• Is there any window or door that is open?	• Close the window or door.
	• Is the outdoor unit blocked or clogged?	• Remove obstacles.
When the product stops during operation	• Has an "Er" sign on the room temperature display, or "##" sign on the domestic hot water tank display been displayed for more than 1 hour?	• Contact the authorized service center.

※ If your problem persists even after you have taken action in accordance with the aforementioned instructions, please contact your dealer or authorized service center.

※ Carrier's products feature state-of-the-art AI (artificial intelligence). In the event of an error in the product, the "Er" or "##" sign appears repeatedly on the temperature display, and the product performs self-diagnosis and restarts automatically. If the error code is displayed continuously for more than 1 hour, please contact the authorized service center.

Periodic Checklist

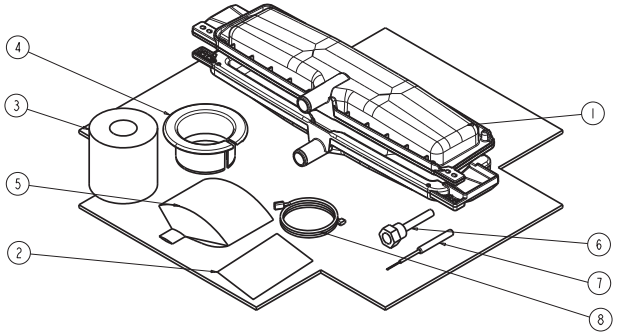
What to check	Annually			Every 6 months
	Indoor Unit	Outdoor Unit	Domestic Hot Water Tank	Indoor Unit
Surface cleaning of the outdoor unit		●		
Cleaning of the BPHE on the water side in the indoor unit ①				●
Removal of dust on electric parts using compressed air ①	●	●	●	
Fastening status of electric wire connections ①	●	●	●	
Cleaning of outdoor fan ①	●	●	●	
Fastening status between the outdoor fan and the motor ①	●	●	●	
Cleaning of the strainer on the water inlet side ①	●		●	
Water flow rate ①	●			
Leakage on the water pipe and thermal storage tank connections	●		●	
Water quality ①			●	
Refilling of anticorrosive agent ①			●	

Reference

① The items marked should be cleaned and checked by a trained installer in accordance with the installation manual.

- Installation should be performed by the authorized service center or by a professional installation agency that has been certified by Carrier.
- This product requires a seperate power supply (400V 50Hz 3-phase 4-wire AC electricity). A dedicated circuit must be used in the power supply of the hybrid boiler.
- Make sure all of the following components are in place before installing the product.

Installation kits materials



NO	Component name	Specifications	Quantity	Remarks
1	Drain Pan	PP	2	
2	Drain Pan installation Manual	PAPER	1	
3	Finishing tape	PVC FILMa, 30M IVORY	1	
4	Pipe finishing materials	CN25	1	
5	Other materials	SCREW, GROMMET	1	
6	Domestic hot water tank temperature sensor well	WELL, PT1/2	1	
7	Domestic hot water tank temperature sensor	10Kohm, L200	1	
8	Connector for error output	12PIN, L300	1	

Installation materials (optional)

NO	Component name	Specifications	Quantity	Remarks
1	Refrigerant connection pipe	OD 9.52mm X 10m	1	liquid pipe
2	Refrigerant connection pipe	OD 15.8mm X 10m	1	gas pipe
3	Insulator for refrigerant pipes	ID 14 X T7 X 5m	2	
4	Insulator for refrigerant pipes	ID 14 X T7 X 5m	2	
5	Indoor/outdoor unit connection power cable (3-phase power cable)	2.5 ㎟ X 5G X 11m	1	
6	Indoor/outdoor unit communication cable	CVV-SB(shield cable) 1.5㎟ X 2C X 11m	1	
7	Copper pipe processed article	PAPER PIPE, ID230 X T3	1	

Installation materials (local procurement)

No	Component name	Specificat ions	Quantity (2 holes)	Remarks
1	Refrigerant connection pipe	OD 9.52mm	1	Liquid pipe
2	Refrigerant connection pipe	OD 15.8mm	1	Gas pipe
3	Insulator for refrigerant piping	ID 14 X T8	1	
4	Insulator for refrigerant piping	ID 14 X T8	1	
5	Indoor unit power cable (3-phase power cable)	4.0 ㎟ X 4C (excluding ground wire) or 5G	1	Cable length < 20m
		6.0 ㎟ X 4C (excluding ground wire) or 5G		Cable length ≥ 20m
6	Indoor/outdoor unit connection power cable (3-phase power cable)	2.5 ㎟ X 4C (excluding ground wire) or 5G	1	Cable length < 20m
		4.0 ㎟ X 4C (excluding ground wire) or 5G	1	Cable length ≥ 20m
7	Power cable (thermal storage pump, heating pump)	1.0㎟ X 2C	1	
8	Communication cable	CVV-SB (shield cable) 1.5㎟ X 2C	1	
9	Domestic hot water tank	Local sourcing (output : less than 80W)	1	
10	Heating Pump	Local sourcing (output : less than 80W)	1	
11	Domestic hot water tank temperature sensor connection cable	Heat shrinkable tube + CVV-SB (shield cable)	1	
12	Wired remote controller connection cable	UTP(Cat.5e)	1	
13	Domestic hot water tank	Local sourcing	1	
14	Expansion tank	Local sourcing	1	
15	Ball top	Procured in the market	1	
16	Ball valve	Use pressure: 10Kg, diameter: 25A, material:bronze	6	
17	Ball valve (for cleaning a brazed plate heat exchanger)	Use pressure: 10Kg, diameter: 15A, material:bronze	2	
18	Check valves	Use pressure: 10Kg, diameter: 25A, 50 mesh or higher, material:bronze	2	
19	Filter (strainer)	Use pressure: 10Kg, diameter: 25A, material:bronze	1	
20	Air vent	Use pressure: 10Kg, diameter: 15A, material:bronze	1	
21	Water drainage	Copper or stainless steel pipe	1	25A
22	Pipe insulator	PE heat insulator (with a thickness of 20mm or higher)	1	

Note) The specified wire should be used when extending the domestic hot water tank temperature sensor.
In addition, wire tubing should be used to protect wires.
After removing the wire clothing to extend the wire, the connection area should be covered with a heat shrinkable tube.

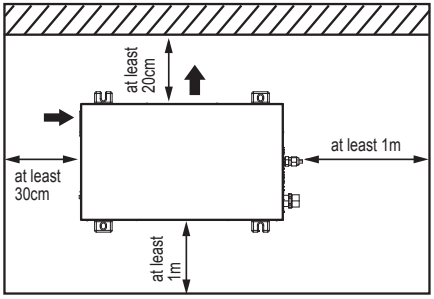
Note) For power cable, use an IEC 60245-4 IEC57 or higher, or an H05RN-F wire or higher.

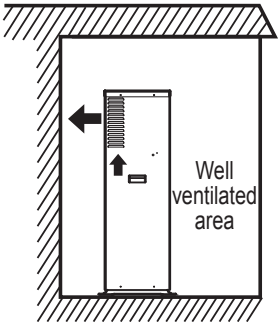
Note) The length of the main power cable refers to the length from the main panel board to the hydro unit, and should be less than 50 meters in principle.
If the length of the main power cable exceed 50 meters, please contact a Carrier dealer.

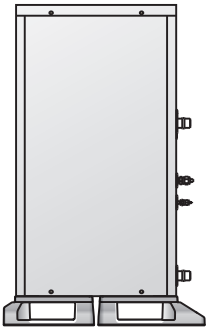
Note) The grounding wire should be of at least the same thickness as the power cable.

Indoor Unit

- Select a location that can withstand the vibration and weight of the indoor unit.
- The product must be installed indoors (a location in which the product will not be exposed to snow, rain and a temperature below 0℃)
  In an environment with a temperature below 0℃, water will freeze and may cause damage to the product.
- A location free from flammable gas leakage and fire sources
- A location in which it is easy to connect to the pipe of outdoor unit and perform water piping and electrical work
- Electric wiring should be carried out by a qualified, experienced service technician who is familiar with safety procedures and equipped with proper tools and test instruments.
- A sufficient space not to experience any disturbance or difficulty in air flow is required.
- Do not install the product in a location where it will be exposed to hot air or direct sunlight.
- Do not install the product in a location with a saline atmosphere or exposed to sulphate gas.
- Do not place any obstacle in front of the inlet or outlet of indoor unit.
- A location with excellent drain performance
- A location at least 3 meters away from any object that generates electric noises

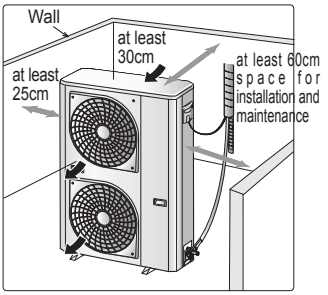




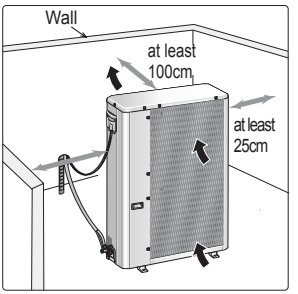


Outdoor Unit

- Select a location that can withstand the vibration and weight of the outdoor unit.
- For safety purposes, do not install the outdoor unit on the outer wall or outside of the porch.
- A sufficient space not to experience any disturbance or difficulty in air flow is required.
- Do not install it in a location that is exposed to hot air or direct sunlight.
- Do not install it in a location with a saline atmosphere or where it will be exposed to sulphate gas.
- Do not place any obstacle in front of the inlet or outlet of outdoor unit.
- Make sure that the hot wind or noise from the outdoor unit does not affect or disturb your neighbors.
- Do not install the outdoor unit in a location where the air discharged from the outdoor unit may disturb pedestrians.
  (When installing on the road, install the outdoor unit at a height of 2m or higher.)



- When the air inlet is headed for the wall

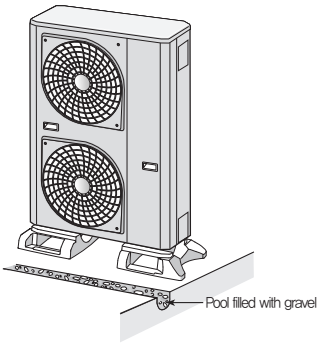


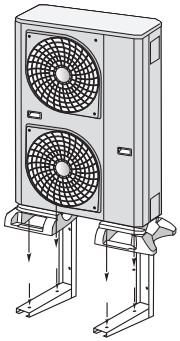
- When the air outlet is headed for the wall

Installation place of outdoor unit

1 A base mount must be installed when installing the outdoor unit.
Failure to install a base mount may cause deterioration of heating performance due to accumulated condensate and snow.

2 In an area in which heavy snow is expected, install the outdoor unit at an elevation 200mm higher than the average snowfall, or use a bracket for the outdoor unit.





⚠ **Caution: When the outdoor temperature is below 0℃, drainage may be unavailable if the drain hose freezes.**

3 **Recommended places**

- An area with no head wind
- An area with no direct sunlight
- An area in which the wind and noise from the outdoor unit will not disturb pedestrians
- An area with sufficient space to install the outdoor unit
- An area that can withstand the weight and vibration of the outdoor unit

4 **Places to avoid**

- An area close to heat source, steam and combustion gas
- An area with significant dust

● Fix the outdoor unit securely on the ground using bolts to prevent it from falling as a result of strong winds.

Installation place of domestic hot water tank

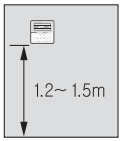
- The domestic hot water tank must be installed in an indoor location that is free from the risk of freezing or bursting.
- Install the domestic hot water tank in a location in which waterworks are available.
- Install the domestic hot water tank in a location in which it is easy to perform repair and maintenance activities.
- Install the domestic hot water tank in a place with no moisture and that is equipped with drainage.
- Do not install the domestic hot water tank in a location in which flammable or combustible materials are stored or handled.

Installation of wired remote controller

1 Install a wired remote controller on the wall of room to be heated.
The installation location should be a well-ventilated spot that is 1.2 to 1.5 meters above the floor.

2 Do not install the remote controller in a location that is close to a frequently opened door, a location that is exposed to a cold wind or direct sunlight, or a location that is within the reach of a child.

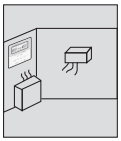
<Example of location for the installation of wired remote controller>



(O) Well-ventilated place
A place that is not directly exposed to hot wind from a heating device

(X) Poorly ventilated place

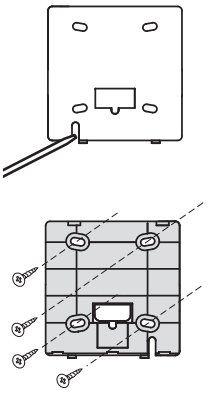
(X) A place near a window or door subject to the influence of drafts from the gap

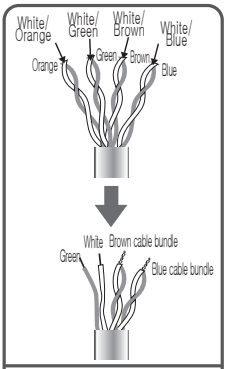


(X) A place subject to the direct influence of radiator or other heat

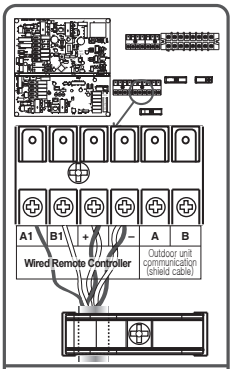
How to install a wired remote controller

① Remove the bracket of the remote controller using a screwdriver, as shown in on the left of below figure.
② Place the bracket on the installation location and firmly fix it with the 4 screws provided.
③ Connect the communication cable to the power and communication terminals in the back of the wired remote controller.
④ Connect the opposite end of the communication cable to the terminal of hydro unit.

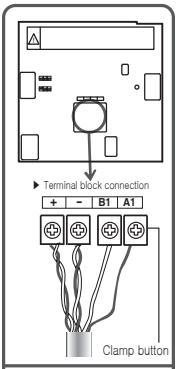




1. UPT cable processing
As shown in the figure above, cut the orange cable bundle, remove the wire clothing at the end and twist the wires of blue cable bundle and brown cable bundle. Untwist the wires in the green cable bundle and separate white cable from green cable. The clothing of these wires should be removed as well.



2. Connection on the hydro unit
A1 : Green / B1 : White
+ : Brown bundle / – : Blue bundle
Connect the wires to the corresponding terminals as shown in the figure above and then securely tighten all fixing screws.



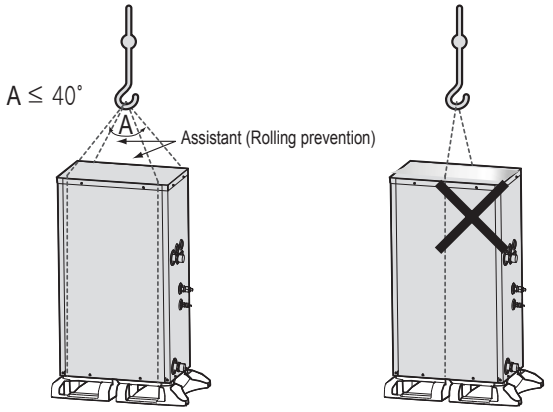
3. Connection on the wired remote controller
A1: Green / B1: White
+ : Brown bundle /
– : Blue bundle

Precautions during transportation

- This product can be transported using a general elevator (if transporting with an elevator is not possible, use a rope as stated below)

How to transport the product using a rope

- When carrying the indoor unit by lifting it using a rope, pass the rope through the 4 holes located at each leg of the product.
- You must pass the rope through 4 holes to prevent impact on the product before lifting it.
- When connecting the rope to the indoor unit, the angle should be less than 40°.
- If the rope comes into contact with the casing, place a plate on the casing or wrap the indoor unit with a cloth to prevent damages to the product.



Warning

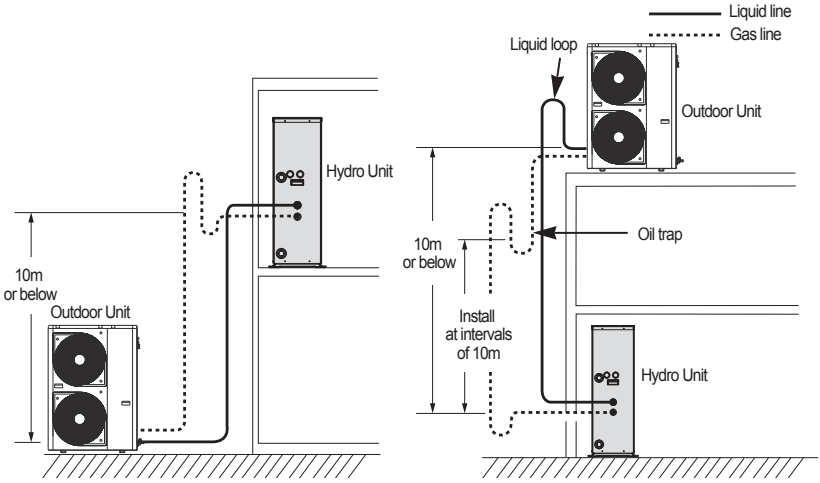
- **Transport the product with care.**
- **A product with a weight of over 20kg should be carried by at least 2 people.**
- **The plastic packing bag should be torn into pieces when disposing of it so that children do not play with it. If a child puts the plastic bag over his or her head while playing with it, this may cause suffocation.**
- **You must carry the indoor unit using the 4-point support method, as shown in the figure above. Carrying the indoor unit using a 3-point support method is not that stable and may cause the indoor unit to fall off the rope.**
- **When carrying the product using a forklift, be careful not to let the product fall off the forklift while driving it.**
- **Do not lift the product using the refrigerant pipe or water pipe. This may damage the pipes.**

Length and height of piping

- The maximum allowable length of piping is 30m.

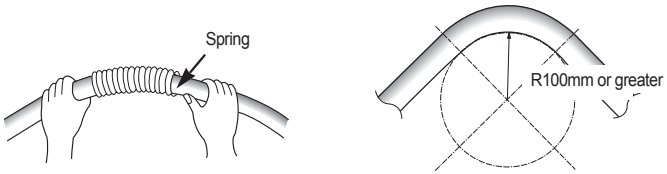
1 Install the oil trap and liquid loop at the correct position depending on the installation location of the indoor/ outdoor unit.

2 The maximum allowable height of piping is 10m.



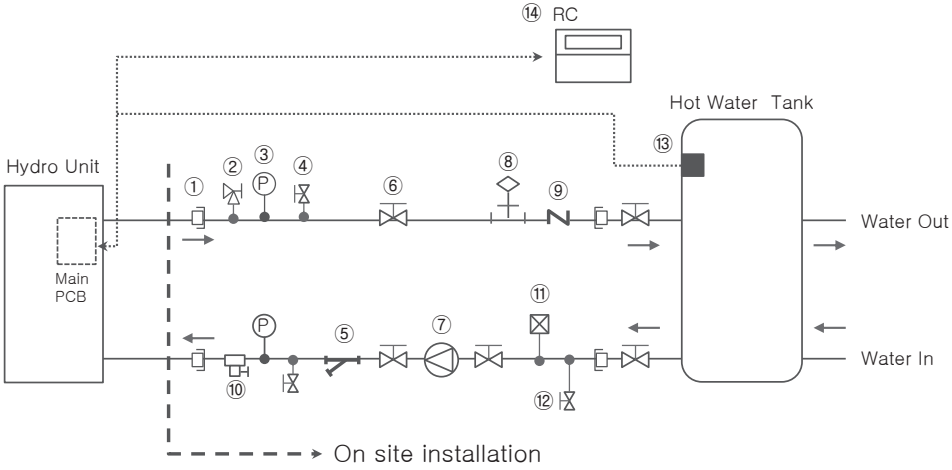
Bending processing of pipe

- Bend a pipe correctly in one attempt.
  Bending and straightening a pipe 2 times or more may cause damages to the pipe.
- The minimum bending radius should be 100mm.



Installation

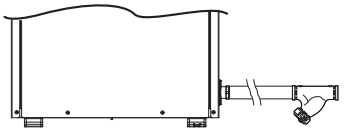
1. For the water piping, select components that exceed water pressure specifications needed for the product.
2. Use copper or stainless steel pipes for water piping.
3. Install union joints to facilitate the easy replacement of connectors.
4. Install a service valve for cleaning the heat exchanger at the inlet and outlet of each water pipe.
5. You must install a strainer on a water pipe.
   - Use a strainer with 50 mesh or greater and a scale diameter of 0.4mm or less.
   - You must install a strainer on a horizontal pipe.
     (Sand, waste, rust particles accumulated in the water pipe may cause failure of the product due to corrosion of metal materials.)
6. Install the air vent in the section of the pipe with the highest elevation. This prevents air from gathering in the piping that could potentially impede the flow of water in the system.
7. Install a drain valve to drain water in the piping in case of replacing parts or performing service activities.
8. Install a ball valve that will be used to block the flow of water by locking the valve in the event of part replacement or cleaning.
9. Insulate water pipes to prevent condensed water from forming on the outer surface of a water pipe.
10. The flow temperature range in the water pipe is 15 to 80℃.
    (Operation out of flow temperature range may cause product failure.)
11. The pump flow in a water pipe is 20 to 80LPM, and the recommended flow ranges from 35 to 40LPM. The maximum allowable pressure is less than 0.98 bar.
12. Install a ball valve at each side of a pump to facilitate the cleaning and repair of the pump.
13. Install a flexible joint to prevent noise and vibration from being delivered by the pump.
14. Install an expansion tank not only to contain water that shrinks and expands according to the temperature gap, but also to supply water.
15. Supply water by opening the water supply valve after completing the installation of the water piping system.
16. Install a domestic hot water tank temperature sensor to measure the water temperature in the tank using the domestic hot water tank temperature sensor and temperature sensor well.



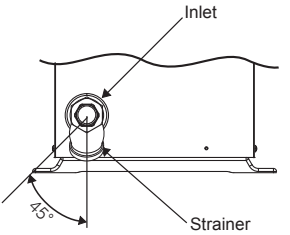
①	Union(water pipe, 25A)	②	Pressure relief valve	③	Manometer
④	Service ballvalve(15A)	⑤	Strainer	⑥	Ball valve(25A)
⑦	Domestic hot water pump(output less than 80W)	⑧	Air vent	⑨	Check valve(25A)
⑩	Drain valve	⑪	Expansiontank	⑫	Water supply valve
⑬	DHW tank temperature sensor	⑭	Remote controller		

Strainer Installation

- Use a strainer of 50 mesh (with a scale diameter of 0.4mm or less)
- Check the direction of the strainer in the inlet pipe of heat exchanger, and then fasten it (see figure).
- Wind a Teflon tape more than 15 times around the thread of a screw on the water pipe and fasten the screw.
- Install the service port downwards (within 45 degrees of vertical plane)
- Check whether any leakage can be observed at the connections.
- Continually check and clean strainers as necessary.



(Front view)

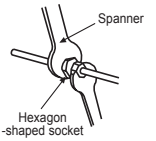


(Side view)

Water piping

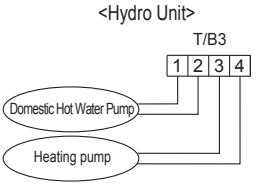
- The water pipe should be at least the same size as the connection pipe of the product.
- When connecting a water pipe with a socket, apply fastening torque as specified in the table below. (Applying more torque than specified may cause damage to the machine)
- Heat insulation materials must be applied to the pipe of inlet and outlet pipes to avoid condensation. (Use PE heat insulating materials with a thickness of 20mm or higher)

Pipe diameter	Torque
mm	(N, m)
25A	155



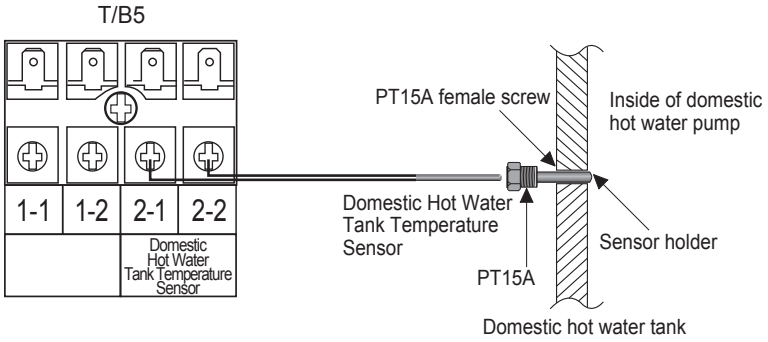
- When fastening an inlet or outlet pipe, you must use 2 spanners.
  Applying excessive force to the pipe not grabbing the hexagon shaped socket with a spanner may cause damages to the product.

Connecting a Domestic Hot Water Pump and heating pump



Connection of domestic hot water tank temperature sensor

- Put the sensor holder thread (15A) into the domestic hot water tank screw hole (15A).
- Push domestic hot water tank temperature sensor into the cap hole of the sensor holder.
- Lock the sensor holder cap.
- Connect the sensor cable to the terminal of domestic hot water tank temperature sensor in the indoor unit.



Refrigerant piping procedures

piping design → Pipe flaring →piping connection(indoor/outdoor unit) → Evacuating → Gas leakage test → Additional refrigerant charging
(if the length of connection piping is beyond standard length.)

Precautions for refrigerant piping

- Refrigerant piping design significantly affects the product's performance, and incorrect piping may cause a failure.

1 Use the designated pipe diameter and thickness.

2 Select the shortest distance when arranging piping.

3 Fix the pipe supports securely.

4 For a vertical piping, install oil traps at intervals of 10m along the gas pipe.

5 The height difference between the indoor unit and the outdoor unit should be lower as much as possible, and should not exceed the allowable range.

6 Take care in handling pipe and seal the end part of a pipe with a cap or tape to prevent dust or moisture from entering the pipe.

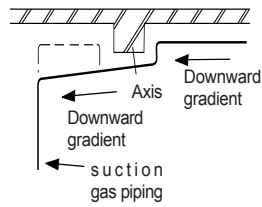
7 If a pipe passes through a wall, each end of the pipe should be sealed.

8 When placing a pipe on the ground, do not let either end of the pipe come into contact with the ground's surface.

9 Be sure the end of the pipe is pointed downward (toward the floor) when you remove the burrs after machining a pipe.

10 Pay extra attention when performing piping work on a rainy day.

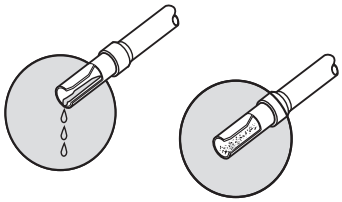
11 Do not install unnecessary traps to prevent refrigerating oil or refrigerant in the suction gas pipes from being stagnant. In addition, if climbing over an axis such as a ceiling, do not install in the way specified in the figure by a dotted line, which may deteriorate the recovering of refrigerating oil in case refrigerant amount is not enough.



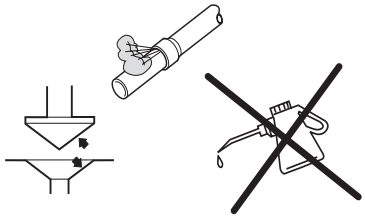
Precautions for refrigerant piping

⚠ Attention
- As R410A refrigerant has a strong hygroscopic property, do not expose the valve and piping to the atmosphere for a long time.
- Use dedicated tools for R410A when installing the product.
- For more information about the installation and characteristics of R410A product, please see the service guide of Carrier inverter air conditioning system.

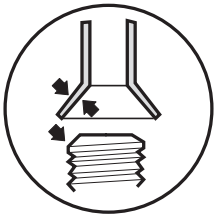
1 There should be no moisture or dust.



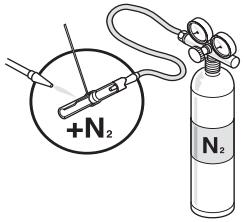
2 There should be no leakage, or use of mineral oil.



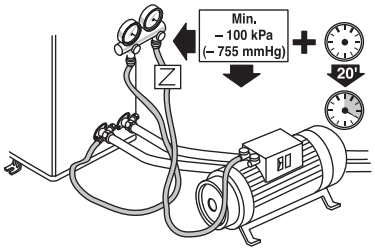
3 It should be precisely and accurately processed.



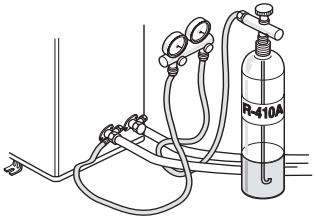
4 Nitrogen welding



5 Vacuum using a vacuum pump before charging refrigerant.

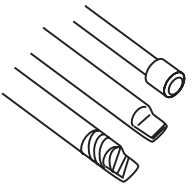


6 Charge refrigerant in a liquid state. (Do not charge refrigerant in a gaseous state)

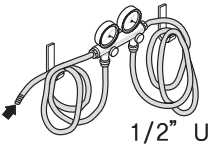


Precautions for refrigerant piping

7 Both ends of a copper pipe should be sealed. Foreign substances and moisture entering into the pipe may cause a product failure; such failure will not be covered by the warranty.

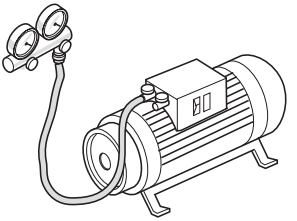


8 Use dedicated high pressure tools for R410A.



1/2" UNF(R410A)

9 Replace the vacuum pump oil at regular intervals.
A measurement reading less than 0.1 torr during vacuum operation indicates a normal state. If the reading is in the range of 0.2 to 0.5 torr, you should replace the oil (if oil is mixed with dust or moisture coming from outside during the vacuum operation, it takes longer or may be impossible to achieve the desired vacuum state.)



When performing installation

1 When installing gas pipes horizontally, apply a gradient of 1/250 downwards (2cm downwards over a length of 5m) to the flowing direction of refrigerant to facilitate the flow of refrigerant.

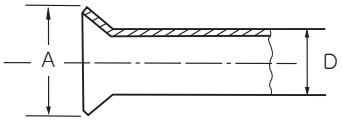
2 Liquid pipes and gas pipes must be insulated separately.
Insulation work by wrapping a liquid pipe and a gas pipe together will cause heat exchange between these pipes, significantly deteriorating the compressor's performance.

How to connect refrigerant pipes between the indoor unit and the outdoor unit

1 How to connect refrigerant pipes

The flare connection method is widely used to connect a refrigerant pipe between the indoor and outdoor units, as this method is simple to install and does not take much time. As shown in the figure below, mount a processed flare at the end of a pipe, connect the flare to the connection valve of the indoor/outdoor and fasten the flare nuts to fix it.

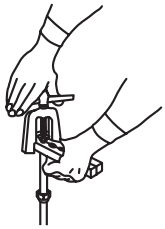
2 Flare Specifications



	Outer diameter	A
Liquid side	9.5	12.8~13.2
Gas side	15.88	18.6~19

Flare processing

1 Remove the protective cap at the end of a copper pipe.

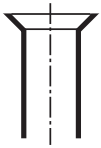


2 Hold the copper pipe to allow the end of the pipe to be headed downwards, cut the pipe as required, and remove the burr on the insection using a reamer.

3 During installation, be careful not to expose the inside of the copper pipe to the atmosphere for a period exceeding the specified time.

4 As the compressor oil is sensitive to moisture, maintain the end of the copper pipe in a sealed state during installation.

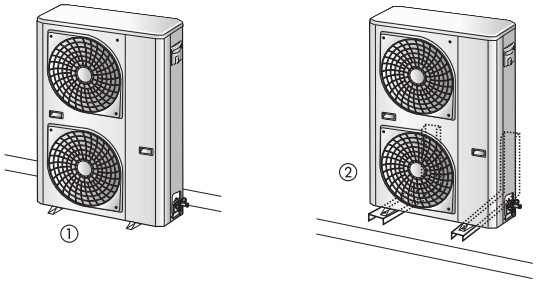
5 Remove the flare nuts from the connections of the main body and place the flare at the end of the copper pipe. Process the flare using a flare tool.



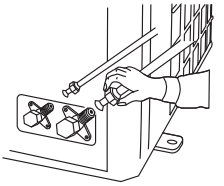
- There should be no burr at the end part of the flare, and the processed surface of the flare should be even.

Flare processing

1 This product can be installed as follows:
① Installation on the floor
② Installation on the wall using brackets

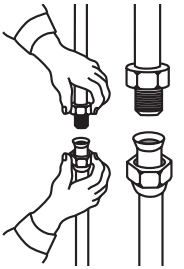


2 Perform piping work according to the specified lengths of connection pipes.



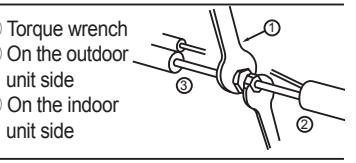
3 First fasten the fitting by hand, and then fasten it further using a wrench at a specified torque.

4 Fasten the fitting by hand, and fasten it further using 2 wrenches at a specified torque.



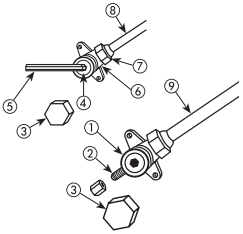
Fastening of connections

• Fastening of connections
- Insufficient fastening torque may cause gas leakage.
- Excessive fastening torque may cause damage to the flare of the copper pipe, resulting in gas leakage.

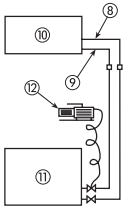


	Outer diameter (mm)	Fastening torque (kg*m)
Liquid side	9.52	3.1~3.5
Gas side	15.88	7.0~7.5

Evacuating



① 3-way valve (gas)
② Needle valve
③ Valve cap
④ Valve needle
⑤ Allen (hex. head) Wrench
⑥ 2-way valve (liquid)
⑦ Flare nut



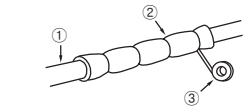
⑧ Liquid pipe (small diameter)
⑨ Gas pipe (large diameter)
⑩ Indoor unit
⑪ Outdoor unit
⑫ Vacuum pump

Caution

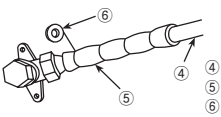
- **Use a vacuum pump to perform evacuating during piping work.**
- **Do not use the compressor of the product as a vacuum pump.**
- **Do not use the refrigerant gas of the product to remove the air inside the connection pipe.**
- **Additional refrigerant for air purging is not provided.**

Evacuating procedures

① Remove the cap from the 3-way valve.
② Generate a vacuum using the vacuum pump connected to the shut-off valve (gas) on the suction side.
Maintain the shutdown state until the vacuum pressure reaches 50Pa (0.5mbar).
③ Open the liquid-side valve for 3 seconds and close it quickly.
Check whether any leakage is observed.
④ After checking for leakage, open the 3-way valve and the 2-way valve completely.
⑤ Fasten the cap and check the leakage status.
⑥ After completing the connection of all pipes, perform a leakage check using an HFC refrigerant leakage detector.
⑦ After completing the connection of all pipes, apply soapy water to the pipes to detect any leakages. Wrap the joint with insulator and finish with a tape.



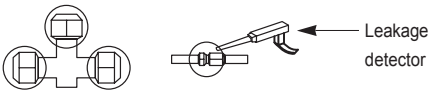
① Copper pipe
② Copper pipe insulator
③ Fixing tape



④ Pipe
⑤ Pipe insulator
⑥ Fixing tape

Leakage test

- Perform leakage test on joints and connections using a leakage detector or soapy water.



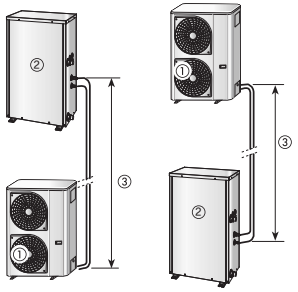
Product specifications

Classification	Indoor Unit	Outdoor Unit
Model name	30AWH-025QI	30AWH-025QO
Power supply	3-phase 400V 50Hz	3-phase 400V 50Hz
Max heating capacity (W)	24,500 [1]	
Product Size (W X H X D, mm)	690 X 1,030 X 330	900 X 1,360 X 320
Product Weight (kg)	99	95
Noise(dB) [2]	56	60

[1] Test condition : Outdoor ambient temperature : 7℃ DB/6℃ WB, EW 30℃, LW 35℃

[2] The values of the noise is the sound pressure level.
(When measure the noise, the distance between products and a microphone is 1m.)

Connection piping



① Outdoor Unit
② Indoor Unit
③ Height difference

Classification	30AWH-025QI / 30AWH-025QO
Maximum height difference	10M
Maximum piping length	30M

Classification	Pipe diameter (mm)	
	Gas pipe	Liquid pipe
30AWH-025QI / 30AWH-025QO	15.88	9.52

Refrigerant charging

⚠ **Caution: In this product, R134A refrigerant and R410A refrigerant are used in the indoor unit and the outdoor unit, respectively. (Mixture with R22 refrigerant is strictly prohibited.)**

Classification	Standard amount of refrigerant (g)	Standard length (M)	Maximum allowable Pipe length (M)	Maximum allowable Height difference (M)
Indoor unit (30AWH-025QI)	2,000	5	30	10
Outdoor unit (30AWH-025QO)	2,800			

- If the pipe length of outdoor unit exceed 5m, add an extra 40g of refrigerant per 1m of extra pipe length.
  Example) 5m → No additional refrigerant charging is required.
  25m → (25m-5m) x 40g = 800g of additional refrigerant charging is required.
- If the amount of refrigerant is reduced due to leakage or repair, collect all residual refrigerant in the product and charge a rated amount of refrigerant into the product using a vacuum pump.
- For more information about the discharge/suction pressure and the compressor speed in each temperature condition, refer to the service manual. As this product is an inverter hybrid boiler system in which the speed of the compressor varies depending on the operating condition, do not add or subtract the amount of refrigerant based on the discharge/suction pressure.

Wiring work

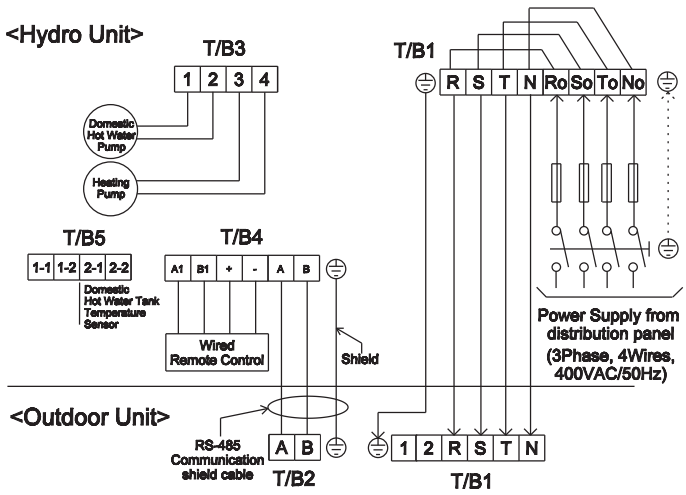
⚠ **Caution**

- You must install a dedicated circuit breaker for this product prior to performing wiring work. (Capacity of circuit breaker for 3ph-400V-50Hz is 30A)
- You must perform grounding work.
- The power should be connected to the indoor unit.
- Prior to connecting power supply cable, perform wiring work between the hydro unit and the outdoor unit.
- Connect the electric wire firmly to the terminal in accordance with the wiring diagram.
- When connecting to the power supply cable, use a switch on which every contact has at least 3mm of clearance.

- The responsibility for all wiring works lies with the installation contractor.

Wiring diagram between outdoor unit and indoor unit

- Power and communication wiring diagram



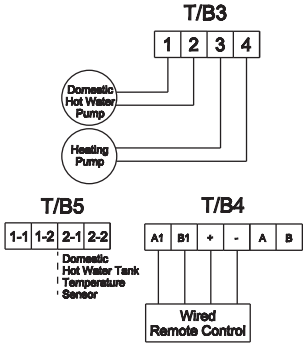
Wiring between indoor unit and outdoor

1. Connect the power cable for 3phase-400V-50Hz and communication cable correctly. Incorrect wiring will cause damage to the controllers of the outdoor unit and the hydro unit.
2. Do not put the power cable and the communication cable in the same transmission line.
3. Do not fasten the power cable and the communication cable together using a cable tie or other fixing devices.
4. As the power of the outdoor unit is supplied from the indoor unit, connect to R, S, T, N of the terminal block No.1 in the indoor unit.
5. For power cable and communication cable, use cables that meet the requirements of the specifications, and do not combine the power cable and the communication cable into a single cable with multiple wires.

⚠ **Warning** Combining the power cable and communication cable into a single cable causes electrical interference affecting the communication line, which will result in malfunctions and failures.

Connection wiring diagram between Indoor unit and Load

- Domestic hot water pump, heating pump, domestic hot water tank temperature sensor, wired remote controller



Wiring between Indoor unit and Load

1 Connect the domestic hot water pump and heating pump correctly.
Incorrect wiring will cause a malfunction of the controller.
(however, polarity does not matter when connecting each load)

2 Connect domestic hot water tank temperature sensor correctly.
Incorrect wiring will cause malfunctions of the controller.
(however, polarity does not matter when connecting each load)

3 When connecting the wired remote controller, connect to the A1, B1, + and - terminals correctly.
Incorrect connection causes malfunctions or damages to the remote controller.

4 Use only wires that meet the specifications when connecting each load.

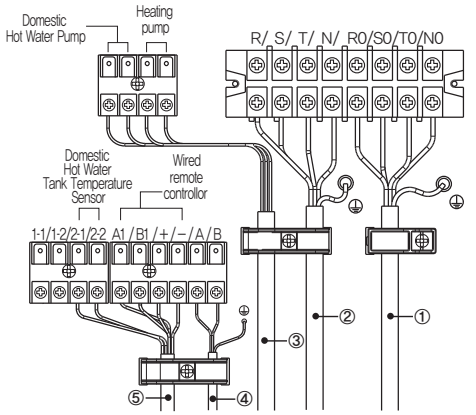
⚠ **Warning** **Be careful not to cause malfunctions and damages when connecting as stated above.**

Connection wire specifications

Classification	Specifications
Domestic hot water pump	1.0㎟ X 2C
Heating pump	
Temperature sensor	CVV-SB (shield cable)
Wired remote controller	UTP(Cat.5e)

※ Please refer to the checklist on page 16 before installation.

Wiring work of indoor unit



	Terminal board index table
①	Indoor Unit main power cable from distribution panel.(R/S/T/N) (3ϕ-400V-50Hz)
②	Indoor-outdoor unit power cable
③	Power cable for heating pump Power cable for domestic hot water pump
④	Indoor-outdoor unit communication cable
⑤	Domestic Hot Water Tank Temperature Sensor wire
⏚	Ground to chassis

Main power cable (3ϕ-400V-50Hz) should be connected to the indoor unit.

1 Open the front panel.

2 Before connecting the power, connect the wires between the indoor unit and the outdoor unit.

3 Referring to the wiring diagram, connect the wire firmly to the terminal.

4 Before connecting wires to the power supply, refer to the wiring diagram between outdoor unit and indoor unit on page 36.

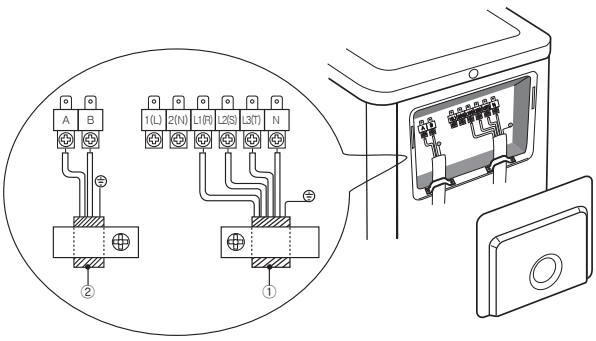
⚠ **Caution: Perform grounding work first before connecting wires.**

Specifications of main power cable of Indoor unit

Classification	Specifications	Reference distance
Specifications of main power cable (3ϕ-400V-50Hz)	4.0㎟ X 4C (Ingtall a separate ground wire) or 5G	When the installation distance is less than 20 meters
	6.0㎟ X 4C (Ingtall a separate ground wire) or 5G	When the G wiring distance is 20 meters or longer

Note 1) Use power cable of IEC 60245-4 IEC66 wire or higher or H07RN-F wire or higher.
Note 2) The length of the main power cable refers to the length from the main panel board to the hydro unit, and should be less than 50 meters in principle.
If the length of the main power cable must be more than 50 meters, please contact a Carrier dealer.
Note 3) The grounding wire should have at least the same thickness as the power cable.
Note 4) ELB and the main breaker for the main power off must be installed separately. (Rated capacity : 30A)

Wiring work of outdoor unit



Terminal box index table	
①	Outdoor unit main power cable (R/S/T/N)
②	Indoor unit - Outdoor unit communication cable (A/B)
⏚	Ground to chassis

1 Open the control box panel.

2 Before connecting the power, connect wires between the indoor unit and the outdoor unit.

3 With reference to the wiring diagram, connect the wire firmly to the terminal.

4 Before connecting wires to the power supply, refer to wiring diagram between the outdoor unit and indoor unit on the page 36.

⚠ **Caution: Perform grounding work first before connecting wires.**

Cable specifications between Outdoor Unit and Indoor Unit

Classification	Specifications	Reference distance
Communication cable	CVV-SB 1.5 ㎟ X 2C (shield cable)	-
Connection cable (indoor unit - outdoor unit)	2.5㎟ X 4C (Ingtall a separate ground wire) or 5G	When the wiring distance is less than 20 meters
	4.0㎟ X 4C (Ingtall a separate ground wire) or 5G	When the wiring distance is 20 meters or longer

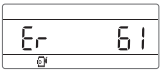
Note 1) Use power cable IEC 60245-4 IEC66 wire or higher or H07RN-F wire or higher.
Note 2) Install the power cable separately from the communication cable, and maintain a consistent distance between these two cables.

Error codes

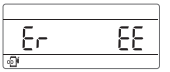
- When an error occurs in the indoor unit or outdoor unit during operation, an error code is displayed as follows.

Prompted on the room temperature display	Prompted on the Domestic hot water tank temperature display	Outdoor unit error	Indoor unit error
Er	Error code	OD is flickering	ID is flickering

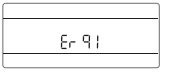
① In case of an indoor unit error (example)



② In case of an outdoor unit error (example)



- Wired remote controller error code appears on the repeat time display.
  In case of a wired remote controller error (example)



- Initial communication error code appears on the room temperature display of the wired remote controller.

Dip switch

1 When the front cover of the indoor unit is opened, a dip switch are visible in the center of the left PCB.

SW 1
(operating method)

2 Operating method (SW1): Configure settings appropriately according to the operating method with reference to the table below.

<DIP S/W Specifications>

SW1	1	2	3	4
ON	New market	Automatic control on	Heater control on	Not used
OFF	Replacement market	Automatic control off	Heater control off	Not used

<Detailed description of operating method>

Configuration		Operating method
Market (Dip #1)	BAS response (Dip #2)	Input/Output processing
New market (ON) 1) Domestic Hot Water Tank Temperature Sensor input available 2) Low Level Sensor input available 3) Heating pump operation output available	Yes(ON)	1) Wired remote controller input ignored
		2) Operation according to BAS signal
	No(OFF)	1) Operation by the wired remote controller
		2) BAS input ignored
Replacement market (OFF) 1) Domestic Hot Water Tank Temperature Sensor input available 2) Low Level Sensor input not available 3) Heating pump operation output not available	Yes(ON)	1) Wired remote controller input ignored
		2) Operation according to BAS signal
	No(OFF)	1) Operation by the wired remote controller
		2) BAS input ignored

Test operation of water piping system

● Perform the test operation of the water piping system prior to performing the test operation of the entire inverter hybrid boiler system to check the water flow and water supply temperature.

Equipment design

Carry out design of the system including heating load, water flow and installation location.

- Check the design capacity (domestic hot water tank, expansion tank capacity, temperature adjustment range)
- Install the indoor unit and the domestic hot water tank indoor place.
- Make sure that the indoor unit and the heat storage tank are level.

Installation of water piping system

Install water piping and components for piping system.

- Install pipe connections for domestic hot water tank, various valves and sensors.

Connection of water piping to the product

Connect the water pipes to the inlet and outlet of the product to enable the supplied water to flow in the product.

Test operation of the water piping system

Perform test operation of the water piping system

- Check whether the power supply cable connected to the indoor unit has the correct capacity.
- Open the front cover of the indoor unit, connect the power supply cable to the terminal of the indoor unit, and check whether 3-phase 400V electricity is supplied properly using a tester.
- Fill the tank up with water and vent air sufficiently.
- Check whether water is supplied to the expansion tank seamlessly.
- No valve should be closed in the heating piping.
- When using an existing domestic hot water tank, supply water until no dirty water or water with foreign substances is discharged.
- Turn the Power switch on.
- Operate the domestic hot water pump to let the water flow to the heat exchanger in the indoor unit without operating hybrid boiler.
- Check whether there is any leakage on the pipe joints.
- Let the water flow throughout the water piping system to filter impurities in the pipe, and perform air purging to remove air in the pipe to facilitate the water flow.

Verification of abnormalities in the water piping system

Perform a test on the water piping system without operating the product.

- Check whether the water flow rate satisfies the product requirements.
- Check the temperature of supply water.

Test operation of the product

Perform test operation of the product after verifying that the supply water is in a normal state.

- If you press and hold the Tact switch on the main board for 3 seconds while the system is in an idle state, the test operation starts in an automatic heating operation condition immediately when you take your finger off the switch. And then, test operation will be stopped after 30 minutes of test. Test operation is a function to check whether the system is installed correctly by automatically performing operation by itself.
  (When performing test operation, automatic heating mode is operated, and the default setting temperature of the domestic hot water tank and the room are 80℃ and 30℃, respectively.
  Other operating conditions are set according to the applicable operational specifications and at this time, the self-diagnosis and protection functions are activated.)
- Turn on the hybrid boiler and check the heating circulation status.

Implementation of heating operation

After performing a test operation, implement the automatic heating operation.

- Press the Operation on/off button on the wired remote controller and adjust the heating temperature (room, domestic hot water tank).
- Turn on the hybrid boiler and check the heating circulation status.
  Turn wired remote controller on → Turn hybrid boiler on →Heating pump on or off according to the room temperature settings.
  → Turn off the switch on the wired remote controller and check whether the hybrid boiler stops properly.
- Check whether heating is sufficient.
- If the heating is not sufficient, vent air in the heating piping.

Precautions for test operation

- Verify and check whether air has completely vented, whether supply water flows seamlessly, whether the temperature difference between the entering water and leaving water is appropriate and whether the flow switch operates normally.
- Verify whether there is any refrigerant leakage and disconnected or loosely fastened communication or power cable, and check the wire connection status using an electrical wiring diagram.
- Check whether the night electricity timer is set to 22:00 when the night power service is initiated (in case of using night electricity in Korea).
- Check whether the power cable and the communication cable are connected.

- Check whether the power cable is connected accurately according to the correct sequence.
- Check whether the insulation resistance measured between the power supply terminal block and a ground with DC mega tester (DC 500V) is 2.0 MΩ or higher.
- Do not operate the product if the reading is below 2.0MΩ.

Caution **You must check whether the water during test operation flows in the product seamlessly. (If water flow in the water piping is not sufficient, do not operate the product.)**

Verification of water flow into the indoor unit

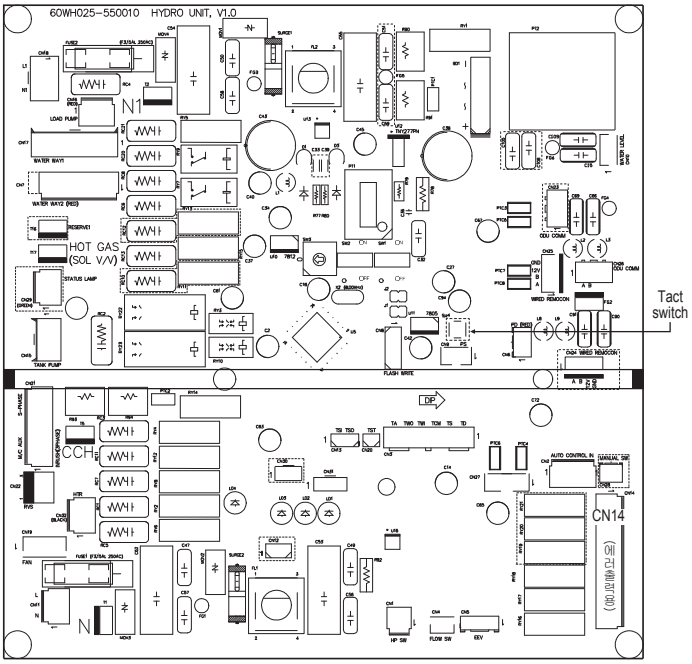
Item	Symptom	Cause	Check and measure
Water flow status	Er 62	Water does not flow, or the water flow is not sufficient	Check whether the Domestic Hot Water Pump is working.
			Check whether the water piping system is clogged. (strainer cleaning, valve closing, valve disorder, air in the water piping, etc.)
			Check for abnormality of the water flow switch. (water flow switch failure, arbitrary modification, disconnection, etc.)

Guide for users

- After installation and test are completed, provide a detailed explanation about the major operating mode of the boiler to the user.
  (turning the product on and off, functions of the remote controller)

What is test operation after installation?

Test operation after installation is a function to automatically determine whether the installation has been correctly performed.



1 How to perform test operation

① Press and hold the Tact switch on the main board for 3 seconds while in an idle state.
② For default setting temperature of the domestic hot water tank and the room are 80℃ and 30℃, respectively.

2 Termination of test operation

The system automatically enters stop mode after 3 hours of test operation.

Reference

- Automatically selects and performs the heating operation according to the outdoor temperature.
- Operation other than Tact switch is not allowed.
  It may cause serious injuries in the event of abnormal operation.
- Error output status can be checked by connecting the "error output connector" to the CN14 of the indoor unit>
  ex) Plug the connector into the indoor unit and operate it, and then measure the resistance between each end of two wires using a multimeter
  1) If the resistance is 10Ω or below = There is an error in the product.
  2) If the resistance is infinite MΩ = The product is normal.

Refrigerant Recovery Operation

In order to relocate the products, it is necessary to recover the R-410A refrigerant of outdoor unit.

1 **How to start refrigerant recovery operation**

Please press and hold continuously the TACT switch in the main board of Hydro Unit for more than 30 seconds in stop status of the system and then the outdoor unit will start the recovery operation right after releasing from TACT switch.

2 **How to stop refrigerant recovery operation**

Recovery operation can be terminated by pressing TACT switch for more than 2 seconds during recovery operation.
Also recovery operation will be automatically stopped in case of operating for more than 10 minutes.

3 **Caution**

Please close the service valve at low pressure side within 30 seconds after closing service valve at high pressure side. If it exceed 30 seconds, the compressor will be damaged.

Maintenance of brazed plate heat exchanger

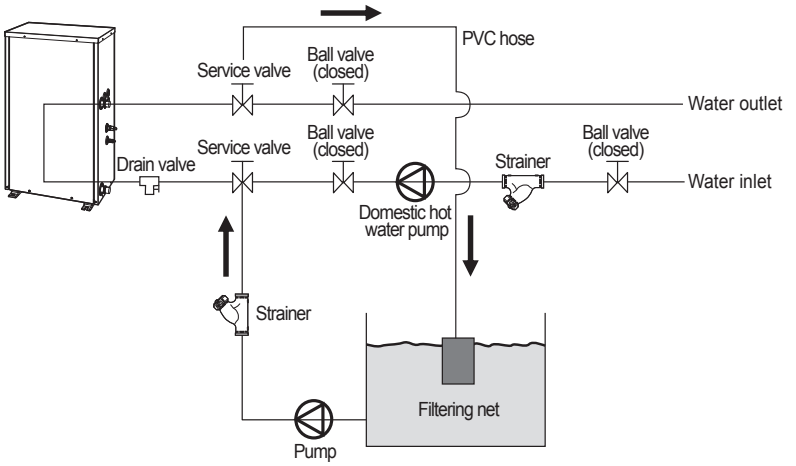
The efficiency of the heat exchanger will decrease as the scaling accumulates. furthermore, freezing and bursting caused by the decrease in flow may lead to damages to the product.
For these reasons, it is necessary to perform maintenance on a regular basis to prevent scale generation.

- Check the following items prior to the heating season. (interval: once a year)
  - Perform a water quality inspection to verify compliance with the standard requirements.
  - Performing cleaning of the strainer.
  - Check whether the water flow is appropriate.
  - Check whether the operating environment is appropriate.
  (pressure, water flow, leaving water temperature, etc.)

- To clean the brazed plate heat exchanger, it is necessary to comply with the following procedures.
  - Check whether a service port is mounted in the water pipe to clean using chemical solvent.
    Installing a pressure sensor in the inlet and outlet pipes facilitates the identification of the degree of cleaning by checking pressure changes.
    The descaling operation includes 2 stages, a cleaning operation and a neutralization operation.
    Diluted phosphoric acid or oxalic acid with a concentration of 5% is an appropriate chemical agent for descaling.
    (Do not use hydrochloric acid, sulfuric acid or nitric acid, as they are caustic.)
  - Check whether the ball valve of the inlet and outlet pipes and the drain pipe valve are closed properly when performing cleaning.
  - Connect a pipe to service valve for cleaning and fill cleaning agent with a temperature of 50 to 60℃ into the brazed plate heat exchanger and circulate it for 4 to 8 hours using a pump.
    Water flow more than 1.5 times of the normal flow is appropriate; reverse the direction of water flow every 30 minutes.
    Before reversing the circulation direction, flush the water through the drain valve for about 5 minutes until no impurities are discharged.
    The circulation time may vary depending on the temperature of the cleaning agent or the degree of scaling.
    For this reason, it is necessary to observe carefully the changes in color to determine the circulation duration for descaling.
    When the pressure difference between the inlet and outlet of BPHE is equal to the design value or PH between inlet and outlet of BPHE is equal, it indicates that the cleaning has been completed.
  - Drain all chemical agents inside the brazed plate heat exchange after cleaning work, fill sodium hydroxide (NaOH) or sodium bicarbonate (NaHCO3) in the heat exchanger and circulate for 15 to 20 minutes to neutralize it.
  - After the completion of neutralization, clean the inside of the heat exchanger with clean water.
    You can check whether the chemical agent is properly removed by measuring the pH concentration of the water.
  - If using a different kind of chemical cleaner on sale in the market, you must check whether it causes corrosion on stainless steel or copper in advance.
  - For more information about chemical cleaners, consult with a professional in the field.

- After completing the cleaning work, operate the product to check whether it works properly.

● After completing the cleaning work, operate the product to check whether it works properly.



[Cleaning of brazed plate heat exchanger]

Daily checklist

● Water quality control

- A brazed plate heat exchanger does not have a structure in which any of its parts are disassemblable, cleanable or replaceable.
- To prevent corrosion or scaling, water quality control is very important.
- At a minimum, the water quality must comply with local or national codes.
- If an anti-corrosion agent and corrosion inhibitor is added, only an agent that does not cause corrosion on stainless steel or copper should be used.
- We recommend that you drain and refill water in the water piping periodically, even if the circulation water is not contaminated by ambient air.

● Water flow control

- Insufficient water flow may cause freezing and bursting in the brazed plate heat exchanger. Make sure that the strainer is not clogged or filled with air, and determine whether the water flow is sufficient by checking the temperature and pressure differences between the inlet and outlet pipes of the indoor unit.
- Temperature or pressure difference exceeding an appropriate level indicates reduced water flow. In this case, you should stop the operation immediately and resolve the causes before restarting the operation.
  (※Purging must be performed if air is contained in the water)
  Air in the water piping disturbs the circulation of water, causes insufficient water flow and may cause freezing and bursting.

Criteria for water quality control

Water containing a large amount of impurities causes corrosion or scaling in the condenser and piping, which may affect the performance and life of the product.

To ensure the use of water that complies with the local or national codes, you should perform a water quality test.

- Water quality control should be performed in accordance with the criteria shown below. If you don't control the water quality according to the standards given in the table below, it may performance deterioration or abnormalities in the product.

Item	Sealed system		Impact	
	Circulation water	Refilling water	Corrosion	Scale
Basic item				
pH [25℃]	7.0~8.0	7.0~8.0	O	O
Electrical conductivity [25℃] (mS/m)	≤ 30	≤ 30	O	O
Chloride ion (mg Cl^-/ℓ)	≤ 50	≤ 50	O	-
Sulfate ion (mg S-O/ℓ)	≤ 50	≤ 50	O	-
Acid consumption [pH 4.8] (mg $CaCO_3$/ℓ)	≤ 50	≤ 50	-	O
Total hardness (mg $CaCO_3$/ℓ)	≤ 70	≤ 70	-	O
Calcium hardness (mg $CaCO_3$/ℓ)	≤ 50	≤ 50	-	O
Ionic silica (mg SiO_2/ℓ)	≤ 30	≤ 30	-	O
Reference				
Iron (mg Fe/ℓ)	≤ 1.0	≤ 0.3	O	O
Copper (mg Cu/ℓ)	≤ 1.0	≤ 0.1	O	-
Sulfate ion (mg S^2/ℓ)	Should not be detected	Should not be detected	O	-
Ammonium ion (mg NH_4^+/ℓ)	≤ 0.3	≤ 0.1	O	-
Residual chlorine (mg Cl/ℓ)	≤ 0.25	≤ 0.3	O	-
Free carbon dioxide (mg CO_2/ℓ)	≤ 0.4	≤ 4.0	O	-
Stability Index	-	-	O	O

Reference

- The circular marks in the corrosion and scale columns indicate potential occurrence.
- When iron without protective coating is exposed to water with a temperature of 40℃ or higher, corrosion may occur. Addition of an anticorrosive agent or air vent may moderate corrosion.
- 15 items in the table above are general causes of corrosion and scaling.

Other Precautions

- The warranty does not apply to any used product. Furthermore, we do not take any responsibility for or liability for compensation for damages attributable to any unrepairable used product.
- Failures caused by nonconformance to the precautions for installation is not covered by the warranty and will incur service fees.
- Grounding of the product is mandatory, and warranty does not apply to failures attributable to a lack of grounding.
- Service may be limited if there is insufficient space for service activities; e.g. if installing another one on top of a product.
- Additional shipping fees may be charged for delivery to remote islands or mountainous areas.
- Service may be limited if using domestic hot water pump, heating pump or other components that are not certified or qualified by Carrier.

In case of simple disposal

If you are planning to dispose of large household waste such as home appliances or furniture, you will need to contact your local village office.