

# INSTALLATION MANUAL

# AIR-TO-WATER HEAT PUMP

Please read this installation manual completely before installing the product. Installation work must be performed in accordance with the national wiring standards by authorized personnel only. Please retain this installation manual for future reference after reading it thoroughly.

**THERMA V™**

Original instruction



MFL68681838  
Rev.02\_032624

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POLSKI

LIMBA ROMÂNĂ

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## PREFACE

This installation manual is to present information and guide about understanding, installing, and checking **THERMAV™**.

Your careful reading before installation is highly appreciated to make no mistake and to prevent potential risks. The manual is divided into ten chapters. These chapters are classified according to installation procedure. See the table below to get summarized information.

| Chapters   | Contents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chapter 1  | <ul style="list-style-type: none"> <li>Warning and Caution concerned with safety.</li> <li>This chapter is directly related with human safety. We strongly recommend reading this chapter carefully.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Chapter 2  | <ul style="list-style-type: none"> <li>Items Inside product Box</li> <li>Before starting installation, please make it sure that all parts are found inside the product box.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Chapter 3  | <ul style="list-style-type: none"> <li>Fundamental knowledge about <b>THERMAV™</b>.</li> <li>Model identification, accessories information, refrigerant and water cycle diagram, parts and dimensions, electrical wiring diagrams, etc.</li> <li>This chapter is important to understand <b>THERMAV™</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| Chapter 4  | <ul style="list-style-type: none"> <li>Installation about the outdoor unit.</li> <li>Installation location, constraints on installation site, etc</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chapter 5  | <ul style="list-style-type: none"> <li>Installation about the indoor unit.</li> <li>Installation location, constraints on installation site, etc</li> <li>Constrains when accessories are installed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Chapter 6  | <ul style="list-style-type: none"> <li>How to perform piping (for refrigerant) and wiring at the outdoor unit.</li> <li>Refrigerant pipe connection between the indoor unit and the outdoor unit.</li> <li>Electrical wiring at the outdoor unit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| Chapter 7  | <ul style="list-style-type: none"> <li>How to perform piping (for water) and wiring at the indoor unit.</li> <li>Water pipe connection between the indoor unit and pre-built under floor water loop pipe.</li> <li>Electrical wiring at the indoor unit.</li> <li>System set-up and configuration.</li> <li>As many control parameters of <b>THERMAV™</b> is adjustable by control panel, deep understanding about this chapter is required to secure the operation flexibility of <b>THERMAV™</b>.</li> <li>For more detailed information, please read the separate operation manual to use control panel and adjust control parameters.</li> </ul> |
| Chapter 8  | <ul style="list-style-type: none"> <li>Information about supported accessories</li> <li>Specification, Constraints, and wiring are described.</li> <li>Before purchasing accessories, please find supported specification to buy proper one.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| Chapter 9  | <ul style="list-style-type: none"> <li>Test operation and check point while test running.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Chapter 10 | <ul style="list-style-type: none"> <li>Check points before starting operation are explained.</li> <li>Troubleshooting, maintenance, and error code list are presented to correct problems.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                |

**REMARK : ALL CONTENTS OF THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE.  
TO GET THE LATEST INFORMATION, PLEASE VISIT LG ELECTRONICS WEB SITE.**

\* The feature may be vary according to the type of model.

# SAFETY INSTRUCTIONS

|                                                                                   |                                                                           |                                                                                   |                                                                                                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
|  | Read the precautions in this manual carefully before operating the unit.  |  | This appliance is filled with flammable refrigerant (R32)                                                                   |
|  | This symbol indicates that the Operation Manual should be read carefully. |  | This symbol indicates that a service personnel should be handling this equipment with reference to the Installation Manual. |

The following safety guidelines are intended to prevent unforeseen risks or damage from unsafe or incorrect operation of the appliance. The guidelines are separated into 'WARNING' and 'CAUTION' as described below.

 This symbol is displayed to indicate matters and operations that can cause risk. Read the part with this symbol carefully and follow the instructions in order to avoid risk.

## **WARNING**

This indicates that the failure to follow the instructions can cause serious injury or death.

## **CAUTION**

This indicates that the failure to follow the instructions can cause the minor injury or damage to the product.

## **WARNING**

### Installation

- Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.
  - There is risk of fire or electric shock.

- For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized Service Center.
  - There is risk of fire or electric shock.
- Always ground the unit.
  - There is risk of fire or electric shock.
- Install the panel and the cover of control box securely.
  - There is risk of fire or electric shock.
- Always install a dedicated circuit and breaker.
  - Improper wiring or installation may cause fire or electric shock.
- Use the correctly rated breaker or fuse.
  - There is risk of fire or electric.
- Do not modify or extend the power cable.
  - There is risk of fire or electric shock.
- Do not install, remove, or reinstall the unit by yourself (customer).
  - There is risk of fire, electric shock, explosion, or injury
- For antifreeze, always contact the dealer or an authorized service center.
  - Almost the antifreeze is a toxic product.
- For installation, always contact the dealer or an authorized Service Center.
  - There is risk of fire, electric shock, explosion, or injury.
- Do not install the unit on a defective installation stand.
  - It may cause injury, accident, or damage to the unit.
- Be sure the installation area does not deteriorate with age.
  - If the base collapses, the unit could fall with it, causing property damage, unit failure, and personal injury.
- Do not install the water pipe system as Open loop type.
  - It may cause failure of unit.

- Use a vacuum pump or inert (nitrogen) gas when doing leakage test or purging air. Do not compress air or oxygen and do not use flammable gases.
  - There is the risk of death, injury, fire or explosion.
- Make sure the connected condition of connector in product after maintenance.
  - Otherwise, it may cause product damage.
- Do not touch leaked refrigerant directly.
  - There is risk of frostbite.
- Copper in contact with refrigerants shall be oxygen-free or deoxidized, for example Cu-DHP as specified in EN 12735-1 and EN 12735-2.
- Compliance with national gas regulations shall be observed. (for R32)
- Refrigerant tubing shall be protected or enclosed to avoid damage. (for R32)
- The installation of pipe-work shall be kept to a minimum. (for R32)
- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system part. (for R32)
- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification. (for R32)
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. (for R32)

- Do not pierce or burn. (for R32)
- Be aware that refrigerants may not contain an odour. (for R32)
- Dismantling the unit, treatment of the refrigerant oil and eventual parts should be done in accordance with local and national standards. (for R32)
- Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operations shall be protected against mechanical damage. (for R32)
- Pipe-work shall be protected from physical damage. (for R32)
- Mechanical connections (mechanical connectors or flared joints) shall be accessible for maintenance purposes. (for R32)
- Ventilated area  
Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
- Cabling  
Cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

## Operation

- Take care to ensure that power cable could not be pulled out or damaged during operation.
  - There is risk of fire or electric shock.



- Do not place anything on the power cable.
  - There is risk of fire or electric shock.
- Do not plug or unplug the power supply plug during operation.
  - There is risk of fire or electric shock.
- Do not touch (operate) the unit with wet hands.
  - There is risk of fire or electric shock.
- Do not place a heater or other appliances near the power cable.
  - There is risk of fire or electric shock.
- Do not allow water to run into electric parts.
  - There is risk of fire, failure of the unit, or electric shock.
- Do not store or use flammable gas or combustibles near the unit.
  - There is risk of fire or failure of unit.
- Do not use the unit in a tightly closed space for a long time.
  - It may cause damage to the unit.
- When flammable gas leaks, turn off the gas and open a window for ventilation before turning the unit on.
  - There is risk of explosion or fire.
- If strange sounds, or smell or smoke comes from unit, turn the breaker off or disconnect the power supply cable.
  - There is risk of electric shock or fire.
- Stop operation and close the window in storm or hurricane. If possible, remove the unit from the window before the hurricane arrives.
  - There is risk of property damage, failure of unit, or electric shock.
- Do not open the front cover of the unit while operation. (Do not touch the electrostatic filter, if the unit is so equipped.)
  - There is risk of physical injury, electric shock, or unit failure.

- Do not touch any electric part with wet hands. you should be power off before touching electric part.
  - There is risk of electric shock or fire.
- Do not touch refrigerant pipe and water pipe or any internal parts while the unit is operating or immediately after operation.
  - There is risk of burns or frostbite, personal injury.
- If you touch the pipe or internal parts, you should be wear protection or wait time to return to normal temperature.
  - Otherwise , it may cause burns or frostbite, personal injury.
- Turn the main power on 6 hours ago before the product starting operation.
  - Otherwise, it may cause compressor damage.
- Do not touch electric parts for 10 minutes after main power off.
  - There is risk of physical injury, electric shock.
- The inside heater of product may operate during stop mode. It is intended to protect the product.
- Be careful that some part of the control box are hot.
  - There is risk of physical injury or burns.
- When the unit is soaked (flooded or submerged), contact an Authorized Service Center.
  - There is risk of fire or electric shock.
- Be cautious that water could not be poured to the unit directly.
  - There is risk of fire, electric shock, or unit damage.
- Ventilate the unit from time to time when operating it together with a stove, etc.
  - There is risk of fire or electric shock.
- Turn the main power off when cleaning or maintaining the unit.
  - There is risk of electric shock.

- Take care to ensure that nobody could step on or fall onto the unit.
  - This could result in personal injury and unit damage.
- If the unit is not used for long time, we strongly recommend not to switch off the power supply to the unit.
  - There is risk of water freezing.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation. (for R32)
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater). (for R32)
- The appliance shall be stored so as to prevent mechanical damage from occurring. (for R32)
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants. (for R32)
- When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated. (for R32)
- Periodic(more than once/year) cleaning of the dust or salt particles stuck on the heat exchangers by using water. (for R32)
- Keep any required ventilation openings clear of obstruction. (for R32)

## Repair

### • **Detection of flammable refrigerants**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

A halide torch (or any other detector using a naked flame) shall not be used.

### • **Leak detection methods**

The following leak detection methods are deemed acceptable for systems containing 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.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

## **NOTE**

Examples of leak detection fluids are

- Bubble method
- Fluorescent method agents

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to removal and evacuation procedure.

## • Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instruction.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system. Prior to recharging the system, it shall be pressure tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## • Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

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

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.

Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.

Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.

The evacuation process shall be carried out prior to returning the compressor to the suppliers.

Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

- **Removal and evacuation**

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration.

The following procedure shall be adhered to:

- Remove refrigerant;
- Purge the circuit with inert gas (optional for A2L);

- Evacuate (optional for A2L);
- Purge with inert gas (optional for A2L);
- Open the circuit by cutting or brazing

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants other than A2L refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process may need to be repeated several times.

Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, other than A2L refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

## CAUTION

### Installation

- Always check for gas (refrigerant) leakage after installation or repair of unit.
  - Low refrigerant levels may cause failure of unit.
- Keep level even when installing the unit.
  - To avoid vibration or water leakage.

- Use two or more people to lift and transport the unit.
  - Avoid personal injury.
- In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.
- Do not install the unit in potentially explosive atmospheres.
- The water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere.
- The pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.
- A discharge pipe connected to the pressure-relief device is to be installed in a continuously downward direction and in a frost-free environment.

## Operation

- Do not use the unit for special purposes, such as preserving foods, works of art, etc.
  - There is risk of damage or loss of property.
- Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.
  - There is risk of fire, electric shock, or damage to the plastic parts of the unit.
- Do not step on or put anything on the unit.
  - There is risk of personal injury and failure of unit.
- Use a firm stool or ladder when cleaning or maintaining the unit.
  - Be careful and avoid personal injury.



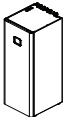
- Do not turn on the breaker or power under condition that front panel cabinet, top cover, control box cover are removed or opened.
  - Otherwise it may cause fire, electric shock, explosion or death.
- The appliance shall be disconnected from its power source during service and when replacing parts.
- Means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- The Installation kit supplied with the appliance are to be used and that old Installation kit should not be reused.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard. Installation work must be performed in accordance with the national wiring standards by authorized personnel only.
- This equipment shall be provided with a supply conductor complying with the national regulation.
- The instructions for service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

# INSTALLATION PART

Thank you for choosing LG Electronics Air-to-Water Heat Pump **THERMAV™**.

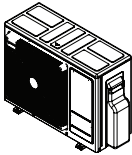
Before starting installation, please make it sure that all parts are found inside the product box

## INDOOR UNIT BOX

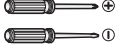
| Item                          | Image                                                                             | Quantity | Item            | Image                                                                                   | Quantity |
|-------------------------------|-----------------------------------------------------------------------------------|----------|-----------------|-----------------------------------------------------------------------------------------|----------|
| Indoor unit                   |  | 1        | Connection Hose |        | 1        |
| Card, Installation            |  | 1        | Gasket (G1")    |  | 2        |
| Owner's / Installation manual |  | 1        | Adapter Cable   |        | 1        |

\* There are 3 gaskets between pipes and caps, which is in Heating circuit outlet pipe, Domestic cold water inlet pipe and DHW Re-Circulation pipe. 2 gaskets are enclosed inside the product box.

## OUTDOOR UNIT BOX

| Item            | Image                                                                               | Quantity |
|-----------------|-------------------------------------------------------------------------------------|----------|
| Outdoor Unit    |   | 1        |
| Drain Cap       |  | 5        |
| Drain Nipple    |  | 1        |
| Damper          |  | 4        |
| Socket (Liquid) |  | 1        |
| Socket (Gas)    |  | 1        |

# INSTALLATION TOOLS

| Figure                                                                              | Name                  | Figure                                                                              | Name                             |
|-------------------------------------------------------------------------------------|-----------------------|-------------------------------------------------------------------------------------|----------------------------------|
|    | Screw driver          |    | Ohmmeter                         |
|    | Electric drill        |    | Hexagonal wrench                 |
|    | Measuring tape, Knife |    | Ammeter                          |
|    | Hole core drill       |    | Leak detector                    |
|    | Spanner               |    | Thermometer,<br>Horizontal meter |
|  | Torque wrench         |  | Flaring tool set                 |
|  | Manifold Gauge        |  | Vacuum Pump                      |
|  | Pliers                | -                                                                                   | -                                |

## GENERAL INFORMATION

With advanced inverter technology, **THERMAV**™ is suitable for applications like under floor heating, under floor cooling, and hot water generation. By Interfacing to various accessories user can customize the range of the application.

In this chapter, general information of **THERMAV**™ is presented to identify the installation procedure. Before beginning installation, read this chapter carefully and find helpful information on installation.

Energy Labels and Product Fiches for all possible combinations can be found at <https://www.lg.com/global/support/cedoc/cedoc>. Search for outdoor unit name in cedoc page.

### Model Information

#### Factory Model Name

##### Outdoor unit

| Model | No. |   |   |    |   |   |   |
|-------|-----|---|---|----|---|---|---|
|       | 1   | 2 | 3 | 4  | 5 | 6 | 7 |
| Split | ZH  | U | W | 06 | 6 | A | 0 |

|   | Signification                                   |
|---|-------------------------------------------------|
| 1 | ZH : Air-to-Water-Heat Pump for R32             |
| 2 | Classification<br>- U : Outdoor unit of Split   |
| 3 | Model Type<br>- W : Inverter Heat Pump          |
| 4 | Heating Capacity<br>- e.g. 06 : 6 kW            |
| 5 | Electrical ratings<br>- 6 : 1Ø, 220-240V, 50 Hz |
| 6 | Function<br>- A : General function of Split     |
| 7 | Series number (Factory)                         |

##### Indoor unit

| Model | No. |   |   |    |   |    |   |   |
|-------|-----|---|---|----|---|----|---|---|
|       | 1   | 2 | 3 | 4  | 5 | 6  | 7 | 8 |
| Split | ZH  | N | W | 20 | 6 | 03 | I | 2 |

|   | Signification                                   |
|---|-------------------------------------------------|
| 1 | ZH : Air-to-Water-Heat Pump for R32             |
| 2 | Classification<br>- N : Indoor unit             |
| 3 | Model Type<br>- W : Inverter Heat Pump          |
| 4 | Water Tank Capacity<br>- 20 : 200L              |
| 5 | Electrical ratings<br>- 6 : 1Ø, 220-240V, 50 Hz |
| 6 | Heater Capacity<br>- 3: 3 kW Heater             |
| 7 | Function<br>- I : Split IWT                     |
| 8 | Series number (Factory)                         |

**Buyer Model Name****Outdoor unit**

| Type  | Refrigerant | No. |   |    |   |   |   |    |   |
|-------|-------------|-----|---|----|---|---|---|----|---|
|       |             | 1   | 2 | 3  | 4 | 5 | 6 | 8  | 9 |
| Split | R32         | H   | U | 06 | 1 | M | R | U2 | 0 |

|   | Signification                                         |
|---|-------------------------------------------------------|
| 1 | Air-to-Water Heat Pump                                |
| 2 | Classification<br>- U : Outdoor unit                  |
| 3 | Heating Capacity<br>- e.g. 06 : 6 kW                  |
| 4 | Electrical ratings<br>- 1 : 1Ø, 220-240V, 50 Hz       |
| 5 | Leaving water combination<br>- M : Medium Temperature |
| 6 | Refrigerant<br>- R : R32                              |
| 8 | Chassis<br>- U2 : U24A Chassis                        |
| 9 | Series number (Buyer)                                 |

**Indoor unit**

| Type  | Refrigerant | No. |   |    |   |   |   |   |   |    |  |
|-------|-------------|-----|---|----|---|---|---|---|---|----|--|
|       |             | 1   | 2 | 3  | 4 | 5 | 6 | 8 | 9 | 10 |  |
| Split | R32         | H   | N | 06 | 1 | 3 | T | N | K | 0  |  |

|    | Signification                                   |
|----|-------------------------------------------------|
| 1  | Air-to-Water Heat Pump                          |
| 2  | Classification<br>- N : Indoor unit             |
| 3  | Heating Capacity<br>- e.g. 06 : 6 kW            |
| 4  | Electrical ratings<br>- 1 : 1Ø, 220-240V, 50 Hz |
| 5  | Heater capacity (kW)<br>- 3: 3kW Heater         |
| 6  | Function<br>- T: Split IWT                      |
| 8  | Classification<br>- N : Indoor unit             |
| 9  | Chassis (Platform)<br>- K : K5 Chassis          |
| 10 | Series number (Buyer)                           |

Check the model information based on the buyer model series number.  
(e.g., geometry, cycle, etc.)

## Related Information

| Unit      |             |              |               |             |                     |                            |                            |               |                     |
|-----------|-------------|--------------|---------------|-------------|---------------------|----------------------------|----------------------------|---------------|---------------------|
| Heat Pump |             |              |               |             |                     |                            |                            | Backup Heater |                     |
| Type      | Refrigerant | Outdoor Unit |               | Indoor Unit | Power Supply        | Capacity                   |                            | Capacity [kW] | Power Supply        |
|           |             | Phase        | Capacity [kW] | Phase       |                     | Heating [kW] <sup>*1</sup> | Cooling [kW] <sup>*2</sup> |               |                     |
| Split     | R32         | 1Ø           | 4             | 1Ø          | 220-240 V~<br>50 Hz | 4.0                        | 4.0                        | 3             | 220-240 V~<br>50 Hz |
|           |             |              | 6             |             |                     | 6.0                        | 6.0                        |               |                     |

\*1 : Tested under EN14511

(water temperature 30 °C → 35 °C at outdoor ambient temperature 7 °C / 6 °C)

\*2 : Tested under EN14511

(water temperature 23 °C → 18 °C at outdoor ambient temperature 35 °C / 24 °C)

※ All appliances were tested at atmospheric pressure.

| Refrigerant                                          |                 |                              | R32        |
|------------------------------------------------------|-----------------|------------------------------|------------|
| Max allowable pressure                               | High side [MPa] |                              | 4.32       |
|                                                      | Low side [MPa]  |                              | 2.4        |
| Operating temperature of leaving water (Min. ~ Max.) | Heating [°C]    | For Fan coil unit / Radiator | 15 ~ 55    |
|                                                      |                 | For under floor              | 15 ~ 55    |
|                                                      | Cooling [°C]    | For Fan coil unit            | 5 ~ 27     |
|                                                      |                 | For under floor              | 16 ~ 27    |
|                                                      | DHW             |                              | 15 ~ 80    |
| Inlet water pressure [MPa] (Min. ~ Max.)             |                 |                              | 0.03 ~ 0.3 |
| Maximum DHW tank pressure [MPa]                      |                 |                              | 1.0        |

\* DHW: Domestic hot water

\* IWT : Integrated water tank indoor unit

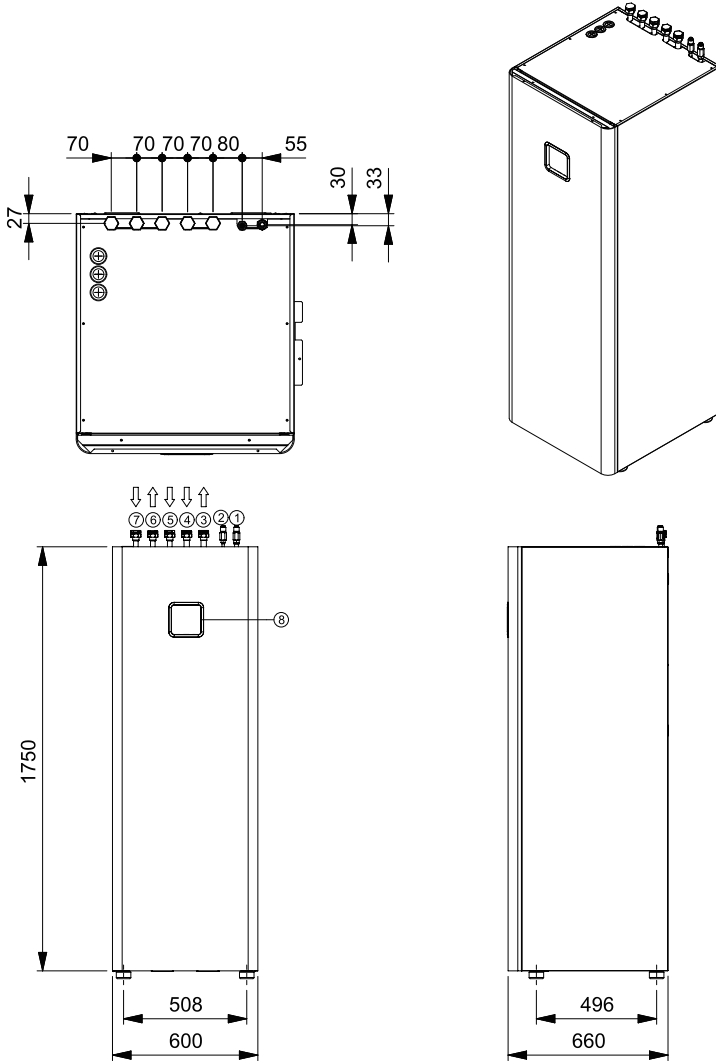
- Energy Labels and Product Fiches for all possible combinations can be found at <https://www.lg.com/global/support/cedoc/cedoc>. Search for outdoor unit name in cedoc page.

- Additional Information : Serial number is refer to the barcode on the product.

## Parts and Dimensions

Indoor unit : External

(unit : mm)



\* The feature may vary according to the type of model.

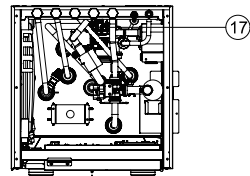
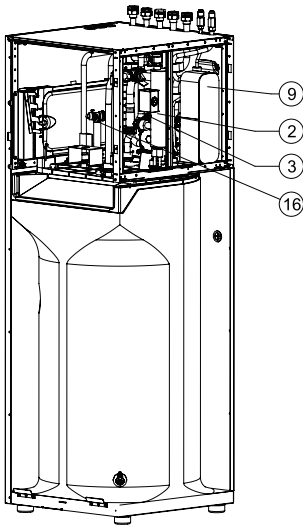
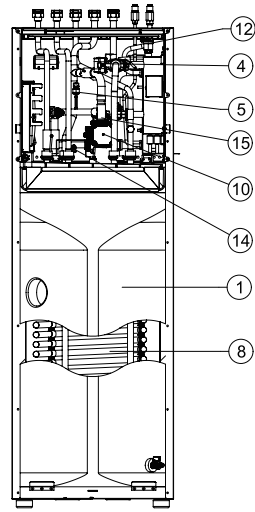
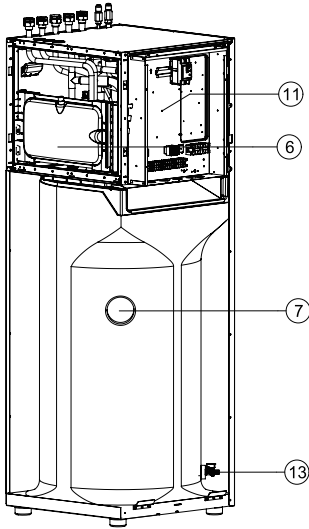
**Description**

| No. | Part Name                      | Remark                                                  |
|-----|--------------------------------|---------------------------------------------------------|
| 1   | Refrigerant gas pipe           | SAE 1/2"                                                |
| 2   | Refrigerant liquid pipe        | SAE 1/4"                                                |
| 3   | Heating circuit outlet pipe    | Female G1" according to ISO228-1(parallel pipe threads) |
| 4   | Heating circuit inlet pipe     | Female G1" according to ISO228-1(parallel pipe threads) |
| 5   | Domestic cold water inlet pipe | Female G1" according to ISO228-1(parallel pipe threads) |
| 6   | Domestic hot water outlet pipe | Female G1" according to ISO228-1(parallel pipe threads) |
| 7   | DHW RE-Circulation pipe        | Female G1" according to ISO228-1(parallel pipe threads) |
| 8   | Control panel                  | Built-in Remote controller                              |



Indoor unit : Internal

(unit : mm)



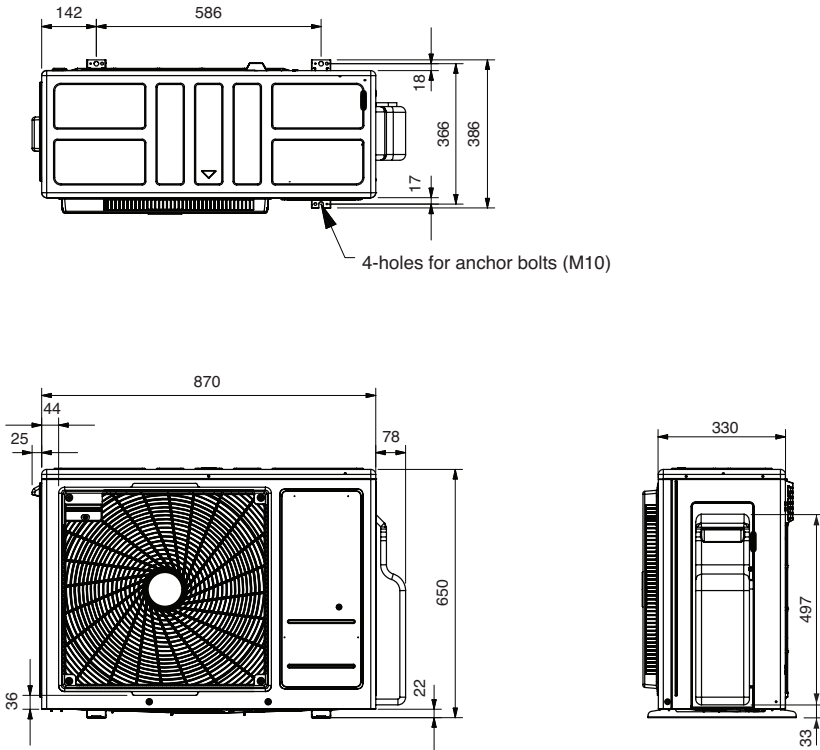
**Description**

| No. | Part Name        | Remark                             |
|-----|------------------|------------------------------------|
| 1   | DHW Tank         | Domestic hot water tank(200L)      |
| 2   | Heater           | Electric heater (3kW)              |
| 3   | Flow sensor      | Flow metering sensor               |
| 4   | 3Way valve       | For DHW / Heating                  |
| 5   | Pressure sensor  | Pressure sensor                    |
| 6   | Expansion vessel | 8L for Heating circuit             |
| 7   | DHW tank sensor  | Temperature sensor                 |
| 8   | Heat exchanger 1 | Coil Heat Exchange (water / DHW)   |
| 9   | Heat exchanger 2 | Plate Heat Exchange (Ref. / Water) |
| 10  | Water pump       | Main circulation pump              |
| 11  | Control Box      | PCB'A and Terminal blocks          |
| 12  | Air vent         | For Air purging                    |
| 13  | Drain cock 1     | Valve for DHW Tank drain           |
| 14  | Drain cock 2     | Valve for water circuit drain      |
| 15  | Strainer         | For water circuit                  |
| 16  | Safety valve     | For DHW (10 bar)                   |
| 17  | Safety valve     | For water circuit (3 bar)          |

**Outdoor unit : External**

Chassis : U24A

(unit : mm)

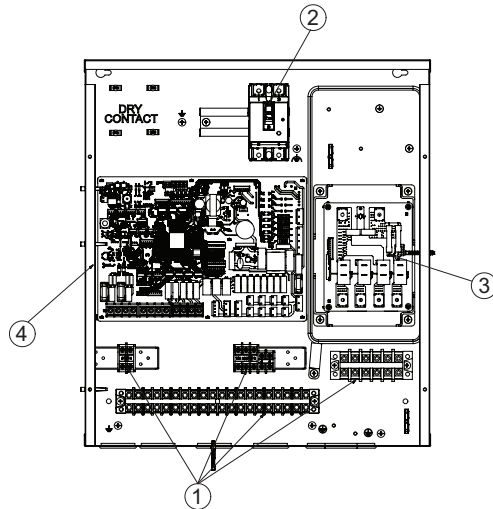


\* The feature may be vary according to the type of model.

# Control Parts

Control Box : Indoor Unit

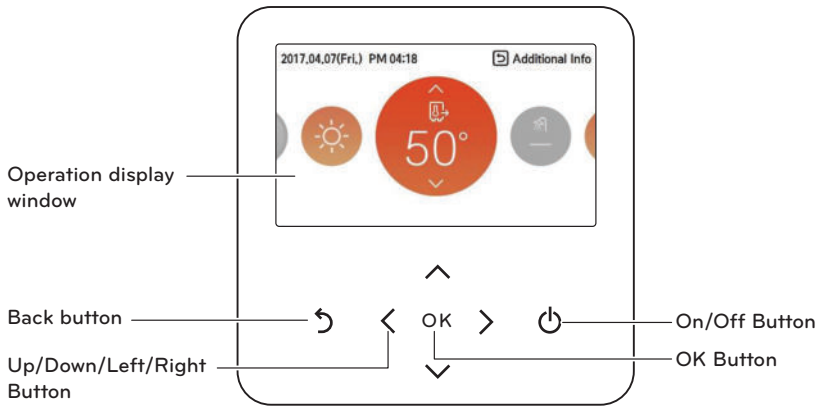
1Ø Electric Heater Model



## Description

| No | Name               | Remark                                                                           |
|----|--------------------|----------------------------------------------------------------------------------|
| 1  | Terminal blocks    | The terminal blocks allow easy connection of field wiring                        |
| 2  | Unit ELB           | The ELB protects the unit against overload or short circuit                      |
| 3  | Heater PCB (Relay) | Heater PCB (Printed Circuit Board) controls the functioning of the backup heater |
| 4  | Main PCB           | The main PCB (Printed Circuit Board) controls the functioning of the unit        |

## Control Panel



|                           |                                                                   |
|---------------------------|-------------------------------------------------------------------|
| Operation display window  | Operation and Settings status display                             |
| Back button               | When you move to the previous stage from the menu's setting stage |
| Up/down/left/right button | When you change the menu's setting value                          |
| OK button                 | When you save the menu's setting value                            |
| On/Off button             | When you turn ON/OFF the AWHP                                     |

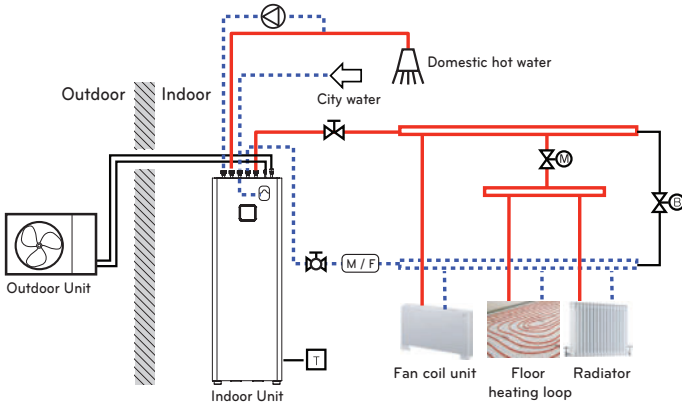
## Typical Installation Example

### CAUTION

If **THERMAV** is installed with pre-existing boiler, the boiler and **THERMAV** should not be operated together. If entering water temperature of **THERMAV** is above 55 °C, the system will stop operation to prevent mechanical damage of the product. For detailed electric wiring and water piping, please contact authorized installer.  
Some installation scenes are presented for example. As these scenes are conceptual figures, installer should optimize the installation scene according to the installation conditions.  
Note that buffer tank should be installed.

### CASE 1 : Connecting Heat Emitters for Heating and Cooling & DHW

(Under floor loop, Fan Coil Unit, Radiator, and Domestic hot water)

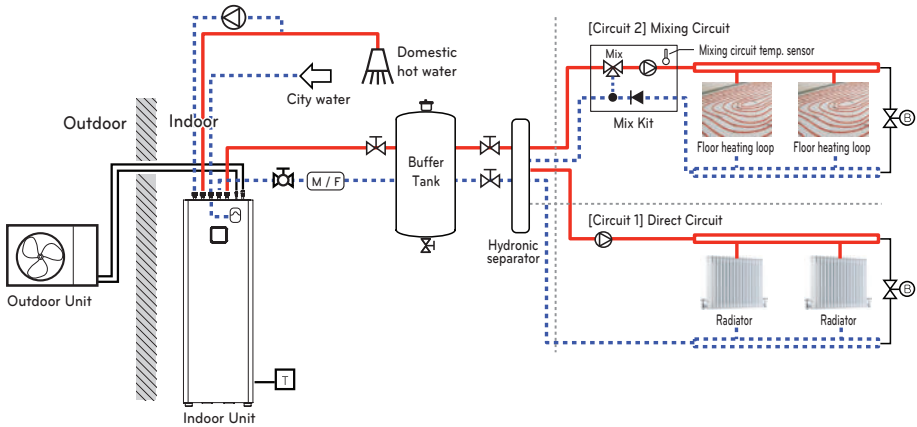


### NOTE

- Room thermostat
  - Type of thermostat and specification should be complied with chapter 8 and chapter 9 of **THERMAV** installation manual.
- 2way valve
  - It is important to install 2way valve to prevent dew condensation on the floor and radiator while cooling mode.
  - Type of 2way control valve and specification should be complied with chapter 8 and chapter 9 of **THERMAV** installation manual.
  - 2way valve should be installed at the supply side of the collector.
- By-pass valve
  - To secure enough water flow rate, by-pass valve should be installed at the collector.
  - By-pass valve should guarantee minimum water flow rate in any case. Minimum water flow rate is described in water pump characteristics curve.

|                                                                                                                             |                                                                                                                  |                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <p>— High Temperature</p> <p>.... Low Temperature</p> <p>(M/F) Magnetic Filter (Mandatory)</p> <p>⊗ Pump (Field supply)</p> | <p>⊗ 2way valve (Field supply)</p> <p>⊗ By-pass valve (Field supply)</p> <p>⊗ Room Thermostat (Field supply)</p> | <p>⊗ Shut-off valve with strainer(Field Supply)</p> <p>⊗ Shut-off valve (Field supply)</p> <p>⊗ DHW Expansion vessel (Field Supply)</p> |
|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|

## CASE 2 : Connecting mixed Circuit

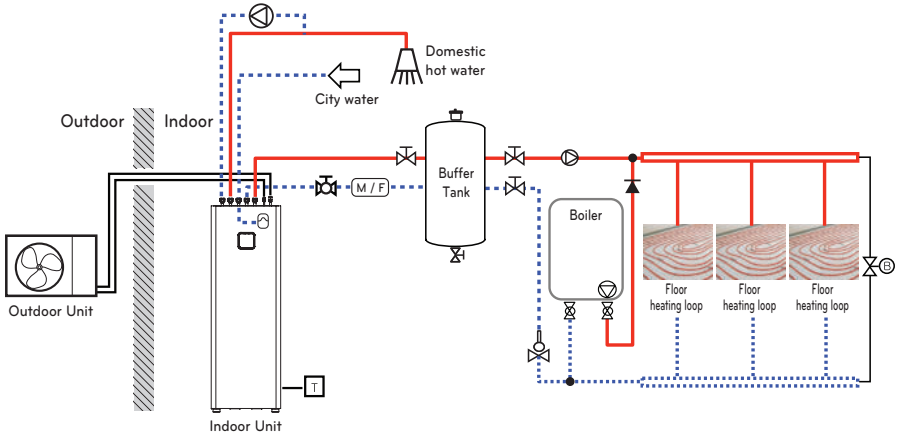


## NOTE

- Mix Kit
  - You can install it when you want to set the temperature of two rooms individually
  - When heating, Circuit 2 can not be higher than Circuit 1.
  - When cooling, Circuit 2 can not be lower than Circuit 1.
  - The types and specifications of the Mix Kit are to comply with chapter 8 and chapter 9 of the **THERMAV** Installation Manual.

|                                                                                                                 |                                                                                                                         |                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| — High Temperature                                                                                              |  By-pass valve (Field supply)          |  Shut-off valve with strainer(Field Supply) |
| .... Low Temperature                                                                                            |  Room Thermostat (Field supply)       |  Shut-off valve (Field supply)             |
|  Magnetic Filter (Mandatory) |  Mix Kit (Field supply)              |  Pressure Regulation valve (Field supply) |
|  Pump (Field supply)         |  DHW Expansion vessel (Field Supply) |  Buffer tank (Field Supply)               |

# CASE 3 : Connecting 3<sup>rd</sup> Party Boiler



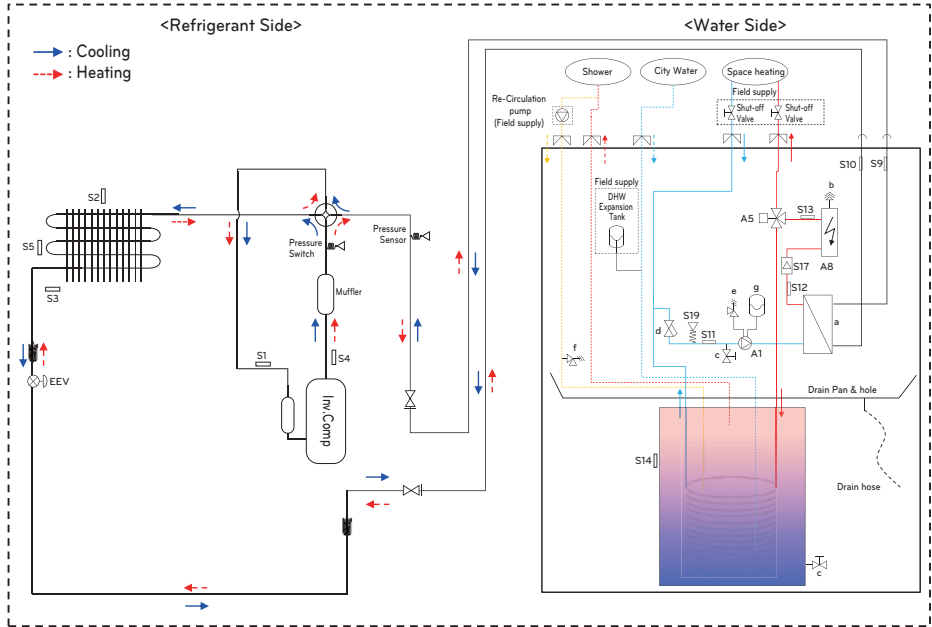
## NOTE

- 3<sup>rd</sup> party Boiler
  - You can control the boiler automatically and manually by comparing the outside temperature and the set temperature.

|                                                                                                                                                  |                                                                                                                                                                                                |                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>— High Temperature</p> <p>.... Low Temperature</p> <p>(M/F) Magnetic Filter (Mandatory)</p> <p>⦿ Pump (Field supply)</p> <p>▲ Check Valve</p> | <p>⊗ 2way valve (Field supply)</p> <p>⊗ By-pass valve (Field supply)</p> <p>⊗ Room Thermostat (Field supply)</p> <p>⊗ Air vent (Field supply)</p> <p>⊗ DHW Expansion vessel (Field Supply)</p> | <p>⊗ Shut-off valve with strainer(Field Supply)</p> <p>⊗ Shut-off valve (Field supply)</p> <p>⊗ Aquastat V/V</p> <p>⊗ Buffer tank (Field Supply)</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|



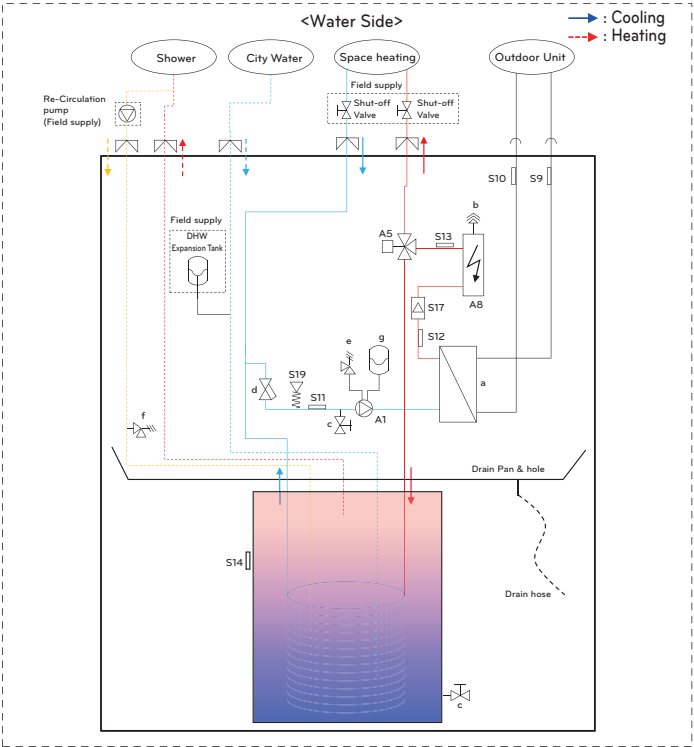
## Cycle Diagram



## Description

| Category         | Symbol | Meaning                                      |
|------------------|--------|----------------------------------------------|
| Refrigerant side | S1     | Compressor-suction pipe temperature sensor   |
|                  | S2     | Outdoor air temperature sensor               |
|                  | S3     | Outdoor-HEX temp. sensor                     |
|                  | S4     | Compressor-discharge pipe temperature sensor |
|                  | S5     | Outdoor-HEX middle temp. sensor              |
|                  | S9     | PHEX gas temp. sensor                        |
|                  | S10    | PHEX liquid temp. sensor                     |
| Water Side       | EEV    | Electronic Expansion Valve (Heating)         |
|                  | S11    | Inlet water temperature sensor (WATER IN)    |
|                  | S12    | Outlet water temperature sensor (PHEX OUT)   |
|                  | S13    | Backup heater outlet sensor (WATER OUT)      |
|                  | S14    | DHW tank temperature sensor                  |
|                  | S17    | Flow sensor                                  |
|                  | S19    | Water pressure sensor                        |
|                  | A1     | Main water pump                              |
|                  | A8     | Electric backup heat                         |

# Water cycle



## Description

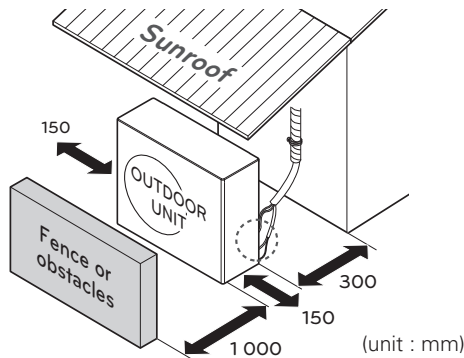
| Category         | Symbol | Meaning                           |
|------------------|--------|-----------------------------------|
| Refrigerant Side | S9     | PHEX gas temp. sensor             |
|                  | S10    | PHEX liquid temp. sensor          |
| Water Side       | S11    | Inlet water temperature sensor    |
|                  | S12    | Outlet water temperature sensor   |
|                  | S13    | Electric heater outlet sensor     |
|                  | S14    | DHW tank temperature sensor       |
|                  | S17    | Flow sensor                       |
|                  | S19    | Water pressure sensor             |
|                  | A1     | Main water pump                   |
|                  | A5     | 3Way Valve                        |
|                  | A8     | Electric backup heater            |
|                  | a      | PHEX (Ref. / Water)               |
|                  | b      | Air vent                          |
|                  | c      | Drain valve                       |
|                  | d      | Strainer                          |
|                  | e      | Safety valve(water circuit, 3bar) |
|                  | f      | Safety valve(DHW tank, 10bar)     |
|                  | g      | Expansion Tank(8L)                |

# INSTALLATION OF OUTDOOR UNIT

The outdoor unit of **THERMAV** is installed outside to exchange heat with ambient air. Therefore, it is important to secure proper space around the outdoor unit and care for specific external conditions. This chapter presents a guide to install the outdoor unit, make a route to connect with the indoor, and what to do when installed around seaside.

## Conditions where Outdoor Unit is Installed

- If a sunroof is built over the unit to prevent direct sunlight or rain exposure, make sure that heat radiation from the heat exchanger is not restricted.
- Ensure that the spaces indicated by arrows around front, back and side of the unit.
- Do not place animals and plants in the path of the warm air.
- Take the weight of the outdoor unit into account and select a place where noise and vibration are minimum.
- Select a place so that the warm air and noise from the outdoor unit do not disturb neighbors.
- Place that can sufficiently endure the weight and vibration of the outdoor unit and where even Installation is possible.
- Place that has no direct influence of snow or rain.
- Place with no danger of snowfall or icicle drop.
- Place without weak floor of base such as decrepit part of the building or with a lot of snow accumulation.



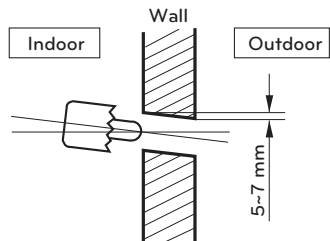
Minimum service space

※ The feature may be vary according to the type of model.

## Drill a Hole in the Wall

- If making a hole to the wall is required to connect pipe between the indoor unit and the outdoor unit, please follow below descriptions.

Drill the piping hole with a  $\varnothing 70$  mm hole core drill.  
Piping hole should be slightly slant to the outdoor side to prevent raindrop into indoor side.

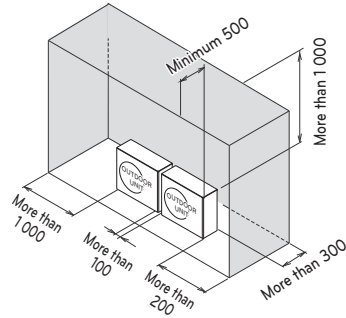
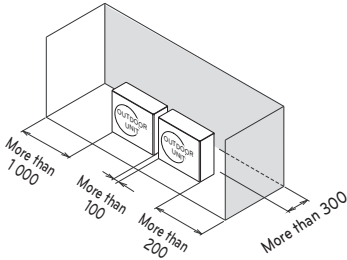


## Multiple installation

When installing two or more units, please observe the installation space.

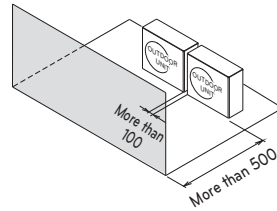
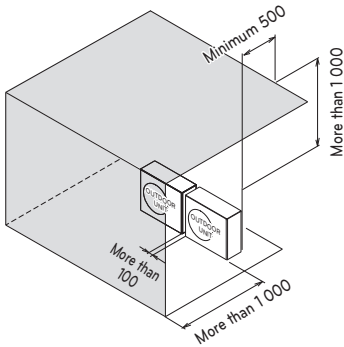
- If there is an obstruction in the intake

(Unit : mm)



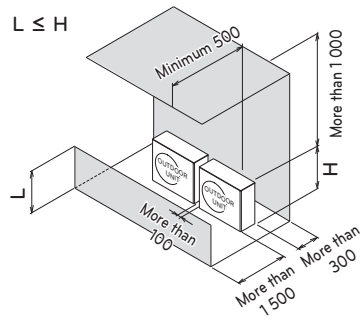
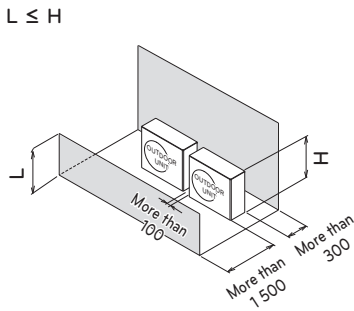
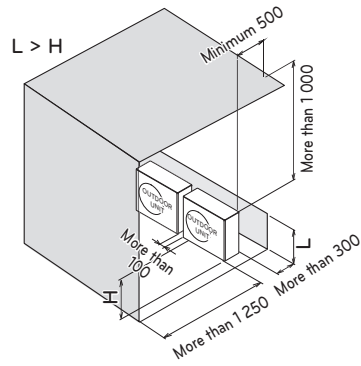
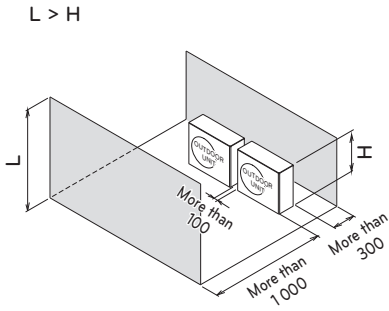
- If there is an obstruction in the discharge part

(Unit : mm)



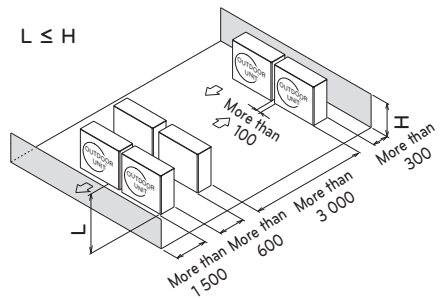
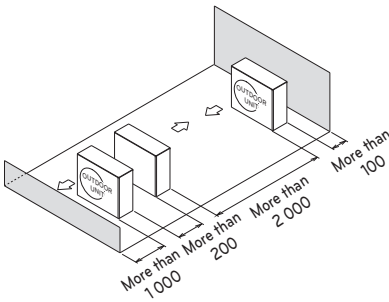
- When there is an obstacle in the suction or discharge part

(Unit : mm)



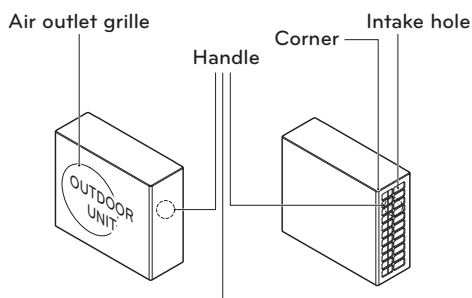
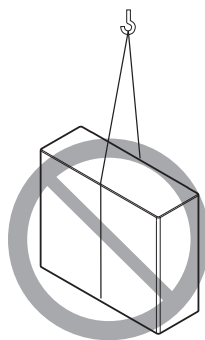
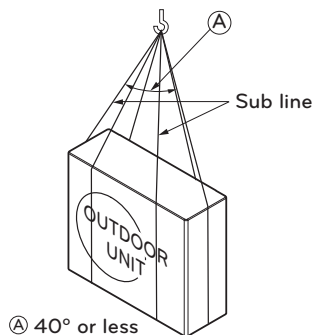
- Multiple installation on the roof

(Unit : mm)

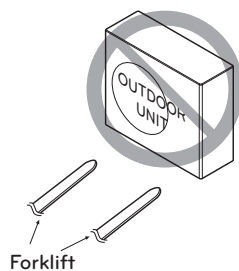


## Transporting the Unit

- When carrying the suspended unit, pass the ropes between legs of base panel under the unit.
- Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- Attach the ropes to the unit at an angle (A) of 40° or less.
- Use only accessories and parts which are of the designated specification when installing.
- Forklift trucks are not available without a palette.
- Be careful not to damage the product when moving the forklift.



Always hold the unit by the corners, as holding it by the side intake holes on the casing may cause them to deform.





## CAUTION

Be very careful while carrying the product.

- Do not have only one person carry product if it is more than 20 kg.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.
- Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.
- When carrying in Unit, be sure to support it at four points. Carrying in and lifting with 3-point support may make Outdoor Unit unstable, resulting in a fall.
- Use 2 belts of at least 8 m long.
- Place extra cloth or boards in the locations where the casing comes in contact with the sling to prevent damage.
- Hoist the unit making sure it is being lifted at its center of gravity.

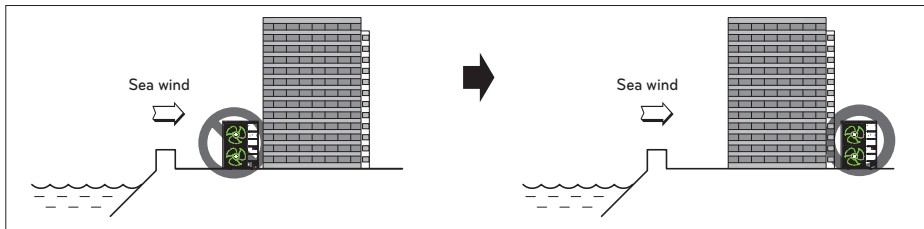
## Installation at Seaside

### ! CAUTION

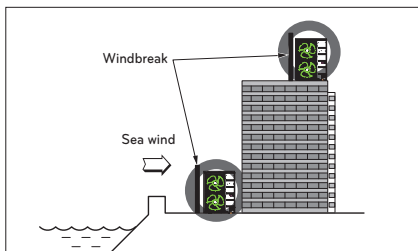
- Unit should not be installed in areas where corrosive gases, such as acid or alkaline gas, are produced.
- Do not install the product where it could be exposed to sea wind (salty wind) directly. It can result corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient performance.
- If outdoor unit is installed close to the seaside, it should avoid direct exposure to the sea wind. Otherwise it needs additional anti-corrosion treatment on the heat exchanger.

### Selecting the location(Outdoor Unit)

- If the outdoor unit is to be installed close to the seaside, direct exposure to the sea wind should be avoided. Install the outdoor unit on the opposite side of the sea wind direction.



- In case, to install the outdoor unit on the seaside, set up a windbreak not to be exposed to the sea wind.



- It should be strong enough like concrete to prevent the sea wind from the sea.
- The height and width should be more than 150% of the outdoor unit.
- It should be keep more than 700 mm of space between outdoor unit and the windbreak for easy air flow.

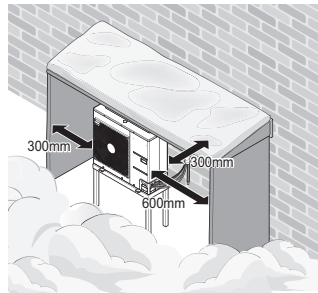
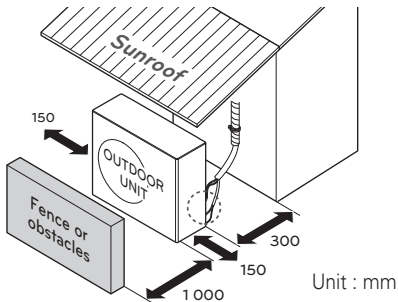
- Select a well-drained place.  
Periodic (more than once/year) cleaning of the dust or salt particles stuck on the heat exchanger by using water.
- If you can't meet above guide line in the seaside installation, please contact your supplier for the additional anti-corrosion treatment.



## Seasonal Wind and Cautions in Winter

In areas with low ambient temperature, high humidity, or heavy snowfall, particular measures are required to ensure that the unit operates properly.

- Install the unit so that it does not come into direct contact with snow. If snow accumulates and freezes in the air inlet, the system may malfunction. When installing in an area with heavy snowfall, attach the hood to the system.
- Install the suction and discharge ducts to prevent the entry of snowfall or rainfall.
- When installing in an area with heavy snowfall, install it on an installation console which is 500mm higher than the average snowfall (annual average snowfall).
- The height of the H frame must be at least twice the amount of snowfall and its width must not exceed the width of the unit. (Snow may accumulate if the width of the frame is wider than the width of the unit.)
- If condensed water from the outdoor unit freezes around the product, the floor/ground may become slippery and cause an accident, so do not install the outdoor unit near a sidewalk. If it is unavoidable, install a water channel or drainage pipe to prevent condensed water from flowing onto the sidewalk.
- If more than 100mm of snow has accumulated on the top of the product, be sure to remove the snow before carrying out any work on the unit.
- Do not install the inlet or outlet of the unit so that they face seasonal winds.
- Make preparations for snow and/or seasonal winter winds in all areas in which the unit is installed.



# INSTALLATION OF INDOOR UNIT

The indoor unit of **THERMAV** is installed inside where terminal of under floor water pipe cycle and refrigerant pipe from the outdoor unit are accessible at the same time.

In this chapter conditions for installation place is described. In addition, considerations when installing accessories or 3<sup>rd</sup> party accessories are described, too.

## Conditions where Indoor Unit is Installed

Specific conditions are required for installation place such as service space, condensate drainage, water pipe length and height, total volume of water, adjusting expansion vessel, and water quality.

### General Considerations

Followings are should be considered before the installation of the indoor unit.

- The installation place should be free from outdoor weather conditions such as rain, snow, wind, frost, etc.
- Choose the place where is water-resistant or good drainage.
- Service space should be secured.
- No flammable materials around the indoor unit.
- Mice can not be appeared to prevent entering the indoor unit or attacking wires.
- Do not place anything in front of the indoor unit to ensure air circulation around the indoor unit.
- Do not locate anything under the indoor unit to be free from unexpected water out.
- In case of water pressure increasing to 3 bar or tank pressure increasing to 10 bar, water drainage should be treated when water is drained by safety valve.



### WARNING

Do not block the venting openings on the backside of the unit!



### CAUTION

The device must not be installed under pipelines because there is a possibility of condensate forming. Ingress of water condensate can cause disturbances in the operation.

### NOTICE

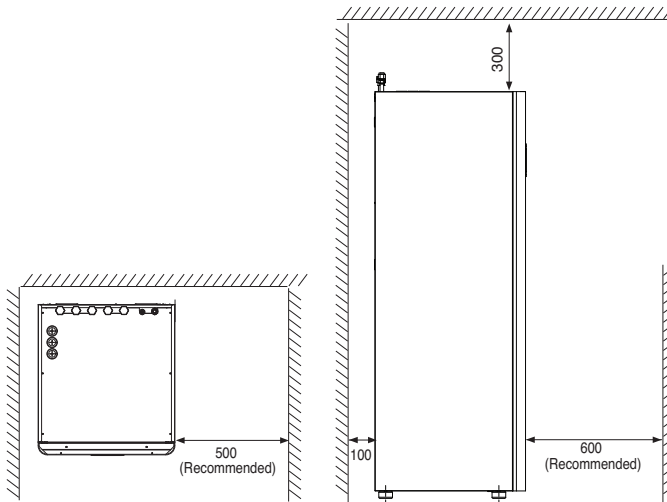
The installation location of the indoor unit must be dry and in the temperature range between +10 °C and 40 °C, for a short period (up to 24h) also up to 55 °C.

### Service Space

- Ensure that the spaces indicated by arrows around front, right, and top side.
- Wider spaces are preferred for easy maintenance and piping.
- If minimum service space is not secured, air circulation can be troubled and internal parts of the indoor unit can be damaged by overheating.

### NOTE

- Provide enough space for servicing and air circulation. The unit is designed to allow servicing from front side. However, if it becomes necessary to replace components, a service area of approximately 500 mm on the right side, makes the task much easier.

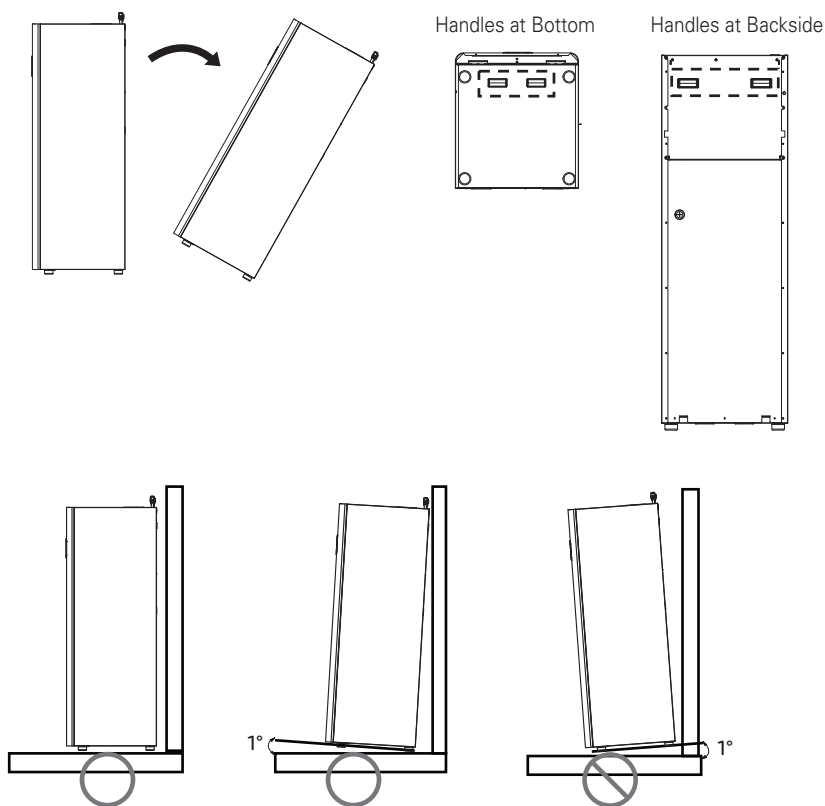


Minimum service space  
(unit : mm)

## Transporting the Unit

### ! CAUTION

- The device must be transported with transport devices.
- Secure the device during transport to prevent damage.
- The device must not be stacked and other objects must not be placed on it.
- Appropriate transport equipment must be used for installing the device. Safety regulations and good practice have to be applied.
- When lifting the unit, use the dedicated carrying handles at bottom and backside of the product
- Tilt over the unit carefully with at least two persons
- Do not tilt the unit forwards (because of drainage)



## Connecting Condensate drainage

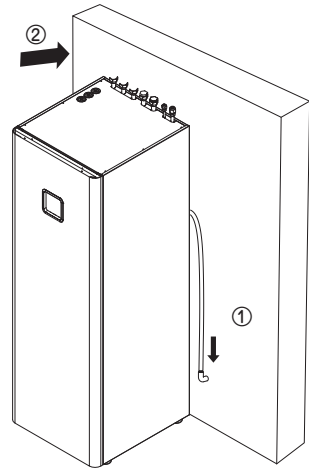
**Step 1.** Before the indoor unit's final positioning, Insert the drainage hose into the drain ①, which leads to the sinkhole or storm drain. Seal the gap with a suitable gasket.

**Step 2.** Then push the appliance to the wall ②.

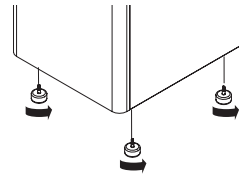


### CAUTION

- Attaching the hose for the condensate drain to the sewer hose can cause corrosion of the appliance's internal components.
- The drain pipe must have an odor trap!



**Step 3.** Before connecting any pipes, level the indoor unit with supplied adjustable levelling feet.

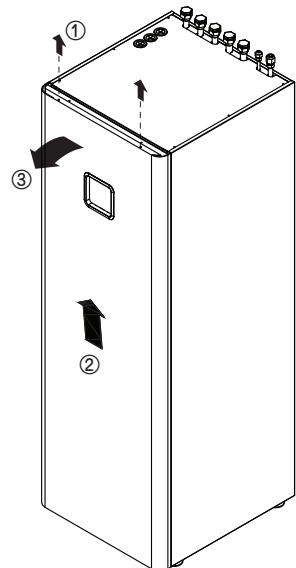
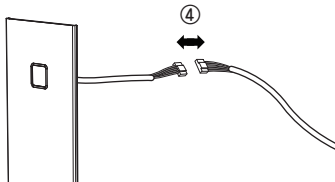


## Front Panel Removal

**Step 1.** After releasing screws from the top the Indoor unit, detach front panel ①.

**Step 2.** Lift the front panel ② and tilt it towards you ③ for opening

**Step 3.** Before taking front panel off completely, disconnect the cable of the remote controller ④.

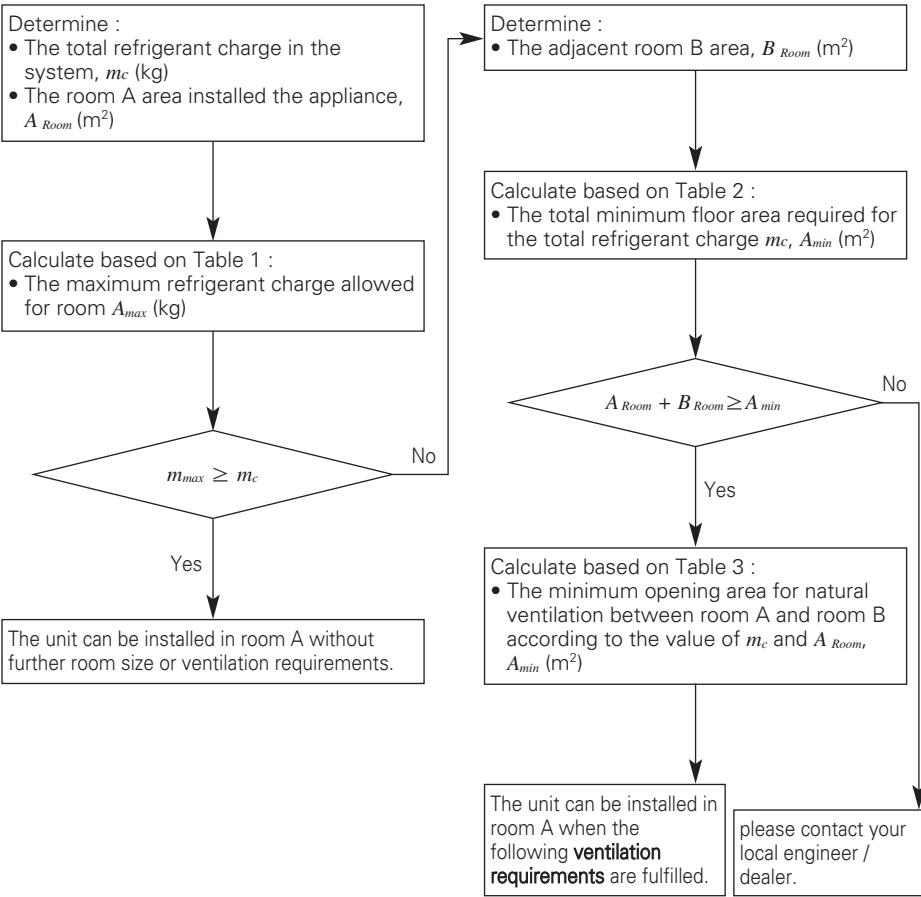
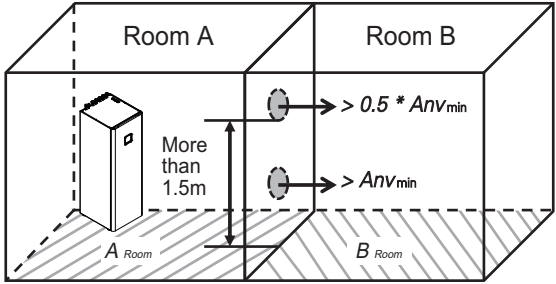


### CAUTION

After installation is completed, reconnect the cable of remote controller.

## Floor area requirement : Indoor unit

- If the total refrigerant charge ( $m_c$ ) is in system  $\geq 1.842$  kg, additional minimum floor area requirements is complied in the following flow chart.



## Ventilation requirements

- Two ventilation openings, one at bottom, another at top, for ventilation purposes are made between room A and room B.
- Bottom opening :
  - Must comply to the minimum area requirement of  $Anv_{min}$ .
  - Opening must be located 300mm from the floor.
  - At least 50% of required opening area must be 200mm from the floor.
  - The bottom of the opening shall not be higher than the point of release when the unit is installed and must be situated 100mm above the floor.
  - Must be as close as possible to the floor and lower than  $h_0$ .  
( $h_0$ =Installation height, The value of  $h_0$  in this unit is considered as 1.2m)
- Top opening :
  - The total size of the Top opening must be more than 50% of  $Anv_{min}$
  - Opening must be located 1500mm above the floor.
- The height of the openings between the wall and floor which connect the rooms are not less than 20 mm.
- Ventilation openings to the outside are NOT considered suitable ventilation openings (the user can block them when it is cold).

Table 1 - Maximum refrigerant charge allowed in a room

| $A_{room}$ (m <sup>2</sup> ) | Maximum refrigerant charge in a room $m_{max}$ (kg) |
|------------------------------|-----------------------------------------------------|
|                              | Based on $h_0$ 1.2 m                                |
| 1                            | 0.28                                                |
| 2                            | 0.55                                                |
| 3                            | 0.83                                                |
| 4                            | 1.11                                                |
| 5                            | 1.38                                                |
| 6                            | 1.66                                                |
| 7                            | 1.81                                                |
| 8                            | 1.94                                                |
| 9                            | 2.06                                                |
| 10                           | 2.17                                                |
| 11                           | 2.27                                                |
| 12                           | 2.37                                                |
| 13                           | 2.47                                                |
| 14                           | 2.57                                                |
| 15                           | 2.66                                                |
| 16                           | 2.74                                                |
| 17                           | 2.83                                                |
| 18                           | 2.91                                                |
| 19                           | 2.99                                                |
| 20                           | 3.07                                                |
| 21                           | 3.14                                                |

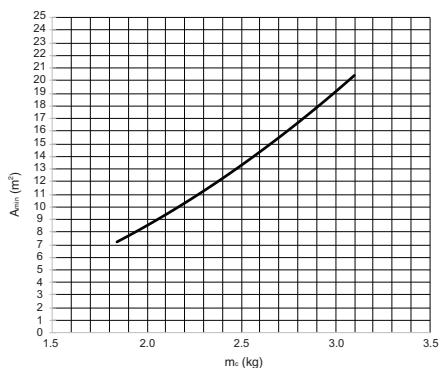
### NOTE

- The value of "Release height ( $h_0$ )" in this unit is considered 1200 mm to comply to IEC 60335-2-40:2013 A1 2016 Clause GG2.
- For intermediate  $A_{room}$  values, the value that corresponds to the lower  $A_{room}$  value from the table is considered. (If  $A_{room}=10.5$  m<sup>2</sup>, consider the value that corresponds to  $A_{room}=10$  m<sup>2</sup>.)

Table 2 - Minimum floor area

| Total Ref.<br>Amount $m_c$ (kg) | Minimum Floor Area $A_{min}$ (m <sup>2</sup> )<br>Based on $h_0$ 1.2 m |
|---------------------------------|------------------------------------------------------------------------|
| 1.84                            | 7.20                                                                   |
| 1.86                            | 7.36                                                                   |
| 1.88                            | 7.52                                                                   |
| 1.90                            | 7.68                                                                   |
| 1.92                            | 7.84                                                                   |
| 1.94                            | 8.01                                                                   |
| 1.96                            | 8.17                                                                   |
| 1.98                            | 8.34                                                                   |
| 2.00                            | 8.51                                                                   |
| 2.02                            | 8.68                                                                   |
| 2.04                            | 8.85                                                                   |
| 2.06                            | 9.03                                                                   |
| 2.08                            | 9.21                                                                   |
| 2.10                            | 9.38                                                                   |
| 2.12                            | 9.56                                                                   |
| 2.14                            | 9.74                                                                   |
| 2.16                            | 9.93                                                                   |
| 2.18                            | 10.11                                                                  |
| 2.20                            | 10.30                                                                  |
| 2.22                            | 10.49                                                                  |
| 2.24                            | 10.68                                                                  |
| 2.26                            | 10.87                                                                  |
| 2.28                            | 11.06                                                                  |
| 2.30                            | 11.26                                                                  |
| 2.32                            | 11.45                                                                  |
| 2.34                            | 11.65                                                                  |
| 2.36                            | 11.85                                                                  |
| 2.38                            | 12.05                                                                  |
| 2.40                            | 12.26                                                                  |
| 2.42                            | 12.46                                                                  |
| 2.44                            | 12.67                                                                  |
| 2.46                            | 12.88                                                                  |
| 2.48                            | 13.09                                                                  |
| 2.50                            | 13.30                                                                  |
| 2.52                            | 13.51                                                                  |
| 2.54                            | 13.73                                                                  |
| 2.56                            | 13.94                                                                  |
| 2.58                            | 14.16                                                                  |
| 2.60                            | 14.38                                                                  |
| 2.62                            | 14.61                                                                  |
| 2.64                            | 14.83                                                                  |
| 2.66                            | 15.05                                                                  |
| 2.68                            | 15.28                                                                  |
| 2.70                            | 15.51                                                                  |
| 2.72                            | 15.74                                                                  |
| 2.74                            | 15.97                                                                  |
| 2.76                            | 16.21                                                                  |

| Total Ref.<br>Amount $m_c$ (kg) | Minimum Floor Area $A_{min}$ (m <sup>2</sup> )<br>Based on $h_0$ 1.2 m |
|---------------------------------|------------------------------------------------------------------------|
| 2.78                            | 16.44                                                                  |
| 2.80                            | 16.68                                                                  |
| 2.82                            | 16.92                                                                  |
| 2.84                            | 17.16                                                                  |
| 2.86                            | 17.40                                                                  |
| 2.88                            | 17.65                                                                  |
| 2.90                            | 17.89                                                                  |
| 2.92                            | 18.14                                                                  |
| 2.94                            | 18.39                                                                  |
| 2.96                            | 18.64                                                                  |
| 2.98                            | 18.89                                                                  |
| 3.00                            | 19.15                                                                  |
| 3.02                            | 19.41                                                                  |
| 3.04                            | 19.66                                                                  |
| 3.06                            | 19.92                                                                  |
| 3.08                            | 20.18                                                                  |
| 3.10                            | 20.45                                                                  |

**NOTE**

- The value of "Release height ( $h_0$ )" in this unit is considered 1200 mm to comply to IEC 60335-2-40:2013 A1 2016 Clause GG2.
- For intermediate  $m_c$  values, the value that corresponds to the higher  $m_c$  value from the table is considered.  
(If  $m_c = 1.85$  kg, the value that corresponds to  $m_c = 1.86$  kg is considered.)
- Systems with total refrigerant charge lower than 1.84 kg are not subjected to any room area requirements.
- Charges above 3.10 kg are not allowed in the unit.



Table 3 - Minimum venting opening area for natural ventilation

| A <sub>room</sub><br>(m <sup>2</sup> ) | Minimum opening area A <sub>nv,min</sub> (cm <sup>2</sup> ) (Based on h <sub>0</sub> 1.2 m) |     |     |     |     |     |     |     |     |     |     |     |     |  |
|----------------------------------------|---------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
|                                        | Total Ref. Amount m <sub>c</sub> (kg)                                                       |     |     |     |     |     |     |     |     |     |     |     |     |  |
|                                        | 3.1                                                                                         | 3.0 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 |  |
| 1                                      | 808                                                                                         | 779 | 751 | 722 | 693 | 665 | 636 | 607 | 579 | 550 | 522 | 493 | 464 |  |
| 2                                      | 729                                                                                         | 700 | 671 | 643 | 614 | 586 | 557 | 528 | 500 | 471 | 443 | 414 | 385 |  |
| 3                                      | 650                                                                                         | 621 | 592 | 564 | 535 | 507 | 478 | 449 | 421 | 392 | 364 | 335 | 306 |  |
| 4                                      | 571                                                                                         | 542 | 513 | 485 | 456 | 428 | 399 | 370 | 342 | 313 | 285 | 256 | 227 |  |
| 5                                      | 492                                                                                         | 463 | 434 | 406 | 377 | 349 | 320 | 291 | 263 | 234 | 206 | 177 | 148 |  |
| 6                                      | 413                                                                                         | 384 | 355 | 327 | 298 | 270 | 241 | 212 | 184 | 155 | 126 | 98  | 69  |  |
| 7                                      | 380                                                                                         | 350 | 321 | 291 | 262 | 232 | 203 | 173 | 144 | 114 | 85  | 55  | 25  |  |
| 8                                      | 355                                                                                         | 324 | 293 | 263 | 232 | 202 | 171 | 141 | 110 | 80  | 49  | 19  |     |  |
| 9                                      | 328                                                                                         | 297 | 265 | 234 | 202 | 171 | 139 | 108 | 77  | 45  | 14  |     |     |  |
| 10                                     | 301                                                                                         | 269 | 236 | 204 | 172 | 140 | 107 | 75  | 43  | 10  |     |     |     |  |
| 11                                     | 273                                                                                         | 240 | 207 | 174 | 141 | 108 | 75  | 42  | 9   |     |     |     |     |  |
| 12                                     | 245                                                                                         | 211 | 177 | 144 | 110 | 76  | 42  | 9   |     |     |     |     |     |  |
| 13                                     | 217                                                                                         | 182 | 148 | 113 | 79  | 44  | 10  |     |     |     |     |     |     |  |
| 14                                     | 188                                                                                         | 153 | 118 | 83  | 47  | 12  |     |     |     |     |     |     |     |  |
| 15                                     | 159                                                                                         | 123 | 88  | 52  | 16  |     |     |     |     |     |     |     |     |  |
| 16                                     | 130                                                                                         | 94  | 57  | 21  |     |     |     |     |     |     |     |     |     |  |
| 17                                     | 101                                                                                         | 64  | 27  |     |     |     |     |     |     |     |     |     |     |  |
| 18                                     | 72                                                                                          | 34  |     |     |     |     |     |     |     |     |     |     |     |  |
| 19                                     | 42                                                                                          | 4   |     |     |     |     |     |     |     |     |     |     |     |  |
| 20                                     | 13                                                                                          |     |     |     |     |     |     |     |     |     |     |     |     |  |

## NOTE

- The value of "Release height (h<sub>0</sub>)" in this unit is considered 1200 mm to comply to IEC 60335-2-40:2013 A1 2016 Clause GG2.
- For intermediate A<sub>room</sub> values, the value that corresponds to the lower A<sub>room</sub> value from the table is considered. (If A<sub>room</sub>=10.5 m<sup>2</sup>, consider the value that corresponds to A<sub>room</sub>=10 m<sup>2</sup>.)
- For intermediate m<sub>c</sub> values, the value that corresponds to the higher m<sub>c</sub> value from the table is considered. (If m<sub>c</sub> = 2.15 kg, the value that corresponds to m<sub>c</sub> = 2.2 kg is considered.)

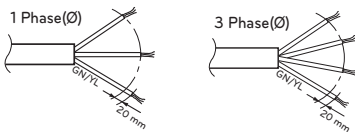
# Electrical Wiring

Two kind of cables should be connected to the outdoor unit : One is 'Power cable', the other one is 'Connecting cable'. Power cable is a cable which is used to supply external electricity to the outdoor unit. This cable is generally connected between external power source (such as main electric power distribution panel of user's house) and the outdoor unit. Connecting cable is, on the other hand, used to connect between the outdoor unit and the indoor unit to supply electric power to the indoor unit and to establish the communication between the outdoor unit and the indoor unit.

Procedure for wiring to the outdoor unit is four steps. Before starting wiring, check if wire specification is suitable and read following directions and cautions VERY carefully.

## CAUTION

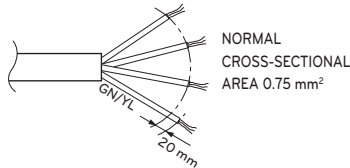
The power cord connected to the outdoor unit should be complied with IEC 60245 or HD 22.4 S4 (This equipment shall be provided with a cord set complying with the national regulation.)



### NORMAL CROSS-SECTIONAL AREA

| Model Name |               | Area (mm <sup>2</sup> ) | Cable Type |
|------------|---------------|-------------------------|------------|
| Phase (Ø)  | Capacity (kW) |                         |            |
| 1          | 4             | 2.5                     | H07RN-F    |
|            | 6             |                         |            |

The connecting cable connected to the outdoor unit should be complied with IEC 60245 or HD 22.4 S4 (This equipment shall be provided with a cord set complying with the national regulation.)



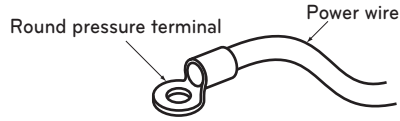
When the connection line between the indoor unit and outdoor unit is over 40 m, connect the telecommunication line and power line separately.

In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

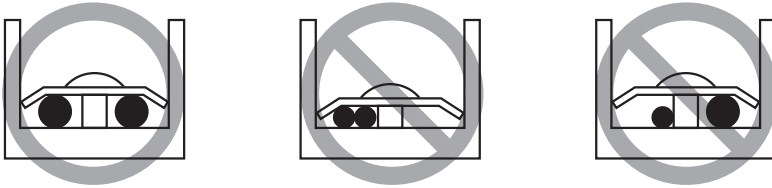
### Precautions when laying power wiring

Use round pressure terminals for connections to the power terminal block.



When none are available, follow the instructions below.

- Do not connect wiring of different thicknesses to the power terminal block. (Slack in the power wiring may cause abnormal heat.)
- When connecting wiring which is the same thickness, do as shown in the figure below.



- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal block.
- 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.

### WARNING

Make sure that the screws of the terminal are free from looseness.

### Point for attention regarding quality of the public electric power supply

- European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current  $\leq 75$  A.
  - European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current  $\leq 16$  A of  $> 75$  A per phase.
- 
- This equipment complies with IEC (EN) 61000-3-2.
  - This equipment complies with IEC (EN) 61000-3-3.

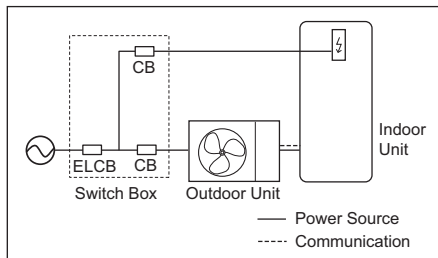
### Circuit Breaker Specification

Perform the electrical wiring work according to the electrical wiring connection.

- All wiring must comply with local requirements.
- Select a power source that is capable of supplying the current required by the unit.
- Use a recognized ELCB(Electric Leakage Circuit Breaker) between the power source and the unit. A disconnection device to adequately disconnect all supply lines must be fitted.
- Model of circuit breaker recommended by authorized personnel only

\*Pipes and wires should be purchased separately for installation of the product.

When the electrical phase of outdoor unit and heater is same



| Type  | Capacity [kW] | Phase [Ø] | Area [mm <sup>2</sup> ] | CB (A) |
|-------|---------------|-----------|-------------------------|--------|
| Split | 4             | 1         | 2.5                     | 16     |
|       | 6             |           |                         | 20     |

| Type            | Capacity [kW] | Phase [Ø] | Area [mm <sup>2</sup> ] | Maximum Current [A] |
|-----------------|---------------|-----------|-------------------------|---------------------|
| Electric Heater | 3             | 1         | 2.5                     | 13.0                |

# PIPING AND WIRING FOR OUTDOOR UNIT

Procedures about refrigerant piping, water piping and electric wiring at the outdoor are described in this chapter. Most of procedures are similar to those of LG Air Conditioner.

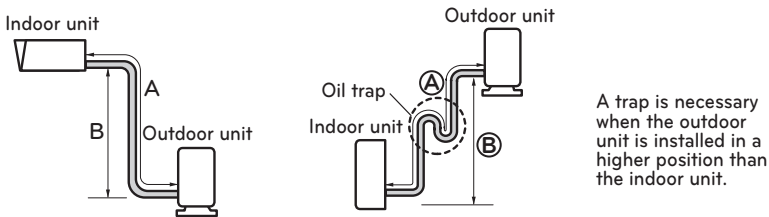
\*Pipes and wires should be purchased separately for installation of the product.

## Refrigerant Piping

Before starting refrigerant piping, constraints in pipe length and elevation should be examined. After resolving all constraints, some preparations are required to proceed. Then connecting pipe to the outdoor and the indoor unit is beginning.

### Constraints in Pipe Length and Elevation

| Refrigerant | Capacity (kW) | Pipe Diameter [mm(inch)] |            | Length A (m) |      | Elevation B (m) | Additional Refrigerant (g/m) |
|-------------|---------------|--------------------------|------------|--------------|------|-----------------|------------------------------|
|             |               | Gas                      | Liquid     | Standard     | Max. | Max.            |                              |
| R32         | 4/6           | 12.7(1/2")               | 6.35(1/4") | 5            | 30   | 30              | 20<br>(longer than 10m)      |



## CAUTION

- If the pipe length is longer than 10 m, additional charge of the refrigerant is required according to the table.  
- Example : If R32 6 kW model is installed at a distance of 30 m,  
400 g of refrigerant should be added according to following formula :  
 $(30-10) \times 20 \text{ g} = 400 \text{ g}$
- Rated capacity of the product is based on standard length and maximum allowable length is based on the product reliability in the operation.
- Improper refrigerant charge may result in abnormal operation.
- Oil trap should be installed every 10 meters, when the outdoor unit is installed in a higher position than the indoor unit.
- Installing a refrigerant pipe that is shorter than the standard length may result in noise or abnormal operation of the product.

## NOTE

Fill in the f-gas Label attached on outdoor about the quantity of the fluorinated greenhouse gases (This note about f-gas label may not apply depending on your product type or market.)

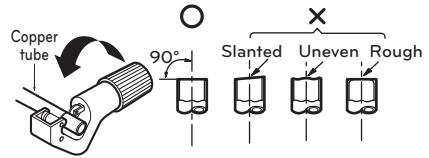
- Manufacturing site (See Model Name label)
- Installation site (If possible being placed adjacent to the service points for the addition or removal of refrigerant)
- The total Charge (① + ②)

## Preparation for Piping

- Main cause of gas leakage is defect in flaring work. Carry out correct flaring work in the following procedure.
- Use the de-oxidised copper as piping materials to install.

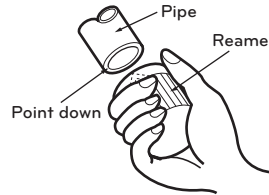
### Step 1. Cut the pipes and the cable.

- Use the accessory piping kit or the pipes purchased locally.
- Measure the distance between the indoor unit and the outdoor unit.
- Cut the pipes a little longer than measured distance.
- Cut the cable 1.5 m longer than the pipe length.



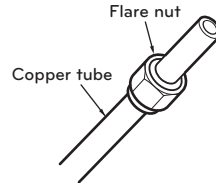
### Step 2. Burrs removal

- Completely remove all burrs from the cut cross section of pipe/tube.
- Put the end of the copper tube/pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the tubing.



### Step 3. Putting nut on

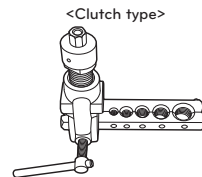
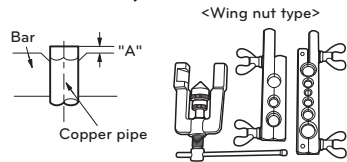
- Remove flare nuts attached to indoor and outdoor units, then put them on pipe/tube having completed burr removal. (Not possible to put them on after flaring work)



### Step 4. Flaring work.

- Carry out flaring work using dedicated flaring tool for R-410A refrigerant as shown below.

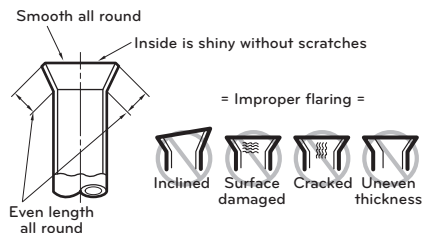
| Pipe diameter<br>[inch(mm)] | A inch (mm)        |                   |
|-----------------------------|--------------------|-------------------|
|                             | Wing nut type      | Clutch type       |
| 1/4 (6.35)                  | 0.04~0.05(1.1~1.3) | 0~0.02<br>(0~0.5) |
| 3/8 (9.52)                  | 0.06~0.07(1.5~1.7) |                   |
| 1/2 (12.7)                  | 0.06~0.07(1.6~1.8) |                   |
| 5/8 (15.88)                 | 0.06~0.07(1.6~1.8) |                   |
| 3/4 (19.05)                 | 0.07~0.08(1.9~2.1) |                   |



- Firmly hold copper tube in a bar(or die) as indicated dimension in the table above.

### Step 5. Check

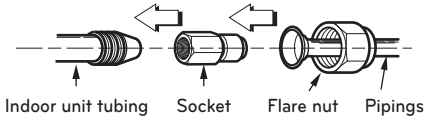
- Compare the flared work with right figure.
- If flare is seemed to be defective, cut off the flared section and do flaring work again.



## Connecting Pipe to Indoor Unit

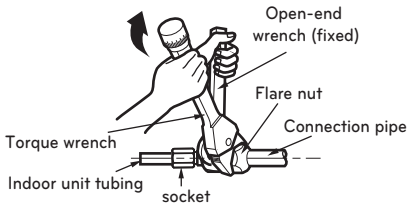
### Step 1. Pre-tightening.

- Align the center of the pipes and sufficiently tighten the socket and the flare nut by hand.



### Step 2. Tightening.

- Tighten the socket and the flare nut with a wrench.
- Tightening torque is as following.



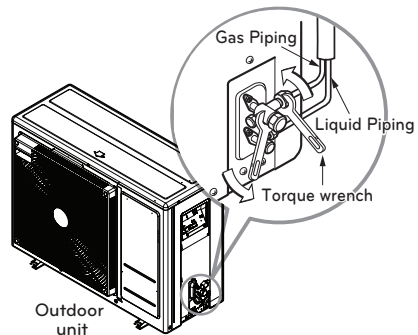
| Outside diameter [mm(inch)] | Torque [kgf·m] |
|-----------------------------|----------------|
| 6.35 (1/4)                  | 1.8 ~ 2.5      |
| 9.52 (3/8)                  | 3.4 ~ 4.2      |
| 12.7 (1/2)                  | 5.5 ~ 6.6      |
| 15.88 (5/8)                 | 6.6 ~ 8.2      |
| 19.05 (3/4)                 | 9.9 ~ 12.1     |

## Connecting Pipe to Outdoor Unit

### Step 1. Tightening

- Align the center of the pipes and sufficiently tighten the flare nut by hand.
- Tighten the flare nut with a wrench until the wrench clicks.
- Tightening torque is as following.

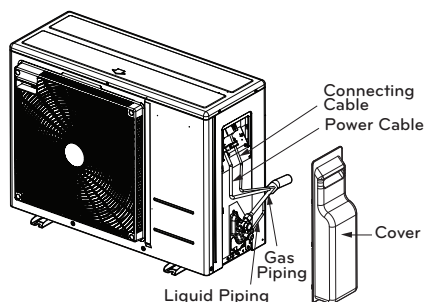
| Outside diameter [mm(inch)] | Torque [kgf·m] |
|-----------------------------|----------------|
| 6.35 (1/4)                  | 1.8 ~ 2.5      |
| 9.52 (3/8)                  | 3.4 ~ 4.2      |
| 12.7 (1/2)                  | 5.5 ~ 6.6      |
| 15.88 (5/8)                 | 6.6 ~ 8.2      |
| 19.05 (3/4)                 | 9.9 ~ 12.1     |



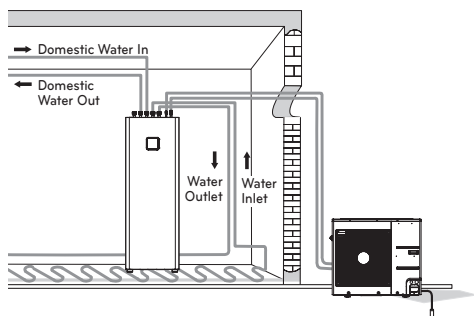
### Step 2. Preventing entering of foreign objects

- If insects or small animals enter the outdoor unit, it may cause a short circuit in the electrical box.
- Finally, form the pipes by wrapping the connecting portion of the indoor unit with insulation material and secure it with two kinds of vinyl tape. Ensuring thermal insulation is very important.

## Wiring Procedure for Power Cable and Connecting Cable



- Step 1.** Disassemble the cover from the outdoor unit by loosening screws.
- Step 2.** Connect Power cable to Main Power Terminal and Connecting cable to Control Terminal, respectively. See below figure for detailed information. When connecting earth cable, the diameter of cable should be bigger than  $2.5 \text{ mm}^2$  to secure safety. The earth cable is connected to the terminal block where earth symbol  $\oplus$  is marked.
- Step 3.** Use cable clamps (or cord clamps) to prevent unintended move of Power cable and Connecting cable.
- Step 4.** Reassemble the cover to the outdoor unit by fastening screws.



## CAUTION

After checking and confirming following conditions, start wiring work.

- Secure dedicated power source for the Air-to-Water heat pump. The wiring diagram (attached inside the control box of the indoor unit) is presenting related information.
- Provide a circuit breaker switch between power source and the outdoor unit.
- Although it is very rare case, sometimes the screws used to fasten internal wires can be loosen due to the vibration while product transportation. Check these screws and make it sure if they are all fastened tightly. If not tightened, burn-out of the wire can be occurred.
- Check the specification of power source such as phase, voltage, frequency, etc.
- Confirm that electrical capacity is sufficient.
- Be sure that the starting voltage is maintained at more than 90 percent of the rated voltage marked on the name plate.
- Confirm that the cable thickness is as specified in the power sources specification. (Particularly note the relation between cable length and thickness.)
- Provide an ELB (electric leakage breaker) when the installation place is wet or moist.
- The following troubles would be caused by abnormal voltage supply such as sudden voltage increasing or voltage drop-down.
  - Chattering of a magnetic switch. (frequent on and off operation.)
  - Physical damage of parts where magnetic switch is contacted.
  - Break of fuse.
  - Malfunction of overload protection parts or related control algorithms.
  - Failure of compressor start up.
- Ground wire to ground outdoor unit to prevent electrical shock.





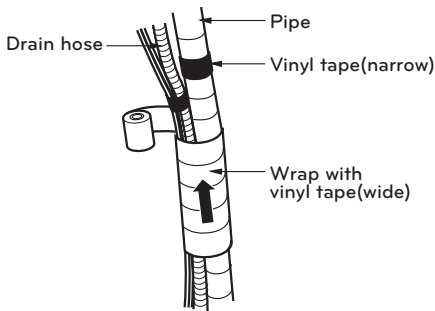
## CAUTION

The Power cord connected to the unit should be selected according to the following specifications.

## Finalizing

After pipes are connected and electric cables are wired, pipe forming and some tests are remained. Especially, careful attention is required while proceeding leakage test because the leakage of the refrigerant effects degrade of performance directly. Also, it is very hard to find leaked point after all installation procedures are finished.

### Pipe Forming

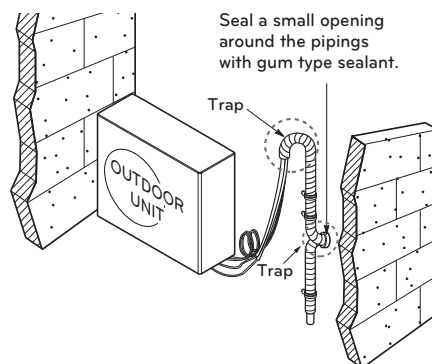
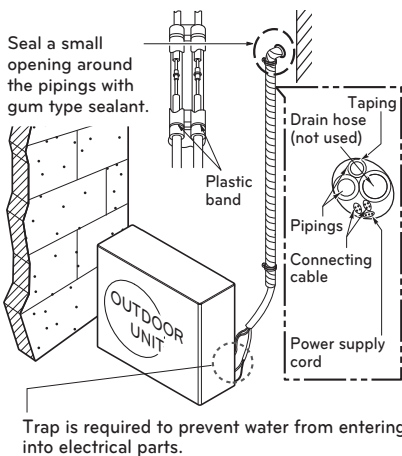


Do pipe forming by wrapping the connecting cable and refrigerant pipe (between the indoor unit and outdoor unit) with thermal insulation material and secure it with two kinds of vinyl tape.

- Tape the refrigerant pipe, power cable and connecting cable from down to up.
- Secure the taped pipe is along with the exterior wall. Form a trap to prevent water entering the room and electrical part.
- Fix the taped pipe onto the wall by saddle or equivalent.

### Taping Procedure

- Tape the pipes, connecting cable and power cable from down to up. If taping direction is up to down, rain drop may be sinking into the pipes or cables.
- Secure the taped pipe along the exterior wall using saddle or equivalent.
- Trap is required to prevent water from entering into electrical parts.



## Leakage test and Evacuation

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below.

- Pressure in the system rises.
- Operating current rises.
- Cooling(or heating) efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigeration system.

Therefore, the indoor/outdoor unit and connecting tube must be checked for leak tight, and vacuumed to remove incondensable gas and moisture in the system.

### Preparation

- Check that each tube(both liquid and gas side tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the service valve caps from both the gas and the liquid side on the outdoor unit. Check that both the liquid and the gas side service valves on the outdoor unit are kept closed at this stage.

### Leakage test

- Connect the manifold valve(with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.



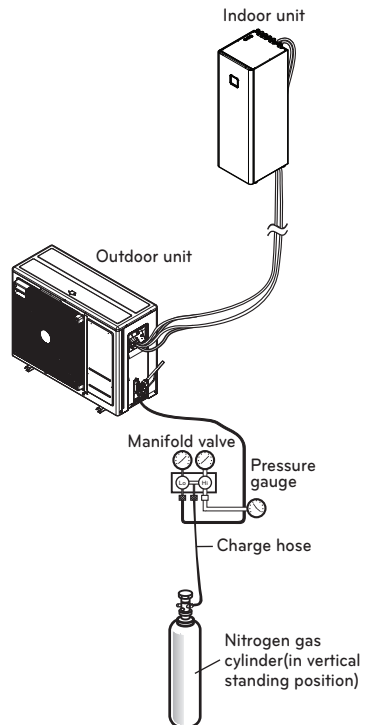
## CAUTION

**Be sure to use a manifold valve for leakage test. If it is not available, use a stop valve for this purpose. The "Hi" knob of the manifold valve must always be kept close.**

- Pressurize the system to no more than 3.0 MPa with dry nitrogen gas and close the cylinder valve when the gauge reading reached 3.0 MPa Next, test for leaks with liquid soap.

**To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than its bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position.**

- Do a leakage test of all joints of the tubing(both indoor and outdoor) and both gas and liquid side service valves. Bubbles indicate a leak. Be sure to wipe off the soap with a clean cloth
- After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.



## Evacuation

- Connect the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit. Confirm the "Lo and Hi" knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with tubing length and capacity of the pump. The following table shows the time required for evacuation.

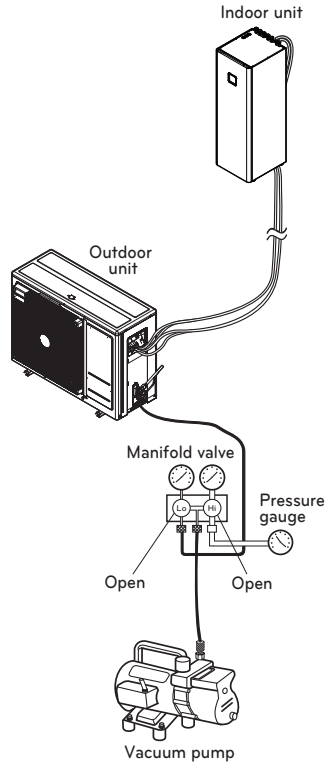
| Required time for evacuation when 30 gal/h vacuum pump is used |                                             |
|----------------------------------------------------------------|---------------------------------------------|
| If tubing length is less than 10 m(33 ft)                      | If tubing length is longer than 10 m(33 ft) |
| 30 min. or more                                                | 60 min. or more                             |
| 0.8 torr or less                                               |                                             |

- When the desired vacuum is reached, close the "Lo and Hi" knob of the manifold valve and stop the vacuum pump.

## Finishing the job

- With a service valve wrench, turn the valve stem of liquid side valve counter-clockwise to fully open the valve.
- Turn the valve stem of gas side valve counter-clockwise to fully open the valve.
- Loosen the charge hose connected to the gas side service port slightly to release the pressure, then remove the hose.
- Replace the flare nut and its bonnet on the gas side service port and fasten the flare nut securely with an adjustable wrench. This process is very important to prevent leakage from the system.
- Replace the valve caps at both gas and liquid side service valves and fasten them tight. This completes air purging with a vacuum pump.

**THERMAV.** is now ready to test run.



## Electrical Wiring

### General Consideration

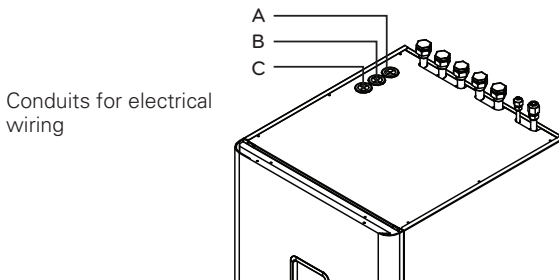
Followings are should be considered before beginning indoor unit wiring.

- Field-supplied electrical components such as power switches, circuit breakers, wires, terminal boxes, etc should be properly chosen with compliance with national electrical legislation or regulation.
- Make it sure that supplied electricity is enough to operate the product including outdoor unit, electric heater, water tank heater, etc. The capacity of fuse also selected according to the power consumption.
- The main electricity supply should be dedicated line. Sharing main electricity supply with other devices such as washing machine or vacuum cleaner is not permitted.



### CAUTION

- Before starting wiring job, the main electricity supply should be turned off until wiring is completed.
- When adjusting or changing wiring, the main electricity supply should be turned off and ground wire should be connected securely.
- Installation place should be free from the attack of wild animal. For example, mice's wire attacking or frog's entering into the indoor unit may cause critical electrical accident.
- All power connections should be protected from dew condensation by thermal insulation.
- All electrical wiring should comply with national or local electrical legislation or regulation.
- The ground should be connected exactly. Do not earth the product to the copper pipe, steel fence at the veranda, city water outlet pipe, or any other conductivity materials.
- Fix all cable using cord clamp tightly. (When cable is not fixed with cord clamp, use additionally supplied cable ties.)



Hole A : For High Voltage line (Wire which is connected to the terminal block of Heater Power)

Hole B : For AC line (Wire which is connected to the terminal block of the control box)

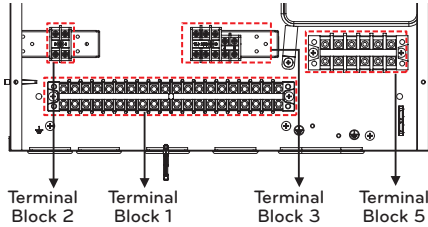
Hole C : For DC line (Wire which is connected to the PCB of the control box)

## Terminal Block Information

Symbols used below pictures are as follows :

- L, L1, L2 : Live (230 V AC)
- N : Neutral (230 V AC)
- BR : Brown, WH : White, BL : Blue, BK : Black

For 1Ø



### Terminal Block 1 ~ 3

Connection  
for 3rd Party  
controller  
(5 V DC)

|                                                       |       |
|-------------------------------------------------------|-------|
| 21(A)                                                 | 22(B) |
| 3rd PARTY CONTROLLER<br>3. PARTI KONTROLÖR<br>(5V DC) |       |

Connection for thermostat  
(230 V AC)  
Supporting type : Heating only or  
Heating/Cooling

|                                                                     |       |        |        |        |
|---------------------------------------------------------------------|-------|--------|--------|--------|
| 23(L)                                                               | 24(N) | 25(L1) | 26(L2) | 27(L3) |
| THERMOSTAT (Default : 230V AC)<br>THERMOSTAT (Varsayilan : 230V AC) |       |        |        |        |

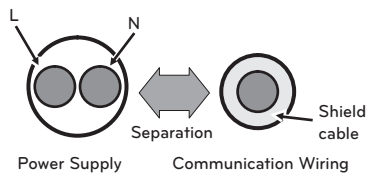
|   |   |                                                      |      |   |   |                                        |      |                       |        |       |    |    |    |                                                     |        |       |                                                      |          |       |
|---|---|------------------------------------------------------|------|---|---|----------------------------------------|------|-----------------------|--------|-------|----|----|----|-----------------------------------------------------|--------|-------|------------------------------------------------------|----------|-------|
| 1 | 2 | 3(L)                                                 | 4(N) | 5 | 6 | 7(L)                                   | 8(N) | 9(L1)                 | 10(L2) | 11(N) | 12 | 13 | 14 | 15(L1)                                              | 16(L2) | 17(N) | 18(1(L))                                             | 19(2(N)) | 20(3) |
|   |   | WATER PUMP<br>SU POMPASI<br>(C)                      |      |   |   | MIX PUMP<br>MIX POMPASI                |      | MIX VALVE<br>MIX VANA |        |       |    |    |    | 2WAY VALVE<br>2YÖLÜ VALF<br>(A)                     |        |       | OUTDOOR UNIT<br>DIŞ MEKAN ÜNİTESİ                    |          |       |
|   |   | Energizing<br>Water pump<br>For DHW<br>recirculation |      |   |   | Power supply<br>for 2nd<br>heating kit |      |                       |        |       |    |    |    | opening or closing<br>water flow<br>for FCU cooling |        |       | Power supply for<br>Indoor unit and<br>communication |          |       |

### Terminal Block 5

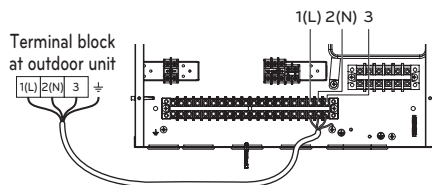
|                                                                |   |      |      |  |  |
|----------------------------------------------------------------|---|------|------|--|--|
| 1                                                              | 2 | 3(L) | 4(N) |  |  |
| POWER SUPPLY<br>(1 Ø, 220-240 V, 50 Hz)                        |   |      |      |  |  |
| connecting external electric power<br>supply for backup heater |   |      |      |  |  |

## CAUTION

You should separate the communication wiring, in case of communication wiring length is over 40 m.



## Connecting with Outdoor Unit

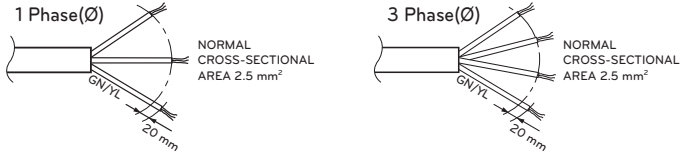


The feature may be changed according to the type of model.

## Backup Heater Wiring

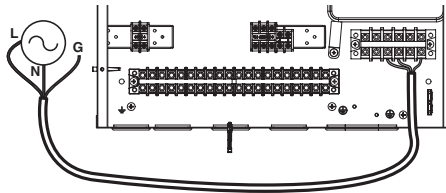
### CAUTION

**Power Cable Specification :** The power cord connected to the outdoor unit should be complied with IEC 60245 or HD 22.4 S4(Rubber insulated cord, type 60245 IEC 66 or H07RN-F)



If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

External power supply  
(same dedicated power supply for  
the indoor unit and outdoor unit)



## PIPING AND WIRING FOR INDOOR UNIT

Procedures about water piping and electric wiring at the indoor unit are described in this chapter. Water piping and water circuit connection, water charging, pipe insulations will be shown for water piping procedures. For wiring, terminal block connection, connecting with the outdoor unit, electric heater wiring will be introduced. Accessories connection, such as sanitary water tank, thermostat, 3way or 2way valves, etc will be dealt in separated chapter.

### Water Piping and Water Circuit Connection



#### CAUTION

##### General Considerations

Followings are should be considered before beginning water circuit connection.

- Service space should be secured.
- Water pipes and connections should be cleaned using water.
- Space for installing external water pump should be provided if internal water pump capacity is not enough for installation field.
- Never connect electric power while proceeding water charging.

Definition of terms are as follow :

- Water piping : Installing pipes where water is flowing inside the pipe.
- Water circuit connecting : Making connection between the product and water pipes or between pipes and pipes. Connecting valves or elbows are, for example, in this category.

Configuration of water circuit is shown in Chapter 2. All connections should be complied with presented diagram.

While installing water pipes, followings should be considered :

- While inserting or putting water pipes, close the end of the pipe with pipe cap to avoid dust entering.
- When cutting or welding the pipe, always be careful that inner section of the pipe should not be defective. For example, no weldments or no burrs are found inside the pipe.
- Drain piping should be provided in case of water discharge by the operation of the safety valve. This situation can be happened when the internal pressure is over 3.0 bar and water inside the indoor unit will be discharged to drain hose.

While connecting water pipes, followings should be considered.

- Pipe fittings (e.g. L-shape elbow, T-shape tee, diameter reducer, etc) should be tightened strongly to be free from water leakage.
- Connected sections should be leakage-proof treatment by applying teflon tape, rubber bushing, sealant solution, etc.
- Appropriate tools and tooling methods should be applied to prevent mechanical breakage of the connections.
- Operation time of flow control valve(e.g. 3way valve or 2way valve) should be less than 90 seconds.
- Drain hose should be connected with drain piping.
- Maximum allowable Torque at the water piping connection is 50 N·m
- Connect the water for filling or refilling the heating system as specified by EN 1717/EN 61770 to avoid contamination of drinking water by return flow.





## WARNING

### **Water condensation on the floor**

While cooling operation, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can be occurred on the floor.

If floor is in humid environment, do not set leaving water temperature below 18 °C.

### **Water condensation on the radiator**

While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred.

### **Drainage treatment**

While cooling operation, condensed dew can drop down to the bottom of the indoor unit. In this case, prepare drainage treatment (for example, vessel to contain condensed dew) to avoid water drop.

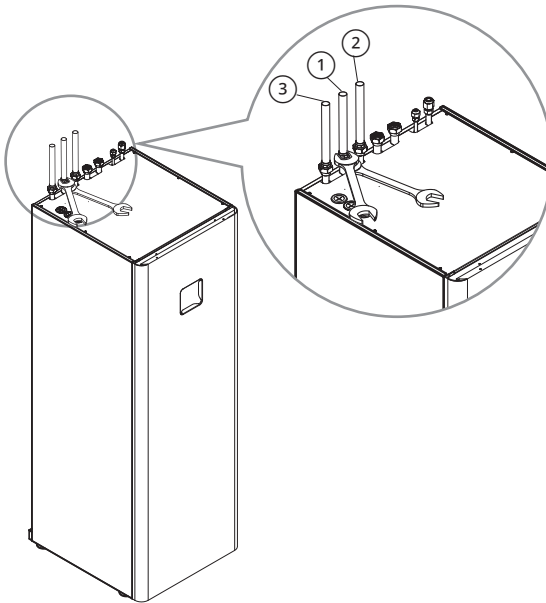
## Connection to the Domestic hot water system

The hydraulic connection has to be installed in accordance with the national and local regulations. For connecting DHW to enable the water flow in full force. To prevent water leakage, install a drain through the floor below the level of the device. The following picture shows the correct hydraulic connection of the device.

### Water Piping

Connect the hot water pipe ①, the cold water supply ② and optionally the re-circulation pipe ③ as shown below. If a re-circulation pipe is not used, close it with a 1" cap.

Use a counter wrench to tighten the connections firmly.

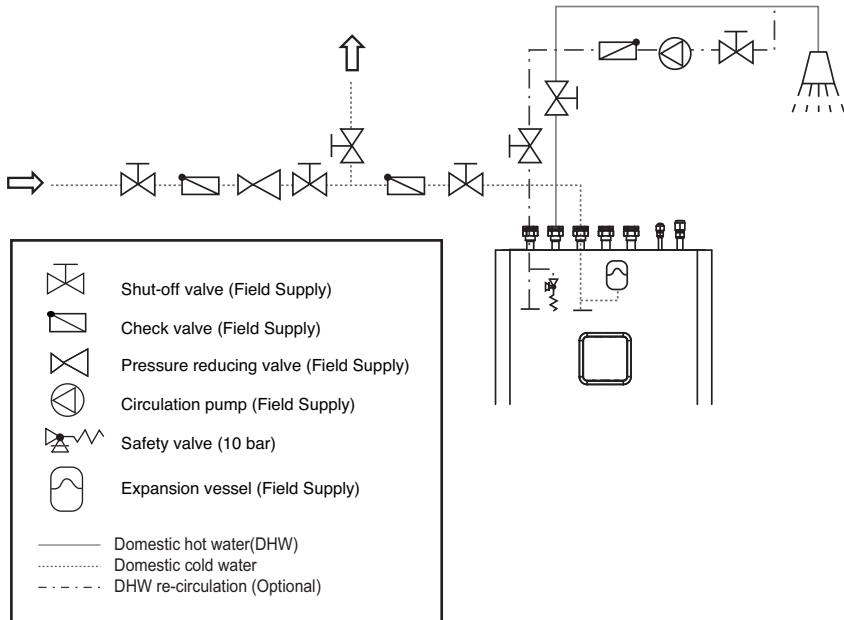


| No. | Connections                                 | Recommended tightening torque [N·m] |
|-----|---------------------------------------------|-------------------------------------|
| ①   | Domestic hot water outlet pipe (female G1") | 42 ± 2                              |
| ②   | Domestic cold water inlet pipe (female G1") |                                     |
| ③   | DHW recirculation pipe (female G1")         |                                     |

#### NOTE

Before connect domestic water pipes, use the provided gaskets(G1") for each water pipe.

\* There are 3 gaskets between pipes and caps, which is in Heating circuit outlet pipe, Domestic cold water inlet pipe and DHW Re-Circulation pipe. 2 gaskets are enclosed inside the product box.



**CAUTION**

- Because different materials are used on the pipe installation, all connections on the device (cold and hot water, circulation, heat conductor) have to be galvanically isolated; otherwise corrosion of connections can occur. We recommend placing galvanic isolators made of red brass the length of at least twice the diameter of the pipe on the connections.
- The DHW tank is intended for storing drinking water, this is why the water has to be in accordance with the national regulations on drinking water in force; otherwise, damage to the device and a termination of the warranty can arise.
- The unit is equipped with a safety valve with a rated pressure of 1 MPa (10 bar).
- In addition, it is necessary to install either a DHW expansion vessel. Alternatively, another pressure relief valve must be installed with suitable set point lower than that of the safety valve. Such a valve would need to be equipped with a hose and connected to a sink.

## Setting the pressure for the expansion vessel for DHW

### NOTE

- The cold DHW connection must be fitted with an expansion vessel suitable for drinking water. The selection and installation must be in accordance with the standard DIN 4807 T5.
  - An expansion vessel of 8 l volume can be integrated into the unit.
  - The actual size of the vessel must be decided by the installer. If a larger volume is needed, a third-party expansion vessel must be installed outside of the unit.
- 
- For proper operation of the expansion vessel, a suitable setting of the vessels operating pressure must be made. The pressure is set in regards to the pressure in the DHW system. The setting needs to be checked every 12 months.
  - Expansion vessel for DHW is factory filled to a precharge pressure  $p_0$  with dry nitrogen. The pressure must be set depending on the settings of the pressure reducing valve on the DHW supply to the building.
  - The pressure in the expansion vessel must be set according to the following formula:

$$p_0 = p_{rv} - 0,2 \text{ bar}$$

$p_0$  – pressure in the expansion vessel

$p_{rv}$  – setting of the pressure reducing valve

## Connection to the Heating system

The selection of circulation pumps, valves, safety elements and pipes has to be performed by the design engineer according to the heating/cooling capacity of the device and minimum water flow rate.

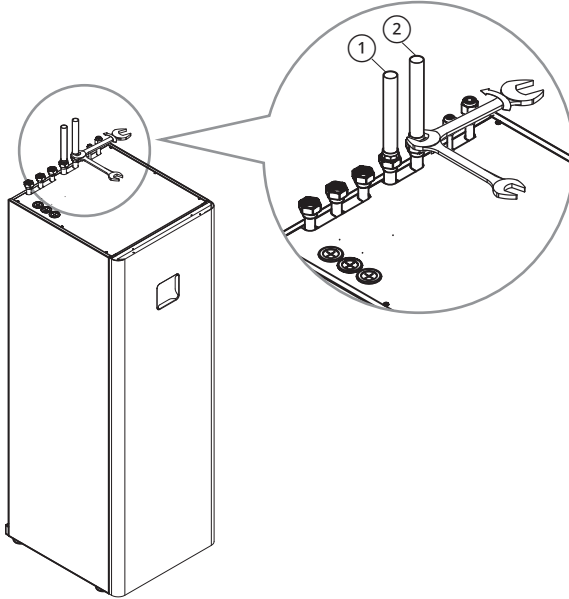


### CAUTION

- Before connecting the device, it is necessary to rinse the pipe system thoroughly and remove impurities. Use suitable detergents if necessary.
- Thorough venting of the system has to be ensured. Otherwise, malfunctions in operation may occur.

## Water Piping

Assemble ball valves (field supply) before connecting the Inlet ① and Outlet ② pipes. Use a counter wrench to tighten the connections firmly.



| No. | Connections                                      | Recommended tightening torque [N·m] |
|-----|--------------------------------------------------|-------------------------------------|
| ①   | Heating/Cooling circuit inlet pipe (female G1")  | 42 ± 2                              |
| ②   | Heating/Cooling circuit outlet pipe (female G1") |                                     |

### NOTE

Before connect heating water pipes, use the provided gaskets(G1") for each water pipe.

\* There are 3 gaskets between pipes and caps, which is in Heating circuit outlet pipe, Domestic cold water inlet pipe and DHW Re-Circulation pipe. 2 gaskets are enclosed inside the product box.

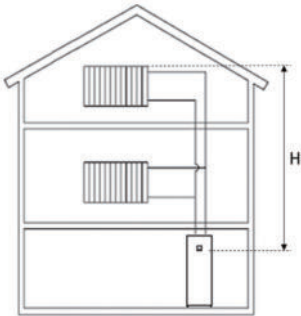
## Water Volume and Expansion Vessel Pressure

- The expansion vessel must be dimensioned in accordance with standard EN 12828. The integrated vessel has a volume of 8 liters. If the expansion volume is not enough, and additional vessel must be installed externally (Field supply).



### CAUTION

- For normal operation of the expansion vessel, it is necessary to perform proper adjustments of the vessel's working pressure. The integrated vessel is supplied with a factory pre-charge of 1 bar. The settings have to be checked every 12 months.
- Consider the maximal operational pressure of the vessel.
- Unsuitable charge of the expansion vessel with the pressure  $p_0$  is the reason for incorrect operation of the heating system.



H - Height of the heating system  
 $p_{sv}$  - Pressure of the safety valve.

Setting the pressure for the expansion vessel  $p_0$

- Before filling the system with water, check and set the pressure  $p_0$ . The expansion vessel is factory set to the pressure specified on its data label. For correct operation of the system, set the pressure  $p_0$  according to the equation below. The filling must not exceed the maximum operational pressure specified on the data label of the expansion vessel.
- Calculate the  $p_0$  pressure value with the help of the equation:

$$p_0[\text{bar}] = H[\text{m}]/10 + 0.3 [\text{bar}]$$

$p_0[\text{bar}]$  – pressure in the expansion vessel

$p_{0\min} [\text{bar}]$  – minimum allowable pressure of the heating system

$p_{0\max} [\text{bar}]$  – maximum allowable pressure of the heating system

$H[\text{m}]$  – Height of the heating system (from expansion vessel to the highest heating body in the building).

If the calculation shows a pressure lower than 1 bar, set the pressure of the expansion vessel to 1 bar.

- Set the amount of pressure in the expansion vessel by releasing or adding dry nitrogen.
- Record the new value of the pressure  $p_0$  on the data label.
- Open the closing valve of the expansion vessel carefully, open the vents and close the drain.

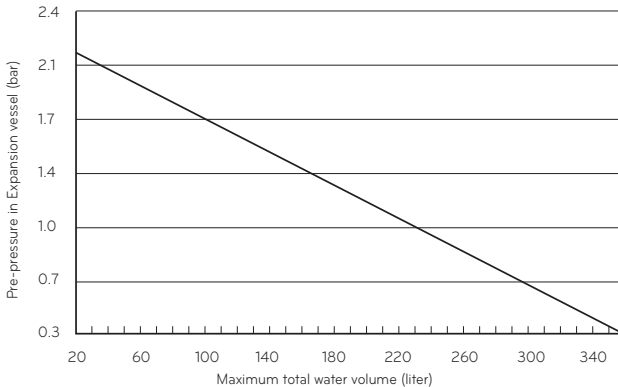
## Water Volume and Expansion Vessel Pressure

Inside expansion vessel is included which is 8 liter capacity with 1 bar pre-pressure. That means, according to the volume-pressure graph, total water volume of 230 liter is supported as default. If total water volume is changed because of installation condition, the pre-pressure should be adjusted to secure proper operation.

| If                                          | Minimum water volume |
|---------------------------------------------|----------------------|
| The system contains a backup heater         | 20 L                 |
| The system does NOT contain a backup heater | 80 L                 |

\* The internal water volume of the outdoor unit is NOT included

- Pre-pressure is adjusted by the total water volume. If the indoor is located at the highest position of the water circuit, adjustment is not required.
- To adjust pre-pressure, use nitrogen gas by certificated installer.



Adjusting pre-pressure of expansion vessel is as following :

**Step 1.** Refer "Volume-Height" table.

If installation scene is belong to Case A, go to Step 2.  
Otherwise, if it is Case B, do nothing. (pre-pressure adjustment is not required.)  
Otherwise, if it is Case C, go to Step 3.

**Step 2.** Adjust pre-pressure by following equation.

Pre-pressure [bar] =  $(0.1 \times H + 0.3)$  [bar]  
where H : difference between unit and the highest water pipe  
0.3 : minimum water pressure to secure product operation

**Step 3.** Volume of expansion vessel is less than installation scene.

Please install additional expansion vessel at the external water circuit.

Volume-Height Table

|         | V < 230 liter | V ≥ 230 liter |
|---------|---------------|---------------|
| H < 7 m | Case B        | Case A        |
| H ≥ 7 m | Case A        | Case C        |

H : Difference between unit and the highest water pipe

V : total water volume of installation scene

## Water Charging

For water charging, please follow below procedures.

### For DHW Tank

- Step 1.** Open all hot water tap.  
**Step 2.** Open the cold water supply valve to fill DHW Tank.  
**Step 3.** Close all water taps after air is purged.

### For space heating

- Step 1.** Open all valves of whole water circuit. Supplied water should be charged not only inside the indoor unit, but also in the under floor water circuit, sanitary water tank circuit, FCU water circuit, and any other water circuits controlled by the product.  
**Step 2.** Connect supply water into drain valve and fill valve.



## CAUTION

No water-leakage permitted at the drain and fill valve. Leakage-proof treatment which is described in previous section should be applied.

- Step 3.** Start to supply water. While supplying water, following should be kept.
- Pressure of supplying water should be 2.0 bar approximately.
  - For supplying water pressure, time to be taken from 0 bar to 2.0 bar should be more than 1 minute. Sudden water supply can yield water drain through safety valve.
  - Fully open the cap of air vent to assure air purging. If air is exist inside the water circuit, then performance degrade, noise at the water pipe, mechanical damage at the surface of electric heater coil (Air purge is located at the top of the heater.).
  - Use the "pump test run" function. (both a space heating line and a DHW line are open during the pump test run operation.)
- Step 4.** Stop water supplying when the pressure gauge located in front of the control panel indicates 2.0 bar.
- Step 5.** Close drain valve and fill valve. Then wait for 20~30 seconds to observe water pressure being stabilized.
- Step 6.** If following conditions are satisfactory, then check the pipe insulation. Otherwise, go to step 3.
- Pressure gauge indicates 2.0 bar. Note that sometimes pressure is decreased after step 5 due to water charging inside expansion vessel.
  - No air purging sound is heard or no water drop are popping out from air vent.



## CAUTION

Keep the air vent of the water pipe open and keep the air vent of the pump closed. Otherwise, the pump may make noise.



Pipe Insulation

Purpose of water pipe insulation is :

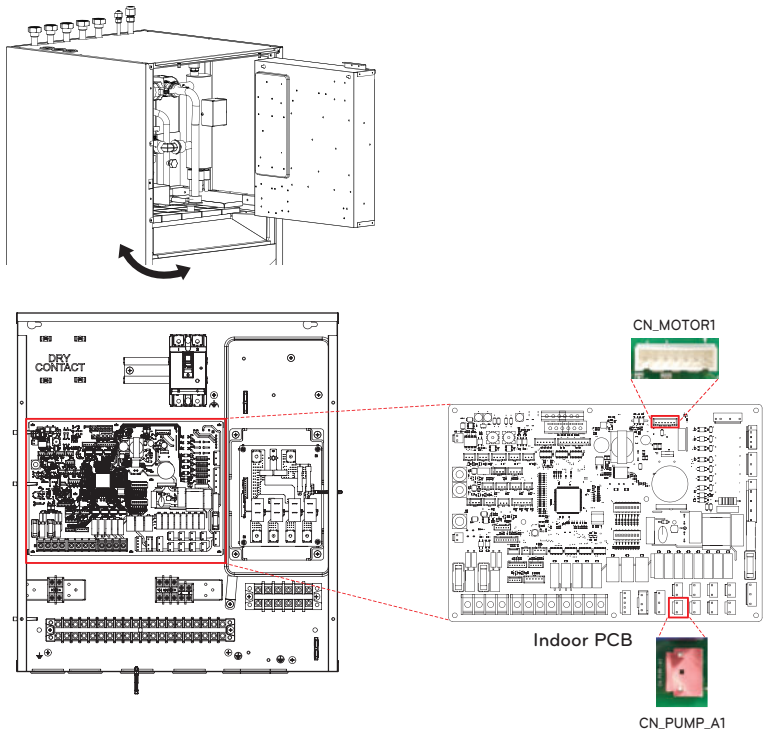
- To prevent heat loss to external environment
- To prevent dew generation on the surface of the pipe in cooling operation
- Minimum insulation thickness recommendations ensure correct operation of the product, but local regulations may vary and must be followed.

\*  $\lambda = 0.04 \text{ W/mk}$

| Water Piping length (m) | Minimum insulation Thickness(mm) |
|-------------------------|----------------------------------|
| <20                     | 20                               |
| 20~30                   | 30                               |
| 30~40                   | 40                               |
| 40~50                   | 50                               |

NOTE

Before opening the Control Box, remove the harness shown below.



CAUTION

After finishing the work, Please connect the harness back again.

## Water pump Capacity

The water pump is variable type which is capable to change flow rate, so it may be required to change default water pump capacity in case of noise by water flow. In most case, however, it is strongly recommended to set capacity as Maximum.

### NOTE

- To secure enough water flow rate, do not set water pump capacity as Minimum.  
It can lead unexpected flow rate error CH14.

## Pressure Drop

### NOTE

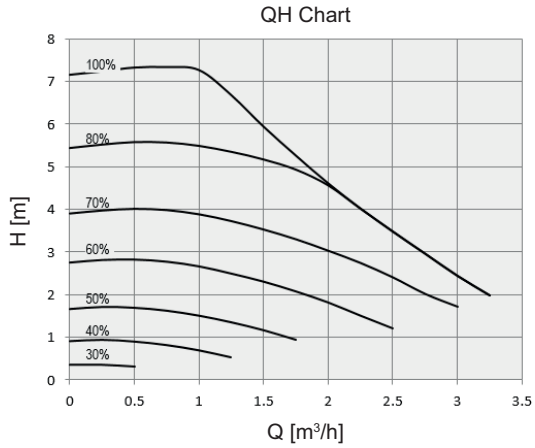
When installing the product, install additional pump in consideration of the pressure loss and pump performance.  
If flow-rate is lower than rated flow-rate, overloading of product can occur.

| Capacity<br>[kW] | Rated flow-rate<br>[LPM] | Pump Head [m]<br>(at rated flow-rate) | Product pressure<br>drop [m]<br>(Plate heat<br>exchanger) | Serviceable<br>Head [m] |
|------------------|--------------------------|---------------------------------------|-----------------------------------------------------------|-------------------------|
| 4                | 11.5                     | 7.4                                   | 0.2                                                       | 7.2                     |
| 6                | 17.25                    | 7.3                                   | 0.2                                                       | 7.1                     |

✱ Above data is valid at Rated flow-rate with delta-temperature of 5 Kelvin.

## Performance curve

MGQ62321902 : UPM3K GEO 20 - 75 CHBL



### WARNING

Selecting a water flowrate outside the curves can cause damage to or malfunction of the unit.

## Water Quality

Water quality should be complied with EN 98/83 EC Directives.

Detailed water quality condition can be found in EN 98/83 EC Directives.

### CAUTION

- If the product is installed at existing hydraulic water loop, it is important to clean hydraulic pipes to remove sludge and scale.
- Installing sludge strainer in the water loop is very important to prevent performance degrade.
- Chemical treatment to prevent rust should be performed by installer.
- It is strongly recommended to install an additional filter on the heating water circuit. Especially to remove metallic particles from the heating piping, it is advised to use a magnetic or cyclone filter, which can remove small particles. Small particles may damage the unit and will NOT be removed by the standard filter of the heat pump system.

## Frost protection by antifreeze

In areas of the country where entering water temperatures drop below 0 °C, the water pipe must be protected by using an approved antifreeze solution. Consult your AWHP unit supplier for locally approved solutions in your area. Calculate the approximate volume of water in the system. (Except the AWHP unit.) And add six liters to this total volume to allow for the water contained in AWHP unit.

| Antifreeze type  | Antifreeze mixing ratio |       |        |        |        |        |
|------------------|-------------------------|-------|--------|--------|--------|--------|
|                  | 0 °C                    | -5 °C | -10 °C | -15 °C | -20 °C | -25 °C |
| Ethylene glycol  | 0 %                     | 12 %  | 20 %   | 30 %   | -      | -      |
| Propylene glycol | 0 %                     | 17 %  | 25 %   | 33 %   | -      | -      |
| Methanol         | 0 %                     | 6 %   | 12 %   | 16 %   | 24 %   | 30 %   |

If you use frost protection function, change DIP switch setting and input the temperature condition in Installation mode of remote controller. Refer to 'CONFIGURATION > DIP Switch Setting > DIP Switch Information > Option Switch 3' and 'INSTALLER SETTING > Antifreezing Temperature'.

### CAUTION

- Use only one of the above antifreeze.
- If a antifreeze is used, pressure drop and capability degradation of the system can be occurred.
- If one of antifreezes is used, corrosion can be occurred. So please add corrosion inhibitor.
- Please check the concentration of the antifreeze periodically to keep same concentration.
- When the antifreeze is used (for installation or operation), take care to ensure that antifreeze must not be touched.
- Ensure to respect all laws and norms of your country about Anti-freeze usage.

# ACCESSORIES INSTALLATION

**THERMAV.** can interface to various accessories to extend its functionality and to improve user convenience. In this chapter, specifications about supported 3<sup>rd</sup> party accessories and how to connect to **THERMAV.** is introduced.

The Product is designed to work with the following LG accessories. Regarding any other compatible accessories refer to Product Databook or ask your local dealer.

## Accessories supported by LG Electronics

| Item                                               | Purpose                                                                                                                                                                                                           | Model      |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Dry contact                                        | To receive on & off external signal                                                                                                                                                                               | PDRYCB000  |
|                                                    | Dry contact For Thermostat                                                                                                                                                                                        | PDRYCB320  |
| Meter Interface                                    | To measure production / consumption power                                                                                                                                                                         | PENKTH000  |
| Wi-Fi Modem                                        | To enable remote system operation from smartphone                                                                                                                                                                 | PWFMDD200  |
| Thermistor for 2 <sup>nd</sup> Circuit or E/heater | To interlock with 2 <sup>nd</sup> circuit operation and control temperature of main zone or To interlock with 3 <sup>rd</sup> party E/Heater and control temperature of water out 3 <sup>rd</sup> party E/Heater. | PRSTAT5K10 |
| Extension Wire                                     | To connect remote controller with Indoor PCB for communication                                                                                                                                                    | PZCWRC1    |
| Cover Plate                                        | To relocate remote controller from indoor unit                                                                                                                                                                    | PDC-HK10   |
| Remote air sensor                                  | To control the unit using Room air as reference temperature                                                                                                                                                       | PQRSTA0    |
| Extension cable                                    | To extend Wi-Fi modem cable                                                                                                                                                                                       | PWYREW000  |
| RS3 remote controller                              | To control unit with 2 remote controllers                                                                                                                                                                         | PREMTW101  |
| 2-Remo Control Wire                                | The wire for 2 remo control                                                                                                                                                                                       | PZCWRC2    |
| Mixing valve                                       | 3/4" DN20                                                                                                                                                                                                         | OSHA-MV    |
| Mixing valve                                       | 1" DN25                                                                                                                                                                                                           | OSHA-MV1   |

Accessories supported by 3<sup>rd</sup> party Companies

| Item                             | Purpose                                                             | Specification                                                                                                                                          |
|----------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermostat                       | To control by air temperature                                       | <ul style="list-style-type: none"> <li>• Heating-Only type (230 V AC)</li> <li>• Cooling/Heating type (230 V AC with Mode selection switch)</li> </ul> |
| Mix Kit                          | To use mixing circuit                                               | <ul style="list-style-type: none"> <li>• Mixing valve</li> <li>• Mix pump</li> </ul>                                                                   |
| 3 <sup>rd</sup> Party Boiler     | To use auxiliary boiler.                                            |                                                                                                                                                        |
| 3 <sup>rd</sup> Party Controller | To connect external controller using modbus protocol                |                                                                                                                                                        |
| 2way valve and actuator          | To control water flow for Fan Coil Unit                             | 2 wire, NO(Normal Open) or NC(Normal Closed) type, 230 V AC                                                                                            |
| External Pump                    | To control the water flow at the rear of the buffer tank            |                                                                                                                                                        |
| Smart Grid                       | To control operation mode depending on input signal from provider   |                                                                                                                                                        |
| 3 <sup>rd</sup> Party ESS        | To control the operation mode according to the energy storage state |                                                                                                                                                        |
| Expansion Vessel for DHW tank    | For DHW system - Integrable inside of unit                          | Ø CONNECTION : ¾" G<br>Max. working pressure : 10 bar<br>Pre-charged pressure : 3 bar<br>Outer diameter : 200mm                                        |

## Before Installation

 **WARNING**

Followings should be kept before installation

- Main power must be turned off during installing accessories.
- 3<sup>rd</sup> party accessories should be comply with supported specification.
- Proper tools should be chosen for installation.
- Never do installation with wet hands.

## Thermostat

Thermostat is generally used to control the product by air temperature. When thermostat is connected to the product, the product operation is controlled by the thermostat.

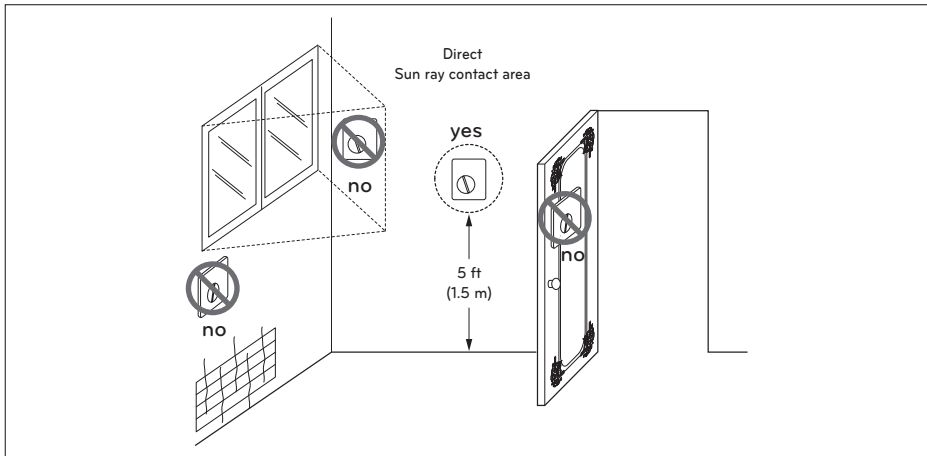
### Installation condition

#### ! CAUTION

- USE 220-240 V~ Thermostat
- Some electro-mechanical type thermostat has internal delay time to protect compressor. In that case, mode change can takes time more than user's expectation. Please read thermostat manual carefully if the unit does not response quickly.
- Setting temperature range by thermostat can be different with that of the unit. The heating or cooling set temperature should be chosen within the setting temperature range of the unit.
- It is highly recommended that the thermostat should be installed where space heating is mainly applied.

Following location should be avoid to secure proper operation :

- Height from floor is approximately 1.5 m.
- Thermostat can not be located where the area may be hidden when door is open.
- Thermostat can not be located where external thermal influence may be applied. (such as above heating radiator or open window)



## General Information

The Heat Pump supports following thermostats.

| Type           | Power  | Operating Mode                      | Supported |
|----------------|--------|-------------------------------------|-----------|
| Mechanical (1) | 230 V~ | Heating Only (3)                    | Yes       |
|                |        | Heating / Cooling (4)               | Yes       |
|                |        | Heating / Cooling / DHW Heating (5) | Yes       |
| Electrical (2) | 230 V~ | Heating Only (3)                    | Yes       |
|                |        | Heating / Cooling (4)               | Yes       |
|                |        | Heating / Cooling / DHW Heating (5) | Yes       |

- (1) There is no electric circuit inside the thermostat and electric power supply to the thermostat is not required.
- (2) Electric circuit such as display, LED, buzzer, etc is included in the thermostat and electric power supply is required.
- (3) Thermostat generates "Heating ON or Heating OFF" signal according to user's heating target temperature.
- (4) Thermostat generates both "Heating ON or Heating OFF" and "Cooling ON or Cooling OFF" signal according to user's heating and cooling target temperature.
- (5) For Hydrosplit IWT, Thermostat generates "Heating ON or Heating OFF", "Cooling ON or Cooling OFF", "DHW Heating ON or DHW Heating OFF" signal according to user's heating, cooling and DHW heating target temperature.



## CAUTION

Choosing heating / cooling thermostat

- Heating / cooling thermostat must have "Mode Selection" feature to distinguish operation mode.
- Heating / cooling thermostat must be able to assign heating target temperature and cooling target temperature differently.
- If above conditions are not kept, the unit can not operation properly.
- Heating / cooling thermostat must send cooling or heating signal immediately when temperature condition is satisfied. No delay time while sending cooling or heating signal is permitted.



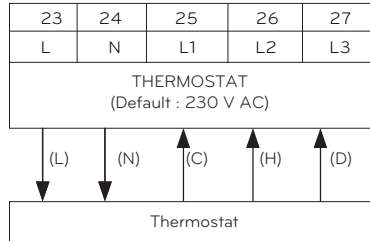
## How to wire thermostat

Follow below procedures Step 1 ~ Step 3.

**Step 1.** Uncover front cover of the unit and open the control box.

**Step 2.** Identify the power specification of the thermostat. If it is 220-240 V~, go to Step 3.

**Step 3.** Find terminal block and connect wire as below.



## WARNING

Mechanical type thermostat.

Do not connect wire (N) as mechanical type thermostat does not require electric power supply.



## CAUTION

Do not connect external electric loads.

Wire (L) and (N) should be used only for operation electric type thermostat.

Never connect external electric loads such as valves, fan coil units, etc. If connected, Main PCB (Heater) can be seriously damaged.

(L) : Live signal from PCB to thermostat

(N) : Neutral signal from PCB to thermostat

(C) : Cooling signal from thermostat to PCB

(H) : Heating signal from thermostat to PCB

(D) : DHW Heating signal from thermostat to PCB

## Final check

- DIP switch setting :  
Set DIP switch No. 8 to 'ON'. Otherwise, the unit can not recognize the thermostat.
- Remote Controller :
  - 'Thermostat' text is displayed on the remote controller.
  - Button input is prohibited.

## 2<sup>nd</sup> Circuit

The 2<sup>nd</sup> circuit is a function that can separately control the circuit1 requiring high temperature and the circuit 2 requiring medium temperature, you need to prepare a separate Mix Kit. The mix kit must be installed in the circuit 2.

### [Install Guide Mixing circuit Heating]

| Circuit 1 \ Circuit 2  | Floor (35°C) | Convector (FCU, 45 °C) | Radiator (45 °C) | Radiator (55 °C) |
|------------------------|--------------|------------------------|------------------|------------------|
| Floor (35 °C)          | ○            | ○                      | ○                | ○                |
| Convector (FCU, 45 °C) | ○            | ○                      | ○                | ○                |
| Radiator (45 °C)       | ○            | ○                      | ○                | ○                |
| Radiator (55 °C)       | ○            | ○                      | ○                | ○                |

### [Install Guide Mixing circuit Cooling]

| Circuit 1 \ Circuit 2 | Floor (18 °C) | Convector (FCU, 5 °C) |
|-----------------------|---------------|-----------------------|
| Floor (18 °C)         | ○             | ○                     |
| Convector (FCU, 5 °C) | ○             | ○                     |

- ※ To use a floor combination during cooling operation, the flow through the floor of the flow must be blocked by the 2 way valve.
- ※ For detailed 2nd circuit remote control settings, refer to 'Mixing Circuit' under [Chapter 9]

### NOTE

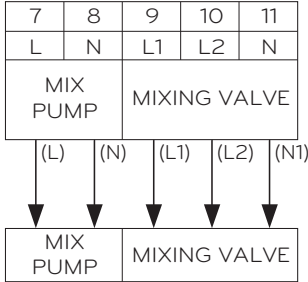
Circuit 1 = Direct circuit : Zone where the water temperature is Highest when heating  
 Circuit 2 = Mixing circuit : The other zone

## How to Wire Mixing Kit

Follow below procedures Step 1 ~ Step 3.

**Step 1.** Uncover front cover of the unit.

**Step 2.** Find terminal block and connect wire as below



(L) : Live signal from PCB to mix pump

(N) : Neutral signal from PCB to mix pump

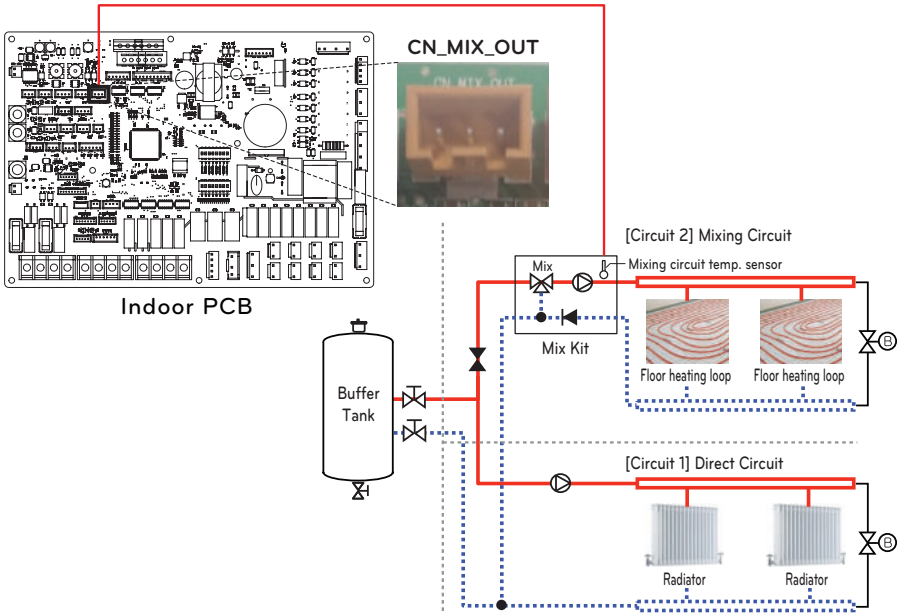
(L1) : Live signal (for Normal\* Closed type) from PCB to mixing valve

(L2) : Live signal (for Normal Open type) from PCB to mixing valve

(N1) : Neutral signal from PCB to mixing valve

\*Closed = NOT Mixed

**Step3.** Insert the temperature sensor to 'CN\_MIX\_OUT' (Brown) of the main PCB as shown below. The sensor should be mounted correctly to discharge pipe of mix pump as shown below.



### NOTE

- The location of the external pump may vary depending on the installer settings.
- Temperature sensor specification:  
Type : Thermistor,NTC  
Resistance at 25 °C : 5 kΩ  
Minimum operating temperature range : -30 °C~100 °C

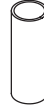
[Thermistor for Mixing circuit]



Sensor



Sensor Holder



Sensor Connector

Follow below procedures step 1 ~ step 4.

- Step 1.** Install sensor connector to discharge pipe of mix pump.  
(Welding must be performed to connect the sensor connector to the pipe)
- Step 2.** Check if the power of the unit is turned off.
- Step 3.** Fasten the sensor connector to the sensor holder as shown in the figure below.
- Step 4.** Insert harness into PCB(CN\_MIX\_OUT) fully and fix the thermal sensor into tube connector as shown below.



## 3<sup>rd</sup> Party Boiler

The product can be used by connecting an Auxiliary boiler. 3<sup>rd</sup> party boiler can be controlled by manually via RS3 remote controller or automatically itself by means of comparing the outside air temperature and the preset temperature.

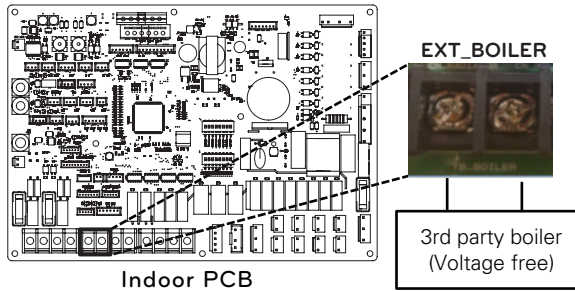
### How to wire 3<sup>rd</sup> party boiler

Follow below procedures step 1 ~ step 3.

Step 1. Check if the power of the unit is turned off.

Step 2. Disassemble front panels and Distinguish terminal block in Indoor PCB.

Step 3. Connect Power cable to terminal block fully.



## 3<sup>rd</sup> Party Controller

The product can also be linked to 3<sup>rd</sup> party controller. You can connect external controllers using Modbus protocol except for LG controller. If 3<sup>rd</sup> party controller is used, LG controller is not applied to AWHP simultaneously.

### How to wire 3<sup>rd</sup> party controller

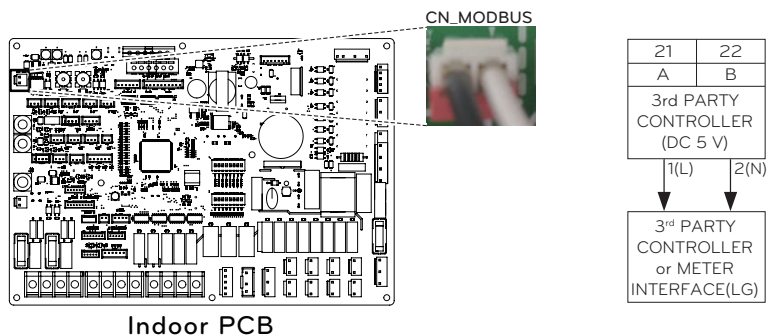
Follow below procedures step 1 ~ step 4.

**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish control box(Indoor) of the unit.

**Step 3.** Check if the harness(White) is inserted fully to the indoor unit PCB.

**Step 4.** Connect the 3<sup>rd</sup> party controller to terminal block 4 completely. (including Meter interface module)





## Central Controller

The product can communicate and control through the central controller. The following functions can be controlled in the central control linked state (Operation/Stop, Desired temperature, Hot water operation / stop, Warm water temperature, Full lock, Etc)

### LG Central controller

| Item         | Purpose                                      | Model     |
|--------------|----------------------------------------------|-----------|
| ACP 5        | To control AWWHP using LG central controller | PACEZA000 |
| AC Smart 5   |                                              | PACS5A000 |
| ACP Ez Touch |                                              | PACP5A000 |

### Accessories for Central controller

| Item               | Purpose                                                                     | Model     |
|--------------------|-----------------------------------------------------------------------------|-----------|
| PI485 Gateway      | To connect LG Central Controller / Modbus                                   | PP485A00T |
| Modbus RTU Gateway | To communicate and control BMS / 3 <sup>rd</sup> party controller directly. | PMBUSB00A |

#### NOTE

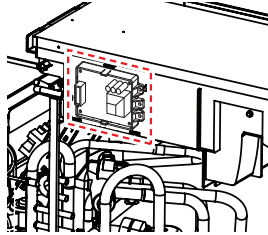
- PI485 is required for central controller.



## How to Installation PI485

Fix the PI485 PCB as shown in below images.

For detailed installation method refer to PI485 Installation Manual

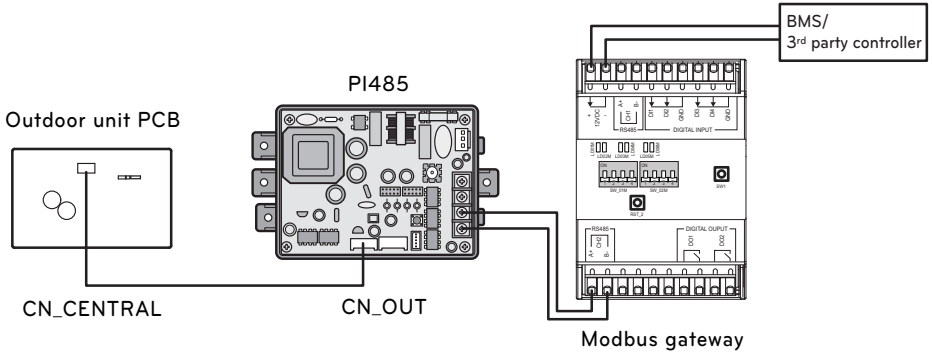


- For detailed installation instructions, refer to the manual included in the accessories.

## How to Installation Modbus gateway

Connect the Modbus gateway as shown in below diagram.

For detailed installation method refer to Modbus gateway Installation Manual.



## Dry Contact

Dry Contact is a solution for automatic control of HVAC system at the owner's best. In simple words, it's a switch which can be used to turn the unit On/Off after getting the signal from external sources.

### How to install dry contact

[Parts of Dry contact]



Dry Contact body



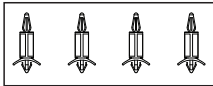
Cable(for connecting with IDU)

Follow below procedures step 1 ~ step 6.

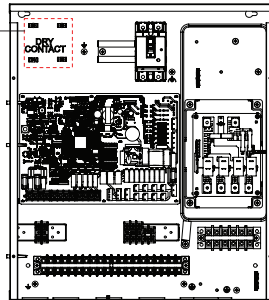
**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish terminal block in Indoor PCB.

Holes for dry contact



Supporters



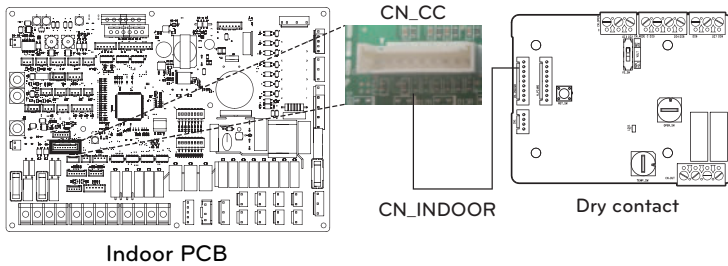
Control box (Indoor unit)

**Step 3.** Before installing the dry contact PCB inside control box, Remove the marking label on control box for using the holes.

**Step 4.** Secure the dry contact PCB using the provided supporters in control box.

**Step 5.** Connect cable to the unit PCB(CN\_CC) fully.

**Step 6.** Then, Insert harness to the dry contact PCB(CN\_INDOOR) firmly as shown below.

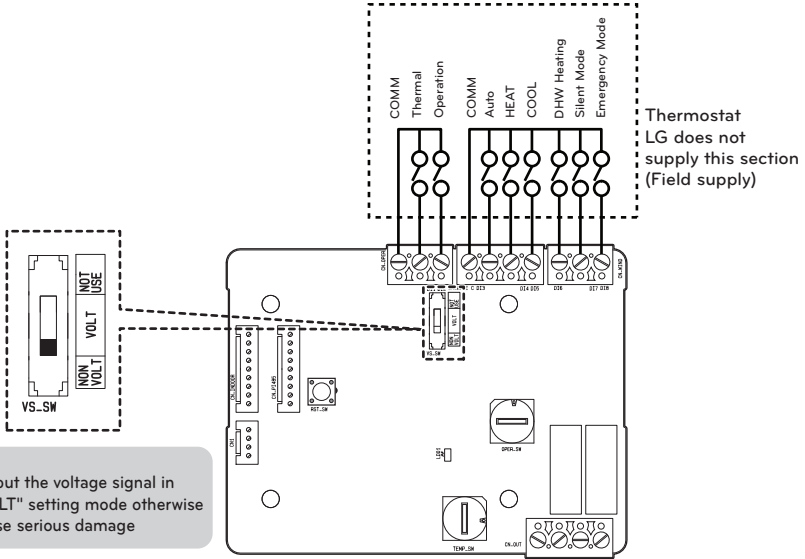


#### NOTE

- For more information about installing Dry Contact, Please refer installation manual provided with Dry Contact.
- For system set-up, please read chapter 9.

### [Setting of Contact Signal Input - PDRYCB320]

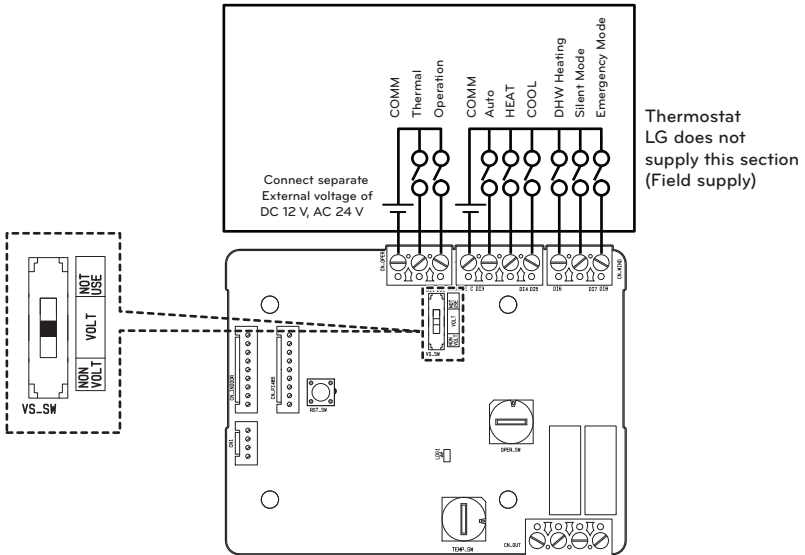
- For input contact closure only(No power input)



#### Notes

Do not input the voltage signal in "NON VOLT" setting mode otherwise it will cause serious damage

- For input contact voltage : DC 12 V, AC 24 V~



## External Controller - Setting up programmable digital input operation

If you require to control depending on external digital input(ON/OFF), connect cable to indoor PCB(CN\_EXT).

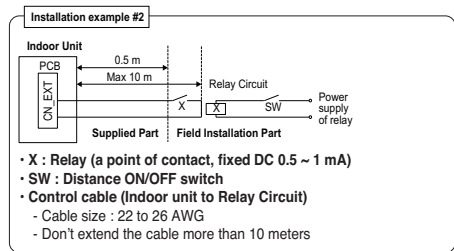
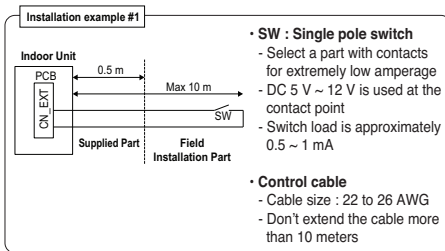
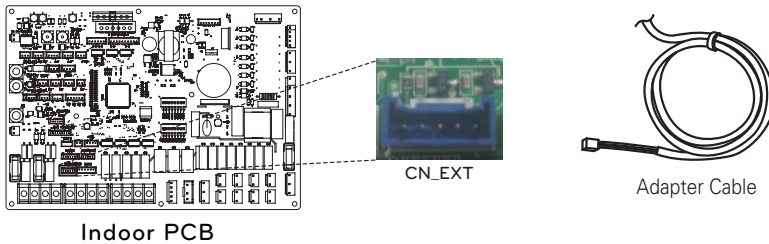
Follow below procedures step 1 ~ step 4.

**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish control box(Indoor) of the unit

**Step 3.** Connect the external controller to PCB(CN\_EXT) completely.

**Step 4.** Connect the cable and field installation part.



## Remote Temperature Sensor

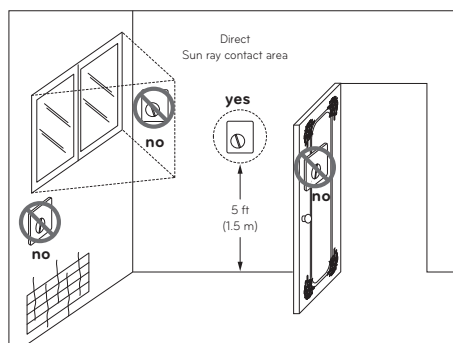
Remote temperature sensor can be installed any place a user wants to detect the temperature.

- The function is not available for some products.

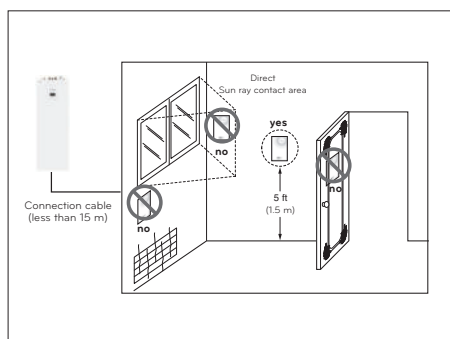
### Installation condition

Role and constraint while installation of remote air temperature sensor is very similar to that of thermostat.

- Distance between the unit and the remote air temperature sensor should be less than 15 m due to length of the connection cable of remote air temperature sensor.
- For other constraints, please refer to previous page where constraints about thermostat is described.



Thermostat



Remote Air Temperature Sensor

## How to Install Remote Temperature Sensor

### [Parts of Remote Temperature Sensor]



Remote sensor



Connection wire



Screw(to fix remote sensor)

Follow below procedures step 1 ~ step 6.

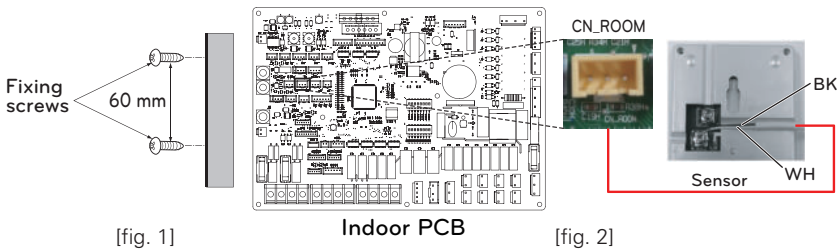
**Step 1.** Decide where the remote temperature sensor is Installed. Then, Determine the location and height of the fixing screws in fig. 1 (Interval between the screws : 60 mm)

**Step 2.** Check if the power of the unit is turned off.

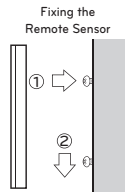
**Step 3.** Disassemble front panels and distinguish control box(Indoor) of the unit.

**Step 4.** Insert temperature sensor into PCB(CN\_ROOM) and fix the sensor firmly in fig. 2.

**Step 5.** The Connection wire does not matter if you change the color of the wire because of nonpolar.



**Step 6.** Integrate the remote temperature sensor with the screws as the order of arrows.



### CAUTION

- Choose the place where the average temperature can be measured for the unit operates.
- Avoid direct sunlight.
- Choose the place where the cooling/heating devices do not affect the remote sensor.
- Choose the place where the outlet of the cooling fan do not affect the remote sensor.
- Choose the place where the remote sensor isn't affected when door is open.

### NOTE

- For more information about installing Remote Temperature Sensor, Please refer installation manual provided with Remote Temperature Sensor.
- For system set-up, please read chapter 9.

## External pump

External pump can be required when the room to take floor heating is too long or the pressure drop of heat emitter is too large to produce the required flow rate.

Also, the external pump shall be installed to assist water circulation when the buffer tank is installed.

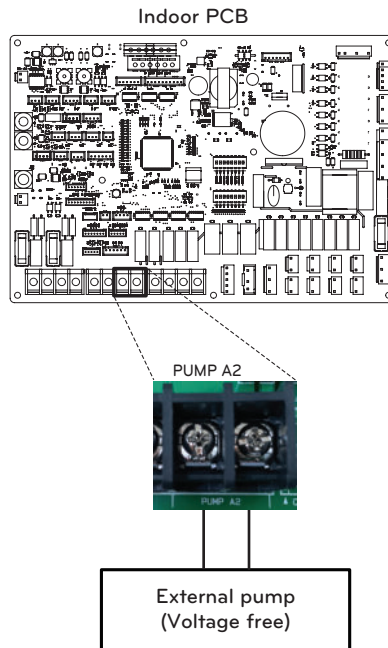
### How to wire external pump

Follow below procedures step 1 ~ step 3.

**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish terminal block in Indoor PCB.

**Step 3.** Connect signal cable to terminal block fully.





## Wi-fi Modem

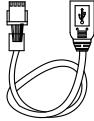
Wi-fi modem enables remote system operation from smartphone. Available functions include selection of on/off, operation mode, DHW heating, temperature setup and weekly scheduling etc.

### How to install Wi-fi Modem

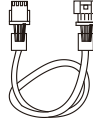
#### [Parts of Wi-fi modem]



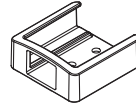
Wi-fi modem body



USB Cable



Extension Cable



Holder

Follow below procedures step 1 ~ step 6.

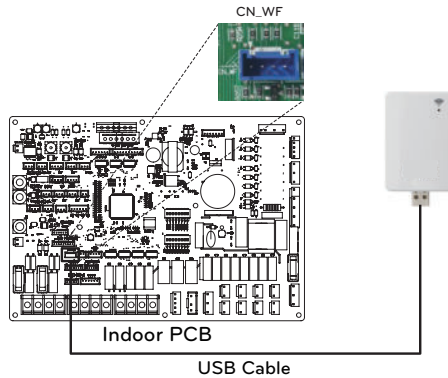
**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish control box(Indoor) of the unit.

**Step 3.** Connect the USB cable to the indoor unit PCB (CN\_WF ; Blue) until it clicks into place.

**Step 4.** Connect the Wi-Fi modem to the USB cable fully.

**Step 5.** Refer to the image below to install the Wi-Fi modem in the marked position.



**Step 6.** Secure the holder of Wi-fi modem on top cover of the product.

#### NOTE

- Please install the Wi-fi modem outside the product for smooth operation.
- Extension cable[PWYREW000] can be used if the length of the connecting cable is insufficient.

## Energy State

This product provides energy states that enable customers to use as much as possible of their own renewable energy. It can shift setpoints depending on input signal from Energy Storage System (ESS) or from any other third-party device using Modbus RTU or Digital 230V inputs.

### Available Energy States

There are 8 energy states available. 4 fixed and 4 customizable - each with the possibility to enhance Self-consumption of renewable energy.

| Energy state | Command                      | Battery State of charge | Operation (standard setting)          |                      |                                  |                      |                                       |                       |
|--------------|------------------------------|-------------------------|---------------------------------------|----------------------|----------------------------------|----------------------|---------------------------------------|-----------------------|
|              |                              |                         | Heating                               |                      | Cooling                          |                      | Domestic Hot Water                    |                       |
|              |                              |                         | Setting                               | Range                | Setting                          | Range                | Setting                               | Range                 |
| 1            | Operation Off (Utility lock) | Low                     | Forced internal operation off         | Fixed                | Forced internal operation off    | Fixed                | Forced internal operation off         | Fixed                 |
| 2            | Normal Operation             | Normal                  | Maintain operation status             | Fixed                | Maintain operation status        | Fixed                | Maintain operation status             | Fixed                 |
| 3            | Operation On Recommend       | High                    | Increase 2 °C from target temperature | Fixed                | Maintain operation Status        | Fixed                | Increase 5 °C from target temperature | Fixed                 |
| 4            | Operation On Recommend       | Very High               | Maintain operation status             | Fixed                | Maintain operation status        | Fixed                | DHW Target 80 °C                      | Fixed                 |
| 5            | Operation On Command         | Very High               | Increase from target temperature      | 0/+30 (Default : +5) | Decrease from target temperature | 0/-30 (Default : -5) | Increase from target temperature      | 0/+50 (Default : +30) |
| 6            | Operation On Recommend       | High                    | Increase from target temperature      | 0/+30 (Default : +2) | Decrease from target temperature | 0/-30 (Default : -2) | Increase from target temperature      | 0/+50 (Default : +10) |
| 7            | Operation Save               | Low                     | Decrease from target temperature      | 0/-30 (Default : -2) | Increase from target temperature | 0/+30 (Default : +2) | Decrease from Target Temperature      | 0/-50 (Default : 0)   |
| 8            | Operation Super Save         | Very Low                | Decrease from target temperature      | 0/-30 (Default : -5) | Increase from target temperature | 0/+30 (Default : +5) | Decrease from Target Temperature      | 0/-50 (Default : 0)   |

## Digital Input for energy saving (ESS, Smart Grid)

This product provides two digital inputs (ES1/ES2) that can be used to switch between energy states when not using Modbus RTU (CN\_MODBUS).

### Available Energy States

There are 8 energy states available in total. Four different states can be triggered using the 230V-inputs – by default Energy states 1-4.

With the digital input assignment in the menu 'Energy state/Digital input assignment' of the control panel, different Energy states can be selected for Signals 0:1 and 1:1.

0:0 is always linked with ES2 (Normal operation) and 1:0 is always linked with ES1 (Operation off/Utility lock).

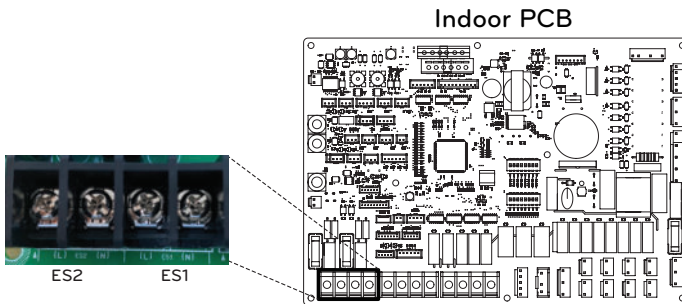
### How to set Digital input signal

Follow below procedures step 1 ~ step 3.

**Step 1.** Check if the power of the unit is turned off.

**Step 2.** Disassemble front panels and distinguish terminal block in Indoor PCB.

**Step 3.** Connect signal cable to terminal block in PCB (ES2, ES1) fully as shown below.



### Energy state depending on input signal (ES1/ES2)

| Input Signal |     | Output state |         |
|--------------|-----|--------------|---------|
| ES1          | ES2 | Default      | Range   |
| 0            | 0   | ES2          | fixed   |
| 1            | 0   | ES1          |         |
| 0            | 1   | ES3          | ES3-ES8 |
| 1            | 1   | ES4          |         |

## 2Way Valve

2way valve is required to control water flow while cooling operation. Role of 2way valve is to cut off water flow into under floor loop in cooling mode when fan coil unit is equipped for cooling operation.

### General Information

**THERMAV.** supports following 2way valve.

| Type          | Power    | Operating Mode              | Supported |
|---------------|----------|-----------------------------|-----------|
| NO 2-wire (1) | 230 V AC | Energize : Valve closing    | Yes       |
|               |          | De-energize : Valve opening |           |
| NC 2-wire (2) | 230 V AC | Energize : Valve opening    | Yes       |
|               |          | De-energize : Valve closing |           |

(1) : Normal Open type. When electric power is NOT supplied, the valve is open. (When electric power is supplied, the valve is closed.)

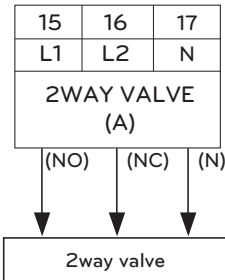
(2) : Normal Closed type. When electric power is NOT supplied, the valve is closed. (When electric power is supplied, the valve is open.)

### How to Wire 2Way Valve

Follow below procedures Step 1 ~ Step 2.

**Step 1.** Uncover front cover of the unit.

**Step 2.** Find terminal block and connect wire as below.



### CAUTION

Dew Condensation

- Wrong wiring can yield dew condensation on the floor. If radiator is connected at the under floor water loop, dew condensation can be occurred on the surface of the radiator.

### WARNING

Wiring

- Normal Open type should be connected to wire (NO) and wire (N) for valve opening in cooling mode.
- Normal closed type should be connected to wire (NC) and wire (N) for valve closing in cooling mode.

(NO) : Live signal (for Normal Open type) from PCB to 2way valve.

(NC) : Live signal (for Normal Closed type) from PCB to 2way valve.

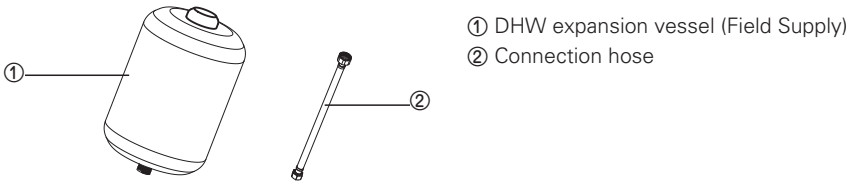
(N) : Neutral signal from PCB to 2way valve.

### Final Check

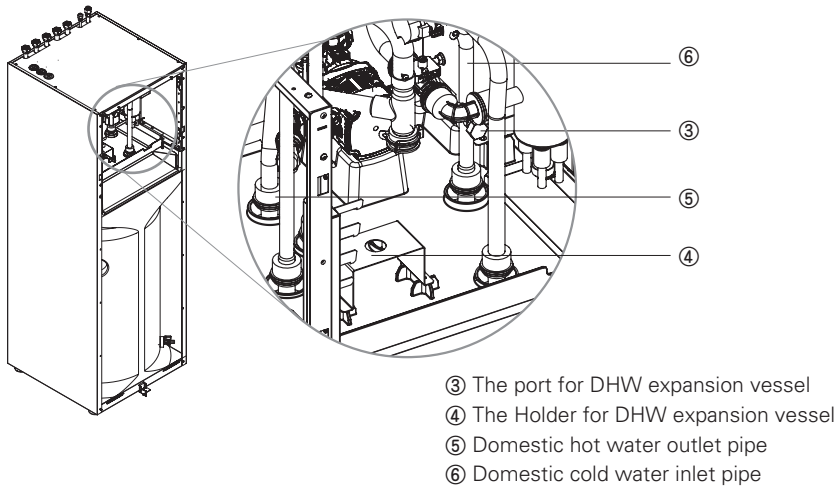
- Flow direction :
  - Water should not flow into under floor loop in cooling mode.
  - To verify the flow direction, check temperature at the water inlet of the under floor loop.
  - If correctly wired, this temperatures should not be reached below 16 °C in cooling mode.

## Domestic hot water expansion vessel – integrated into the unit

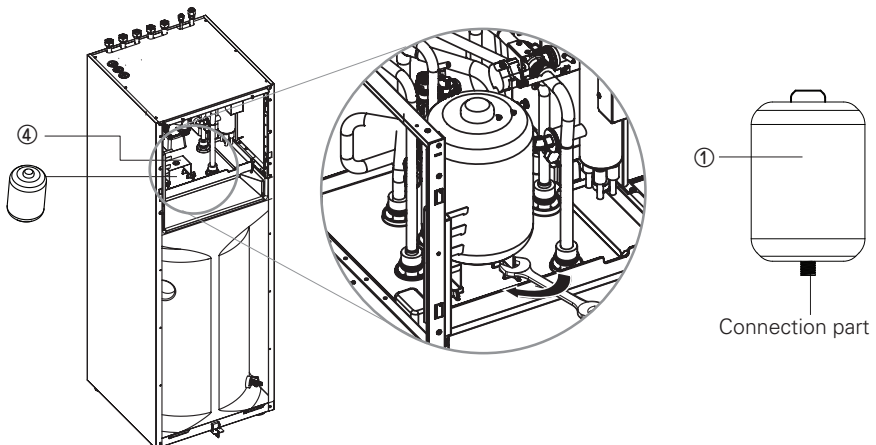
### How to install DHW expansion vessel (Field Supply)



**Step 1.** Screw the hose to the dedicated port ③ inside of the unit.



**Step 2.** Place the vessel ① on top of the holder ④ and fasten the connection hose from below.



## Final check

| No. | Check point                               | Description                                                                                                                                                                                                                                                                                                                                                         |
|-----|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Connection of Water Inlet/Outlet          | <ul style="list-style-type: none"> <li>- Check if the shut-off valves should be assembled with Water inlet and outlet pipe of the unit</li> <li>- Check the location of the water inlet/outlet water pipe</li> </ul>                                                                                                                                                |
| 2   | Hydraulic pressure                        | <ul style="list-style-type: none"> <li>- Check the pressure of supplying water by using pressure gauge inside the unit</li> <li>- Pressure of Supplying water should be Under 3.0 bar approximately</li> <li>- Pressure of Supplying tank water should be Under 10.0bar approximately</li> </ul>                                                                    |
| 3   | Water pump capacity                       | <ul style="list-style-type: none"> <li>- To secure enough water flow rate, do not set water pump capacity as Minimum.</li> <li>- It can lead unexpected flow rate error CH14. (Refer to Chapter 4 'Water Piping and Water Circuit Connection')</li> </ul>                                                                                                           |
| 4   | Transmission line and power source wiring | <ul style="list-style-type: none"> <li>- Check if Transmission line and power source wiring are separated from each other.</li> <li>- If it is not, electronic noise may occur from the power source.</li> </ul>                                                                                                                                                    |
| 5   | The power cord specifications             | <ul style="list-style-type: none"> <li>- Check the power cord specifications (Refer to Chapter 4 'Connecting Cables')</li> </ul>                                                                                                                                                                                                                                    |
| 6   | 2Way Valve                                | <ul style="list-style-type: none"> <li>- Water should not flow into under floor loop in cooling mode.</li> <li>- To verify the flow direction, check temperature at the water inlet of the under floor loop.</li> <li>- If correctly wired, this temperatures should not be reached below 16 °C in cooling mode.</li> </ul>                                         |
| 7   | Air Vent                                  | <ul style="list-style-type: none"> <li>- Air-vent must be located highest level of Water pipe system</li> <li>- It should be installed at the point which is easy to service.</li> <li>- It takes some times to remove air in the water system if air purge is not performed sufficiently it may occur CH14 error. (refer to Chapter 4 'Water Charging')</li> </ul> |

# CONFIGURATION

As **THERMAV** is designed to satisfy various installation environment, it is important to set up system correctly. If not configured correctly, improper operation or degrade of performance can be expected.

## DIP Switch Setting



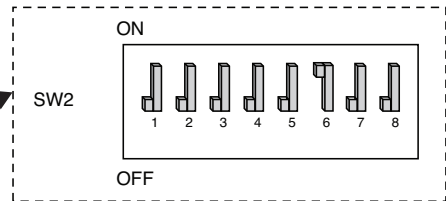
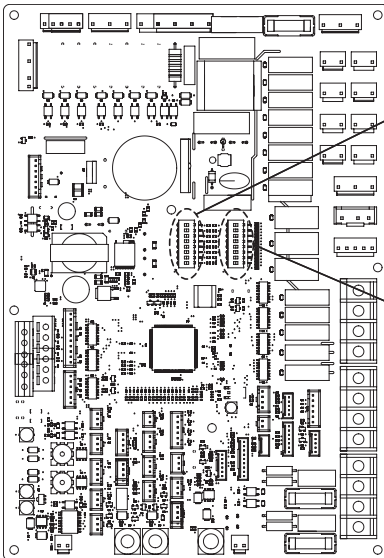
### CAUTION

Turn off electric power supply before setting DIP switch

- Whenever adjusting DIP switch, turn off electric power supply to avoid electric shock.

## General Information

### Indoor PCB



OFF is selected



ON is selected

## DIP Switch Information

### Option Switch 2

| Description                         | Setting                                                                                                                                                                           |                                                           | Default                                                                                                                                                                    |  |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Group control                       | 1                                                                                                | As Master                                                 | 1                                                                                         |  |
|                                     | 1                                                                                                | As Slave                                                  |                                                                                                                                                                            |  |
| Accessory installation information  | <br>2 <br>3     | DHW integrated indoor unit<br>+ Outdoor unit is installed | <br>     |  |
|                                     | <br>2 <br>3     |                                                           |                                                                                                                                                                            |  |
|                                     | <br>2 <br>3     | Reserved                                                  |                                                                                                                                                                            |  |
|                                     | <br>2 <br>3     |                                                           |                                                                                                                                                                            |  |
| Cycle                               | 4                                                                                                | Heating Only                                              | 4                                                                                         |  |
|                                     | 4                                                                                                | Heating & Cooling                                         |                                                                                                                                                                            |  |
| Room Air Sensor                     | 5                                                                                                | Room Air Sensor is not installed                          | 5                                                                                         |  |
|                                     | 5                                                                                                | Room Air Sensor is installed                              |                                                                                                                                                                            |  |
| Selecting electric heater capacity  | <br>6 <br>7 | Electric Heater is not used                               | <br> |  |
|                                     | <br>6 <br>7 | Full capacity is used                                     |                                                                                                                                                                            |  |
|                                     | <br>6 <br>7 | Electric Heater is not used                               |                                                                                                                                                                            |  |
|                                     | <br>6 <br>7 | Electric Heater is not used                               |                                                                                                                                                                            |  |
| Thermostat installation information | 8                                                                                              | Thermostat is NOT installed                               | 8                                                                                       |  |
|                                     | 8                                                                                              | Thermostat is installed                                   |                                                                                                                                                                            |  |



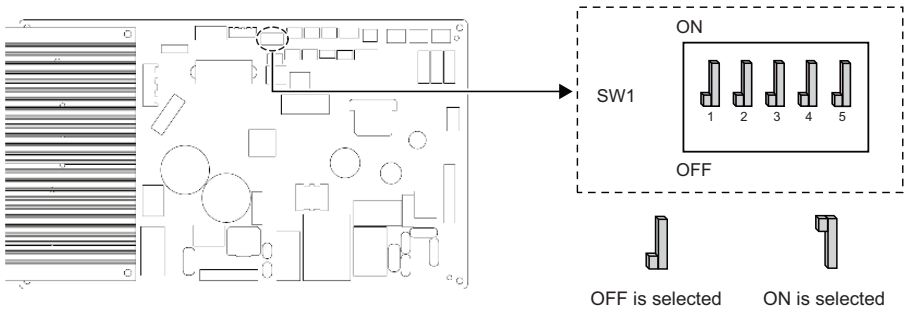
## Option Switch 1

| Description     | Setting                                                                             |                                                | Default                                                                             |
|-----------------|-------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------|
| MODBUS          | 1  | As Master<br>(LG Extension Module)             | 1  |
|                 | 1  | As Slave<br>(3 <sup>rd</sup> Party Controller) |                                                                                     |
| MODBUS Function | 2  | REGIN                                          | 2  |
|                 | 2  | Unified Open Protocol                          |                                                                                     |
| ANTIFREEZE      | 8  | Antifreeze mode not use                        | 8  |
|                 | 8  | Antifreeze mode *                              |                                                                                     |

※ Only the switch in the table has a function. Others have no function.

\* Possibility to allow colder water temperature by setting.  
Bridge at CN\_ANTI\_SW must be dis-connected to enable setting.

## Outdoor PCB



# DIP Switch Information

| Description    | Setting                                                                                                                                                                 |                                                                       | Default                                                                                                                                                                    |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low Noise Mode | 2                                                                                      | Always Mode<br>- Maintain low noise mode for target temperature       | 2                                                                                         |
|                | 2                                                                                      | ON/OFF Partial mode<br>- Escape low noise mode for target temperature |                                                                                                                                                                            |
| Peak Control   | 3  4  | Max Mode                                                              | 3 <br>4  |
|                | 3  4  | Peak Control Step 1<br>- To limit maximum current (Power saving)      |                                                                                                                                                                            |
|                | 3  4  | Peak Control Step 2<br>- To limit maximum current (Power saving)      |                                                                                                                                                                            |

- \* Only DIP-switch no. 2 and no.3 has a function. Others have no function.
- \* When setting the on/off partial mode, Mode can be exited to secure capacity after operating for a certain time.

## NOTE

\* Input current value can be limited by DIP Switch operation.

| Model Name |           |               | Peak Control Mode Running Current (A) |        |
|------------|-----------|---------------|---------------------------------------|--------|
| Chassis    | Phase (Ø) | Capacity (kW) | 1 Step                                | 2 Step |
| U24A       | 1         | 4             | 10                                    |        |
|            |           | 6             | 13                                    |        |

**NOTE****Emergency Operation****• Definition of terms**

- Trouble : a problem which can stop system operation, and can be resumed temporarily under limited operation without certificated professional's assist.
- Error : problem which can stop system operation, and can be resumed ONLY after certificated professional's check.
- Emergency mode : temporary heating operation while system met Trouble.

**• Objective of introducing 'Trouble'**

- Not like air conditioning product, Air-to-Water heat pump is generally operation in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with end user's decision.

**• Classified Trouble**

- Trouble is classified two levels according to the seriousness of the problem : Slight Trouble and Heavy trouble
- Slight Trouble : a problem is found inside the unit. In most case, this trouble is concerned with sensor problems. The outdoor unit is operating under emergency mode operation condition which is configured by DIP switch No. 4 of the unit PCB.
- Heavy trouble : a problem is found inside the outdoor unit. As the outdoor unit has problem, the emergency mode operation is performed by electric heater located in the unit.
- Option Trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

**• When the AWHP has any trouble,**

- (1) If there is not a function to judge possibility of operation :

Once an error occurs mainly in indoor unit, AWHP stops. On the other hand, remote controller allows the product to activate On/ Off operation. (On : emergency operation)

- Slight / Heavy trouble : Heating Operable only
- Critical trouble : Full stop
- Treatment priority : Critical>Heavy>Slight

- (2) If there is a function to judge possibility of operation :

Depending on the status of slight / heavy / critical trouble, pop-up phrase is guided separately on display.

- Slight trouble : Heating/Cooling Operable
- Heavy trouble : Heating Operable only
- Critical trouble : Service center request

AWHP operates when user pressed OK button on pop-up window.

**NOTE****• Duplicated trouble : Option trouble with slight or heavy trouble**

- If option trouble is occurred with slight (or heavy) trouble at the same time, the system puts higher priority to slight (or heavy) trouble and operates as if slight (or heavy) trouble is occurred.
- Therefore, sometimes DHW heating can be impossible in emergency operation mode. When DHW is not warming up while emergency operation, please check if DHW sensor and related wiring are all Ok.

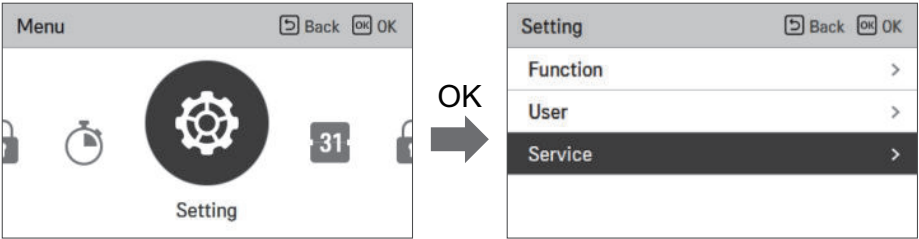
**• Emergency operation is not automatically restarted after main electricity power is reset.**

- In normal condition, the product operating information is restored and automatically restarted after main electricity power is reset.
- But in emergency operation, automatic re-start is prohibited to protect the product.
- Therefore, user must restart the product after power reset when emergency operation has been running.

# SERVICE SETTING

## How to enter service setting

- To enter the menu displayed at the bottom, you need to enter the service setting menu as follows.
- In the menu screen, press [,<,>(left/right)] button to select the setting category, and press [OK] button to move to the setting list.
  - In the setting list, select the service setting category, and press [OK] button to move to the service setting list.



## Service setting

- You can set the product service functions.
- Some functions may not be displayed/operated in some product types.

| Menu                    | Description                                                                                    |
|-------------------------|------------------------------------------------------------------------------------------------|
| Service contact         | Check and input the service center phone number that you can call when there is service issue. |
| Model information       | View product and capacity information                                                          |
| RMC Version Information | Check the remote controller model name and software version.                                   |
| Open Source License     | View the remote controller's open source license.                                              |

# Service contact

Check and input the service center phone number that you can call when there is service issue.

- In the service setting list, select the service contact point and press [OK] button to move to the detail screen.
- While “edit” button is selected, press [OK] button to move to the edit screen, change it, and press [OK] button to change the service contact point.

| Service                 |   |
|-------------------------|---|
| Service Contact         | > |
| Model Information       | > |
| RMC Version Information | > |
| Open Source License     | > |



| Service Contact                                            |  |
|------------------------------------------------------------|--|
| <div>Telephone</div> <div>+1544-7777</div> <div>Edit</div> |  |

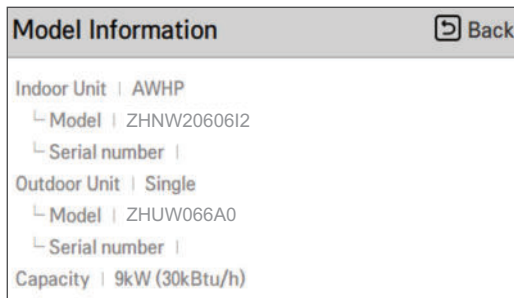
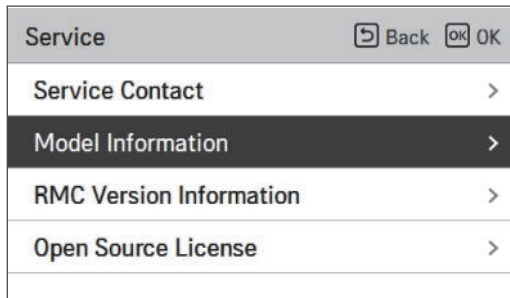


| Service Contact                                                                                                                                                                                                                                           |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <div>Telephone</div> <div> <div> <div>+</div> <div>1</div> <div>5</div> <div>4</div> <div>4</div> <div>-</div> <div>7</div> <div>7</div> </div> <div> <div>7</div> <div>7</div> <div></div> <div></div> <div></div> <div></div> <div></div> </div> </div> |  |

## Model information

Check product and capacity information to which the remote controller is connected.

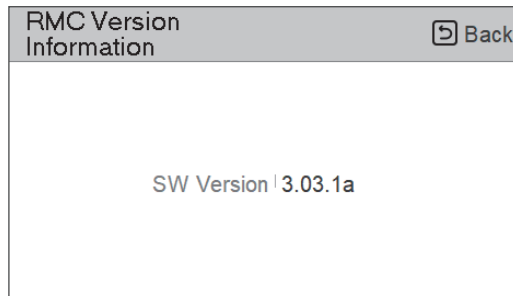
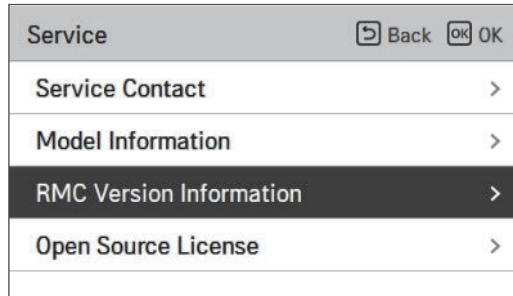
- In the service setting list, select model information category, and press [OK] button to move to the detail screen.
- The unit capacity
  - $1 \text{ kWh} = 1 \text{ kBtu} \times 0.29307$
  - kWh is the result calculated based on Btu, There may be a small difference between calculated and actual capacity.
  - Ex) If the unit capacity is 18 kBtu, it is displayed as 5 kWh.



## RMC version information

View the remote controller software version.

- In the service setting list, select the RMC version information and press [OK] button to move to the detail screen





## Open source license

View the remote controller's open source license.

- In the service setting list, select the open source license category, and press [OK] button to move to the detail screen.

|                         |             |
|-------------------------|-------------|
| Service                 | ⏮ Back ⏭ OK |
| Service Contact         | >           |
| Model Information       | >           |
| RMC Version Information | >           |
| Open Source License     | >           |



|                                                                                                                                                                            |                             |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------|
| Open Source License                                                                                                                                                        |                             | ⏮ Back |
| LGE Open Source Software Notice                                                                                                                                            |                             |        |
| Product Type                                                                                                                                                               | HVAC WIRED REMOTE CONTR     |        |
| Model Number/Range                                                                                                                                                         | RS3 Wired Remote Controller | 1/401  |
| Those products identified by the Product Type and Model Range above from LG Electronics, Inc. ("LGE") contain the open source software detailed below. Please refer to the |                             |        |

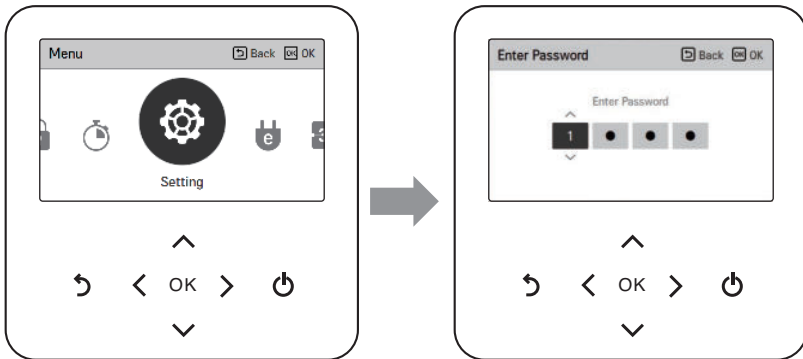
# INSTALLER SETTING

## How to enter installer setting

### CAUTION

The installer setting mode is the mode to set the remote controller's detail function. If the installer setting mode is incorrectly set, it may cause product failure, user's injury, or property damage. It must be set by the installation specialist with the installation license, and if it is installed or changed without installation license, all problems caused will be the responsibility of the installer, and may void the LG warranty.

- In the menu screen, press [←,→(left/right)] button to select the setting category, and press [^ (up)] button for 3 seconds to enter the password input screen for the installer setting.
- Input the password and press [OK] button to move to the installer setting list.



### \* Installer setting password

Main screen → menu → setting → service → RMC version information → SW Version

Example) SW version : 1.00.1 a

In the above case, the password is 1001.

### NOTE

Some categories of the installer setting menu may not be available depending on the product function or the menu name may be different.

## Installer setting

- You can set the product user functions.
- Some functions may not be displayed/operated in some product types.

### Configuration

| Function                  | Description                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select Temperature Sensor | Selection for setting temperature as air temperature or water temperature or air+water temperature.                                                           |
| Use Heating Tank Heater   | Determine the delay time of the electric heater for the water tank.                                                                                           |
| Mixing Circuit            | This function is to use mixing circuit function. Set enable/disable mixing circuit function and valve closing time and hysteresis.                            |
| Use External Pump         | Set up to control an external water pump.                                                                                                                     |
| RMC master/slave          | This function is to set master / slave to use two remote controllers in one indoor unit.                                                                      |
| LG Therma V Configuration | This function can be set to save the environment settings of the product for use in LG Therma V Configurator through Micro SD card. (LG heating configurator) |

### General

| Function               | Description                                                                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Forced operation       | Main water pump off After 20 consecutive hours, disable / enable the logic that drives the water pump by itself.                                                                                           |
| Pump Prerun/Overrun    | Set to reach the optimum flow rate by circulating the heating water with the water pump before heat exchange. After the operation stop, additional water pump is activated to circulate the heating water. |
| Water Flow Control     | Set water pump to control the water flow.                                                                                                                                                                  |
| Energy Monitoring      | Set up to use energy monitoring function of unit                                                                                                                                                           |
| Anti-Freezing Option 1 | This function is to select whether to use Type1 or Type2 to prevent freezing when the remote control is turned off.                                                                                        |
| Password Reset         | It is the function to reset (0000) the password when you forgot the password set in the remote controller.                                                                                                 |

**Room Heating**

| Function                      | Description                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Heating temp. setting         | At the water control in heating mode, the control reference water temperature position setting.                   |
| Air heating set temp.         | Adjusting range of 'Setting Air Temperature' in heating mode                                                      |
| Water heating set temp.       | Adjusting range of 'Setting Leaving water Temperature' in heating mode.                                           |
| Hysteresis Heating Water      | Heating Water Outlet Temperature Hysteresis range setting                                                         |
| Hysteresis Room Air (Heating) | Heating air temperature Hysteresis range setting                                                                  |
| Pump setting in heating       | Set water pump on/off interval option during thermo off condition in heating mode                                 |
| Heater on temperature         | Setting outdoor air temperature where electric heater starts operation.                                           |
| Screed drying                 | This function controls floor heating to a specific temperature for a certain period of time to cure floor cement. |

**Room Cooling**

| Function                              | Description                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------|
| Cooling temp. setting                 | At the water control in cooling mode, the control reference water temperature position setting.     |
| Air cooling set temp.                 | Adjusting range of 'Setting Air Temperature' in cooling mode.                                       |
| Water cooling set temp.               | Adjusting range of 'Setting Leaving Water Temperature' in cooling mode.                             |
| Water supply off temp. during cooling | Determine the leaving water temperature which blocks the flow into underfloor coil in cooling mode. |
| Hysteresis Cooling Water              | Cooling Water Outlet Temperature Hysteresis range setting                                           |
| Hysteresis Room Air (Cooling)         | Cooling air temperature Hysteresis range setting                                                    |
| Pump setting in cooling               | Set water pump on/off interval option during thermo off condition in cooling mode.                  |

## Auto Mode

| Function           | Description                                          |
|--------------------|------------------------------------------------------|
| Seasonal auto temp | Set the operating temperature in Seasonal Auto mode. |

## Domestic Hot Water

| Function                    | Description                                                                                                                                                                    |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DHW set temp.               | Setting DHW set temperature.                                                                                                                                                   |
| Tank disinfection setting 1 | Setting start/maintain time for disinfection.                                                                                                                                  |
| Tank disinfection setting 2 | Setting disinfection temperature.                                                                                                                                              |
| Tank setting1               | Setting minimum and maximum temperature using heat pump cycle for DHW heating.                                                                                                 |
| Tank setting2               | Setting temperature hysteresis.                                                                                                                                                |
| DHW time setting            | Determine follow time duration : operation time of domestic hot water tank heating, stop time of domestic hot water tank heating, and delay time of DHW tank heater operating. |
| Recirculation time          | Whether to use the recirculation function and set the water pump on/off interval option                                                                                        |

## Service

| Function               | Description                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Pump test run          | Main water pump test run.                                                                                                 |
| Frost Protection Temp. | The function is to apply an offset to the freezing temperature of the freeze protection logic when using antifreeze mode. |
| BUH for DHW in emerg.  | This function selects whether or not to heat DHW with Backup Heater when emergency operation is entered.                  |

## Connectivity

| Function                     | Description                                                                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dry Contact Mode             | Dry contact function is the function that can be used only when the dry contact devices is separately purchased and installed.                                                                               |
| Central Control Address      | Selection for setting temperature as air temperature or leaving water temperature or air+leaving water temperature.                                                                                          |
| CN_CC                        | It is the function to set whether to install (use) Dry Contact. (It is not a function for Dry Contact installation, but it is a function to set the usage of the unit's CN_CC port.)                         |
| Modbus Address               | It is function to set the address of the Modbus device that is externally linked to the product. Modbus address setting function is available from indoor unit.                                              |
| CN_EXT                       | Function to set external input and output control according to DI / DO set by customer using dry contact port of indoor unit. Determine the use of the contact port (CN_EXT) mounted on the indoor unit PCB. |
| 3 <sup>rd</sup> Party Boiler | Configuration to control 3 <sup>rd</sup> party boiler.                                                                                                                                                       |
| Meter Interface              | When installing the meter interface to measure energy / calorie in the product, set unit spec for each port.                                                                                                 |
| Energy state                 | Select whether to use or not use the SG Mode function of the product, set the operation option value in SG1 step.                                                                                            |
| Thermostat control type      | Setting Thermostat control type                                                                                                                                                                              |

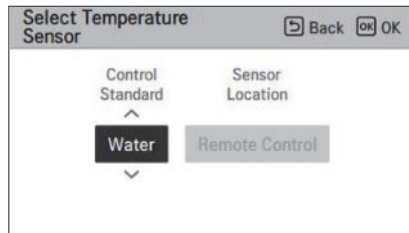
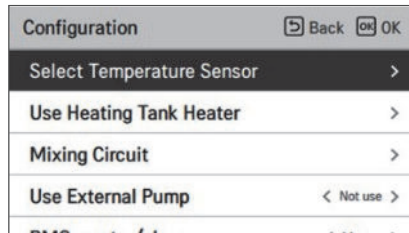
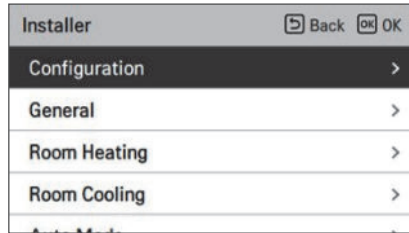
## Information

| Function            | Description                                           |
|---------------------|-------------------------------------------------------|
| Pump operation time | Function to check the main water pump operation time. |
| IDU operation time  | Function to check the IDU operation time.             |
| Current Flow Rate   | Function to check the current flow rate.              |
| Data logging        | Display error history of connected unit.              |

# Select Temperature Sensor

The product can be operated according to air temperature or water temperature. The selection for setting temperature as air temperature or water temperature is determined.

- In the installer setting list, Select Temperature Sensor category, and press [OK] button to move to the detail screen.



| Control Standard | Sensor Location | Temperature target                               | Required accessories                          |
|------------------|-----------------|--------------------------------------------------|-----------------------------------------------|
| Water (Default)  | -               | Inlet or Outlet water temp.                      | -                                             |
| Air              | Remote Control  | Room air temp. only                              | Cover plate PDC-HK10 or (PREMTW101 + PZCWRC2) |
|                  | Indoor unit     |                                                  | Remote room sensor PQRSTA0 <sup>1)</sup>      |
| Air+Water        | Remote control  | Room air temp. and (Inlet or Outlet) water temp. | Cover plate PDC-HK10 or (PREMTW101 + PZCWRC2) |
|                  | Indoor unit     |                                                  | Remote room sensor PQRSTA0 <sup>1)</sup>      |

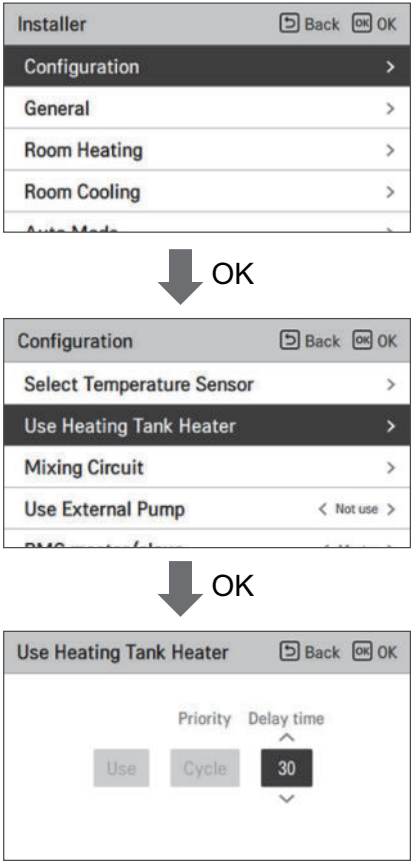
## NOTE

- 1) Sensor must be enabled by DIP switch first, before setting is available.

# Use Heating Tank Heater

This is a function to determine the delay time of the electric heater for water tank.

- In the installer setting list, Select Configuration category, and press [OK] button to move to the detail screen.

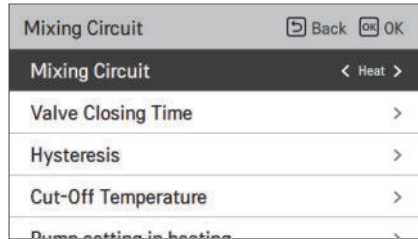
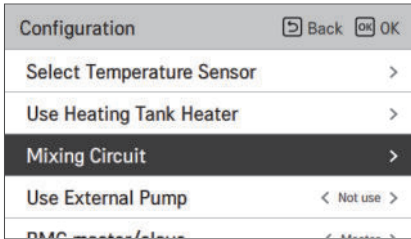


| Function   | Unit   | Default | Value                         |
|------------|--------|---------|-------------------------------|
| Delay time | minute | 30      | 10/20/30/40/50/60/90/120/1440 |



# Mixing Circuit

Function to set whether or not to use an installed mixing circuit function using mixing kit.



| Value                 | Default |
|-----------------------|---------|
| Not Use / Heat / Cool | Not Use |

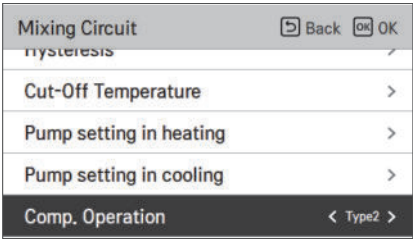
You can set valve closing time[s] and hysteresis temperature[°C] on screen by yourself. Setting the cut-off temperature protects the water from flowing over the cut-off temperature in the mixing circuit during heating operation.



| Value               | Default | Range      |
|---------------------|---------|------------|
| Valve Closing Time  | 240 s   | 60 ~ 999 s |
| Hysteresis          | 2 °C    | 1 ~ 3 °C   |
| Cut-Off Temperature | 40 °C   | 20 ~ 55 °C |

You can set the operation of the outdoor unit when only the mixing circuit is operating and the direct circuit is not operating.

| Type1             | Type2(Default)        |
|-------------------|-----------------------|
| Outdoor Operation | Outdoor Not Operation |



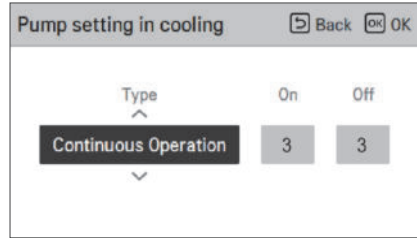
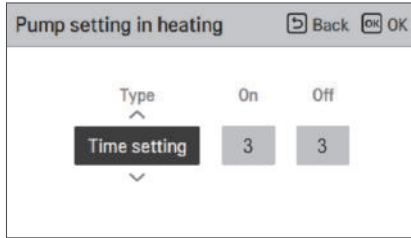
| Value           | Default |
|-----------------|---------|
| Type 1 / Type 2 | Type 2  |



## CAUTION

Set Type 1 only at the installation site with a small load or no buffer tank.  
When setting Type 1 in a site with a large load or a site with a buffer tank, overheating may occur in the direct circuit.

Installer setting function to set water mixing pump operation / delay time option in heating/cooling mode



| Value | Default      | Range                               |
|-------|--------------|-------------------------------------|
| Type  | Time Setting | Time Setting / Continuous Operation |
| On    | 3 min        | 1 ~ 60 min                          |
| Off   | 3 min        | 1 ~ 60 min                          |

\* When Continuous Operation is selected, On, Off is disabled.

Activating this function, It allows 2 circuits (Circuit 1, Circuit 2) temperature to be controlled, separately.

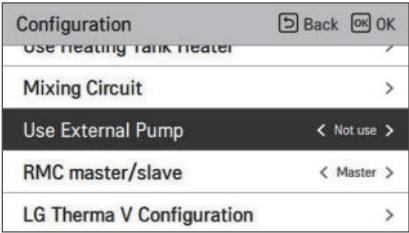
## NOTE

When using the Mixing Circuit function, the external pump setting must be changed to 'Circuit 1'.

# Use External Pump

This function can be set to control the external water pump.

- In the installer setting list, select Use External Pump category, and press [OK] button to move to the detail screen.
- Heating/Cooling  
You can use this feature when you have installed a 3 Way valve to switch the water flow between the underfloor and the water tank. The external pump operates only in the direction of water flow in the underfloor.
- Circuit1  
This function controls the external pump when operating the mixing circuit.  
The external pump should be controlled according to Th/on and Th/off in Circuit1(Direct circuit).  
Therefore, when using the mixing circuit, be sure to set the external pump to 'Circuit1'.

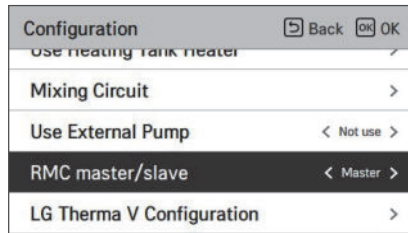
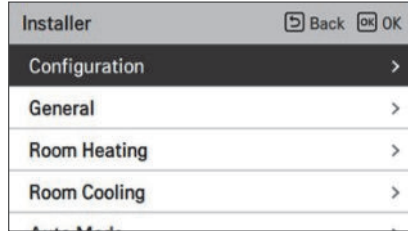


| Value             |     |             |          |
|-------------------|-----|-------------|----------|
| Not use (Default) | Use | Heat & Cool | Circuit1 |

## RMC master/slave

This function can be select Master/Slave on remote controller to use 2 Remote Control environment

- In the Installer setting list, and select RMC master/slave setting category, and press [<,>(left/right)] button to following setting values.

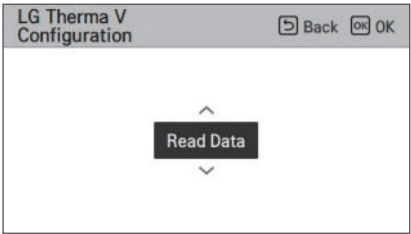
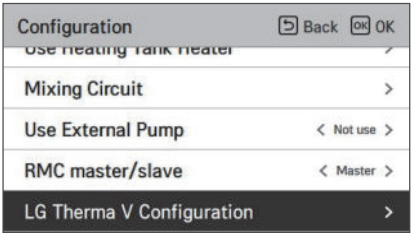


| Value            |       |
|------------------|-------|
| Master (Default) | Slave |

# LG Therma V Configuration

This function can be set to save the installation settings of the product for use in LG Therma V Configurator through SD Card (LG heating configurator).

- In the Installer setting list, and select LG Therma V Configuration setting category, and press [OK] button to move to the detail screen.



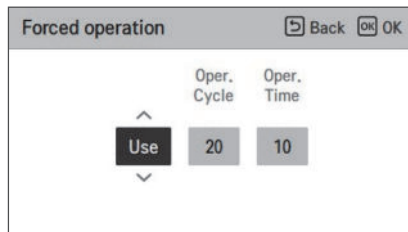
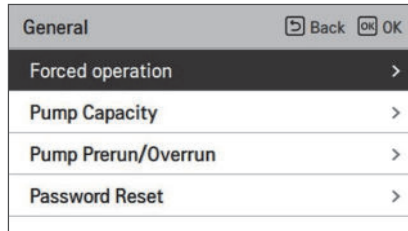
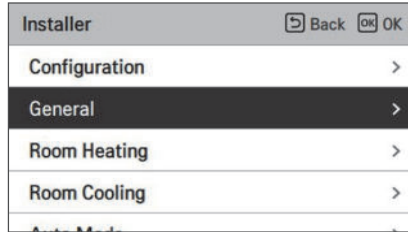
| Value               |           |
|---------------------|-----------|
| Read Data (Default) | Save Data |

## NOTE

When saving the environment settings of the product in the micro SD Card, please be sure to save the file name as "RS3\_AWHP\_DATA"

## Forced operation

- If the product is not used for a long time, the main water pump will be forced to operate for preventing pump failure and PHEX freezing.
- Water pump off After 20 consecutive hours, disable / enable the logic that drives the water pump by itself
- In the installer setting list, select Forced operation category, and press [OK] button to move to the detail screen

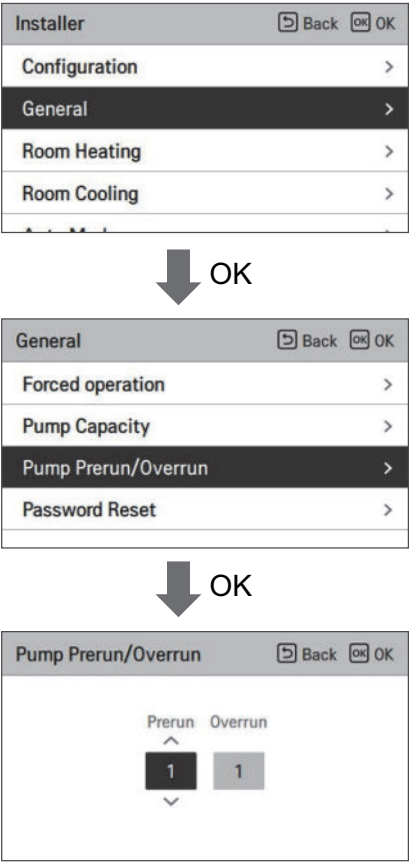


| Type        | Use (Default)                          | Not use |
|-------------|----------------------------------------|---------|
| Oper. Cycle | 20 ~ 180 hours<br>(Default : 20 hours) | -       |
| Oper. Time  | 1 ~ 10 min<br>(Default : 10 min)       | -       |

# Pump Prerun/Overrun

Pump Prerun operates to ensure sufficient flow before the compressor is operated. This is a function that allows heat exchange to work smoothly.

Pump Overrun is a function to prevent water pump failure and to help mechanical life.



| Value   | Default | Range    |
|---------|---------|----------|
| Prerun  | 1 min   | 1~10 min |
| Overrun | 1 min   | 1~10 min |



# Water Flow Control

This function controls the water flow by controlling the water pump. Select the way to control the water pump and set the target value

- In the installer setting list, select Configuration category, and press [OK] button to move to the detail screen.

- Optimal Flow Rate

The water pump is automatically controlled at the optimum flow rate required according to the desired temperature of the Main screen.

- Pump Capacity

It operates with the capacity set for the water pump.

- Fixed Flow Rate

The water pump is automatically controlled to maintain the set flow rate.

- Fixed  $\Delta T$

Set the target  $\Delta T$  (\* $\Delta T$  = temperature difference between inlet and outlet water temperature)

The water pump is automatically controlled to maintain the set  $\Delta T$ .

| General                   | Back | OK |
|---------------------------|------|----|
| Forced operation          |      | >  |
| Pump Prerun/Overrun       |      | >  |
| <b>Water Flow Control</b> |      | >  |
| Password Reset            |      | >  |



| Water Flow Control | Back | OK                    |
|--------------------|------|-----------------------|
| Control Method     |      | < Optimal Flow Rate > |
| Pump Capacity      |      | >                     |
| Fixed Flow Rate    |      | >                     |
| Fixed $\Delta T$   |      | >                     |

| Pump Capacity | Back | OK |
|---------------|------|----|
| %             |      |    |
| 100           |      |    |

| Fixed Flow Rate | Back | OK  |
|-----------------|------|-----|
| Heat            | Cool | DHW |
| 46              | 46   | 46  |

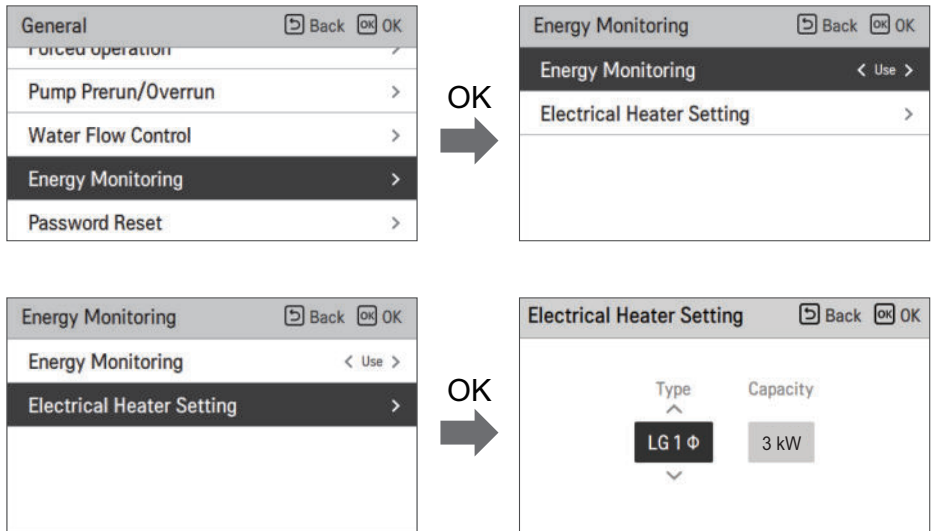
| Fixed $\Delta T$ | Back | OK  |
|------------------|------|-----|
| Heat             | Cool | DHW |
| 5                | 5    | 5   |

| Flow Control Method            |               |                 |                  |
|--------------------------------|---------------|-----------------|------------------|
| Optimal Flow Rate<br>(Default) | Pump Capacity | Fixed Flow Rate | Fixed $\Delta T$ |

## Energy Monitoring

This function can be set to use energy monitoring function of unit.

- Change setting values using [<,>(left/right)] button.



| Value                   |                 | Default | Range                    |
|-------------------------|-----------------|---------|--------------------------|
| Energy Monitoring       |                 | Use     | Use/Not Use              |
| Electric Heater Setting | Type            | LG 1Ø   | LG 1Ø / LG 3Ø / EXTERNAL |
|                         | Heater Capacity | 3 kW    | 1 kW ~ 10 kW             |

## Anti-Freezing Option 1

This function is to select whether to use Type1 or Type2 to prevent freezing when the remote control is turned off.

- Change setting values using [<,>(left/right)] button.

|                               |           |
|-------------------------------|-----------|
| <b>General</b>                | Back  OK  |
| Pump Firing/Overrun           | >         |
| Water Flow Control            | >         |
| Energy Monitoring             | >         |
| <b>Anti-Freezing Option 1</b> | < Type1 > |
| Password Reset                | >         |

| Value          |       |
|----------------|-------|
| Type1(Default) | Type2 |

### CAUTION

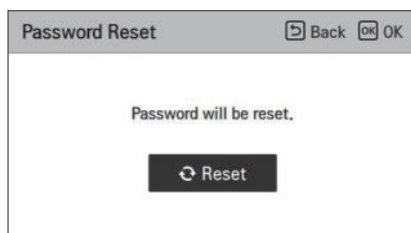
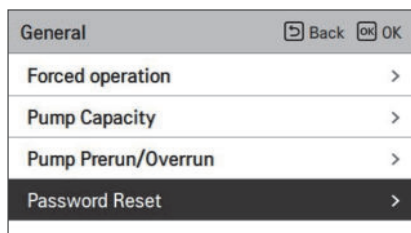
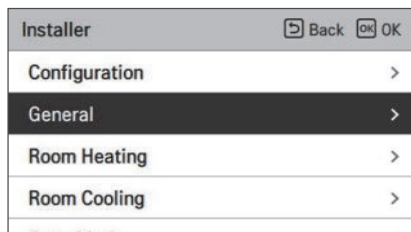
If the function is set to Type 2, there is a risk of freezing.

| Function | Detection            | Case                                                     | Operation              |
|----------|----------------------|----------------------------------------------------------|------------------------|
| Type 1   | Type 2 + Inlet Temp. | Air Temp. < Certain Level<br>Inlet Temp. < Certain Level | Pump always ON         |
|          |                      | Air Temp. < Certain Level<br>Inlet Temp. > Certain Level | Pump intermittently On |
|          |                      | Air Temp. > Certain Level<br>Inlet Temp. > Certain Level | Pump always OFF        |
| Type 2   | Air Temp.            | Air Temp. < Certain Level                                | Pump intermittently On |
|          |                      | Air Temp. > Certain Level                                | Pump always OFF        |

## Password Reset

It is the function to reset (0000) when you forgot the password set in the remote controller.

- In the installer setting list, select the password reset setting category, and press [OK] button to move to the detail screen.
- When you press “reset” button, a popup screen appears, and when you press “check” button, password reset starts, and the user password is changed to 0000.



## Heating temp. setting

- At the water control in heating mode, the control reference water temperature position setting  
- If the air / leaving water temperature selection setting is set to leaving water temperature
- Change setting values using [<,>(left/right)] button
- The function is not available for some products.

|               |         |
|---------------|---------|
| Installer     | Back OK |
| Configuration | >       |
| General       | >       |
| Room Heating  | >       |
| Room Cooling  | >       |
| Auto Mode     | >       |



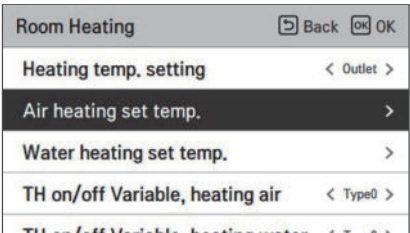
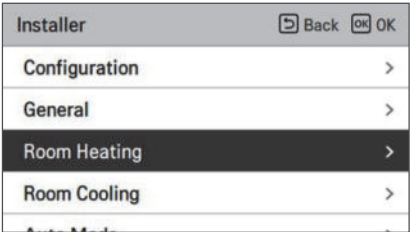
|                                 |            |
|---------------------------------|------------|
| Room Heating                    | Back OK    |
| Heating temp. setting           | < Outlet > |
| Air heating set temp.           | >          |
| Water heating set temp.         | >          |
| TH on/off Variable, heating air | < Type0 >  |

| Value            |       |
|------------------|-------|
| Outlet (Default) | Inlet |

# Air heating set temp.

Determine heating setting temperature range when air temperature is selected as setting temperature

- In the installer setting list, select Air heating set temp. category, and press [OK] button to move to the detail screen.



| Value | Default | Range |
|-------|---------|-------|
| Max.  | 30      | 30~24 |
| Min.  | 16      | 22~16 |

\* Upper / lower limit / default value is in °C

## CAUTION

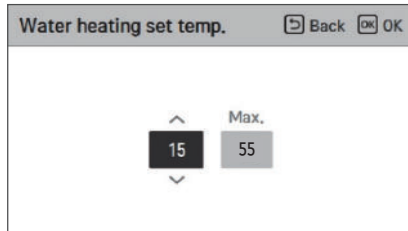
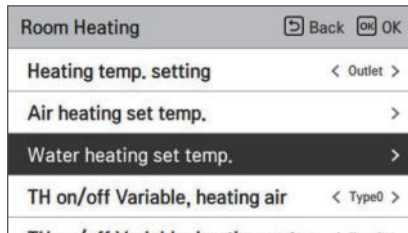
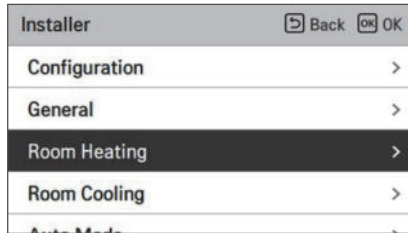
It is possible to control the unit based on room air temperature by using either remote air temperature sensor or wired remote controller (RS3).

- Remote room air sensor is an accessory (PQRSTA0) and sold separately.
- DIP switch setting should be set properly in order to control the unit based on room air temperature.

## Water heating set temp

Determine heating setting temperature range when water temperature is selected as setting temperature.

- In the installer setting list, select Water heating set temp. category, and press [OK] button to move to the detail screen.



| Value |                  | Default | Range   |
|-------|------------------|---------|---------|
| Max.  | Outlet           | 55      | 55 ~ 35 |
|       | Inlet            | 50      | 50 ~ 35 |
| Min.  | E/heater use     | 15      | 34 ~ 15 |
|       | E/heater Not use | 20      | 34 ~ 20 |

\* Value is in °C

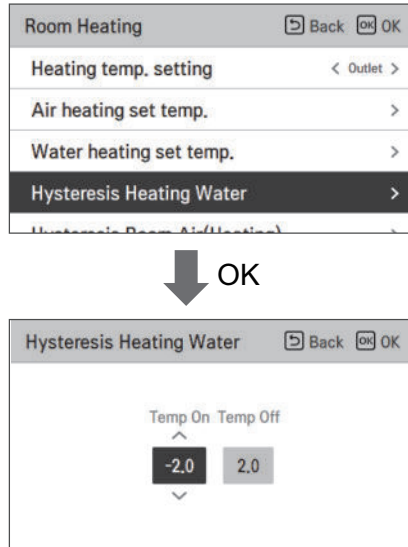
### NOTE

- When the E/heater is not used, the minimum temperature of the water temperature can be set from 34 °C to 20 °C and default value is 20 °C.

## Hysteresis Heating Water

It is a function to adjust the heating water temperature Thermal On / Off temperature according to the field environment in order to offer optimized heating operation.

- In the Installer setting list, and select Hysteresis Heating Water category, and press [OK] button to move to the detail screen.



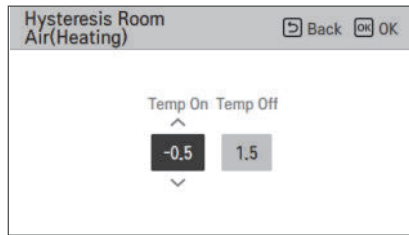
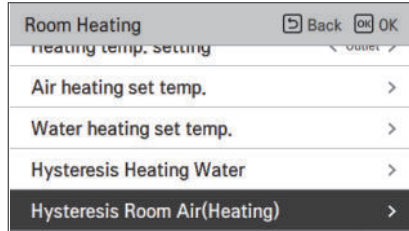
| Type     | Default | Range  |
|----------|---------|--------|
| Temp On  | -2      | 0 ~ -9 |
| Temp Off | 2       | 4 ~ 0  |



## Hysteresis Room Air(Heating)

It is a function to adjust the heating air temperature Thermal On / Off temperature according to the field environment in order to offer optimized heating operation.

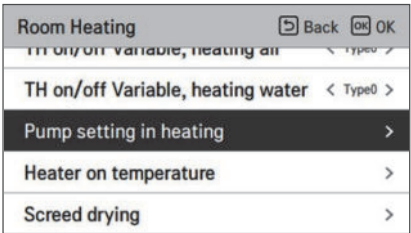
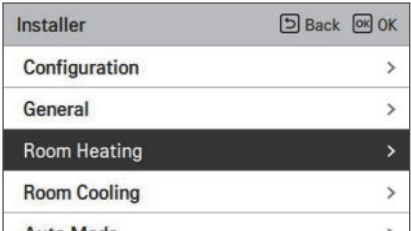
- In the Installer setting list, and select Hysteresis Room Air(Heating) category, and press [OK] button to move to the detail screen.



| Type     | Default | Range  |
|----------|---------|--------|
| Temp On  | -0.5    | 0 ~ -3 |
| Temp Off | 1.5     | 4 ~ 0  |

# Pump setting in heating

- It is a function to help the water pump's mechanical life by putting the water pump's rest time.
- Installer setting function to set water pump on/off interval option during thermo off condition in heating mode.
- In the installer setting list, select Pump setting in heating category, and press [OK] button to move to the detail screen.

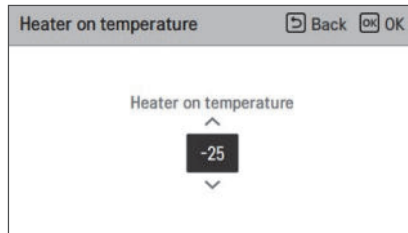
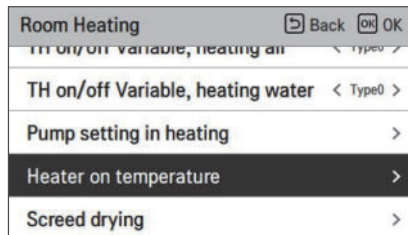
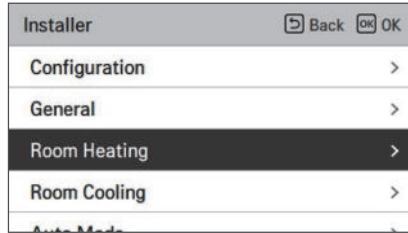


| Type                      | On                              | Off                             |
|---------------------------|---------------------------------|---------------------------------|
| Time setting<br>(Default) | 1 ~ 60 min<br>(Default : 2 min) | 1 ~ 60 min<br>(Default : 1 min) |
| Operation continue        | -                               | -                               |

## Heater on temperature

Depending on local climatic conditions, it is necessary to change the temperature condition in which electric heater turns on / off.

- In the installer setting list, Heater on temperature category, and press [OK] button to move to the detail screen.



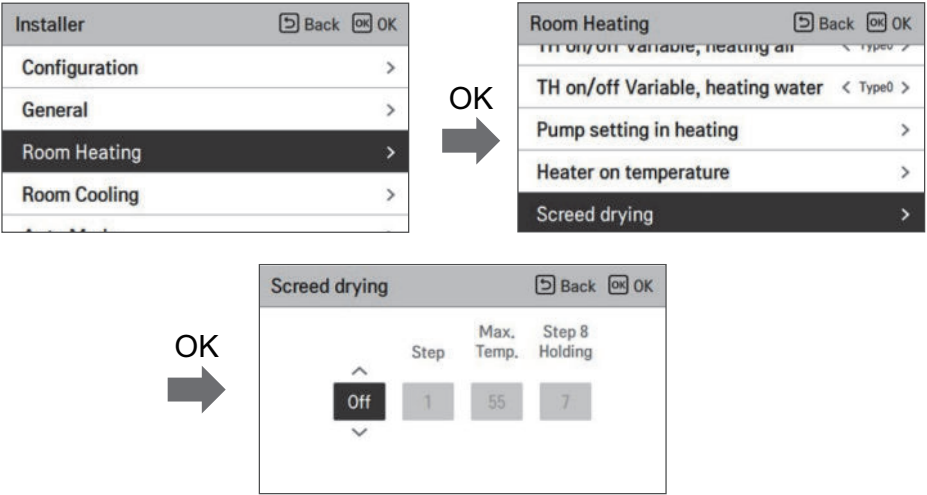
| Default | Range  |
|---------|--------|
| -5      | 18~-25 |

\* Upper / lower limit / default value is in °C

# Screed drying

This function is a unique feature of AWHP that, when AWHP is installed in a new concrete structure, controls the specific temperature floor heating out temperature for a certain period of time to cure the floor cement.

- In the installer setting list, select Screed drying category, and press [OK] button to move to the detail screen.



## How to display

Main Screen - Displays 'Screed drying' on the desired temperature display. The step in progress at the bottom of the display is displayed.

## Setting value

- Start-up step: 1 ~ 11
- Maximum temperature : 35 °C ~ 55 °C (Default : 55 °C)
- Step 8 Holding time : 1 days ~ 30 days (Default : 7 days)

## Function operation

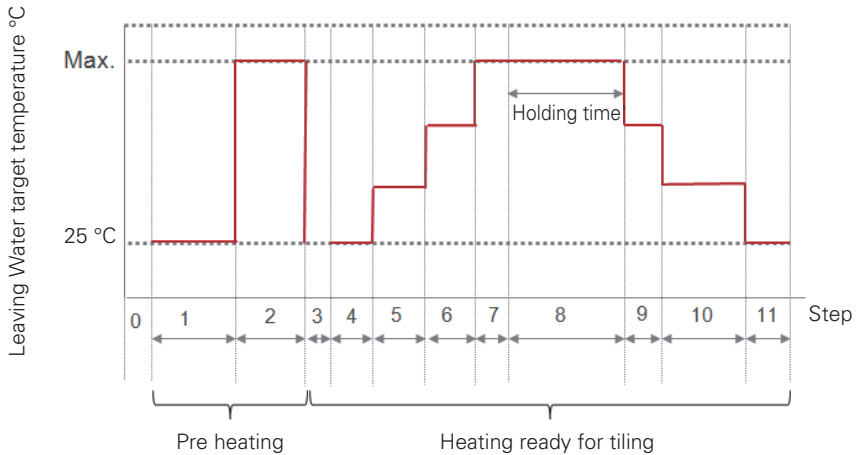
- It is performed by the following procedure from the selected starting step.
- After all steps are completed, turn off the cement curing operation.

| Step                                 | 1  | 2     | 3   | 4  | 5  | 6  | 7     | 8            | 9  | 10 | 11 |
|--------------------------------------|----|-------|-----|----|----|----|-------|--------------|----|----|----|
| Leaving Water target temperature[°C] | 25 | Max.T | Off | 25 | 35 | 45 | Max.T | Max.T        | 45 | 35 | 25 |
| Duration [hours]                     | 72 | 96    | 72  | 24 | 24 | 24 | 24    | Holding time | 72 | 72 | 72 |

※ If the upper limit setting value of the heating LW temperature is 55 °C or lower, it is set to 55 °C forcibly.

## NOTE

- During Screed drying operation, button input except for installer function and temperature display is restricted.
- When the power is applied again after a power outage during product operation, the product operation state before power failure is remembered and the product is automatically operated.
- Screed drying operation stops when an error occurs / When error is cleared, restart cement Screed drying. (However, if the wired remote control is reset to the error occurrence state, it is compensated in the unit of one day)
- Upon releasing after an error, Screed drying operation may take up to 1 minute of waiting time after boot up. (The Screed drying operation status is judged as 1 minute cycle.)
- During Screed drying operation, installer function Screed drying operation is selectable.
- During Screed drying operation, starting operation, low noise mode off, low noise time setting off, hot water off, solar heat off.
- During Screed drying operation, simple, sleep, on, off, weekly, holiday, heater does not execute reservation operation.



Cooling temp. setting

- At the water control in cooling mode, the control reference water temperature position setting
- If the air / leaving water temperature selection setting is set to leaving water temperature
- Change setting values using [<,>(left/right)] button.
- The function is not available for some products.

|                    |      |    |
|--------------------|------|----|
| Installer          | Back | OK |
| General            |      |    |
| Room Heating       |      | >  |
| Room Cooling       |      | >  |
| Auto Mode          |      | >  |
| Domestic Hot Water |      | >  |



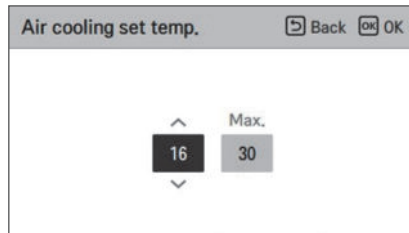
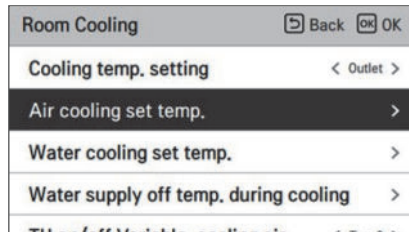
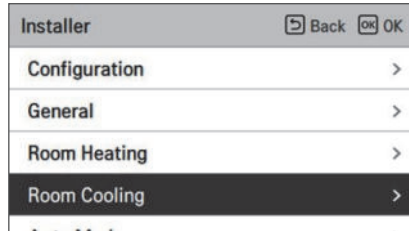
|                                       |            |    |
|---------------------------------------|------------|----|
| Room Cooling                          | Back       | OK |
| Cooling temp. setting                 | < Outlet > |    |
| Air cooling set temp.                 |            | >  |
| Water cooling set temp.               |            | >  |
| Water supply off temp. during cooling |            | >  |

| Value            |       |
|------------------|-------|
| Outlet (Default) | Inlet |

## Air cooling set temp.

Determine cooling setting temperature range when air temperature is selected as setting temperature.

- In the installer setting list, select Air cooling set temp category, and press [OK] button to move to the detail screen.



| Value | Default | Range |
|-------|---------|-------|
| Max.  | 30      | 30~24 |
| Min.  | 18      | 22~16 |

\* Upper / lower limit / default value is in °C

### NOTE

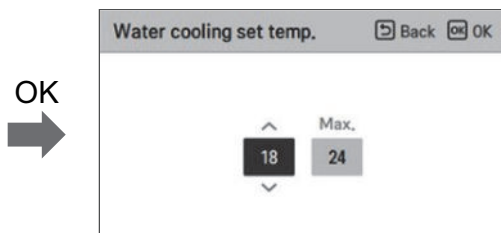
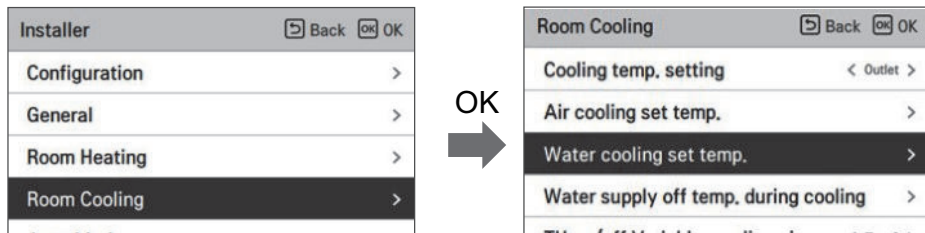
It is possible to control the unit based on room air temperature by using either remote air temperature sensor or wired remote controller (RS3).

- Remote room air sensor is an accessory (PQRSTA0) and sold separately.
- DIP switch setting should be set properly in order to control the unit based on room air temperature.

## Water cooling set temp

Determine cooling setting temperature range when water temperature is selected as setting temperature.

- In the installer setting list, select water cooling set temp category, and press [OK] button to move to the detail screen.



| Value |        | Default | Range |
|-------|--------|---------|-------|
| Max.  |        | 24      | 22~27 |
| Min.  | Outlet | 5       | 5~20  |
|       | Inlet  | 10      | 10~20 |

※ Value is in °C

※ When set to inlet temperature, the default value of Min. temp is set to the minimum value that can be set.

### NOTE

Water condensation on the floor

- While cooling operation, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can be occurred on the floor.
- If floor is in humid environment, do not set leaving water temperature below 18 °C.

### NOTE

Water condensation on the radiator

- While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred.



## Water supply off temp. during cooling

Determine the leaving water temperature which blocks the flow into underfloor coil in cooling mode. This function is used for preventing condensation on the floor in cooling mode

- In the installer setting list, select Water supply off temp. during cooling category, and press [OK] button to move to the detail screen.

Installer [Back] [OK]

- Configuration >
- General >
- Room Heating >
- Room Cooling >**



Room Cooling [Back] [OK]

- Air cooling set temp. >
- Water cooling set temp. >
- Water supply off temp. during cooling >**
- TH on/off Variable, cooling air < Type0 >



Water supply off temp. during cooling [Back] [OK]

FCU Stop temp.

Use 16

| Value      | Default | Range         |
|------------|---------|---------------|
| FCU        | Use     | Use / Not use |
| Stop temp. | 16      | 25 ~ 16       |

\* Value is in °C

### NOTE

- If the FCU is not used, the stop temp. cannot be set.
- Depending on FCU setting, the water cooling set temperature range is adjusted.

- Stop temp. : cut-off temperature. Stop temp. is valid when FCU is installed.
- FCU : determines if FCU is installed or not.
- Example : If FCU is set as 'Use', Stop temp. setting is disabled. However, if actually FCU is NOT installed in the water loop, the unit operates continuously in cooling mode until water temperature meets desired temperature. In this case, a condensed water may form on the floor caused by cold water in the underfloor coil.
- Example : If Stop temp. is set as '20' and FCU is set as 'Not use' and actually FCU is installed in the water loop, then the Stop temp. is used and the unit stops operation in cooling mode when the leaving water temperature is below 20 °C. As a result, the unit may not offer enough cooling since the cold water with desired temperature doesn't flow into the FCU.



## CAUTION

### FCU Installation

- If FCU is used, related 2way valve should be installed and connected to the Main PCB assembly 1.
- If FCU is set as 'Use' whereas FCU or 2way valve is NOT installed, the unit can do abnormal operation.

# Hysteresis Cooling Water

It is a function to adjust the cooling water temperature Thermal On / Off temperature according to the field environment in order to offer optimized cooling operation.

- In the Installer setting list, and select Hysteresis Cooling Water setting category, and press [OK] button to move to the detail screen.

Room Cooling Back OK

Water cooling set temp. >

Water supply off temp. during cooling >

**Hysteresis Cooling Water** >

Hysteresis Room Air(Cooling) >

Pump setting in cooling >



Hysteresis Cooling Water Back OK

Temp On Temp Off

>

0.5

<

>

-0.5

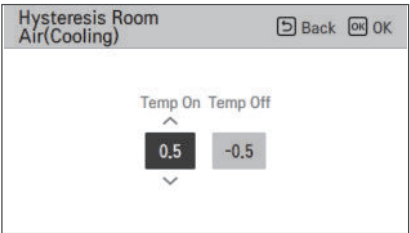
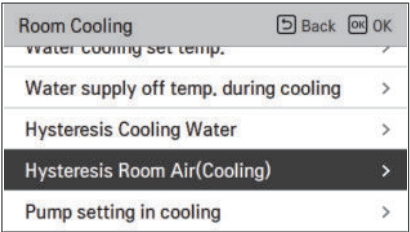
<

| Type     | Default | Range  |
|----------|---------|--------|
| Temp On  | 0.5     | 3 ~ 0  |
| Temp Off | -0.5    | 0 ~ -3 |

# Hysteresis Room Air(Cooling)

It is a function to adjust the cooling air temperature Thermal On / Off temperature according to the field environment in order to offer optimized cooling operation.

- In the Installer setting list, and select Hysteresis Room Air(Cooling) setting category, and press [OK] button to move to the detail screen.



| Type     | Default | Range  |
|----------|---------|--------|
| Temp On  | 0.5     | 3 ~ 0  |
| Temp Off | -0.5    | 0 ~ -3 |

## Pump setting in cooling

- It is a function to help the water pump's mechanical life by putting the water pump's rest time.
- Installer setting function to set water pump on/off interval option during thermo off condition in cooling mode.
- In the installer setting list, select Pump setting in cooling category, and press [OK] button to move to the detail screen.

The screen shows the 'Installer' menu with options: General, Room Heating, Room Cooling (highlighted), Auto Mode, and Domestic Hot Water. At the top right are 'Back' and 'OK' buttons.



The screen shows the 'Room Cooling' menu with options: water cooling set temp., Water supply off temp. during cooling, TH on/off Variable, cooling air, TH on/off Variable, cooling water, and Pump setting in cooling (highlighted). At the top right are 'Back' and 'OK' buttons.



The screen shows the 'Pump setting in cooling' detail screen. It has a 'Type' dropdown menu (currently showing 'Time setting'), and two buttons labeled 'On' and 'Off'. The 'On' button has the number '2' and the 'Off' button has the number '1'. At the top right are 'Back' and 'OK' buttons.

| Type                      | On                              | Off                             |
|---------------------------|---------------------------------|---------------------------------|
| Time setting<br>(Default) | 1 ~ 60 min<br>(Default : 2 min) | 1 ~ 60 min<br>(Default : 1 min) |
| Operation continue        | -                               | -                               |

## Seasonal auto temp.

It is the function to set the operation reference value in Seasonal Auto mode.

- In the installer setting list, select Seasonal auto temp category, and press [OK] button to move to the detail screen.

Auto Mode Back OK

Seasonal auto temp >

OK

Seasonal auto temp Back OK

Mode < Heat & Cool >

Outdoor Temp. >

Target Temp. >

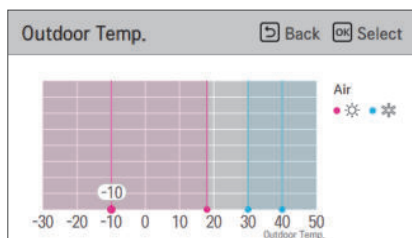
Seasonal auto temp Back OK

Mode < Heat & Cool >

Outdoor Temp. >

Target Temp. >

OK



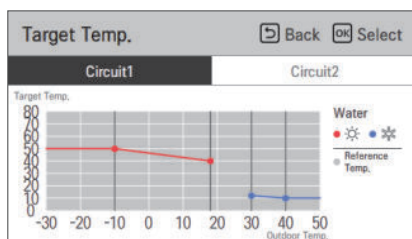
Seasonal auto temp Back OK

Mode < Heat & Cool >

Outdoor Temp. >

Target Temp. >

OK



| Function             | Description                 | Range                                                                                                                                                                                           | Default (Circuit1) | Default (Circuit2) | Boundary                         |
|----------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|----------------------------------|
| Outdoor1,Heat (Out1) | Heating lower ambient temp  | -20 ~ 35 °C                                                                                                                                                                                     | -10 °C             |                    | Out1 ≤ Out2-1                    |
| Outdoor2,Heat (Out2) | Heating higher ambient temp |                                                                                                                                                                                                 | 18 °C              |                    | Out2 ≥ Out1 +1<br>Out2 ≤ Out3 -5 |
| Outdoor3,Cool (Out3) | Cooling lower ambient temp  | 10 ~ 46 °C                                                                                                                                                                                      | 30 °C              |                    | Out3 ≥ Out2 +5<br>Out3 ≤ Out4 -1 |
| Outdoor4,Cool (Out4) | Cooling higher ambient temp |                                                                                                                                                                                                 | 40 °C              |                    | Out4 ≥ Out3 +1                   |
| Water1,Heat (LW1)    | Heating higher water temp   | Use heater :<br>LW STD : 15~55 °C<br>EW STD : 15~50 °C<br>Not use heater :<br>LW STD : 20~55 °C<br>EW STD : 20~50 °C                                                                            | 50 °C              | 35 °C              | LW1 ≥ LW2                        |
| Water 2,Heat (LW2)   | Heating lower water temp    |                                                                                                                                                                                                 | 40 °C              | 28 °C              | LW1 ≥ LW2                        |
| Water3,Cool (LW3)    | Cooling higher water temp   | Use FCU & 5 °C<br>IDU :<br>LW STD : 5~27 °C<br>EW STD : 10~27 °C<br>Use FCU & 6 °C<br>IDU :<br>LW STD : 6~27 °C<br>EW STD : 11~27 °C<br>Not use FCU :<br>LW STD : 16~27 °C<br>EW STD : 20~27 °C | 12 °C              | 18 °C              | LW3 ≥ LW4                        |
| Water4,Cool (LW4)    | Cooling lower water temp    |                                                                                                                                                                                                 | 10 °C              | 16 °C              | LW3 ≥ LW4                        |
| Air 1, Heat (RA1)    | Heating higher air temp     | 16 ~ 30 °C                                                                                                                                                                                      | 21 °C              |                    | RA1 ≥ RA2                        |
| Air 2, Heat (RA2)    | Heating lower air temp      |                                                                                                                                                                                                 | 19 °C              |                    | RA1 ≥ RA2                        |
| Air 3, Cool (RA3)    | Cooling higher air temp     | 18 ~ 30 °C                                                                                                                                                                                      | 21 °C              |                    | RA3 ≥ RA4                        |
| Air 4, Cool (RA4)    | Cooling lower air temp      |                                                                                                                                                                                                 | 19 °C              |                    | RA3 ≥ RA4                        |

- Setting range: Celsius

- Seasonal Auto Driving mode: Heating, Heating & Cooling

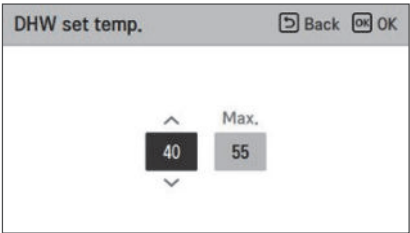
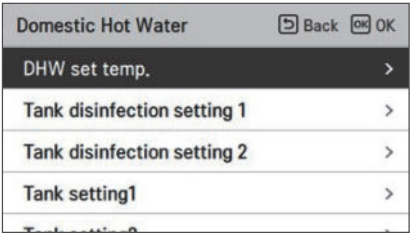
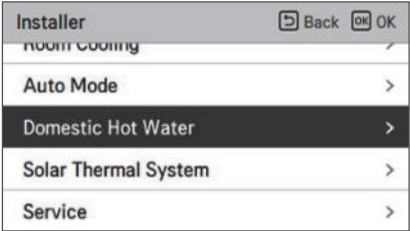
\* If heating mode is selected, heating & cooling or cooling can not be selected.

- Depending on the air / outflow control selection value, the water / air related setting value is displayed on the screen (seasonal auto temp) .

# DHW set temp

Determine heating setting temperature range when DHW temperature is selected as setting temperature

- In the installer setting list, select DHW set temp. category, and press [OK] button to move to the detail screen.



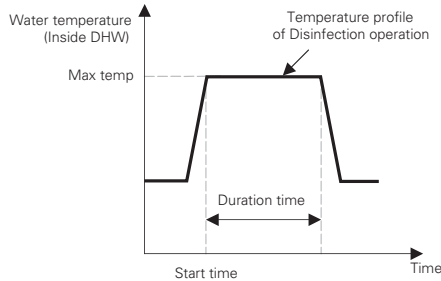
| Value | Default | Range |
|-------|---------|-------|
| Max.  | 50      | 80~50 |
| Min.  | 40      | 40~30 |

\* Upper / lower limit / default value is in °C



# Tank disinfection setting 1, 2

- Disinfection operation is special DHW tank operation mode to kill and to prevent growth of legionella inside the tank.
  - Disinfection active : Selecting enable or disable of disinfection operation.
  - Start date : Determining the date when the disinfection mode is running.
  - Start time : Determining the time when the disinfection mode is running.
  - Max temp. : Target temperature of disinfection mode.
  - Duration time : Duration of disinfection mode.



- In the installer setting list, select 'Domestic Hot Water' category, and press [OK] button to move to the tank disinfection setting screen.

Domestic Hot Water [Back] [OK]

DHW set temp. >

**Tank disinfection setting 1 >**

Tank disinfection setting 2 >

Tank setting1 >



Tank disinfection setting 1 [Back] [OK]

Disinfection active Start date Start time

Not use Fri. 23

Domestic Hot Water [Back] [OK]

DHW set temp. >

Tank disinfection setting 1 >

**Tank disinfection setting 2 >**

Tank setting1 >



Tank disinfection setting 2 [Back] [OK]

Max temp. Duration time Forced end time

70 10 1

| Value               | Default | Range         |
|---------------------|---------|---------------|
| Disinfection active | Not use | Use / Not use |
| Start date          | Fri.    | Mon. ~ Sun.   |
| Start time          | 23      | 23 ~ 00       |

| Value           | Default | Range                      |
|-----------------|---------|----------------------------|
| Max temp.       | 70      | 60 ~ 80                    |
| Duration time   | 10      | 60 ~ 5<br>(Change unit: 5) |
| Forced and time | 1       | 1 ~ 12                     |

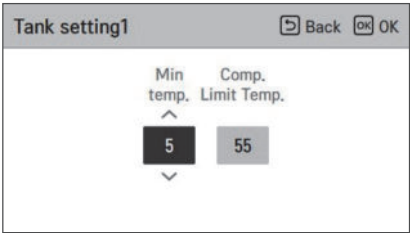
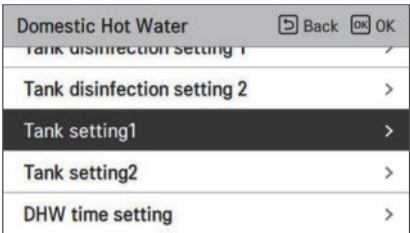
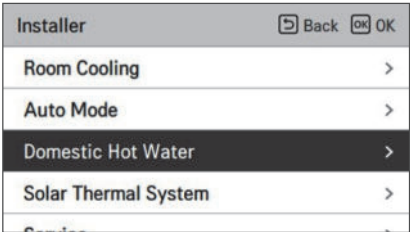
## NOTE

DHW heating should be enable

- If Disinfection active is set as 'Not use', that is 'disable disinfection mode', Start date and Start time is not used.

# Tank setting 1

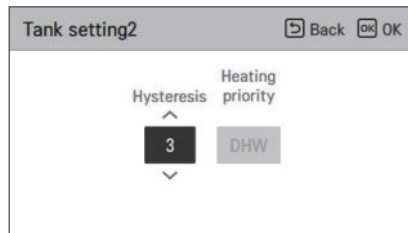
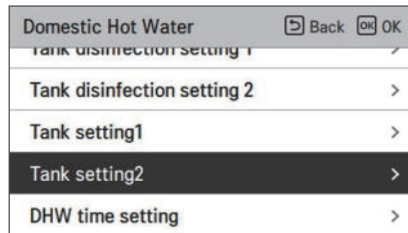
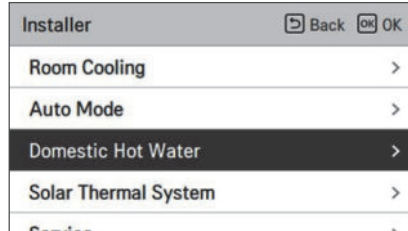
- In the installer setting list, select tank setting 1 category, and press [OK] button to move to the detail screen.



| Value            | Default | Range      |
|------------------|---------|------------|
| Min temp         | 5 °C    | 30 ~ 1 °C  |
| Comp. Limit Temp | 50 °C   | 50 ~ 40 °C |

## Tank setting 2

- In the installer setting list, select tank setting 2 category, and press [OK] button to move to the detail screen.



| Value      | Default | Range    |
|------------|---------|----------|
| Hysteresis | 3 °C    | 4 ~ 2 °C |

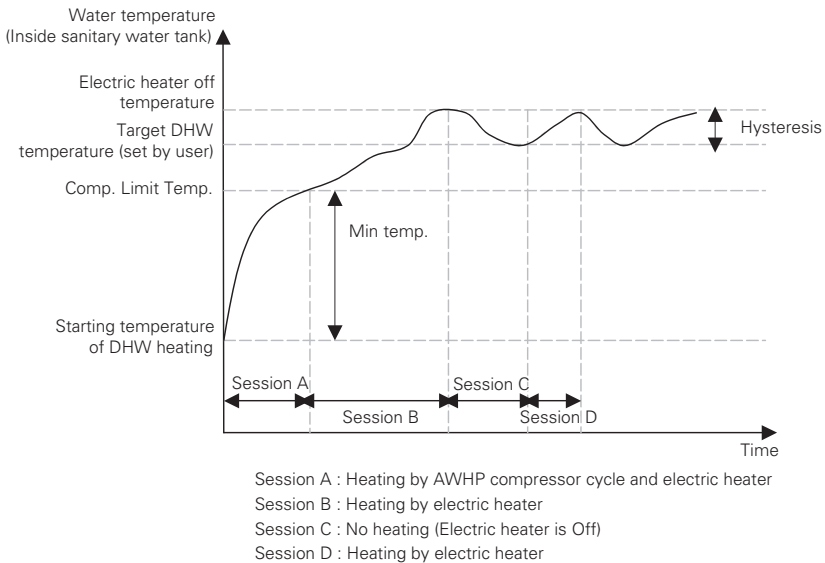
### NOTE

The Heating priority in IWT products is always 'DHW'.

### • Tank setting 1, 2

Descriptions for each parameters are as following.

- Min temp. : temperature gap from Max outdoor temp.
- Comp. Limit Temp. : maximum temperature generated by AWHP compressor cycle.
- Example : If Min temp. is set as '5' and Comp. Limit Temp. is set as '48', then Session A (see the graph) will be started when the water tank temperature is below 43 °C.... If temperature is above 48 °C..., then Session B will be started.
- Hysteresis : temperature gap from target DHW temperature. This value is required to prevent frequent On and Off of electric heater.
- Example : If user's target temperature is set as '70' and Hysteresis is set as '3', then the electric heater will be turned off when the water temperature is above 73 °C. The electric heater will be turned on when the water temperature is below 70 °C.
- Example : If Heating priority is set as 'DHW', that means heating priority is on DHW heating, DHW is heated by AWHP compressor cycle and electric heater. In this case the under floor can not be heated while DHW heating. On the other hand, if the Heating priority is set as 'Floor heating', that means heating priority is on under floor heating, DHW tank is ONLY heated by electric heater. In this case the under floor heating is not stopped while DHW is heated.



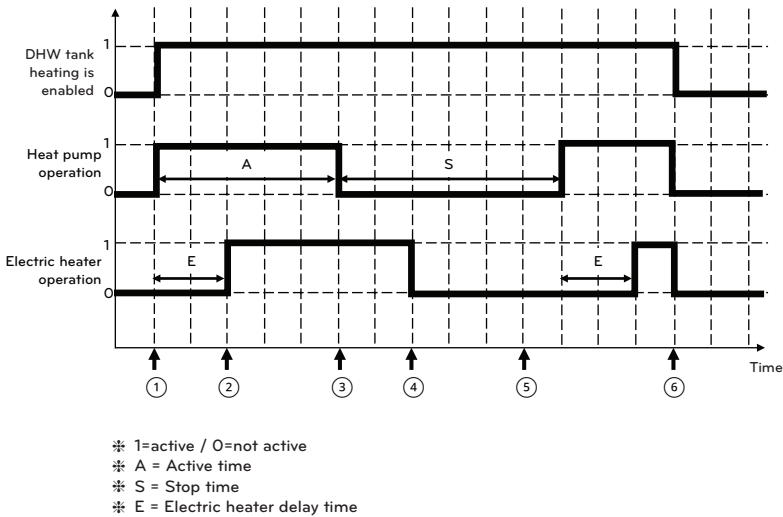
### NOTE

DHW heating does not operate when it is disabled.

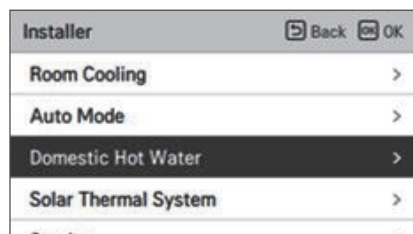
## DHW time setting

Determine following time duration : operation time of DHW tank heating, stop time of DHW tank heating, and delay time of DHW tank heater operating.

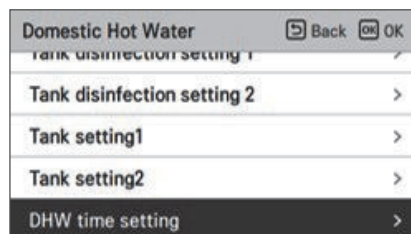
- Active time : This time duration defines how long time DHW tank heating can be continued.
- Stop time : This time duration defines how long time DHW tank heating can be stopped. It is also regarded as time gap between DHW tank heating cycle.
- Electric heater delay time : This time duration defines how long time electric heater will not be turned on in DHW heating operation. The electric heater delay time setting can be set in the **'Use Heating Tank Heater'** category.
- Example of timing chart :



|   |                                                                                                 |
|---|-------------------------------------------------------------------------------------------------|
| ① | Heat pump ON condition                                                                          |
| ② | Electric heater starts after delay time, if heat pump has not reached target temperature yet    |
| ③ | Heat pump OFF even if hot water target is not reached                                           |
| ④ | Hot water heating interrupted (Heat pump may commence with Heating or Cooling during Stop time) |
| ⑤ | Hot water heating re-starts                                                                     |
| ⑥ | DHW heating is disabled (by reaching target temperature or by schedule or manually)             |



OK



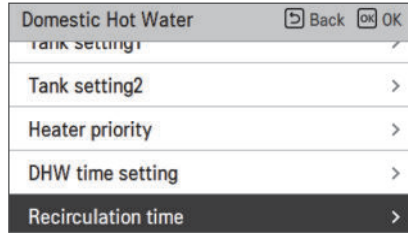
OK



| Value       | Default | Range     |
|-------------|---------|-----------|
| Active time | 30 min  | 5~95 min  |
| Stop time   | 30 min  | 0~600 min |

## Recirculation time

- It is function to set recirculation water pump on/off interval option
- In the installer setting list, select Recirculation time category, and press [OK] button to move to the detail screen.

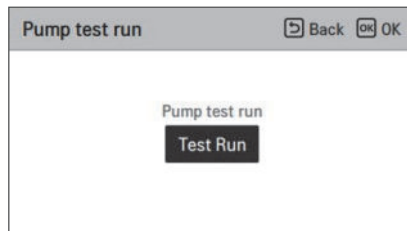
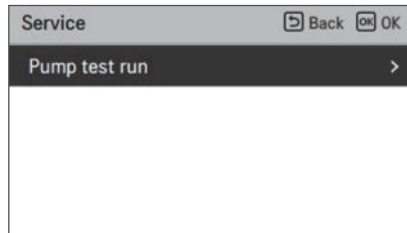
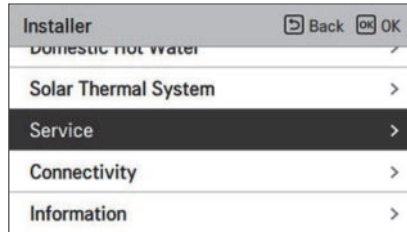


| Value             | Default | Range         |
|-------------------|---------|---------------|
| DHW recirculation | Not use | Use / Not use |
| ON Time           | 10 min  | 5 ~ 60 min    |
| OFF Time          | 20 min  | 5 ~ 60 min    |

## Pump test run

The pump test run is the function to test run by operating the main water pump for one hour. This function can be used for air vents / flow sensors and others.

- In the installer setting list, Pump Test run category, and press [OK] button to move to the detail screen.
- Both a space heating line and a DHW line are open during the pump test run operation.

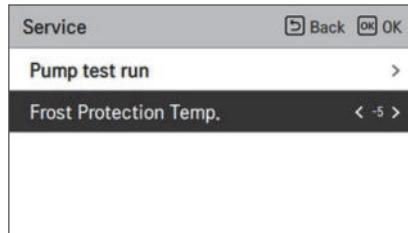
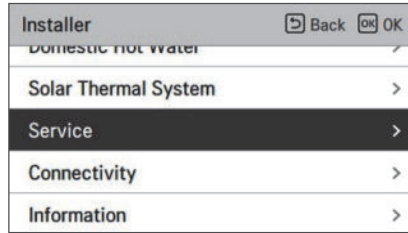




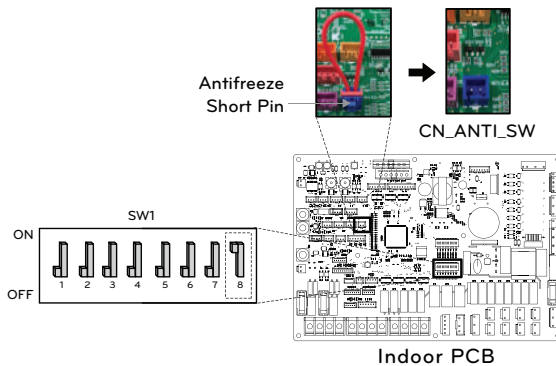
## Frost Protection Temp.

Frost protection temperature setting is available in installer mode. It prevents frostbite from happening In the range of -25 to -5 degree celsius.

- Change setting values using [**<**, **>**(left/right)] button.



| Default | Value                      |
|---------|----------------------------|
| -5      | -5 / -10 / -15 / -20 / -25 |



### NOTE

To use this function, the antifreeze short pin (CN\_ANTI\_SW) must be open and Switch No.8 in option SW1 must be on.

## BUH for DHW in emerg.

This function selects whether or not to heat DHW with Backup Heater when emergency operation is entered.

- Change setting values using [<, >(left/right)] button.
- The function is not available for some products.

| Service                | Back | OK        |
|------------------------|------|-----------|
| Pump test run          |      | >         |
| Frost Protection Temp. | <    | -10 >     |
| BUH for DHW in emerg.  | <    | Not use > |
|                        |      |           |

| Default | Range         |
|---------|---------------|
| Use     | Use / Not use |

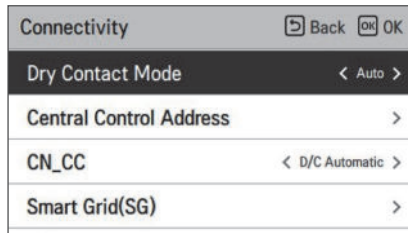
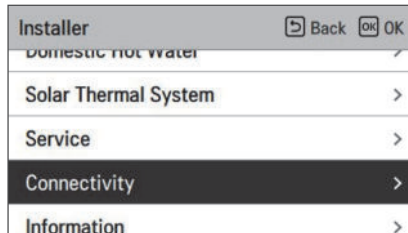
### NOTE

When Use is selected, heating and hot water are switched according to the product operation logic.

## Dry Contact Mode

Dry contact function is the function that can be used only when the dry contact devices is separately purchased and installed.

- Change setting values using [<,>(left/right)] button.
  - Setting up operation status when dry contact on
    - Auto : Automatically, Operation ON with release hard lock
    - Manual : Keep Operation OFF with release hard lock
- ※ Dry contact Off : Operation Off + Hard Lock



| Value          |
|----------------|
| Auto (Default) |
| manual         |

### NOTE

For dry contact mode related detail functions, refer to the individual dry contact manual.

What is dry contact?

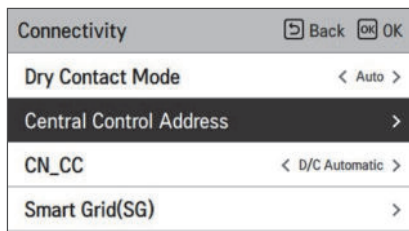
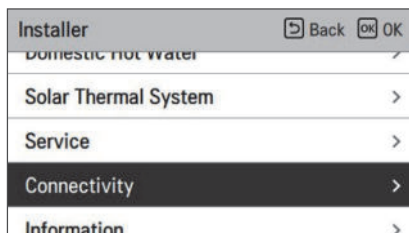
It means the contact point signal input when the hotel card key, human body detection sensor, etc. are interfacing with the unit.

Added system functionality by using external inputs (dry contacts and wet contacts).

## Central Control Address

When connecting the central control, set the central control address of the unit.

- In the installer setting list, select Central Control Address category, and press [OK] button to move to the detail screen.



### NOTE

Enter address code as hexadecimal value

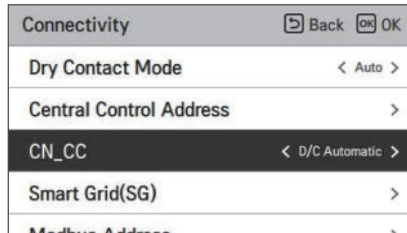
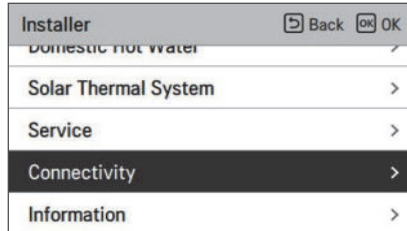
Front: Central Control Gr. No.

Back side: Central control indoor the number

## CN\_CC

It is the function to set the usage of the unit's CN\_CC port.

- Change setting values using [<,>(left/right)] button



| Value                      | Description                                                                                                                                    |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| D/C Automatic<br>(Default) | When power is applied to the product, the unit when the contact point is on in Dry Contact installed state recognizes Dry Contact installation |
| D/C Not Installed          | Do not use (install) Dry Contact                                                                                                               |
| D/C Installed              | Use (install) Dry Contact                                                                                                                      |

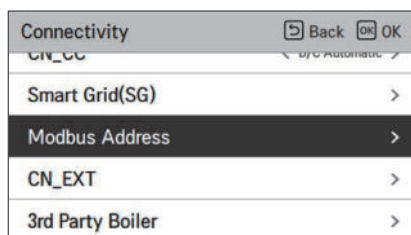
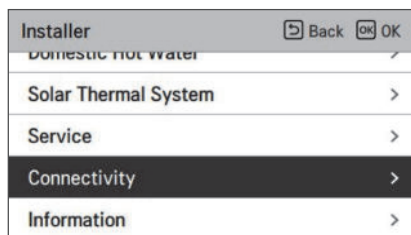
### NOTE

CN\_CC is the device connected to the unit to recognize and control the external contact point.

## Modbus Address

It is function to set the address of the Modbus device that is externally linked to the product. Modbus address setting function is available from indoor unit.

- In the installer setting list, select Modbus Address , and press [OK] button to move to the detail screen.



### NOTE

To use this function, switch No.1 of option switch 1 must be turned ON.

## Modbus gateway memory map

### NOTE

In case of Split IWT, RTU Gateway should be installed for using modbus and refer to the RTU Gateway installation manual for memory maps.

Baud Rate : 9 600 bps Stop Bit : 1 stop bit Parity : None Parity

### Coil Register (0x01)

| Register | Description                      | Value explanation                         |
|----------|----------------------------------|-------------------------------------------|
| 00001    | Enable/Disable (Heating/Cooling) | 0 : Operation OFF / 1 : Operation ON      |
| 00002    | Enable/Disable (DHW)             | 0 : Operation OFF / 1 : Operation ON      |
| 00003    | Silent Mode Set                  | 0 : Silent mode OFF / 1 : Silent mode ON  |
| 00004    | Trigger Disinfection operation   | 0 : Keep status / 1 : Operation start     |
| 00005    | Emergency Stop                   | 0 : Normal operation / 1 : Emergency stop |
| 00006    | Trigger Emergency Operation      | 0 : Keep status / 1 : Operation Start     |

### Discrete Register (0x02)

| Register | Description                                              | Value explanation                                   |
|----------|----------------------------------------------------------|-----------------------------------------------------|
| 10001    | Water flow status                                        | 0 : Flow rate ok / 1 : Flow rate too low            |
| 10002    | Water Pump status                                        | 0 : Water Pump OFF / 1 : Water Pump ON              |
| 10003    | Ext. Water Pump status                                   | 0 : Water Pump OFF / 1 : Water Pump ON              |
| 10004    | Compressor status                                        | 0 : Compressor OFF / 1 : Compressor ON              |
| 10005    | Defrosting status                                        | 0 : Defrost OFF / 1 : Defrost ON                    |
| 10006    | DHW heating status<br>(DHW Thermal On/Off)               | 0 : DHW inactive / 1 : DHW active                   |
| 10007    | DHW Tank disinfection status                             | 0 : Disinfection inactive / 1 : Disinfection active |
| 10008    | Silent mode status                                       | 0 : Silent mode inactive / 1 : Silent mode active   |
| 10009    | Cooling status                                           | 0 : No cooling / 1 : Cooling operation              |
| 10010    | Solar pump status                                        | 0 : Solar pump OFF / 1 : Solar pump ON              |
| 10011    | Backup heater (Step 1) status                            | 0 : OFF / 1 : ON                                    |
| 10012    | Backup heater (Step 2) status                            | 0 : OFF / 1 : ON                                    |
| 10013    | DHW boost heater status                                  | 0 : OFF / 1 : ON                                    |
| 10014    | Error status                                             | 0 : no error / 1 : error state                      |
| 10015    | Emergency Operation Available<br>(Space heating/cooling) | 0 : Unavailable / 1 : Available                     |
| 10016    | Emergency Operation Available<br>(DHW)                   | 0 : Unavailable / 1 : Available                     |
| 10017    | Mix pump status                                          | 0 : Mix pump OFF / 1 : Mix pump ON                  |

## Holding Register (0x03)

| Register | Description                                   | Value explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40001    | Operation Mode                                | 0 : Cooling / 4 : Heating / 3 : Auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 40002    | Control method (Circuit 1/2)                  | 0 : Water outlet temp. control<br>1 : Water inlet temp. control<br>2 : Room air control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 40003    | Target temp (Heating/Cooling)<br>Circuit 1    | [0.1 °C ×10]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40004    | Room Air Temp. Circuit 1                      | [0.1 °C ×10]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40005    | Shift value(Target) in auto mode<br>Circuit 1 | 1K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 40006    | Target temp (Heating/Cooling)<br>Circuit 2    | [0.1 °C ×10]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40007    | Room Air Temp. Circuit 2                      | [0.1 °C ×10]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40008    | Shift value(Target) in auto mode<br>Circuit 2 | 1K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 40009    | DHW Target temp.                              | [0.1 °C ×10]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40010    | Energy state input                            | 0 : Not Use<br>1 : Forced off (equal to TB_SG1=close /<br>TB_SG2=open)<br>2 : Normal operation (equal to TB_SG1=open /<br>TB_SG2=open)<br>3 : On-recommendation (equal to<br>TB_SG1=open / TB_SG2=close)<br>4 : On-command (equal to TB_SG1=close /<br>TB_SG2=close)<br>5 : On-command step 2 (++ Energy<br>Consumption compared to Normal)<br>6 : On-recommendation Step 1 (+ Energy<br>Consumption compared to Normal)<br>7 : Energy Saving mode (- Energy Consumption<br>compared to Normal)<br>8 : Super Energy saving mode (– Energy<br>Consumption compared to Normal) |



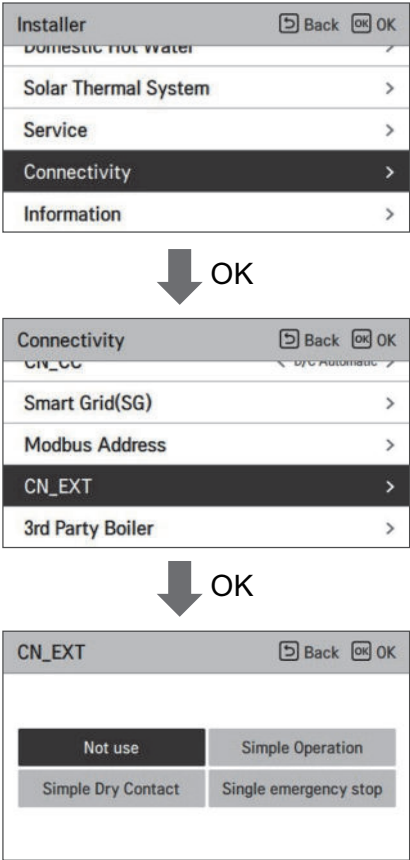
## Input Register (0x04)

| Register | Description                | Value explanation                                                                   |
|----------|----------------------------|-------------------------------------------------------------------------------------|
| 30001    | Error Code                 | Error Code                                                                          |
| 30002    | ODU operation Cycle        | 0 : Standby(OFF) / 1 : Cooling / 2 : Heating                                        |
| 30003    | Water inlet temp.          | [0.1 °C ×10]                                                                        |
| 30004    | Water outlet temp.         | [0.1 °C ×10]                                                                        |
| 30005    | Backup heater outlet temp. | [0.1 °C ×10]                                                                        |
| 30006    | DHW tank water temp.       | [0.1 °C ×10]                                                                        |
| 30007    | Solar collector temp.      | [0.1 °C ×10]                                                                        |
| 30008    | Room air temp. (Circuit 1) | [0.1 °C ×10]                                                                        |
| 30009    | Current Flow rate          | [0.1 LPM ×10]                                                                       |
| 30010    | Flow temp. (Circuit 2)     | [0.1 °C ×10]                                                                        |
| 30011    | Room air temp. (Circuit 2) | [0.1 °C ×10]                                                                        |
| 30012    | Energy State input         | 0 : Energy state 0; 1: Energy state 1....                                           |
| 30013    | Outdoor Air temp.          | [0.1 °C ×10]                                                                        |
| 39998    | Product Group              | 0x8X (0x80, 0x83, 0x88, 0x89)                                                       |
| 39999    | Product Info.              | Split : 0 / Monobloc : 3 / High Temp. : 4 /<br>Medium Temp. : 5 / System Boiler : 6 |

CN\_EXT

It is a function to control external input and output according to DI type set by customer using CN-EXT Port.

- In the installer setting list, select CN-EXT Port category, and press [OK] button to move to the detail screen.



| Value             |                  |                    |                       |
|-------------------|------------------|--------------------|-----------------------|
| Not use (Default) | Simple Operation | Simple Dry Contact | Single emergency stop |

### 3<sup>rd</sup> Party Boiler

Installer [Back] [OK] [OK]

Domestic Hot Water >

Solar Thermal System >

Service >

Connectivity >

Information >



Connectivity [Back] [OK] [OK]

CN\_CC >

Smart Grid(SG) >

Modbus Address >

CN\_EXT >

3rd Party Boiler >

This function is to configure the 3<sup>rd</sup> party boiler to be controlled.

3rd Party Boiler [Back] [OK] [OK]

Mode Temp. Hysteresis

Not use Manual -7 4

3rd Party Boiler [Back] [OK] [OK]

Mode Temp. Hysteresis

Use Manual -7 4

If the status of this function is "Use", you can choose control mode of boiler, Auto or Manual.

3rd Party Boiler [Back] [OK] [OK]

Mode Temp. Hysteresis

Use Auto -7 4

3rd Party Boiler [Back] [OK] [OK]

Mode Temp. Hysteresis

Use Manual -7 4

If the mode of this function is set to "Auto", you can set temperature of the boiler and hysteresis, respectively.

3rd Party Boiler [Back] [OK] [OK]

Mode Temp. Hysteresis

Use Auto -7 4

| Value      | Default | Range    |
|------------|---------|----------|
| Temp.      | -7      | -25 ~ 25 |
| Hysteresis | 7       | 2 ~ 10   |

External boiler ON condition :

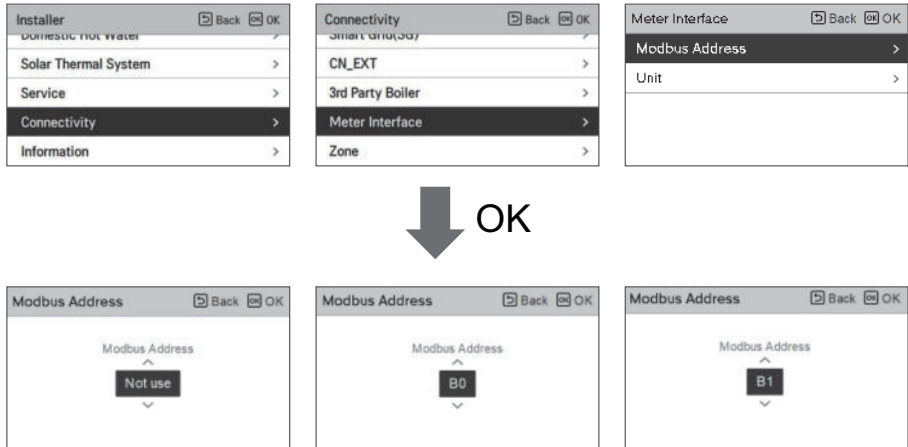
- If outdoor temperature  $\leq$  external boiler operation temperature value (installer setting), turn off the indoor unit and operate the external boiler.

External boiler OFF condition :

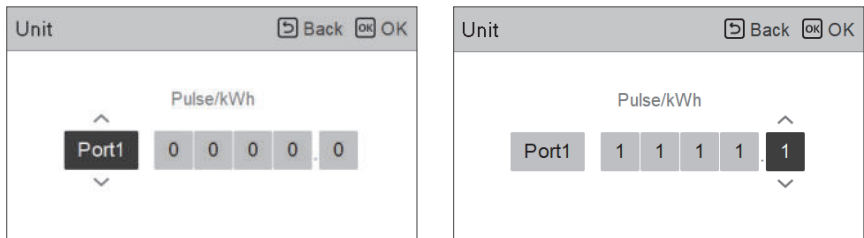
- If External air temperature  $\geq$  external boiler operation temperature value (installer setting) + Hysteresis (installer setting), turn off external boiler operation and operate indoor unit

## Meter Interface

It is the function that can check the status of energy and power on screen. It collects and calculates power or calorie data to create data for energy monitoring and energy warning alarm pop-ups. This function can be activated in installer mode.



There are 2 options, modbus address and unit, in this function. Activating the modbus address option, you choose one address(B0 or B1) or don't use. Then, you set the port and specification in range of 0000.0~9999.9[pulse/kWh] as shown in the figure below.



## Energy state

This function is to control the product according to the energy state. When the charged state of ESS is transmitted, it changes the target temperature of heating, cooling and DHW by setting value according to energy state.

Select either Signal Mode or Modbus Mode according to the connection type between the product and the ESS.

Select ThinQ Mode for wireless connection between the product and the ESS via ThinQ.  
This function is available only in Germany.

| Connectivity            | Back | OK |
|-------------------------|------|----|
| ON_EXE                  |      |    |
| 3rd Party Boiler        |      |    |
| Meter Interface         |      |    |
| <b>Energy state</b>     |      |    |
| Thermostat control type |      |    |

OK

| Energy state             | Back | OK |
|--------------------------|------|----|
| ESS use type             |      |    |
| Energy state definition  |      |    |
| Digital input assignment |      |    |

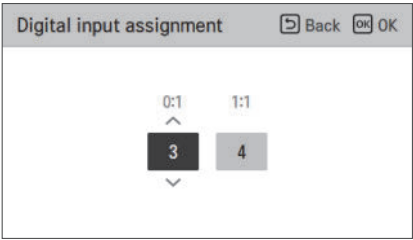
| Value             | Default |
|-------------------|---------|
| Not Use           | Not use |
| Use Modbus        |         |
| Use Digital Input |         |
| ThinQ             |         |

| Energy state definition | Back | OK |
|-------------------------|------|----|
| <b>Energy state 5</b>   |      |    |
| Energy state 6          |      |    |
| Energy state 7          |      |    |
| Energy state 8          |      |    |

OK

| Energy state 5                                                                                                                                     | Back | OK |
|----------------------------------------------------------------------------------------------------------------------------------------------------|------|----|
| <div> <div>Heat Temp.</div> <div>Cool Temp.</div> <div>DHW Temp.</div> </div> <div> <div>Use</div> <div>5</div> <div>-5</div> <div>30</div> </div> |      |    |

When Signal Mode of EES use type is selected, press the Digital Input Assignment button to set the energy state according to the input signal.

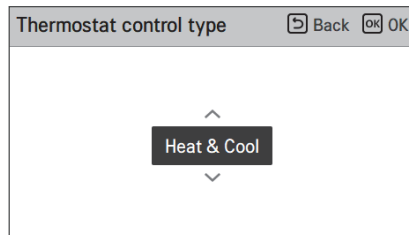
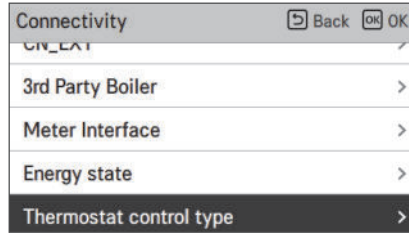


| Value | Input Signal |     | Output state |         |
|-------|--------------|-----|--------------|---------|
|       | ES1          | ES2 | Default      | Range   |
| X     | 0            | 0   | ES2          | fixed   |
| X     | 1            | 0   | ES1          | fixed   |
| 0:1   | 0            | 1   | ES3          | ES3-ES8 |
| 1:1   | 1            | 1   | ES4          |         |

## Thermostat control type

It is a function to enable installer to control Water Pump Options using water flow sensor.

- In the Installer setting list, and select Connectivity category, and press [OK] button to move to the detail screen.

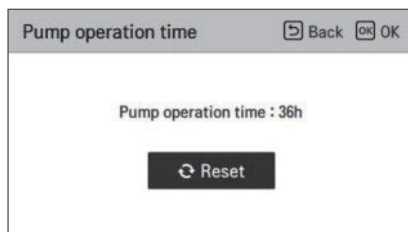
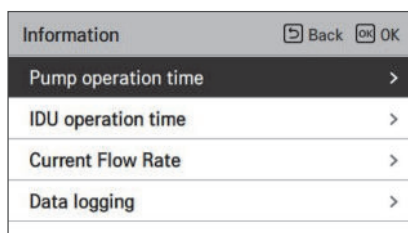
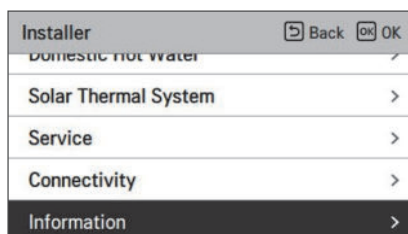


| Type                  |                   |
|-----------------------|-------------------|
| Heat & Cool (Default) | Heat & Cool / DHW |

## Pump operation time

It is a function to show the main water pump's operation time for check mechanical life.

- In the Installer setting list, and select Information category, and press [OK] button to move to the detail screen.

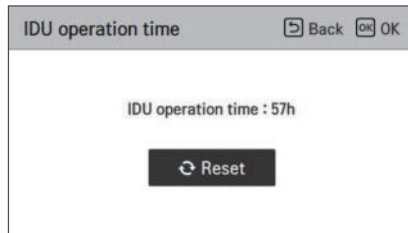
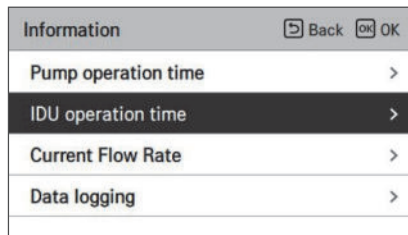
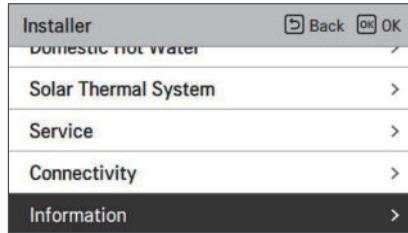




## IDU operation time

It is a function to show the Indoor Unit's operation time for check mechanical life.

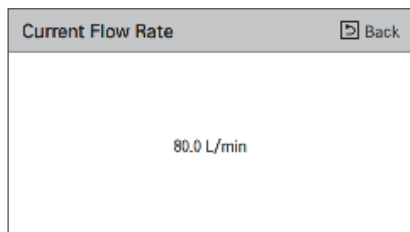
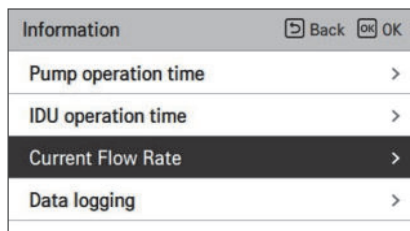
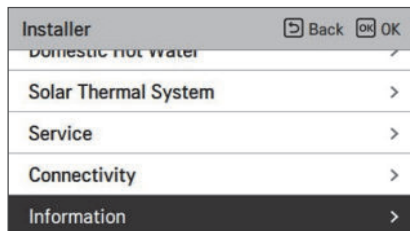
- In the Installer setting list, and select Information category, and press [OK] button to move to the detail screen.



## Current flow rate

It is the function to check the current flow rate.

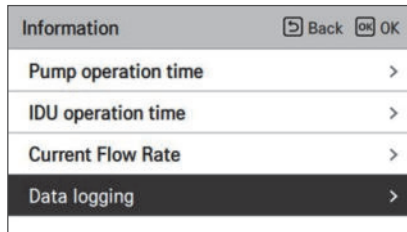
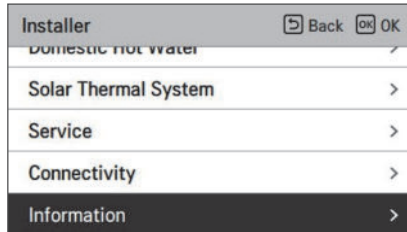
- In the installer setting list, select Current Flow Rate category, and press [OK] button to move to the detail screen. The current flow rate can be checked. (Range : 7 ~ 80 L/min)
- The function is not available for some products.



## Data logging

This function is to check the operation and error history.

- In the installer setting list, select Data logging category, and press [OK] button to move to the detail screen.



| Data logging [Back] |       |       |         |           |
|---------------------|-------|-------|---------|-----------|
| Date                | Time  | Oper. | Settemp | In/Out    |
| 1970.01.01          | 00:10 | Off   | —       | 24° / 25° |
| 1970.01.01          | 00:09 | Off   | —       | 24° / 25° |
| 1970.01.01          | 00:09 | Off   | —       | 24° / 25° |
| 1970.01.01          | 00:09 | Off   | —       | 24° / 25° |
| 1970.01.01          | 00:09 | Off   | —       | 24° / 25° |

### NOTE

Error history lookup range: 50

Error history information

Item: date, time, mode (including Off), set temperature, incoming temperature, outgoing temperature, room temperature, Hot water operation / stop, Hot water set temperature, Hot water temperature, Outdoor unit On / Off, Error code

Number of Display: Within 50

- Save criteria ▽

▽ Error occurred, released ON / OFF of outdoor unit operation.

# COMMISSIONING

If everything is going well until now, it is time to start the operation and to take advantages of **THERMAX**.

Before starting operation, pre-check points are described in this chapter. Some comments about maintenance and how to do troubleshooting are presented.

## Check List before Starting Operation



### CAUTION

Turn off the power before changing wiring or handling product.

| No | Category             | Item                   | Check Point                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----|----------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Electricity          | Field wiring           | <ul style="list-style-type: none"> <li>• All switches having contacts for different poles should be wired tightly according to regional or national legislation.</li> <li>• Only qualified person can proceed wiring.</li> <li>• Wiring and local-supplied electric parts should be complied with European and regional regulations.</li> <li>• Wiring should be following the wiring diagram supplied with the product.</li> </ul> |
| 2  |                      | Protective devices     | <ul style="list-style-type: none"> <li>• Install ELB (earth leakage breaker) with 30 mA.</li> <li>• ELB inside the control box of the unit should be turned on before starting operation.</li> </ul>                                                                                                                                                                                                                                |
| 3  |                      | Earth wiring           | <ul style="list-style-type: none"> <li>• Earth should be connected. Do not earth to gas or city water pipe, metallic section of a building, surge absorber, etc.</li> </ul>                                                                                                                                                                                                                                                         |
| 4  |                      | Power supply           | <ul style="list-style-type: none"> <li>• Use dedicated power line.</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| 5  |                      | Terminal block wiring  | <ul style="list-style-type: none"> <li>• Connections on the terminal block (inside the control box of the unit) should be tightened.</li> </ul>                                                                                                                                                                                                                                                                                     |
| 6  | Water                | Charged water pressure | <ul style="list-style-type: none"> <li>• After water charging, the pressure gauge (in front of the unit) should indicate 2.0~2.5 bar. Do not exceed 3.0 bar.</li> </ul>                                                                                                                                                                                                                                                             |
| 7  |                      | Air purge              | <ul style="list-style-type: none"> <li>• During water charging, air should be taken out through the hole of the air purge.</li> <li>• If water does not splash out when the tip (at the top of the hole) is pressed, then air purging is not completed yet. If well purged, the water will splash out like fountain.</li> <li>• Be careful when testing air purge. Splashed water may make your dress wet.</li> </ul>               |
| 8  |                      | Shut-off valve         | <ul style="list-style-type: none"> <li>• Two shut-off valves (located at the end of water inlet pipe and water outlet pipe of the unit) should be open.</li> </ul>                                                                                                                                                                                                                                                                  |
| 9  |                      | By-pass valve          | <ul style="list-style-type: none"> <li>• By-pass valve should be installed and adjusted to secure enough water flow rate. If water flow rate is low, flow switch error (CH14) can be occurred.</li> </ul>                                                                                                                                                                                                                           |
| 10 | Product Installation | Hang to the wall       | <ul style="list-style-type: none"> <li>• As the unit is hung on the wall, vibration or noise can be heard if the unit is not fixed tightly.</li> <li>• If the unit is not fixed tightly, it can fall down during operation.</li> </ul>                                                                                                                                                                                              |
| 11 |                      | Parts inspection       | <ul style="list-style-type: none"> <li>• There should be no apparently damaged parts inside the unit.</li> </ul>                                                                                                                                                                                                                                                                                                                    |
| 12 |                      | Refrigerant leakage    | <ul style="list-style-type: none"> <li>• Refrigerant leakage degrades the performance. If leakage found, contact qualified LG air conditioning installation person.</li> </ul>                                                                                                                                                                                                                                                      |
| 13 |                      | Drainage treatment     | <ul style="list-style-type: none"> <li>• While cooling operation, condensed dew can drop down to the bottom of the unit. In this case, prepare drainage treatment (for example, vessel to contain condensed dew) to avoid water drop.</li> </ul>                                                                                                                                                                                    |

To assure best performance of **THERMAV**®, it is required to perform periodical check and maintenance. It is recommended to proceed following check list for once a year.



## CAUTION

Turn off the power before proceeding maintenance.

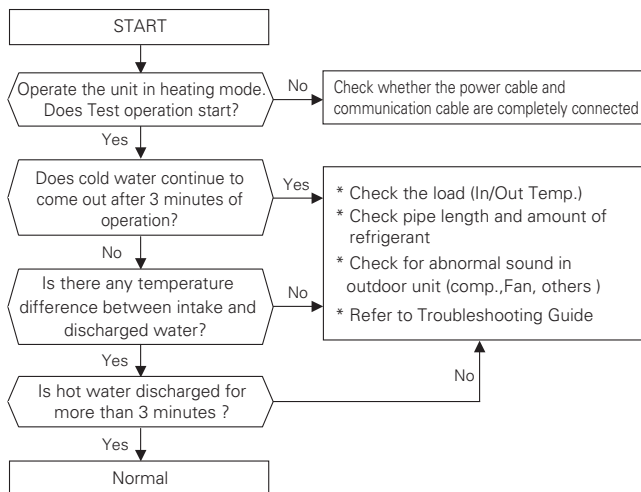
| No | Category    | Item                    | Check Point                                                                                                                                                                                                                   |
|----|-------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Water       | Water pressure          | <ul style="list-style-type: none"> <li>• In normal state, the pressure gauge (in front of the unit) should indicate 2.0~2.5 bar.</li> <li>• If the pressure is less than 0.3 bar, please recharge the water.</li> </ul>       |
| 2  |             | Strainer (Water filter) | <ul style="list-style-type: none"> <li>• Close the shut-off valves and disassemble strainer. Then wash the strainer to make it clean.</li> <li>• While disassembling the strainer, be careful for water flood out.</li> </ul> |
| 3  |             | Safety valve            | <ul style="list-style-type: none"> <li>• Open the switch of the safety valve and check if water is flood out through the drain hose.</li> <li>• After checking, close the safety valve.</li> </ul>                            |
| 4  | Electricity | Terminal block wiring   | <ul style="list-style-type: none"> <li>• Look and inspect if there is loosen or defected connection on the terminal block.</li> </ul>                                                                                         |

## Starting Operation

### Check before Starting Operation

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Check to see whether there is any refrigerant leakage, and check whether the power or transmission cable is connected properly.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2 | <p>Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less.</p> <p><b>NOTE:</b><br/>Never carry out mega ohm check over terminal control board.<br/>Otherwise the control board may break.</p> <p>Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2.0 MΩ as a result of refrigerant accumulation in the internal compressor.</p> <p>If the insulation resistance is less than 2.0 MΩ, turn on the main power supply.</p> |
| 3 | When the power is applied for the first time, operate the product after preheating for 2 hours. To protect the unit by increasing the oil temperature of the compressor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Starting Operation flow chart



## Airborne Noise Emission

The A-weighted sound pressure emitted by this product is below 70 dB.

\*\* The noise level can vary depending on the site.

The figures quoted are emission level and are not necessarily safe working levels.

Whilst there is a correlation between the emission and exposure levels, this cannot be used reliably to determine whether or not further precautions are required.

Factor that influence the actual level of exposure of the workforce include the characteristics of the work room and the other sources of noise, i.e. the number of equipment and other adjacent processes and the length of time for which an operator exposed to the noise.

Also, the permissible exposure level can vary from country to country.

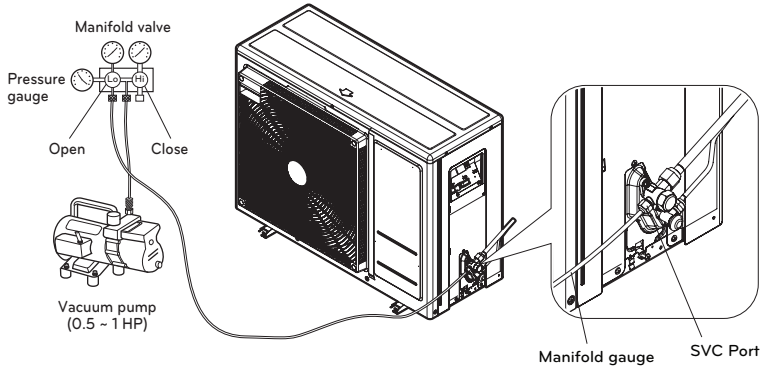
This information, however, will enable the user of the equipment to make a better evaluation of the hazard and risk.

## Vacuum & Charge of Refrigerant

By default, the product was charged of refrigerant.  
Vacuum and refrigerant charge, If there is leak refrigerant.

### 1. Vacuum

To work of vacuum action. when the leak of refrigerant.



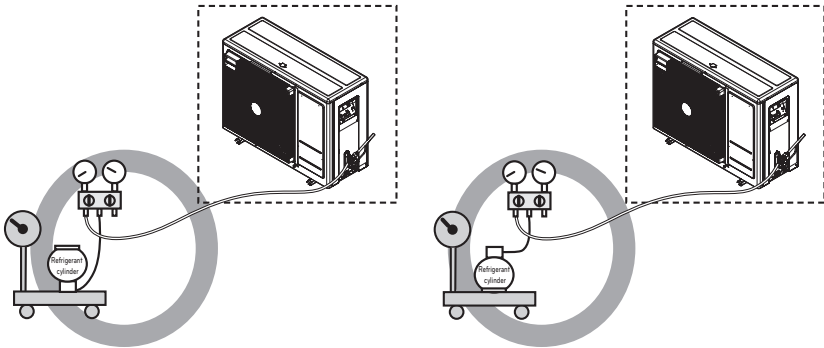
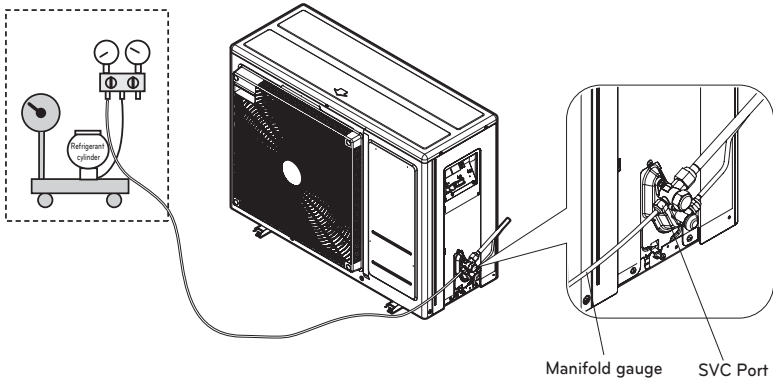
When selecting a vacuum, you should select one which is capable of achieving 0.2 Torr of ultimate vacuum.

Degree of vacuum is expressed in Torr, micron, mmHg, and Pascal (Pa). The units correlate as follows:

|                   | Unit   | Standard atmospheric pressure | Perfect vacuum |
|-------------------|--------|-------------------------------|----------------|
| Gauge Pressure    | Pa     | 0                             | -1.033         |
| Absolute Pressure | Pa     | 1.033                         | 0              |
| Torr              | Torr   | 760                           | 0              |
| Micron            | Micron | 760 000                       | 0              |
| mmHg              | mmHg   | 0                             | 760            |
| Pa                | Pa     | 1 013.33                      | 0              |

## 2. Charge of refrigerant

You should be charged after vacuum.  
 You can see amount of refrigerant at quality label.  
 Please to charge at cooling mode when there is not full charging.

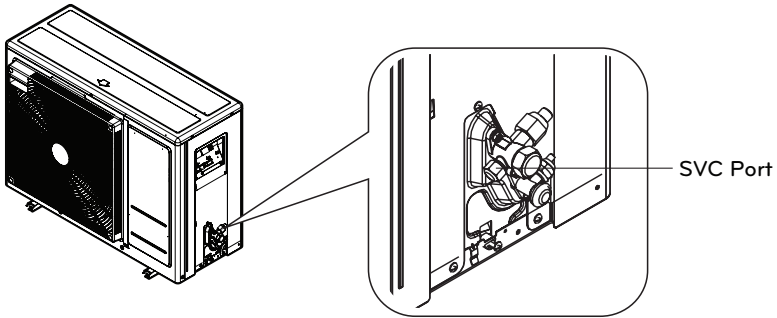


\* It is recommended to charge the refrigerant container upside down.



### 3. Location of SVC port

1Ø : 4 kW, 6 kW



## Decommissioning and Recycling

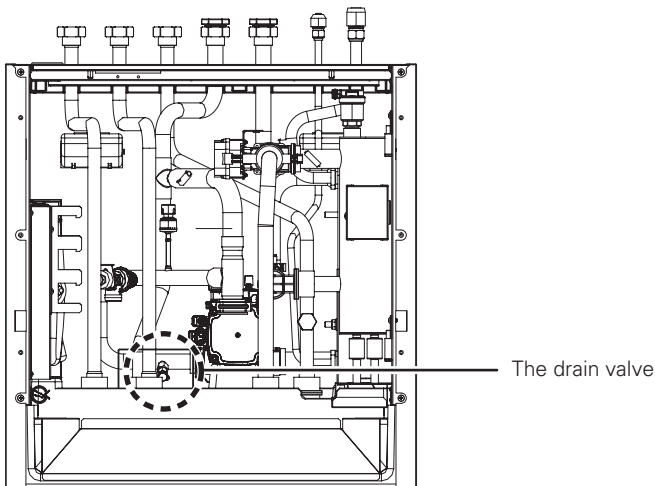
- Sort the packaging according to cardboard, wood and foil and dispose of it in appropriate containers.
- After the lifespan of the device ends it has to be disposed of in accordance with the legislation on waste electrical and electronic devices in force.

### 1. Extraction of Refrigerant

The indoor unit has to be connected to the outdoor unit holding the HFC refrigerant R32 which is a fluorinated greenhouse gas covered in the Kyoto protocol. You have to prevent leakage of the gas into the atmosphere. During a maintenance procedure or removal of the device, make sure that the gas is removed in accordance with the current regulations for the use of substances harmful to the ozone and fluorinated greenhouse gases.

### 2. Draining the unit (Heating system)

Use the drain valve below to drain the Heating system.



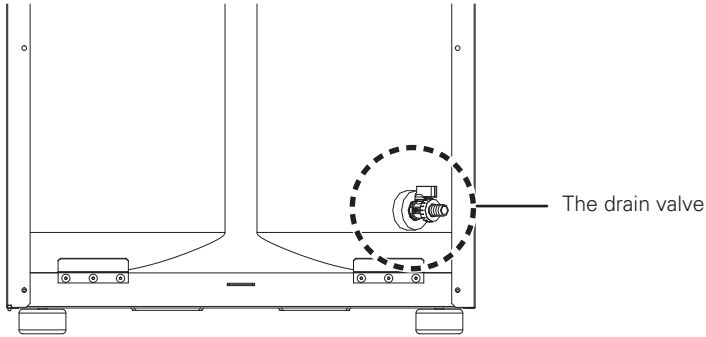
## ! CAUTION

Turn off the power supply of the heat pump before draining the unit.

- Turn off the unit
- Connect a hose to the drain cock and lead it into a sink.
- Open the air vent(s) at the highest level of the heating system
- Open the drain valve

### 3. Draining the DHW tank

Use the drain valve shown below to drain the Domestic hot water tank and circuit.



#### CAUTION

Turn off the power supply of the heat pump before draining the unit.

- Turn off the unit
- Close the Cold water supply line
- Connect a hose to the drain cock and lead it into a sink
- Open the drain valve
- Open the tap at the highest level of the DHW system.

## Reset of the thermal protection of the electrical heater

The thermal protection of the electrical heater is an additional safeguard protecting the device in the following cases:

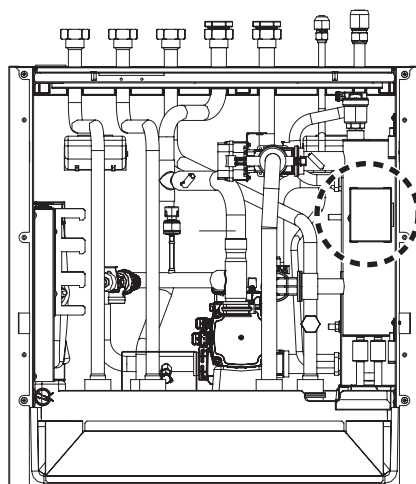
- The electrical relay, which turns on the electrical flow heater can be permanently short-circuited.
- At commissioning, air is in the system; this causes heating without heat extraction.

The easiest way to determine whether the thermal protection of the electrical heater is operative is to force the Backup heater to work using the Emergency mode (refer to the Owner's manual for more detail).

Determine if you can feel by hand the difference between the supply line and the return line. The electrical heater works if the supply line is warmer.

In case the electrical heater does not work because of one of the aforementioned reasons, the Safety thermostat has to be reset manually after the problem is resolved.

First you have to remove the front panel. Reset the safety thermostat by pressing the red button until you hear a "CLICK".



### ⚠ CAUTION

Resetting the device can only be performed by installers, authorized contractors for commission or authorized maintenance worker in a voltage-free state.

## Troubleshooting

If **THERMAV.** operates not properly or it does not start operation, please check following list.



### CAUTION

Turn off the power before proceeding troubleshooting.

## Troubleshooting for Problem while Operation

| No | Problem                                                                                                         | Reason                                      | Solution                                                                                                                                                                                                                                                                                                                                                                               |
|----|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Heating or Cooling is not satisfactory.                                                                         | • Setting target temperature is not proper. | • Set target temperature correctly.<br>• Check if temperature is water-based or air-based. See 'Remote sensor active' and 'Temp. sensor selection' in Chapter6.                                                                                                                                                                                                                        |
|    |                                                                                                                 | • Charged water is not enough.              | • Check pressure gauge and charge more water until pressure gauge is indication 2~2.5 Bar                                                                                                                                                                                                                                                                                              |
|    |                                                                                                                 | • Water flow rate is low.                   | • Check if strainer gathers too much particles. If so, strainer should be cleaned.<br>• Check if pressure gauge indicates above 4 Bar<br>• Check if water pipe is getting closed due to stacked particles or lime.                                                                                                                                                                     |
| 2  | Although electric power supply is OK (remote controller displays information), the unit does not start working. | • Water inlet temperature is too high.      | • If water inlet temperature is above 50 °C, the unit does not operated for the sake of system protection                                                                                                                                                                                                                                                                              |
|    |                                                                                                                 | • Water inlet temperature is too low.       | • If water inlet temperature is below 5 °C in cooling operation, the unit does not operated for the sake of system protection. Wait while unit warms up the water inlet temperature.<br>• If water inlet temperature is below 15 °C in heating operation, the unit does not operated for the sake of system protection. Wait while unit warms up to 18 °C the water inlet temperature. |
| 3  | Water pump noise.                                                                                               | • Air purging is not completely finished.   | • Open the cap of air purge and charge more water until pressure gauge is indicating 2~2.5 Bar<br>• If water does not splash out when the tip(at the top of the hole) is pressed, then air purging is not completed yet. If well purged, the water will splash out like fountain.                                                                                                      |
|    |                                                                                                                 | • Water pressure is low.                    | • Check if pressure gauge indicates above 0.3 Bar.<br>• Check if the expansion tank and pressure gauge operates well.                                                                                                                                                                                                                                                                  |
| 4  | Water is flood out through drain hose.                                                                          | • Too much water is charged.                | • Flood out water by opening the switch of the safety valve until pressure gauge is indicating 2~2.5 Bar.                                                                                                                                                                                                                                                                              |
|    |                                                                                                                 | • Expansion tank is damaged.                | • Replace the expansion tank                                                                                                                                                                                                                                                                                                                                                           |
| 5  | DHW is not hot.                                                                                                 | • DHW Heating is disabled.                  | • Select DHW Heating Operation and identify if icon is displayed on the remote controller.                                                                                                                                                                                                                                                                                             |

## Troubleshooting for Error Code

| Display code | Title                                                                                            | Cause of error                                                                                                                                                                                                                                                                                      | Check point & Normal condition                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Problem in remote room air sensor                                                                | <ul style="list-style-type: none"> <li>• Incorrect connection between sensor and PCB(Heater).</li> <li>• PCB(Heater) fault</li> <li>• Sensor fault</li> </ul>                                                                                                                                       | <ul style="list-style-type: none"> <li>• Resistance: 10 k<math>\Omega</math> at 25 centigrade (unplugged) → for Remote room air sensor</li> <li>• Resistance: 5 k<math>\Omega</math> at 25 centigrade (unplugged) → for all sensors EXCEPT remote room air sensor</li> <li>• Voltage: 2.5 V DC at 25 centigrade (plugged) (for all sensors)</li> <li>• Refer resistance-temperature table to check in different temperature</li> </ul> |
| 2            | Problem in refrigerant (inlet side) sensor                                                       |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6            | Problem in refrigerant (outlet side) sensor                                                      |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 8            | Problem in water tank sensor                                                                     |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 16           | Problems in sensors                                                                              |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 17           | Problem in water-inlet sensor                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18           | Problem in water-outlet sensor                                                                   |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 19           | Problem in Electric heater outlet sensor                                                         |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 10           | Water pump Lock                                                                                  | Fault feedback signal detected From Indoor water pump (for 30 seconds)                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Water pump defect</li> <li>• If there is a leak in the water pipe system</li> <li>• Wiring defect</li> <li>• Main PCB(Indoor)/Harness defect</li> </ul>                                                                                                                                                                                                                                       |
| 3            | Bad communication between remote controller and unit.                                            | <ul style="list-style-type: none"> <li>• Incorrect connection between sensor and PCB(Heater)</li> <li>• PCB(Heater) fault</li> <li>• Sensor fault</li> </ul>                                                                                                                                        | <ul style="list-style-type: none"> <li>• Wire connection between remote controller and Main PCB assembly(Heater) should be tight</li> <li>• Output voltage of PCB should be 12 V DC</li> </ul>                                                                                                                                                                                                                                         |
| 5            | Bad communication between Main PCB assembly(Heater) and Main PCB assembly(Inverter) of the unit. | <ul style="list-style-type: none"> <li>• The connector for transmission is disconnected</li> <li>• The connecting wires are misconnected</li> <li>• The communication line is broken</li> <li>• Main PCB assembly(Inverter) is abnormal</li> <li>• Main PCB assembly(Heater) is abnormal</li> </ul> | <ul style="list-style-type: none"> <li>• Wire connection between remote control panel and Main PCB assembly(Heater) should be tight.</li> </ul>                                                                                                                                                                                                                                                                                        |
| 53           |                                                                                                  |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 9            | PCB program (EEPROM) fault                                                                       | <ul style="list-style-type: none"> <li>• Electrical or mechanical damage a the EEPROM</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• This error can not be permitted</li> </ul>                                                                                                                                                                                                                                                                                                                                                    |
| 14           | Problem in flow sensor                                                                           | Flow sensor <ul style="list-style-type: none"> <li>• Water Pump ON. :<br/>If flow rate is not more than 5 l/min or not less than 80 l/min, detect it for 15 seconds.</li> <li>• Water Pump OFF. :<br/>If flow rate is not less than 5 l/min, detect it for 15 seconds.</li> </ul>                   | Flow Sensor <ul style="list-style-type: none"> <li>• Display the flow rate value that received from the indoor unit. (Range : 5~ 80 l/min)</li> </ul>                                                                                                                                                                                                                                                                                  |

| Display code | Title                                               | Cause of error                                                                                                                                                                                   | Check point & Normal condition                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15           | Water pipe overheated                               | <ul style="list-style-type: none"> <li>Abnormal operation of electric heater</li> <li>Leaving water temperature is above 55 °C</li> </ul>                                                        | <ul style="list-style-type: none"> <li>If there is no problem in electric heater control, possible maximum leaving water temperature is 55 °C</li> </ul>                                                                                                                                                                                                                                                                  |
| 20           | Thermal fuse is damaged                             | <ul style="list-style-type: none"> <li>Thermal fuse is cut off by abnormal overheating of internal electric heater</li> <li>Mechanical fault at thermal fuse</li> <li>Wire is damaged</li> </ul> | <ul style="list-style-type: none"> <li>This error will not be happened if temperature of electric heater tank is below 80 °C</li> </ul>                                                                                                                                                                                                                                                                                   |
| 21           | DC PEAK (IPM Fault)                                 | <ul style="list-style-type: none"> <li>Instant over current</li> <li>Over Rated current</li> <li>Poor insulation of IPM</li> </ul>                                                               | <ul style="list-style-type: none"> <li>An instant over current in the U,V,W phase               <ul style="list-style-type: none"> <li>- Comp lock</li> <li>- The abnormal connection of U,V,W</li> </ul> </li> <li>Over load condition               <ul style="list-style-type: none"> <li>- Overcharging of refrigerant Pipe length. Outdoor Fan is stop</li> </ul> </li> <li>Poor insulation of compressor</li> </ul> |
| 22           | Max. C/T                                            | Input Over Current                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Malfunction of Compressor</li> <li>Blocking of Pipe</li> <li>Low Voltage Input</li> <li>Refrigerant, Pipe length, Blocked...</li> </ul>                                                                                                                                                                                                                                            |
| 23           | DC Link High / Low Volt                             | <ul style="list-style-type: none"> <li>DC Link Voltage is above 420 V DC</li> <li>DC Link Voltage is below 140 V DC</li> </ul>                                                                   | <ul style="list-style-type: none"> <li>Check CN_(L), CN_(N) Connection</li> <li>Check Input Voltage</li> <li>Check PCB DC Link voltage sensor parts</li> </ul>                                                                                                                                                                                                                                                            |
| 24           | High pressure Error (Activation of pressure switch) | Compressor stop by operating high pressure switch                                                                                                                                                | <ul style="list-style-type: none"> <li>High pressure switch failure</li> <li>Fan failure of outdoor unit</li> <li>Compressor check valve clogged</li> <li>Deformation due to breakage of refrigerant pipe</li> <li>Refrigerant overcharge</li> <li>Poor outdoor EEV</li> <li>Shielding (Indoor filter clogged during heating)</li> <li>Bad outdoor unit board</li> </ul>                                                  |
| 26           | DC Compressor Position                              | <ul style="list-style-type: none"> <li>Compressor Starting fail error</li> </ul>                                                                                                                 | <ul style="list-style-type: none"> <li>Check the connection of comp wire "U,V,W"</li> <li>Malfunction of compressor</li> <li>Check the component of "IPM", detection parts.</li> </ul>                                                                                                                                                                                                                                    |
| 27           | AC Input Instant over Current Error                 | PCB(Inverter) input current is over 100 A(peak) for 2 us                                                                                                                                         | <ul style="list-style-type: none"> <li>Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge)</li> <li>Compressor damage (Insulation damage/Motor damage)</li> <li>Input voltage abnormal (L,N)</li> <li>Power line assemble condition abnormal</li> <li>PCB assembly 1 Damage (input current sensing part)</li> </ul>                                                                                    |
| 29           | Inverter compressor over current                    | Inverter Compressor input current is 23 A.                                                                                                                                                       | <ul style="list-style-type: none"> <li>Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge)</li> <li>Compressor damage(Insulation damage/Motor damage)</li> <li>Input voltage low</li> <li>ODU PCB assembly 1 damage</li> </ul>                                                                                                                                                                         |

| Display code | Title                                                         | Cause of error                                                                                                                                                                                                                                                    | Check point & Normal condition                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32           | High temperature in Discharge pipe of the inverter compressor | <ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Refrigerant leakage (insufficient)</li> <li>• Poor INV Comp Discharge sensor</li> <li>• LEV connector displaced / poor LEV assembly</li> </ul> | <ul style="list-style-type: none"> <li>• Check outdoor fan constraint/ screened/ flow structure</li> <li>• Check refrigerant leakage</li> <li>• Check if the sensor is normal</li> <li>• Check the status of EEV assembly</li> </ul>                                                                                                                                                                                                                                             |
| 35           | Low Presser Error                                             | Excessive decrease of low pressure                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Defective low pressure sensor</li> <li>• Defective unit fan</li> <li>• Refrigerant shortage/leakage</li> <li>• Deformation because of damage of refrigerant pipe</li> <li>• Defective unit EEV</li> <li>• Covering / clogging (unit covering during the cooling mode / unit filter clogging during heating mode)</li> <li>• SVC valve clogging</li> <li>• Defective unit PCB(Inverter)</li> <li>• Defective unit pipe sensor</li> </ul> |
| 41           | Problem in D-pipe temperature sensor                          | <ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>• Bad connection of thermistor connector</li> <li>• Defect of thermistor connector (Open/Short)</li> <li>• Defect of outdoor PCB(Inverter)</li> </ul>                                                                                                                                                                                                                                                                                     |
| 43           | Problem in high pressure sensor                               | Abnormal value of sensor (Open/Short)                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• Bad connection of connector PCB(Inverter)</li> <li>• Bad connection high pressure connector</li> <li>• Defect of high pressure connector (Open/Short)</li> <li>• Defect of connector PCB(Inverter) (Open/Short)</li> <li>• Defect of PCB(Inverter)</li> </ul>                                                                                                                                                                           |
| 44           | Problem in outdoor air temperature sensor                     | <ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>                                                                                                                                     | <ul style="list-style-type: none"> <li>• Bad connection of thermistor connector</li> <li>• Defect of thermistor connector (Open/Short)</li> <li>• Defect of outdoor PCB(Inverter)</li> </ul>                                                                                                                                                                                                                                                                                     |
| 45           | Problem in Cond. middle pipe temperature sensor               |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 46           | Problem in suction pipe temperature sensor                    |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 48           | Condenser out pipe temperature Error                          |                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 52           | PCB Communication Error                                       | Checking the communication state between Main PCB and Inverter PCB                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Generation of noise source interfering with communication</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| 54           | Open and Reverse Phase Error                                  | Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor                                                                                                                                                                      | Main power wiring fault                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



| Display code | Title                                                | Cause of error                                                                                                                                                                                                                                                            | Check point & Normal condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 60           | PCB(Inverter) & Main EEPROM check sum error          | EEPROM Access error and Check SUM error                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• EEPROM contact defect/wrong insertion</li> <li>• Different EEPROM Version</li> <li>• ODU Inverter &amp; Main PCB assembly 1 damage</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 61           | High temperature in Cond. Pipe                       | <ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Unit heat exchanger contaminated</li> <li>• EEV connector displaced / poor EEV assembly</li> <li>• Poor Cond. Pipe sensor assembly / burned</li> </ul> | <ul style="list-style-type: none"> <li>• Check outdoor fan constraint / screened / flow structure</li> <li>• Check if refrigerant overcharged</li> <li>• Check the status of EEV assembly</li> <li>• Check the status of sensor assembly / burn</li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| 62           | Heat sink Temp, High error                           | Heat sink sensor detected high temp.(85 °C)                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Part no. : EBR37798101~09               <ul style="list-style-type: none"> <li>- Check the Heat sink sensor: 10 kΩ / at 25 °C Unplugged)</li> <li>- Check the outdoor fan is driving rightly</li> </ul> </li> <li>• Part no. : EBR37798112~21               <ul style="list-style-type: none"> <li>- Check the soldered condition in the 22,23 pin of IPM, PFCM</li> <li>- Check the screw torque of IPM, PFCM</li> <li>- Check the spreadable condition of thermal grease on IPM, PFCM</li> <li>- Check the outdoor fan is driving rightly</li> </ul> </li> </ul> |
| 65           | Problem in Heat sink Temperature sensor              | Abnormal value of sensor(Open/Short)                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Check if there is defect of thermistor connector (Open/Short)</li> <li>• Check defect of outdoor PCB(Inverter)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 67           | Fan lock error                                       | <p>Fan RPM is less than 10 for 5 seconds from start-up operation.</p> <p>Fan RPM is less than 40 in operation except for start-up operation</p>                                                                                                                           | <ul style="list-style-type: none"> <li>• Fan motor damage.</li> <li>• Assembly condition abnormal.</li> <li>• Jammed fan by surroundings.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 114          | Problem in Vapor injection inlet temperature sensor  | <ul style="list-style-type: none"> <li>• Open / short of outdoor unit sensor</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>                                                                                                                      | <ul style="list-style-type: none"> <li>• Bad connection of thermistor connector</li> <li>• Defect of thermistor connector (Open/Short)</li> <li>• Defect of outdoor PCB(Outdoor)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 115          | Problem in Vapor injection outlet temperature sensor |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 231          | Problem in Water pressure sensor                     | Water Pressure Sensor of indoor unit is damaged.                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Sensor mismatch on the main PCB of Indoor unit.</li> <li>• The main PCB of Indoor unit.</li> <li>• Sensor failure (Reason of major defect)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                              |
| 232          | Problem in Flow sensor                               | Flow Sensor of indoor unit is damaged.                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## Open Source Software Notice Information

To obtain the source code under GPL, LGPL, MPL, and other open source code licenses, that is contained in this product, Please visit <https://opensource.lge.com>.

In addition to the source code, all referred license terms, warranty disclaimers and copyright notice are available for download. LG Electronics will also provide open source code to you on CD-ROM for a charge covering the cost of performing such distribution (such as the cost of media, shipping, and handling) upon email request to [opensource@lge.com](mailto:opensource@lge.com). This offer is valid for three(3) years from the date on which you purchased the product.



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**Eco design requirement**

- The information for Eco design is available on the following free access website.  
<https://www.lg.com/global/support/cedoc/cedoc>

# OWNER'S MANUAL

# AIR-TO-WATER HEAT PUMP

Please read this manual carefully before operating your set and retain it for future reference.

**THERMA V™**

Original instruction



MFL68680916  
Rev.01\_020123

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# INTRODUCTION

## What is AWHP(Air to Water Heat Pump)?

- Air to Water Heat Pump system can be used as various heating solution from floor heating to hot water supply with multiple heat sources. It is 4 times more energy efficient than conventional system.
- High efficiency with conventional boiler functions.

## Why is AWHP(Air to Water Heat Pump)?

- Various regulations are implemented in Europe to reduce energy use of building heating.
- Also, AWHP-related subsidy programs are implemented by country.

## Read this manual

Inside you will find many helpful hints on how to use and maintain your AWHP properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your product.

You'll find many answers to common problems in the chart of troubleshooting tips. If you review our chart of Troubleshooting Tips first, you may not need to call for service at all.

## How to find additional model information

Energy Labels and Product Fiches for all possible combinations can be found at <https://www.lg.com/global/support/cedoc/cedoc>.  
Search for outdoor unit name in cedoc page.

### *For your records*

Staple your receipt to this page in case you need it to prove the date of purchase or for warranty purposes. Write the model number and the serial number here:

Model number : \_\_\_\_\_

Serial number : \_\_\_\_\_

You can find them on a label on the side of each unit.

Dealer's name : \_\_\_\_\_

Date of purchase : \_\_\_\_\_

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# SAFETY INSTRUCTIONS

|                                                                                   |                                                                           |                                                                                   |                                                                                                                             |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
|  | Read the precautions in this manual carefully before operating the unit.  |  | This appliance is filled with flammable refrigerant.                                                                        |
|  | This symbol indicates that the Operation Manual should be read carefully. |  | This symbol indicates that a service personnel should be handling this equipment with reference to the Installation Manual. |

The following safety guidelines are intended to prevent unforeseen risks or damage from unsafe or incorrect operation of the appliance.

The guidelines are separated into 'WARNING' and 'CAUTION' as described below.

 This symbol is displayed to indicate matters and operations that can cause risk.

Read the part with this symbol carefully and follow the instructions in order to avoid risk.

## WARNING

This indicates that the failure to follow the instructions can cause serious injury or death.

## CAUTION

This indicates that the failure to follow the instructions can cause the minor injury or damage to the product.

## WARNING

- Always ground the product.
  - There is a risk of electric shock.
- Do not use a defective or underrated circuit breaker. Use the correctly rated breaker and fuse.
  - There is risk of fire or electric shock.
- Do not use a multi outlet. Always use this appliance on a dedicated circuit and breaker.
  - There is risk of fire or electric shock.



- For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized Service Center. Do not disassemble or repair the product by yourself.
  - There is risk of fire or electric shock.
- Always ground the product as per the wiring diagram. Do not connect the ground wire to gas or water pipes lightning rod or telephone ground wire.
  - There is risk of fire or electric shock.
- Install the panel and the cover of control box securely.
  - There is risk of fire or electric shock due to dust, water etc.
- Use the correctly rated breaker or fuse.
  - There is risk of fire or electric shock.
- Do not modify or extend the power cable. If the power cable or cord has scratches or skin peeled off or deteriorated then it must be replaced.
  - There is risk of fire or electric shock.
- For installation, removal or reinstall , always contact the dealer or an Authorized Service Center.
  - There is risk of fire, electric shock, explosion, or injury.
- Do not install the product on a defective installation stand. Be sure that the installation area does not deteriorate with age.
  - It may cause product to fall.
- Never install the unit on a moving base or a place from where it can fall down.
  - The falling unit can cause damage or injury or even death of a person.
- When the product is soaked (flooded or submerged) in water, contact an Authorized Service Center for repair before using it again.
  - There is risk of fire or electric shock.
- Be sure to check the refrigerant to be used. Please read the label on the product.
  - Incorrect refrigerant can prevent the normal operation of the unit.
- Don't use a power cord, a plug or a loose socket which is damaged.
  - Otherwise it may cause a fire or electrical shock.
- Do not touch , operate, or repair the product with wet hands.
  - There is risk of electric shock or fire.

- Do not place a heater or other heating appliances near the power cable.
  - There is risk of fire and electric shock.
- Do not allow water to run into electric parts. Install the unit away from water sources.
  - There is risk of fire, failure of the product, or electric shock.
- Do not store or use or even allow flammable gas or combustibles near the product.
  - There is risk of fire.
- Wiring connections must be secured tightly and the cable should be routed properly so that there is no force pulling the cable from the connection terminals.
  - Improper or loose connections can cause heat generation or fire.
- Safely dispose off the packing materials. Like screws, nails, batteries, broken things etc after installation or service and then tear away and throw away the plastic packaging bags.
  - Children may play with them and cause injury.
- Make sure to check that the power device is not dirty, loose or broken and then turn on the power.
  - Dirty, loose or broken power device can cause electric shock or fire.
- In unit the step-up capacitor supplies high voltage electricity to the electrical components. Be sure to discharge the capacitor completely before conducting the repair work.
  - An charged capacitor can cause electrical shock.
- When installing the unit, use the installation kit provided with the product.
  - Otherwise the unit may fall and cause severe injury.
- Be sure to use only those parts which are listed in the service parts list. Never attempt to modify the equipment.
  - The use of inappropriate parts can cause an electrical shock, excessive heat generation or fire.
- Do not use the product in a tightly closed space for a long time. Perform ventilation regularly.
  - Oxygen deficiency could occur and hence harm your health.
- Do not open the front cover or grille of the product during operation.  
(Do not touch the electrostatic filter, if the unit is so equipped.)
  - There is risk of physical injury, electric shock, or product failure.

- If strange sounds, smell or smoke comes from product, immediately turn the breaker off or disconnect the power supply cable.
  - There is risk of electric shock or fire.
- Ventilate the product room from time to time when operating it together with a stove, or heating element etc.
  - Oxygen deficiency can occur and hence harm your health.
- Turn the main power off when cleaning or repairing the product.
  - There is risk of electric shock.
- Take care to ensure that nobody especially kids could step on or fall onto the unit.
  - This could result in personal injury and product damage.
- Take care to ensure that power cable could not be pulled out or damaged during operation.
  - There is risk of fire or electric shock.
- Do not touch any electric part with wet hands. you should be cut power before touching electric part.
  - There is risk of electric shock or fire.
- Do not touch refrigerant pipe and water pipe or any internal parts while the unit is operating or immediately after operation.
  - There is risk of burns or frostbite, personal injury.
- If you touch the pipe or internal parts, you should be wear protection or wait time to return to normal temperature.
  - Otherwise , it may cause burns or frostbite, personal injury.
- Do not touch leaked refrigerant directly.
  - There is risk of frostbite.
- Make sure to install mixing valve (field supply). The mixing valve is setting the water temperature. The hot water temperature maximum values shall be selected according to the applicable legislation.
- Do not heated to a temperature of more than provided by the product.
  - Otherwise, it may cause fire or damage of product.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- Do not step on the unit and do not put anything on it.  
It may cause an injury through dropping of the unit or falling down.

- Use a vacuum pump or Inert (nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and Do not use Flammable gases. Otherwise, it may cause fire or explosion.
  - There is the risk of death, injury, fire or explosion.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- The appliance shall be stored so as to prevent mechanical damage from occurring.
- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
- Keep any required ventilation openings clear of obstruction.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- Installation work must be performed in accordance with the national wiring standards by authorized personnel only.
- The appliance shall be installed in accordance with national wiring regulation.

## CAUTION

- Two or more people must lift and transport the product.
  - Avoid personal injury.
- Do not install the product where it will be exposed to sea wind (salt spray) directly.
  - It may cause corrosion on the product.

- Keep level even when installing the product.
  - To avoid vibration or noise.
- Do not install the product where the noise or hot air from the unit could damage or disturb the neighborhoods.
  - It may cause a problem for your neighbors and hence dispute.
- Always check for gas (refrigerant) leakage after installation or repair of product.
  - Low refrigerant levels may cause failure of product.
- Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer AWHP, not a precision refrigeration system.
  - There is risk of damage or loss of property.
- Do not block the inlet or outlet of air flow.
  - It may cause product failure.
- Use a soft cloth to clean. Do not use harsh detergents, solvents or splashing water etc.
  - There is risk of fire, electric shock, or damage to the plastic parts of the product.
- Do not step on or put anything on the product.
  - There is risk of personal injury and failure of product.
- Do not insert hands or other objects through the air inlet or outlet while the product is operating.
  - There are sharp and moving parts that could cause personal injury.
- Be cautious when unpacking and installing the product.
  - Sharp edges could cause injury.
- If the refrigerant gas leaks during the repair, do not touch the leaking refrigerant gas.
  - The refrigerant gas can cause frostbite (cold burn).
- Do not tilt the unit when removing or uninstalling it.
  - The condensed water inside can spill.
- Do not mix air or gas other than the specified refrigerant used in the system.
  - If air enters the refrigerant system, an excessively high pressure results, causing equipment damage or injury.
- If the refrigerant gas leaks during the installation, ventilate the area immediately.
  - Otherwise it can be harmful for your health.

- Dismantling the unit, treatment of the refrigerant oil and eventual parts should be done in accordance with local and national standards.
- Do not expose your skin or kids or plants to the cool or hot air draft.
  - This could harm to your health.
- Use a firm stool or ladder when cleaning, maintaining or repairing the product at an height.
  - Be careful and avoid personal injury.
- The hot water may not be available immediately, during disinfection operation or depending on the amount of hot water.
- During floor heating operation it is important to limit the minimum/maximum water temperature.
- If anyone other than a licensed Professional installs, repairs, or alters LG Electronics Air Conditioning Products, the warranty is voided.
  - All costs associated with repair are then the full responsibility of the owner.
- Do not install the unit in potentially explosive atmospheres.
- Refrigerants are pre-charged in the factory to the outdoor unit. Additional refrigerants need to be charged depending on the length and size of pipe.
- The water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere.
- The pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard. Installation work must be performed in accordance with the national wiring standards by authorized personnel only.

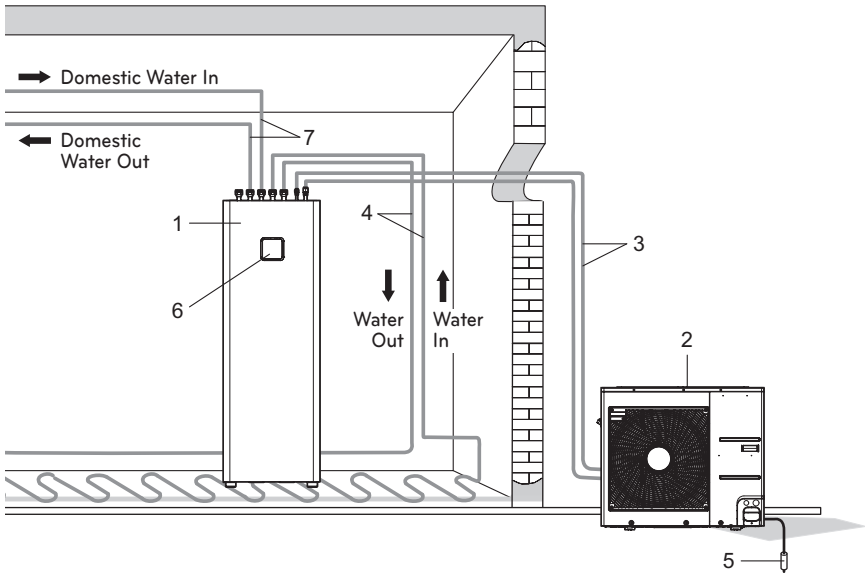
This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

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

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.

# PRODUCT INTRODUCTION

## Typical installation scene

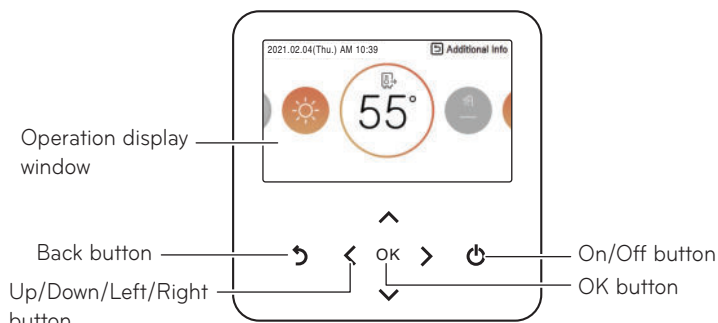


1. Indoor unit
2. Outdoor unit
3. Refrigerant pipe and connecting cable
4. Water pipe
5. Ground wire to ground outdoor unit to prevent electrical shocks.
6. Remote controller
7. Water pipe for DHW tank

\*The shape of products can be changed according to the model capacity and type.



## Remote controller



|                                  |                                                                   |
|----------------------------------|-------------------------------------------------------------------|
| <b>Operation display window</b>  | Operation and Settings status display                             |
| <b>Back button</b>               | When you move to the previous stage from the menu's setting stage |
| <b>Up/down/left/right button</b> | When you change the menu's setting value                          |
| <b>OK button</b>                 | When you save the menu's setting value                            |
| <b>On/Off button</b>             | When you turn ON/OFF the AWHF                                     |

### NOTE

- The remote controller is located on the indoor unit from factory. It can be repositioned at living space using cover plate accessory kit.
- Some functions may not be operated and displayed depending on the product type.
- The actual product can be different from above contents depending upon model type.
- When using simultaneous operation system, whenever press remote controller button, system will approximately operate after 1~2 minutes.

## Related Information

| Refrigerant                                          |                 |                              | R32                   |
|------------------------------------------------------|-----------------|------------------------------|-----------------------|
| Max allowable pressure                               | High side [MPa] |                              | 4.32                  |
|                                                      | Low side [MPa]  |                              | 2.4                   |
| Operating temperature of leaving water (Min. ~ Max.) | Heating [°C]    | For Fan coil unit / Radiator | 15 ~ 65 <sup>1)</sup> |
|                                                      |                 | For under floor              | 15 ~ 65 <sup>1)</sup> |
|                                                      | Cooling [°C]    | For Fan coil unit            | 5 ~ 27                |
|                                                      |                 | For under floor              | 16 ~ 27               |
|                                                      | DHW             |                              | 15 ~ 80               |
| Inlet water pressure [MPa] (Min. ~ Max.)             |                 |                              | 0.03 ~ 0.3            |
| Maximum DHW tank pressure [MPa]                      |                 |                              | 1.0                   |

<sup>1)</sup> For R32 split 4,6kW Model : 15 ~ 55 °C

\* DHW: Domestic hot water

\* IWT : Integrated water tank indoor unit

- Energy Labels and Product Fiches for all possible combinations can be found at <https://www.lg.com/global/support/cedoc/cedoc>. Search for outdoor unit name in cedoc page.

- Additional Information : Serial number is refer to the barcode on the product.

# DESCRIPTION OF THE OPERATION

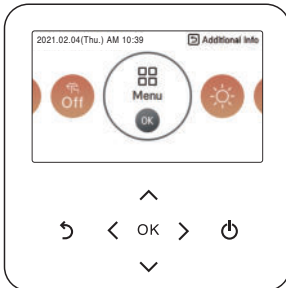
## Main screen

In the main screen, press [ $\leftarrow$ ,  $\rightarrow$  (left/right)] button to select the category to set, and you can control by pressing [ $\wedge$ ,  $\vee$  (up/down)] button.

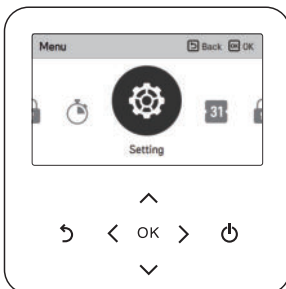


## Menu screen

In the main screen, press [ $\leftarrow$ ,  $\rightarrow$  (left/right)] button to select the menu and press [OK] button to move to menu screen.

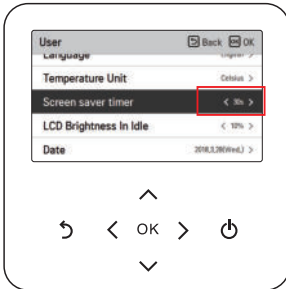


In the menu screen, press [ $\leftarrow$ ,  $\rightarrow$  (left/right)] button to select the category to set, and press [OK] button to move to the detail screen.



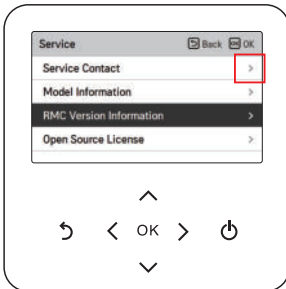
## Setting screen

Select the category to set using [ $\wedge$ ,  $\vee$  (up/down)] button.



In each detail screen of the menu, as in the box in the left figure, when "<,>" icons are displayed at the same time, you can immediately apply the setting value by pressing [<, >(left/right)] button.

※ For the values that can be set in each category, refer to the detail manual for each function.



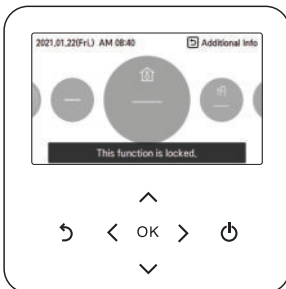
In each detail screen of the menu, as in the box in the left figure, if only ">" icon is displayed, you can move to the detail setting screen by pressing [>(right) or OK] button.

※ For the values that can be set in each category, refer to the detail manual for each function.

## Popup screen

The toast message is the message displayed at the bottom of the screen when an operation is turned On/Off or if a function is set / canceled.

The popup message is mainly displayed when an error occurred in the product.



< Toast message >

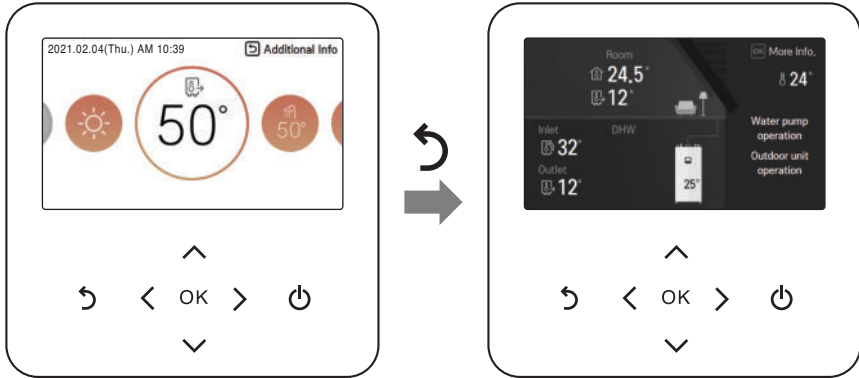


< Popup message >

## Monitoring

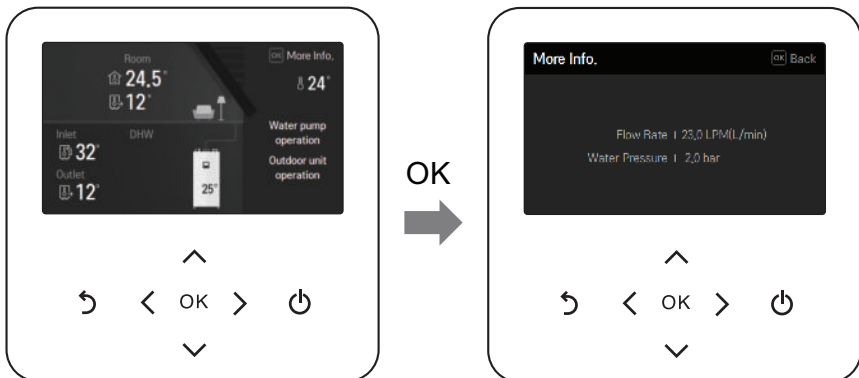
In the main screen, you can enter the monitoring screen by pressing [Back] button  
In the monitoring screen, you can check the following information,

- The room temperature
- The outdoor temperature
- The water inlet / outlet temperature
- The DHW tank temperature
- The water pump operation
- The outdoor unit operation



In the monitoring screen, you can see the more information by pressing [OK] button.

- The flow rate
- The Water pressure



## Returning to the screen

In the main screen, after moving to the category by pressing [<, >(left/right)] button, if there is no remote controller operation, after 10 seconds, it returns to the main screen basic position. (basic position: indoor temperature display part)

In the screens except the main screen, if there is no remote controller operation for 1 minute, it moves to the main screen.

# OPERATION SETTING

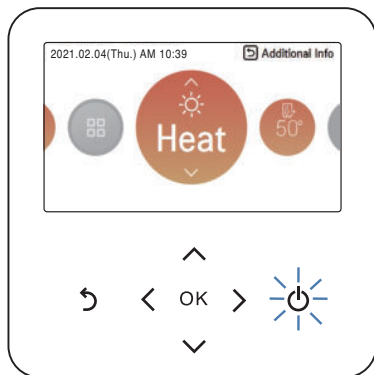
## On / Off

**THERMA V.** will be turned on or off.

Press the remote controller's  (On/Off) button.

- If the product is in operation, On/Off button will be illuminated.

If the product is in off, On/Off button backlight will be off.



## Operation mode

You can easily control the desired operation mode.

In the main screen, press [<,> (left/right)] button to select the operation mode or home leave or hold category, and press [^, v (up/down)] button to set the operation mode.

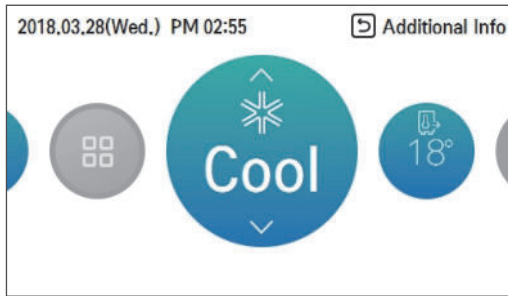
※ Some products may not support some operation modes.

| Mode      | Description                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------|
| Cool      | Cool the room to the desired temperature.<br>Activated when No. 4 ON of indoor unit PCB DIP SW 2. (Refer to installer setting.) |
| Heat      | Heats the room to the desired room temperature.                                                                                 |
| AI / Auto | The product automatically provides the appropriate fan speed based on the temperature of the room.                              |

## Cooling operation

Cooling operation's minimum setting temperature is 5 °C.

- The desired temperature can be controlled in the units of 1 °C.
- Set the desired temperature lower than the water temperature.
- water temperature is displayed on the default screen of the remote controller.
- If the setpoint is set higher than the water temperature, then the unit will remain in the cool mode but will not begin to cool the water temperature exceeds the setpoint.
- If your unit is operating in cooling mode and you press the [On/Off] button the cooling operation will shut off.



### NOTE

Activated when No. 4 ON of indoor unit PCB DIP SW 2 (Refer to installer setting)

### What is 3 minutes delay function?

After the cooling stops, when the product is started right away, the reason that the cold water does not come out is that it is the function to protect the compressor.

The compressor starts after 3 minutes and the cold water comes out.

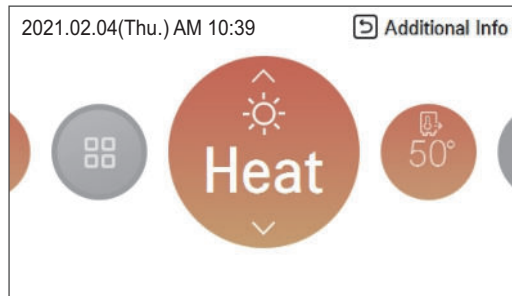
### NOTE

The compressor starts after 3 minutes and the cold water comes out.

In the cooling operation, you can select the desired temperature in the range of 5 °C~27 °C. The favorable temperature difference between the water inlet temperature and outlet temperature is 5 °C.

## Heating operation

- The desired temperature can be controlled in the units of 1 °C.
- Set the desired temperature higher than the water temperature.
- Water temperature is displayed on the default screen of the remote controller.
- When the desired temperature is set lower than the water temperature, warm water doesn't come out.
- If your unit is operating in heating mode and you press the [On/Off] button the heating operation will shut off.



### NOTE

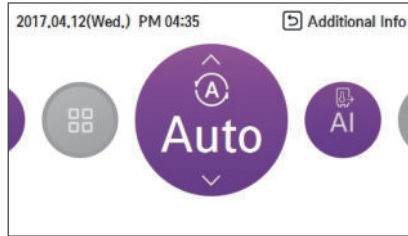
In the heating operation, you can select the desired temperature in the range of 15 °C~65<sup>1)</sup> °C.

<sup>1)</sup> For R32 split 4,6kW Model : 15 ~ 55 °C

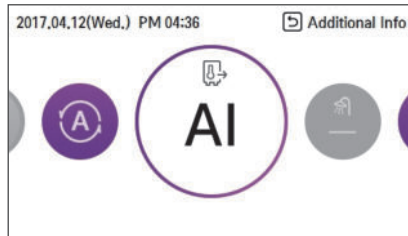
## AI / Auto operation

In order to save energy and to give highest comfort, setting temperature will follow outside temperature. If outdoor temperature decreases, heating capacity for the house will increase automatically in order to keep same room temperature. All parameters will be set by installer during start-up procedure and will be adapted to the site characteristic.

1. Select AI / Auto mode.



2. Select the desired temperature category



3. Adjust the desired temperature level by press [^, v (up/down)] button.



### NOTE

The set temperature can be changed from 5 °C to -5 °C in 1 °C.

<Temperature adjust step (unit : °C)>

-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5

← Cold

Hot →

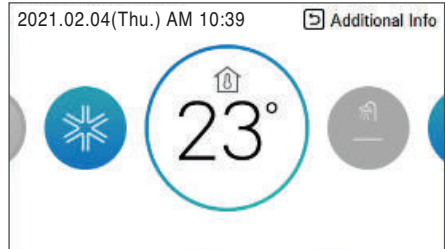
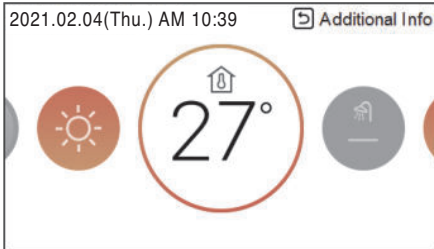


# TEMPERATURE SETTING

## Controlling desired temperature

You can easily control to the desired temperature.

- In the main screen, press [<, > (left/right)] button to select the desired temperature category, and press [^, v (up/down)] button to set the desired temperature.
  - In the cooling, heating, and AI/auto mode, the desired temperature control is possible.



| Mode                                 | Description                                                                                                                                                                                                                                                    |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Room temperature                     | Room temperature setting is available when remote room air sensor (sold separately) is installed                                                                                                                                                               |
| Room1 & Room2 temperature            | Temperature of Room 1 and Room 2 can be set respectively, when 2nd circuit option is activated in installer mode.                                                                                                                                              |
| Leaving water temperature            | If the desired temperature is lower than the water temperature, the heating is not performed.<br>Set the desired temperature higher than the water temperature.                                                                                                |
| DHW tank temperature                 | DHW tank temperature setting is available when DHW tank is installed.                                                                                                                                                                                          |
| Water inlet temperature              | This operation is changed to the temperature sensor only, the inlet temperature sensor, and temperature control logic is the same as the leaving water temperature operation.                                                                                  |
| Room temperature + Water temperature | Room temperature setting is available when remote room air sensor (sold separately) is installed. If the desired temperature is lower than the water temperature, the heating is not performed. Set the desired temperature higher than the water temperature. |

### NOTE

The function can be activated according to the installer setting.

### NOTE

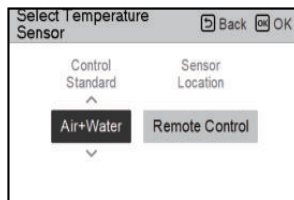
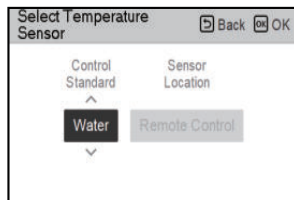
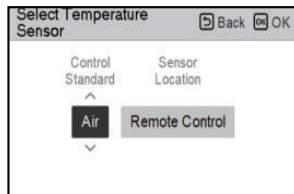
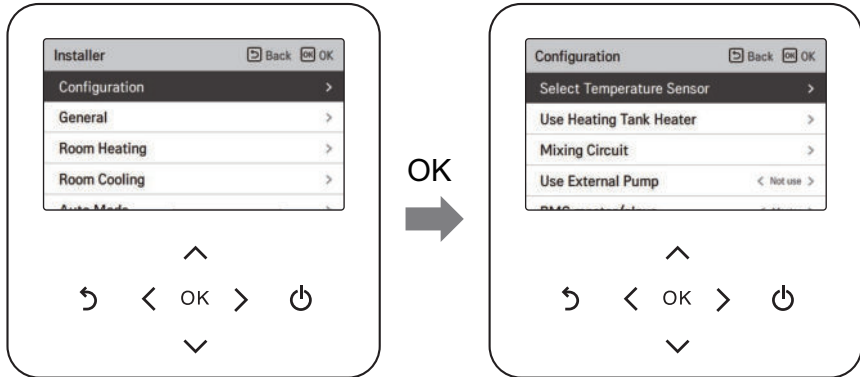
Room 1 = Circuit 2 = Mixing circuit

Room 2 = Circuit 1 = Direct circuit

## Select Temperature Sensor

There are 3 sensor options, air only, water only, and air+water in installer mode.

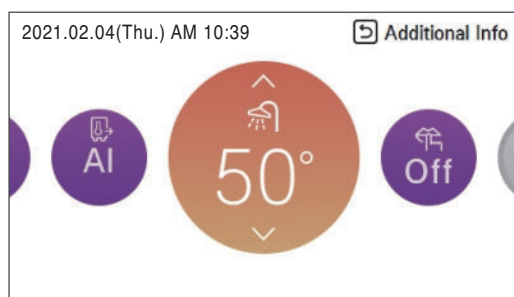
Sensor Locations are not available on all models.



## DHW heating operation

The DHW heating operation's minimum setting temperature is 30 °C.

- The desired temperature can be controlled in the units of 1 °C.
  - Set the desired temperature higher than the DHW tank temperature.
  - DHW tank temperature is displayed on the default screen of the remote controller.
  - When the desired temperature is set lower than the DHW tank temperature, warm water doesn't come out.
  - If your unit is operating in DHW heating mode and you press the [On/Off] button the DHW heating operation will shut off.



### NOTE

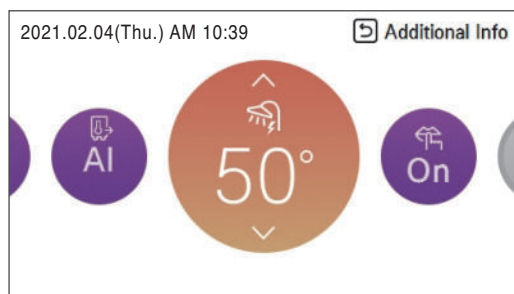
- In the heating operation, you can select the desired temperature in the range of 30 °C~80 °C.
- If you want to know more information, refer function on installation information section.

## Quick DHW tank heating

If there is urgent DHW heating demand, Quick DHW Tank Heating mode can be used to reduce the time to reach target DHW tank temperature by forcibly turning on DHW tank heater.

After reaching target DHW tank temperature or by user's input to stop, Quick DHW Tank Heating mode will be finished.

1. Press down [Back] button for a second while focusing on DHW Heating Operation.



# View temperature

## General mode

You can check the current temperature.

- In the main screen, you can enter the monitoring screen by pressing [Back] button.



| Mode                | Description                   |
|---------------------|-------------------------------|
| Room temperature    | View room temperature         |
| Inlet temperature   | View inlet water temperature  |
| Outlet temperature  | View outlet water temperature |
| DHW temperature     | View DHW temperature          |
| Outdoor temperature | View outdoor temperature      |

## 2<sup>nd</sup> circuit mode

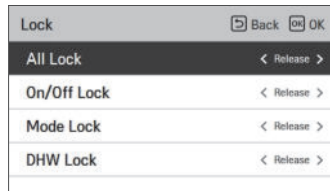
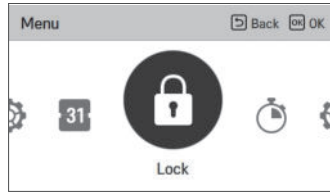


| Mode                  | Description                   |
|-----------------------|-------------------------------|
| Circuit 1 temperature | View Circuit 1 temperature    |
| Circuit 2 temperature | View Circuit 2 temperature    |
| Inlet temperature     | View inlet water temperature  |
| Outlet temperature    | View outlet water temperature |
| DHW temperature       | View DHW temperature          |
| Outdoor temperature   | View outdoor temperature      |

# LOCK SETTING

## How to enter Lock setting

- In the menu screen, press [<,>(left/right)] button to select “lock setting” category, and press [OK] button to move to the lock setting list screen.
- In the lock setting list, if you press [Δ, ∇ (up/down)] button, you can turn on/off the corresponding lock function.



## Lock setting – all, on/off, mode, DHW lock

- It is the function to lock the button operation of the remote controller so that children or other persons cannot use it without permission.
- It is the function to limit the desired temperature range that can be set in the wired remote controller.

| Mode        | Description                                                            |
|-------------|------------------------------------------------------------------------|
| All Lock    | It locks all button operation of the remote controller.                |
| On/Off Lock | It locks the On/Off button operation of the remote controller.         |
| Mode Lock   | It locks the operation mode button operation of the remote controller. |
| DHW Lock    | It locks the DHW On/Off button operation of the remote controller.     |

### NOTE

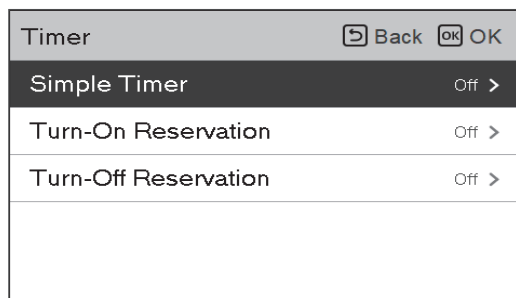
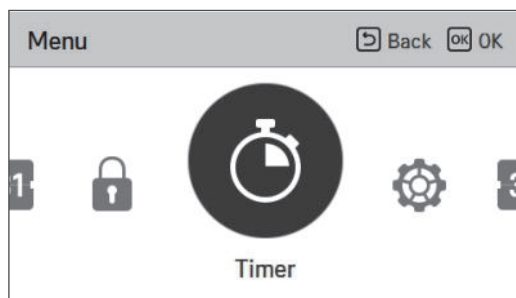
In the central controller, when the central control temperature range lock is set, the wired remote controller's temperature lock setting is cleared.

The temperature change by external equipment is reflected regardless of the remote controller temperature range lock.

# TIMER SETTING

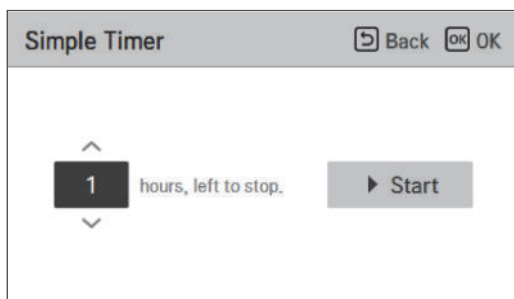
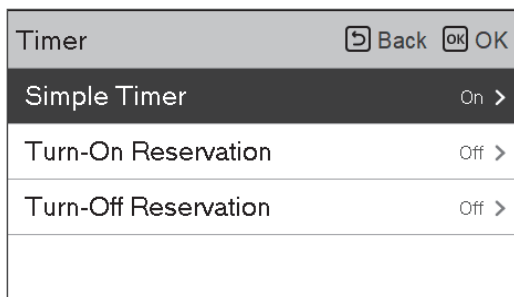
## Timer entrance and setting method

- In the menu screen, press [ $\leftarrow$ ,  $\rightarrow$ ] button to select the timer category, and press [OK] button to move to the timer setting list screen.
- In the timer setting list screen, press [ $\uparrow$ ,  $\downarrow$ ] button to select the timer to set, and press [OK] button to move to the detail screen.
- After setting the value, when you press [OK] button, the timer is activated.
- After setting the value, if you press [Back] button, the changed value will not be applied.



## Simple Timer

You can easily set the timer in the range of 1~7 hours in the units of 1 hour.



### NOTE

If the product operation is On, the easy timer turns off the operation after the corresponding time.

If the product operation is Off, the easy timer turns on the operation after the corresponding time.

If the easy timer operation is turned On/Off before the timer operation, the set timer will be cleared.



The product is automatically turned On at the set timer time.

Timer

⏮ Back

OK

|                      |       |
|----------------------|-------|
| Simple Timer         | Off > |
| Turn-On Reservation  | On >  |
| Turn-Off Reservation | Off > |

It provides 2 Time formats, 12Hours(AM/PM) or 24Hours reference.

Turn-On Reservation

Back OK OK

Minute

14 : 00

Start

Turn-On Reservation

Back

OK

AM/PM

Minute

AM

12

:

00

▶ Start

Even if the Turn-on Reservation operation is turned On/Off after the setting and before the timer operation, the set timer is not cleared.

## Turn-Off Reservation

The product is automatically turned Off at the set timer time.

| Timer                | Back | OK |
|----------------------|------|----|
| Simple Timer         | Off  | >  |
| Turn-On Reservation  | Off  | >  |
| Turn-Off Reservation | On   | >  |

It provides 2 Time formats, 12 Hours(AM/PM) or 24 Hours reference.

| Turn-Off Reservation |         | Back  | OK |
|----------------------|---------|-------|----|
| Minute               | 23 : 00 | Start |    |

| Turn-Off Reservation |            | Back  | OK |
|----------------------|------------|-------|----|
| Hour Minute          | PM 11 : 00 | Start |    |

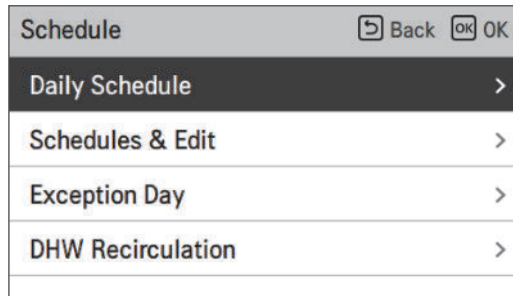
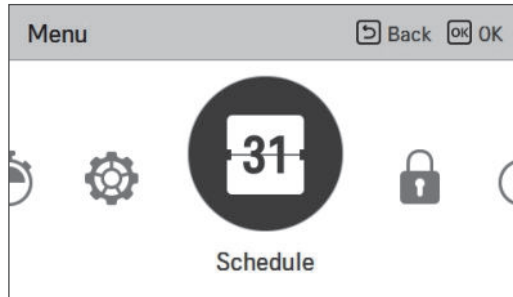
### NOTE

Even if the Turn-off Reservation operation is turned On/Off after the setting and before the timer operation, the set timer is not cleared.

# SCHEDULE SETTING

## How to enter schedule

- In the menu screen, press [←,→(left/right)] button so select the schedule category, and press [OK] button to move to the schedule setting list screen.
- In the schedule setting list screen, press [↑,↓ (up/down)] button to select the menu to set, and press [OK] button to move to the detail screen.
- There are 4 options in schedule formula ,depending on product function.
  - Room
  - Hot water / DHW
  - Heater of hot water tank / DHW heater
  - DHW recirculation



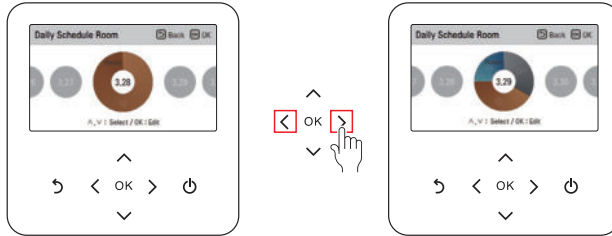
### NOTE

Even though there is a heater of hot water tank schedule option, it cannot be activated in case of disinfection setting.

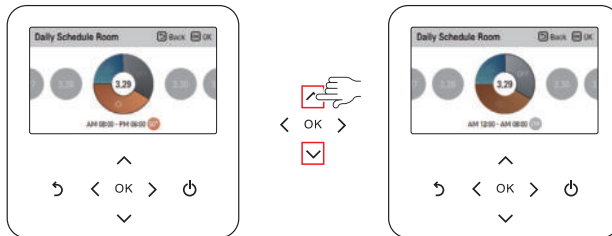
## Daily schedule

It is the function that can check the status of the timer (schedule) saved in the remote controller.

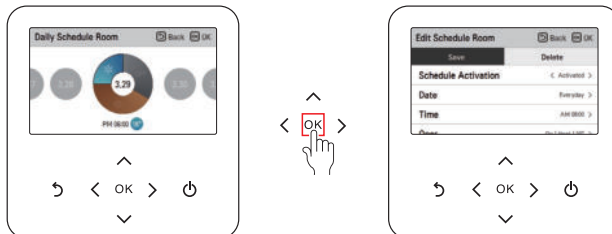
- In the schedule list, select the daily schedule status category, and press [OK] button to move to the detail daily schedule status screen.
- You can use the remote controller's [<, > (left/right)] button to check the timer information of other dates.



- You can use the remote controller's [Δ, ∇ (up/down)] button to check the corresponding date's other timer information.



- Select the timer information, and press [OK] button to move to the corresponding timer's edit screen.



### NOTE

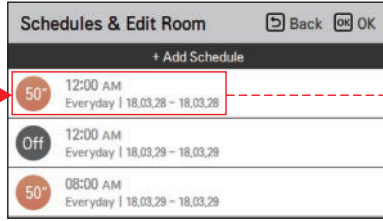
In the daily schedule status screen, even if the timer (schedule) is set, if the corresponding date is designated as an exception date, the schedule will not be performed.

Less than 5 schedules per day is recommended.

## Schedules & Edit

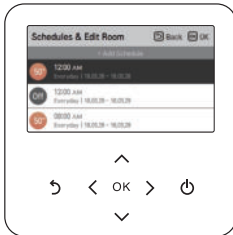
It is the function that can check the status of the timer (schedule) saved in the remote controller.

- In the schedule list, select the daily schedule status category, and press [OK] button to move to the daily schedule status detail screen.
- You can use the remote controller's [←,→(left/right)] button to check other date's timer information.

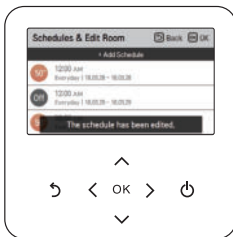


You can check the set timer's operation information (operation On/Off, operation mode, desired temperature), timer time, period, and day of week.

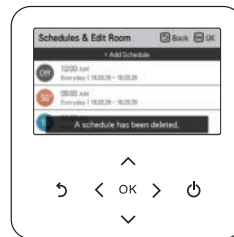
- You can edit the saved schedule's timer information.
  - Select the schedule to edit using [↑, ↓ (up/down)] button, and press [OK] button to move to the edit screen.



- Select the timer information, and press [OK] button to move to the corresponding timer's edit screen.



< If schedule is changed >



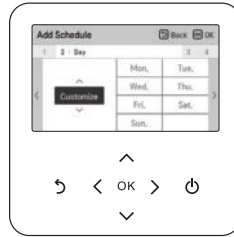
< If schedule is deleted >

## Schedules & Edit – Add schedule

Description of each stage in Add schedule



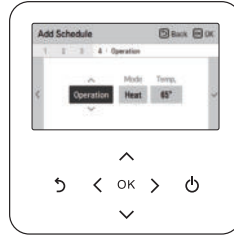
Stage 1. Period setting



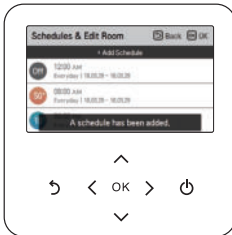
Stage 2. Day of week setting



Stage 3. Time setting



Stage 4. Operation setting



Add schedule is completed

In 'Stage 1', it sets the period to perform the timer.

In 'Stage 2', it sets the day of week to perform the timer.

- You can select 'Everyday / Weekend / Weekdays / Individual selection'.

In 'Stage 3', it sets the start time for the timer.

In 'Stage 4', it sets the timer operation information.

- If 'Stop' is selected, you cannot set the mode / temperature.

When stages 1~4 are completed, along with the message of 'schedule is added', it moves to View and edit schedule screen.

## Exception Day

It is the function to automatically stop the operation on the set timer day.

- In the schedule list, select the exception day category, and press [OK] button to move to the Exception day designation detail screen.
- In the exception day, you can check, and add/change/delete the exception day information saved in the remote controller.
  - To add an exception day, in the Exception day registration detail screen, designate year/month/day, and press [OK] button to save the Exception day.
  - Select the Exception day to edit using [∧, ∨ (up/down)] button, and press [OK] button to move to the edit screen.

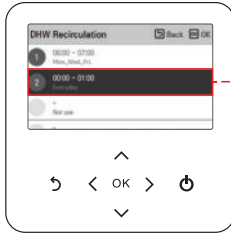


- In the exception day edit screen, you can check, delete/change the corresponding exception day's setting contents.
- When you change the exception day information, you need to save it after the change.

## DHW Recirculation Schedule

It is the function that can check the status of DHW recirculation timer (schedule) saved in the remote controller.

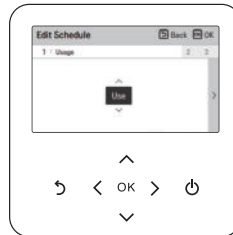
- In the schedule list, select the DHW recirculation schedule status category, and press [OK] button to move to the daily schedule status detail screen.



You can check the set  
Timer time, period, and day of week.

- DHW recirculation schedule can be set up to 4 times.

- Select the timer information, and press [OK] button to move to the corresponding timer's edit screen.



### NOTE

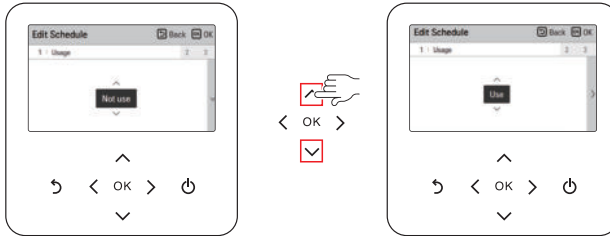
This function is not default.  
It can be activated, after setting value in installer mode.



## 38 SCHEDULE SETTING

Description of each stage in Add schedule

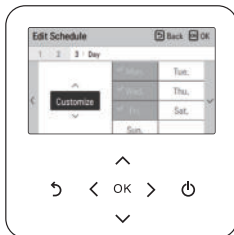
- Stage 1. Usage setting
  - It sets the use of the timer setting.
  - Select 'Use' to move on the next stage



- Stage 2. Time setting setting
  - It sets the period to perform the timer.
  - The end time cannot be earlier than the start time.



- Stage 3. Day of week setting
  - It sets the day of week to perform the timer.
  - You can select 'Customize / Weekend / Weekday / Everyday'.



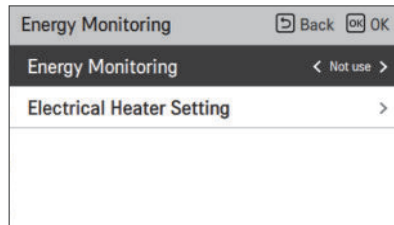
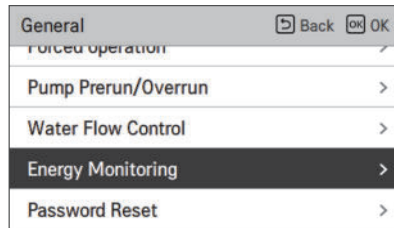
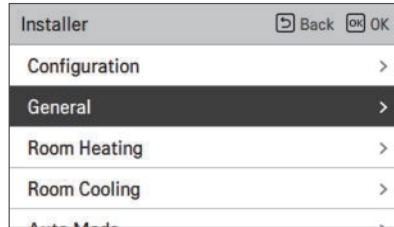
## NOTE

If you select 'Not use' again in stage 1 after completing the schedule setting, the timer does not work. but the setting value remains, and when selecting 'Use' again, the same setting value can be used.

# ENERGY MONITORING SETTING

## Energy Monitoring Setting

It is the function that can check the status of energy and power on screen. It calculates power data to create data for energy monitoring. This function can be activated in installer mode.



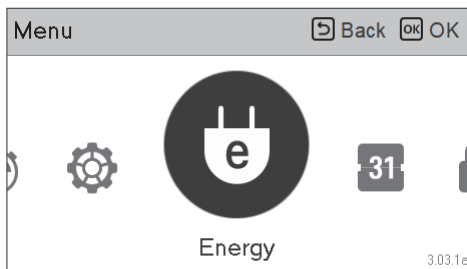
If the heater of the unit is used, the heater power can be calculated after setting the heater information on remote controller

### NOTE

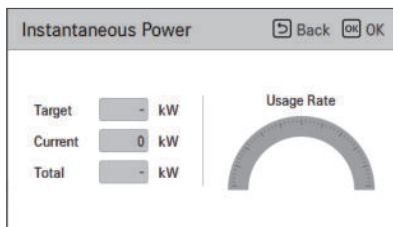
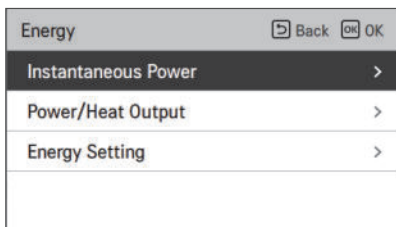
The accuracy of the energy monitoring functionality calculated by the product cannot be guaranteed. This function is not available when using ESS

## Information of Energy Monitoring

It provides useful information on the amount of energy and power during the week/month/year. Opening "Energy" option, these are presented on screen.

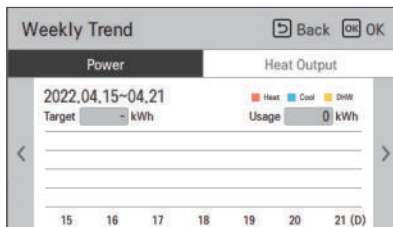
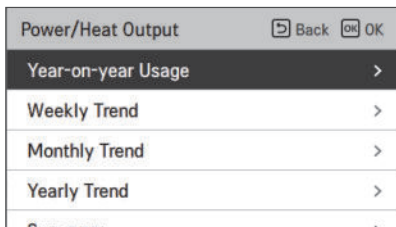


### Instantaneous Power



### Power / Heat Output

The information includes instantaneous power as well as power usage /heat output produced and up to annual trend.



#### NOTE

The calculated produced heat output and power are an estimation, the accuracy cannot be guaranteed.

The energy data should NOT be used for being invoiced or requested to government incentive and subsidy.

If use antifreeze agent(the antifreeze short pin(CN\_ANTI\_SW) must be open and switch No.8 in Option SW 1 must be on.), then the produced heat will NOT be calculated, nor will it be displayed on the user interface.

# METER INTERFACE SETTING

## Connection path of meter interface

It is the function that can check the status of energy and power on screen. It collects and calculates power or calorie data to create data for energy monitoring and energy warning alarm pop-ups. This function can be activated in installer mode.

The first screenshot shows the 'Installer' menu with options: Domestic Hot Water, Solar Thermal System, Service, **Connectivity**, and Information. The second screenshot shows the 'Connectivity' menu with options: Smart Control, CN\_EXT, 3rd Party Boiler, **Meter Interface**, and Zone. The third screenshot shows the 'Meter Interface' menu with options: **Modbus Address** and Unit.



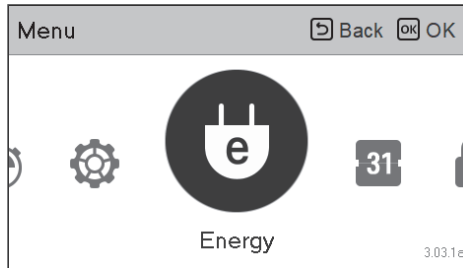
The first screenshot shows the 'Modbus Address' screen with 'Not use' selected. The second screenshot shows the 'Modbus Address' screen with 'B0' selected. The third screenshot shows the 'Modbus Address' screen with 'B1' selected.

There are 2 options, modbus address and unit, in this function. Activating the modbus address option, you choose one address(B0 or B1) or don't use. Then, you set the port and specification in range of 0000.0~9999.9[pulse/kWh] as shown in the figure below.

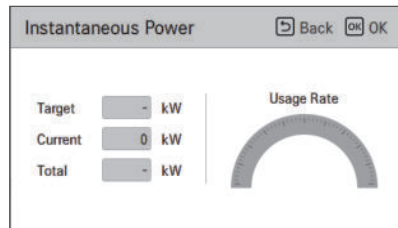
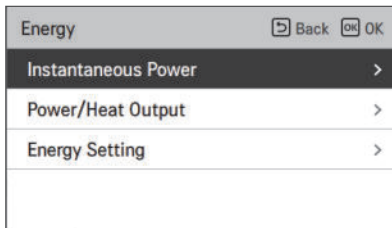
The first screenshot shows the 'Unit' screen with 'Port1' selected and 'Pulse/kWh' displayed. The second screenshot shows the 'Unit' screen with 'Port1' selected and 'Pulse/kWh' displayed.

## Information of meter interface

It provides useful information on the mount of energy and power during the week/month/year. Opening "Energy" option, these are presented on screen.

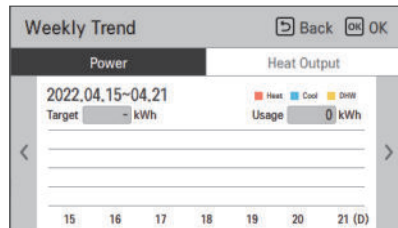
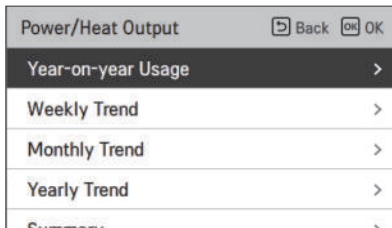


### Instantaneous Power



### Power / Heat Output

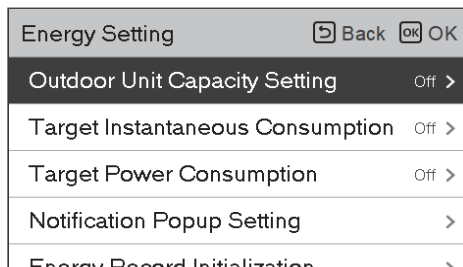
The information includes instantaneous power as well as power usage /heat output produced and up to annual trend.



### Energy Setting

In addition, various energy settings are possible as shown below.

Current value reaches to defined target value, It alerts to you on display

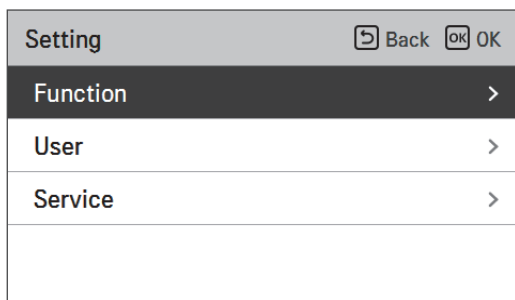
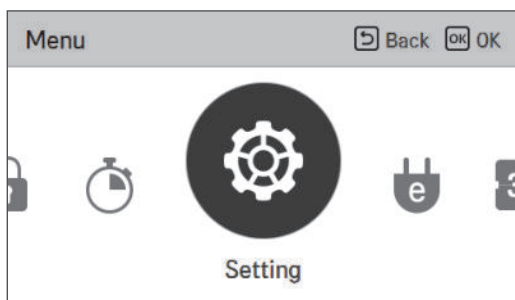


# FUNCTION SETTING

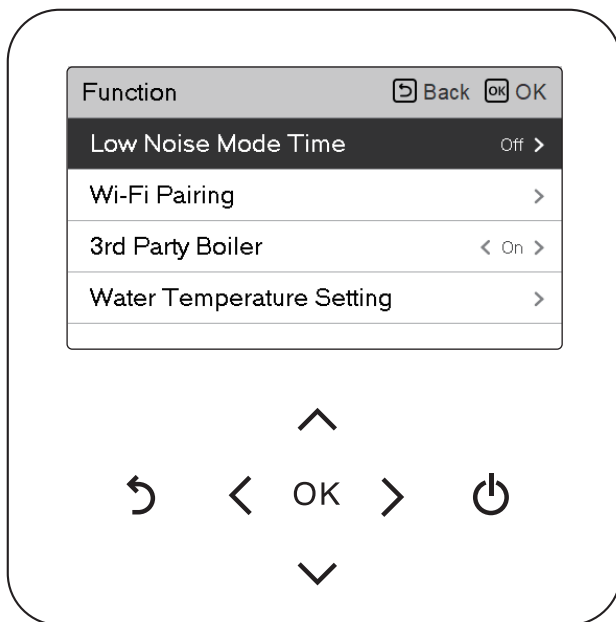
## How to enter function setting

To enter the menu displayed at the bottom, you need to enter the function setting menu as follows.

- In the menu screen, press [<,>(left/right)] button to select the setting category, and press [OK] button to move to the setting list.
- In the setting list, select the function setting category, and press [OK] button to move to the function setting list.



## Function setting

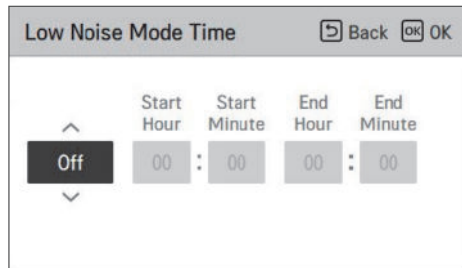
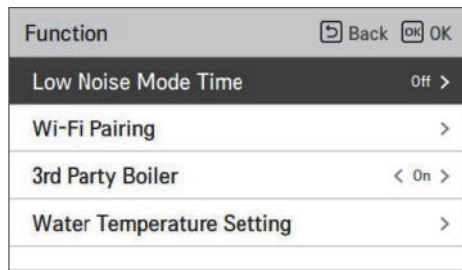


| Menu                         | Description                                                                                                                                          |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low Noise Mode Time          | It is the function to set the start and end time of the outdoor unit's low noise mode operation.                                                     |
| Wi-Fi Pairing                | It is the function to control remotely through network with indoor unit.                                                                             |
| Water Temperature Setting    | If you choose (Leaving/Inlet) water temperature control way, This option is activated on screen. It is the function to set target water temperature. |
| 3 <sup>rd</sup> Party Boiler | It is the function to linkage the boiler of other companies. (this function can be activated, after setting every value in installer mode.)          |

## Low Noise Mode Time

It is the function to set the start and end time of the outdoor unit's low noise mode operation.

- In the function setting list, select the Low Noise Mode Time category, and press [OK] button to move to the detail screen.
  - After setting the start time and the end time, press [OK] button to move to the upper level list.
  - If the start time and the current time are the same, it enters the outdoor unit low noise operation mode, and in the monitoring screen, 'in outdoor unit low noise operation mode' message is displayed.
  - If the end time and the current time are the same, the outdoor unit low noise operation mode is cleared.



### NOTE

Low noise mode time setting function can be set only when the installer setting's outdoor unit function M/S setting is set to "Master".

Low noise mode time setting function is only available in some products.



### CAUTION

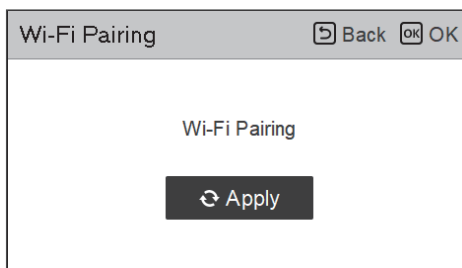
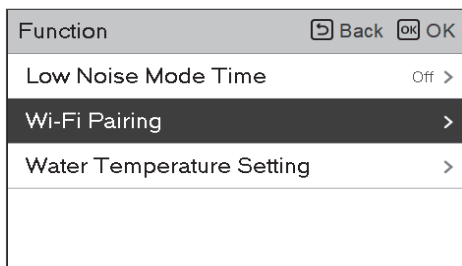
If the function is not used, please set it to Off.

When you enter the low noise operation, the cooling capacity may be degraded.



## Wi-Fi Pairing

It is the function to control remotely through network with indoor unit.



## Water Temperature Setting

If you choose air+water temperature control way, this option is listed-up on function setting display. It is the function to set upper limit of water temperature while controlling the unit based on room air temperature.

| Function                  | Back | OK  | OK |
|---------------------------|------|-----|----|
| Low Noise Mode Time       |      | Off | >  |
| Wi-Fi Pairing             |      |     | >  |
| Water Temperature Setting |      |     | >  |

| Water Temperature Setting   | Back | OK | OK |
|-----------------------------|------|----|----|
| Heating Temperature Setting |      |    | >  |
| Cooling Temperature Setting |      |    | >  |

| Heating Temperature Setting |       |       |  | Back | OK | OK |
|-----------------------------|-------|-------|--|------|----|----|
| Mode                        | Room1 | Room2 |  |      |    |    |
| Manual                      | 35    | 45    |  |      |    |    |

| Cooling Temperature Setting |       |       |  | Back | OK | OK |
|-----------------------------|-------|-------|--|------|----|----|
| Mode                        | Room1 | Room2 |  |      |    |    |
| Manual                      | 23    | 18    |  |      |    |    |

| Heating Temperature Setting |       |       |  | Back | OK | OK |
|-----------------------------|-------|-------|--|------|----|----|
| Mode                        | Room1 | Room2 |  |      |    |    |
| Auto                        | 35    | 35    |  |      |    |    |

| Cooling Temperature Setting |       |       |  | Back | OK | OK |
|-----------------------------|-------|-------|--|------|----|----|
| Mode                        | Room1 | Room2 |  |      |    |    |
| Auto                        | nan   | 18    |  |      |    |    |

| Value  | Description                                                                          |
|--------|--------------------------------------------------------------------------------------|
| Manual | Manually setting water target temperature of heating and cooling mode                |
| Auto   | Automatically setting water target temperature depends on seasonal auto mode setting |

### NOTE

This function is not default.  
It can be activated, after setting value in installer mode.

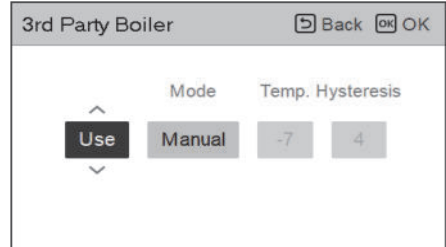
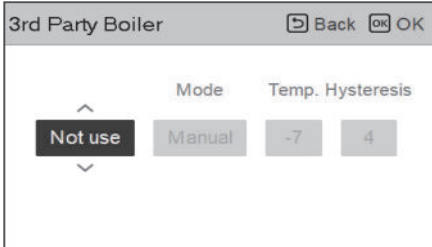
## 3<sup>rd</sup> Party Boiler

### NOTE

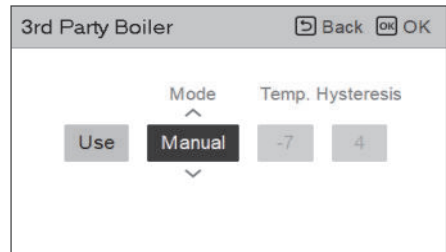
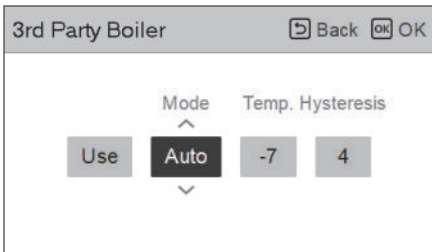
This function is not default.

It can be activated, after setting value in installer mode.

Function to set whether or not to use a installed 3<sup>rd</sup> party boiler function.



If the status of this function is "Use", you can choose control mode of boiler, Auto or Manual.



As shown above, After every setting is completed in installer mode, 3rd party boiler option is activated in function list. (Only active in manual mode.)

| Function                  | Back OK OK |
|---------------------------|------------|
| Low Noise Mode Time       | Off >      |
| Wi-Fi Pairing             | >          |
| 3rd Party Boiler          | < On >     |
| Water Temperature Setting | >          |

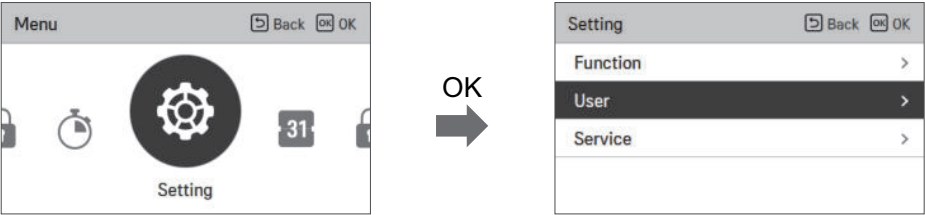
On/off mode of this option are opened by pushing "<" or ">" button simply and easily.

# USER SETTING

## How to enter user setting

To enter the menu displayed at the bottom, you need to enter the user setting menu as follows.

- Select the setting category, and press [OK] button to move to the setting list.
- Select the user setting category, and press [OK] button to move to the user setting list.



## User Setting

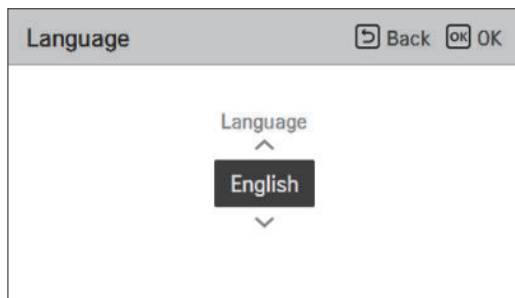
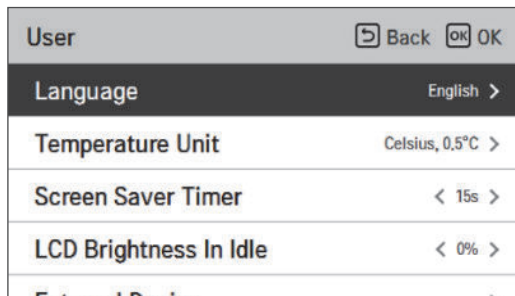
- You can set the product user functions.
- Some functions may not be available in some product types.

| Menu                       | Description                                                                    |
|----------------------------|--------------------------------------------------------------------------------|
| Language                   | Set the language to be displayed on the remote controller.                     |
| Temperature Unit           | Set the temperature unit displayed on the remote controller.                   |
| Screen Saver Timer         | Adjust the screen Off time of the remote controller.                           |
| LCD Brightness In Idle     | Adjust the remote controller's screen brightness.                              |
| Date                       | Set the date displayed on the remote controller.                               |
| Time                       | Set the time displayed on the remote controller.                               |
| Summer Time                | Set the summer time in the remote controller.                                  |
| Password                   | Set the password to prevent unauthorized change to remote controller settings. |
| Schedule Reset             | Initialize all timer settings in the remote controller.                        |
| Theme                      | Set the theme of the remote controller screen.                                 |
| Auto return to main screen | Set the auto return mode.                                                      |
| System Reboot              | Restart the remote controller.                                                 |

## Language

Set the language to be displayed on the remote controller.

- In the user setting list, select the language category, and press [OK] button to move to the detail screen.
- After the setting, if you press [OK] button, the setting is saved and moves to the previous screen.

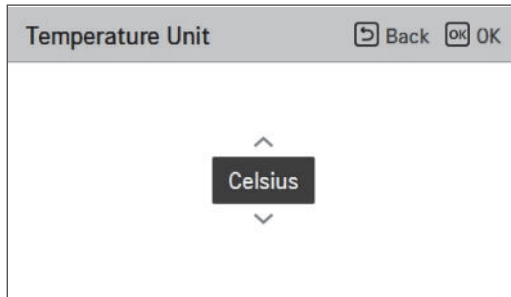
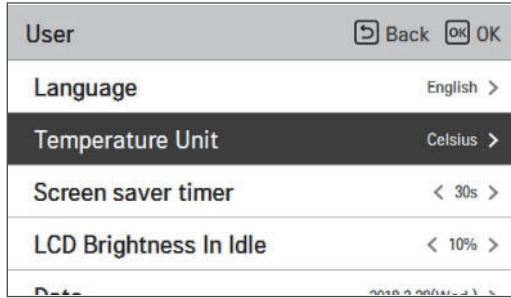


| Language   |             |           |
|------------|-------------|-----------|
| 한국어        | English     | Français  |
| Deutsche   | Italiano    | Español   |
| Русский    | Polski      | Português |
| 中国         | Čeština     | Türk      |
| Nederlands | Românesc    | ελληνικά  |
| Magyar     | Български   | Srpski    |
| Hrvatski   | Slovenščina | Dansk     |

## Temperature Unit

Set the temperature unit displayed on the remote controller.

- In the user setting list, select the temperature unit setting category, and press [OK] button to move to the detail screen.



|       |            |
|-------|------------|
| Value | Celsius    |
|       | Fahrenheit |

### ! CAUTION

The temperature unit function may not work or work differently in some products.  
You cannot set the temperature unit in the slave wired remote controller.

# Screen Saver Timer

Adjust the screen Off time of the remote controller.

- Select the following setting values using [<,>(left/right)] button.

| User                   | Back OK OK       |
|------------------------|------------------|
| Language               | English >        |
| Temperature Unit       | Celsius, 0.5°C > |
| Screen Saver Timer     | < 15s >          |
| LCD Brightness In Idle | < 0% >           |
| External Device        | >                |

| Value      |                      |          |
|------------|----------------------|----------|
| 15 seconds | 30 seconds (default) | 1 minute |



## CAUTION

Selecting longer stand by screen will decrease LCD lifespan.

# LCD Brightness In Idle

Adjust the remote controller's screen brightness.

- Select the following setting values using [<,>(left/right)] button.

| User                   | Back OK OK       |
|------------------------|------------------|
| Language               | English >        |
| Temperature Unit       | Celsius, 0.5°C > |
| Screen Saver Timer     | < 15s >          |
| LCD Brightness In Idle | < 0% >           |
| External Device        | >                |

| Value |                   |      |      |
|-------|-------------------|------|------|
| 0 %   | 10 %<br>(default) | 20 % | 30 % |



## CAUTION

Selecting brighter stand by screen will decrease LCD lifespan.

## Date

Set the date displayed on the remote controller.

- In the user setting list, select the date category, and press [OK] button to move to the detail screen.
- After the setting, if you press [OK] button, the setting is saved and moves to the previous screen.

|                 |                   |
|-----------------|-------------------|
| User            | Back OK OK        |
| External Device | /                 |
| Date            | 2016.5.18(Wed.) > |
| Time            | PM 02:02 >        |
| Summer Time     | Off >             |
| Password        | Off >             |



|                                                                         |            |  |
|-------------------------------------------------------------------------|------------|--|
| Date                                                                    | Back OK OK |  |
| <div><div>&lt; 2016 &gt;</div><div>Month 5</div><div>Day 18</div></div> |            |  |



## Time

Set the time displayed on the remote controller.

- In the user setting list, select the time category, and press [OK] button to move to the detail screen.
- After the setting, if you press [OK] button, the setting is saved and moves to the previous screen.
- In the screen, Time display can be presented in the form of AM / PM or 24 hours standard.

| User            |                 | Back | OK |
|-----------------|-----------------|------|----|
| External Device |                 |      |    |
| Date            | 2016.5.18(Wed.) | >    |    |
| Time            | PM 02:04        | >    |    |
| Summer Time     | Off             | >    |    |
| Password        | Off             | >    |    |



| Time        |      |        |    | Back | OK |
|-------------|------|--------|----|------|----|
| Time Format | Hour | Minute |    |      |    |
| 24 Hours    | 08   | :      | 44 |      |    |

| Time        |       |      |        | Back | OK |
|-------------|-------|------|--------|------|----|
| Time Format | AM/PM | Hour | Minute |      |    |
| 12 Hours    | AM    | 8    | :      | 44   |    |

## Summer Time

Set the daylight savings time dates in the remote controller.

- In the user setting list, select the summer time setting category, and press [OK] button to move to the detail screen.
  - Summer time: The system to advance the time by 1 hour from the spring when the day is longer and return back in the fall when the day gets shorter.
  - When it becomes AM 02:00 on the DST start date, the current time changes to AM 03:00, and when it becomes AM 02:00 of the DST end date, the current time changes to AM 01:00.

|                 |                   |
|-----------------|-------------------|
| User            | Back OK OK        |
| External Device |                   |
| Date            | 2016.5.18(Wed.) > |
| Time            | PM 02:05 >        |
| Summer Time     | Off >             |
| Password        | Off >             |

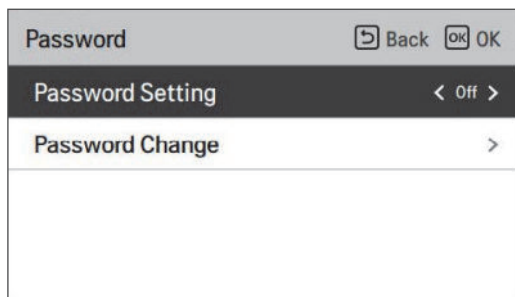
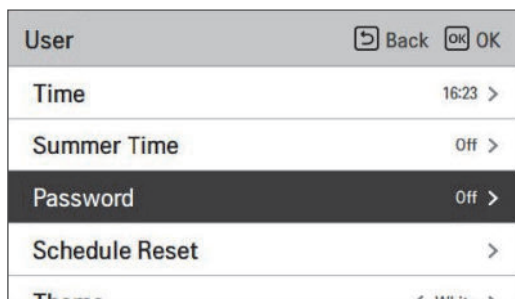


|             |       |            |           |
|-------------|-------|------------|-----------|
| Summer Time |       | Back OK OK |           |
| ^           |       |            |           |
| Off         | Month | Day        | Month Day |
|             | 1     | 1          | - 1 1     |
| v           |       |            |           |

## Password

Set the password to prevent unauthorized change to remote controller settings.

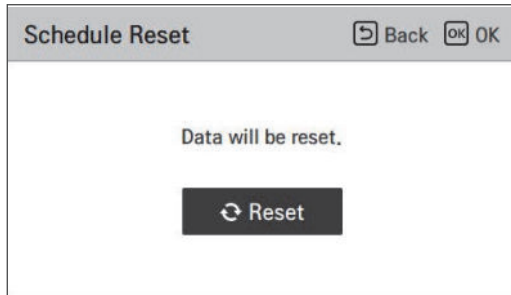
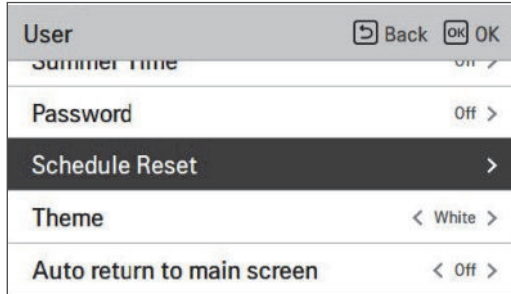
- Select the user password setting category, and press [OK] button to move to the detail screen.
    - If the password is set, when you enter "menu – setting", you need to input password to enter the setting list.
    - When you forgot the password, you can initialize the password using the installer setting's "password initialization".
- The initialized password is "0000".



## Schedule Reset

Reset all timer settings in the remote controller.

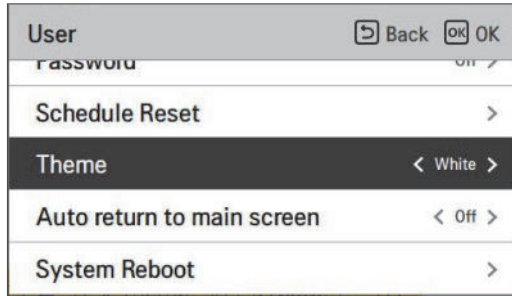
- In the user setting list, select the schedule reset setting category, and press [OK] button to move to the detail screen.
  - Press the check button to reset the sleep/simple timer, on/off timer, schedule and exception date in the remote controller.



## Theme

Set the theme of the remote controller screen.

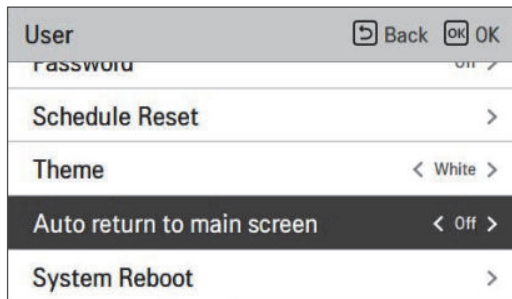
- Select either white or black using [<,>(left/right)] button.



## Auto return to main screen

Set the auto return mode.

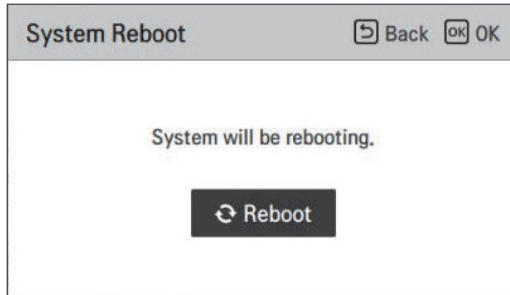
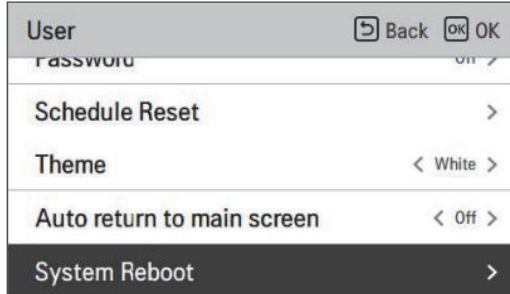
- Select either On or Off using [<,>(left/right)] button.



## System Reboot

Restart the remote controller.

- In the user setting list, select the system restart setting category, and press [OK] button to move to the detail screen.
  - In the detail screen, when you press [OK] button, a popup message is displayed, press the check button, to restart the system.
  - For forced reset, press down [On/Off + Back] button for 5 seconds to restart the system.



# OVERVIEW OWNER'S SETTINGS

## Menu structure

|                                      |       |    |
|--------------------------------------|-------|----|
| Menu                                 |       |    |
| → Lock                               |       |    |
| → All Lock                           | ..... | 27 |
| → On/Off Lock                        | ..... | 27 |
| → Mode Lock                          | ..... | 27 |
| → DHW Lock                           | ..... | 27 |
| → Timer                              |       |    |
| → Simple Timer                       | ..... | 29 |
| → Turn-On Reservation                | ..... | 30 |
| → Turn-Off Reservation               | ..... | 31 |
| → Schedule                           |       |    |
| → Daily Schedule                     | ..... | 33 |
| → Schedules & Edit                   | ..... | 34 |
| → Exception Day                      | ..... | 36 |
| → DHW Recirculation Schedule         | ..... | 37 |
| → Energy                             |       |    |
| → Energy Monitoring Setting          | ..... | 39 |
| → Information of Energy Monitoring   | ..... | 40 |
| → Instantaneous Power                | ..... | 40 |
| → Power / Heat Output                | ..... | 40 |
| → Connection path of meter interface | ..... | 41 |
| → Information of meter interface     | ..... | 42 |
| → Instantaneous Power                | ..... | 42 |
| → Power / Heat Output                | ..... | 42 |
| → Energy Setting                     | ..... | 42 |

|                              |         |
|------------------------------|---------|
| Setting                      |         |
| Function                     |         |
| Low Noise Mode Time          | .....45 |
| Wi-Fi Pairing                | .....46 |
| Water Temperature Setting    | .....47 |
| 3 <sup>rd</sup> Party Boiler | .....48 |
| User                         |         |
| Language                     | .....50 |
| Temperature Unit             | .....51 |
| Screen Saver Timer           | .....52 |
| LCD Brightness In Idle       | .....52 |
| Date                         | .....53 |
| Time                         | .....54 |
| Summer Time                  | .....55 |
| Password                     | .....56 |
| Schedule Reset               | .....57 |
| Theme                        | .....58 |
| Auto return to main screen   | .....58 |
| System Reboot                | .....59 |



## USING THERMOSTAT

The term "thermostat", which is widely used in this chapter, is a kind of 3rd party accessory. LG Electronics does not supply thermostat and it should be supplied 3rd party manufacturers.

Room thermostat can be used for easy and convenience control. To utilize thermostat more efficiently and correctly, this chapter presents information about using thermostat.

When thermostat is interlocked, the subject of Thermo On / Off is limited to the thermostat



### CAUTION

- Some electro-mechanical type thermostat has internal delay time to protect compressor. In that case, mode change can take time more than user's expectation. Please read thermostat manual carefully if the product does not response quickly.
- Setting temperature range by thermostat can be different with that of the product. The heating or cooling set temperature should be chosen within the setting temperature range of the product.

### How to use thermostat

To find how to turn on and off, how to set target temperature, how to change operating mode, etc, please refer thermostat operating manual provided by thermostat manufacturer.

# EMERGENCY OPERATION

## • Definition of terms

- Trouble : a problem which can stop system operation, and can be resumed temporally under limited operation without certificated professional's assist.
- Error : problem which can stop system operation, and can be resumed only after certificated professional's check.
- Emergency mode : temporary heating operation while system met trouble.

## • Objective of introducing 'Trouble'

- Not like airconditioning product, Air-to-Water heat pump is generally operation in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue in emergency mode operation with end user's decision.

## • Classified trouble

- Trouble is classified two levels according to the seriousness of the problem. : Slight trouble and Heavy trouble
- Slight trouble : Sensor trouble. In most case, this trouble is concerned with sensor problems. The unit is operating under emergency mode operation(level 1).
- Heavy trouble : Compressor cycle trouble. Emergency mode operation(level 2) is performed by optional electric heater.
- Option trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

## • Emergency operation level

When the AWHP has any trouble,

- (1) If there is not a function to judge possibility of operation : Once an error occurs mainly in indoor unit, AWHP stops. On the other hand, Remocon allows the product to activate On / Off operation.(On : emergency operation)
  - Slight / Heavy trouble : Heating Operable only
  - Critical trouble : Full stop
  - Treatment priority : Critical > Heavy > Slight
- (2) If there is a function to judge possibility of operation : Depending on the status of slight / heavy / critical trouble, pop-up phrase is guided separately on display.
  - Slight trouble : Heating / Cooling Operable
  - Heavy trouble : Heating Operable only
  - Critical trouble : Service center request
  - AWHP operates when user pressed OK button on pop-up window.

- **Duplicated trouble : Option trouble with slight or heavy trouble**

- If option trouble is occurred with slight (or heavy) trouble at the same time, the system puts higher priority to slight (or heavy) trouble and operates as if slight (or heavy) trouble is occurred.
- Therefore, sometimes sanitary water heating can be impossible in emergency operation mode. When sanitary water is not warming up while emergency operation, please check if sanitary water sensor and related wiring are all Ok.

- **Emergency operation is not automatically restarted after main electricity power is reset.**

- In normal condition, the product operating information is restored and automatically restarted after main electricity power is reset.
- But in emergency operation, automatic re-start is prohibited to protect the product.
- Therefore, user must restart the product after power reset when emergency operation has been running.

## Decommissioning and Recycling

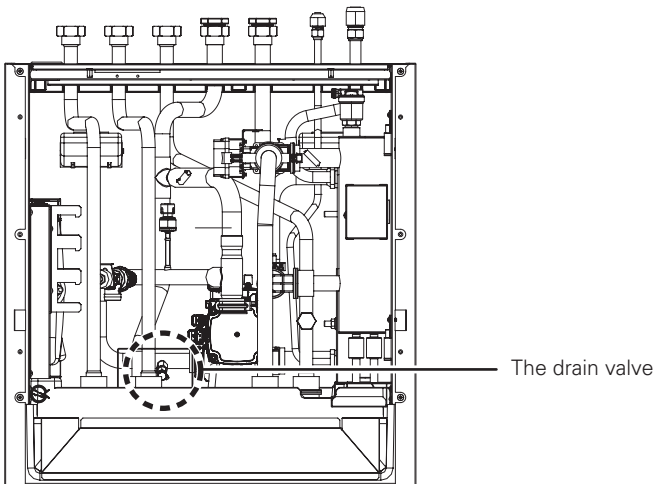
- Sort the packaging according to cardboard, wood and foil and dispose of it in appropriate containers.
- After the lifespan of the device ends it has to be disposed of in accordance with the legislation on waste electrical and electronic devices in force.

### 1. Extraction of Refrigerant

The indoor unit has to be connected to the outdoor unit holding the HFC refrigerant R32 which is a fluorinated greenhouse gas covered in the Kyoto protocol. You have to prevent leakage of the gas into the atmosphere. During a maintenance procedure or removal of the device, make sure that the gas is removed in accordance with the current regulations for the use of substances harmful to the ozone and fluorinated greenhouse gases.

### 2. Draining the unit (Heating system)

Use the drain valve below to drain the Heating system.



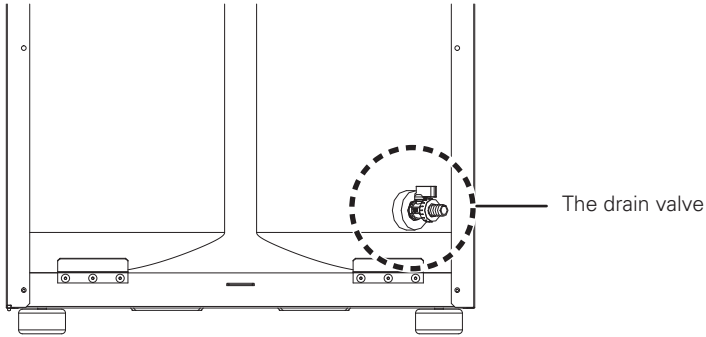
## ⚠ CAUTION

Turn off the power supply of the heat pump before draining the unit.

- Turn off the unit
- Connect a hose to the drain cock and lead it into a sink.
- Open the air vent(s) at the highest level of the heating system
- Open the drain valve

### 3. Draining the DHW tank

Use the drain valve shown below to drain the Domestic hot water tank and circuit.



## CAUTION

Turn off the power supply of the heat pump before draining the unit.

- Turn off the unit
- Close the Cold water supply line
- Connect a hose to the drain cock and lead it into a sink
- Open the drain valve
- Open the tap at the highest level of the DHW system

## Reset of the thermal protection of the electrical heater

The thermal protection of the electrical heater is an additional safeguard protecting the device in the following cases:

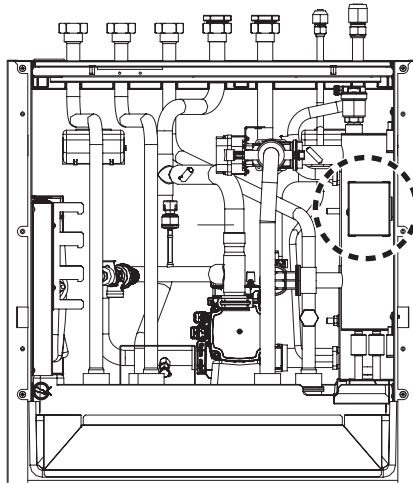
- The electrical relay, which turns on the electrical flow heater can be permanently short-circuited.
- At commissioning, air is in the system; this causes heating without heat extraction.

The easiest way to determine whether the thermal protection of the electrical heater is operative is to force the Backup heater to work using the Emergency mode (refer to the Owner's manual for more detail).

Determine if you can feel by hand the difference between the supply line and the return line. The electrical heater works if the supply line is warmer.

In case the electrical heater does not work because of one of the aforementioned reasons, the Safety thermostat has to be reset manually after the problem is resolved.

First you have to remove the front panel. Reset the safety thermostat by pressing the red button until you hear a "CLICK".



### CAUTION

Resetting the device can only be performed by installers, authorized contractors for commission or authorized maintenance worker in a voltage-free state.

# MAINTENANCE AND SERVICE

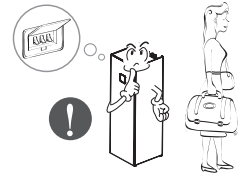
## Maintenance activities

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals, preferably yearly. This maintenance should be carried out by your local agreed technician.

## When the unit is not going....

### ! CAUTION

- If the product is not used for long time, we strongly recommend not to switch off the power supply to the product.
- When the power is applied for the first time, operate the product after preheating for 2 hours. To protect the unit by increasing the oil temperature of the compressor.
- If power is not supplied, some special product-protecting actions (such as water pump anti-locking) will not performed.



## Call the service immediately in the following situations

- Anything abnormal such as burning smell, loud noise etc. happen. Stop the unit and turn the breaker off. Never try to repair by yourself or restart the system in such cases.
- Main power cord is too hot or damaged.
- Error code is generated by self diagnosis.
- Water leaks from unit.
- Any switch, breaker (safety, earth) or fuse fails to work properly.

User must carry routine checkup & cleaning to avoid unit's poor performance.

In case of special situation, the job must be carried out by the only service person.

### ! CAUTION

- In the case of water with added brine, the drain valve of shut-off valve must be connected to a recovery container.
- Do not touch the water stirred with the brine.
- When the brine in the pipe is leaked, do not operate the unit and contact dealer, seller or an authorized service center.

## Open Source Software Notice Information

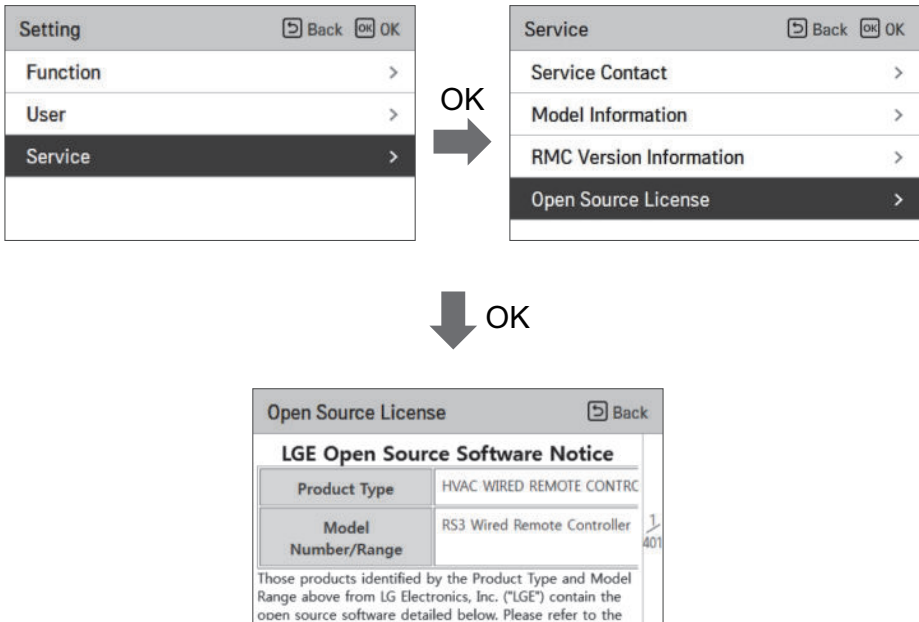
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## Open source license

View the remote controller's open source license.

- In the service setting list, select the open source license category, and press [OK] button to move to the detail screen.









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**Eco design requirement**

- The information for Eco design is available on the following free access website.  
<https://www.lg.com/global/support/cedoc/cedoc>