

navien Air to Water Heat Pump

Service Manual

Getting Service

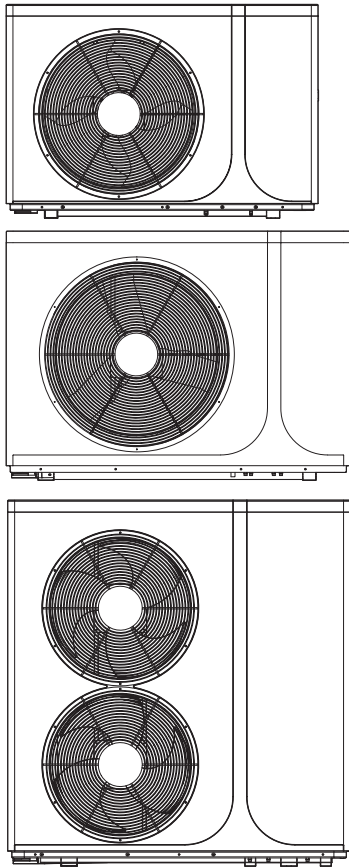
If your product requires service, you have several options for getting service:

- Contact the Technical Helpdesk at 0344 332 2323 or go to the website (www.navien.co.uk).
For warranty service, always contact the Technical Helpdesk first.
- Contact the technician or professional who installed your heat pump.
- Contact a Gas Safe Registered engineer.

When contacting the Technical Helpdesk, please have the following information available:

- Model number
- Serial number
- Date purchased
- Installation location and type
- Error code, if any appears on the control panel display

Version: 1.0 (April, 2025)



navien Air to Water Heat Pump

Service Manual

Refrigerant	Capacity	Models
R290	4kW	PEM750V004PGKC
	6kW	PEM750V006PGKC
	8kW	PEM750V008PGKC
	10kW	PEM750V010PGKC
	17kW	PEM750V017PGKC



WARNING

If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage or personal injury.

- Do not store or use petrol or other flammable vapours and liquids in the vicinity of this or any other appliance.
- Read this manual completely before installing the product.
- The product must be installed in accordance with national wiring standards by authorised personnel only.
- Retain this manual for future reference after reading it thoroughly.



Contents

1. Safety Information	4	7. Using the Wi-Fi module	40
2. About the AWHP	9	7.1 Components	40
2.1 Included Items	9	7.2 Included Items	40
2.2 Technical Data	10	7.3 Technical Specifications	41
2.3 Components	11	7.4 Disposal Instructions	41
2.4 Dimensions	13	7.5 CE Declaration of Conformity	41
2.5 Operating Modes	15	7.6 Installing the Wi-Fi module	42
3. Installing the Heat Pump	17	7.7 LED Status Indicators	42
3.1 Moving the Heat Pump	17	7.8 Using the Wi-Fi Module App	43
3.2 Choosing an Installation Location	17	7.9 Connecting the Wi-Fi Module to the Heat Pump	43
3.3 Installation in Coastal Areas in the Vicinity of Sea	19	8. Operating the Heat Pumps	44
3.4 Installation in Areas with Heavy Snowfall	20	8.1 Using the Front Panel	44
3.5 Conditions for the Installation Types	21	8.2 Turning the Heat Pump On or Off	45
3.6 Drain Work	24	8.3 Selecting the Operating Mode	46
3.7 Connecting Water Pipes	25	8.4 Setting the Target Temperature	47
3.8 Flushing and Air Purging	26	8.5 Using the Smart Grid (SG) Ready Feature	48
3.9 Freeze Protection	26	8.6 Setting the System Time and Timer	53
3.10 Charging Water	27	8.7 Viewing the Temperature Curve	59
3.11 Installing Filter and Strainer	28	8.8 Adjusting the Display Brightness	60
3.12 Piping Insulation	28	8.9 Viewing the Fault Records	61
3.13 Water Quality	28	8.10 Turning On or Off the Electric Heater	62
4. System Operations	29	8.11 Viewing the System Status	63
4.1 System Requirements	29	8.12 Locking or Unlocking the Screen	64
4.2 Filling the Sealed System	30	8.13 Setting the Parameters	65
4.3 Operating the Pressure Relief (Safety) Valve	31	9. Troubleshooting	68
4.4 Domestic Hot Water Operation	31	9.1 Solving Problems	68
4.5 Legionella	32	9.2 Error Code Classification	69
4.6 Day Immersion Programmer (Legionella)	32	9.3 Error Code List	73
4.7 Compressor Protection Function	32	9.4 Parameter List	77
5. Connecting the Electrical Supply	33	10. Key Components Description	78
5.1 Accessing the Terminal Strips	33	10.1 Compressor	78
5.2 Connecting the Power Supply Cables	33	10.2 4-Way valve	79
5.3 Setting the Remote Control Functions	34	10.3 EEV	80
5.4 Connecting the Heating System Controls	34	10.4 Fan Motor	81
5.5 Connecting the Warm Water Secondary Circulation Pump	35	10.5 Water Pump	82
5.6 Connecting the 3 Port Diverter Valve	35	11. Connecting the Electrical Supply	83
5.7 Connecting the Temperature Sensor	35	11.1 Preparing for Replacement	83
5.8 Configuring the Smart Grid (SG) Ready	36	11.2 Components Replacement Instructions	83
5.9 Connecting the Electric Heater	36	12. Components Diagram and Part List	95
5.10 Connecting the Buffer Tank	37	12.1 PEM750V004PGKC/PEM750V006PGKC	95
5.11 Connecting the Pan Heater	37	12.2 PEM750V008PGKC	97
6. Installing the Remote Controller	38	12.3 PEM750V010PGKC	99
6.1 Installing the Remote Controller on a Wall	38	12.4 PEM750V017PGKC	101
6.2 Connecting the Remote Controller to the Heat Pump	39		

13. Maintaining the Heat Pump	103
13.1 Precautions for Daily Use	104
13.2 Periodic Maintenance (every 6 months)	104
13.3 Cleaning the Casing	104
13.4 Checking the Evaporator, Fan, and Condensate Discharge	104
13.5 Disposal and Recycling	104
13.6 Recovery	105
14. Commissioning	106
14.1 Checklist Commissioning (Before and Pre-test)	106
14.2 Test Run	107
14.3 Checklist Commissioning (Operation Measured Data)	107
15. Appendices	108
15.1 Wiring Diagram	108
15.2 Common Applications	112
15.3 Field Wiring Diagram	116
15.4 Field Wiring Case	117

1. Safety Information

The following safety symbols are used in this manual. Read and follow all safety instructions in this manual precisely to avoid unsafe operating conditions, fire, explosion, property damage or personal injury.

DANGER

Indicates an imminently hazardous situation which, if not avoided, could result in severe injury or death.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Descriptions of the Symbols Shown on the Product

Safety-relevant stickers are affixed to several points on the product. These warning stickers provide guidelines for handling the R290 refrigerant and must not be removed.

Symbol	Description
	Indicates that the appliance uses a flammable refrigerant. If the refrigerant leaks and comes into contact with an external ignition source, there is a risk of fire.
	Indicates that fire, naked flames and smoke are prohibited.
	Indicates that the Installation & Operation Manual should be read carefully.
	Indicates that service personnel should handle this equipment in accordance with the Installation & Operation Manual.
	Indicates that service personnel should handle this equipment in accordance with the Installation & Operation Manual.
	Indicates that additional information, such as the Installation & Operation Manual, is available.

DANGER

- **The product contains the combustible refrigerant R290. If there is a leak, escaping refrigerant may mix with air and form a flammable atmosphere which can explode and catch fire, causing severe burns.**
 - Do not use or place any ignition sources, such as plug sockets, light switches, lamps, electrical switches, or other ignition sources, in the protective zone.
 - Keep all flammable sources away from the product.
 - Do not place it near any devices with an extremely hot surface.
 - Before opening the cover and working on the product, use a gas leak detector to make sure there is no leak.
 - If there is a leak, close the front cover and inform the end user and contact the Technical Helpdesk at 0344 332 2323.
 - Ensure that the product installation site can be ventilated and aerated properly.
 - Do not allow any unauthorised personnel to access or work on the product installation site.
 - Keep any required ventilation openings clear of obstruction.

DANGER

- **There is a risk of death from electric shock if you touch live components. Before commencing work on the product:**
 - Disconnect the product from the power supply by switching off all power supplies at all poles (electrical partition in overvoltage category III for full partition, e.g. fuse or circuit breaker).
 - Secure against being switched back on again.
 - Wait for at least 3 minutes until the capacitors have discharged.
 - Check that there is no voltage.
- **When removing, transporting, or filling the refrigerant:**
 - Only licensed personnel may handle the refrigerant.
 - Wear suitable personal protective equipment and bring a fire extinguisher with you.
 - Use permitted tools or units in proper working condition.
 - Do not allow air to get into the refrigerant circuit, refrigerant-carrying tools (or units), or refrigerant cylinder.
 - Do not allow R290 refrigerant to be introduced into the sewage system.
 - Do not use the compressor to pump the refrigerant into the outdoor unit (no pump down).
 - Do not tilt the product more than 30°. Doing so may lead to creating problems in the refrigerant circuit during operation.

DANGER

- **Do not install the product within 3 m of walkways, plastered surfaces, or down pipes.**
 - The air temperature at the air outlet is lower than the outdoor temperature, which can lead to ice formation and cause personal injury by creating a slippery surface.
- **Neglected or improper maintenance or repairs of the product may lead to personal injury or damage to the product.**
 - Always carry out maintenance or repairs (if required) for the product on a regular basis.
 - Maintenance or repairs must be carried out only by a licensed professional.
- **Do not allow condensate to discharge onto paths so that ice does not build up.**
 - Doing so may result in frozen condensate on paths which could cause falls.

WARNING

- **Do not lift the product by yourself.**
 - The product is heavy. At least four people should lift the product. Lifting heavy weight could cause injury.
- **The product may topple over if there is a strong wind load.**
 - Use two concrete bases and an anti-slip protective mat.
 - Fix the product to the concrete base using fixings.
- **Do not use the product to treat industrial wastewater, swimming pool water, or domestic drinking water.**
 - Installing an intermediate heat exchanger may be required in the above cases.
- **Fill or add water to the product when it is cold and the product is turned off.**
 - Failure to do so may damage the product.
- **If the three-phase supply is present, ensure that the immersion heater power supply and heating system controls are taken from the same phase.**
 - If uncertain, contact a qualified electrician or contact the Technical Helpdesk at 0344 332 2323.

CAUTION

- **Use heating water of sufficient quality.**
 - Failure to do so may damage the product due to its poor quality. For more information about the required water quality, refer to "3.13 Water Quality" on page 28.
- **Do not use any improper antifreeze or corrosion inhibitors, biocides, or sealants.**
 - Using unsuitable additives may damage the product, causing changes in the components.
- **Use R290 refrigerant that has been used before or that is at least 99.5% pure with minimal levels of critical impurities, including moisture and unsaturated hydrocarbons.**
 - Using improper or contaminated R290 refrigerant may damage the product.
- **To prevent corrosion particularly on the condenser and evaporator fins, which leads to product malfunction or inefficient performance:**
 - Do not install the product in areas where corrosive gases, such as acid or alkaline gas, are produced.
 - Do not install the product where it is exposed directly to sea wind or salty wind.
 - Do not install the product in the immediate vicinity of the sea. If installation near the seashore is unavoidable, a minimum distance of 500 m to the sea is required. For Ireland, the minimum required distance to the sea is 1,000 m.

CAUTION

- **Do not use the product for anything other than its intended purpose as described in this manual.**
- **Do not remove the front cover unless the power to the product has been turned off or disconnected.**
 - Failure to do so may result in electric shock.
- **When servicing the controls, label all wires prior to disconnecting them.**
 - Failure to do so may result in wiring errors, which can lead to improper or dangerous operation. Verify proper operation after servicing.
- **Do not use unapproved replacement or accessory parts.**
 - Doing so may result in improper or dangerous operation and will void the manufacturer's warranty.
- **This product has been approved for use in the UK and Ireland only.**
 - Using the product in any other country will void the manufacturer's warranty.

EC Conformity Declaration



Navien, hereby declares that the heat pump models:

**PEM750V004PGKC/PEM750V006PGKC/PEM750V008PGKC/
PEM750V010PGKC/PEM750V017PGKC**

to which this declaration refers, conform to and comply with the essential requirements of the following applicable European Standards and Directives.

EMC Directive:	EN IEC 55014-1:2021 EN IEC 55014-2:2021 EN IEC 61000-3-2:2019/A1:2021 EN 61000-3-3:2013/A2:2021 EN 61000-3-12:2011 EN IEC 61000-3-11:2019
Low Voltage Directive:	EN 60335-1:2012/A15:2021 EN 60335-2-40:2003/A3:2012 EN 62233:2008
Ecodesign Directive:	EN 14825:2022 EN 14511-4:2022 EN 12102-1:2022 KEYMARK Certification Scheme for Heat Pumps 2023

Navien, manufactures its products using a Quality Assurance system in compliance with Standard EN-ISO 9001:2015.

The Benchmark Scheme



Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manages and promotes the Scheme. Visit www.centralheating.co.uk for more information.

Disposal of the Product

This product should be handed in at a designated collection point, e.g. by handing it in at a duly authorised reseller when purchasing a similar product, or at an authorised collection site for recycling products which contain electrical and electronic equipment (EEE) and batteries and accumulators. Because of the potentially hazardous substances that usually accompany EEE, improper handling of this type of waste could have a possible impact on the environment and human health.

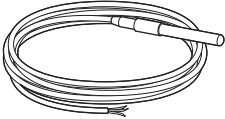
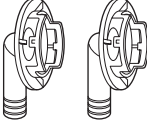
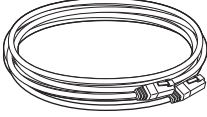
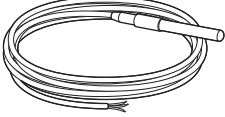
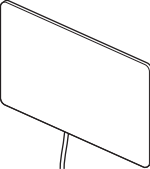
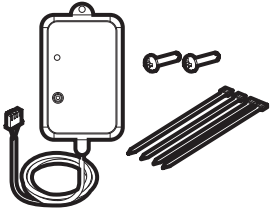
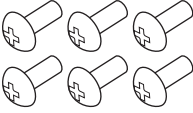
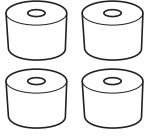
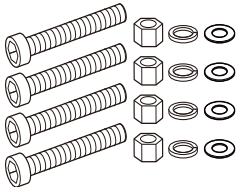
Your cooperation in the proper disposal of this product will contribute to the effective usage of natural resources.

For more information on recycling this product, please contact your city office, local waste disposal facilities, official service for chemical waste or landfill site.

2. About the AWHP

2.1 Included Items

When you open the box, you will find the following items with the AWHP. Check the box for each of the following items before installing the AWHP. If it seems like there is a problem, do not use the heat pump. Contact your supplier. Keep the included items out of the reach of children, as they can be dangerous. When you no longer wish to use the AWHP, disable any parts that could be potentially hazardous.

			
Installation & Operation Manual	Temperature Sensor (TT, 10 m)	Drain Connection (2ea)	Remote Controller Connection Cable (10 m)
			
Wi-Fi Connection Cable (20 m)	Temperature Sensor (BT, 10 m)	Remote Controller	Remote Controller Mounting Plate
			
Wi-Fi Module Package	Tapping Screws	Sockets (2ea)	Rubber Feet (4ea)
			
Plan Washer (4ea) Spring Washer (4ea) Bolt (4ea) Nut (4ea)			

2.2 Technical Data

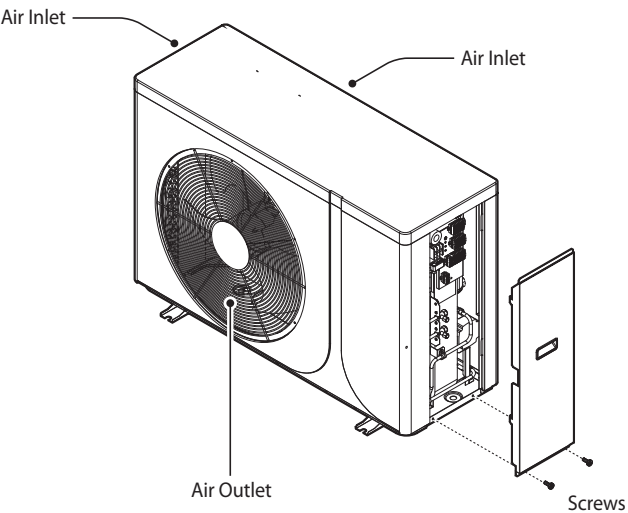
The following table lists the general specifications for the AWHP.

Model		Unit	PEM750V004PGKC	PEM750V006PGKC	PEM750V008PGKC	PEM750V010PGKC	PEM750V017PGKC
Power Supply		V/Hz	220–240V~/50Hz				
Resistance Class			IPX4				
Overvoltage Category			I				
EN14511	Heating Capacity	A7W35 (kW)	4	6	8	10	17
	COP		4.70	4.65	4.60	4.66	4.45
	Heating Capacity	A7W55 (kW)	4.5	5.5	7.5	9.3	17.0
	COP		3.21	3.06	2.96	3.05	2.97
	Cooling Capacity	A35W18 (kW)	4	6	8	10	17
SCOP (35°C/55°C) (MCS)			4.86/3.5	4.79/3.38	4.71/3.44	4.77/3.57	4.79/3.53
ErP Rating (35°C/55°C) Heating			A+++/A++	A+++/A++	A+++/A++	A+++/A++	A+++/A++
Max. Power Input	kW		2.8	3.9	5.1	6.3	8.5
Max. Starting/Running Current	A		1.5/12.0	1.5/17.0	2.0/22.0	2.5/30.0	3.0/36.1
Refrigerant/Amounts	kg		R290/0.75	R290/0.75	R290/0.80	R290/0.98	R290/1.40
CO2 Equivalent	T		0.00225	0.00225	0.00240	0.00290	0.00420
Rated/Max. Fan Speed	RPM		350/600	400/600	460/770	400/700	500/800
Air Volume at Rated Speed	m³/h		1500	2000	2800	4000	6000
Water Pump Input	W		60	60	60	60	180
Sound Pressure (1 m)	dB (A)		42	45	46	46	48
Sound Power Level (EN12102-1)	dB (A)		55	56	60	61	63
Connection Size	inch		1	1	1	1	1
Water Flow Volume	m³/h		0.68	1.03	1.38	1.70	2.90
Internal Water Pressure Drop	kPa		5	15	15	20	40
Water Head	m		5.5	7.5	6.8	5.6	10.5
Weight (Net)	kg		105	105	120	145	205
Unit Dimension (W/D/H)	mm		1166 x 445 x 799.5			1287 x 500 x 932	1247 x 540 x 1332
Operating Ambient Temperature Range Space Heating/Hot Water	°C		-25–43	-25–43	-25–43	-25–43	-25–43
Operating Ambient Temperature Range Cooling	°C		10–43	10–43	10–43	10–43	10–43
Operating Flow Temperature Range Space Heating	°C		15–70	15–70	15–70	15–70	15–70
Operating Flow Temperature Range Hot Water	°C		15–75	15–75	15–75	15–75	15–75
Operating Flow Temperature Range Cooling	°C		10–28	10–28	10–28	10–28	10–28

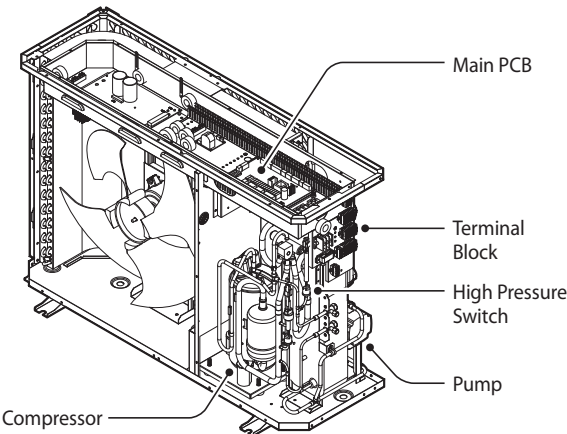
2.3 Components

The following diagram shows the key components of the AWHP. Component assembly diagrams and particular parts lists are included in the Appendices.

PEM750V004PGKC/PEM750V006PGKC

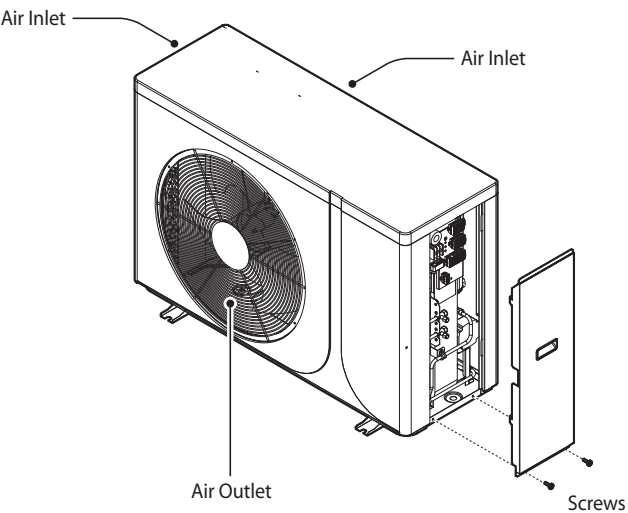


[Exterior Components]

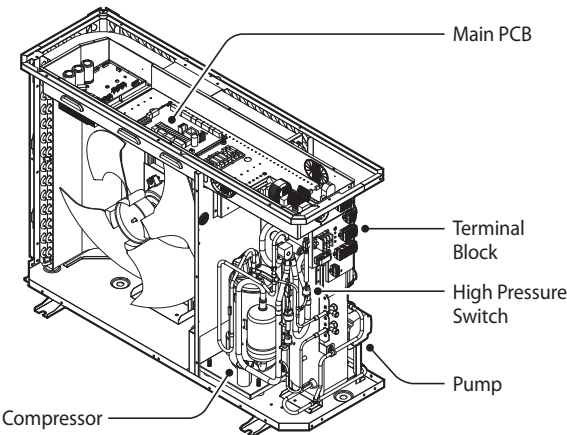


[Internal Components]

PEM750V008PGKC

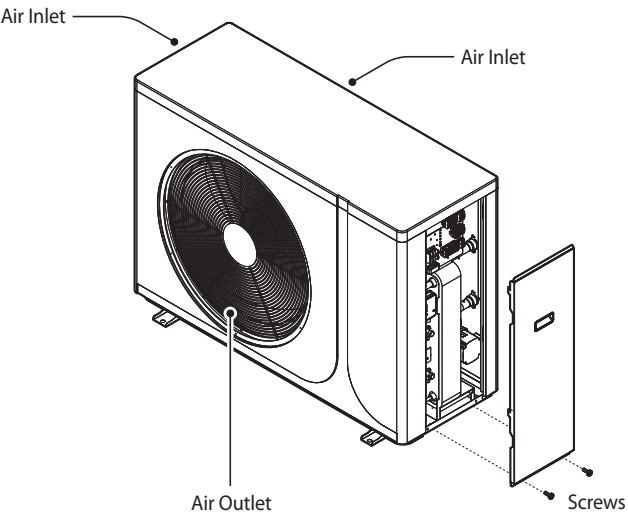


[Exterior Components]

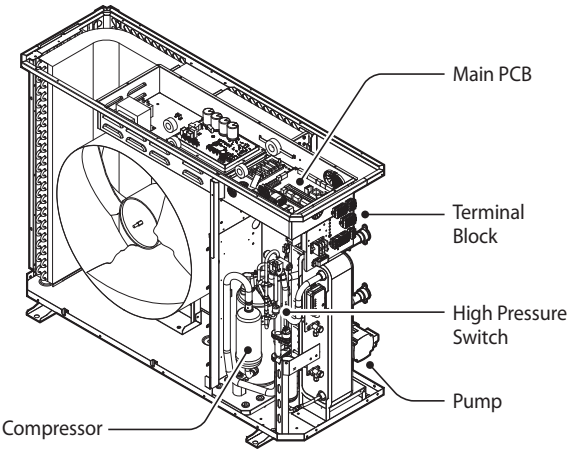


[Internal Components]

PEM750V010PGKC

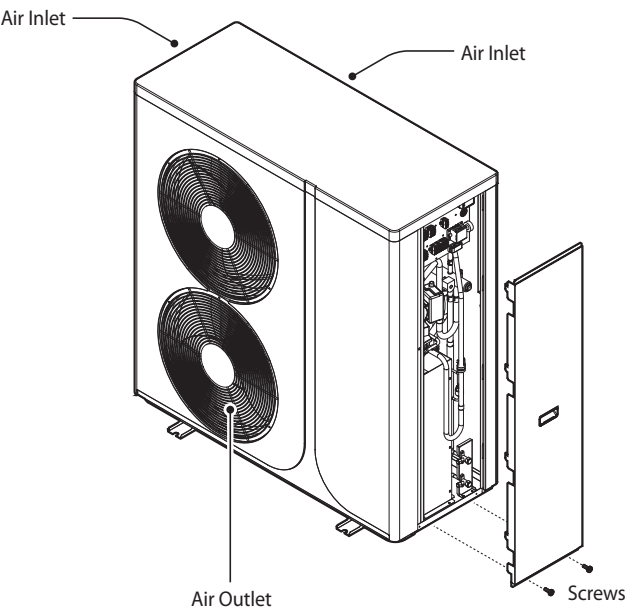


[Exterior Components]

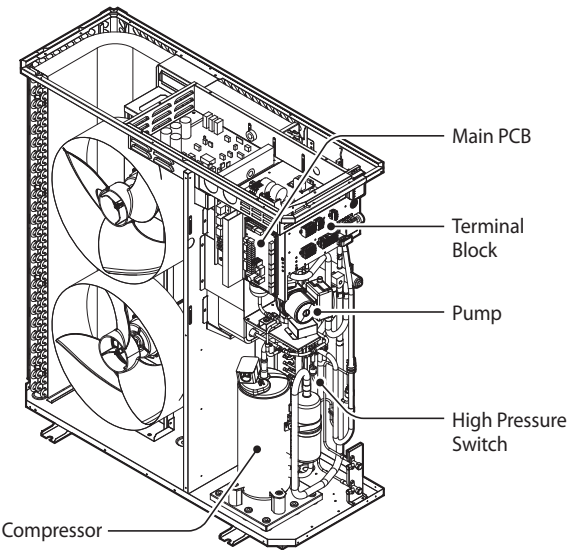


[Internal Components]

PEM750V017PGKC



[Exterior Components]

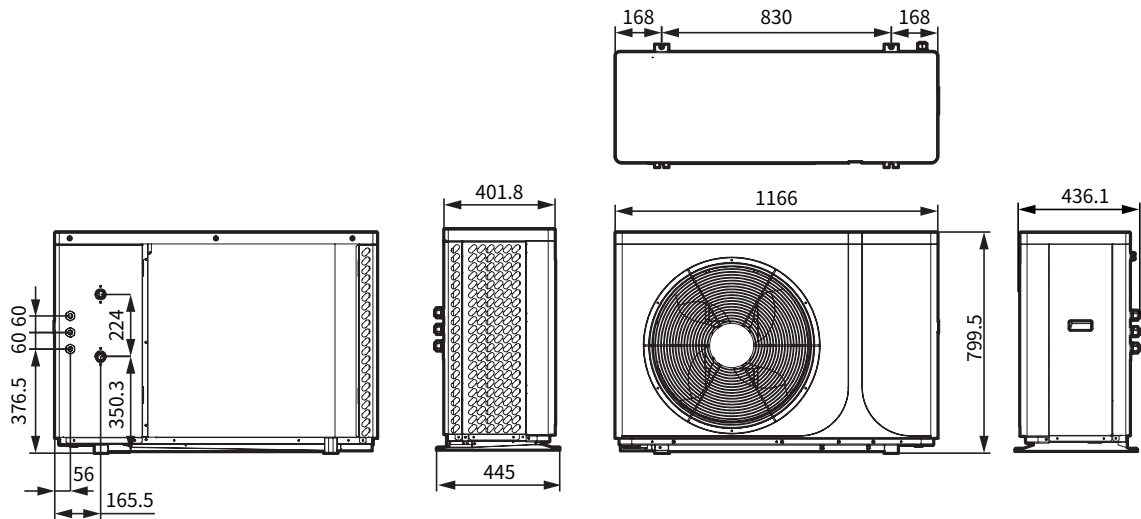


[Internal Components]

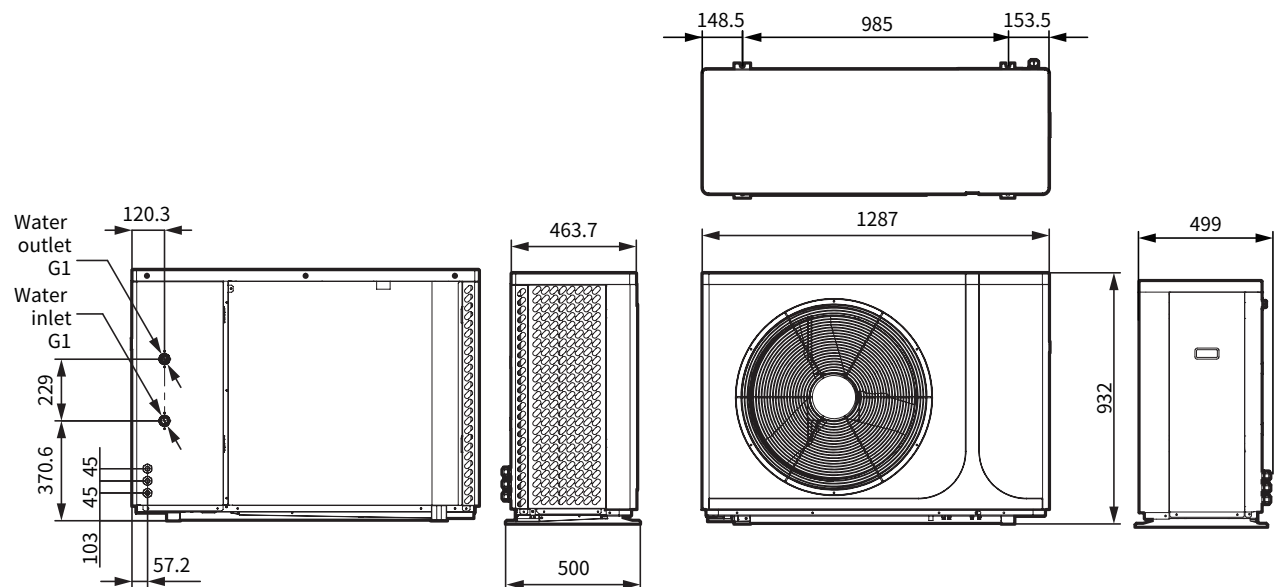
2.4 Dimensions

The following diagrams show the dimensions of the AWHP and the table lists the supply connections.

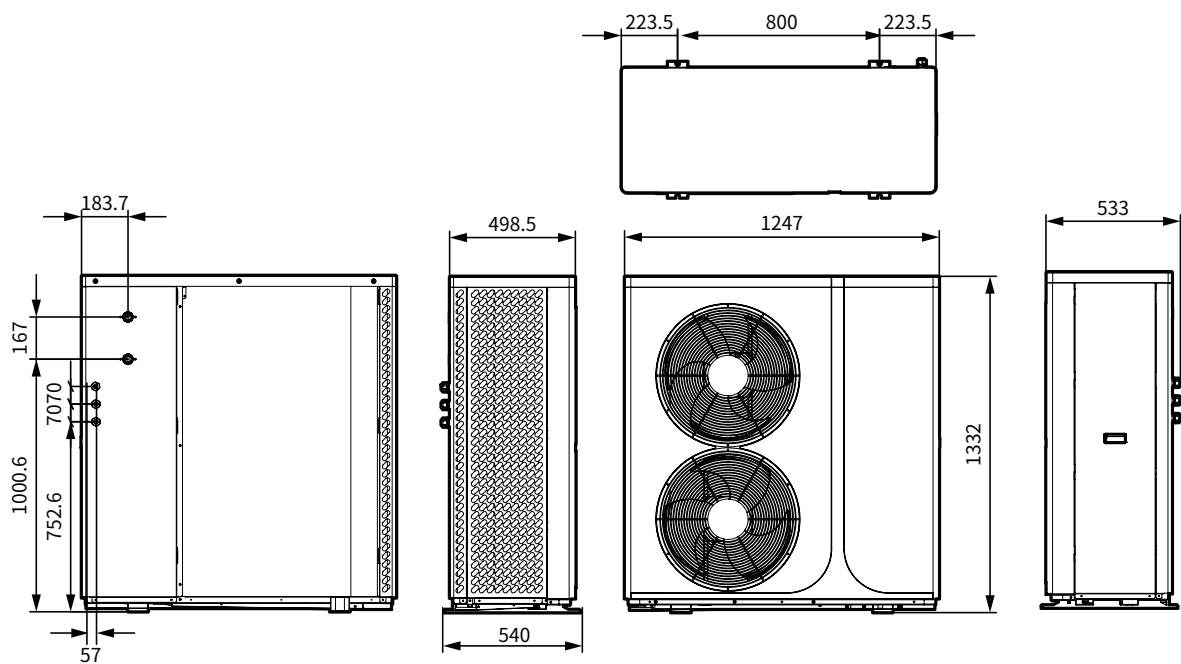
PEM750V004PGKC/PEM750V006PGKC/PEM750V008PGKC



PEM750V010PGKC



PEM750V017PGKC

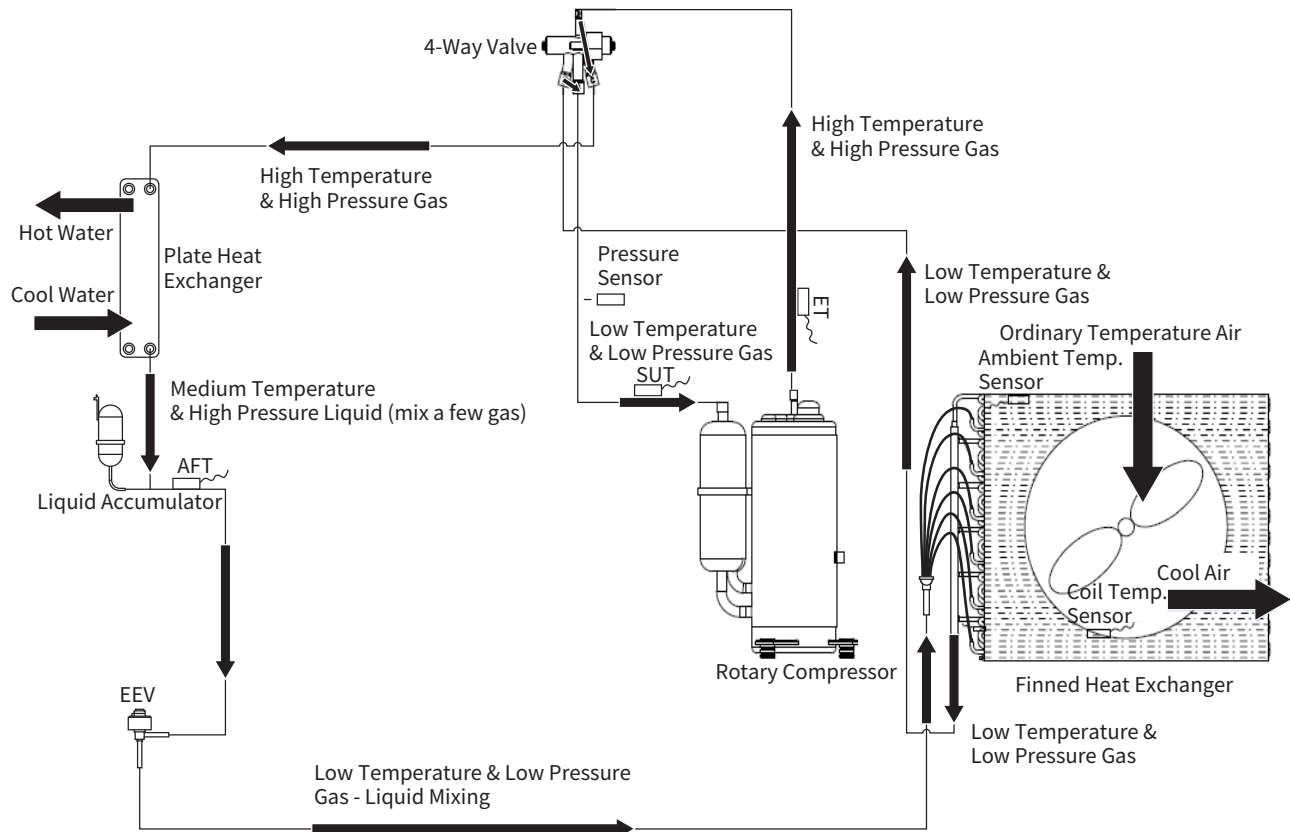


2.5 Operating Modes

The heat pump has a closed refrigerant circuit in which refrigerant circulates. Refer to the following diagrams for each of the heat pump modes in this section.

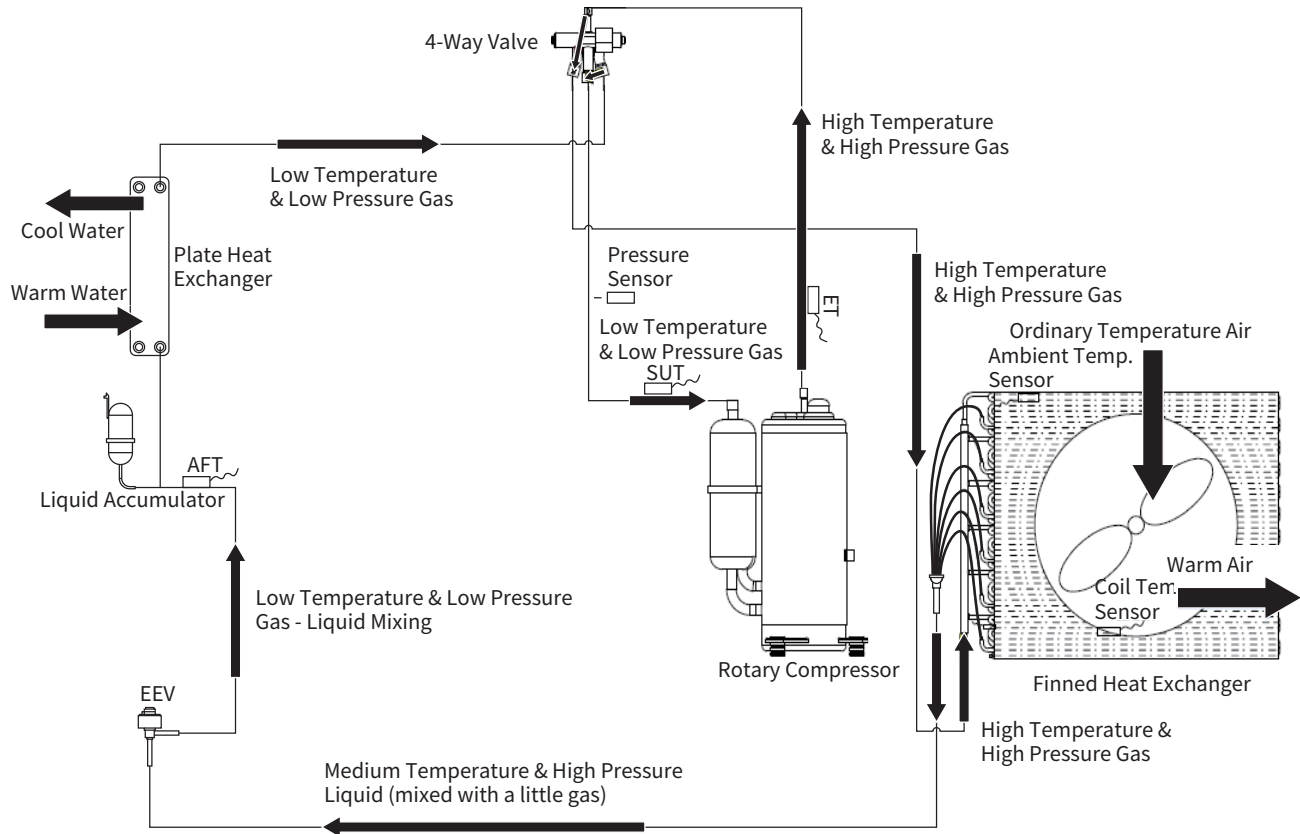
2.5.1 Operating in Heating Mode

The following diagram shows an example of how Heating mode works. In Heating mode, cyclic evaporation, compression, liquefaction, and expansion take in heat from the surroundings and transfer it to the building.



2.5.2 Operating in Cooling Mode

The following diagram shows an example of how Cooling mode works. In Cooling mode, heat is extracted from the building and released into the environment.



3. Installing the Heat Pump



CAUTION

The installation must be in line with MCS standards and system design.

3.1 Moving the Heat Pump



WARNING

The surface of the heat exchanger is sharp. Do not touch the heat exchanger of the heat pump with your fingers or other objects while moving and installing the heat pump.

To move the heat pump safely, follow these guidelines:

- Consider the weight distribution during transport. The product is significantly heavier on the right side than the left.
- Select the movement route in advance, and ensure that the route can bear the weight of the heat pump.
- Do not tilt the heat pump more than 30° when carrying it. (Do not lay the product down sideways.)
- When the unit needs to be hung during installation, a cable (8 m) is needed, and you should put a soft material between the cable and the unit to prevent damage to the heat pump.
- The heat pump should not be stored at temperatures below -30°C or above 60°C.

3.2 Choosing an Installation Location

Installation Location Conditions

When choosing an installation location, select a location that meets the following conditions:

- The noise and air discharged should not affect or disturb neighbours.
- The location should be protected from the wind.
- The location should support the minimum recommended space.
- The heat pump should not obstruct access to doors or paths.
- The surfaces of the floor must be strong enough to support the weight of the heat pump, and they should minimise noise and vibration.
- Preventive measures should be taken so that children cannot reach the heat pump.
- The installation location should be level (not inclined more than 5°).

- There should be no dust or strong wind around the location.
- The location should withstand vibrations and the weight of the heat pump.
- The location should allow for proper airflow.
- There should be no potential sources of ignition, such as heat, steam, or flammable gases around the location.
- During heat pump operation, condensate water flows from the heat pump. Therefore, the heat pump should be installed in a place where the condensate water flow will not be obstructed.
- The location should be in a place where people do not pass frequently.
- The location should be as free from adverse weather conditions as possible.

Noise Level

All heat pumps make noise. Discuss the potential nuisance factor with the end user when considering the final installation location. Take opening windows and doors into account. It is not essential for the heat pump to be positioned against a wall of the house. Installing the heat pump behind an outbuilding may be more suitable, so discuss the options with the end user.

Orientation

The north face of the building will usually have the coolest ambient temperature. To ensure maximum efficiency, position the heat pump on another side. In order of preference, install the heat pump on the south face, followed by either southeast or southwest, then by east or west. Only install the heat pump on the north face if there is no alternative.

Base

The heat pump should be installed on a firm, flat, level surface capable of supporting the heat pump's weight and that minimises the transmission of noise and vibration. For example:

- A flat trowelled concrete base 150 mm thick
- Paving slabs on compacted, hard core of a sufficient depth for the ground condition

This surface should extend at least 150 mm beyond the heat pump on three sides.

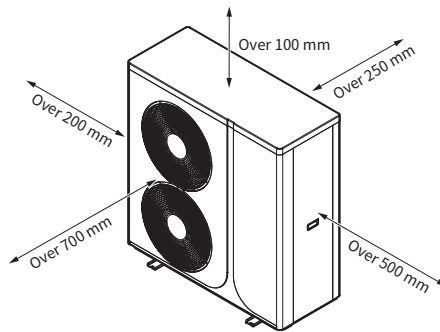
The heat pump should not be installed on loose or uneven surfaces, such as grass, soil, shingle, or gravel. The heat pump must be raised up from the surface of the base by approximately 80 mm on suitable anti-vibration mounts or blocks.

Install the heat pump near a drain or where embankment work has been done.

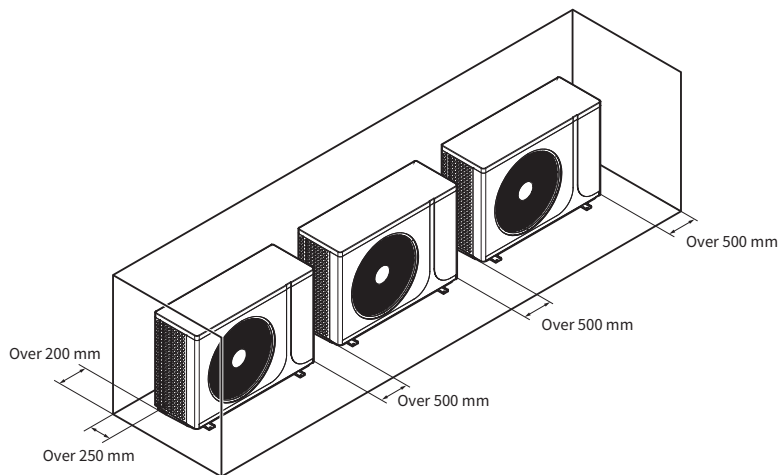
Adequate Installation Clearances

Install the heat pump in an area that allows for service, maintenance, and adequate airflow in and out of the heat pump. Based on the installation location, ensure that the following clearances are maintained:

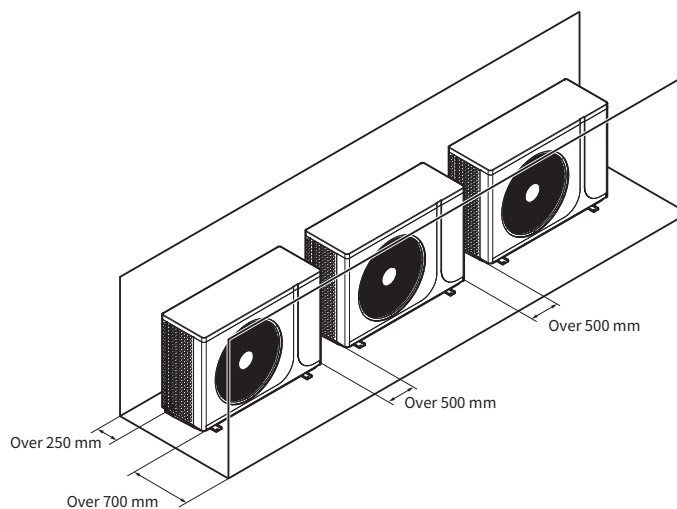
- When installing one heat pump



- When installing more than one heat pump



[3-Sides Suction Obstruction]



[Suction/Discharge Obstruction]

3.3 Installation in Coastal Areas in the Vicinity of Sea

⚠ CAUTION

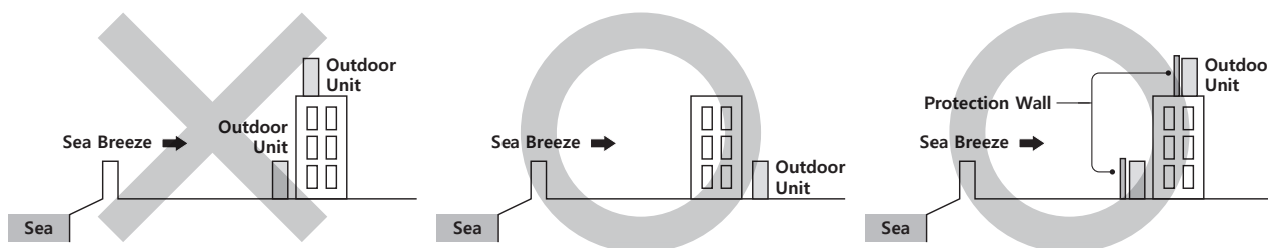
- Do not install the heat pump in areas where it may be exposed to corrosive gases, including acidic or alkaline environments, to prevent material degradation.
- Avoid direct exposure of the heat pump to sea wind, as the salty air can lead to corrosion, particularly damaging the condenser and evaporator fins. This corrosion could result in malfunction or reduced efficiency.
- If the heat pump must be installed near the seaside, ensure it is shielded from direct sea wind. If exposure is unavoidable, apply additional anti-corrosion treatments to the heat exchanger to extend its lifespan and maintain efficiency.

To install the heat pump near the seashore, follow these guidelines:

Installation Location Conditions

Install the product away from direct exposure to salt water and sea breezes. If installation near the seashore is unavoidable:

- Position it behind a building (or protective structure) to shield it from sea breezes.
- Construct a solid wall to protect the product from direct exposure to sea breezes, ensuring the wall is 1.5 times the height and width of the outdoor unit. Maintain at least 700 mm of space between the wall and the unit for adequate air circulation.



Drainage Optimisation

- Choose a location that promotes efficient water drainage, particularly ensuring the base has effective drainage capabilities.
- Keep the surrounding ground level to prevent rainwater from pooling and ensure the drain hole remains unblocked by debris.

Inspections and Maintenance

- Regularly wash the heat pump to remove salinity, especially if installed within 500 meters of the coast.
- Conduct thorough inspections every three months, applying anti-corrosion treatments like commercially available water repellent greases or waxes based on the product's condition.
- Apply additional anti-corrosion treatments as necessary when the product is installed close to the sea.
- Cover the heat pump during prolonged periods of non-use to protect it from environmental factors.

Corrosion Prevention

- Ensure proper sloping at the installation site to facilitate drainage and prevent water accumulation at the base of the outdoor unit, which can accelerate corrosion.
- Address any damages incurred during installation or maintenance promptly to avoid further deterioration.

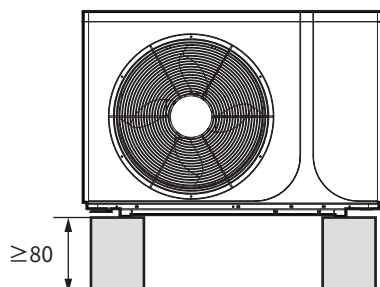
Cleaning the Heat Pump

1. Disconnect the main power supply from the heat pump.
2. Remove foreign substances and dust from the heat pump and clean major parts with a soft cloth and neutral detergent.

3.4 Installation in Areas with Heavy Snowfall

When using the heat pump in Heating mode, ice may accumulate. During de-icing (defrost operation), the condensed water must be drained off safely. To install the heat pump in an area with heavy snowfall, follow these guidelines:

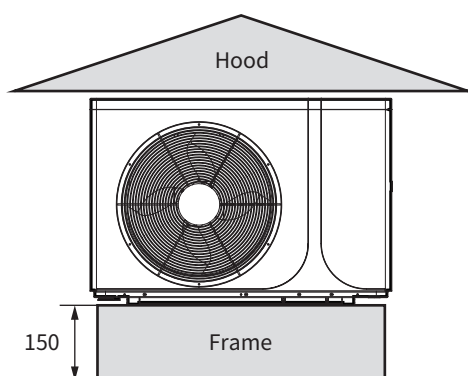
- Make sure that there is enough separation distance more than 80 mm between the bottom of the outdoor unit and the ground.



- When installing the product, make sure that the rack is not placed under the drain hole.
- Ensure that the drained water runs off properly and safely.

CAUTION

- In areas with heavy snowfall, snow may block the air intake. To avoid this, install a frame that is higher than the estimated snowfall. Also, install a snow-proof hood to avoid snow from accumulating around the outdoor unit.
- If ice accumulates around the base, it may cause critical damage to the product. (e.g., a lakeside in a cold area, the coastal, an alpine region, etc.)
- In areas with heavy snowfall, do not install the drain plug and drain cap into the outdoor unit. Doing so may result in frozen ground.
- Install the outdoor unit with a space of at least 150 mm between the floor and the ground. The product exceeds the maximum expected eye level. Make sure they are at least 150 mm above each other.



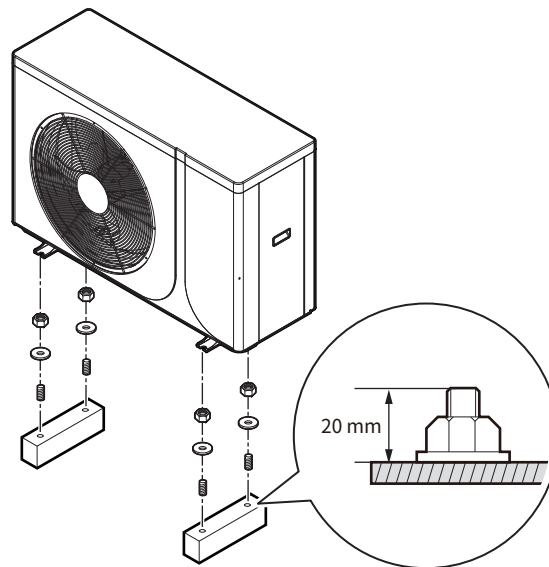
3.5 Conditions for the Installation Types

The heat pump is suitable for ground installation, wall installation and flat-roof installation.

Note The pitched-roof installation is not permitted.

3.5.1 Fixing the Heat Pump to the Ground

The heat pump must be installed on a rigid, stable base to avoid any increase in the noise level and vibration, if the outdoor unit is to be installed in a location exposed to strong winds or at a height, the unit must be fixed to an appropriate support via anchor bolts.



Note The anchor bolts must be 20 mm or higher from the base's surface.

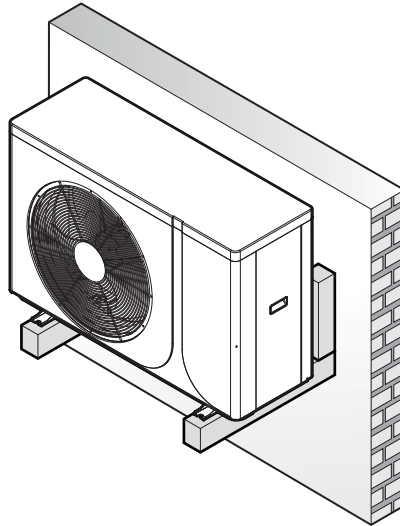


CAUTION

- When tightening the anchor bolts, tighten the rubber washers to prevent the heat pump's bolt connector from corroding.
- Make a drain outlet around the base for outdoor unit drainage.
- If the heat pump is installed on the roof, check the waterproofing of the heat pump and ensure the ceiling can support the heat pump's weight.

3.5.2 Fixing the Heat Pump to a Wall

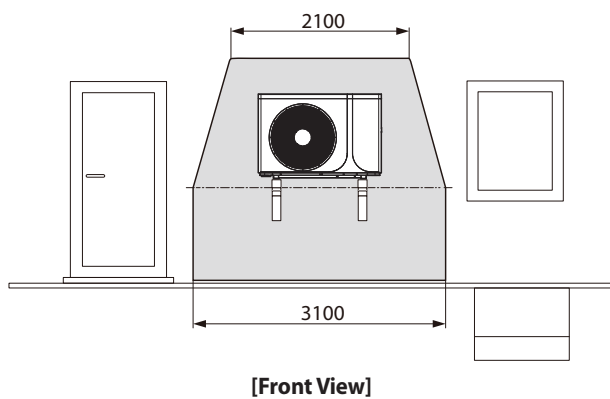
Depending on the ground conditions, you can also fix the heat pump to a wall via support brackets. The wall must be able to support the weight of the heat pump.



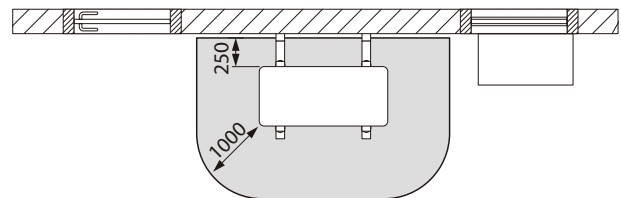
Protective Zone for Wall Installation in Front of a Building Wall or in a Building Corner

The protective zone below the product extends as far as the floor.

Wall

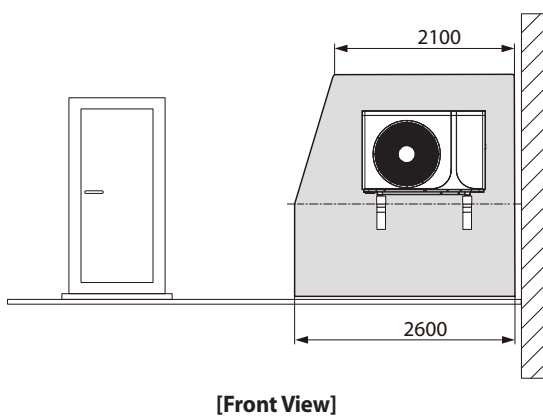


[Front View]

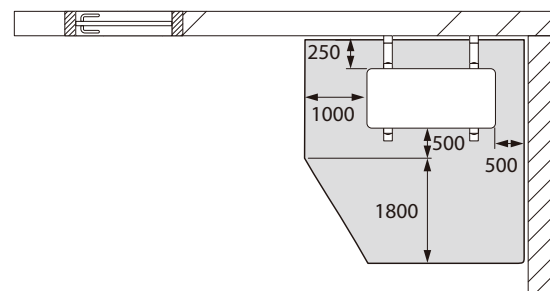


[Top View]

Corner



[Front View]



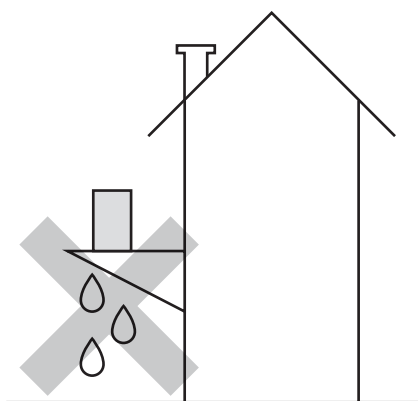
[Top View]

Note

- Install the support brackets close to the column as much as possible.
- Install proper anti vibration washers in order to reduce noise and residual vibration transferred by the outdoor unit towards the wall.
- To cut off vibration from the support brackets to the wall, install a soft rubber washer (optional).

**CAUTION**

If you install the outdoor unit on a wall support bracket, install drainage pipework. To avoid the drain water from dripping on the floor potentially creating a slippery surface or an ice layer under freezing conditions, securely mount the outdoor unit before connecting the water piping.

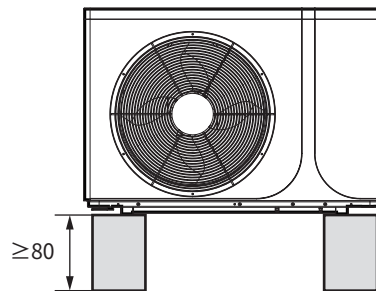


3.6 Drain Work

To effectively manage drainage and prevent ice buildup at low temperatures, follow these guidelines:

Creating Space for Drainage

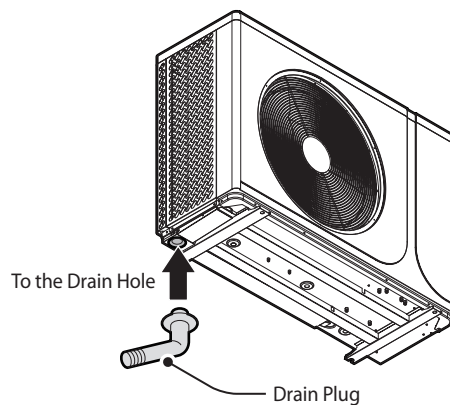
- Ensure there is at least 80 mm of space between the bottom of the outdoor unit and the ground. This space is necessary for installing the drain hose.



- When installing in snowy areas, raise the foundation as high as possible to prevent snow accumulation around the unit.
- If mounting the unit on a building frame, install a waterproof plate (within 80 mm of the unit's underside) to avoid ice accumulation from water dripping.
- Prepare a water drainage channel around the foundation to remove waste water from the unit's vicinity.

Installing the Drain Hose

1. Insert the drain plug into the drain hole in the outdoor unit drain pan.



2. Connect the drain hose to the drain plug.

Note Ensure that dust or small branches do not obstruct the drain hose.

3. Check that water dripping from the drain hose is flowing properly.

3.7 Connecting Water Pipes

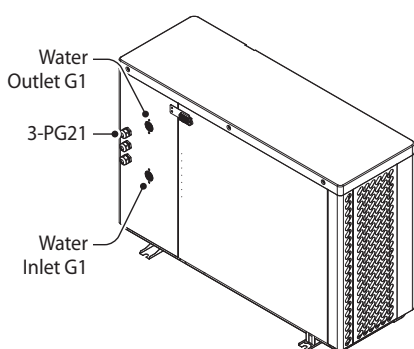
⚠ CAUTION

- Do not turn on the heat pump while installing a shut-off valve.
- Do not use excessive force when connecting the piping to prevent deformation. Deformed piping may damage the outdoor unit and cause it to malfunction.
- Always use two spanners when tightening or loosening the water connections to ensure balanced pressure and prevent damage. Tighten all connections using a spanner to avoid damaging the connections and parts, which could lead to leaks.
- The product is designed for use exclusively in a closed water system. Operating the product in an open water circuit is not recommended as it may lead to contamination of the heat exchangers, corrosion, and leaks.

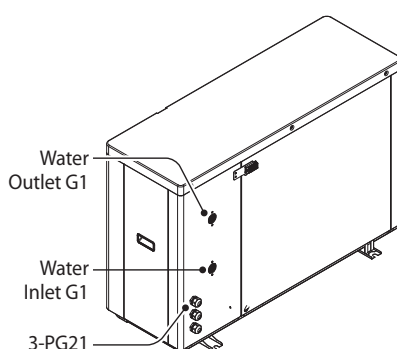
To ensure a proper water circuit connection for the outdoor unit, a shut-off valve must be connected to the outdoor unit. To install a shut-off valve properly, follow these guidelines.

1. Disconnect the main power supply from the heat pump.
2. Connect the shut-off valve (with integrated filter) to the outdoor unit's water inlet using thread sealant.

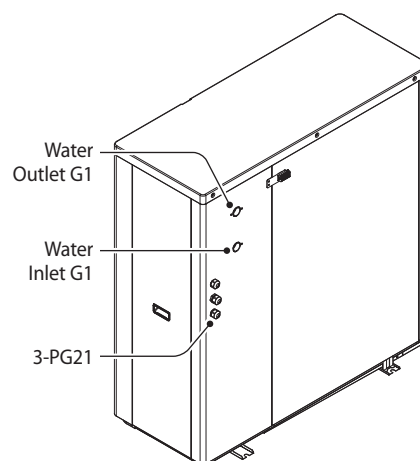
Note Use a reliable thread sealant that can withstand system pressures and temperatures.



PEM750V004PGKC
PEM750V006PGKC
PEM750V008PGKC



PEM750V010PGKC



PEM750V017PGKC

3. To prevent vibration and noise caused by the operation of the outdoor unit, a flexible hose should be connected.
4. Attach the field piping to the shut-off valve.

Note After installing the shut-off valve, follow the instructions below.

- Clean the water pipes and connections thoroughly.
- Remove burrs while holding the pipe with the end facing downwards.
- Cover the pipe end when inserting it through a wall to prevent dust and dirt from entering.
- Insulate non-brass metallic piping to prevent galvanic corrosion.
- A magnetic filter must be installed in the pipe line to remove iron dust or foreign substances inside the pipe.
- An inline Y strainer must be fitted to the primary return.

3.8 Flushing and Air Purging

After installing the heat pump and water pipes to the heat pump, the following start-up procedure must be performed.

1. Test all system components and pipes for leaks.
2. Prepare a make-up water assembly or flushing unit for installation and service.
3. Before connecting pipes to the outdoor unit, flush water pipes clean to remove contaminants using a flushing unit or tap water (at 2-3 bar pressure).
4. Open the shut-off valve and pour glycol into the outdoor unit's water line to prevent freezing.
5. Purge the air from the system using a flushing unit with sufficient capacity to avoid aerating the water.
6. Circulate the water long enough to ensure all the air has been bled from the water piping system.

3.9 Freeze Protection

To prevent the hydraulic components from freezing, the heat pump has a freezing protection function that includes activation of the pump at low temperatures.

Note In case of a power failure, these functions cannot guarantee protection.

To protect water circuit from freezing, any of the following should be performed.

Freeze Protection via Glycol

Add glycol to water. Glycol lowers the freezing point of water. Freeze protection solutions must use propylene glycol with a toxicity rating of Class 1, as listed in Clinical Toxicology of Commercial Products, 5th Edition.



WARNING

- Ethylene glycol is toxic and must not be used in the primary water circuit to prevent cross contamination in the potable circuit.
- If an antifreeze is used, pressure drops and degradation of system capability may occur.



CAUTION

- Due to the presence of glycol, corrosion of the system is possible. Uninhibited glycol will turn acidic due to oxygen. Acidic, uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.
- Glycol with corrosion inhibitors should be selected to counteract acids formed by oxidation.
- No automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates that can contaminate or clog the system.
- Galvanised pipes are NOT used in glycol systems since their presence may lead to the precipitation of certain components in the glycol's corrosion inhibitor.

To prevent the system from freezing, more glycol is required. Add glycol according to the table below.

Freezing Points of Propylene Glycol-Water Mixtures		
Percent Propylene Glycol [wt. %]	Freezing Point [wt. °F]	Freezing Point [wt. °C]
0	32	0
10	26	-3
20	20	-7
30	10	-12
36	0	-18
40	-5	-20
43	-10	-23
48	-20	-29

Antifreeze Valves



WARNING

If you add glycol to the water, do not install an antifreeze valve. Glycol will leak out of the antifreeze valve.



CAUTION

If the unit is used for Cooling mode in summer, install an antifreeze protection valve with an ambient air sensor. This prevents the valves from opening due to low water temperatures. Set the minimum cooling point to 7°C or higher to avoid triggering the freeze protection valves during cooling operations.

Install an antifreeze valve. The antifreeze valve will discharge water from the system before it freezes.

To prevent system water from freezing inside the pipes during sub-zero ambient conditions after sudden power outages, installing an antifreeze valve is recommended if glycol is not a suitable solution. An antifreeze valve opens when the medium (water) is below a certain temperature value. When using the heat pump for cooling in the summer, an antifreeze valve with an ambient sensor is required to avoid unwanted opening due to low water temperatures.

3.10 Charging Water

After installation is completed, the procedures below must be followed to charge water into the heat pump.

1. Connect water lines to the water connections of the heat pump.
2. Open the air vent valve at least two turns so that air can be eliminated from the system.
3. Open the shut-off and drain valves in the water supply connection. The water pressure of supply line must be over 2 bar for good charging work.
4. Stop the water supply when the pressure reaches around 2 bar.



CAUTION

- Water pipes and connections must be cleaned by using water or cleaner before operating the unit for the first time.
- Considering electric submersible pump and water pump performance, select water plumbing specifications and underfloor loops.
- Make sure to calculate the total resistance of the piping system and determine the size of pipes before selecting the required pump heads. If the pressure loss of total water system is over the designed pressure, external water pumps must be installed on the piping system in series.
- Do not connect the power supply while water is charging.
- When initialisation or re-installation is required, remove air via the air vent valve in water plumbing, which is installed by local installers to prevent air from being trapped in the system while charging water.
- Make sure that back flow preventers (check valves) are installed on main supply line to prevent contamination from outside water sources.
 - It is recommended to install a make-up water assembly to prevent contamination.
 - Check valves in the make-up water assembly can prevent running water inside the outdoor unit from contaminated water supplies during installation or maintenance.

3.11 Installing Filter and Strainer

A filter (Filter mesh: #50) and strainer must be installed in the water system, positioned in front of the inlet pipe of the heat pump. During operation, dust and foreign materials can circulate within the system. If not properly filtered, these contaminants can lead to blockages in the heat exchangers and corrosion in various components, damaging the internal components of the system.

3.12 Piping Insulation

To prevent condensation and maintain the efficiency of the water circuit, ensure a minimum insulation thickness of 9 mm with a thermal conductivity of 0.035 W/mK.

This prevents freezing on the outside water piping during winter. If the temperature exceeds 30°C and the humidity is above 80%, increase the insulation thickness to at least 20 mm to prevent condensation on the surface of the insulation.

3.13 Water Quality

Water quality should comply with EN 98/83 EC Directives. Refer to the following table for the requirements for resolved chemical ingredients. Detailed water quality conditions can be found in EN 98/83 EC Directives.

Parameter	Value
Acrylamide	0.10 µg/l
Antimony	5.0 µg/l
Arsenic	5.0 µg/l
Benzene	1.0 µg/l
Benzo(a)pyrene	0.010 µg/l
Boron	1.0 mg/l
Bromate	10 µg/l
Cadmium	5.0 µg/l
Chromium	50 µg/l
Copper	2.0 mg/l
Cyanide	5.0 µg/l
1,2-dichloroethane	3.0 µg/l
Epichlorohydrin	0.10 µg/l
Fluoride	1.5 mg/l
Lead	10 µg/l
Mercury	1.0 µg/l
Nickel	20 µg/l
Nitrate	50 mg/l

Parameter	Value
Nitrite	0.50 mg/l
Pesticides	0.10 µg/l
Pesticides - Total	0.50 µg/l
Polycyclic aromatic hydrocarbons	0.10 µg/l
Selenium	10 µg/l
Tetrachloroethene and Trichloroethene	10 µg/l
Trihalomethanes - Total	100 µg/l
Vinyl chloride	0.50 µg/l



CAUTION

- If the product is installed in an existing hydraulic water loop, you must clean hydraulic pipes to remove sludge and limescale.
- To prevent performance degradation, install a sludge strainer in the water loop.
- Chemical treatment to prevent rust should be performed by an authorised technician or licensed professional.

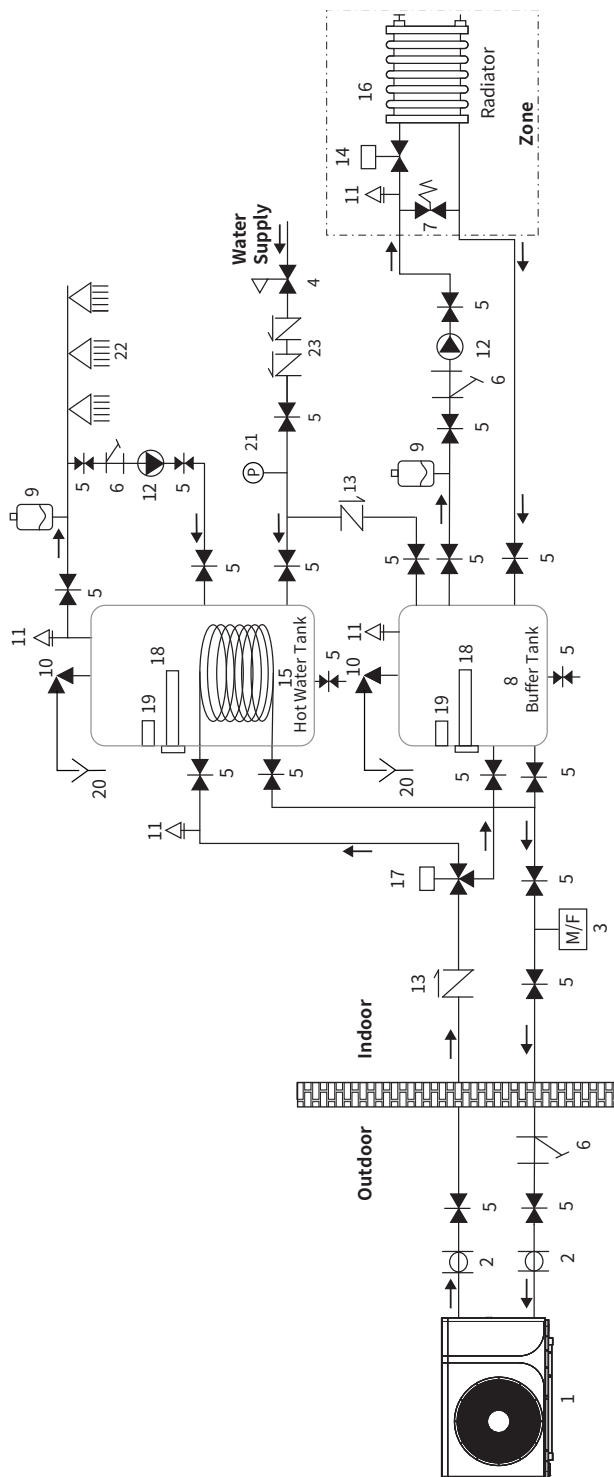
4. System Operations

All heat pumps must be used with sealed systems that complying with the requirements of BS EN 12828, BS EN 12831, and BS EN 14336. The system must be provided with the following items:

- Diaphragm expansion vessel (in compliance with BS EN 13831)
- Pressure gauge
- Pressure relief (safety) valve
- Approved method for filling the system

4.1 System Requirements

The following diagram shows the basic installation of the heat pump system and with its essential devices.



#.	Description
13	Check Valve
14	Valve for Heating
15	Hot Water Tank
16	Radiator
17	3-Way Valve
18	Electric Heater
19	Temperature Sensor
20	Drain
21	Pressure Gauge
22	Shower
23	Double Check Shut-off Valve

#.	Description
1	Heat Pump
2	Flexible Pipe
3	Magnet Filter
4	Pressure-reducing Valve
5	Shut-off Valve
6	Y-Type Water Filter
7	Automatic Bypass Valve
8	Buffer Tank
9	Expansion Tank
10	Relief Valve
11	Air Vent Valve
12	Water Pump

Expansion Vessel

The expansion vessel can be fitted in either the return or flow pipework. To reduce the operating temperature of the expansion vessel, install it below the pipe to which it is connected. The expansion vessel may be positioned away from the system, providing the connecting pipe's diameter is not less than 13 mm.

- Note**
- If the expansion vessel is connected through a flexible hose, ensure that the hose is not twisted.
 - The expansion vessel's size must be sufficient for the system's volume. Refer to BS 7074:1:1989 or the Domestic Heating Design Guide for sizing the required vessel.

Pressure Gauge

The pressure gauge must have an operating range of 0 to 4 bar. It must be located in an accessible place next to the system's filling loop.

Safety Valve

The safety valve is set to operate at 3 bar. It should be installed in the flow pipework close to the heat pump. Ensure that the pipework between the safety valve and the heat pump is unrestricted, meaning it should not contain any valves.

CAUTION

The safety valve must be connected to a discharge pipe that allows the discharge to be visible but prevents injury to persons and damage to property."

Filling Loop

Provisions should be made to replace water lost from the system. This can be done manually, where permitted by local water authorities, using an approved filling loop arrangement that incorporates a double check valve assembly. The filling loop must be isolated and disconnected after the system has been filled.

Heating System

The maximum set temperature for the central heating water is 70°C. Ensure that an automatic air vent is installed at the highest point of the system. If thermostatic radiator valves are installed on all radiators, system bypass is required. The bypass must be automatic and correctly set during system commissioning. All fittings within the system should withstand pressures up to 3 bar, and radiator valves must meet the specifications of BS 2767:1991. Additionally, one or more drain taps compliant with BS 2879 should be installed to enable complete drainage of the system.

4.2 Filling the Sealed System



WARNING

Do not overfill. Fill or add water to the system when it is cold and the heat pump is turned off.

Before Filling the System

Check the air charge pressure in the expansion vessel.

- The charge pressure should be approximately 0.2 bar lower than the maximum static head of the system.
- Ensure that the charge pressure is not less than the actual static head at the point of connection.

Checking Automatic Air Vents

1. Ensure the small cap or screw on all automatic air vents is open at least one turn.
2. Keep the cap or screw in this position until filling is complete, then close it.

Preparing for Filling

1. Loosen the plug on the automatic air vent located inside the heat pump.
2. Ensure the flexible filling loop is connected and the double check shut off valve connecting it to the water supply is closed.

Note

A valve is open when the operating lever is in line with the valve and closed when it is at right angles to it.

Filling

1. Open the fill point valve.
2. Gradually open the double check valve on the water supply until you can hear water flowing.
3. When the pressure gauge needle is between 0.5 and 1.0 bar, close the valve.
4. Vent each heat emitter in turn, starting with the lowest one, to remove air.
5. Continue filling until the pressure gauge is between 0.5 and 1.0 bar, then close the fill point valve.

Note The system fill pressure (cold) should be 0.2–0.3 bar greater than the vessel charge pressure.

After Filling

Note The air charge pressure can be checked using a tyre pressure gauge on the expansion vessel's Schrader valve. The vessel may be re-pressurised, when necessary, using a suitable pump. When checking the air pressure, ensure the water in the heating system is cold and the system pressure is reduced to zero.

1. Repeat the venting and filling steps as necessary until the system is full of water at the correct pressure.
2. Release excess water from the system by manually operating the safety valve until the system design pressure is obtained.
3. Close the fill point, double check valves on either side of the filling loop, and disconnect the loop.
4. Check the system for water soundness, rectifying any issues if necessary.

4.3 Operating the Pressure Relief (Safety) Valve

Check the operation of the pressure relief (safety) valve by doing the following:

1. Turn the head of the valve anticlockwise until it clicks. The click indicates that the safety valve head has lifted off its seat, allowing water to escape from the system.
2. Check if water is leaking from the system. If water is not leaking, do not further force the valve open. Instead, assess the system for any potential issues or blockages before proceeding.
3. Top up the system pressure as necessary.

4.4 Domestic Hot Water Operation

When a demand for Domestic Hot Water (DHW) is initiated, the heat pump will continue providing space heating for a minimum of 15 minutes. If space heating is already active during this period, the heat pump will prioritise DHW.

During the provision of DHW, the target flow temperature will be 55°C, regardless of the space heating target temperature.

Note Weather compensation control is not supported during DHW mode.

By default, the heat pump will revert to its original demand setting or standby state after 120 minutes. If this timeout occurs when DHW is in demand, the motorised valve of the DHW circuit will remain open, as it is controlled by the cylinder thermostat rather than the heat pump. This can lead to inefficient heating if the stored water is hotter than the space heating flow temperature.

Additionally, if the motorised valve for space heating is open during when DHW is in demand, the 55°C flow will enter the space heating circuit, increasing cylinder recovery time.

To minimise high temperature periods and running costs, avoid simultaneous space heating and DHW demands.

4.5 Legionella

The heat pump can be used to raise the hot water cylinder temperature to around 60°C. For protection against Legionella, immersion elements are controlled to purify the cylinder for one hour daily or together at a maximum temperature of 60°C.

Note For this system to operate, the existing immersion switch must be left permanently set to ON. To completely prevent operation of the immersion element, the existing immersion switch must be set to OFF.

Sanitisation Regime

Special attention must be paid to vulnerable individuals who may be at risk of exposure to potentially life-threatening Legionella bacteria. This group includes the elderly, pregnant women, young children, and individuals with breathing difficulties. Additionally, households with low water usage should also be considered at risk.

While this list is not exhaustive, it is crucial to discuss any potential issues with the occupants before determining the appropriate preventive measures. The decision should prioritise the welfare of the occupants over energy-saving measures. Refer to the following table for legionella group sanitation regime.

Group	Uses less than 50 litres of hot water per day	Uses more than 50 litres of hot water per day
Vulnerable Group	Store at 50°C and raise hot water cylinder to 60°C for 1 hour every day.	Store at 50°C and raise hot water cylinder to 60°C for an hour every 3 days.
Non-Vulnerable Group	Store at 50°C and raise hot water cylinder to 60°C for 1 hour every week.	Store at 50°C and raise hot water cylinder to 60°C for an hour every 2 weeks.



WARNING

If the hot water stored in the cylinder has not been used for a prolonged period (e.g., a few days) and has not been stored at 60°C, raise the temperature to at least 60°C for one hour before using the hot water.

4.6 Day Immersion Programmer (Legionella)

This system uses the existing cylinder immersion heater, it can be controlled from the heat pump. This allows the immersion element to be programmed to operate for the required period on either a daily or weekly basis.

Once configured, this system operates fully automatically but can be overridden if necessary. Additionally, you can still switch off the immersion element using the double-pole isolation switch integrated into the programmer's design, regardless of the programmer or cylinder thermostat settings or whether the heat pump is operating.

4.7 Compressor Protection Function

When the unit is powered on for the first time, the compressor will preheat for approximately one hour to prevent damage from a low-temperature start-up.

Note There is no operation during preheating operation.



CAUTION

The installation must be in line with MCS standards and system design.

5. Connecting the Electrical Supply

⚠ CAUTION

The installation must be in line with MCS standards and system design.

⚠ WARNING

Improperly connecting the electrical supply can result in electrical shock and electrocution. All electrical connections must be carried out in line with the British standards and governing regulations and by a competent, qualified electrician.

⚠ DANGER

- You must ensure that the heat pump is disconnected from the electrical supply before carrying out any servicing inside the heat pump and, particularly, on the electric terminal strips.
- If the electrical supply is connected, contact with electricity could cause component damage or serious injury.

⚠ CAUTION

- Label all wires before disconnecting them when you are working on the controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing is complete.
- Be sure to properly ground the unit. Do not connect the ground line to any gas pipe, liquid pipe, lightning rod, or telephone ground line. If the grounding is incomplete, it may cause electric shock.

5.1 Accessing the Terminal Strips

All the wiring connections are made to the terminal PCB and terminal block inside the heat pump. To access these connections, remove the wiring cover at the right end of the heat pump.

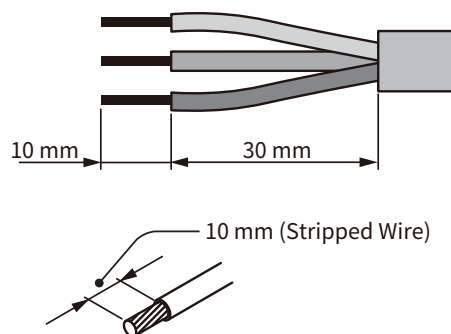
5.2 Connecting the Power Supply Cables

⚠ WARNING

Disconnect the main electrical supply before beginning any work and make sure all the necessary safety precautions are taken into account.

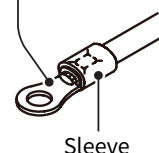
- Note**
- The cables and circuit breakers should meet EN Standards.
 - When the cable is long enough, ensure that the cable specification meets BS 7671 (IET Wiring Regulations).

1. Strip the end of the connecting cables to expose 10 mm of core wires, and then twist the core wires.



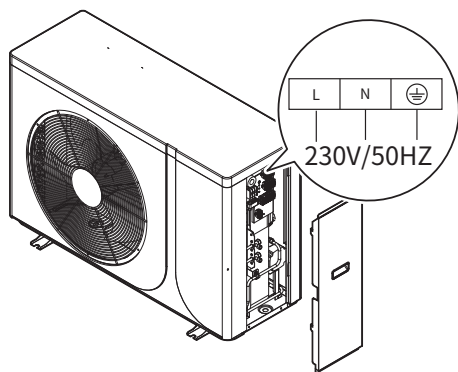
- Note**
- Crimp terminals with insulating sleeves can be used for connecting the wires to the terminal block.

Terminal Block
Crimp Terminal

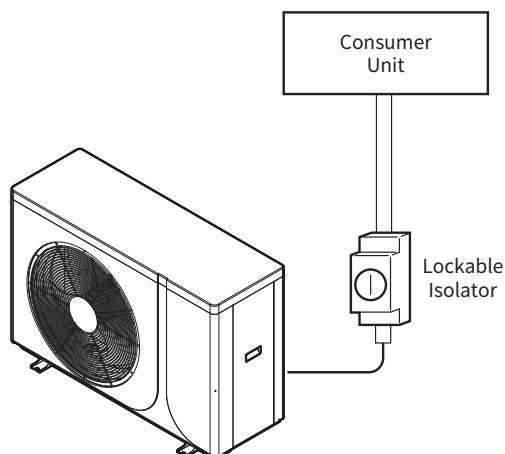


- Do not solder the stranded conductors.
- Use a circuit breaker with a 3 mm gap between the contacts.

2. Fasten each terminal screw securely.
3. After wiring the cables, check if the connections are secure by pulling the cable slightly. The heat pump must be connected to the supply terminals via the cable.



- Note**
- Use a dedicated power supply with a circuit breaker of the proper size to supply power to the heat pump. The final power supply connection must be made from a weatherproof lockable isolator located outside the building. The cable should be either armoured or shielded with a flexible conduit.



- Refer to the following table for the heat pump's power supply cable and breaker capacity for each model of the heat pump.

Model	Power Supply Cable (mm ²)	Breaker Capacity
PEM750V004PGKC	2.5	32A
PEM750V006PGKC	4.0	40A
PEM750V008PGKC	4.0	40A
PEM750V010PGKC	6.0	40A
PEM750V017PGKC	10.0	63A

5.3 Setting the Remote Control Functions

To control the remote controller manually, set the **H07** parameter to 1.

Turning the Heat Pump On/Off

Close the Remote On/Off switch to turn on the heat pump. To turn off the heat pump, open the Remote On/Off switch.

Remote On/Off		Remote Heat/Cool		DHW On/Off		Heat/Cool On/Off	
1	2	3	4	5	6	7	8
Remote On/Off		Remote Heat/Cool		DHW On/Off		Heat/Cool On/Off	

Setting the Mode

To configure the mode settings, close or open the switches. Refer to the following table for detailed settings for each mode.

Mode	Remote Heat/Cool	DHW On/Off	Heat/Cool On/Off
Heat	Close	Open	Close
Cool	Open	Open	Close
Hot water	-	Close	Open
Hot water + Heat	Close	Close	Close
Hot water + Cool	Open	Close	Close

5.4 Connecting the Heating System Controls

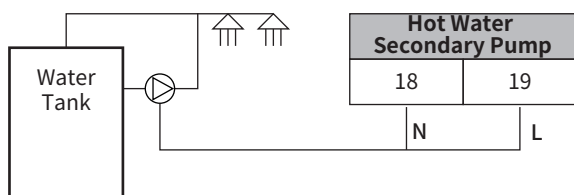
For information about connecting the heating system controls, refer to "15.3 Field Wiring Diagram" on page 116.

5.5 Connecting the Warm Water Secondary Circulation Pump

You can use hot water at any time when using a warm water secondary circulation pump.

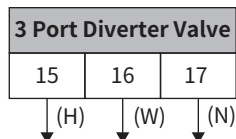
Note To change the warm water circulation pump's operation method, set up the **H40** parameter.

1. Remove the side cover of the heat pump.
2. Connect the wires to the **Hot Water Pump** terminal block as shown in the following diagram.



5.6 Connecting the 3 Port Diverter Valve

1. Remove the side cover of the heat pump.
2. Connect the wires to the **3 Port Diverter Valve** terminal block as shown in the following diagram.



Each terminal of the 3 port diverter valve is explained in the following table.

Wire	Descriptions
15 (H)	Live signal (Heating) from the PCB to the 3 port diverter valve (Heating priority)
16 (W)	Live signal (Water heating) from the PCB to 3 port diverter valve (Hot water priority) (Default)
17 (N)	Neutral signal from the PCB to 3 port diverter valve

Note Depending on the type of heating, the 3 port diverter valve should be set as follows.

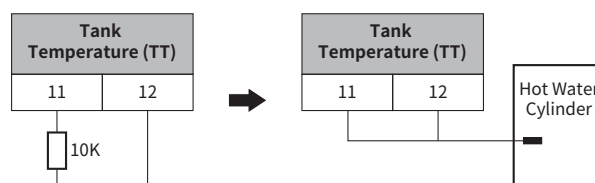
- When electric power is supplied to the 16 (**W**) and 17 (**N**) terminal, the 3 port diverter valve should be used for water heating (Priority Hot water) (Default).
- When electric power is supplied to the 15 (**H**) and 17 (**N**) terminal, the 3 port diverter valve should be used for under floor heating (Heating Priority).

5.7 Connecting the Temperature Sensor

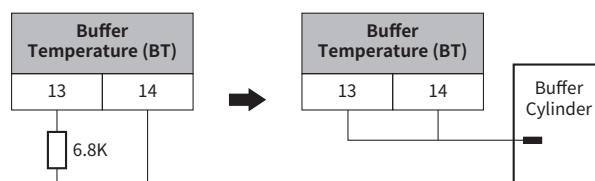
! CAUTION

- Before installing the temperature sensor, remove the resistor (6.8k or 10k).
- Insert the sensor into the sensor pocket firmly.

1. Remove the side cover of the heat pump.
2. Connect the wires to the **Tank Temperature (TT)** terminal block as shown in the following diagram.



[When 10K-Temperature Sensor is Used]

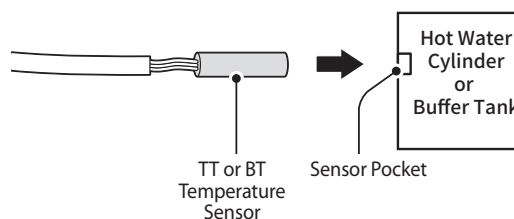


[When 6.8K-Temperature Sensor is Used]

Note To change the type of temperature sensor, change the **H25** parameter to the required temperature sensor.

Parameter	Value	Description
H25	0	Outlet Water Temperature
	1	Room Temperature
	2	Buffer Tank Temperature
	3	Inlet Water Temperature

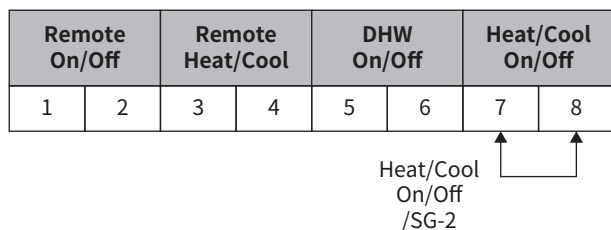
3. Connect the sensor to the hot water cylinder or buffer tank as shown in the following diagram. Make sure it is firmly connected so that it does not fall off.



Note If there is no sensor pocket in the buffer tank, set the **H25** parameter to 0.

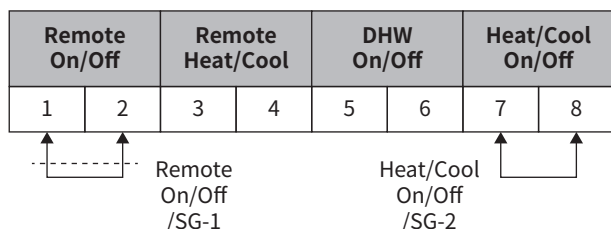
5.8 Configuring the Smart Grid (SG) Ready

1. Remove the side cover of the heat pump.
2. Connect the wires to the **Heat/Cool On/Off** terminal block as shown in the following diagram.



[When the Inverter Only Supports One SG Output Signal]

SG-2 Status	Mode	Description
Open	Normal mode	SG Ready is not active
Close	Solar High mode	The heat pump runs at full capacity and the warm water temperature is raised (the electric heater can be selected to be on or off).



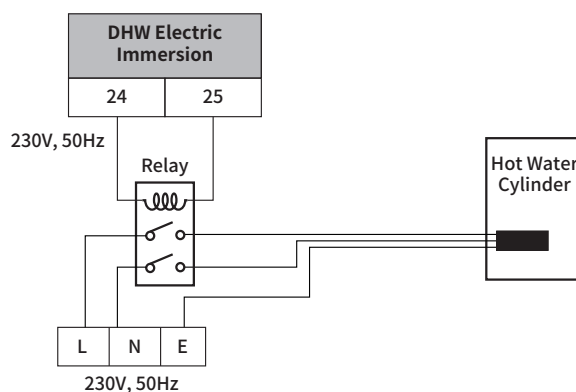
[When the Inverter Supports SG Output and Input Signal]

SG-1 Status	SG-2 Status	Mode	Description
Open	Open	Sleep mode	The heat pump and electric heater are blocked in this mode.
Open	Open	Solar Low mode	The operating power is limited.
Open	Close	Solar Medium mode	The operating power is limited.
Close	Close	Solar High mode	The heat pump runs at full capacity and the warm water temperature is raised. (The electric heater can be selected to be on or off.)
After exiting Sleep mode		Normal mode	SG Ready is not active.

5.9 Connecting the Electric Heater

1. Remove the side cover of the heat pump.
2. Connect the wires to the **DHW Electric Immersion** terminal block with a relay as shown in the following diagram.

Note The relay is not included with the product.



Note • To set the electric heater's stage, change the **H18** parameter.

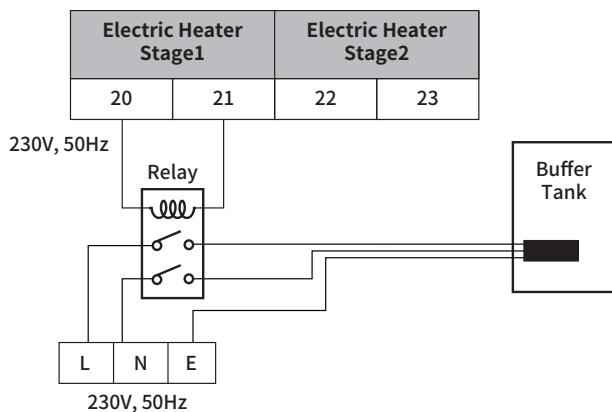
Parameter	Value	Description
H18	1	Only turns on stage 1.
H18	2	Once the value is set, Stage 1 will be turned off after 30 minutes, and then Stage 2 will be turned on.
H18	3	Depending on the current set stage, the stage will be changed as: • Once the value is set, Stage 1 will be turned off after 30 minutes, and then Stage 2 will be turned on. • Once the value is set, Stage 2 will be turned off after 30 minutes, and then Stage 1 will be turned on.

• To disable the electric heating function, set the **R35** parameter to 0.

5.10 Connecting the Buffer Tank

1. Remove the side cover of the heat pump.
2. Set the **R35** parameter to 3 (buffer tank).
3. Connect the wires to the **DHW Electric Heater** terminal block with a relay as shown in the following diagram.

Note The relay is not included with the product.



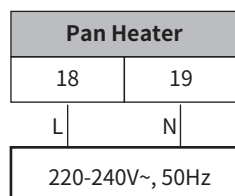
5.11 Connecting the Pan Heater



WARNING

Disconnect the main electrical supply before beginning any work and make sure all the necessary safety precautions are taken into account.

1. Remove the side cover of the heat pump.
2. Connect the wires to the **Pan Heater** terminal block described in the following diagram.



- Note**
- The cables and circuit breakers should meet EN Standards.
 - When the cable is long enough, ensure that the cable specification meets BS 7671 (IET Wiring Regulations).

6. Installing the Remote Controller

CAUTION

The installation must be in line with MCS standards and system design.

The remote controller should be installed in a place where you can easily view the display and control it.

WARNING

- Do not install the remote controller inside the heat pump casing.
- The remote controller is not waterproof. Do not install the remote controller in a place that has a wet environment, such as a bathroom.
- Do not install the remote controller above any heat-emitting appliances, such as cookers or boilers. Doing so may damage the electrical parts and outer case.
- Do not install the remote controller in any location subject to steam.
- Do not install the remote controller in a place exposed to direct sunlight.
- Do not install the remote controller where children can reach it.
- Do not install the remote controller in any location where industrial chemicals are used (ammonia, sulphur, chlorine, ethylene compounds, acids, etc.).
- Do not place the remote controller cable near the heat source.
- To avoid damage to the remote controller cable:
 - Route the remote controller cable in such a way that it is not in contact with heat.
 - Use a cable conduit.

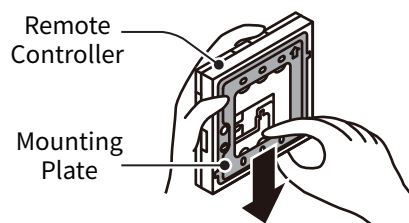
Note

- It is a requirement of MCS installations that any indication of a fault (e.g., error codes displayed on the remote controller's screen) should be visible.
- The remote controller can be installed in the same room as underfloor heating.

6.1 Installing the Remote Controller on a Wall

The electricity that flows between the heat pump and the remote controller is low-voltage, so being qualified to handle electronics is not required when installing the remote controller. However, it is still required to follow the technical standards for electrical equipment.

1. Disconnect the main power supply from the heat pump.
2. Slide the mounting plate downward to remove the plate from the remote controller.



3. Depending on the wiring's configuration, follow the instructions below to fix the mounting plate to the wall.

CAUTION

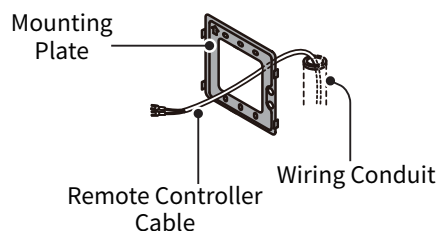
Do not overtighten the screws. Doing so may damage the mounting plate's screw hole.

Note

When installing the mounting plate on the tile, concrete, or mortar, use the wall plugs.

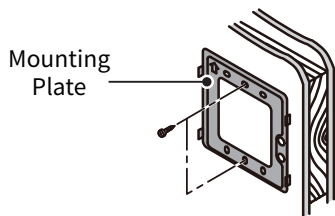
• When the wiring is hidden

- A. Pass the wiring conduit through the inside of the wall.
- B. Pull out the remote controller cable, passing it through the wiring conduit and wiring hole in the mounting plate.



• **When the wiring is exposed**

On the solid position on the wall, install the two screws to fix the mounting plate.



4. Connect the remote controller cable to the port on the back.

Note

- Hook the wires under the clamp, placing them onto the four hooks.
- The remote controller has no polarity, so the wires can be connected either way.

5. Fix the remote controller to the mounting plate by sliding it downwards, and then check if it is securely fixed to the mounting plate.

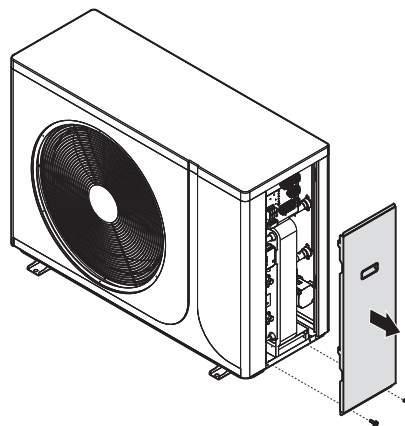


WARNING

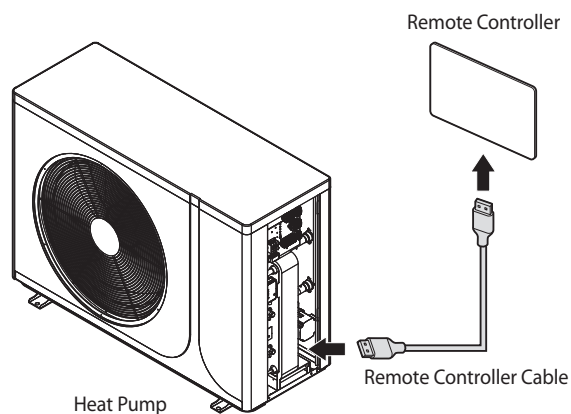
Do not use a power drill or power screwdriver. Doing so may damage the screw hole and result in contact failure.

6.2 Connecting the Remote Controller to the Heat Pump

1. Disconnect the main power supply from the heat pump.
2. Remove the side cover of the heat pump.



3. Connect the remote controller cable to the heat pump and the remote controller.



Note

When connecting, check the tag indicated on the line and connect.

7. Using the Wi-Fi module

 CAUTION

The installation must be in line with MCS standards and system design.

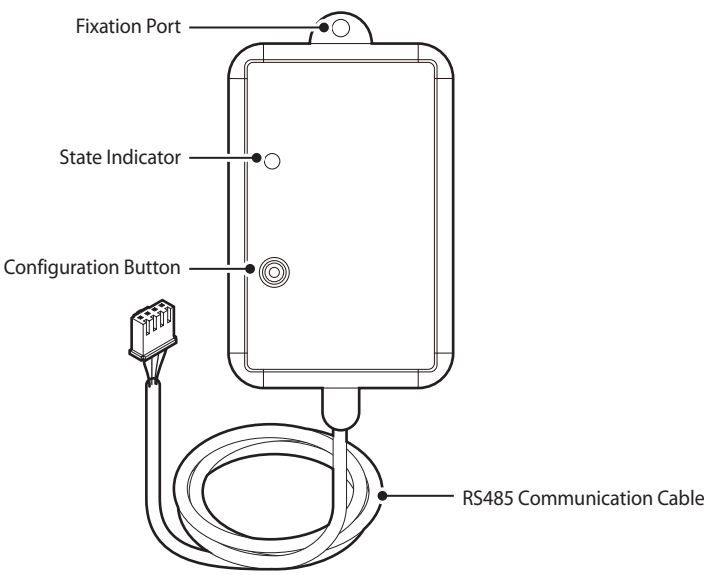
The Wi-Fi module provides two-way communication with the cloud server and the main device, supporting remote upgrades of both the module's baseplate MCU and the main device.

 CAUTION

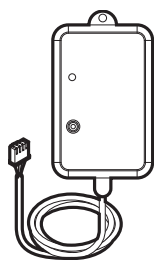
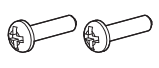
Ensure that the wiring is correct. The Wi-Fi module operate with 12V voltage, and higher voltage may damage the Wi-Fi module.

- Note**
- The Wi-Fi module should be placed in a location where it can receive a strong wireless signal.
 - If you encounter any issues or uncertainties during the installation or configuration process, consult with professional personnel from the customer support team or authorised dealers.

7.1 Components



7.2 Included Items

		
Wi-Fi Module	Screw (2ea)	Cable Tie (4ea)

7.3 Technical Specifications

Item	Wi-Fi	Bluetooth
Transmission Frequency	2.412–2.472	2.402–2.480
Max Transmission Power	802.11b: +16 dBm (@11 Mbps)	10 dBm
	802.11g: +15.5 dBm (@54 Mbps)	
	802.11n: +15 dBm (@HT20, MCS7)	
Power Supply Voltage (V)	3.0–3.6	
Supply Current	Peak (Continuous Transmission): 260 mA	
	Average (STA, Networked Standby): 24 mA (DTIM1)	
	Average (STA, 1kb/s): 54 mA	
	Average (AP): 85 mA	
Working Temp. (°C)	-40–85	
Storage Temp. (°C)	-40–125	

7.4 Disposal Instructions



Disposal of the old appliance

Appliance marked with the symbol shown here must not be disposed of in the domestic refuse. You are obliged to dispose of such old electronic appliances separately. Please consult your local authority about the possibilities of organised disposal. With this environment-friendly form of disposal, old appliances are recycled or used in other forms.

7.5 CE Declaration of Conformity

Hereby, Heissner GmbH declares that the radio equipment type Z1-00 is in compliance with following Directive:

2014/53/EU 2011/65/EU

2014/30/EU 2014/35/EU

The full text of the EU declaration of conformity is available at the following address:

7.6 Installing the Wi-Fi module

The Wi-Fi module should be installed in a position where there are no obstacles between the Wi-Fi module and the wireless router, as this could interfere with communication. When the Wi-Fi module is too far from the router or there are potentially interfering elements between them, it may affect the performance of the Wi-Fi module. Also, place the Wi-Fi module where you can easily press the AP button for device verification.

 CAUTION

Do not install the Wi-Fi module in an area where it may be exposed to moisture or be struck. The operating temperature range of the module is 0°C–40°C, and its operating humidity range is 30%–90% (relative humidity).

- 1. Disconnect the main power supply to the heat pump.

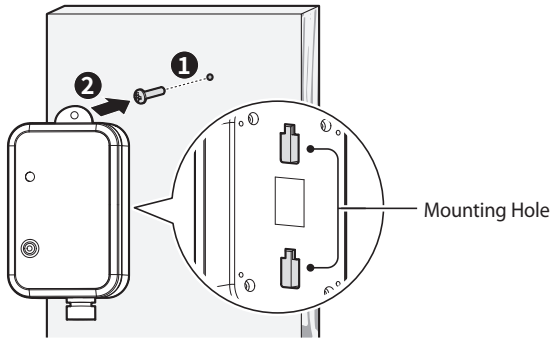
 CAUTION

Do not connect the Wi-Fi module cable when the heat pump is turned on.

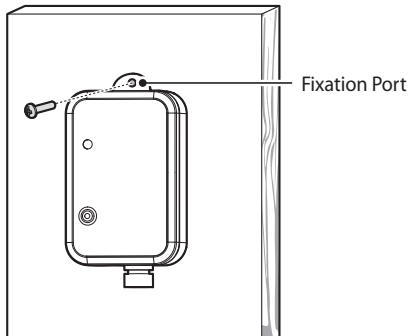
- 2. Mount the Wi-Fi module using screws or magnets.

• Mounting with screws

- A. Install the screw into the wall, and then insert the screw head into one of the Wi-Fi module’s mounting holes to hang the module on the wall.

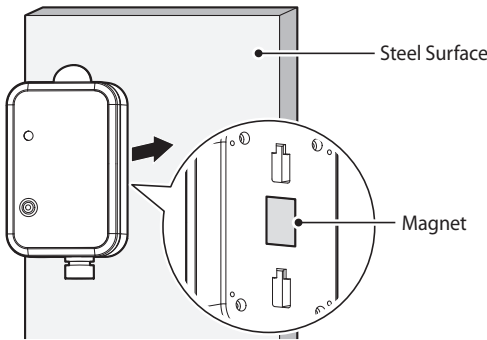


- B. Install the screw into the fixation port to fix the module on the wall.

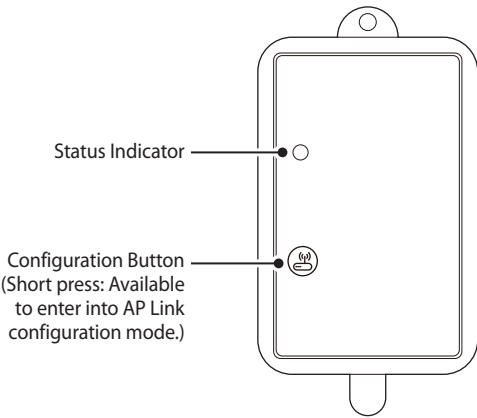


• Mounting with magnets

Attach the Wi-Fi module to the surface made of steel.



7.7 LED Status Indicators



LED Colour/Status	State
Red	Configuring the network
Purple	Connecting the router
Blue	Connecting to the server
Green	Communicating with the server normally
Flicker	Communicating with the server abnormally

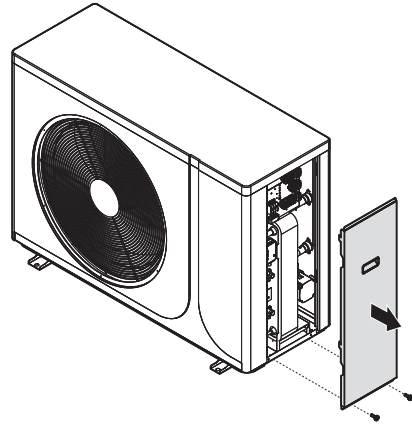
7.8 Using the Wi-Fi Module App

After installing the Wi-Fi module, scan the QR code to receive instructions on downloading the App.

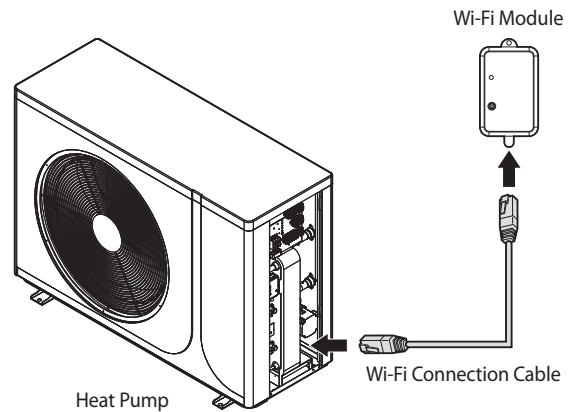


7.9 Connecting the Wi-Fi Module to the Heat Pump

1. Remove the side cover of the heat pump.



2. Connect the Wi-Fi connection cable to the heat pump and the Wi-Fi module.



Note When connecting, check the tag indicated on the line and connect.

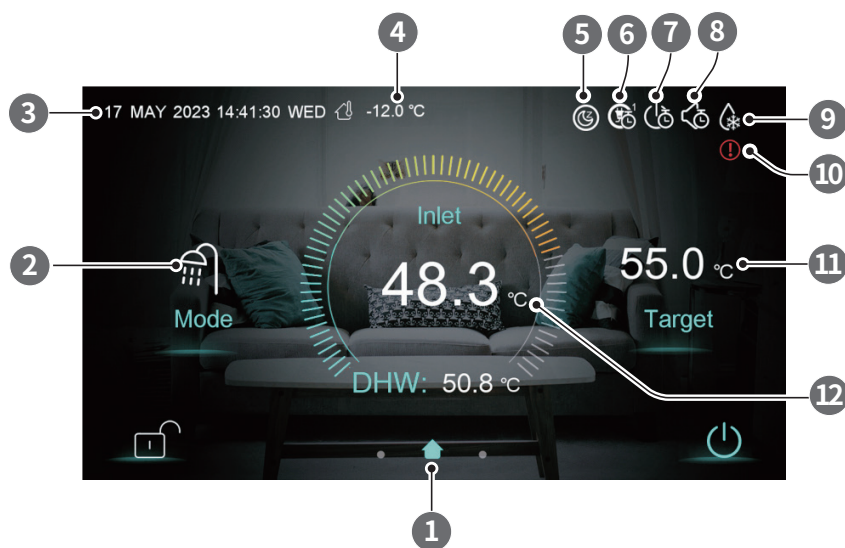
8. Operating the Heat Pumps

8.1 Using the Front Panel

You can set the temperature and select Heating, Hot Water, or Cooling mode directly from the front panel, where you can also monitor operational information in real time. The parameter values can be easily adjusted to meet user preferences.

8.1.1 Icons and Digital Display

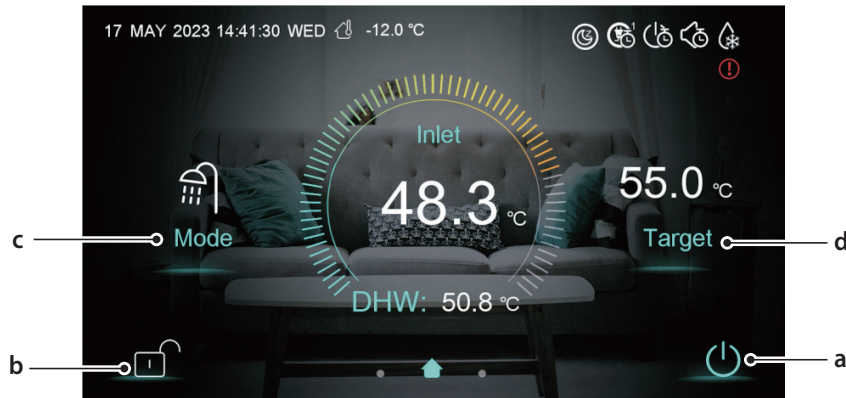
The icons and digital display on the front panel provide important information required for the heat pump's operation. Refer to the following table for detailed information.



#	Name	Description
1	Home	Indicates that the current screen is Home.
2	Current mode in use	Displays the current mode in use.
3	Date and time	Displays the current date and time.
4	Ambient temperature	Displays the ambient temperature.
5	SG Ready	Displays when the Smart Grid (SG) Ready mode is set. SG Ready includes Solar Sleep mode, Solar Low mode, Solar Medium mode, Solar High mode, Normal mode.
6	Mode/temp/power timer	Displays when each timer is set.
7	Power timer	Displays when the power timer is activated.
8	Mute timer	Displays when the mute timer is activated.
9	Defrosting	Displays when the heat pump is defrosting.
10	Fault	Displays when an error occurs while using the heat pump. If you tap this icon, you can see the error details.
11	Target temperature	Displays the target temperature.
12	Outlet water temperature or room temperature	Displays the outlet water or room temperature. Note To change the temperature type, set the H25 parameter (0: Outlet water temperature, 1: Room temperature).

8.1.2 Buttons

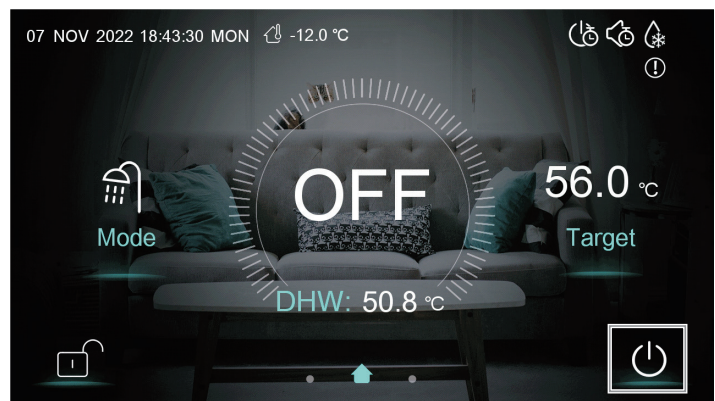
By using the buttons on the front panel, you can turn on or off the heat pump, access to the mode menu, status, and set the values required for the heat pump's operation, such as heating and DHW supply temperatures. Refer to the following table for detailed information.



a		Power Turns the heat pump on or off.	b		Screen lock Locks the screen.
c	Mode	Mode Access to the mode menu.	d	Target	Temperature setting Sets the target temperature.

8.2 Turning the Heat Pump On or Off

To turn the heat pump on or off, tap the power button (⏻).



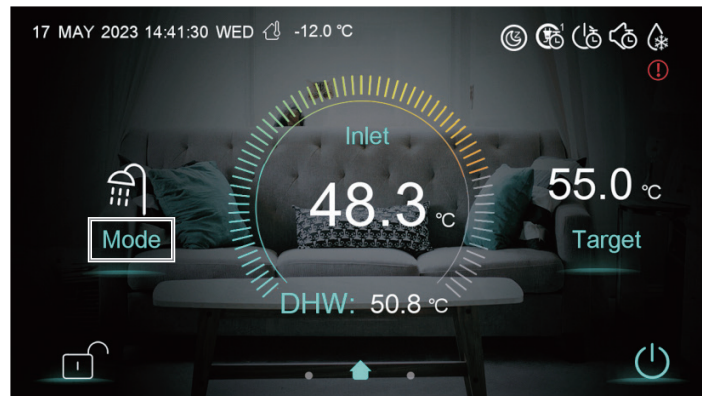
When the power is turned on for the first time, the temperature will appear on the front panel display after the power is turned on.

8.3 Selecting the Operating Mode

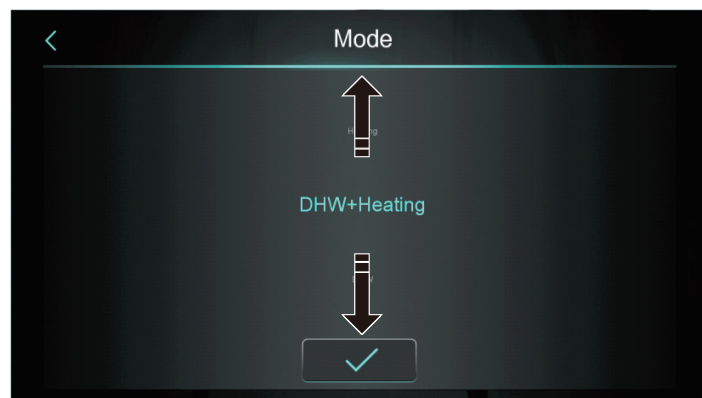
To turn the heat pump on or off, tap the power button (⏻).

Note Depending on your heat pump model, only supported modes will be displayed.

1. On the Home screen, tap **Mode**.



2. On the Mode screen, swipe the screen up or down to select the desired mode and then tap ✓ to confirm the mode.



Refer to the following table for detailed information on each mode.

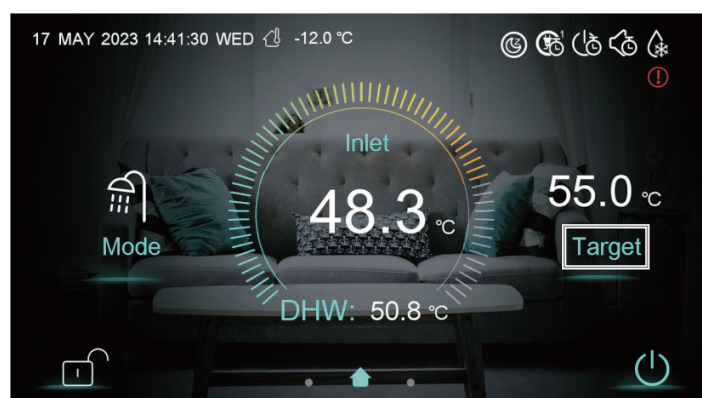
Mode	Description
DHW (Hot water only)	Set the hot water temperature. • Setting range: 15°C–70°C
Heating (Heating only)	Set the heating temperature. • Setting range: 15°C–75°C Note The heat pump operates at an ambient temperature of -25–43°C, recommended that the user set the target outlet water temperature of 30–60°C. The higher the water temperature, the worse the energy saving effect, and maximum target outlet water temperature is 75°C.

Mode	Description
Cooling (Cooling only)	Set the cooling temperature. Setting range: 10°C–28°C Note The heat pump operates at an ambient temperature of 10–43°C, recommended that the user set the target outlet water temperature of 7–20°C. CAUTION When using Cooling mode, please use a fan coil. Using the radiator as is may cause damage due to condensation. Contact the Technical Helpdesk at 0344 332 2323.
DHW+Heating	Operates in both Hot Water and Heating mode with hot water priority.

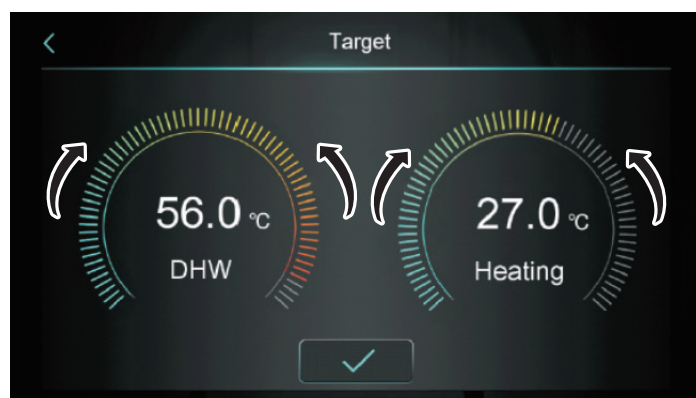
Note Depending on your heat pump model, only supported modes will be displayed.

8.4 Setting the Target Temperature

- On the Home screen, tap **Target**.



- On the Target screen, swipe the temperature scale to the left (lower) or right (higher) to adjust the temperature and then tap ✓ to confirm the target temperature.



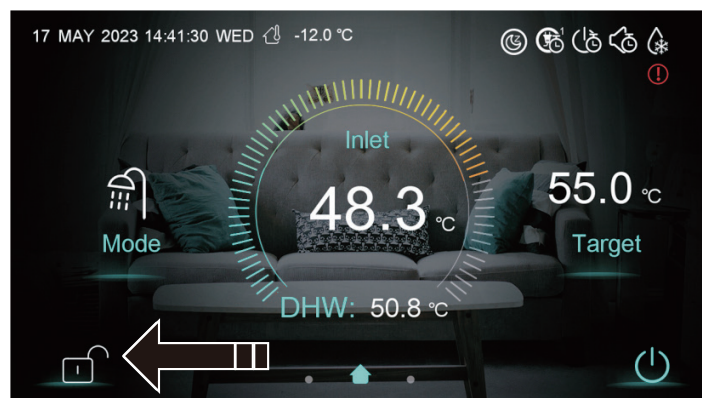
8.5 Using the Smart Grid (SG) Ready Feature

The Smart Grid (SG) Ready is an advanced system that communicates with the electricity grid to optimise energy usage, often shifting operations to off-peak times to reduce costs. It can respond to signals from utility companies to temporarily reduce power during high demand, helping stabilise the grid. It allows the heat pump to enhance the use of renewable energy by operating more when clean energy is abundant.

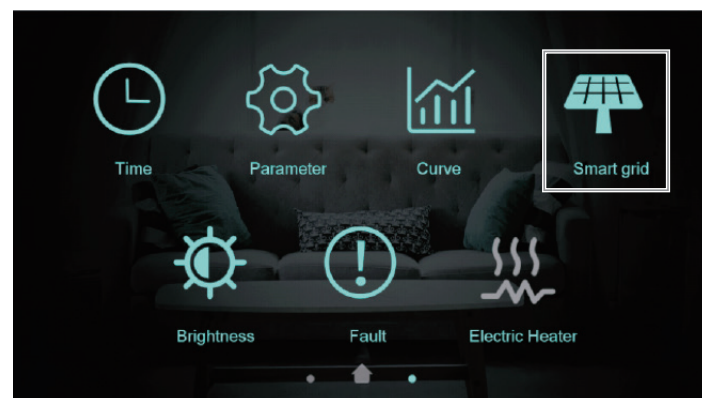
8.5.1 Setting the Smart Grid (SG) Ready Mode

8.5.2 Viewing the Smart Grid (SG) Ready Operation Status and Descriptions

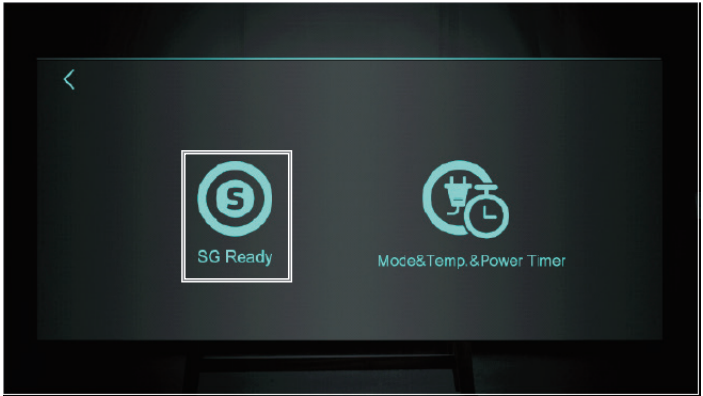
1. On the Home screen, swipe the screen to the left.



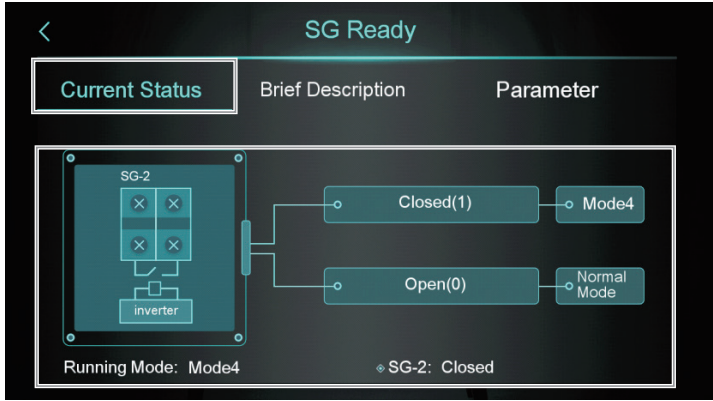
2. On the Setting screen, tap **Smart Grid**.



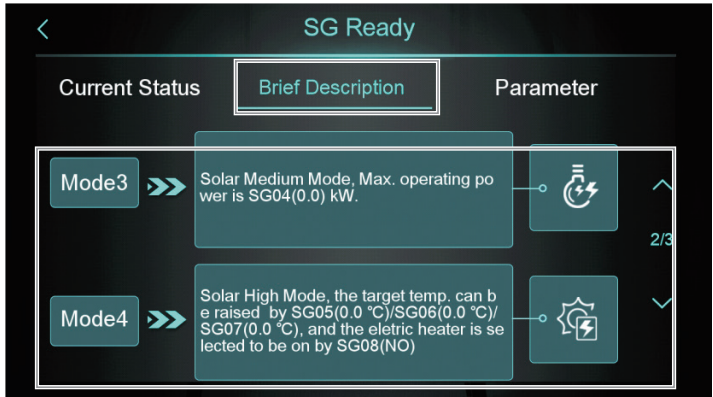
3. On the Smart Grid screen, tap **SG Ready**.



4. On the SG Ready screen, tap the **Current Status** tab and then view the SG Ready status in each set mode.



To view the brief description of each set mode, tap **Brief Description**.

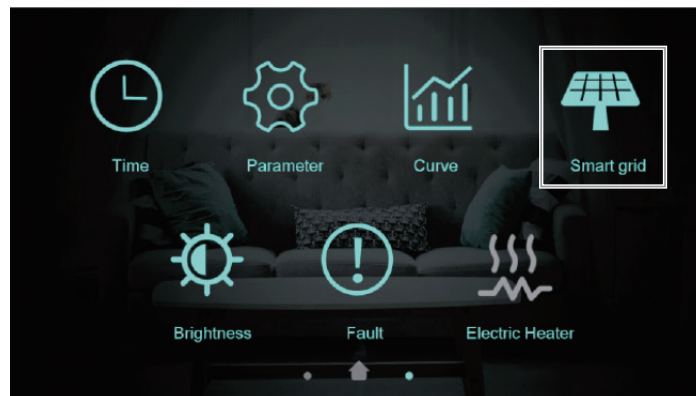


8.5.3 Setting the Smart Grid (SG) Ready Parameters

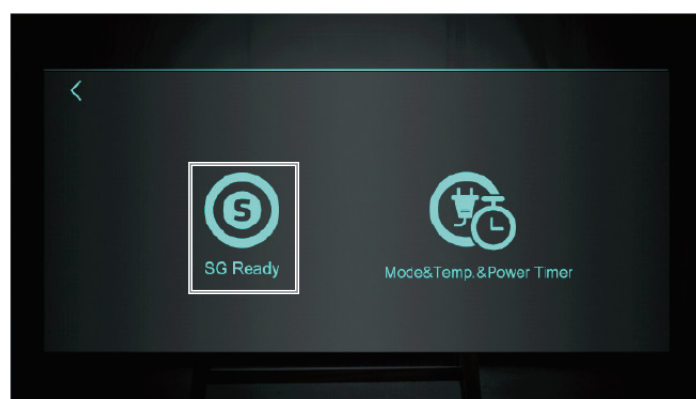
1. On the Home screen, swipe the screen to the left.



2. On the Setting screen, tap **Smart Grid**.



3. On the Smart Grid screen, tap **SG Ready**.



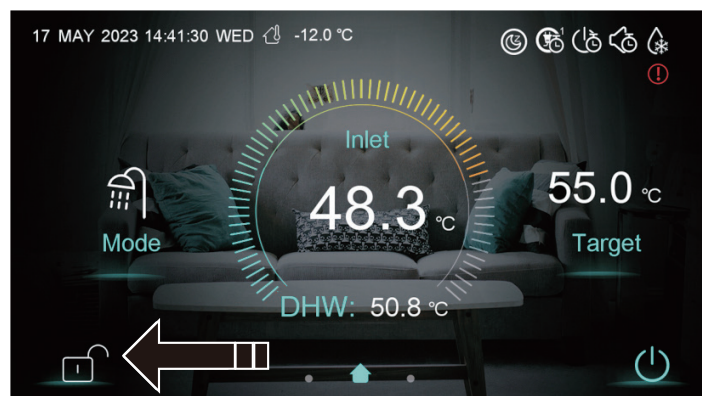
- On the SG Ready screen, tap **Parameter** and enter the password to enter the SG Ready parameter screen.



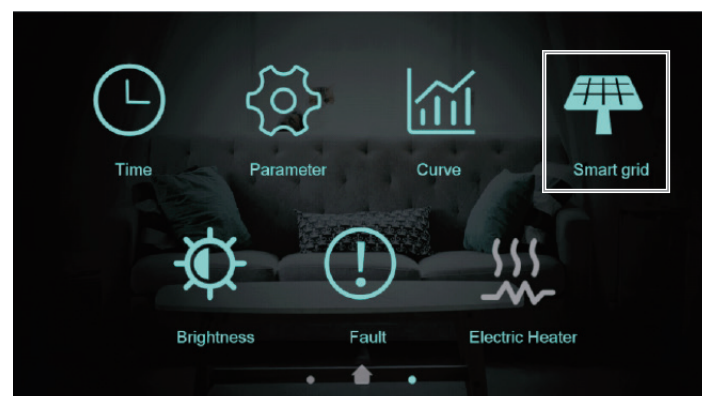
- In the Parameter tab, tap the parameter button, and then set the parameter value.

8.5.4 Setting the Smart Grid (SG) Ready for Mode, Temperature and Power Timer

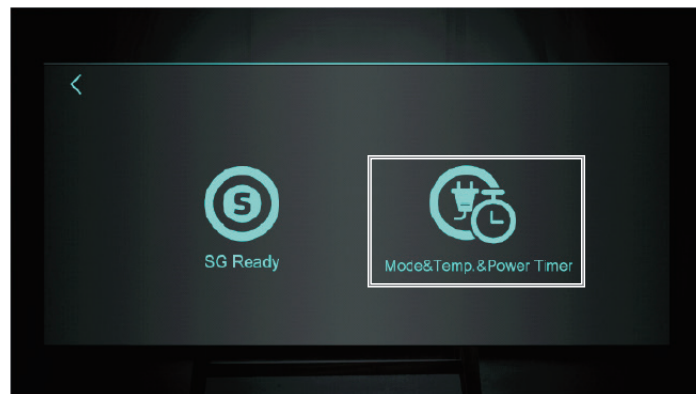
- On the Home screen, swipe the screen to the left.



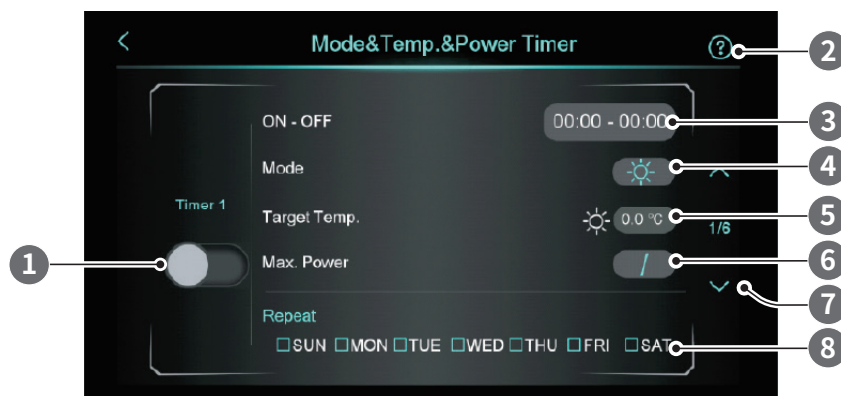
- On the Setting screen, tap **Smart Grid**.



- On the Smart Grid screen, tap **Mode&Temp.&Power Timer**.



- On the Mode&Temp.&Power Timer screen, set the Smart Grid (SG) Ready's details for the mode, target temperature and power timer.



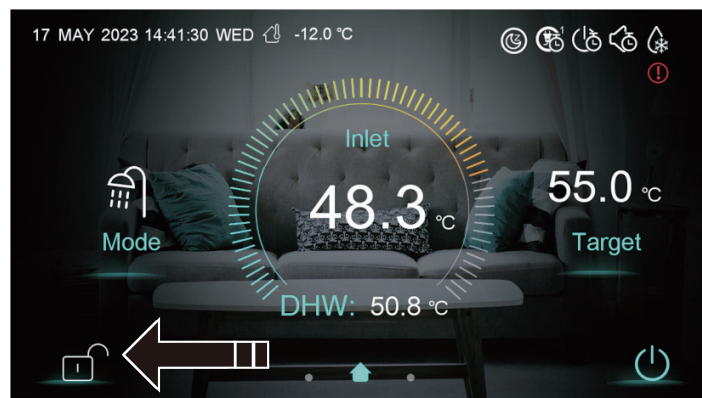
#	Name	Description
1	Timer On/Off Switch	Tap the switch to enable or disable the timer.
2	Information	Tap to view the introduction of the function.
3	Time Setting	Tap to set the timer.
4	Mode	Tap to set the target mode. If you do not need to control the mode, select /.
5	Target Temperature	Tap to set the target temperature.
6	Maximum Power	Tap to set the power limit from 0.0 to 99.9 kW. If you do not need to limit the power, select 0 .
7	Turn Page	Tap to select the desired day to repeat. A maximum 6 timer profiles can be set.
8	Week Settings	Tap to set the timer date.

8.6 Setting the System Time and Timer

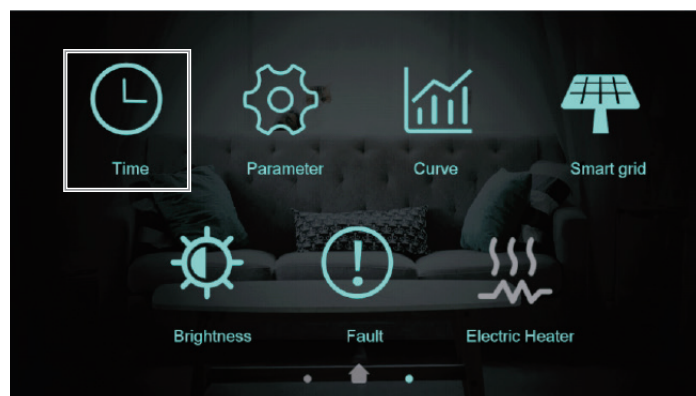
You can adjust the system time or set the timer for various actions of the water heat pump.

8.6.1 Setting the System Time

1. On the Home screen, swipe the screen to the left.



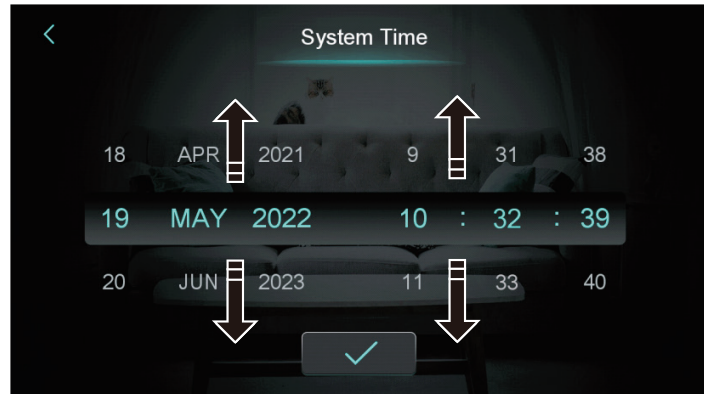
2. On the Setting screen, tap **Time**.



3. On the Time and Timer Setting screen, tap **System Time**.



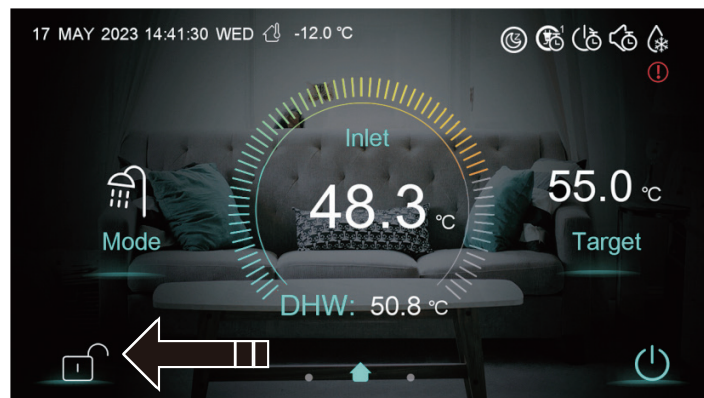
- On the System Time screen, swipe the screen upward or downward to set the time and then tap ✓ to confirm the system time.



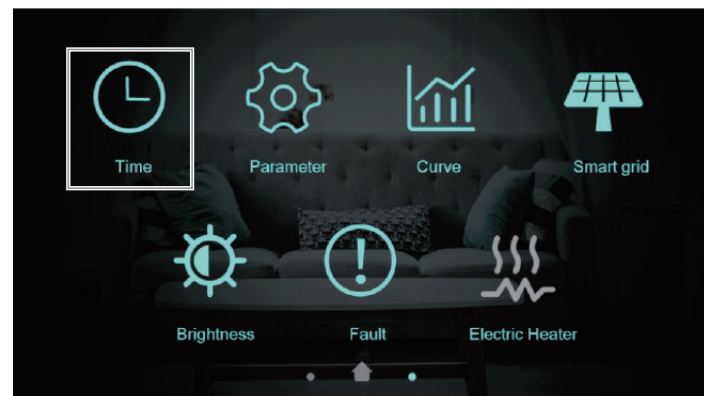
- Note**
- The default time is set to the moment when entered the setting page.
 - When the temperature unit is °F, the time format is displayed as 'month-day-year, hour: minute: second'.

8.6.2 Setting the Power Timer

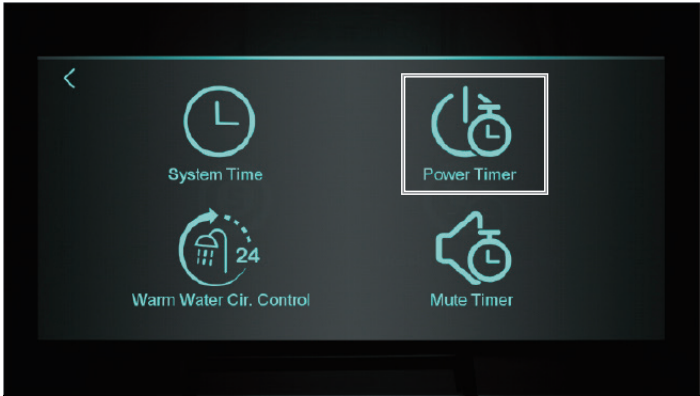
- On the Home screen, swipe the screen to the left.



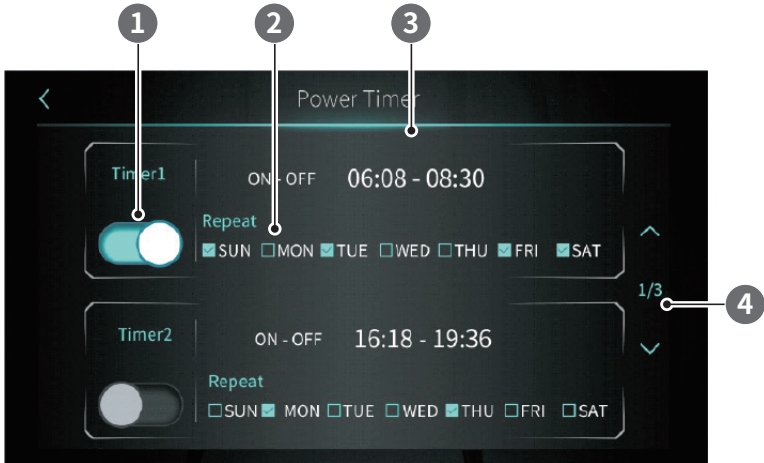
- On the Setting screen, tap **Time**.



3. On the Time and Timer Setting screen, tap **Power Timer**.



4. On the Power Timer screen, set the timer for turning the water heat pump on or off.



Refer to the following table for detailed information on the Power Timer screen.

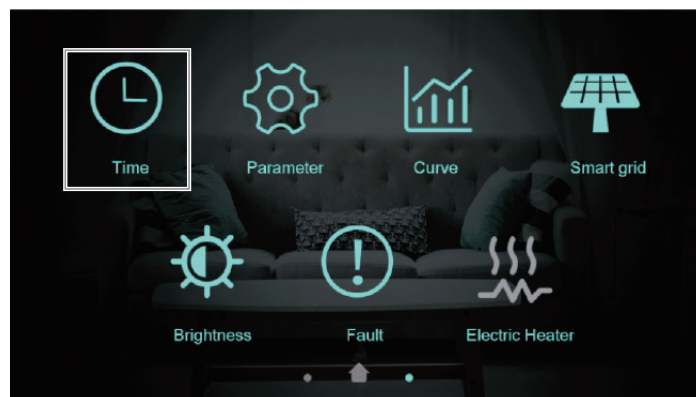
#	Name	Description
1	On/Off Switch	Tap to turn on or off the power timer function.
2	Week	Tap to set the day of the week to activate the timer.
3	Time Period	Tap to set the power on and off time.
4	Turn Page	Tap to switch the timer profile. Maximum 3 timer profiles can be set.

8.6.3 Setting the Warm Water Circulation Control Timer

1. On the Home screen, swipe the screen to the left.



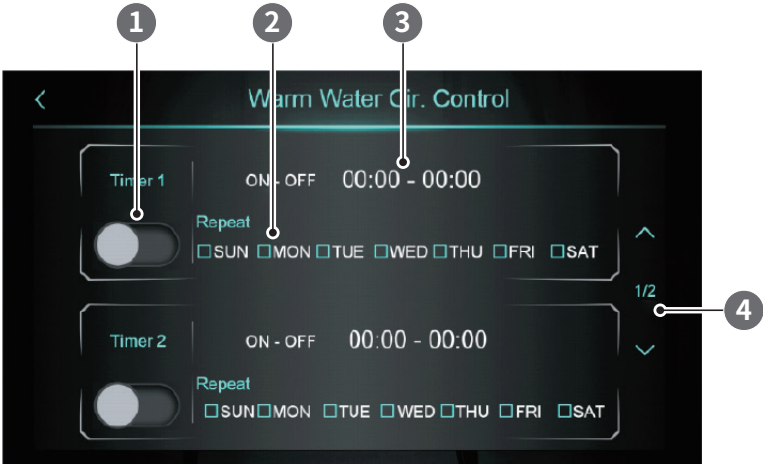
2. On the Setting screen, tap **Time**.



3. On the Time and Timer Setting screen, tap **Warm Water Cir. Control**.



4. On the Power Timer screen, set the control time for warm water circulation.

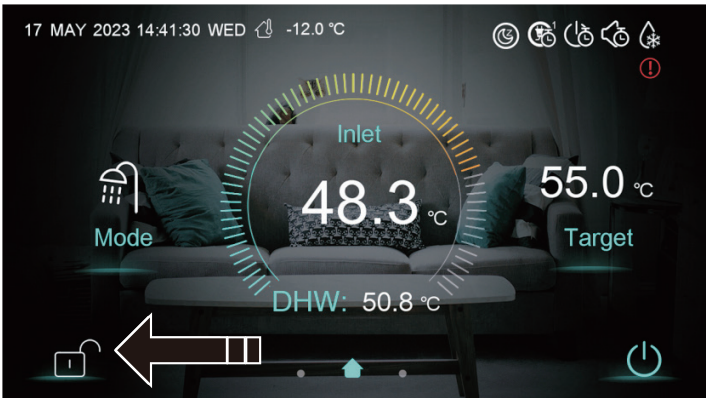


Refer to the following table for detailed information on the Warm Water Cir. Control screen.

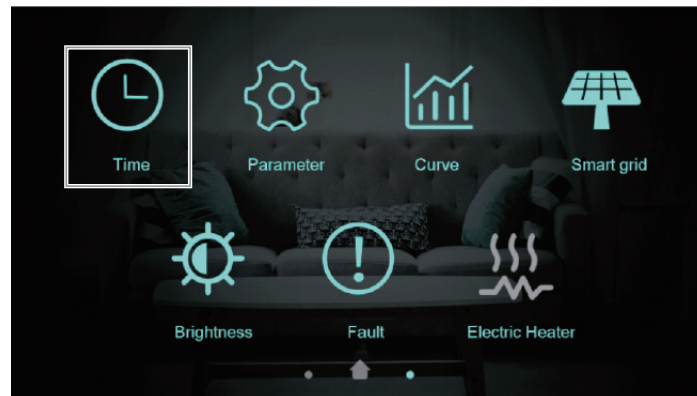
#	Name	Description
1	On/Off Switch	Tap to turn on or off the warm water cir. control timer function.
2	Week	Tap to set the day of the week to activate the timer.
3	Time Period	Tap to set the warm water circulation enabling and disabling time.
4	Turn Page	Tap to switch the timer profile. Maximum 3 timer profiles can be set.

8.6.4 Setting the Mute Timer

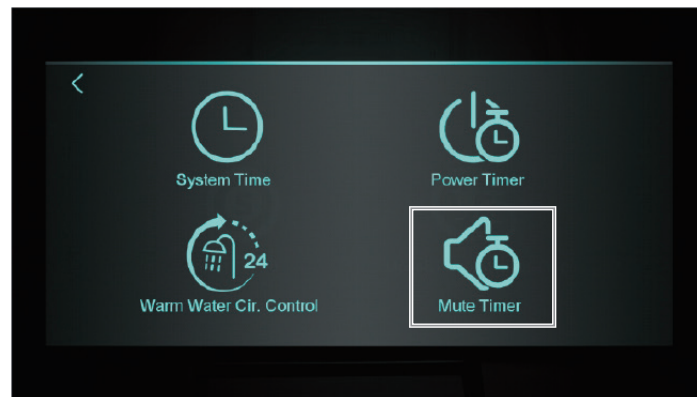
1. On the Home screen, swipe the screen to the left.



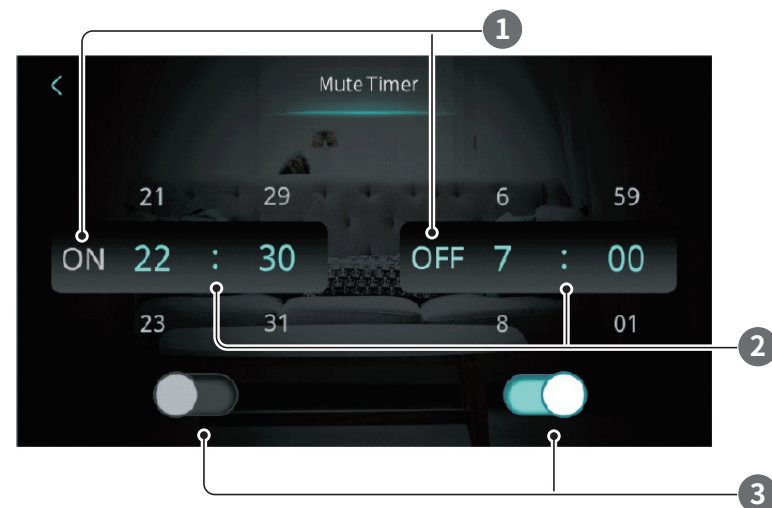
- On the Setting screen, tap **Time**.



- On the Time and Timer setting screen, tap **Mute Timer**.



- On the Mute Timer screen, swipe the screen upward or downward to set the mute timer's time.

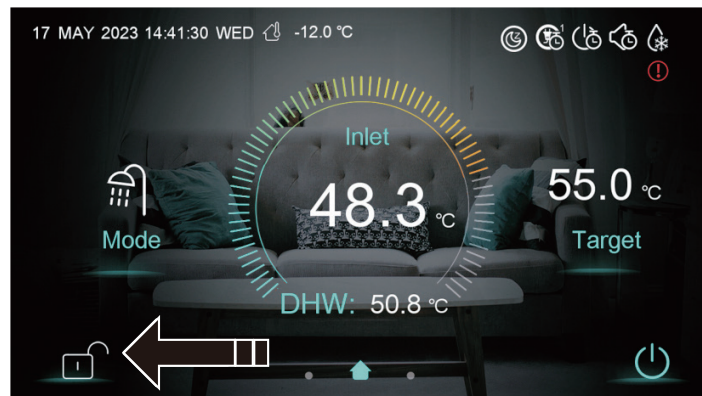


Refer to the following table for detailed information on the Mute Timer screen.

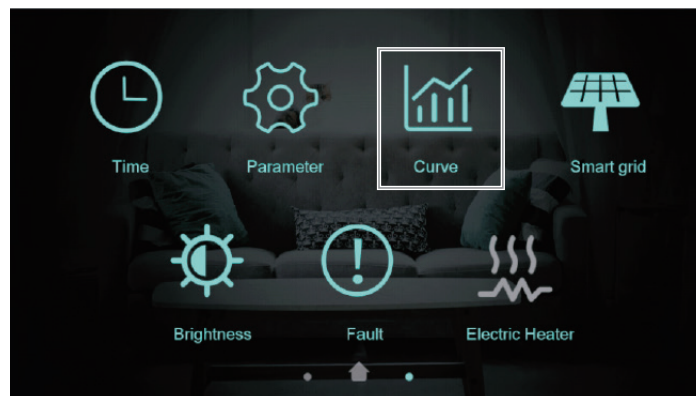
#	Name	Description
1	Mute Timer Status	Displays the current mute timer's time.
2	Time Period	Tap to set the mute timer's time.
3	On/Off Switch	Tap to turn on or off the mute timer function.

8.7 Viewing the Temperature Curve

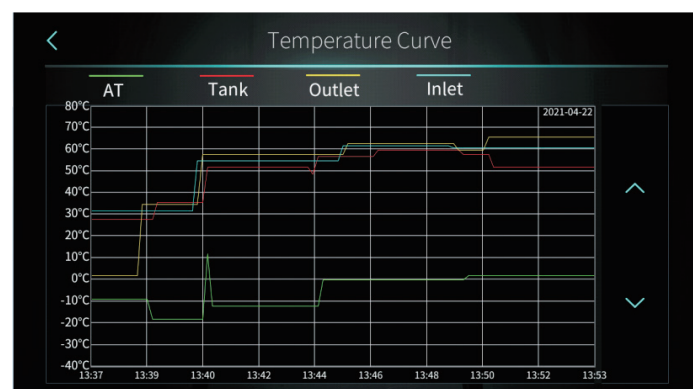
1. On the Home screen, swipe the screen to the left.



2. On the Setting screen, tap **Curve**.



3. On the Temperature Curve screen, view the detailed information on each part's temperature status.



Note

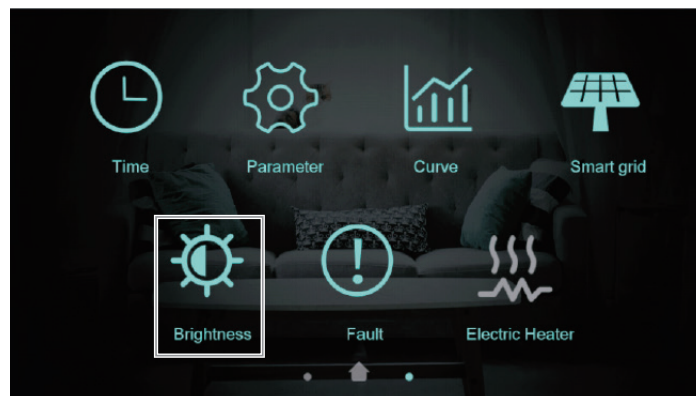
- This curve function records the water inlet temperature, water outlet temperature, tank water temperature and ambient temperature.
- Temperature data is collected and saved every five minutes. Timekeeping is made from the latest data saving.
- The data is only recorded when the power is supplied to the water heat pump. When the power supply to the water heat pump is disconnected and disrupted, the data will be lost. But if the power supply is disrupted for less than five minutes, the data change during such period will not be saved.
- The value of the abscissa indicates the time from the point on the curve to the current time point. The rightmost point on the first page is the latest temperature record.
- Temperature curve record is provided with power-down memory function.

8.8 Adjusting the Display Brightness

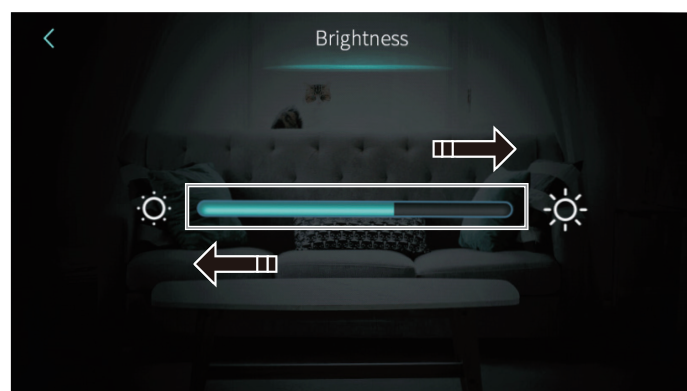
1. On the Home screen, swipe the screen to the left.



2. On the Setting screen, tap **Brightness**.



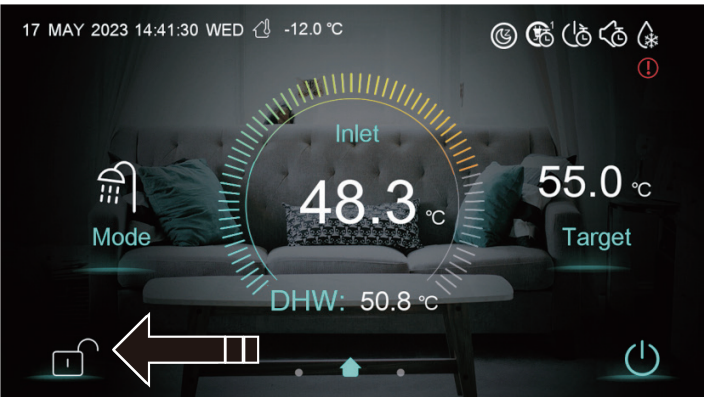
3. On the Brightness screen, swipe the bar to the left or right to adjust the display brightness.



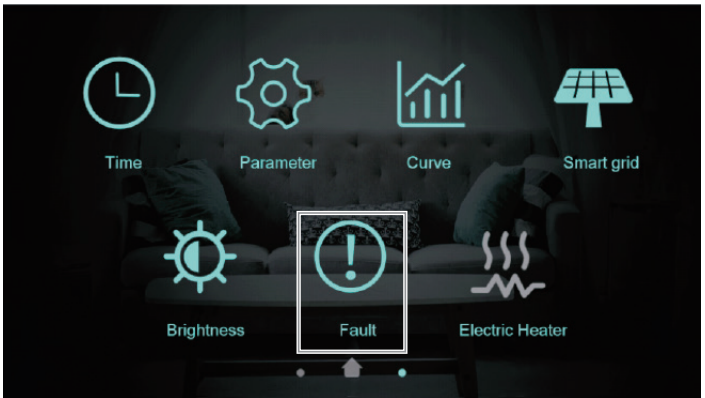
- Note**
- Screen brightness will be saved on power-down memory.
 - The screen automatically turns on and off. When there is no operation for 30 seconds, the screen will enter the half-time screen state. If there is no operation for another 5 minutes (a consecutive 5 minutes), the screen will enter the screen state.

8.9 Viewing the Fault Records

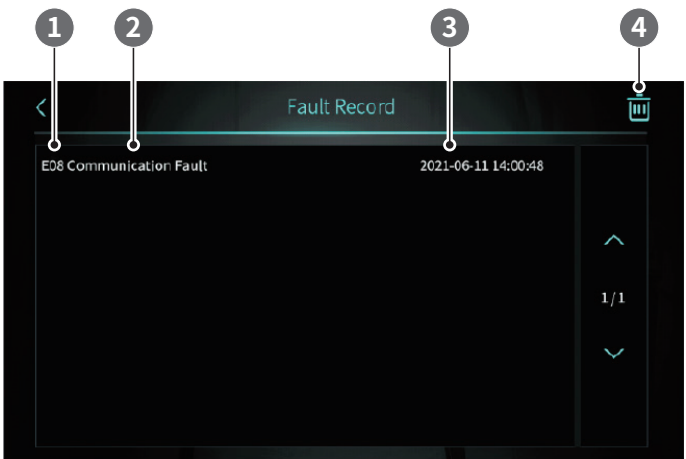
1. On the Home screen, swipe the screen to the left.



2. On the Setting screen, tap **Fault**.



3. On the Fault Record screen, view the list of fault records.

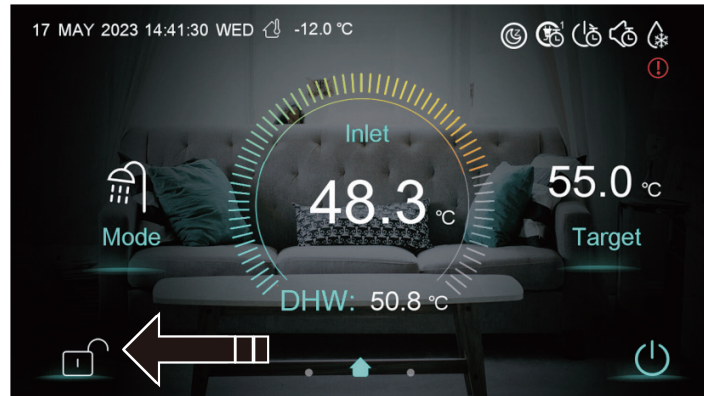


#	Name	Description
1	Fault Code	Displays the fault code number.
2	Fault Name	Displays the fault name.
3	Date and time	Displays the date and time of fault occurrence. Note When the temperature unit is °F, the time format of the occurrence date is displayed as 'month-day, hour: minute: second'.
4	Delete icon	Tap to delete all fault records.

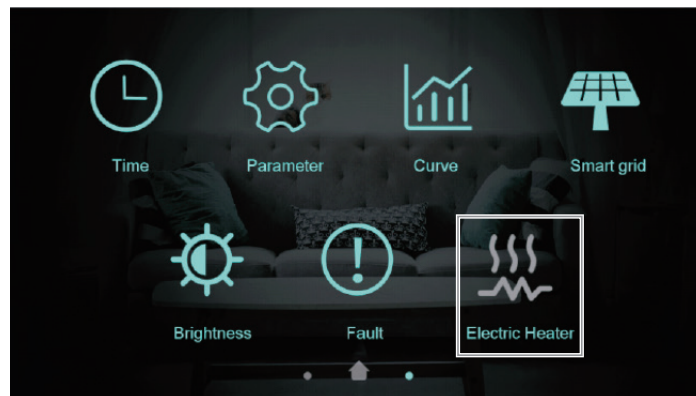
8.10 Turning On or Off the Electric Heater

This feature is used to quickly increase the hot water or heating temperature, and it automatically turns off when the set temperature is reached.

1. On the Home screen, swipe the screen to the left.



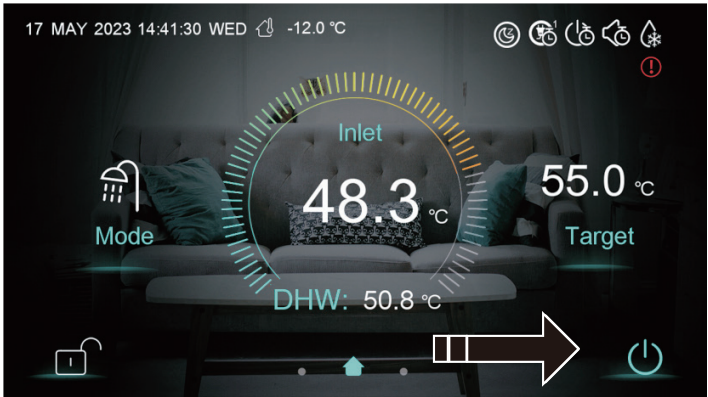
2. On the Setting screen, tap **Electric Heater** to turn on or off the electric heater.



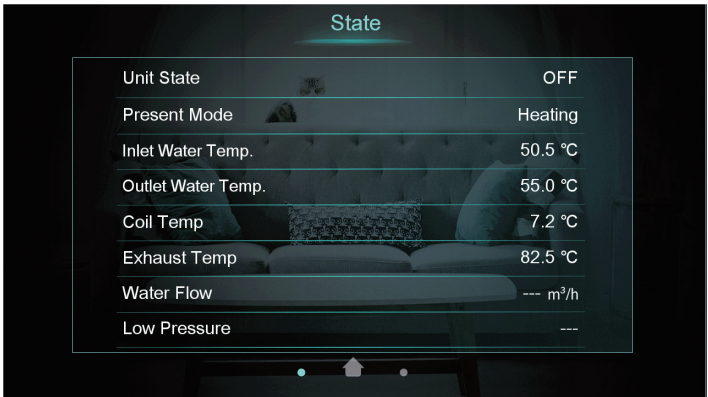
- Note**
- The Electric Heater icon turns dark when the electric heater is off.
 - When electric heating is not enabled, the Electric Heater icon is hidden.

8.11 Viewing the System Status

- 1. On the Home screen, swipe the screen to the right.



- 2. On the State screen, view the state of the overall system.



8.12 Locking or Unlocking the Screen

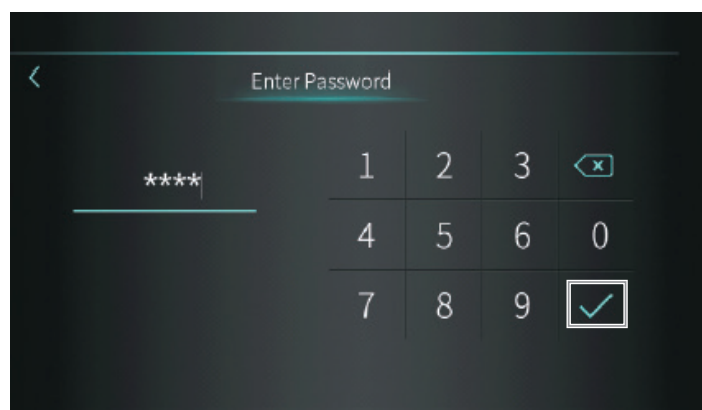
1. On the Home screen, tap  to lock the screen.



2. After the screen is locked, tap .



3. On the Enter Password screen, enter the password and then tap  to unlock the screen.



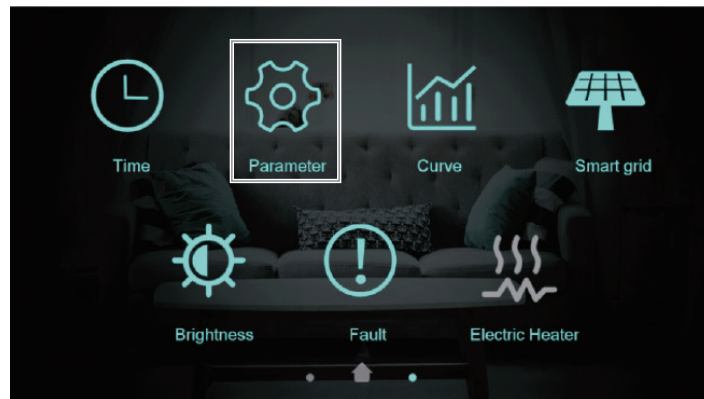
Note The default password is 022 or 22.

8.13 Setting the Parameters

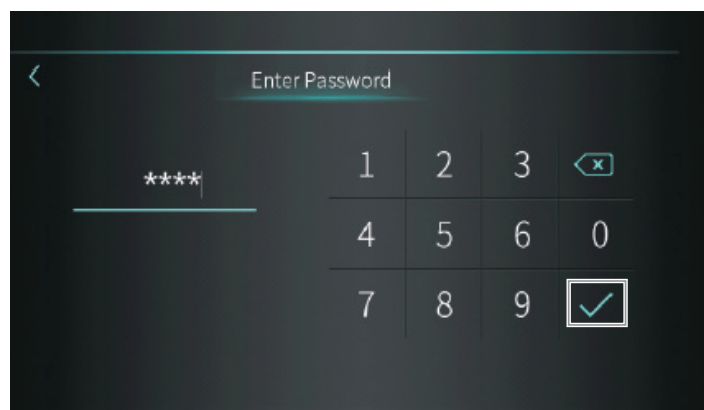
1. On the Home screen, swipe the screen to the left.



2. On the Setting screen, tap **Parameter**.



3. On the Enter Password screen, enter the password and then tap ✓ to unlock the screen.



Note The default password is 022 or 22.

4. Set the parameters you want to change according to the table below.

Item	code	Descriptions
Min. DHW Target Temp.	R36	Set the DHW target minimum temperature. • Setting range: 0–R37°C • Default: 15°C
Max. DHW Target Temp.	R37	Set the DHW target maximum temperature. • Setting range: R36–85°C • Default: 70°C
Domestic Hot Water / DHW Target Temp.	R01	Set the DHW target temperature. • Setting range: R36–R37°C • Default: 55°C
Heating Target Temp.	R02	Set the heating target temperature. • Setting range: R10–R11°C • Default: 45°C
Cooling Target Temp.	R03	Set the cooling target temperature. • Setting range: R08–R09°C • Default: 12°C
Min. Cooling Target Temp.	R08	Set the cooling target minimum temperature. • Setting range: -30.0–R09°C • Default: 5°C
Max. Cooling Target Temp.	R09	Set the cooling target maximum temperature. • Setting range: R08–80.0°C • Default: 28°C
Min. Heating Target Temp.	R10	Set the heating target minimum temperature. • Setting range: -30.0–R11°C • Default: 15°C
Max. Heating Target Temp.	R11	Set the heating target maximum temperature. • Setting range: R10–99°C • Default: 75°C
Main Circulation Pump Operation Mode	P01	Set the main circulation pump operation mode. • Setting range: 0-[Always On], 1-[Saving], 2-[Interval] • Default: 2-[Interval]
Interval Time	P02	Set the main circulation pump interval time • Setting range: 0–120 min • Default: 60 min
Operation Duration Time	P03	Set the main circulation pump operation duration time. • Setting range: 0–30 min • Default: 1 min
DHW Pump Operation Mode	P05	Set the DHW pump operation mode. • Setting range: 0-[Always On], 1-[Saving], 2-[Interval] • Default: 2-[Interval]
Temp. Control Selection	H25	Set the temp. control selection. • Setting range: 0-[Outlet Water Temp.], 1-[Room Temp.], 2-[Buffer Tank Temp.], 3-[Inlet Water Temp.] • Default: 0-[Outlet Water Temp.]

Item	code	Descriptions
Location of Electric Heater	R35	Set the location of the electric heater. - Setting range: 0-[Not Available], 1-[Main Water Circuit], 2-[DHW Tank], 3-[Buffer Tank]) - Default: 0-[Not Available]
Electric Heater Stage	H18	Set the electric heater stage. - Setting range: 1-[Stage1], 2-[Stage2], 3-[Stage3] - Default: 3-[Stage3]
External pump selection	H40	Set the external pump selection. - Setting range: 0-[Hot Water Pump], 1-[Warm Water Cir. Pump], 2-[Off signal when defrosting] - Default: 0-[Hot Water Pump]
Display Control/Remote Control	H07	Set the display and remote Control. - Setting range: 0-[Display/Wire Controller], 1-[Dry Contact]) - Default: 0-[Display/Wire Controller]

9. Troubleshooting

9.1 Solving Problems

Issue	Possible Cause	Related Components	Solution
Unit tripped when powered on	Short circuit	- Terminals - Relays - Contacts - Cables	- Check all the components' connection. - Check whether relays or contacts are damaged. - Component - Resistance to short test required.
Display does not receive power	- Cables has been disconnected. - The power input cable is mis-connected.	- Display cable - Power input cable	- Check the display cable. - Check the power cable. - Check whether the 3-phase power cable is connected in the right phase sequence.
Unit does not start.	- The unit has an error. - Cables have been disconnected.	- Display - Cables	- Check whether the display shows an error. - Check the cable. - Reconnect the power cable and check if it operates properly.
Display does not work.	- The display has been locked. - The display is broken.	Display	- Check whether the displayed icon is locked. - Check the cable. - Reconnect the power cable and check if operates properly.
Heating performance is poor.	- The compressor is running at low frequency. - The fan is not running or is too slow. - Leakage problem	- Compressor - Fan - Refrigerant system	- Check the compressor frequency. - Check the fan speed. - Check the exhaust temperature, and check for low pressure.
The target temperature is not reached	Temperature limit (according to the ambient temperature)	Control logic	Check the parameters.
The evaporator has accumulated excessive frost and cannot defrost properly.	- Fan blade or motor issue - EEV step is unsuitable - Refrigerant amount - Parameter issue	- Parameters - Fan - EEV - Refrigerant system	- Check the defrosting parameters. - Check the compressor frequency. - Check the fan speed. - Check the exhaust temperature, and check for low pressure.
Abnormal noise	- Screw issue - Fan blade or motor issue - Compressor issue - Component collision	- Screws - Fan - Compressor - Other components (tubes, cables)	- Check the screws. - Check the fan blade and motor. - Check the compressor. - Check other components.

9.2 Error Code Classification

Error Code	Error Name	Related Components	Solution
E04	Electric heater overheating protection		- Check whether the electrical heating overheat protector is open or not. - Check the electric heater.
E08	Communication failure between the PCB and display	Communication error between the PCB and display	- Check the PCB and display's cable connection. - Check the software version of PCB and display.
E11	HP protection	HP switch is open	- Check if the error is shown after unit shutdown. - Measure the discharge pressure when the unit is running. - Detect EEV step, suction pressure, inlet/outlet water discharge, and suction temperature. - Release all the system's gas and refill refrigerant according to the nameplate.
E12	LP protection	LP switch is open	- Check whether the error is shown after unit shutdown. - Measure the suction pressure when the unit is running. - Detect EEV step, discharge pressure, inlet/outlet water discharge, and suction temperature. - Release all the system's gas and refill refrigerant according to the nameplate.
E19	Primary antifreeze protection	Ambient temp. $\leq 0^{\circ}\text{C}$, A04- 2°C $\leq$ water inlet $\leq$ A04- 4°C	For winter protection. Once the water temperature rises to A04+4°C or the ambient temp is higher than 1, the error code will disappear.
E29	Secondary antifreeze protection	Ambient temp. $\leq 0^{\circ}\text{C}$, water inlet $\leq$ A04- 2°C	For winter protection, once the water temperature rises to A04+11°C or the ambient temp is higher than 1, the error code will disappear.
E19	Primary antifreeze protection	Ambient temp. $\leq 0^{\circ}\text{C}$, $2^{\circ}\text{C} \leq$ water inlet $\leq 4^{\circ}\text{C}$	For winter protection, once the water temperature rises to 8°C or the ambient temp is higher than 1°C, the error code will disappear.
E29	Secondary antifreeze protection	Ambient temp. $\leq 0^{\circ}\text{C}$, water inlet $\leq 2^{\circ}\text{C}$	For winter protection, once the water temperature rises to 15°C or the ambient temp is higher than 1°C, the error code will disappear.
E032	Flow switch protection	Flow switch is open	- Check the cable connections. - Check the flow switch. - Check whether the water valve is opened fully or otherwise open. - Check the water pump and filter. - Check if there is any air in the water route.
E051	Compressor overcurrent shutdown error	Compressor overcurrent	- Check ambient temperature and inlet/outlet water temperature. - Turn on the unit. Record and analyze the high/low pressure charging process, the discharge/suction temperature, the EEV step, the compressor frequency, and the running current. If they are okay, replace a new compressor driver board.
E065	High water outlet temp. protection	-	Check whether the water flow is too low or the outlet water too high.
E081	Communication failure between PCB and fan driver board	Communication error between the PCB and fan driver board	- Check the connection between the PCB and fan board. All of the 12V-12V, GND-GND, A-A, B-B connection should be closed. - If they are closed, turn on the power, then measure the voltage between 12V and GND on the fan board, and if it is higher than 15V or lower than 7V, replace the fan board.

Error Code	Error Name	Related Components	Solution
E103	Fan motor overload protection	-	• Check if the fan motor is running properly. • Check the fan motor's current. - If the current is more than 1A, it means the motor has a problem and needs to be replaced. - If the current is less than 1A, it means the motor control module has a problem and needs to be replaced.
E171	Anti-freeze protection	Inlet water $\leq A04^{\circ}\text{C}$ and the antifreeze temp $\leq A04\text{-}A05^{\circ}\text{C}$	• Check the water flow. • Check the outlet water temp sensor. • Check the ambient temperature. • Check the cable connections. • Check the defrosting history, looking for whether the time to defrost is too long or defrosting is being used too often.
F01	Compressor activation failure	-	• Restart the unit. • Check the changing process of the EEV step, the pressure, and the inlet/outlet water temperature. • Check the U/V/W connection between the compressor and compressor driver board. • Check the compressor resistance. • Check compressor driver board.
F03	PFC error	-	• Restart the unit. • Check whether the power supply connection and voltage supply is stable or not. • Replace the compressor driver board.
F05	DC bus overvoltage	-	• Check the voltage between the DCP-IN and DCN-IN. If it is lower than 300V, the unit will receive protection. • Check the R/S/T input voltage on the compressor driver board. If it is lower than 210V, the unit will receive protection. If it is okay, replace the compressor driver board.
F06	DC bus undervoltage	-	• Check the voltage between the DCP-IN and DCN-IN. If it is lower than 300V, it will receive protection. • Check the R/S/T input voltage on the compressor driver board. If it is lower than 210V, it will receive protection. If it is okay, replace the compressor driver board.
F07	AC input undervoltage	-	• Measure the input voltage of R/S/T of driver board, if lower than 300V, it will get this protection. If it is okay, replace the compressor driver board.
F08	AC input overcurrent	-	• Only in single phase units. • Restart the unit. • Check if there is electric leakage. If not, replace the driver board.
F09	Input voltage sampling error	-	• Make sure power supply is not lower than 300V or higher than 500V. If it is okay, replace the compressor driver board.
F10	Communication failure between DSP and PFC	-	• Only in single phase units. • Check the inverter board connection. If everything is OK, please replace the compressor driver board.
F11	Communication error between DSP and Communication board	-	• Check the inverter board connection. If it is okay, replace the compressor driver board.

Error Code	Error Name	Related Components	Solution
F12	Communication failure between the PCB and driver board	-	- Check the connection between the main control board and compressor driver board. All of the 12V-12V, GND-GND, A-A, B-B <word> should be closed. - If they are closed, turn on the power, then measure the voltage between the 12V and GND on the compressor driver board. If it is higher than 15V or lower than 7V, replace the compressor driver board.
F13	IPM overheating stop	-	- Check if the fans are running or not. - Check the installation's distance and space. - Leave enough distance and space for the heat pump to have good conditions for transferring heat. - Clean the finned heat exchanger.
F15	Input voltage lacking phase	-	Check the phase of the R/S/T power supply to the compressor driver board. If it is okay, replace the compressor driver board.
F16	Compressor has weak magnetic protection alarm	-	Check the refrigeration system. If it is okay, replace the compressor driver board.
F17	Drive board temperature error	-	- Check the heat sink temp. sensor's connection. - Check the heat sink temp. sensor's resistance.
F18	IPM current sampling error	-	- Check ambient temperature. and inlet/outlet water temperature. - Check the high/low pressure and the discharge temperature and suction temperature. - Check the EEV step. - Check the compressor frequency and current.
F20	IGBT power device overheating alarm	-	- Check if the fans are running or not. - Check the installation distance and space. - If they are OK, replace the compressor driver board. - Leave enough distance and space for the heat pump to have good conditions for transferring heat. - Check if clean air is provided to the finned heat exchanger.
F22	AC input over current protection alarm	-	- Only in single phase unit. - Restart the unit. - Check if there is electric leakage. - If the problem persists, replace the driver board.
F23	EEPROM fault alarm	-	- Check the connection. - Replace the driver board.
F24	Broken EEPROM activation ban alarm	-	
F25	LP 15V underload error	-	- Check if the power supply is stable or not, and restart unit. - If the problem persists, replace the driver board.
F26	IGBT power device overheat error	-	- Check if the fans are running or not. - Check the installation distance and space. - Leave enough distance and space for the heat pump to have good conditions for transferring heat. - Clean the finned heat exchanger.

Error Code	Error Name	Related Components	Solution
F031	DC fan motor 1 failure	-	- Turn off the unit and check the connection. - Restart and check if the motor is running normally or if the error happens again. - Replace the motor.
F032	DC fan motor 2 failure	-	
Pp1	Exhaust pressure sensor error	-	- Check the exhaust pressure sensor connection. - If the connection is okay, replace the pressure sensor.
Pp2	Suction pressure sensor error	-	- Check the suction pressure sensor connection. - If the connection is okay, replace the pressure sensor.
TP	Low ambient temp. protection	Ambient temp $\leq$ -30	- Check the ambient temperature. - When the ambient temp is -28°C or higher, the fault will disappear.
P01	Water inlet temp. sensor error	-	- Check the connection. - Measure the resistance of the sensor. If it is lower than 100Ω or higher than 500kΩ, replace it.
P02	Water outlet temp. sensor error	-	
P04	Ambient temp. sensor error	-	
P17	Water outlet temp. sensor error	-	
P032	Hot water tank temp. sensor error	-	
P42	Room temp. sensor error	-	
P101	EVI inlet temp. sensor error	-	
P102	EVI outlet temp. sensor error	-	
P153	Coil temp. sensor error	-	
P181	Exhaust temp. sensor error	-	
P182	Exhaust over temp.	(Exhaust temp.) $\geq$ C05 default 110	- Measure the resistance of the sensor. If it is lower than 100Ω or higher than 500kΩ, replace it. - Check the unit for refrigerant leakage.
P191	Antifreeze temp. sensor error	-	- Check the connection. - Measure the resistance of the sensor. If it is lower than 100Ω or higher than 500kΩ, replace it.

9.3 Error Code List

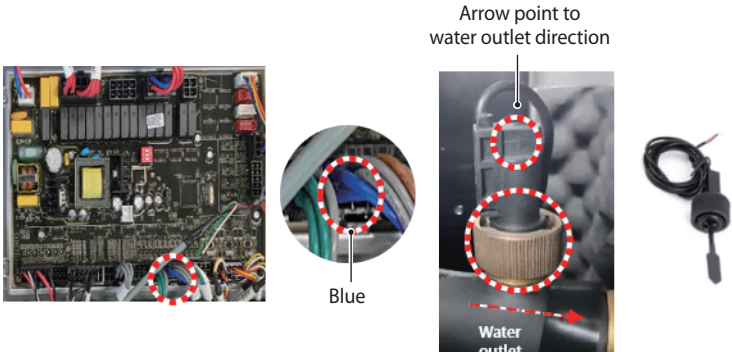
9.3.1 High Pressure Protection (E11)

Fault	Possible causes	Check method
High Pressure Protection (E11)	High pressure switch or overheat protection switch of the compressor is broken	1. Check the connection status on the PCB. • Check if the plug connection is tight. 2. Check whether the overheat protection switch is closed or not. • Normally it is closed. The resistance is 0 ohm.
	Pressure is over the limited pressure value	1. Check if the high pressure value is higher than 3.0MPa. • Check the plug connection whether it is tight (AI/DI 13). 2. Check if the water flow is enough. • Check the inlet and outlet water temperature. • Check if the water pipe is blocked. 3. Record the exhaust temperature and EEV steps to check if the refrigerant system is blocked.

9.3.2 Low Pressure Protection (E12)

Fault	Possible causes	Check method
Low Pressure Protection (E12)	Low Pressure Switch is broken	1. Check the connection status on the PCB. 2. Check whether the low pressure switch is closed or not. 3. Apply a solution of water and soap to the area where a leak is suspected. • If there is a leak, the escaping refrigerant will create bubbles, indicating the location of the leak, only when the refrigerant is escaping.   Soapy Water
	Pressure is below the limited pressure value	1. Check whether the fins are heavily frosted. • If so, clear the fins using a soft brush and ensure that fins are not bent. Then, check if the fault has been resolved. 2. Check if the low pressure value is lower than 0.03MPa. 3. Check the leakage in the refrigeration system. 4. Check the inlet water temperature, outlet water temperature and compressor current to judge whether the refrigerant system is blocked. Note If the unit fails for more than three times within 30 minutes, restart the unit manually.

9.3.3 Water Flow Protection (E032)

Fault	Possible causes	Check method
Water Flow Protection (E032)	Water pipe is blocked	1. Check whether all valves in the water system that should be opened have been opened. • If they are closed valves, open them. 2. Check if the water circuit filter is blocked with debris or impurities. • If debris is found, then take the correct actions to clean and remove the obstruction. 
	Circulation water pump is broken	1. Check if the flow switch connector is firmly connected to the PCB. 2. Disconnect the plug from the PCB to test the operation. 3. Check the switch using a mutimeter. The switch should be closed. 

9.3.4 Primary Anti-freezing Protection (E019) – In Standby Mode

Fault	Decription
Primary Anti-freezing Protection (E019)	- Enter: $A04 - 2^{\circ}\text{C} < \text{Inlet Water Temp} \leq A04$ & $\text{Ambient Temp} \leq 0^{\circ}\text{C}$, water pump will be ON; - Exit: $\text{Inlet Water Temp} \geq A04 + 4^{\circ}\text{C}$ or $\text{Ambient Temp} > 1^{\circ}\text{C}$;

9.3.5 Secondary Anti-freezing Protection (E019) – In Standby Mode

Fault	Decription
Secondary Anti-freezing Protection (E019)	- Enter: $\text{Inlet Water Temp} \leq A04 - 2^{\circ}\text{C}$ & $\text{Ambient Temp} \leq 0^{\circ}\text{C}$, heat pump will be ON; - Exit: $\text{Inlet Water Temp} \geq A04 + 11^{\circ}\text{C}$ or $\text{Ambient Temp} > 1^{\circ}\text{C}$ - Remark: $A04$ (Antifreeze Temp.) = 4;

9.3.6 Anti-freezing Protection (E171) – In Operation Mode

Fault	Decription
Anti-freezing Protection (E171)	- Enter: $\text{Outlet Water Temp} \leq A04$ & $\text{Antifreeze Temp} \leq A04 - A05^{\circ}\text{C}$; Compressor will be OFF, water pump will be ON; - Exit: $\text{Outlet Water Temp} \geq A04 + 3^{\circ}\text{C}$ or $\text{Antifreeze Temp} > A04 - A05 + 2^{\circ}\text{C}$; - Remark: $A04$ (Antifreeze Temp.) = 4; / $A05$ (Antifreeze Temp. Difference) = 3;

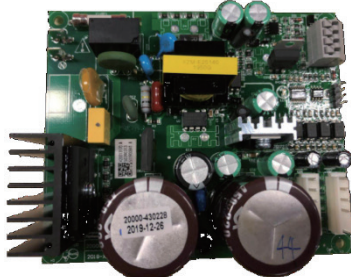
9.3.7 Low Ambient Temperature Protection (TP)

Fault	Decription
Low Ambient Temp Protection (TP)	- Enter: $\text{Ambient Temp} \leq A03^{\circ}\text{C}$; Compressor will be OFF, water pump will be ON; - Exit: $\text{Ambient Temp} > A03 + 2^{\circ}\text{C}$; - Remark: $A03$ (Shutdown Ambient Temp.) = -25°C;

9.3.8 Overhigh Exhaust Temp

Fault	Decription
Overhigh Exhaust Temp	- Enter: When exhaust temp $\geq A06$, the unit will have the exhaust overheat temperature protection; - Exit: When the exhaust temp $< A06 - 30^{\circ}\text{C}$;
Solution	1. Check whether the water flow is low. 2. Check the leakage in the refrigeration system. 3. Check the inlet water temperature, outlet water temperature and compressor current to check if the refrigerant system is blocked.

9.3.9 Communication Failure (E08, E081, E084)

Fault	Possible causes	Check method
E08	Communication failure between the PCB and front panel	1. Detect the connection between the PCB and front panel. 2. Replace the PCB or front panel.
E081	Fan motor module communication failure	1. Check the fan motor parameter setting. • F01 (Fan Motor Type) = 3, F10 (Fan Quantity) 2. Check the fan motor module connection on the PCB. 3. Replace the fan motor module. 
E084	The PCB's software is incompatible with the front panel's software	1. Check the software version on the starting interface. 2. Update the PCB and front panel's software.

9.4 Parameter List

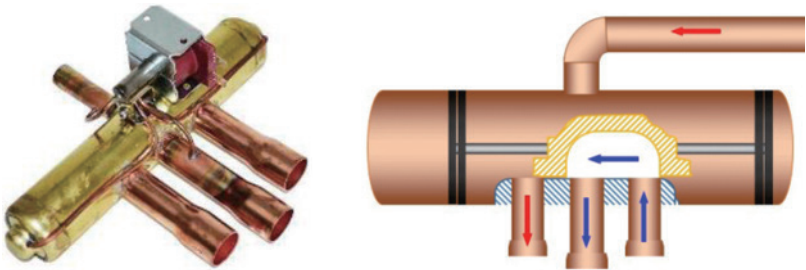
Items	Default	Remarks
Cooling temperature	12°C	Adjustable
Heating temperature	45°C	Adjustable
Hot water target temperature	55°C	Adjustable

10. Key Components Description

10.1 Compressor

Item	Description			
Compress low-temperature, low-pressure gas state refrigerant into high-temperature, high-pressure refrigerant.				
Model type	PEM750V004PGKC PEM750V006PGKC	PEM750V008PGKC	PEM750V010PGKC	PEM750V017PGKC
Motor type	Direct current brushless motor E class / INVERTER			
Power source input to inverter	220V 50Hz 1Φ			
Pole	4P			6P
Application	Heat pump water heater			
Refrigerant	R290			
Displacement	30.7 ml/rev	41.8 ml/rev	54.8 ml/rev Double Cylinder	75.2 ml/rev Double Cylinder
Allowable frequency range	900–7,200 RPM		900–6,600 RPM	900–7,200 RPM
Oil	HAF840 880±20 ml	HAF68 880±20 ml	HAF68 1,150±20 ml	FW68 or equivalent 2000±20ml
Allowable amount of refrigerant charge	Below 800 g	Below 2,000 g	Below 1,500 g	Below 5,300 g
Compressor cooling	Forced air			
Hermetic Terminal	Conventional type			
Space volume of inner case	1,500 cm³			5,000 cm³
Weight (Incl. Oil)	17.5 kg	17.3 kg	18.9 kg	29.1 kg
Electrical Frequency	30–240 Hz			45–330 Hz
Demagnetizing Current	54.01 A			85.00 A
Image				

10.2 4-Way valve

Item	Description
The high temperature/high pressure liquid refrigerant that comes out of the condenser is expanded to create a low temperature/low pressure state where gas and liquid are mixed.	
Max. operative	$\Delta P : 3.1 \text{ MPa}$
Min. operative	$\Delta P : 0.3 \text{ MPa}$
Internal leakage	$< 1,500 \text{ ml/min}$ (0.98MPa, valve body TEMP)
Lowest operative voltage	85% of rated voltage
Air tightness	4.3 MPa
Hydraulic strength	17.2 MPa
Min. burst pressure	17.2 MPa
Refrigerant temp.	$-30^{\circ}\text{C} \sim +120^{\circ}\text{C}$
Max. working pressure	4.3 MPa
Rated voltage	AC 24V, AC 100V, AC 200V, AC 220V, AC 220–240V
Frequency	50/60 Hz
Image	

10.3 EEV

Item	Description
The EEV adjusts and supplies the appropriate refrigerant flow rate in response to fluctuations in load.	
Rated Voltage	DC12V ±10%
Resistance/Phase	46 ± 4Ω / phase (20°C)
Rated Current/phase	0.26 A / phase (DC 12V 20°C)
Driving frequency	30–90PPS
Insulation grade	Class E
Insulation resistance	DC 500V Optical Euclidean Measure > 100 MΩ
Image	Coil  Body  Body Pipe

10.4 Fan Motor

Item	Description		
A power device for blowing the cold air generated by the heat pump outside.			
Model Type	PEM750V004PGKC PEM750V006PGKC PEM750V008PGKC	PEM750V010PGKC	PEM750V017PGKC
Rated Voltage	DC 310 V	DC 310 V	DC 200V–370V
Output Power	130W	170W	75W
Rated Speed	800 RPM	850 RPM	830 RPM
Pole	8P	10P	8P
Insulation grade	Class E		Class B
Protection level	IP44		IP24
Operating Temp.	-25°C–+100°C	-25°C–+70°C	-
Operating Humidity.	Below RH95 (Without Condensation)		
Control Power	DC13.5–16.5 (V)	-	-
Speed Command	DC0–6.5 (V)		-
Rotation Speed Feedback	12-pulse per rotation		-
Image			

10.5 Water Pump

Item	Description
The water pump sends heated water to the hot water tank and returning the used water back to the heat pump to maintain the circulation system.	
Rated Voltage	230 V
Mains frequency	50/60 Hz
Max. power consumption	60 W
Min. power consumption	2 W
Max current consumption/	0.58 A
Min current consumption	0.04 A
Insulation class	IPX4D (IEC 85)
Motor overload protected	Built-in electronic overload protection
Internal Solutions for Surge Protection in Water Pumps: Relay<4 A	
Energy Efficiency Index	< 0.20
Image	The diagram shows an exploded view of a water pump assembly. On the left is a 3D perspective view of the assembled pump. To its right is a 2D exploded view with 15 numbered callouts: 1. Impeller, 2. Impeller nut, 3. Impeller lock washer, 4. Impeller lock nut, 5. Impeller lock washer, 6. Impeller lock nut, 7. Impeller lock washer, 8. Impeller lock nut, 9. Impeller lock washer, 10. Impeller lock nut, 11. Impeller lock washer, 12. Impeller lock nut, 13. Impeller lock washer, 14. Impeller lock nut, 15. Impeller lock washer.

11. Connecting the Electrical Supply

11.1 Preparing for Replacement

! CAUTION

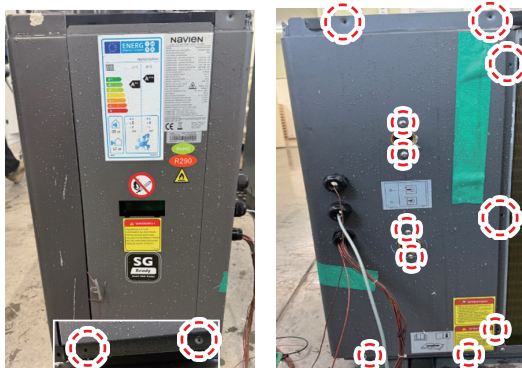
- When performing maintenance and/or servicing the heat pump, always turn off the electric power and water shut-off valve. Wait for the heat pump to become cool. Be careful to avoid injury to your fingers on sharp edges.
- Before any disassembly, make sure that all issues and error codes are properly diagnosed.
- Handle all parts carefully.
- When reassembling, prevent any foreign substance (i.e. dust, etc.) from entering back into the boiler.
- Check the performance and operation after the heat pump has been serviced.

When performing maintenance, use appropriate tools to disassemble and reassemble the boiler. A flashlight and magnetic tip are also recommended. Navien recommends the use of a parts tray to hold small parts and screws. All of the hardware is essential to the proper operation of the unit upon re-assembly.

Note When disassembling and reassembling the heat pump, refer to the components diagram and parts list.

Accessing the Internal Components

1. Turn off the respective circuit breaker.
2. Turn off the water supply to the unit.
3. Disassemble the piping at the back of the device.
4. Remove the total 13 screws from the top cover and side covers of the unit, and then remove the covers.



11.2 Components Replacement Instructions

! CAUTION

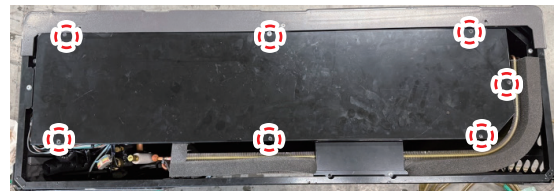
When performing maintenance or servicing the heat pump, always turn off the electric power, and shut off the water valve. Do not clean or perform maintenance without disconnecting power from the heat pump. Doing so may result in electric shock. The heat pump may remain hot for several minutes after it is turned off. To prevent burns, wait until the heat pump has cooled down before cleaning.

11.2.1 PCBs

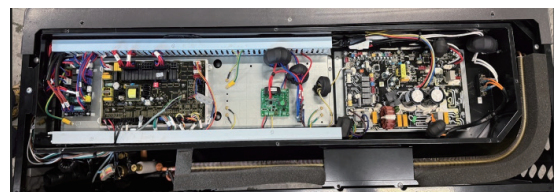
! DANGER

Disconnect the product from the power supply. Wait for at least 3 minutes until the capacitors have discharged. Check that there is no voltage.

1. Turn off the respective circuit breaker.
2. Remove the screws on top of the unit and remove the cover.
3. Remove the 6 screws from the PCB cover and remove it.



4. Disconnect all connections from the PCB and remove the old PCB.



Note Before replacing the PCB, record all existing parameter settings.

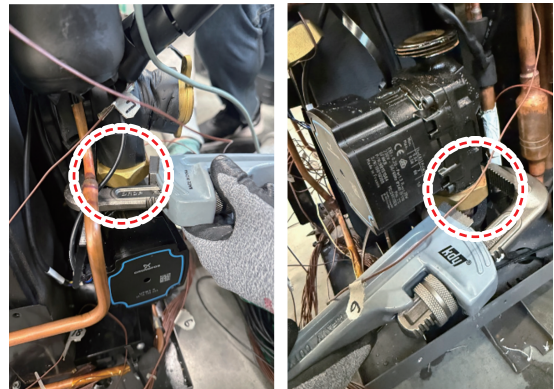
5. Reattach all wiring connectors to the new PCB.
6. Fasten the 6 screws previously removed to install the PCB cover, and then reattach the top cover.
7. Reconnect the power supply to the unit and set the previous parameters.

11.2.2 Water Pump

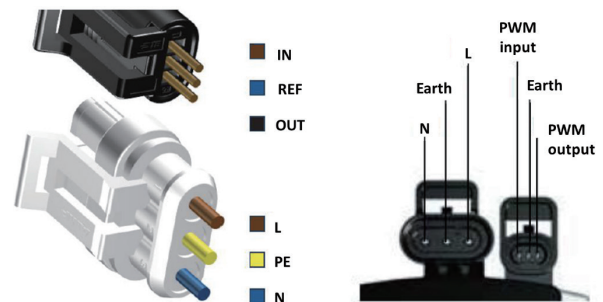
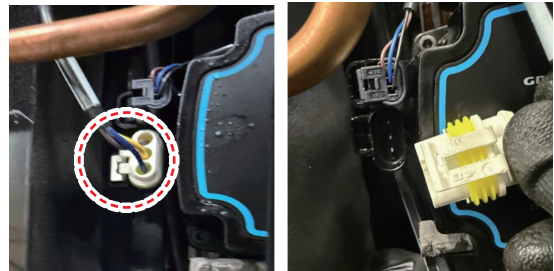
1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Remove the 4 screws from the rear cover, and then remove the 2 screws from the water pump support bracket to detach it from the unit.



3. Use a pipe wrench to remove the fasteners on the upper and lower parts, and then disconnect the water pump.



4. Remove the water pump from the unit and remove the 2 connecting connectors.



[Connector Information]

- Note**
- Remove the remaining water.
 - When disassembling, be careful not to lose the O-ring.



11.2.3 Water Flow Switch

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Disassemble the water flow switch assembly using a monkey spanner.



3. Align the sensors in a single line and separate them.

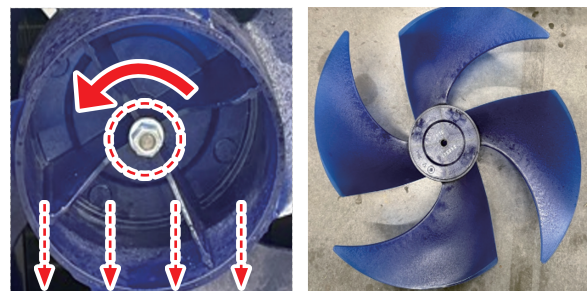


11.2.4 Fan Blade

1. Turn off the respective circuit breaker.
2. Remove the 6 screws from the fan guard on the front of the unit, and then disassemble the fan guard.



3. Remove the nut that secures the fan blade assembly, and then pull out the assembly from the fan motor assembly.

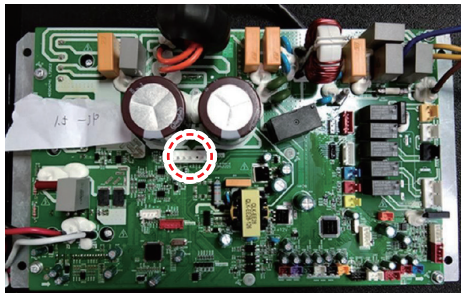


Note When reassembling, align the fan blade assembly precisely with the D-cut of the motor shaft.

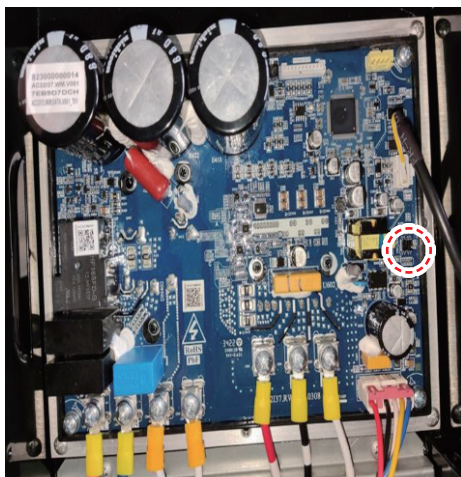
11.2.5 Fan Motor

1. Turn the respective circuit breaker.
2. Remove the fan blade assembly from the unit. Refer to "11.2.4 Fan Blade" on page 85.
3. Disconnect the motor's connector connected to the compressor driver board.

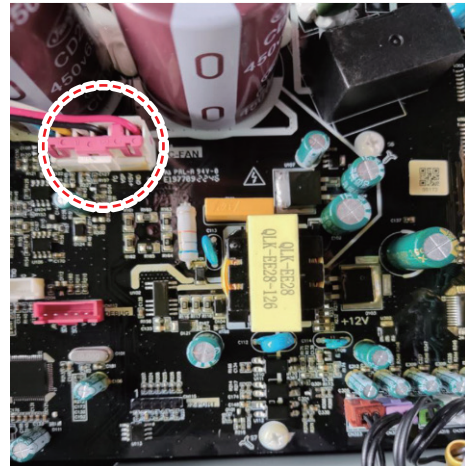
Note Refer to "15.1 Wiring Diagram" on page 108 for more information about the wiring connectors.



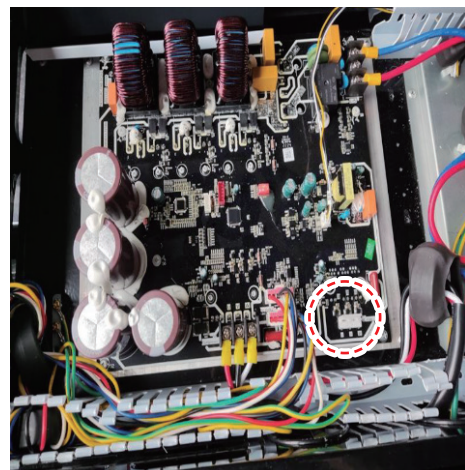
[PEM750V004PGKC/PEM750V006PGKC]



[PEM750V008PGKC]



[PEM750V010PGKC]



[PEM750V017PGKC]

4. Remove the 4 screws from the motor, and then remove the motor from the bracket.

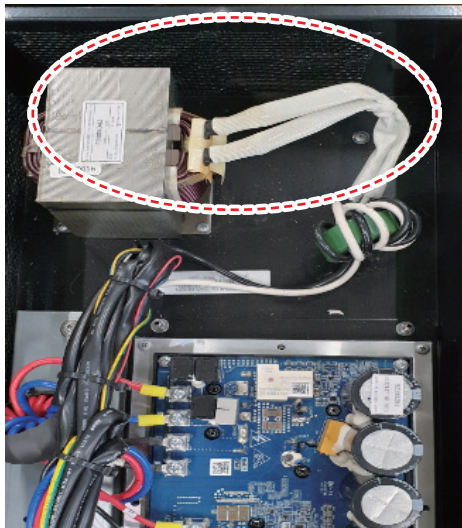


11.2.6 Reactor

- 1. Turn off the respective circuit breaker.
- 2. Turn off the water supply to the unit.
- 3. Remove the covers from the unit according to the model.
 - 4, 6, 8 kW models: Top cover, Side cover, Rear cover (Refer to “Accessing the Internal Components” on page 83.)
 - 10, 17 kW models: Top cover
- 4. Remove the reactor’s connector.



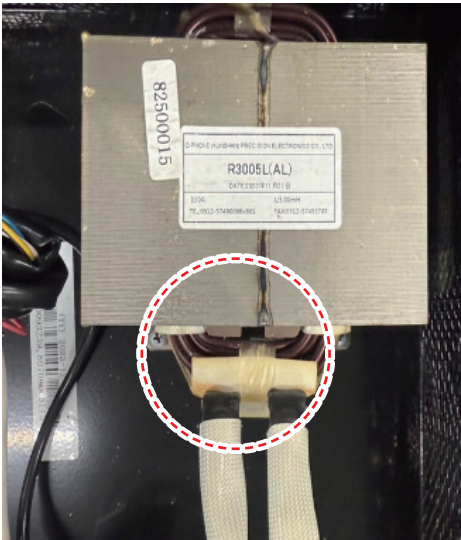
[Side-mounted Type]



[Top-mounted Type]



[Detachable Type]



[Integrated Type]

Power (kW)	Model Type	Connector Type	Mounting Type
4, 6, 8 kW	Side-mounted	Connector detachable	Side-mounted
10, 17 kW	Top-mounted	Connector integrated	Top-mounted

- 5. Remove the 4 screws from the reactor and detach the reactor.



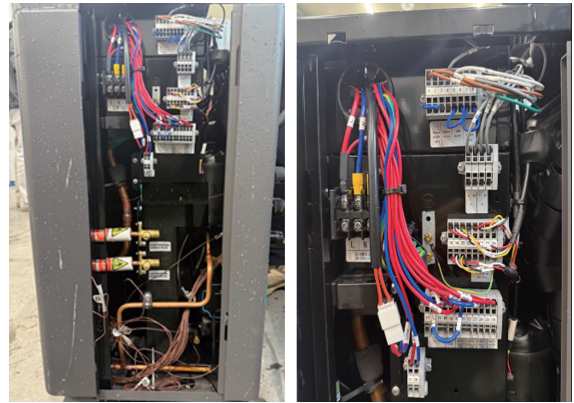
[Side-mounted Type]



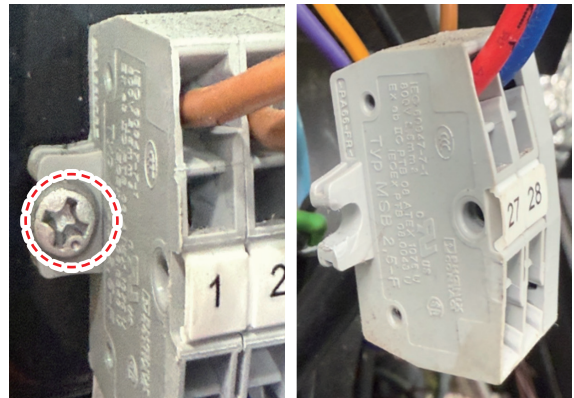
[Top-mounted Type]

11.2.7 Terminal block

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Disconnect the wiring of the terminal block you want to replace.



3. Remove the 2 screws that fix the terminal block and disassemble the terminal block.

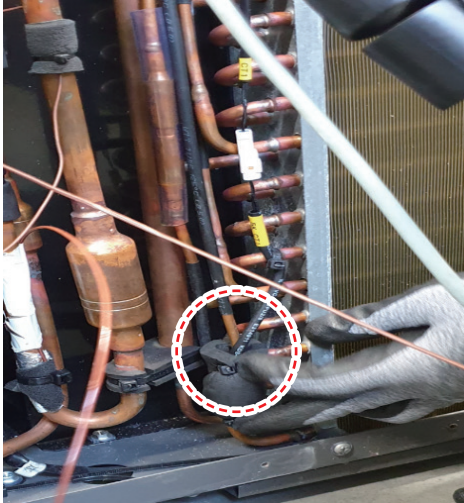


6. Replace it with a new reactor, and then reconnect the connector.

Note For the 10 kW and 17 kW models, the reactor's connector should also be replaced.

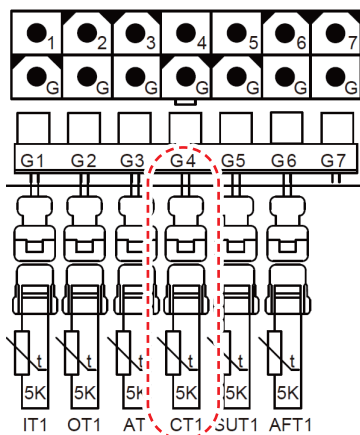
11.2.8 Temperature Sensor (Heat Exchanger)

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Cut the cable ties that fix the insulation and the thermistor wire.

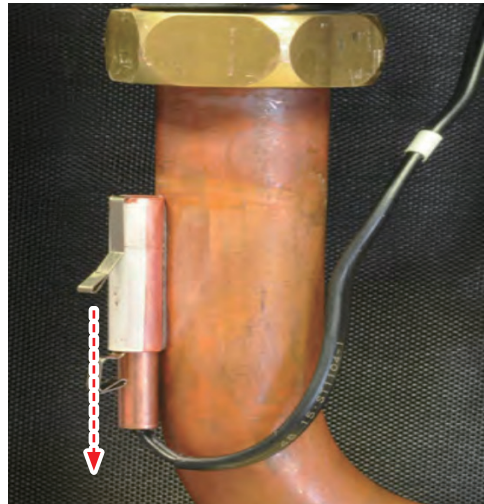
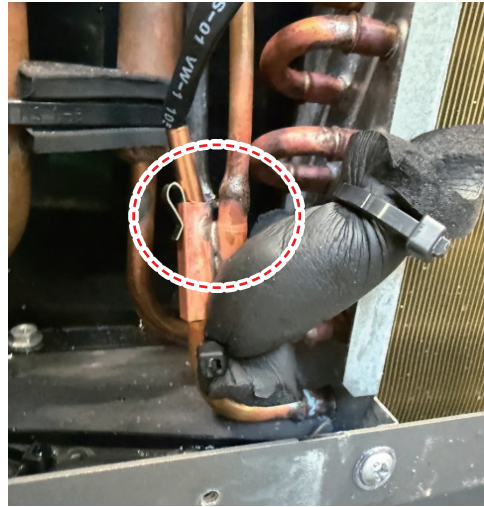


3. Cut and remove the insulation.
4. Remove the clip that fixes the thermistor.
5. Remove the thermistor from the thermistor holder.
6. Disconnect the thermistor's connector from the PCB.

AD1



7. Push the thermistor from the top to remove the thermistor.



[Top-down Type]

Note

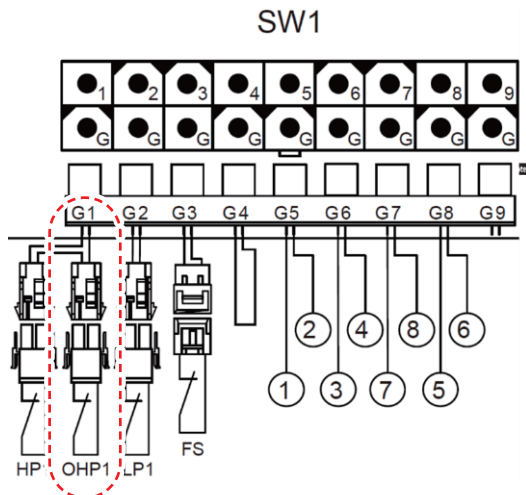
- Refer to "15.1 Wiring Diagram" for more information about the wiring connectors of each model.
- You can monitor the thermistors on the front panel. If the measured resistance value matches the resistance determined through the measured temperature, but the temperature for the corresponding thermistor is incorrect on the front panel, replace the corresponding PCB.

11.2.9 Temperature Sensor (Compressor)

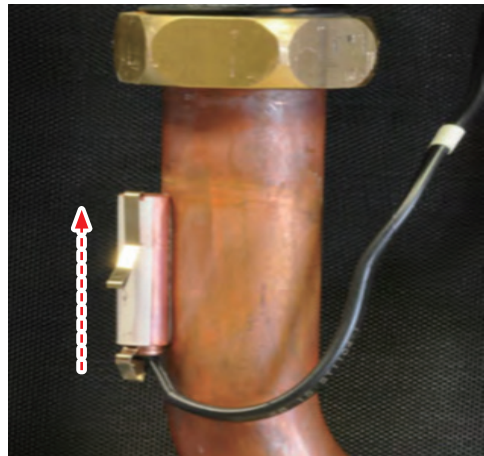
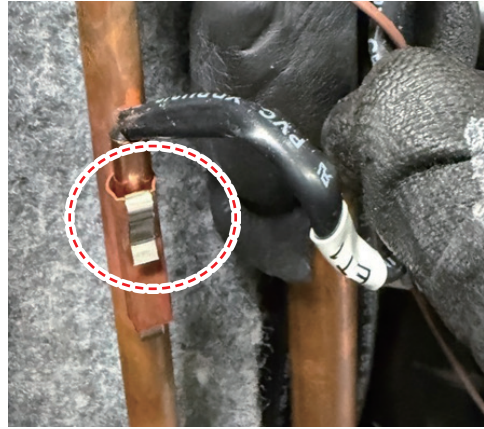
1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page XX.
2. Cut the cable ties that fix the insulation and the thermistor wire.



3. Cut and remove the insulation.
4. Remove the clip that fixes the thermistor.
5. Remove the thermistor from the thermistor holder.
6. Disconnect the thermistor's connector from the PCB.



7. Push the thermistor from the bottom to remove the thermistor.



[Bottom-up Type]

Note

- Refer to "15.1 Wiring Diagram" on page 108 for more information about the wiring connectors of each model.
- You can monitor the thermistors on the front panel. If the measured resistance value matches the resistance determined through the measured temperature, but the temperature for the corresponding thermistor is incorrect on the front panel, replace the corresponding PCB.

11.2.10 High Pressure switch



DANGER

Before performing work with heat, recover all refrigerants to prevent fire hazards.

To remove the refrigerant high pressure switch:

1. Turn off the respective circuit breaker.
2. Remove the screws on top of the unit and remove the cover.
3. Remove the 6 screws from the PCB cover and remove it.



1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Recover the refrigerant from the refrigerant circuit.
3. Cut all cable ties that fix the refrigerant high pressure switch harness.
4. Disconnect wiring connectors from the PCB.
5. Wrap a wet cloth around the components near the refrigerant high pressure switch.
6. Using a brazing torch to heat the brazing point of the refrigerant high pressure switch pipe, and use pliers to remove the refrigerant high pressure switch pipe from the refrigerant pipe.



Note You can also cut the component pipe using a pipe cutter. Make sure to heat the brazing point of the component pipe with a torch to remove the remaining end of the component pipe from the refrigerant pipe.

To install the refrigerant high pressure switch:

1. Remove the plug or cap from the refrigerant piping and make sure it is clean.
2. Install the refrigerant high pressure switch in the correct location.
3. Wrap a wet cloth around the refrigerant high pressure switch and any other components near the pressure sensor, and then braise the refrigerant high pressure switch pipe to the refrigerant pipe.



Note Overheating the pressure sensor will damage or destroy it.

4. Route the refrigerant high pressure switch harness towards the PCB.
5. Connect the refrigerant high pressure switch connector to the PCB.
6. Fix the refrigerant high pressure switch harness using new cable ties.
7. Add refrigerant to the refrigerant circuit.

11.2.11 Compressor



DANGER

Before performing work with heat, recover all refrigerants to prevent fire hazards.

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Remove the sound blanket of compressor.



3. Disconnect the faston connectors from the compressor wire terminals U, V and W.



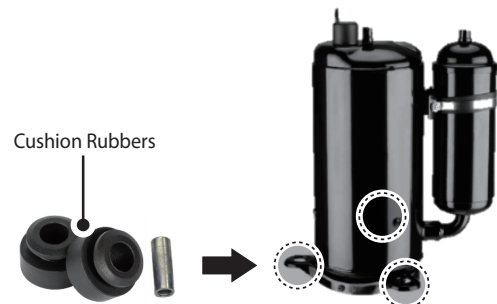
Note Note the position of the faston connectors on the compressor wire terminals to allow correct connection during installation.

4. Disconnect the brazing sections of suction pipe and discharge pipe by using brazing torch after the refrigerant has been recovered.



5. Remove 3 nuts in the rubber pads section to take out the faulty compressor out of the unit.
6. Install the new compressor in the unit.

Note Make sure to insert the cushion rubbers before tightening the compressor's fixing nut.



7. Remove the rubber caps on the suction and discharge pipe of the new compressor to release the sealing nitrogen gas.
8. Braze the suction and discharge pipe to the compressor with brazing torch.
9. Connect the power cable to the terminal board of the compressor and cover the compressor with sound blanket.
10. Evacuate unit using vacuum pump down to 350 microns.
11. After completing vacuuming, open the service valves. If a recovery unit is used, charge refrigerant.

11.2.12 EEV (Electric Expansion Valve)



DANGER

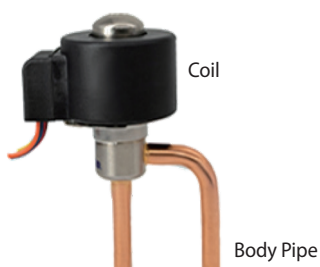
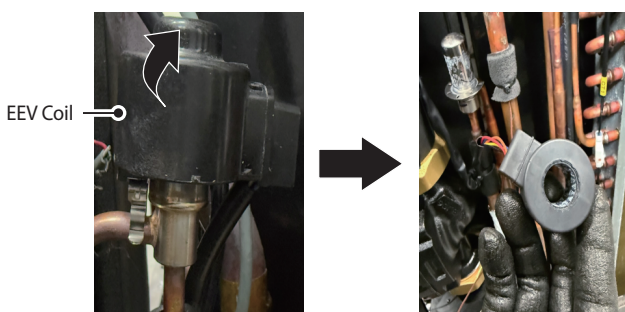
Refrigerant components should be changed by an F-Gas qualified engineer using only genuine parts. At all times the manufacturers maintenance and service guidelines shall be followed.

To remove the EEV Coil:

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Cut all the cable ties that fix the EEV coil harness.

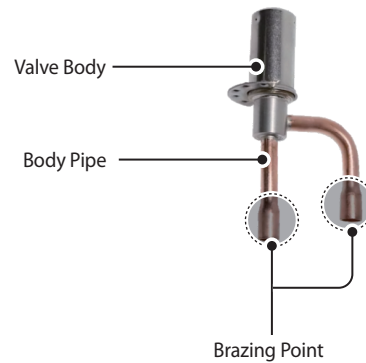


3. Remove the EEV connector from the PCB.
4. Pull the EEV coil upwards to detach it from the valve body.



To remove the EEV body:

1. Wrap a wet cloth around the components near the EEV pipes. Heat the brazing points of the EEV pipes using brazing torch, and remove the EEV pipes from the refrigerant pipes using pliers.



2. Remove the EEV body.

Note

Install plugs or caps on the open pipe ends of the refrigerant piping to avoid dirt or impurities from entering the piping.

To install the EEV:

1. Remove the plugs or caps from the refrigerant piping and make sure they are clean.
2. Remove the EEV coil from the spare EEV body.
3. Install the EEV body in the correct location and so it is correctly oriented. Insert the pipe's ends in the pipe expansions.
4. Wrap a wet cloth around the EEV body and any other components near the EEV, and then braze the EEV pipes to the refrigerant pipes.
5. Install the EEV coil on the EEV body.
6. Route the EEV coil harness towards the PCB.
7. Connect the EEV coil connector to the PCB.

11.2.13 4-Way Valve

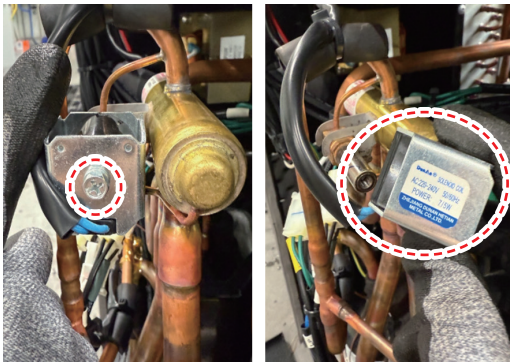


DANGER

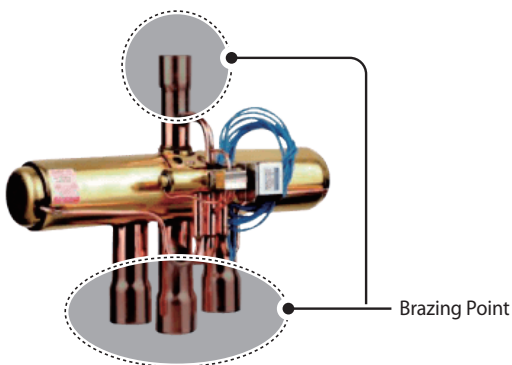
The coil gets hot while energized. Wait for it to cool down.

To remove the 4-Way Valve:

1. Remove the top and side covers from the water heater. Refer to "Accessing the Internal Components" on page 83.
2. Remove the screw that fixes the 4-way valve coil, and then remove the 4-way valve coil from the 4-way valve body.



3. Unplug the 4-way valve connector from the PCB.
4. Wrap a wet cloth around the components near the 4-way valve pipes. Heat the brazing points of the 4-way valve pipes using an brazing torch, and then remove the 4-way valve pipes from the refrigerant pipes using pliers.



Note

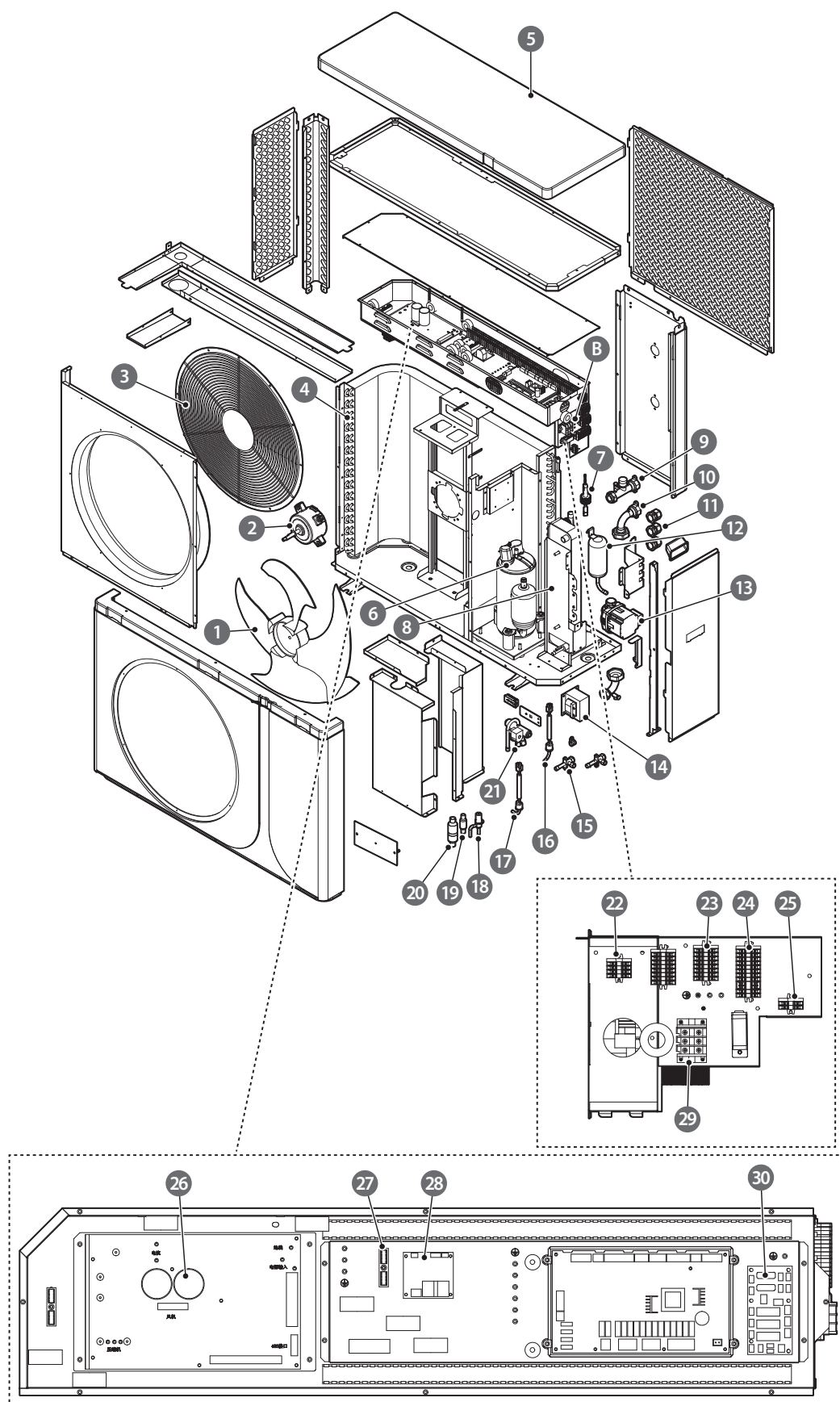
Install plugs or caps on the open pipe ends of the refrigerant piping to prevent dirt or impurities from entering the piping.

To install the 4-Way Valve body:

1. Remove the plugs or caps from the refrigerant piping and make sure they are clean.
2. Remove the 4-way valve coil from the spare part 4-way valve body.
3. Install the 4-way valve body in the correct location and so it is correctly oriented. Insert the pipe's ends in the pipe expansions.
4. Wrap a wet cloth around the 4-way valve body and any other components near the 4-way valve and braze the 4-way valve pipes to the refrigerant pipes.
5. Install the 4-way valve coil on the 4-way valve body.
6. Route the 4-way valve coil harness towards the PCB.
7. Connect the 4-way valve coil connector to the PCB.

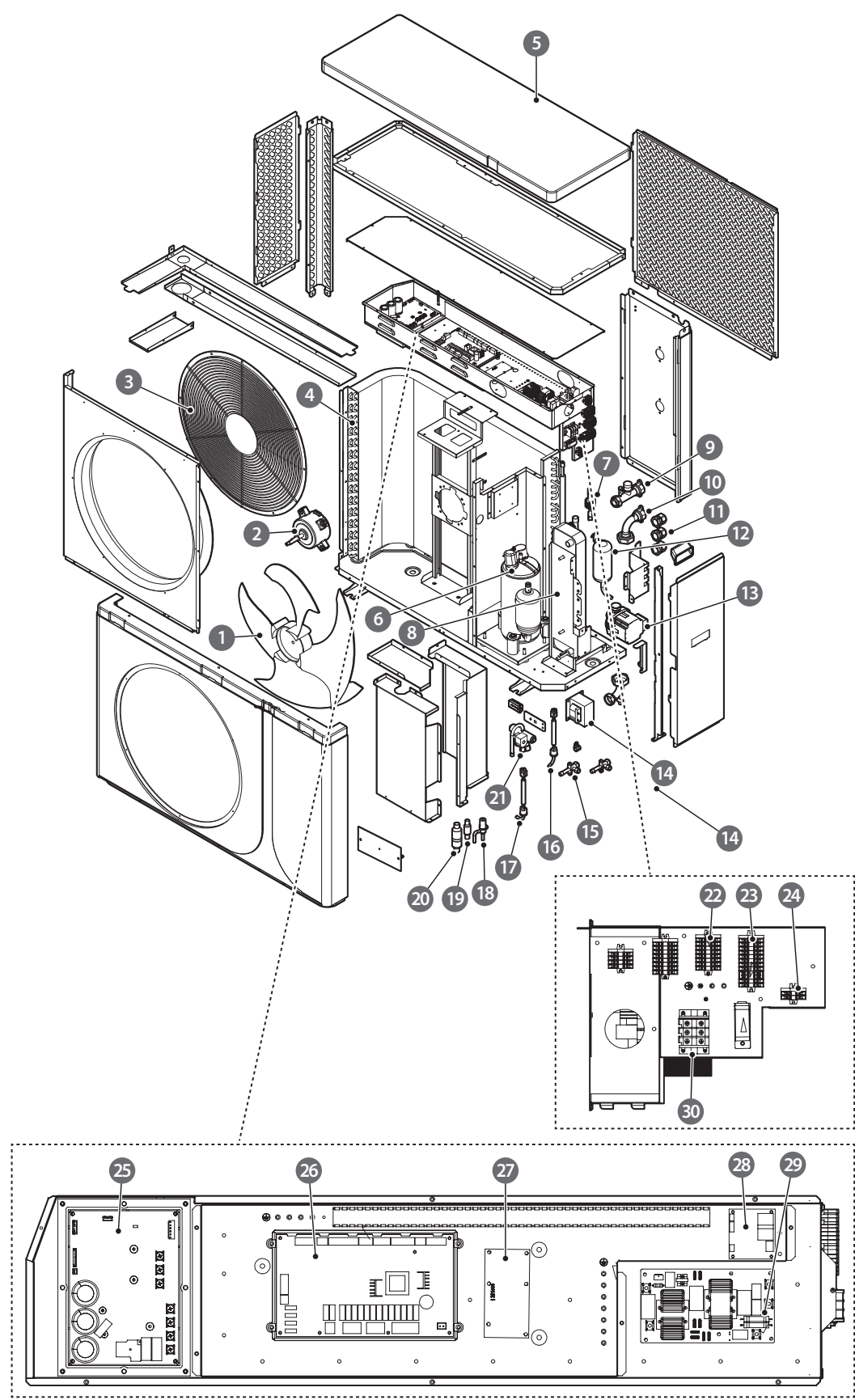
12. Components Diagram and Part List

12.1 PEM750V004PGKC/PEM750V006PGKC



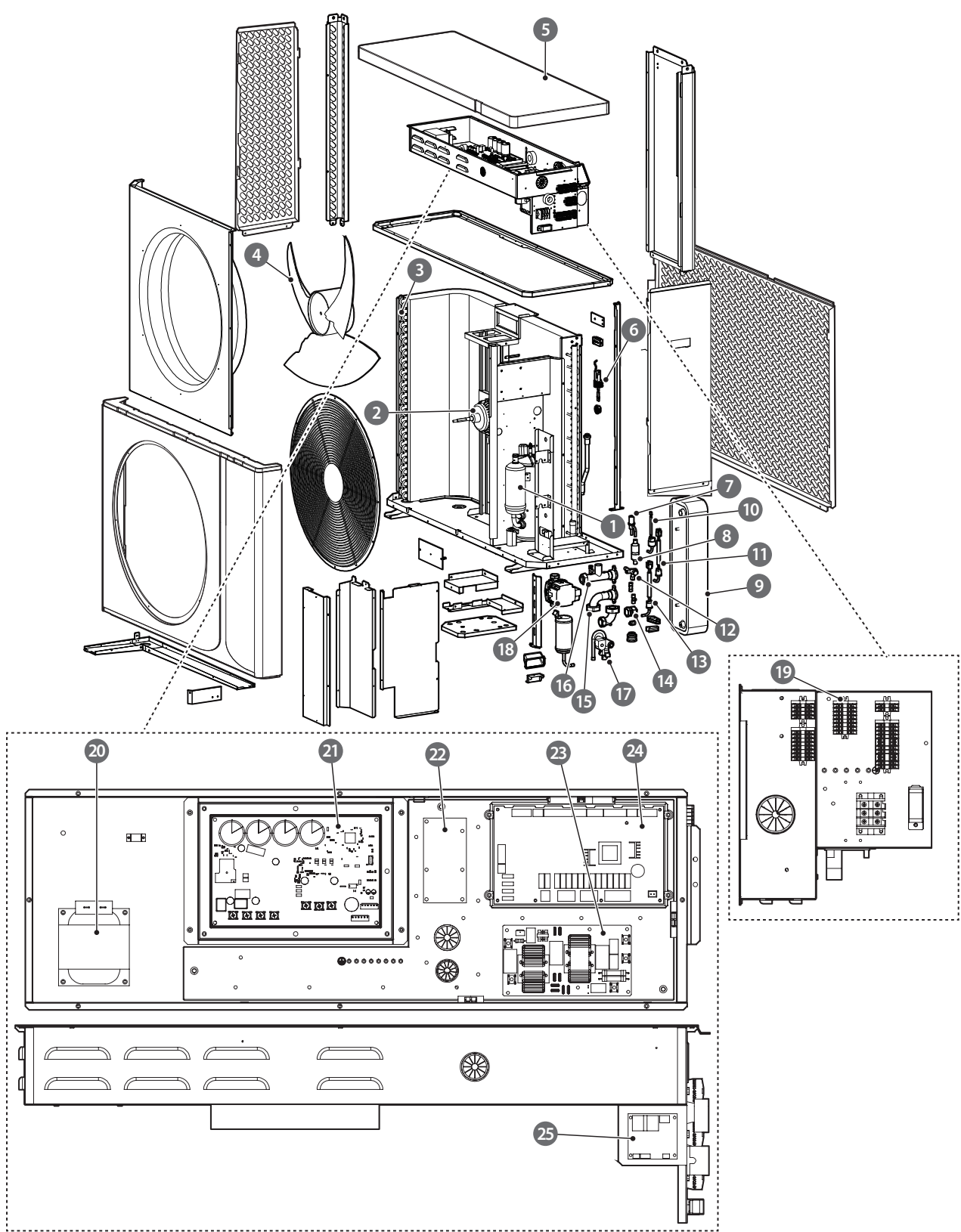
#	Description	Service Code	Remark
1	Axial fan blade	20078145*	
2	DC motor	30040209*	
3	Fan guard	20078148*	
4	Finned heat exchanger	30040210*	
5	Top cover assembly	30040155*	
6	Rotor compressor	30040211*	
7	Water flow switch	20078178*	
8	Plate heat exchanger	20078180*	
9	Joint assembly	20078183*	
10	Joint assembly	20078187*	
11	Over-wire sheaths	20078190*	
12	Single tube tanks	30040178*	
13	Horizontal water pump	30040182*	
14	Reactor	30040189*	
15	Shut-off valves	30040193*	
16	Pressure switch	20078207*	
17	Pressure switches	20078210*	
18	Electronic expansion valve	30040197*	
19	Strainers	20078218*	
20	Strainers	20078219*	
21	4-way valves	30040198*	
22	Combined terminal block	20078228*	
23	Combined terminal blocks	20078230*	
24	Combined terminal blocks	20078234*	
25	Combined terminal block	20078231*	
26	Variable frequency drive modules	30040201*	
27	Controller	30040202*	
28	ZH1003	30040204*	
29	Power meter	30040207*	
30	Power filter	30040206*	
31	Wiring terminal block	20078229*	

12.2 PEM750V008PGKC



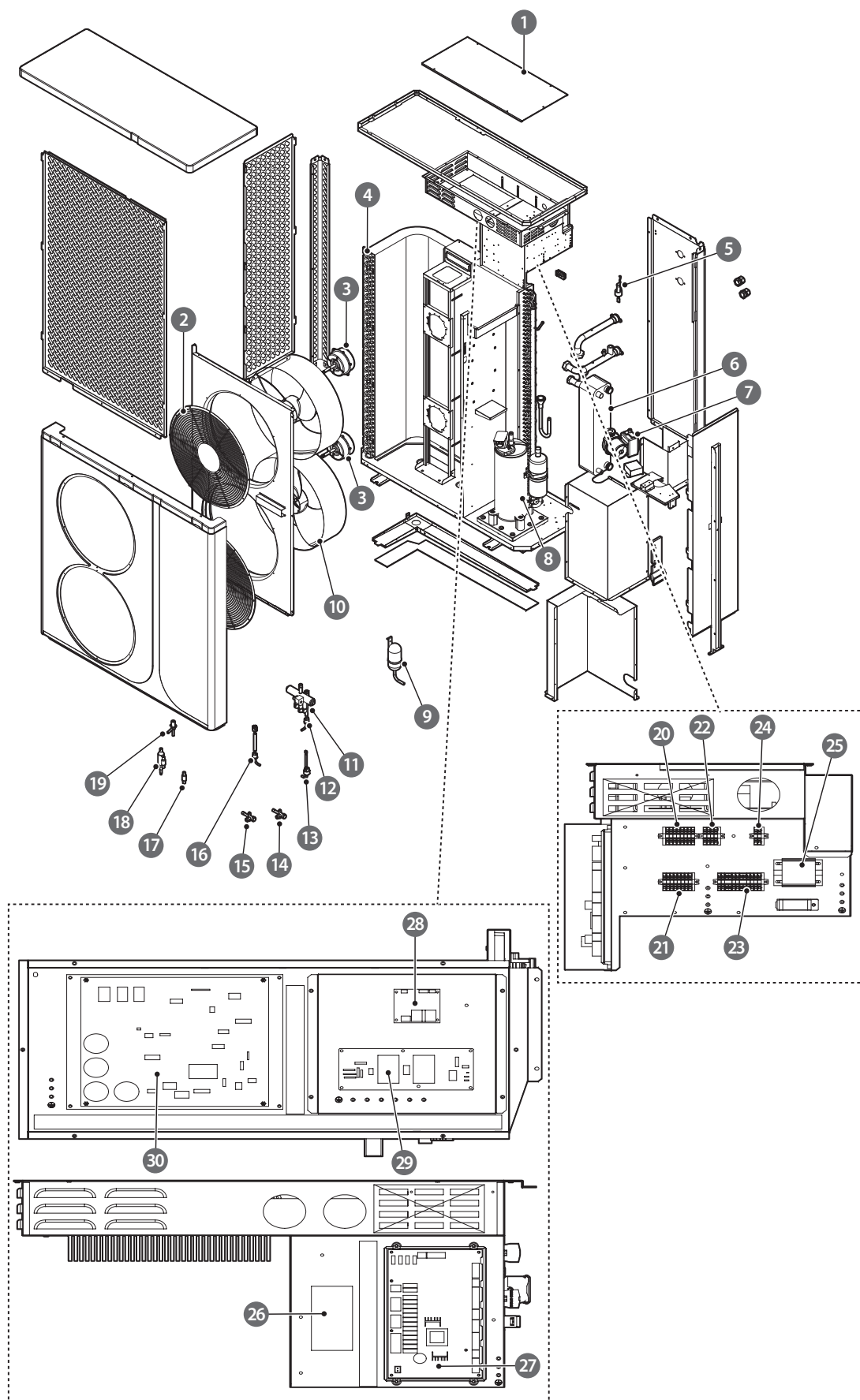
#	Description	Service Code	Remark
1	Axial fan blade	20078145*	
2	DC motor	30040209*	
3	Fan guard	20078148*	
4	Finned heat exchanger	30040210*	
5	Top cover assembly	30040155*	
6	Rotor compressor	30040211*	
7	Water flow switch	20078178*	
8	Plate heat exchanger	20078180*	
9	Joint assembly	20078183*	
10	Joint assembly	20078187*	
11	Over-wire sheaths	20078190*	
12	Single tube tanks	30040178*	
13	Horizontal water pump	30040182*	
14	Reactor	30040189*	
15	Shut-off valves	30040193*	
16	Pressure switch	20078207*	
17	Pressure switches	20078210*	
18	Electronic expansion valve	30040197*	
19	Strainers	20078218*	
20	Strainers	20078219*	
21	4-way valves	30040198*	
22	Combined terminal block	20078224A	
23	Combined terminal blocks	20078222A	
24	Combined terminal blocks	20078221A	
25	Variable frequency drive modules	30040201*	
26	Controller	30040202*	
27	ZH1003	30040204*	
28	Power meter	30040207*	
29	Power filter	30040206*	
30	Wiring terminal block	20078229*	

12.3 PEM750V010PGKC



#	Description	Service Code	Remark
1	Rotor compressor	30040194*	
2	DC motor	30040192*	
3	Finned heat exchanger	30040191*	
4	Axial fan blade	30040185*	
5	Top cover assembly	30040181*	
6	Water flow switch	20078178*	
7	Electronic expansion valve	30040175*	
8	Filter	30040174*	
9	Plate heat exchanger	20078180*	
10	Pressure sensor assembly	30040173*	
11	Pressure switches	20078207*	
12	Stop valve	30040172*	
13	Pressure switch	20078210*	
14	Over-wire sheaths	20078188*	
15	Joint assembly	30040168*	
16	Joint assembly	30040167*	
17	4-way valves	30040166*	
18	Horizontal pump	30040182*	
19	Wiring terminal block	20078229*	
20	Reactor	30040161*	
21	Variable frequency drive module	30040160*	
22	ZH1003	30040204*	
23	Variable frequency drive module	30040160*	
24	Controller	30040202*	
25	Energy meter	30040207*	

12.4 PEM750V017PGKC



#	Description	Service Code	Remark
1	Top cover assembly	30040157*	
2	Fan guard	20078169*	
3	DC motor	30040151*	
4	Finned heat exchanger	30040150*	
5	Water flow switch	20078178*	
6	Plate heat exchanger	30040143*	
7	Vertical pump	30040141*	
8	Rotor compressor	30040137*	
9	Liquid storage tank	30040131*	
10	Axial fan blade	30040130*	
11	4-way valves	30040129*	
12	Pressure switch	20078210*	
13	Pressure sensor components	30040173*	
14	Glove valves	30040172*	
15	Sut-off valves	30040193*	
16	Pressure switches	20078207*	
17	Strainers	20078218*	
18	Check valves	30040127*	
19	Electronic expansion valves	30040126*	
20	8-position terminal block	20078143*	
21	8-position terminal block	20078142*	
22	4-position terminal block	220078141*	
23	12-position terminal block	20078139*	
24	2-position terminal block	20078138*	
25	Wiring terminal block	20078136*	
26	ZH1003	30040204*	
27	Controller	30040202*	
28	Power meter	30040207*	
29	Power filter	30040122*	
30	Variable frequency drive module	30040119*	

13. Maintaining the Heat Pump



WARNING

- If there is refrigerant leakage, a fire or explosion may occur, causing property damage or personal injury.
- Only carry out the work if you are competent and have knowledge about the special features and risks of R290 refrigerant.
- The product contains the combustible refrigerant R290. In case of a leak, escaping refrigerant may mix with air to form a flammable atmosphere. There is a risk of fire and explosion.
- Ensure that the space is sufficiently aerated around the product.
- Ensure that the ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is used, check the secondary circuits for the presence of refrigerant. Ensure that markings on the equipment remain visible and legible.
- Correct any markings or signs that are illegible.
- Refrigeration pipes or components should be installed in a position where they are unlikely to be exposed to corrosive elements, unless the components are made from materials inherently resistant to corrosion or are properly protected against it.

Observe the basic safety rules before carrying out inspections and maintenance work or installing spare parts. Disconnect the unit from the power supply but ensure that the product is still grounded.

Items	Tasks
Water pressure	Check if the water pressure is above 0.3 bars. If necessary, fill the supplement water.
Water filter	Use the water filter for cleaning the water and clean it regularly.
Water pressure relief valve	• Check if the pressure relief valve is operating properly. • If there is water leakage or if water splashes out in normal conditions, contact your local installer.

Items	Tasks
Glycol	• Record and check the glycol concentration and the pH-value in the system at least once a year. • A pH level below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added. • When the pH level is below 7.0, oxidation of the glycol has occurred, the system should be drained and flushed thoroughly before severe damage occurs. • Make sure that the disposal of the glycol solution is done in accordance with relevant local and national regulation.



DANGER

There is a risk of death from electric shock if you touch live components. Before commencing work on the product:

- Disconnect the product from the power supply by switching off all power supplies at all poles (electrical partition in overvoltage category III for full partition, e.g. fuse or circuit breaker).
- Secure against being switched back on again.
- Wait for at least 3 minutes until the capacitors have discharged.
- Check that there is no voltage.

13.1 Precautions for Daily Use

Note Do not change the system parameters without consulting an authorised technician or licensed professional.

Before starting the unit for the first time or after it has been shut down for a long-time, the following must be done:

- Thoroughly inspect and clean the unit.
- Clean the water system.
- Check the water pump, regulating valve, and other related equipment.
- Tighten all wire connections.
- Ensure the water refill and exhaust devices in the waterway are operational. If they are not, the performance and reliability of the unit will become worse.
- Ensure that the water pipes are clean and avoid dirt and blockage.
- Check the electricity and water, and replace the faulty parts in a timely manner. Please use the parts that were provided or recommended by the company. Do not use other parts.
- Refrigerant supplement: Each unit has been equipped with sufficient refrigerant when leaving the factory. Do not add or change the refrigerant. If you need to replenish the refrigerant due to leakage, contact an authorised technician or licensed professional.

13.2 Periodic Maintenance (every 6 months)

Tasks	Descriptions
Preparation	Ensure that the unit is not running and cut off the power supply.
Inspection and cleaning of fin heat exchanger	To ensure that the heat exchangers remain in optimum condition for exchanging heat, their surfaces must be clean.
Inspection and cleaning of plate heat exchanger	Every 6 months, or when the capacity of the unit drops by more than 10%, check the water-side heat exchanger for scale and clean the heat exchanger.
Check the electrical wiring	Check if the contact point is loose, oxidised, or blocked by debris, etc., which can result in the electronic wiring not having contact.

13.3 Cleaning the Casing

Clean the product using a sponge and hot water with a cleaning agent.

- Note**
- Do not clean the product with a high-pressure cleaner or spray the product directly with water.
 - Do not use abrasive cleaners, solvents or any cleaning agents that contain chlorine or ammonia.

13.4 Checking the Evaporator, Fan, and Condensate Discharge

- Check whether there is dirt between the fins or whether debris has adhered to the fins.
- Clean the fins using a soft brush, being sure to not bend the fins.
- Check whether dirt has accumulated on the condensate tray or in the condensate discharge pipe.
- Check whether the water can drain freely.

13.5 Disposal and Recycling

General

Air source heat pumps incorporate components manufactured from a variety of different materials. However, most of these materials cannot be recycled as they are contaminated by the refrigerant and oil used in the heat pump.

Disassembly

This product may only be disassembled by a qualified (F-gas) refrigeration engineer. Under no circumstances should the refrigerant be released into the atmosphere.

Recycling

In order for the heat pump to be recycled or disposed of, it must be taken to a properly licensed waste disposal facility. You will need to contact a qualified refrigeration engineer to do this for you.

Disposal

The refrigerant will be removed and returned to the refrigerant manufacturer for recycling or disposal. The complete heat pump unit, including the compressor and the oil contained within it, must be disposed of at a licensed waste disposal facility, as it still remains contaminated by the refrigerant.

13.6 Recovery

- Before and after performing refrigerant-related work, use a detector to check for refrigerant leaks.
 - Ensure that fire extinguishers are available in the vicinity of the operator.
 - Conduct the work in a well-ventilated area.
 - When removing refrigerant from the system for servicing or decommissioning, it is recommended to remove all of the refrigerant.
 - When transferring the refrigerant into cylinders, make sure that only refrigerant recovery cylinders are used.
 - All cylinders used for the recovered refrigerant should be labelled.
 - Cylinders should be equipped with pressure relief valves and shut-off valves in the proper order.
 - The recovery system should operate normally according to the specified instructions and should be suitable for refrigerant recovery.
 - The calibration scales should operate normally.
 - Hoses should be equipped with leak-free disconnect couplings.
 - Before starting the recovery, check the status of the recovery system and sealing state. Consult with the manufacturer if suspected.
 - The recovered refrigerant should be returned to the supplier in the correct recovery cylinders with the waste transfer note attached.
 - Do not mix refrigerants in the recovery units or cylinders.
 - If compressors or compressor oils are to be removed, make sure that they have been evacuated to the acceptable level to ensure that flammable refrigerant does not remain in the lubricant.
 - The evacuation process should be performed before sending the compressor to the suppliers.
 - Only the electrical heating to the compressor body is allowed to accelerate the process.
 - Oil should be drained safely from the system.
 - Never install motor-driven equipment. Doing so could result in flammable materials igniting.
 - Empty recovery cylinders should be evacuated and cooled before recovery.
- In addition to conventional charging procedures, the following requirements must be followed:
 - Prevent contamination of different refrigerants by using clean charging equipment. Hoses or lines should be kept as short as possible to minimise the amount of refrigerant they contain.
 - Keep cylinders upright.
 - Ensure the refrigeration system is properly earthed before charging it with refrigerant.
 - Label the system once charging is complete (if not already labelled).
 - Exercise extreme care to avoid overfilling the refrigeration system.
 - Before recharging the system, perform a pressure test with OFN. After charging, conduct a leak test before commissioning, and perform a follow-up leak test before leaving the site.
 - Use tools and pipe components specifically designed for R290 refrigerant.
 - Use copper pipes that are deoxidised with phosphorus to transport the refrigerant.
 - Store refrigerant connection pipes in a clean, dry area to prevent damage to the compressor. Apply refrigerant oil to the flared parts to ease tightening and improve the seal.
 - Protect the heat pump components, including insulation and structural elements. Avoid overheating the pipes, as brazed components may be damaged.
 - Protect the pipework from physical damage.
 - Insulate the pipes to minimise heat loss.

14. Commissioning

14.1 Checklist Commissioning (Before and Pre-test)

Check List Commissioning (Before & Pre-test)		
Installation space suits the description in the manual (above average snow height/enough clearances)	☐ Yes	☐ No
Outdoor unit is installed	☐ Yes	☐ No
Product is protected against direct wind on fan/snow ingress	☐ Yes	☐ No
If the product is installed close to sea, additional protection (coating) has been applied	☐ Yes	☐ No
Heat pump is correctly secured to the base	☐ Yes	☐ No
Provisions for condensate or drainage have been made without any risk of freezing (tracing heating)	☐ Yes	☐ No
All external pipework is insulated	☐ Yes	☐ No
The power supply is installed with a dedicated, correctly rated ELCB and correct cable sizing	☐ Yes	☐ No
Voltage running on the power cable is rating voltage	☐ Yes	☐ No
Power supply is fitted with an isolator within in reach (arm length)	☐ Yes	☐ No
ELCB fuse rating (amps)	☐ Yes	☐ No
Main power supply cable size (mm ²)	☐ Yes	☐ No
Communication cable size (mm ²)	☐ Yes	☐ No
Communication cable shielded, single sided, connected to PE	☐ Yes	☐ No
Water filled	☐ Yes	☐ No
Glycol added ☐ 10% ☐ 20% ☐ 30% ☐ 40% ☐ 50%	☐ Yes	☐ No
Anti-frost valves fitted	☐ Yes	☐ No
System water pressure (bar)		
Air purged	☐ Yes	☐ No
Isolating valves fitted (supply and return sides)	☐ Yes	☐ No
Flexible hoses fitted (supply and return sides)	☐ Yes	☐ No
Correct pipe diameters for space heating	☐ Yes	☐ No
Manometer installed	☐ Yes	☐ No
Secondary circuit pump(s) installed	☐ Yes	☐ No
3-way diverting valve is in the default direction	☐ Heating	☐ DHW
Expansion vessel is installed and pre-charged according $P_g = (H/10+0.3)$ bar		
Combination inlet valve installed	☐ Yes	☐ No
Tundish installed and connected to drain	☐ Yes	☐ No
Water quality		
Additives (Inhibitors) used		
Corrosion inhibitor used		
Additional heat sources max. supply temperature are limited to max. 75°C	☐ Yes	☐ No

14.2 Test Run

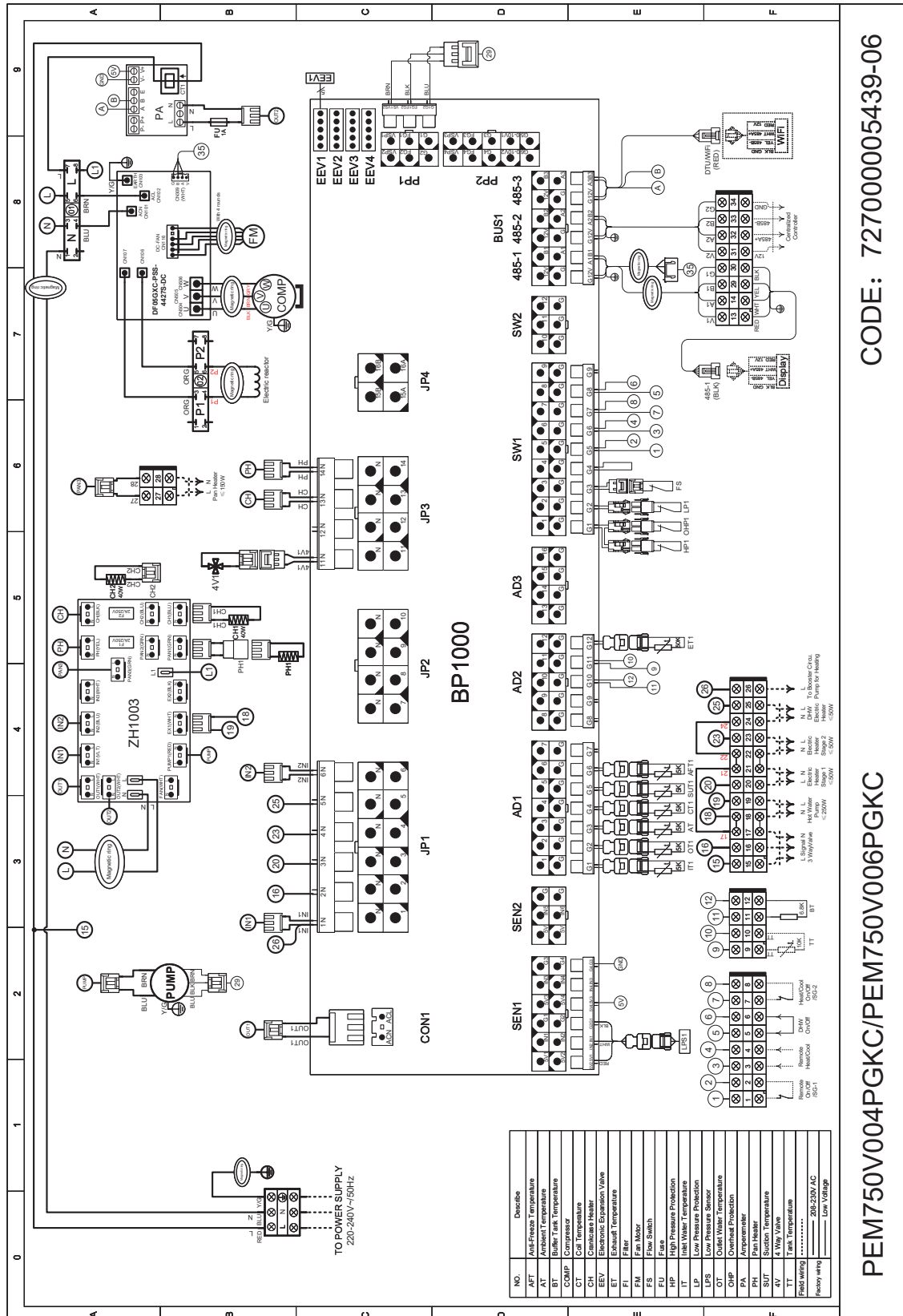
Perform test runs on the unit and monitor the exiting water and tank temperatures to check if the unit is working correctly. The following tests should be made:

- Heating
- Cooling
- DHW

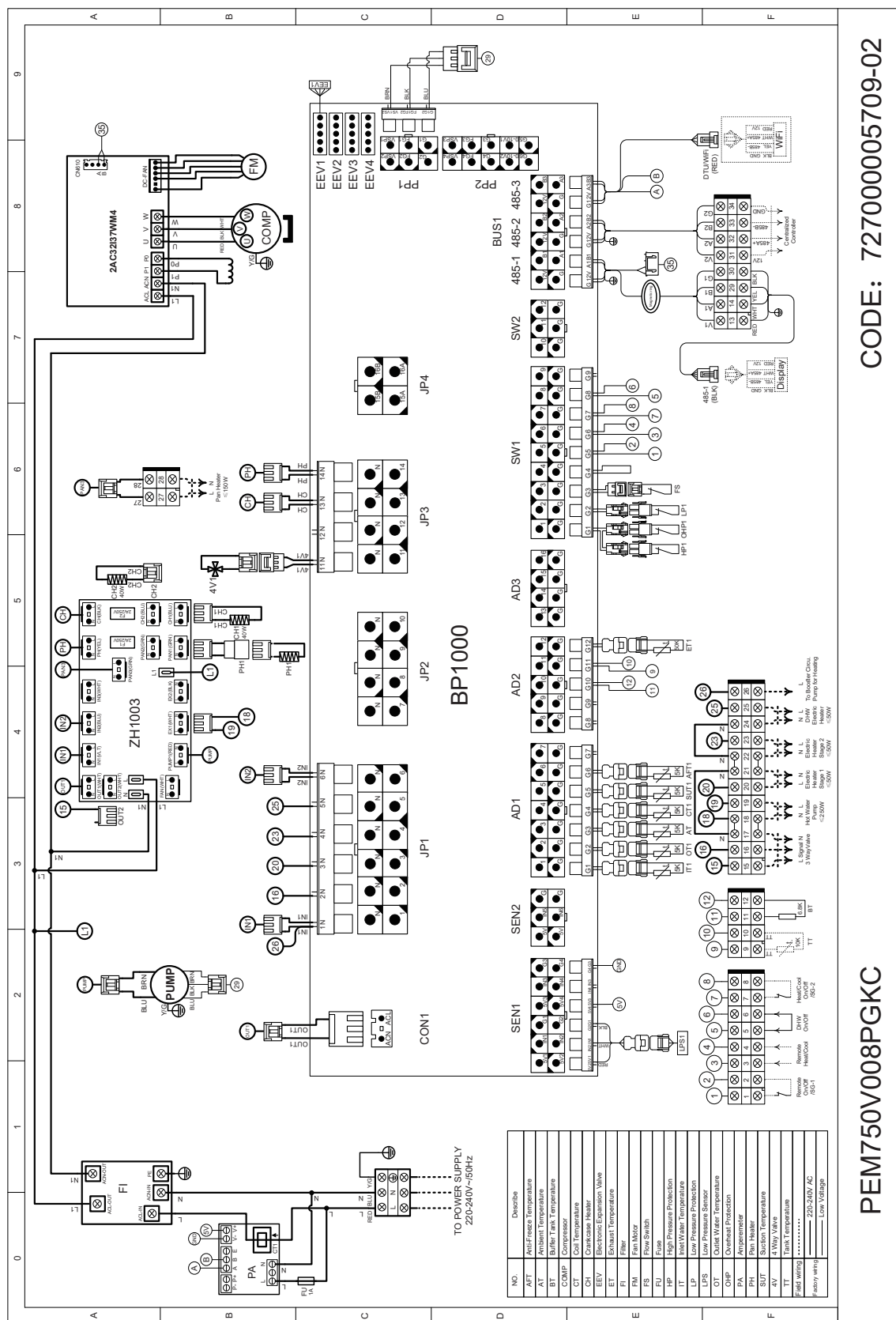
14.3 Checklist Commissioning (Operation Measured Data)

Checklist commissioning (Operation measured data)	
Ambient temperature	°C
Compressor speed (actual)	Hz
Running amps on power supply	A
Discharge temperature	°C
Target discharge temperature	°C
Condenser out temperature	°C
Evaporator in temperature	°C
Evaporator out temperature	°C
Heating set temperature	°C
Heating - Flow (l/min)	l/m
Heating - Temperature difference over the Plate Heat Exchanger ($\Delta T = T_{w2} - T_{w1}$)	°C
DHW set temperature	°C
DHW - Flow (l/min)	l/m
DHW - Temperature difference over the Plate Heat Exchanger ($\Delta T = T_{w2} - T_{w1}$)	°C

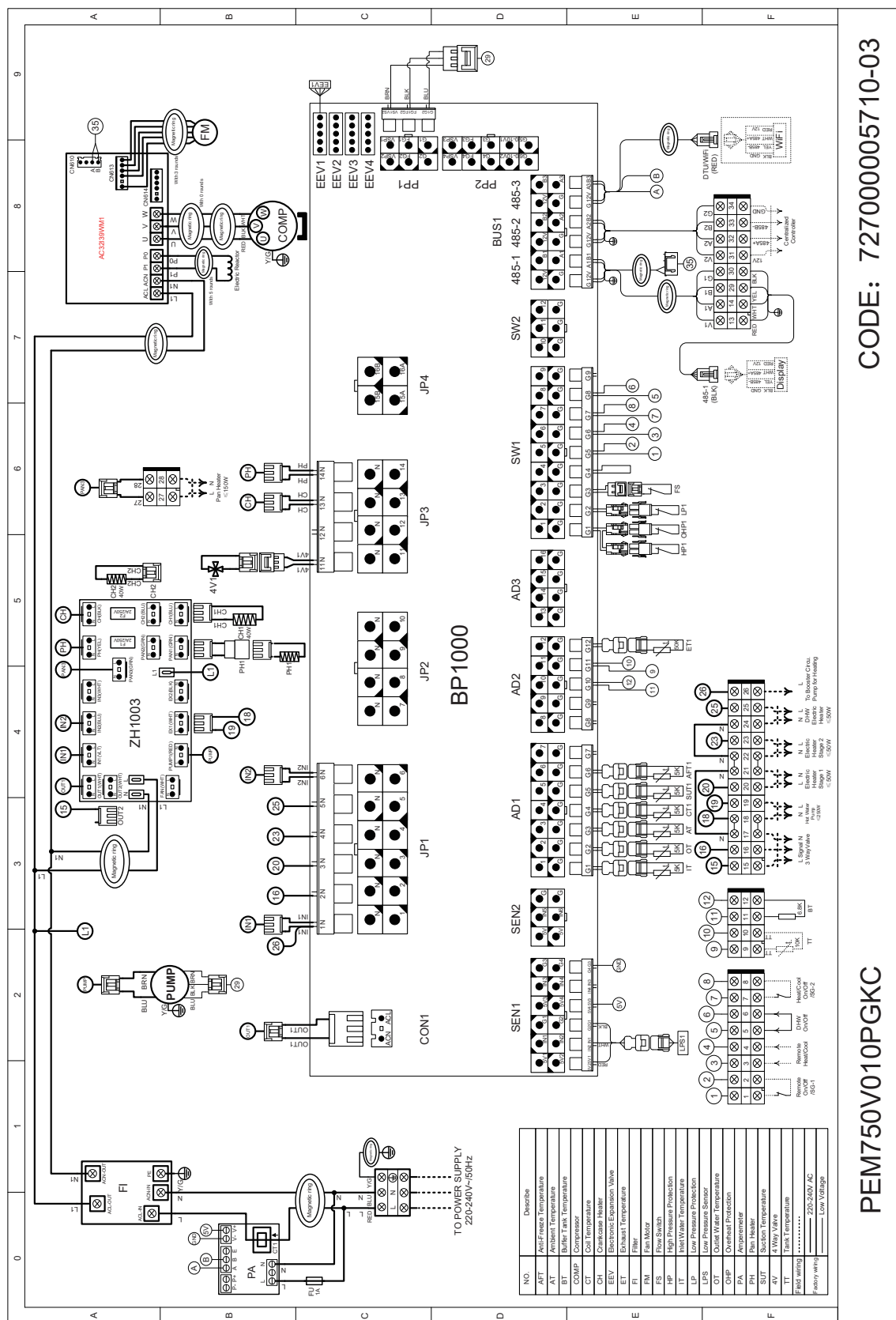
15.1.1 PEM750V004PGKC / PEM750V006PGKC



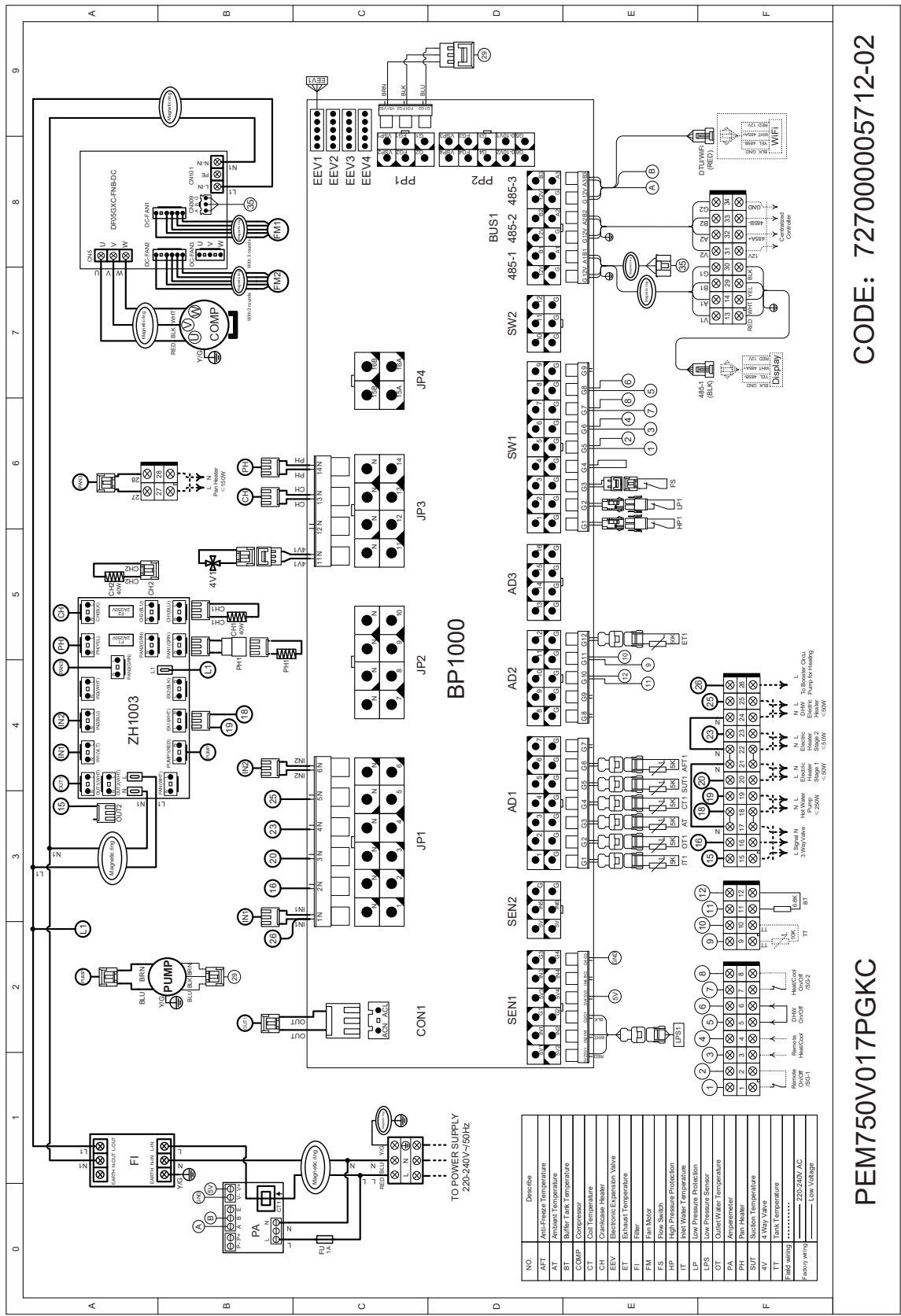
15.1.2 PEM750V008PGKC



15.1.3 PEM750V010PGKC



15.1.4 PEM750V017PGKC



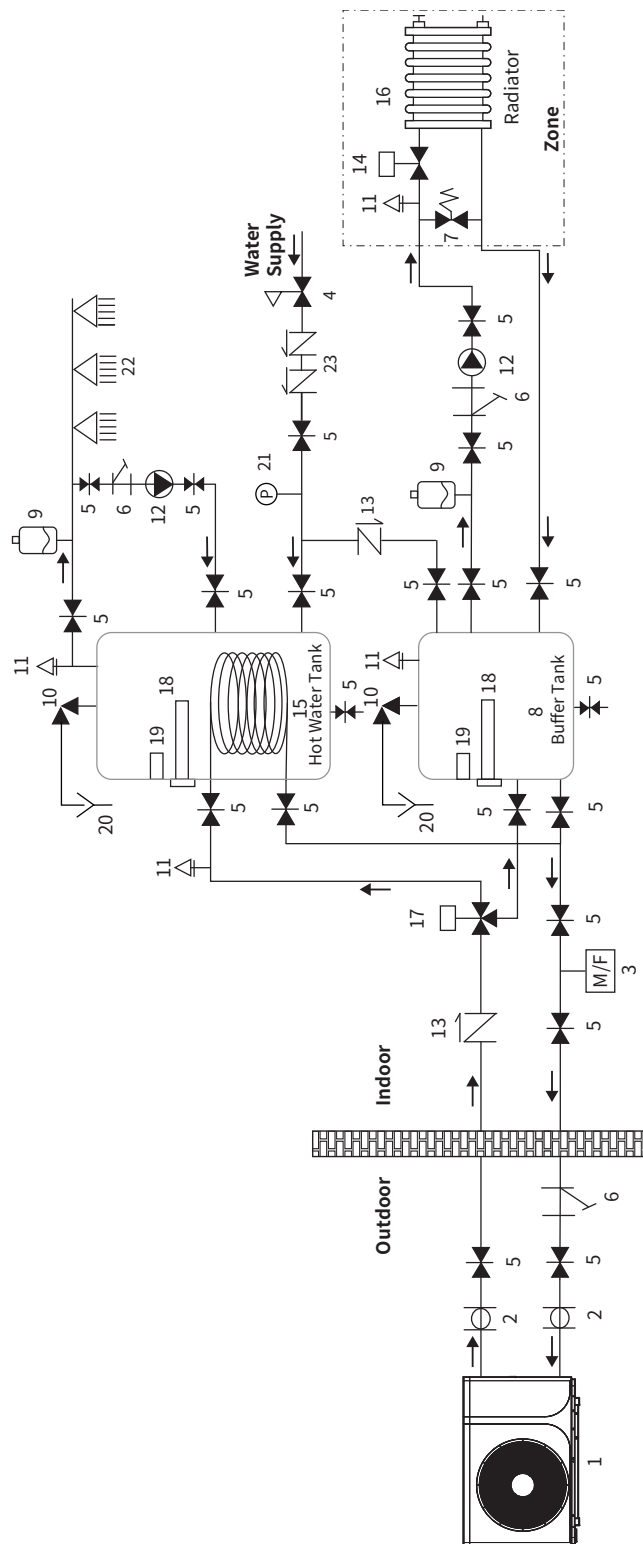
CODE: 727000005712-02

PEM750V017PGKC

15.2 Common Applications

15.2.1 Single Zone Radiators

Note The zone control must be used as a separate controller (not supplied with product).

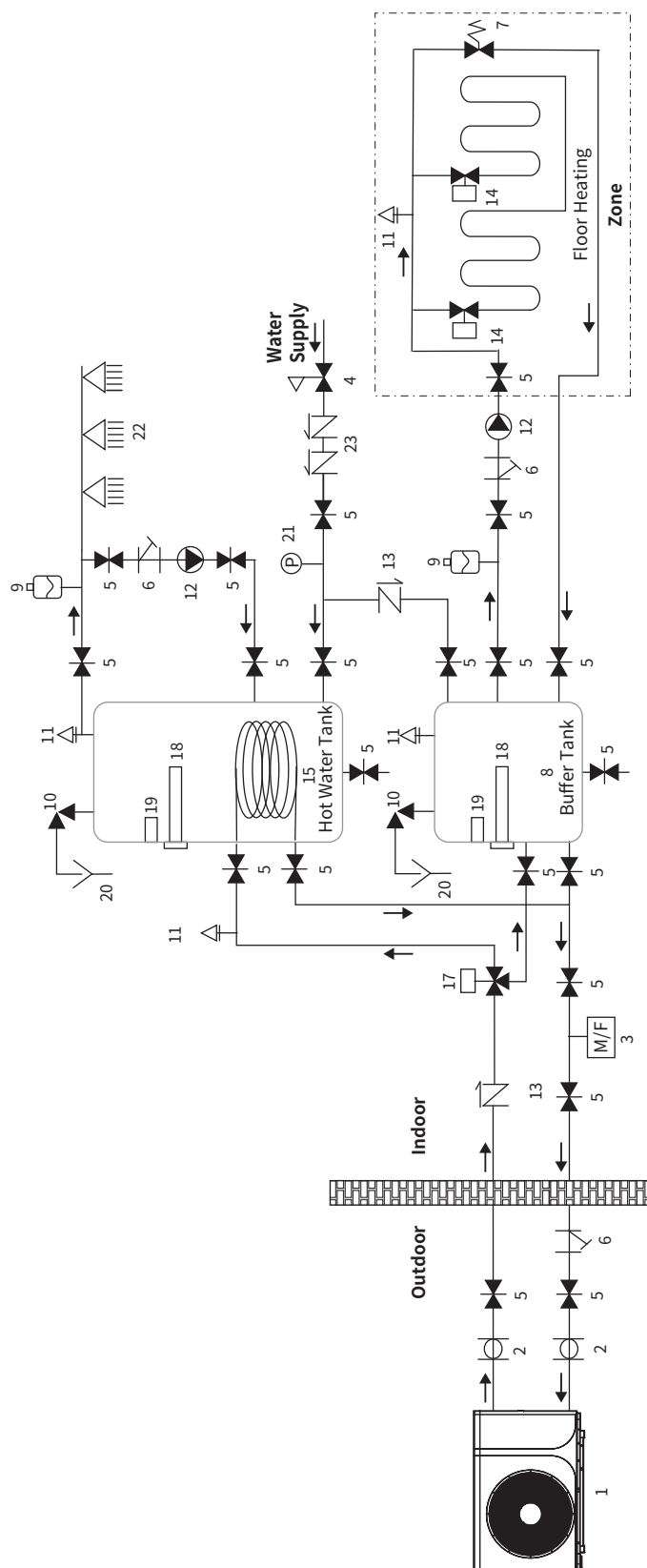


#.	Description
13	Check Valve
14	Valve for Heating
15	Hot Water Tank
16	Radiator
17	3-Way Valve
18	Electric Heater
19	Temperature Sensor
20	Drain
21	Pressure Gauge
22	Shower
23	Double Check Shut-off Valve

#.	Description
1	Heat Pump
2	Flexible Pipe
3	Magnet Filter
4	Pressure-reducing Valve
5	Shut-off Valve
6	Y-Type Water Filter
7	Automatic Bypass Valve
8	Buffer Tank
9	Expansion Tank
10	Relief Valve
11	Air Vent Valve
12	Water Pump

15.2.2 Single Floor Heating Zone

Note The zone control must be used as a separate controller (not supplied with product).

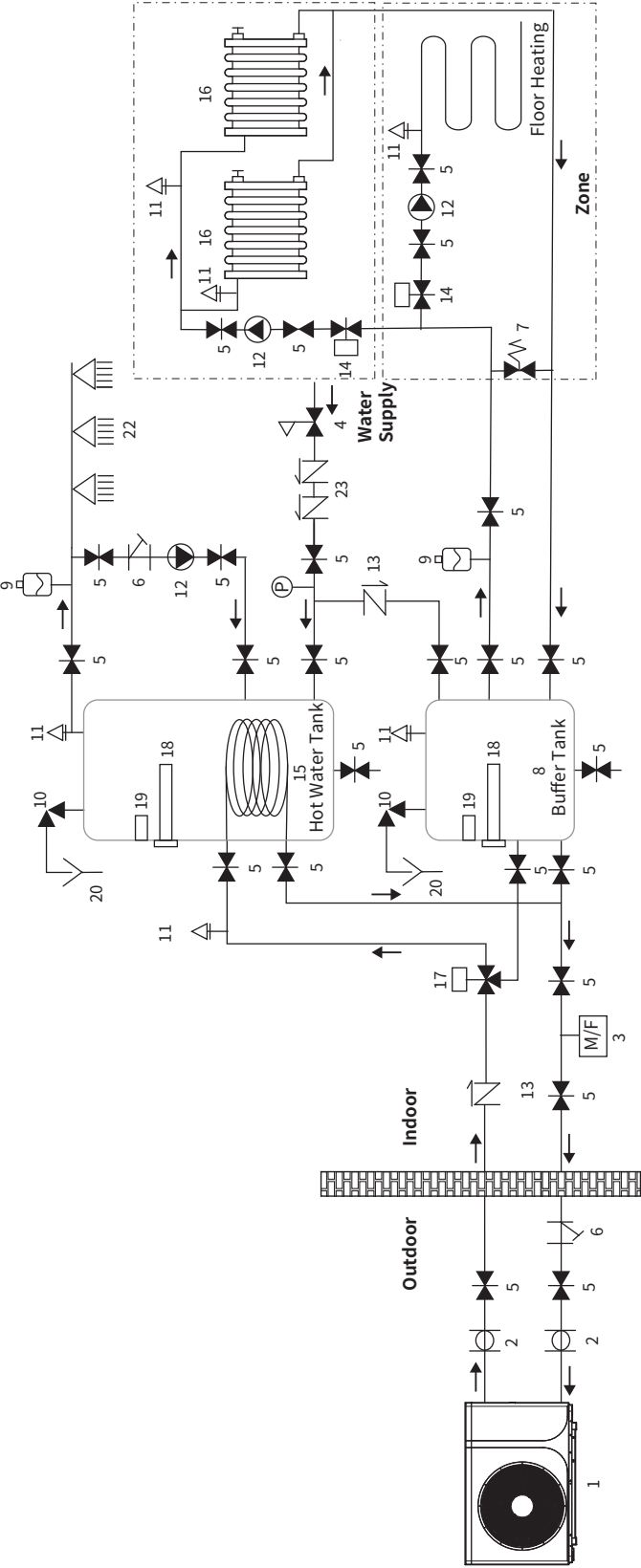


#.	Description	
13	Check Valve	
14	Valve for Heating	
15	Hot Water Tank	
16	Radiator	
17	3-Way Valve	
18	Electric Heater	
19	Temperature Sensor	
20	Drain	
21	Pressure Gauge	
22	Shower	
23	Double Check Shut-off Valve	

#.	Description	
1	Heat Pump	
2	Flexible Pipe	
3	Magnet Filter	
4	Pressure-reducing Valve	
5	Shut-off Valve	
6	Y-Type Water Filter	
7	Automatic Bypass Valve	
8	Buffer Tank	
9	Expansion Tank	
10	Relief Valve	
11	Air Vent Valve	
12	Water Pump	

15.2.3 2-Zone Floor Heating and Radiators

Note The zone control must be used as a separate controller (not supplied with product).

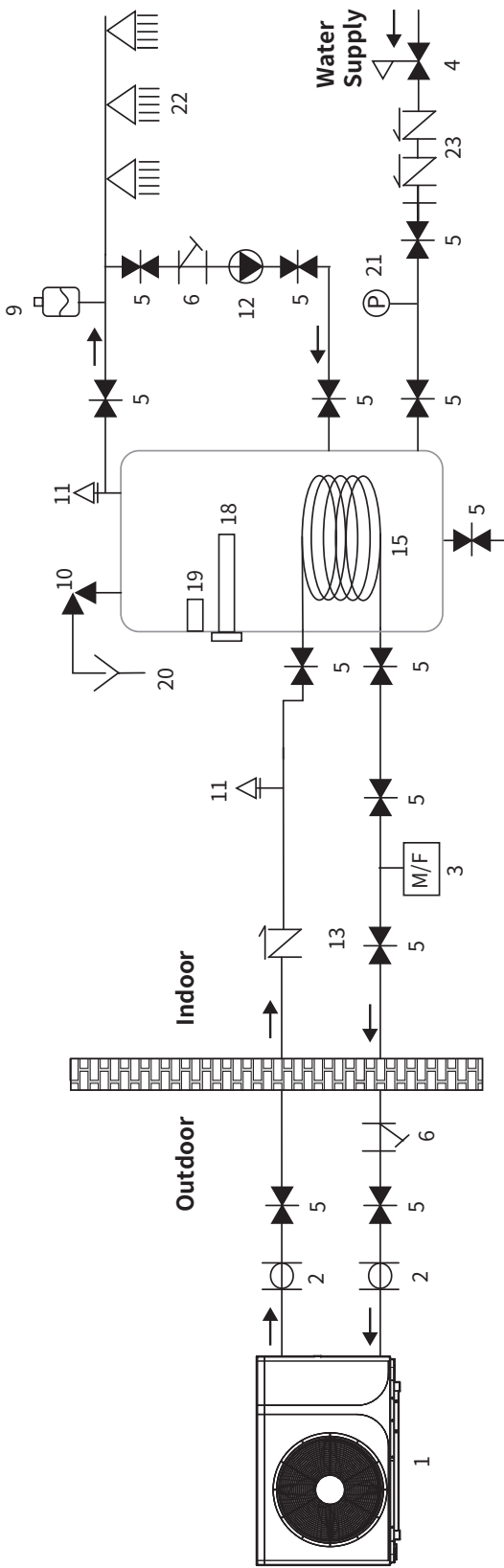


* Zone control must be used as a separate controller (not supplied with product).

#.	Description
13	Check Valve
14	Valve for Heating
15	Hot Water Tank
16	Radiator
17	3-Way Valve
18	Electric Heater
19	Temperature Sensor
20	Drain
21	Pressure Gauge
22	Shower
23	Double Check Shut-off Valve

#.	Description
1	Heat Pump
2	Flexible Pipe
3	Magnet Filter
4	Pressure-reducing Valve
5	Shut-off Valve
6	Y-Type Water Filter
7	Automatic Bypass Valve
8	Buffer Tank
9	Expansion Tank
10	Relief Valve
11	Air Vent Valve
12	Water Pump

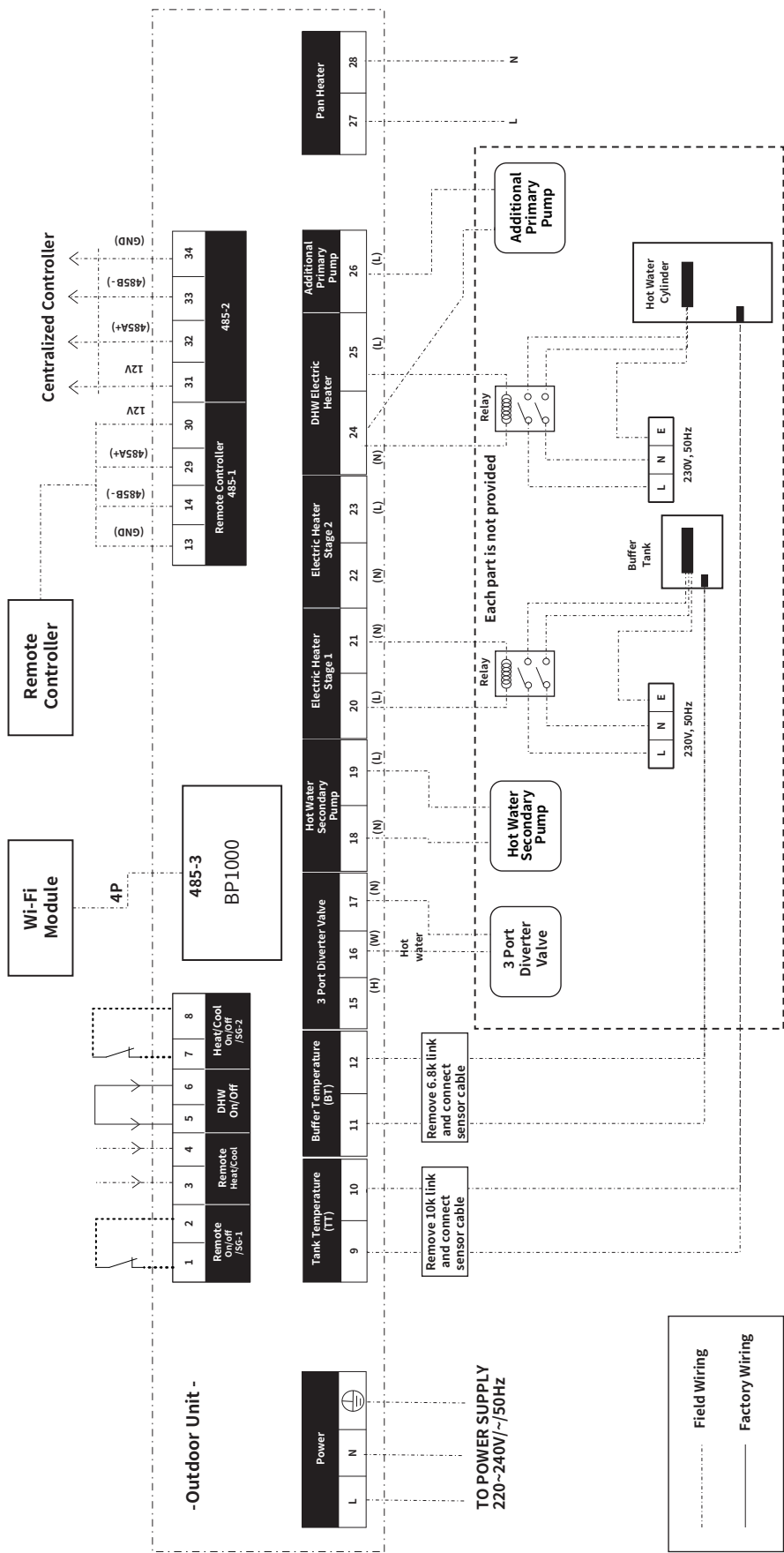
15.2.4 DHW Only



#.	Description
13	Check Valve
14	Valve for Heating
15	Hot Water Tank
16	Radiator
17	3-Way Valve
18	Electric Heater
19	Temperature Sensor
20	Drain
21	Pressure Gauge
22	Shower
23	Double Check Shut-off Valve

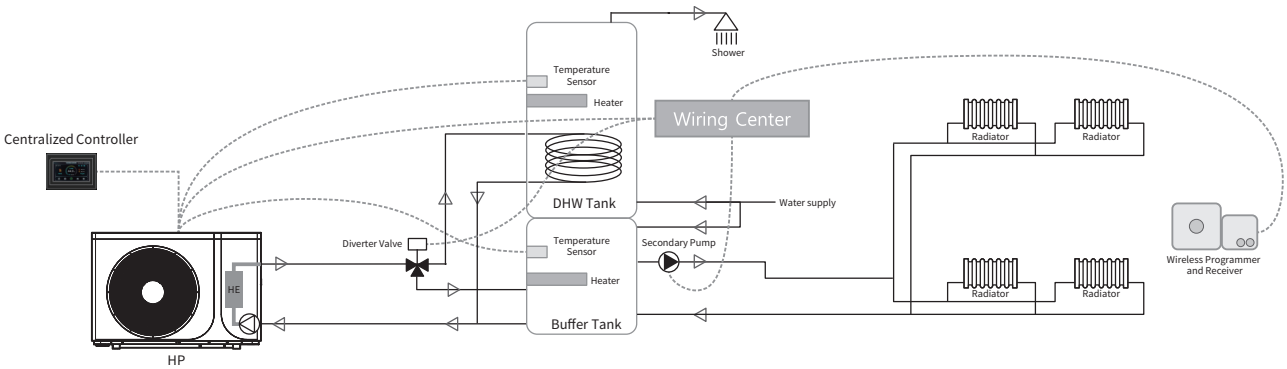
#.	Description
1	Heat Pump
2	Flexible Pipe
3	Magnet Filter
4	Pressure-reducing Valve
5	Shut-off Valve
6	Y-Type Water Filter
7	Automatic Bypass Valve
8	Buffer Tank
9	Expansion Tank
10	Relief Valve
11	Air Vent Valve
12	Water Pump

15.3 Field Wiring Diagram

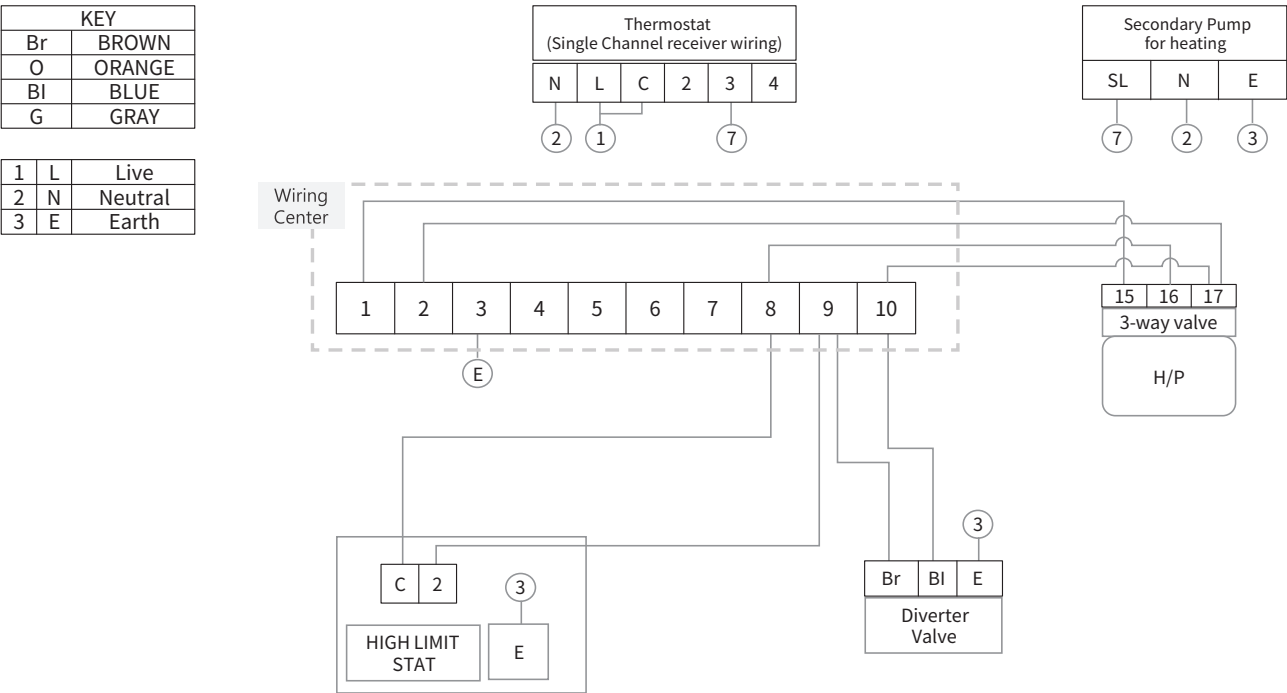


15.4 Field Wiring Case

Open Loop Heating Wiring Diagram with Wireless Programmer



* The programmer will not be able to schedule hot water.

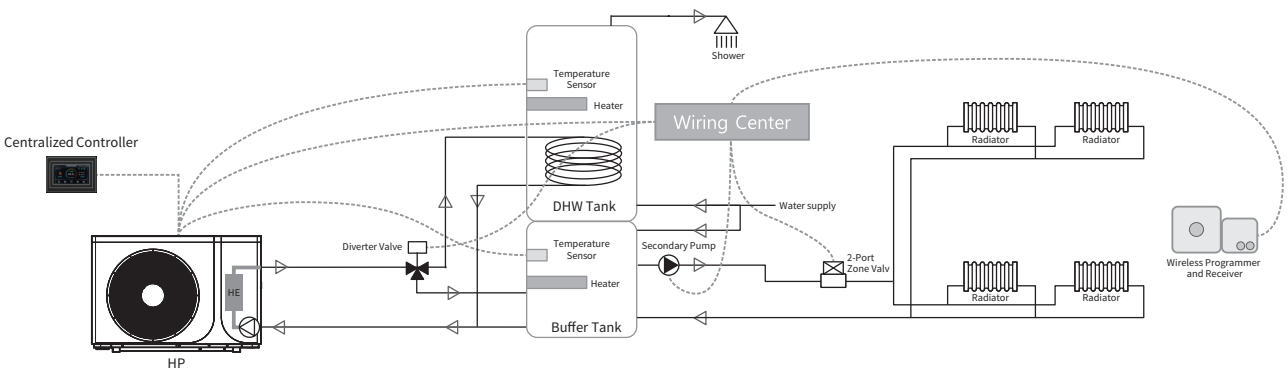


* Navien hold no responsibility for the wiring diagram above. The wiring diagram is for guideline only.

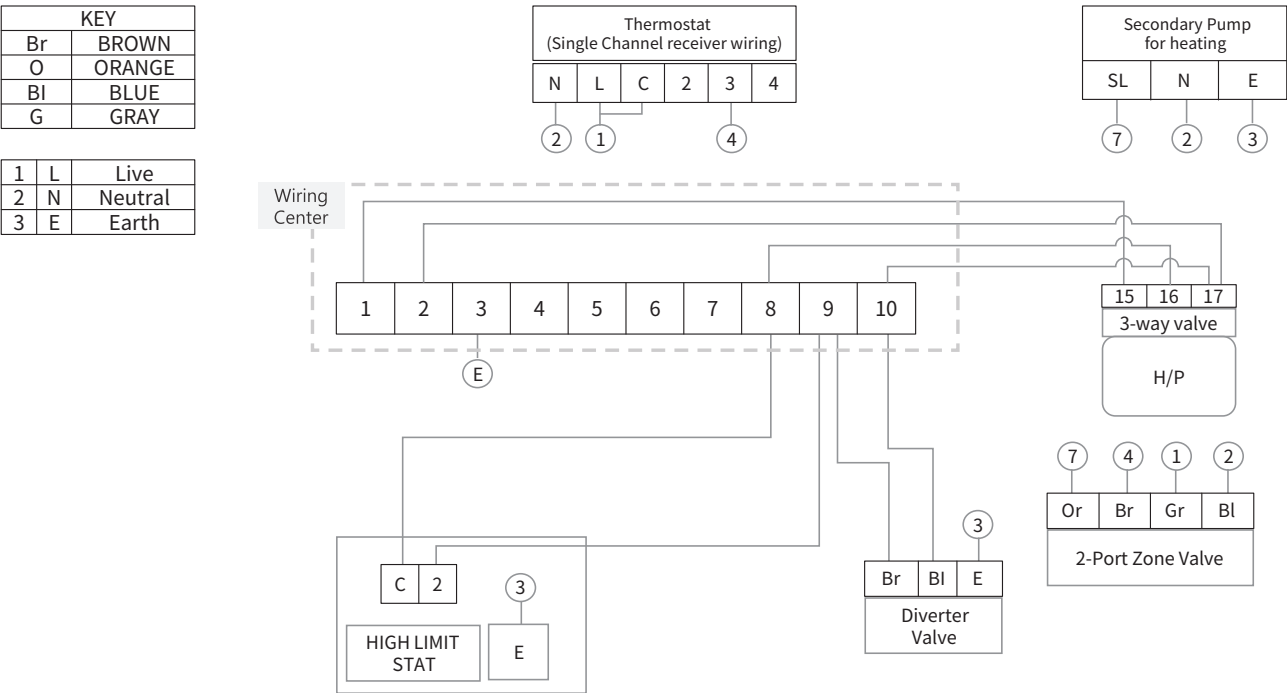
Note

- Terminal 16 supplies 230V in valve hot water mode, diverter valve is normally open to the heating circuit, and opens to hot water when brown is supplied with power.
- Terminal block 15 of HP is permanent power supply.
- Power supply is up to 200W.
- When the heat pump is turned off, the secondary pump is also not supplied with power, making it safe to repair.

1-Heating Zone Wiring Diagram with Wireless Programmer



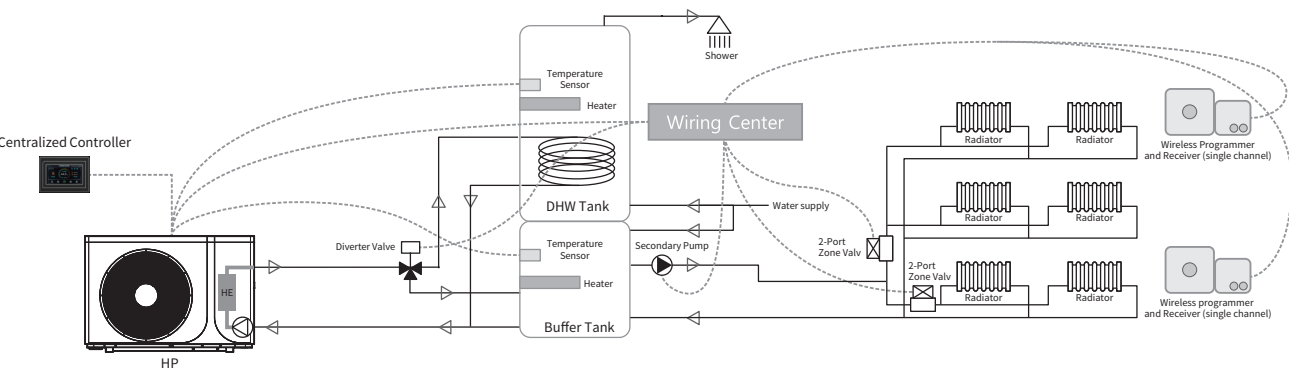
* The programmer will not be able to schedule hot water.



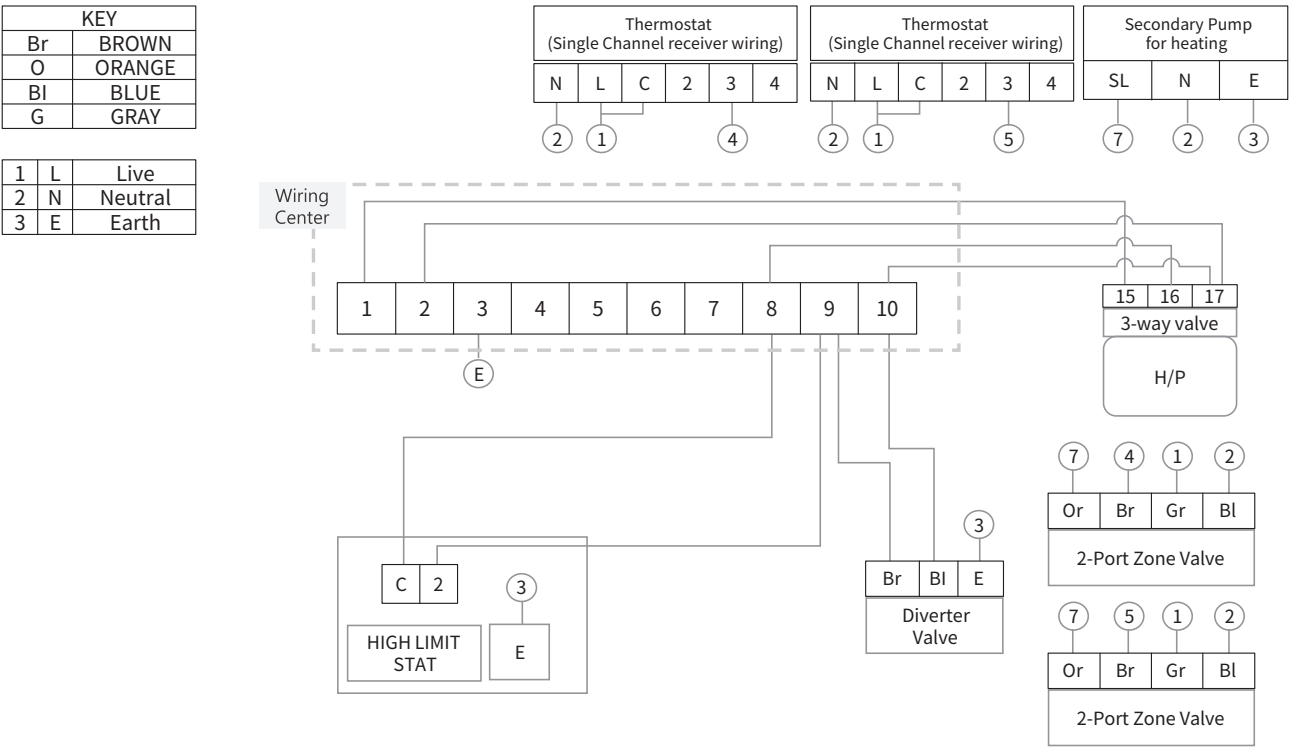
* Navien hold no responsibility for the wiring diagram above. The wiring diagram is for guideline only.

- Note**
- Terminal 16 supplies 230V in valve hot water mode, diverter valve is normally open to the heating circuit, and opens to hot water when brown is supplied with power.
 - Terminal block 15 of HP is permanent power supply.
 - Power supply is up to 200W.
 - When the heat pump is turned off, the secondary pump is also not supplied with power, making it safe to repair.

2-Heating Zone Wiring Diagram with Wireless Programmer



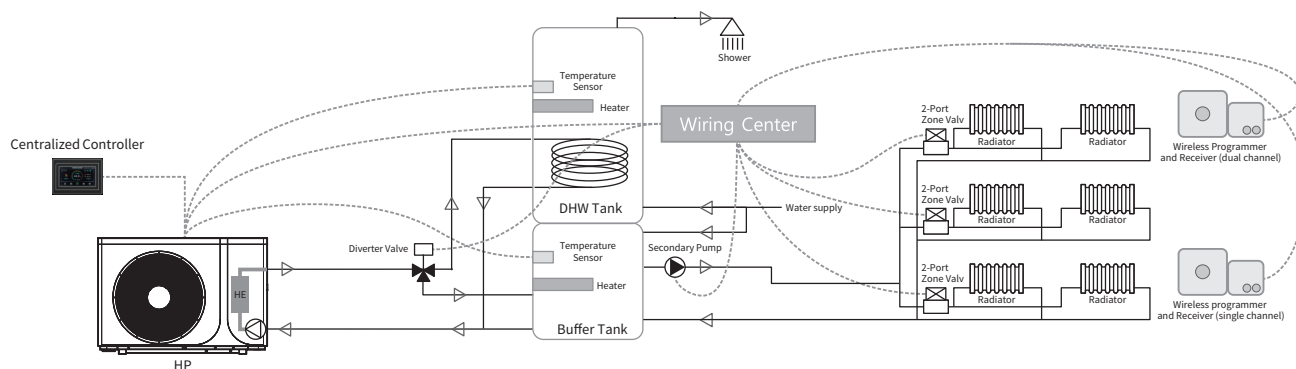
* The programmer will not be able to schedule hot water.



* Navien hold no responsibility for the wiring diagram above. The wiring diagram is for guideline only.

- Note**
- Terminal 16 supplies 230V in valve hot water mode, diverter valve is normally open to the heating circuit, and opens to hot water when brown is supplied with power.
 - Terminal block 15 of HP is permanent power supply.
 - Power supply is up to 200W.
 - When the heat pump is turned off, the secondary pump is also not supplied with power, making it safe to repair.

3-Heating Zone Wiring Diagram with Wireless Programmer



*The programmer will not be able to schedule hot water.

KEY	
Br	BROWN
O	ORANGE
Bl	BLUE
G	GRAY

1	L	Live
2	N	Neutral
3	E	Earth

Thermostat
(Dual Channel receiver wiring)

N	L	1	2	3	4
---	---	---	---	---	---

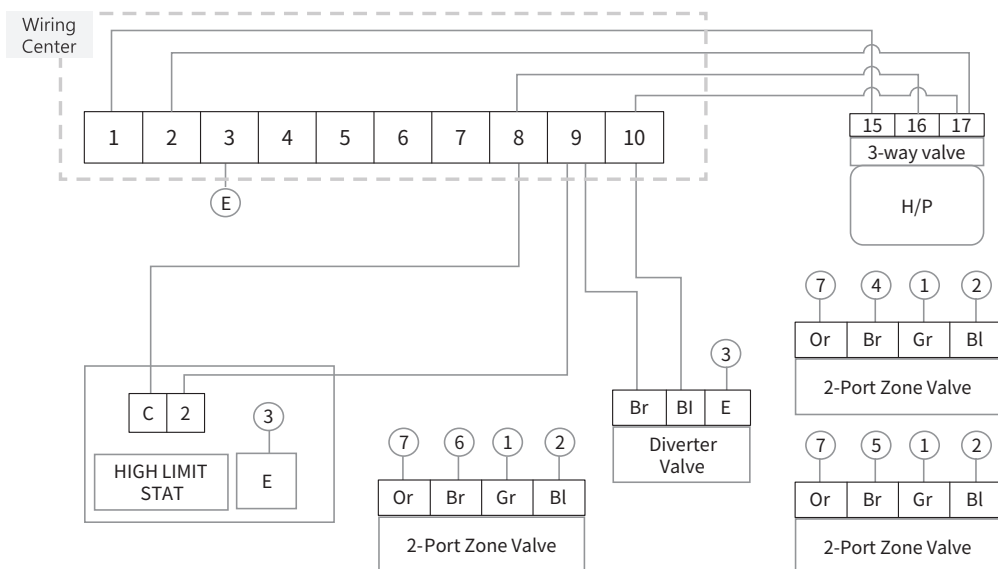
2 1 4 5

Thermostat
(Single Channel receiver wiring)

N	L	C	2	3	4
---	---	---	---	---	---

Wiring connections:
N to 2
L to 1
C to 1
3 to 6

Secondary Pump for heating		
SL	N	E
7	2	3



* Navien hold no responsibility for the wiring diagram above. The wiring diagram is for guideline only.

Note

- Terminal 16 supplies 230V in valve hot water mode, diverter valve is normally open to the heating circuit, and opens to hot water when brown is supplied with power.
- Terminal block 15 of HP is permanent power supply.
- Power supply is up to 200W.
- When the heat pump is turned off, the secondary pump is also not supplied with power, making it safe to repair.

Benchmark Commissioning & Warranty Validation Service Record

It is a requirement that the heat pump is installed and commissioned to the manufacturers' instructions and the data fields on the commissioning checklist completed in full.

To instigate the warranty the heat pump needs to be registered with the manufacturer within one month of the installation. The warranty rests with the end-user (consumer), and they should be made aware it is ultimately their responsibility to register with the manufacturer, within the allotted time period.

It is essential that the heat pump is serviced in line with the manufacturers' recommendations, at least annually. This must be carried out by a competent, certified operative. The service details should be recorded on the Benchmark Service and Interim Heat Pump Work Record and left with the householder. Failure to comply with the manufacturers' servicing instructions and requirements will invalidate the warranty.



www.hhic.co.uk

This Commissioning Checklist is to be completed in full by the competent person who commissioned the heat pump and associated equipment as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturers' instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

© Heating and Hotwater Industry Council (HHIC)



www.hhic.org.uk
Issue date: 20.08.2020

AIR TO WATER HEAT PUMP COMMISSIONING CHECKLIST

Address:													
Heat Pump make and model:													
Heat Pump serial number:													
Commissioned by (PRINT NAME):								Certified Operative Reg number (1):					
Company name:								Telephone number:					
Company email:								Company address:					
												Commissioning date:	
Heating and hot water system complies with the appropriate Building Regulations?												Yes	
DNO notification?												Yes	
Building Regulations Notification Number (if applicable) (2)													
MCS installer registration Number (if applicable)								MCS product certification number (if applicable)					
F-gas certification number (split heat pump only)													
G3 certification number (if applicable)													
Heat Pump Type (Tick)				Split		Monoblock		Peak heat loss of building kW					
Is Heat Pump Installed as part of a cascade?				Yes				Cascade Heat Pump Series				() of ()	
Heat Pump Refrigerant Type								Refrigerant weight (total)				kg	
Electrical and Hydronic Controls – SYSTEM AND HEAT PUMP (Tick the appropriate boxes)													
Time and temperature control to heating				Room thermostat and programmer/timer				Programmable Roomstat					
				Load/weather compensation				Optimum start control					
Time and temperature control to hot water				Cylinder thermostat and programmer/timer				Combined with Heat pump main controls					
Hybrid system – synchronised control of boiler and heat pump fitted								Yes					
If Yes – boiler model switching point – (Quote Tariff or Temperature Level)													
Heating zone valves (including underfloor loops)				pre-existing				Fitted				Not required	
Hot water zone valves				pre-existing				Fitted				Not required	
Thermostatic radiator valves				pre-existing				Fitted				Not required	
Outdoor Sensor				pre-existing				Fitted				Not required	
Heat Pump Safety Interlock (3)				pre-existing				Fitted				Not required	
Automatic bypass to system				pre-existing				Fitted				Not required	
Buffer Vessel Fitted				Yes		No		If yes		volume:		Litres	
Plate Heat Exchanger fitted to give hydronic separation of the heat pump circuit to the heating circuit								Yes				No	
Expansion vessel for heating is sized, fitted & charged in accordance with manufacturer's instructions												Yes	
Legionella protection for stored hot water provided by timed temperature control?												Yes	
Water Treatment – SYSTEM AND HEAT PUMP (Tick the appropriate boxes/Measure and Record)													
System has been cleaned and treated in accordance with BS 7593:2019 and heat pump manufacturers' instructions?								Yes					
What system cleaner was used?				Brand:				Product:					
What heating system inhibitor was used?				Brand:				Product:					
What heat pump system anti-freeze/inhibitor was used? (monoblock only)				Brand:				Product:				% concentration	
System filter fitted in accordance with BS7593 : 2019?								Yes					
Heat Pump outdoor unit (Tick the appropriate boxes/Measure and Record)													
Is the heating system adequately frost protected and pipes insulated to prevent heat loss?								Yes					
Split only: The refrigerant circuit has been evacuated and charged in accordance with manufacturer's instructions								Yes					
The heat pump is fitted on a solid/stable surface capable of taking its weight								Yes					
The necessary heat pump defrost provision been put in place								Yes					
The heat pump fan free from obstacles and operational								Yes					
Condensate drain installed to manufacturer's instructions								Yes					
CENTRAL HEATING MODE (Tick the appropriate boxes/Measure and Record)													
The heating system has been filled and pressure tested								Yes					
Heating Flow Temperature				°C		Heating Return Temperature				°C			
System correctly balance/rebalanced								Yes					
DOMESTIC HOT WATER MODE (Tick the appropriate boxes)													
Is the heat pump connected to a hot water cylinder?				Unvented		Vented		Thermal Store		Not connected			
Hot water cylinder size				Litres		Stored hot water temperature				°C			
Hot water has been checked at all outlets				Yes		Have Thermostatic Blending Valves been fitted?				Yes		Not required	

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

© Heating and Hotwater Industry Council (HHIC)



www.hhic.org.uk
Issue date: 20.08.2020

ADDITIONAL SYSTEM INFORMATION (Tick the appropriate boxes/Measure and Record)									
Water flow rate setting of the heat pump at commissioning (l/min):									
Additional heat sources connected:		Gas Boiler		Oil Boiler		Electric Heater		Solar Thermal	Other:
ALL INSTALLATIONS									
All electrical work complies with the appropriate Regulations									Yes
The heat pump and associated products have been installed and commissioned in accordance with the manufacturer's instructions									Yes
The operation of the heat pump and system controls have been demonstrated to and understood by the customer									Yes
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer									Yes
Commissioning Engineer's signature:									
Customer's signature (To confirm satisfactory demonstration and receipt of manufacturers' literature)									

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE 01		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

SERVICE 02		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

SERVICE 03		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

SERVICE 04		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

SERVICE 05		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

SERVICE 06		Date:	
Engineer name:			
Company name:			
Telephone No:			
Operative ID No:			
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and heat pump manufacturers' instructions. *		Yes	N/a
Comments:			
Signature:			

* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

Memo

Memo
