InstaGen
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Air Source Heat Pump

Installation & Operation Manual

R290
Natural
Refrigerant

IG4-MP1-A1
IG6-MP1-A1
IG8-MP1-A1
IG10-MP1-A1
IG12-MP1-A1
IG16-MP1-A1
IG1-PCB-A1



IMPORTANT SAFETY INSTRUCTIONS — READ AND FOLLOW ALL INSTRUCTIONS

www.instagroup.co.uk | 0118 932 8811 | support@instagen.co.uk

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Important Safety Precautions

Important Notice: This guide provides installation and operation instructions for the InstaGen Air Source Heat Pump. Consult InstaGroup or the re-seller with any questions regarding this equipment.

Attention Installer: This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the heat pump.

Attention User: This manual contains important information that will help you in operating and maintaining this heat pump. Please retain it for future reference.

WARNING - Read Before Installing

Before installing this product, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage.

Codes and Standards

InstaGen Air Source Heat Pump must be installed in accordance with the local building and installation codes as per the utility or authority having jurisdiction. All local codes take precedence over national codes. In the absence of local codes, refer to the latest edition of the National Electric Code (NEC) in the local government Electric Code (CEC) for installation. Installation to comply with BS 7671:2018+A2:2022 (18th Edition) and BS 6700 and BS EN 806 plus Regulation G.

Exhaust Valve & Explosion-Proof Components



Exhaust valve

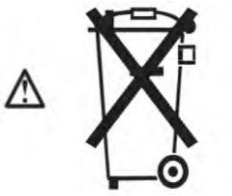
The unit is supplied with an exhaust valve as standard (found in compressor compartment of unit), which can eliminate the air in the water pipe in real time. More importantly, if the refrigerant inside the plate heat exchanger leaks and mixes into the water pipe, the exhaust valve can promptly release the refrigerant, preventing it from entering the room and ensuring system safety. Installation position: Please follow the diagram above and place the exhaust valve on the outlet pipe of the unit. Explosion-proof components included: Relay, Ceramic fuse housing.

Spare parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate warranty. For replacements, please contact InstaGroup and use only original spare parts supplied or approved by InstaGroup.

Unit Recycling and Scrapping

This product should not be disposed of together with other household waste throughout the EU region (WEEE directive). When scrapped, the refrigerant must be recycled by authorised institutions - **direct discharge is prohibited**. Before disassembly, thoroughly vacuum the system to ensure no residual refrigerant.

Compliance statement: This product complies with EU Machinery Directive (2006/42/ EC) and Low Voltage Directive (2014/35/EU).



WEEE recycling label

Work on the refrigerant circuit

R290 REFRIGERANT WARNING

R290 refrigerant (propane) is a colourless, flammable, odourless gas which forms explosive mixtures with air. Refrigerant recovered must be properly handled and disposed of by authorised contractors / engineers.

Measures to perform before beginning work on the refrigerant circuit:

- Check the refrigerant circuit for leaks.
- Ensure good ventilation, especially for the floor area, and sustain this for the duration of the work.
- Secure the area surrounding the work area.
- Inform all maintenance personnel and persons in the vicinity of the type of work.
- Inspect the area immediately around the heat pump for flammable materials and ignition sources - remove all.
- Take measures to prevent electrostatic charging.
- Before, during and after the work, check for escaping refrigerant using an explosion-proof detector suitable for R290. This refrigerant detector must not generate any sparks and must be suitably sealed.

A CO_2 or powder extinguisher must be to hand when:

- Refrigerant is being recovered, topped up, or soldering/welding work is being carried out.
- Display signs prohibiting smoking at all times.

Danger - Escaping Refrigerant

Escaping refrigerant can lead to fire and explosions that can result in serious injuries or death. Do not drill or apply heat to a refrigerant circuit filled with refrigerant.

Do not operate Schroeder valves unless a fill cylinder or recovery pump & manifold gauges are attached.

Take measures to prevent electrostatic charging. No smoking! Prevent naked flames and sparks. Never switch lights or electrical appliances on or off. Components that contain refrigerant must be labelled, stored and transported in well-ventilated areas in accordance with the applicable flammable gas regulations and standards for type of storage and transport being used.

Danger - Direct Contact with Refrigerant

Direct contact with liquid and gaseous refrigerant can cause serious damage to health, e.g. frostbite and/or burns. There is a risk of asphyxiation if it is breathed in.

Prevent direct contact with liquid and gaseous refrigerant.

Wear personal protective equipment when handling liquid and gaseous refrigerant. Never breathe in refrigerant vapours.

Danger - Hot/Cold Surfaces & Hydraulic System

Hot and cold metallic surfaces of the refrigerant circuit may cause burns or frostbite if skin contact is made. Wear personal protective equipment to protect against burns or frostbite.

Please note: When refrigerant is being recovered, hydraulic components may freeze. Drain heating water from the heat pump beforehand.

Damage to the refrigerant circuit can cause refrigerant to enter the hydraulic system. After completion of the work, vent the hydraulic system correctly. When doing so, ensure the area is sufficiently ventilated.

Danger - Storage of Outdoor Unit

The outdoor unit is charged with R290 (propane). Escaping refrigerant can cause fire, explosions, or asphyxiation.

An explosion prevention plan must be in place for storage. Ensure sufficient ventilation at the storage location.

Emergency Guidelines for R290 Refrigerant Leakage



Emergency response flowchart for R290

WARNING

In case of leakage, evacuate immediately and contact professionals.

Emergency Response Steps

Personnel Evacuation

- Immediately evacuate the leak area within at least 50 metres.
- Do not start any electrical equipment (including switches, mobile phones, intercoms).
- Use stretchers when transferring personnel with limited mobility to avoid static electricity.

Ventilation Treatment

- Open all doors and windows for horizontal ventilation (avoid mechanical ventilation equipment).
- If a confined space, use an explosion-proof positive pressure air supply fan (ATEX certification required).
- Maintain ventilation for at least 1 hour per cubic metre of space.

Professional Disposal

- Wear A-level protective clothing and self-contained breathing apparatus (SCBA) when entering the site.
- Use an infrared leak detector to locate the leak point (do not use open flames for detection).
- Recycling residual refrigerant requires explosion-proof recycling equipment.
- After repair, a 24-hour pressure holding test is required.

DANGER - Risk of Electrical Shock or Electrocution

The electrical supply to this product must be installed by a licensed or certified electrician in accordance with the National Electrical Code and all applicable local codes and ordinances. Installation must comply with BS 7671:2018+A2:2022 (18th Edition). Improper installation will create an electrical hazard which could result in death or serious injury to heat pump users, installers, or others due to electrical shock, and may also cause damage to property. Read and follow the specific instructions inside this guide.

1. Ensure that all high voltage circuits are disconnected before commencing heat pump installation. Contact with these circuits could result in death or serious injury to users, installers or others, due to electrical shock and may also cause damage to property.
2. Non-professionals are prohibited from installing.
3. Attention should be paid to high-voltage electrical safety.
4. Ensure that the main power supply of the device is above 1 metre (ensuring that children cannot access it).

WARNING: To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

Consumer Information and Safety

InstaGroup's InstaGen Air Source Heat Pumps are designed and manufactured to provide years of safe and reliable service when installed, operated and maintained according to the information in this manual and the installation codes referred to in later sections. Throughout the manual, safety warnings and cautions are given. Be sure to read and comply with all of the warnings and cautions.

Heat Pump Energy Saving Tips

- If you plan to not use heating or hot water for a prolonged period, then you might choose to turn the heat pump off or decrease the temp. Setting the temperature several degrees lower to minimize energy consumption. We offer the following recommendations to help conserve energy and minimize the cost of operating your heat pump without sacrificing comfort.
- A maximum water temperature of 60°C is recommended.
- It is recommended to turn off the heat pump when ambient air temperature is less than –20°C or if on holiday for longer than 2 weeks.
- To save energy, schedule DHW during daytime when the ambient temperature is higher.
- Where possible, shelter the heat pump from prevailing winds, rain and snow. Consider using a snow hood to reduce frosting and icing.

General Installation Information

1. Installation and service must be performed by a qualified installer or service agent, and must conform to all national, and local codes and/or safety regulations
2. This InstaGen Air Source Heat Pump is specifically designed for domestic hot water & house heating.

1. Introduction

1.1. Product Overview

InstaGroup's InstaGen Air Source Heat Pumps transfer heat from the ambient air to water, providing high-temperature hot water up to 70°C. With innovative and advanced technology, the heat pump can operate at –20°C ambient temperature with output temperatures up to 60°C, ensuring a warm and comfortable home.

Compared with traditional oil/LPG boilers, InstaGroup's heat pumps produce up to 50% less CO_2 whilst providing savings on running costs. Our heat pumps are not only highly efficient, but also easy and safe to operate.

1.2. General Features

Feature	Detail
Low running costs & high efficiency	COP up to 5 results in lower running costs. No immersion heater or Back-Up Heaters required (can be used if desired).
Reduced Capital Costs	Simple installation reduces capital expenditure.
High Comfort Levels	High storage temperatures result in increased hot water availability.
Digital Inverter Control	Digital Inverter Control for ease of use and to maintain desired temperatures.
Durable Construction	Long-life and corrosion-resistant composite chassis & body stands up to severe climates.
High-Performance Compressors	Outstanding performance, ultra energy efficiency, durability and quiet operation.
Self-Diagnostic Feature	Monitors and troubleshoots heat pump operations to ensure safe and reliable operation.
Touch Screen Controller	User-friendly interface with blue LED backlight.
Isolated Electrical Compartment	Prevents internal corrosion and extends heat pump life.
Low Temperature Operation	Can operate down to ambient air temperature of –25°C.

2. Installation

Note: Before installing this product, read and follow all warning notices and instructions. Users are prohibited from installing on their own. All installation, fault finding, and maintenance must be completed by professionals who have obtained relevant certificates and comply with national and local safety regulations.

2.1. Materials needed for installation

The following items are needed and are to be supplied by the installer for all heat pump installations:

- Plumbing fittings
- Level surface for proper drainage, able to safely hold the weight of the unit
- A suitable electrical supply (see rating plate for specifications). PVC conduit is advised. Connections are made inside the heat pump electrical compartment
- A booster pump for pumping water in case of low water pressure
- A filter on the water inlet
- Insulated plumbing pipework to reduce heat loss
- Flexible pipes are required to connect onto the unit
- A flushing bypass is required to protect the unit's Plate Heat Exchanger

Note: *We recommend installing isolation valves on the inlet and outlet water connections for ease of serviceability.*

2.2. Technical Data

Model	IG4-MP1-A1	IG6-MP1-A1	IG8-MP1-A1	IG10-MP1-A1	IG12-MP1-A1	IG16-MP1-A1
Heating Condition – Ambient Temp. (DB/WB): 7/6°C, Water Temp. (In/Out):30/35°C						
Heating Capacity Range (kW)	2.5–6.0	3.3–8.3	4.5–11.4	5.9–14.8	7.2–18.2	9.6–24.0
Heating Power Input Range (kW)	0.48–1.44	0.64–2.18	0.85–2.95	1.13–3.83	1.38–4.65	1.83–6.30
COP Range	4.16–5.21	3.81–5.17	3.86–5.29	3.86–5.22	3.91–5.22	3.81–5.24
DHW Condition – Ambient Temp. (DB/WB): 7/6°C, Water Temp. (In/Out):10/15°C						
Heating Capacity Range (kW)	2.6–5.3	3.7–7.4	5.2–10.2	6.6–13.2	7.2–16.2	8.8–19.6
Heating Power Input Range (kW)	0.56–1.50	0.79–2.10	1.10–2.87	1.41–3.73	1.54–4.58	1.89–5.60
COP Range	3.53–4.64	3.52–4.69	3.55–4.71	3.54–4.67	3.54–4.67	3.50–4.66
Heated Water Output (L/h)	114	159	219	283	348	421

Model		IG4-MP1-A1	IG6-MP1-A1	IG8-MP1-A1	IG10-MP1-A1	IG12-MP1-A1	IG16-MP1-A1
Cooling Condition – Ambient Temp. (DB/WB): 35/24°C, Water Temp. (In/Out):12/75°C							
Cooling Capacity Range (kW)		1.7–4.2	2.4–5.8	3.3–8.2	4.3–10.8	5.6–14.1	6.9–17.0
Cooling Power Input Range (kW)		0.53–1.37	0.79–2.19	1.08–3.07	1.39–3.99	1.80–5.38	2.21–6.49
ERP Range		3.06–3.20	2.65–3.04	2.67–3.06	2.71–3.10	2.62–3.11	2.62–3.12
Space Heating (According to EN14825:2022)							
Average Climate Water Outlet 35°C	**Rated Heat Output (kW)**	4.19	5.82	7.89	9.95	12.20	16.01
	Seasonal Space Heating Energy Efficiency (ηs)	198.1%	182.7%	181.0%	182.9%	186.8%	189.9%
	Seasonal Space Heating Energy Efficiency (SCOP)	5.03	4.64	4.60	4.65	4.74	4.82
	ErP Level	A+++	A+++	A+++	A+++	A+++	A+++
Average Climate Water Outlet 55°C	**Rated Heat Output (kW)**	4.15	5.59	8.70	9.23	12.16	15.80
	Seasonal Space Heating Energy Efficiency (ηs)	144.5%	136.0%	137.0%	131.9%	142.1%	140.0%
	Seasonal Space Heating Energy Efficiency (SCOP)	3.69	3.48	3.50	3.37	3.63	3.57
	ErP Level	A++	A++	A++	A++	A++	A++
Technical Data							
Power Supply		230V/1Ph/50Hz/60Hz					
Max. Power Input (kW)		2.5	3.1	4.1	5.2	7.1	7.8
Max. Current (A)		11.5	14.2	18.8	23.8	32.5	35.7

Model		IG4-MP1-A1	IG6-MP1-A1	IG8-MP1-A1	IG10-MP1-A1	IG12-MP1-A1	IG16-MP1-A1
Rated Current (A)		6.59	9.98	13.5	17.5	21.3	28.8
Fuse / Circuit Breaker (A)		16	20	25	32	40	40
Wire Diameter (mm²)		2.5	2.5	4	6	6	6
EN14825:2022 Average Climate Water Outlet 35°C	**Sound Pressure (dB(A)) @ 1m**	35	44	43	45	41	43
	Sound Pressure (dB(A))	49	58	57	59	57	58
Pipe Diameter (mm)		DN25	DN25	DN25	DN25	DN25	DN32
Water Flow (m³/h)		1.03	1.43	1.96	2.55	3.13	4.13
Min. Water Quantity (L)		20	30	40	50	60	80
Pump head after unit (m) based on optimal flow rate		4.9	6	4.5	2.8	6	3
Max System Water Pressure (Bar)		8	8	8	8	8	8
Net Weight (kg)		95	112	120	138	165	220
Unit Size (WxDxH [mm])		1080x440x761	1080x460x820	1080x460x960	1080x480x1060	1080x480x1372	1080x480x1560
Packing Size (WxDxH [mm])		1105x470x900	1100x490x960	1100x490x1100	1100x500x1210	1100x500x1510	1200x500x1720
Refrigerant		R290/0.5kg	R290/0.8kg	R290/0.95kg	R290/1.15kg	R290/1.3kg	R290/1.6kg
Operating Ambient Temp. (°C)		–25 to 43°C					
DHW temp. range (°C)		28–65°C					
Heating temp. range (°C)		15–75°C					
Cooling temp. range (°C)		7–35°C					

**All cabling must be sized correctly for each installation; given figures are minimum Cross-Sectional Areas (CSA) only.*

Power supply: Ensure the cable specifications meet the correct requirements for the specific installation. The distance between the installation site and mains power supply will affect the cable thickness. Follow the local electrical standards to select the cables, circuit breakers and isolation breakers. MCB type C with a Double pole Type B Heat Pump RCD recommended.

2.3. Electrical Supply Data Table

Model	Power Supply	Rated Current (A)	Max. Current (A)	Fuse / CB (A)	Cable (mm²)
IG4-MP1-A1	230V/1Ph/50Hz	6.59	11.5	16	2.5
IG6-MP1-A1	230V/1Ph/50Hz	9.98	14.2	20	2.5
IG8-MP1-A1	230V/1Ph/50Hz	13.5	18.8	25	4
IG10-MP1-A1	230V/1Ph/50Hz	17.5	23.8	32	6
IG12-MP1-A1	230V/1Ph/50Hz	21.3	32.5	40	6
IG16-MP1-A1	230V/1Ph/50Hz	28.8	35.7	40	6
IG1-PCB-A1	230V/1Ph/50Hz	/	9.27	16	2.5

Correct installation is required to ensure safe operation. Requirements include the following:

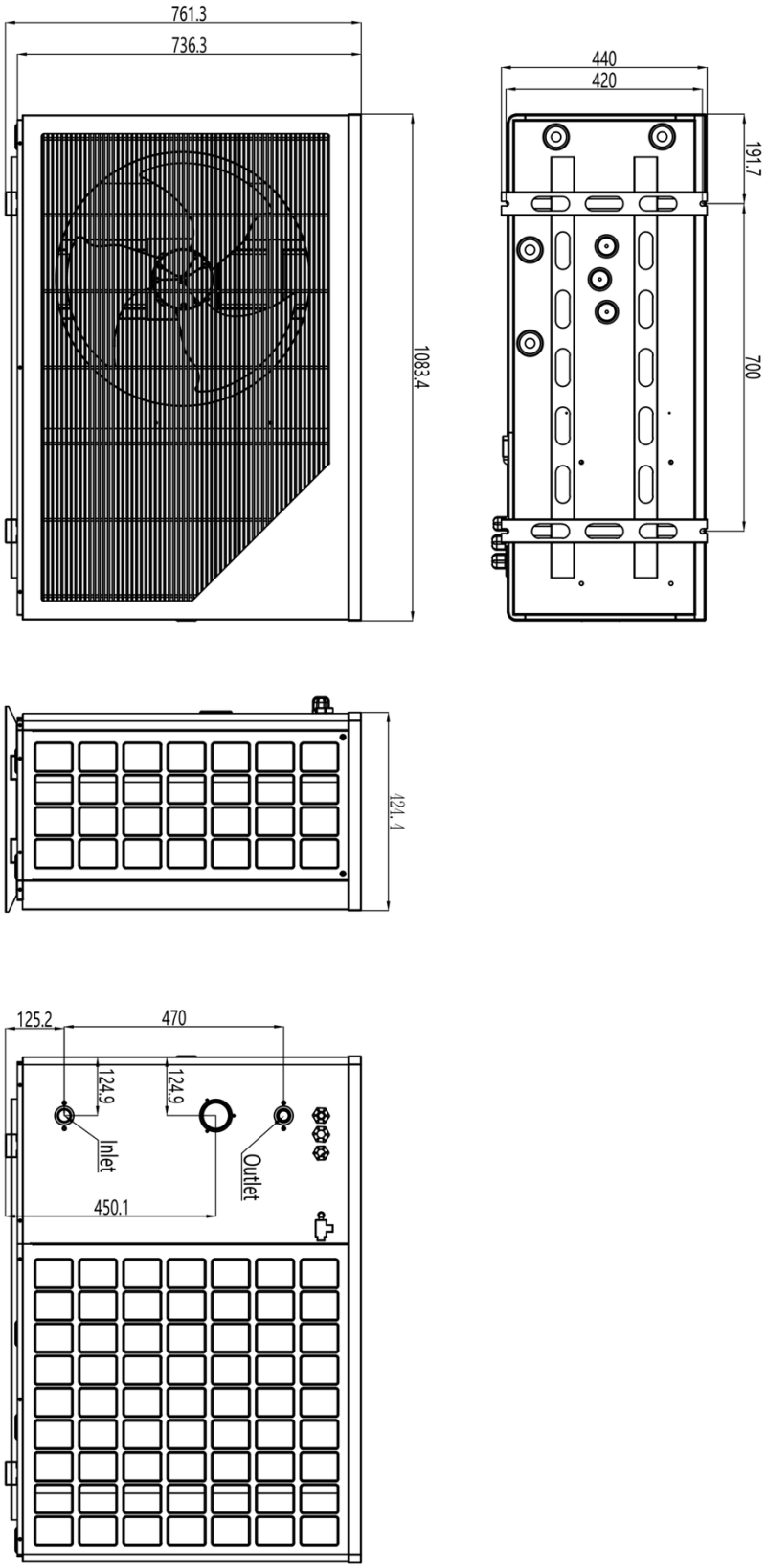
1. Correct sized fitting for all critical connections
2. Field assembly (if required)
3. Appropriate site location and clearances
4. Proper electrical wiring
5. Adequate water air flow

This manual provides the information needed to meet these requirements.

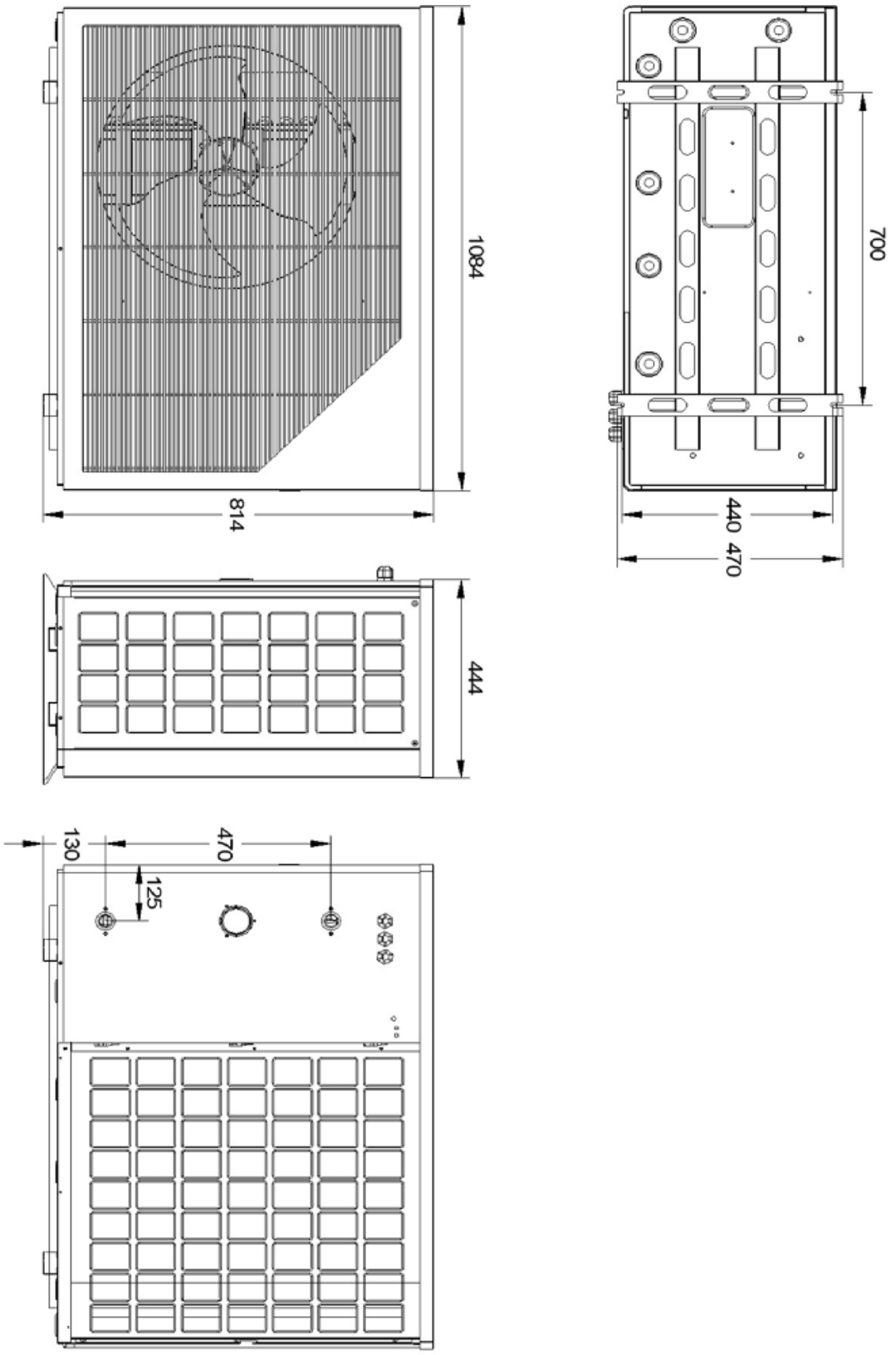
Review all application and installation procedures completely before continuing the installation.

2.4. Dimensions

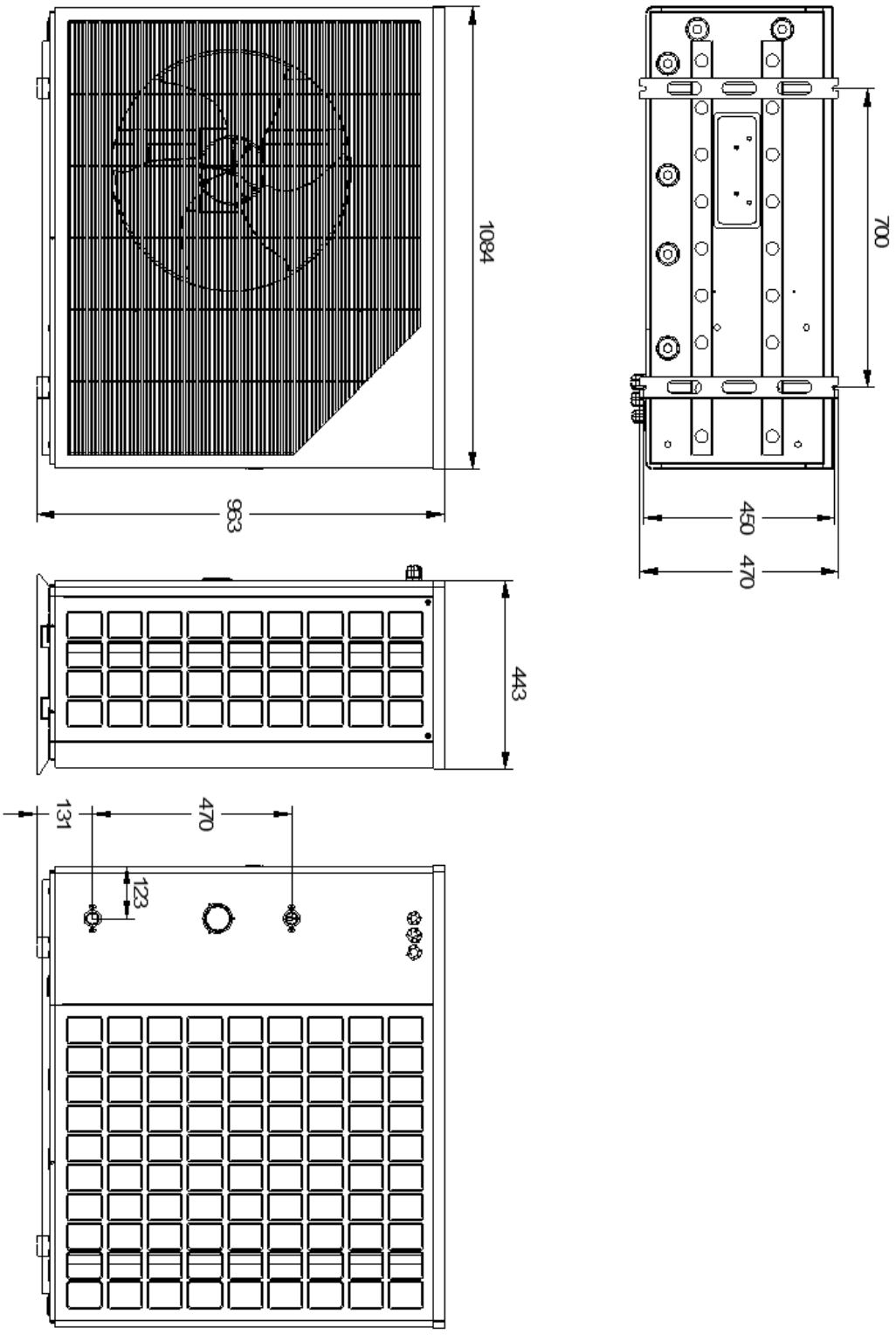
2.4.1. IG4-MP1-A1



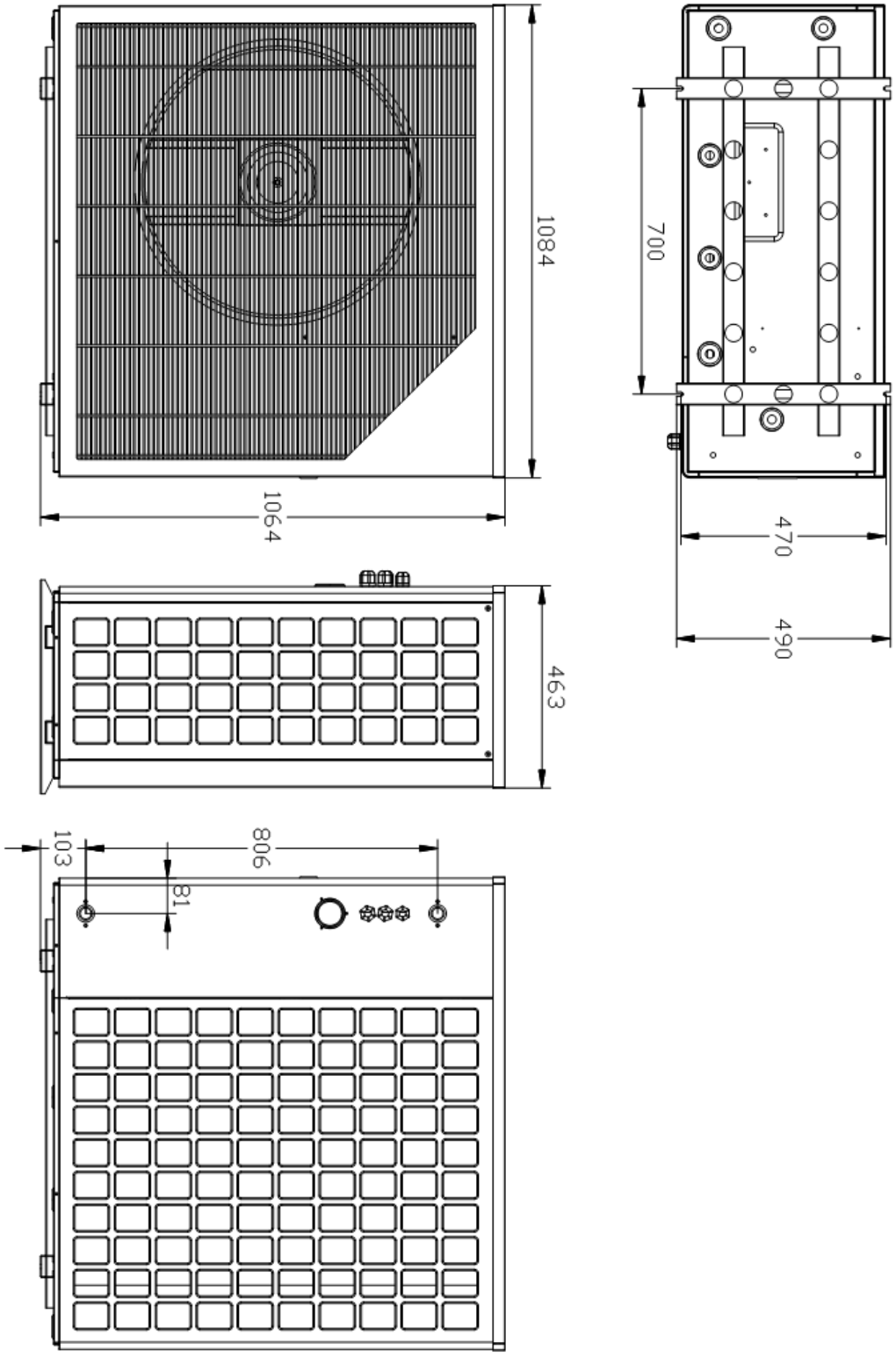
2.4.2. IG6-MP1-A1



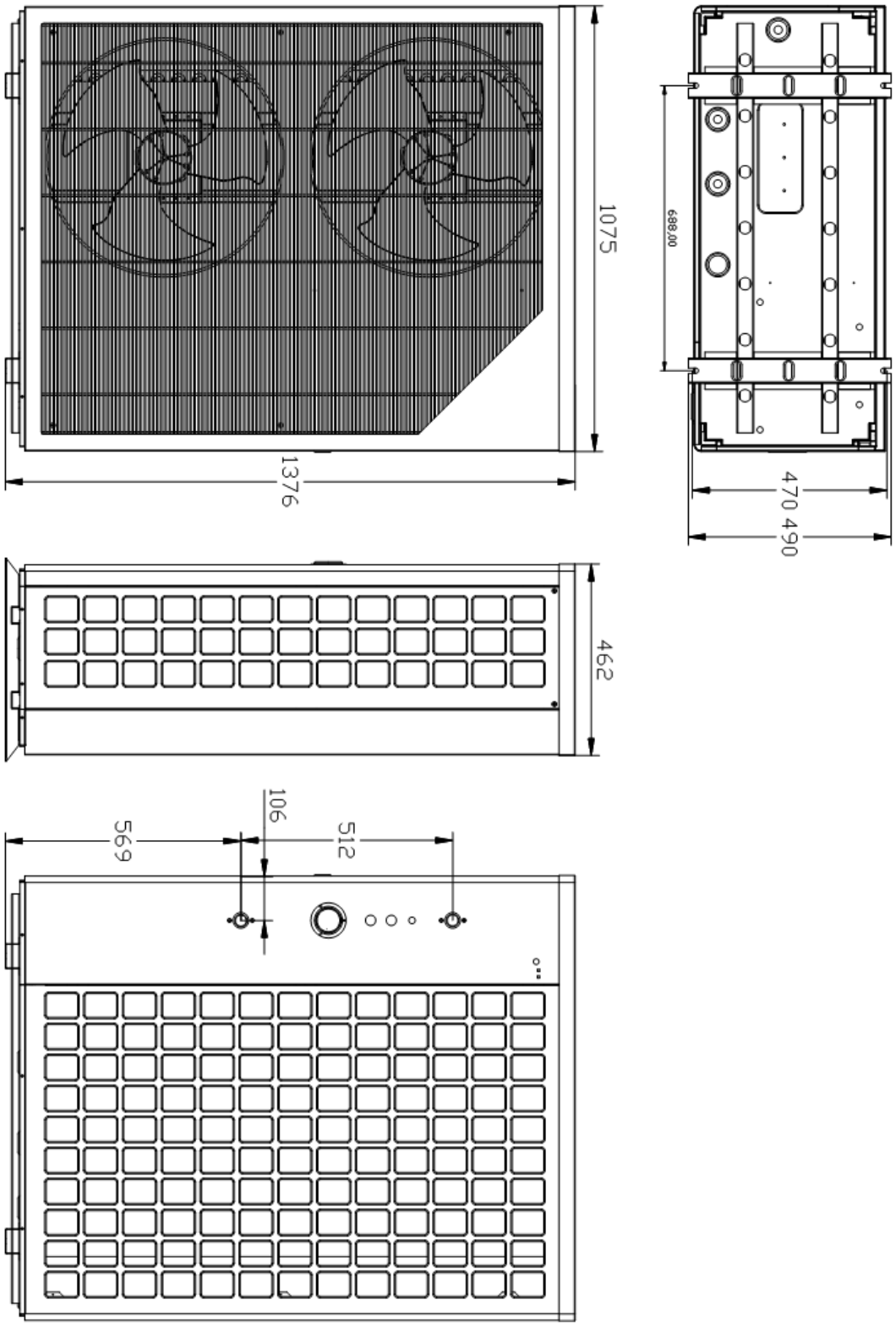
2.4.3. IG8-MP1-A1



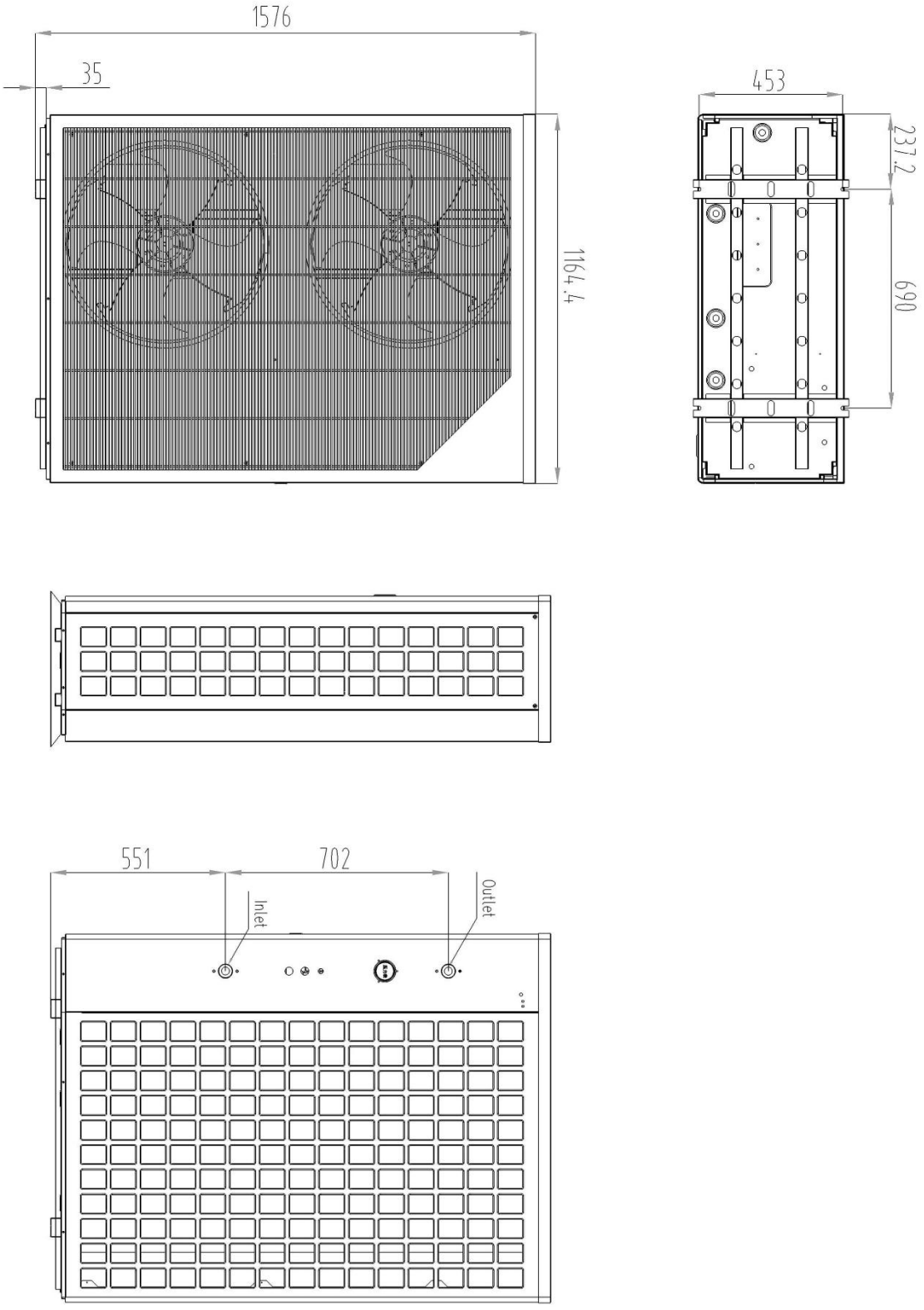
2.4.4 IG10-MP1-A1



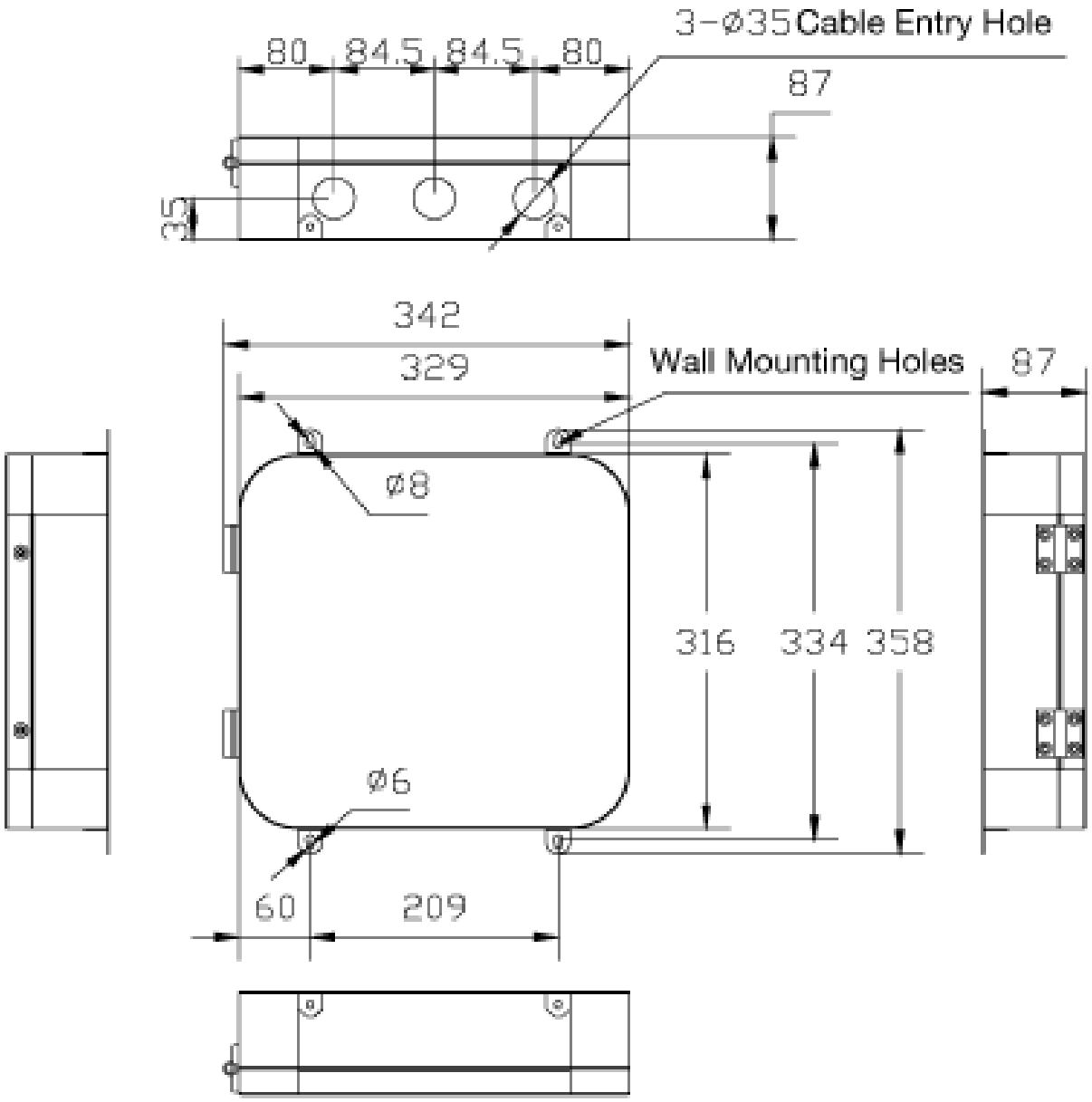
2.4.5. IG12-MP1-A1



2.4.6. IG16-MP1-A1



2.4.7. IG1-PCB-A1

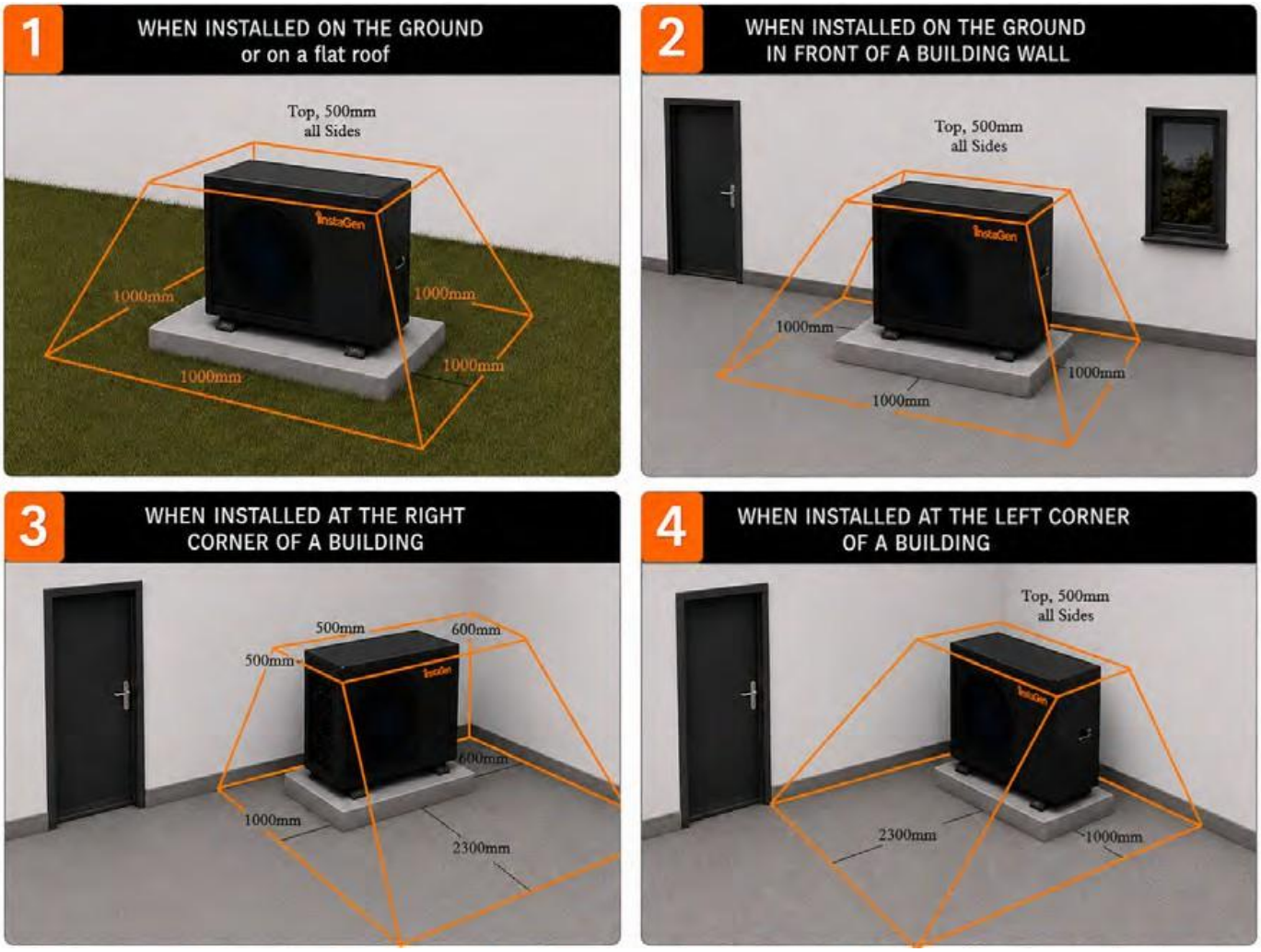


2.5. Installation Details

R290 Safety Protection Zones - IMPORTANT:

This unit uses R290, a highly flammable (A3) refrigerant. To ensure safe operation and comply with international standards (EN 378 / IEC 60335-2-40), the following "Safety Protection Zones" must be strictly maintained:

1. **Clearance from Openings:** A minimum distance of 1m must be maintained between the unit and any building openings (such as windows, doors, or ventilation grilles) and low-lying areas (such as drains, light wells, or basement entries). R290 is heavier than air and can accumulate in these areas in case of a leak. There should be no sinking or deepening of the ground in the safety zone.
2. **No Ignition Sources:** Within 1.5m of the unit, there must be no potential ignition sources, including electrical sockets, switches, or non-explosion-proof lamps.
3. **Ventilation:** The installation site must be well-ventilated to prevent gas concentration.

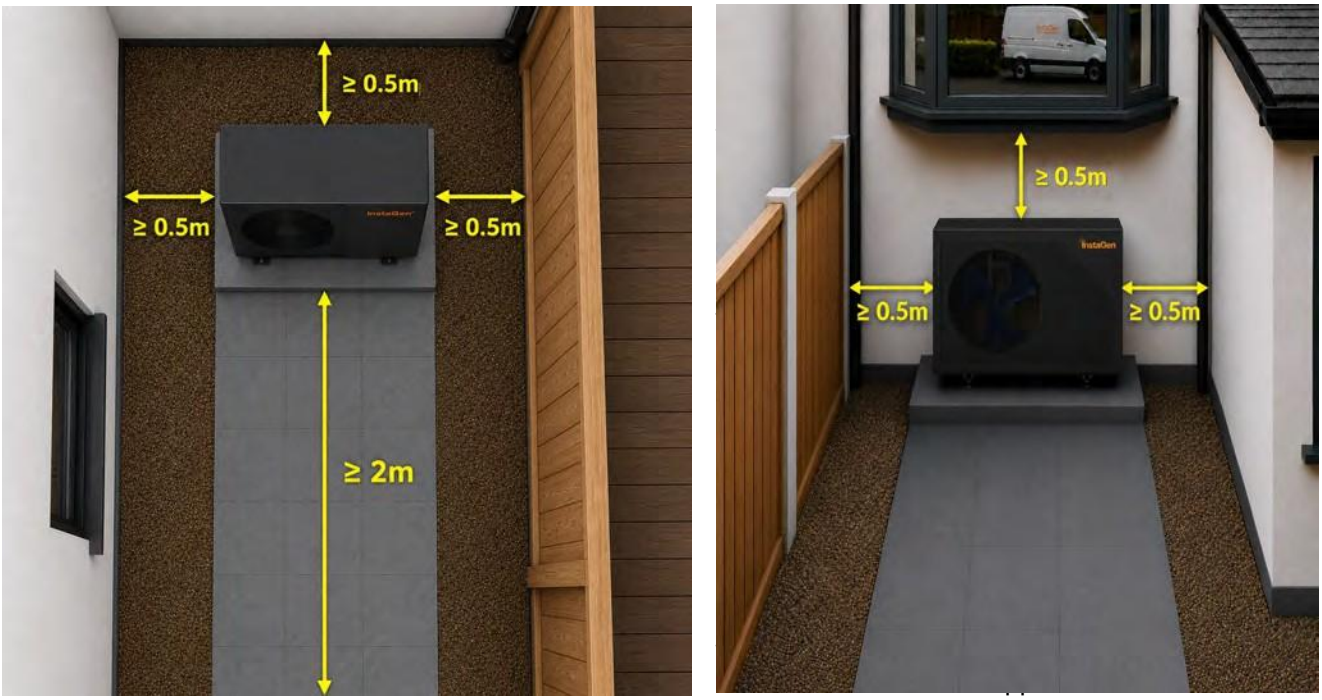


R290 clearances & example installation locations

All of the criteria given in the following section reflect the minimum clearances. However, each installation must be evaluated, taking into account proximity and height of walls, and proximity to public access areas.

The heat pump must be placed to provide clearance for maintenance and inspection as detailed below as a minimum.

1. The heat pump installation area must have good ventilation and shall not hinder the inlet and air outlet.
2. The installation area must have a good drainage system and have a solid foundation.
3. Do not install the unit in areas with corrosive gases (chlorine or acid), dust, sand and leaves.
4. For better ventilation, heat exchange, maintenance, and troubleshooting, sufficient space should be reserved around the unit. According to different installation situations, the recommended reserved distances are shown in the following figure.
5. The heat pump must be installed with Anti-Vibration Mounts (AVM's) to prevent vibration and/or imbalance.
6. Units touch screen controller to be installed indoors within 10m of unit, cable supplied, cannot be lengthened (cable is white and found in compressor compartment pre-wired to PCB terminal).
7. The plumbing pipework must be installed with proper support to prevent possible damage due to vibration. Sanitary water pressure should be kept over 1.96bar. Otherwise, booster pump should be installed.
8. The acceptable operating voltage range should be within ±10% of the rated voltage. The heat pump unit must be grounded /earthed for safety purposes
9. Minimum height from floor is 100mm



Recommended installation clearances around the unit

CAUTION!

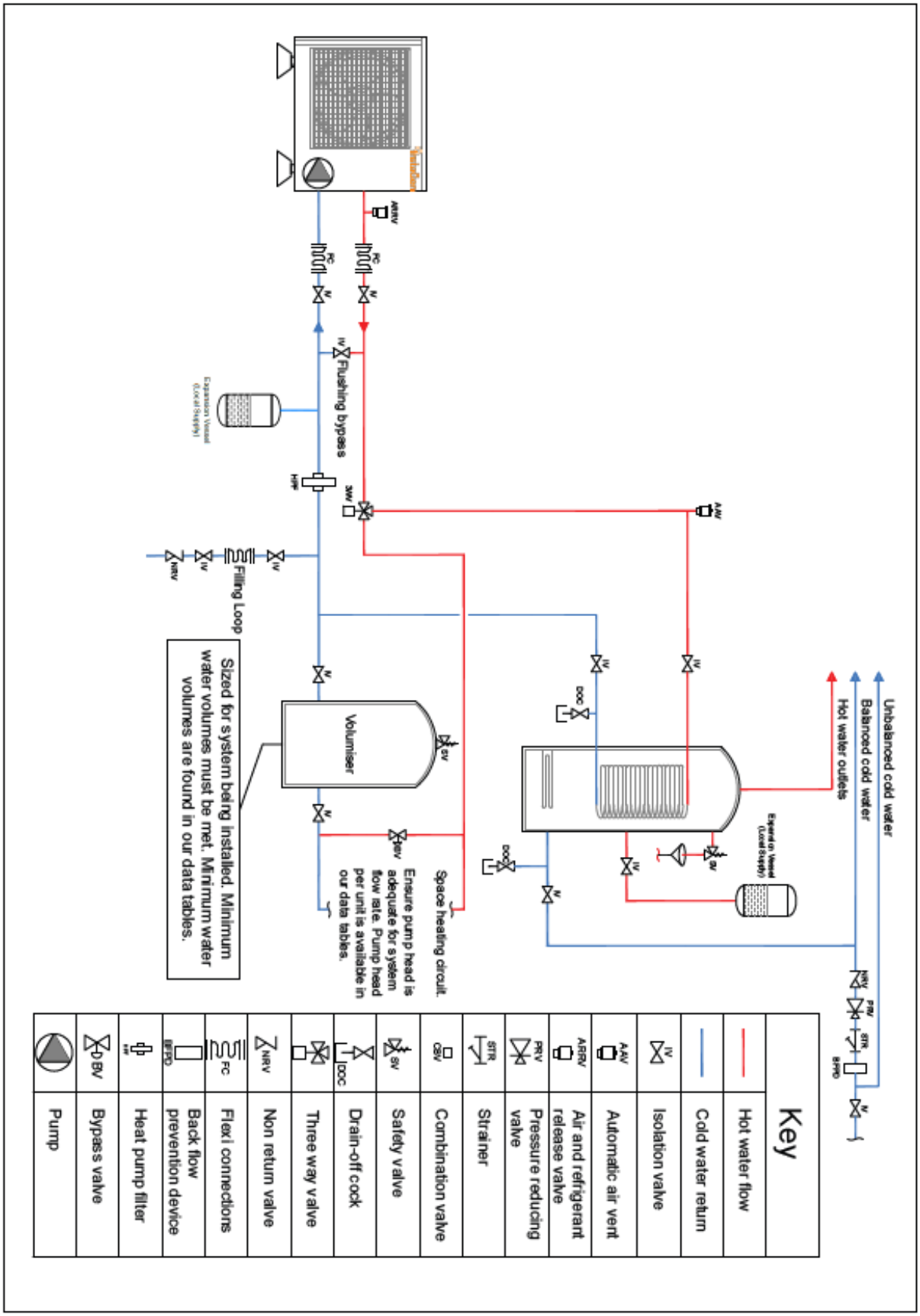
- DO NOT install the heat pump near to hazardous materials and places.
- DO NOT install the heat pump under deep sloping roofs without gutters which will allow rainwater, mixed with debris, to be forced through the unit.
- Place the heat pump on a flat slightly pitched surface, such as concrete or fabricated slab. This will allow proper drainage of condensation and rainwater from the base of the unit. If possible, the slab should be placed at the same level or slightly higher than the drainage system/equipment.
- Ensure there is suitable drainage around the unit as it is likely to produce up to 10L an hour of condensate for larger units. Soak-aways or control into a close downpipe, for example, or otherwise risk a slip hazard especially in freezing conditions

Cylinder connected to the heat pump via a 3-way valve. InstaGroup's Heat Pumps have the Primary pump built into the Outdoor unit.

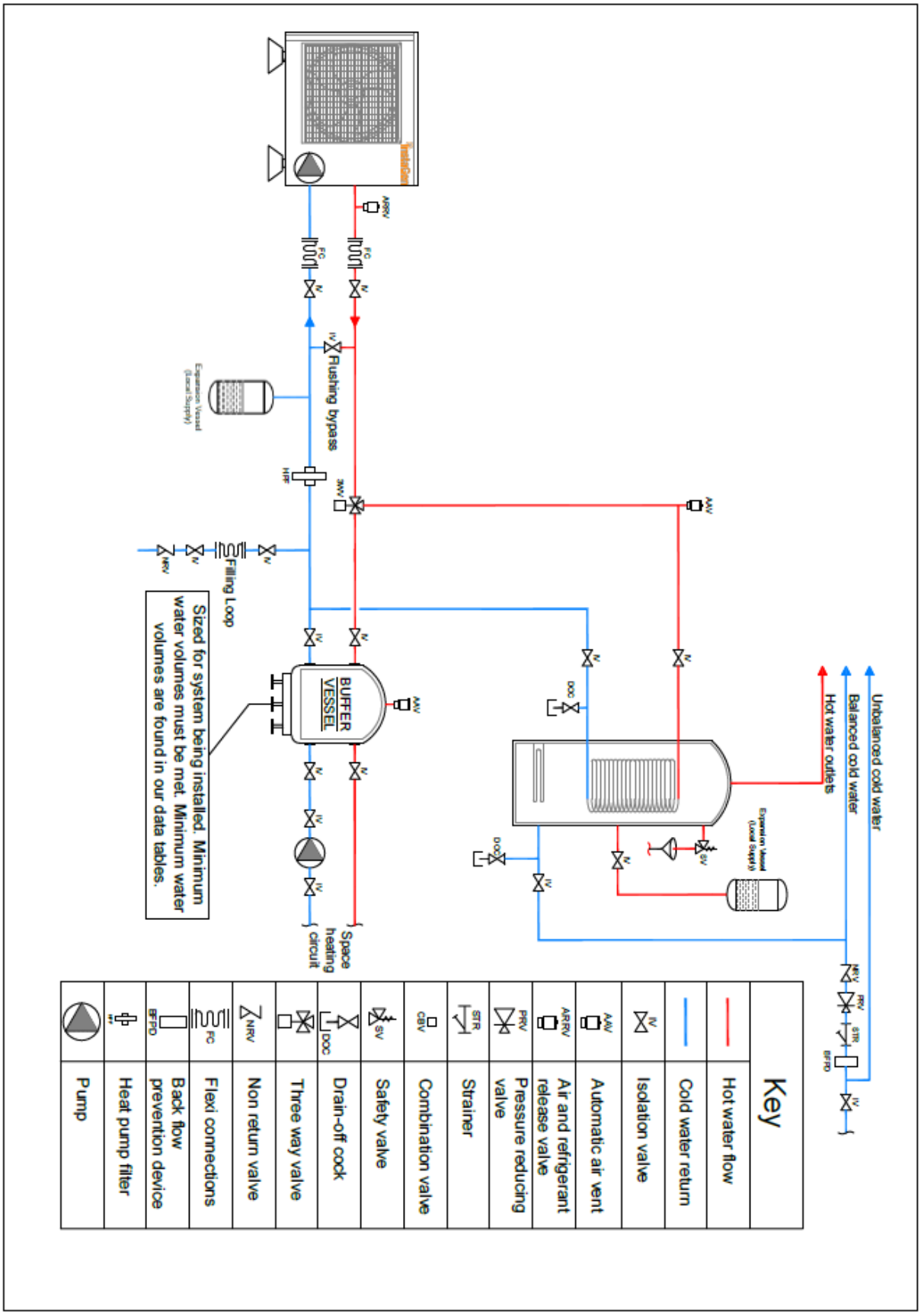
When installing the unit, installers should connect the heat pump with other parts including the buffer tank (for space heating/cooling), Hot Water Cylinder (HWC) (for domestic hot water). External fittings are needed including pressure reducing valve, pressure relief valve, non-return valves, filling loop, three-way valve, heat pump vortex/magnetic filter. Temperature sensor supplied needs to be installed into the HWC. An additional immersion heater can be installed in the HWC or the buffer tank which can be controlled from the heat pump.

1. System installation diagram to see Figure 6.1 (Without buffer) and Figure 6.2 (with buffer).
2. The Indoor PCB Box has the following connected to it, secondary circulation pump (if needed), Thermostat, Immersion heater, Backup heater, and Three-way valve are all wired from the External PCB Box.
3. **C17 in Factory Parameters must be changed to on. (See section 3.1 – Operating Heat Pump)**
4. 3-way valve: For domestic hot water mode, 3-way valve powers on. For space heating or cooling, 3-way valve powers off.
5. When both heating (or cooling) and domestic hot water don't reach the setting temp., hot water is priority.
6. The hot water tank with coil for domestic hot water should be specially customized.
7. The heat exchange capacity of the coil should be ≥ the rated heating capacity of the heat pump.
8. The unit is delivered ready for operation and is filled with R290 refrigerant.
9. Power on the unit for at least 12hrs before for first start. Unit remains off but with power to it so controller is awake but system off. This allows for compressor pre-heat.
10. R290 refrigerant is flammable and explosive. It's prohibited from being installed in an environment which has operating or potential ignition sources.

2.8. Schematic – Space Heating & Hot Water (Without Buffer)



2.9. Space Heating & Hot Water (With Buffer)



2.10. Water Connections

Installation to comply with **BS 6700** and **BS EN 806** plus **Regulation G**. It is recommended to use stainless steel, copper or PPR pipes for the heat pumps plumbing. The water inlet and outlet connection to the heat pump accepts stainless steel, copper or PPR pipe fittings. Flexi hoses are recommended to decrease vibration transfer.

CAUTION!

Ensure flow requirements and tap water turnover rates can be maintained with the installation of additional heat pumps and plumbing restrictions.

2.11.1 Plumbing Installation Requirements

- When water pressure exceeds 490Kpa, please use reducing valve to reduce the water pressure below 294Kpa
- All pipework connected to the unit must incorporate unions (loose joints) and full-flow isolating valves. This ensures the unit can be easily disconnected for maintenance or service without draining the entire system
- Ensure that all plumbing has been properly completed and then proceed to do a water leakage and pressure & leak test
- All the pipelines and pipe fittings must be insulated to prevent heat loss
- Install a drain valve at the lowest point of the system to enable the system to be drained when necessary
- Install a check valve on the water outlet connection in order to prevent back siphoning when water pump stops
- In order to reduce the back pressure, the pipes should be installed horizontally
- Minimize elbows (90 degrees connections)
- Install a bypass valve where & when needed
- Fully flush system using a flushing bypass before final commissioning
- Before using the unit, the water quality should be analysed, such as pH value, conductivity, chloride ion, sulphate concentration, etc. The following are the water quality standards applicable to this unit.

Item	Unit	Standard Requirements
pH Value	**-**	**7.5–9.0**
Chloride Ion	**mg/L**	**≤50**
Sulphate	**ppm**	**≤50**
Total Hardness	**mg/L**	**≤200**

2.11. Electrical Connections

Installation to comply with **BS 7671:2018+A2:2022 (18th Edition).**

WARNING - Risk of Electrical Shock or Electrocution

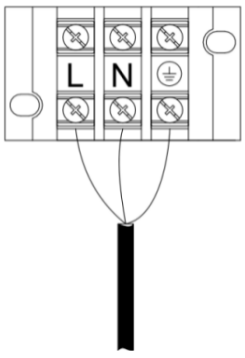
Ensure that all high voltage circuits are disconnected before commencing heat pump installation. Contact with these circuits could result in death or serious injury to users, installers or others, due to electrical shock and may also cause damage to property.

Non-professionals are prohibited from installing. Attention should be paid to high-voltage electrical safety.

Ensure that the main power supply of the device is above 1 metre (ensuring that children cannot access it).

2.12. Power Supply

- If the supply voltage is too low or too high, it can cause damage and/or result in unstable operation of the heat pump unit, due to high in rush currents on start-up.
- The minimum starting voltage should be above 90% of rated voltage. The acceptable operating voltage range should be within ±10% of the rated voltage.
- Ensure the cable specifications meet the correct requirements for the specific installation. The distance between the installation site and mains power supply will affect the cable thickness. Follow the local electrical standards to select the cables, circuit breakers and isolator breakers.
- Power and wiring connections are found on the right hand-side of the compressor compartment at the very top. To access, remove the 4 screws on the right-hand side panel - 2 at the top and 2 at the bottom.
- If PCB Box is being used, then this needs its own isolated power supply as detailed in table in section 2.3.
- Use a 3-core power cable of appropriate length & cross-sectional area according to local safety regulations and connect to the power terminal block of the unit.



Single phase power input

2.13. Grounding and Overcurrent Protection

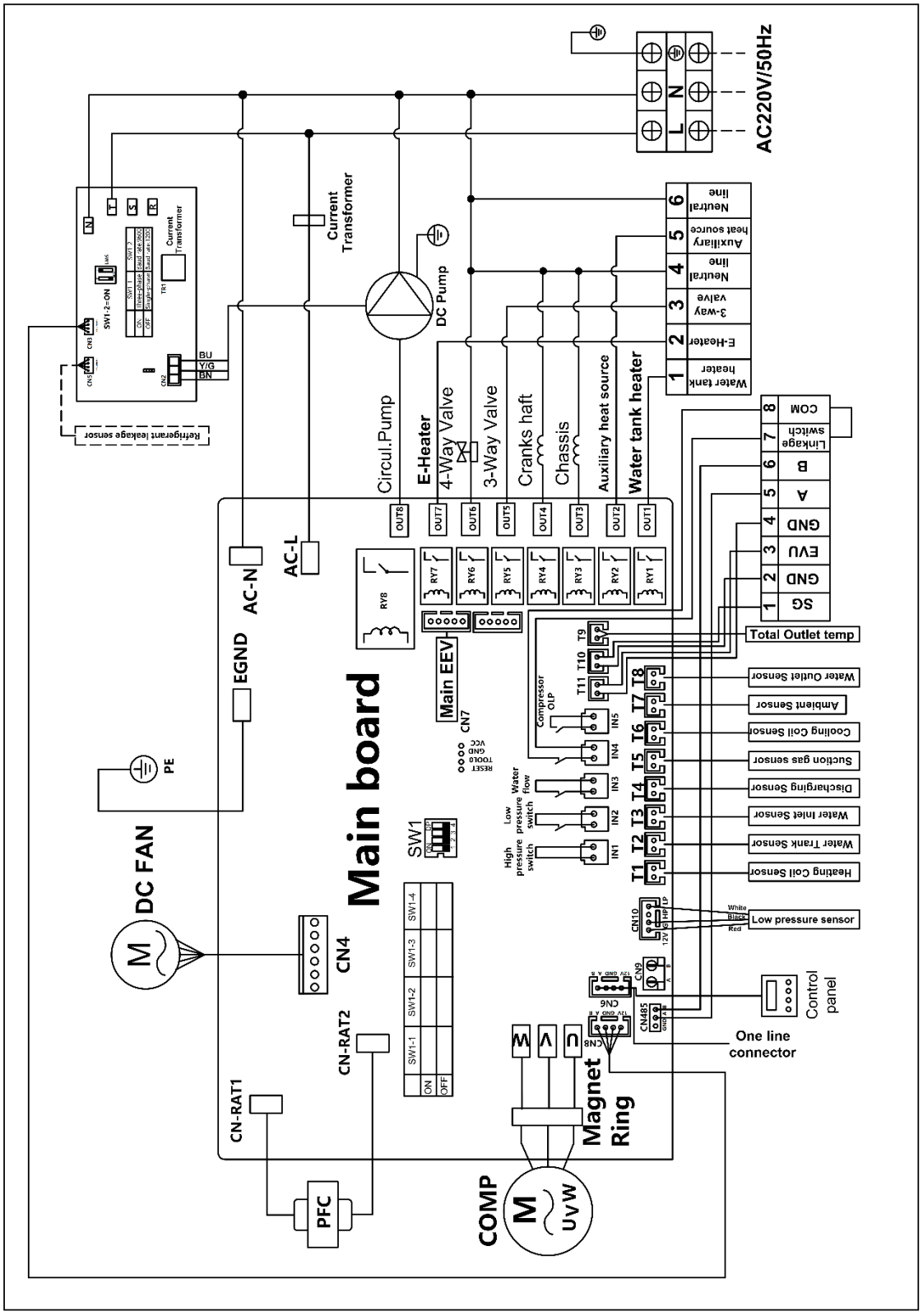
- MCB type C with a Double pole Type B Heat Pump RCD recommended.
- In order to prevent electrical shock in case of leakage from unit, install the heat pump according to local electrical standard.
- Do not interrupt the voltage supply to the heat pump frequently as this may result in a shorter life expectancy of the heat pump.
- When installing over current protection, ensure that the correct current rating is met for this specific installation.
- If an additional auxiliary heater is used and needs to be controlled by the heat pumps controller, the relay (or braker) of the aux-heater must be connected to the relevant output of the controller. The controller will not power the heater directly; it will only provide an on/off signal.

CAUTION

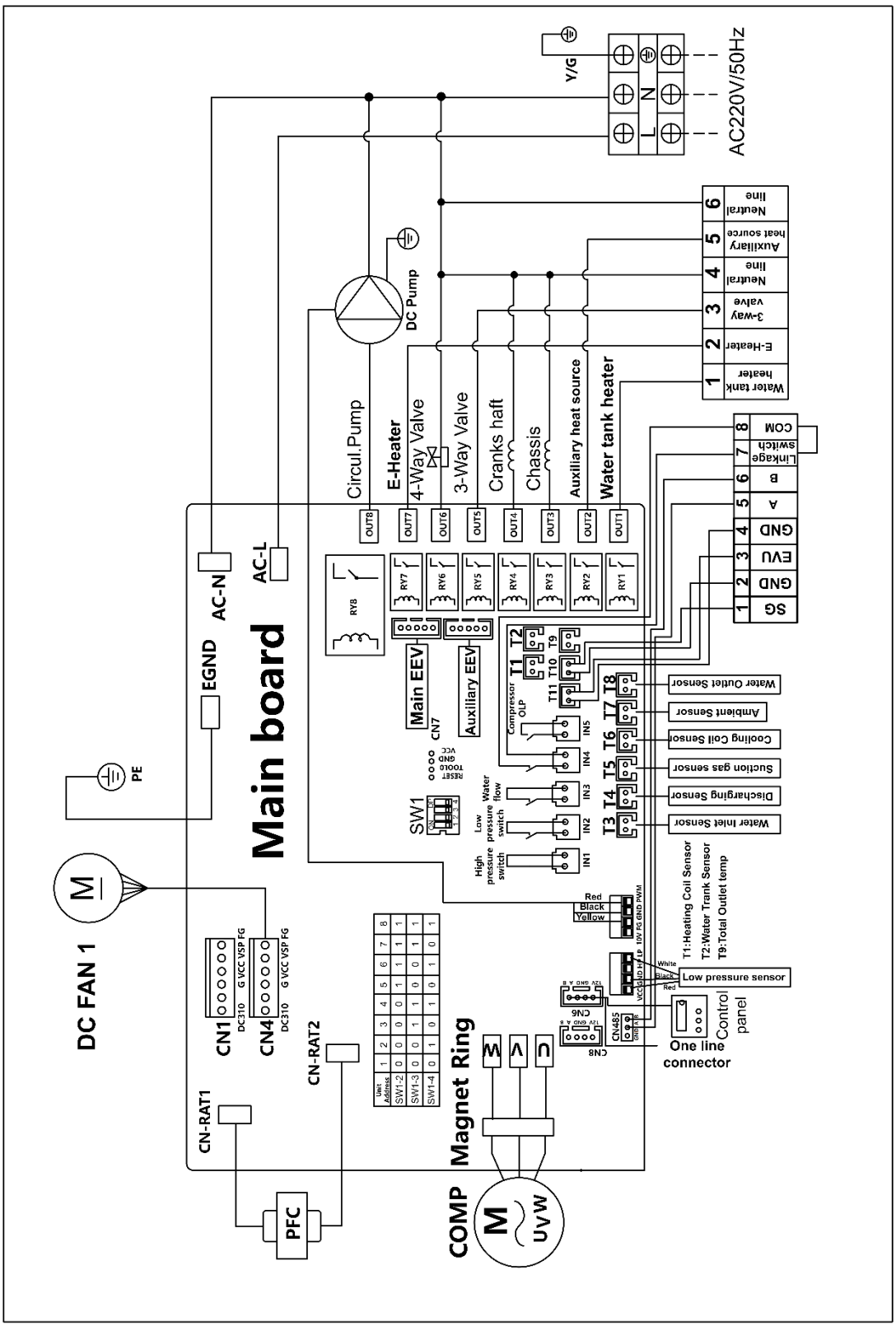
Label all wires prior to disconnection when servicing the heat pump. Wiring errors can cause improper and dangerous operation. Check and ensure proper operation after servicing.

2.14. Electrical Wiring Diagrams

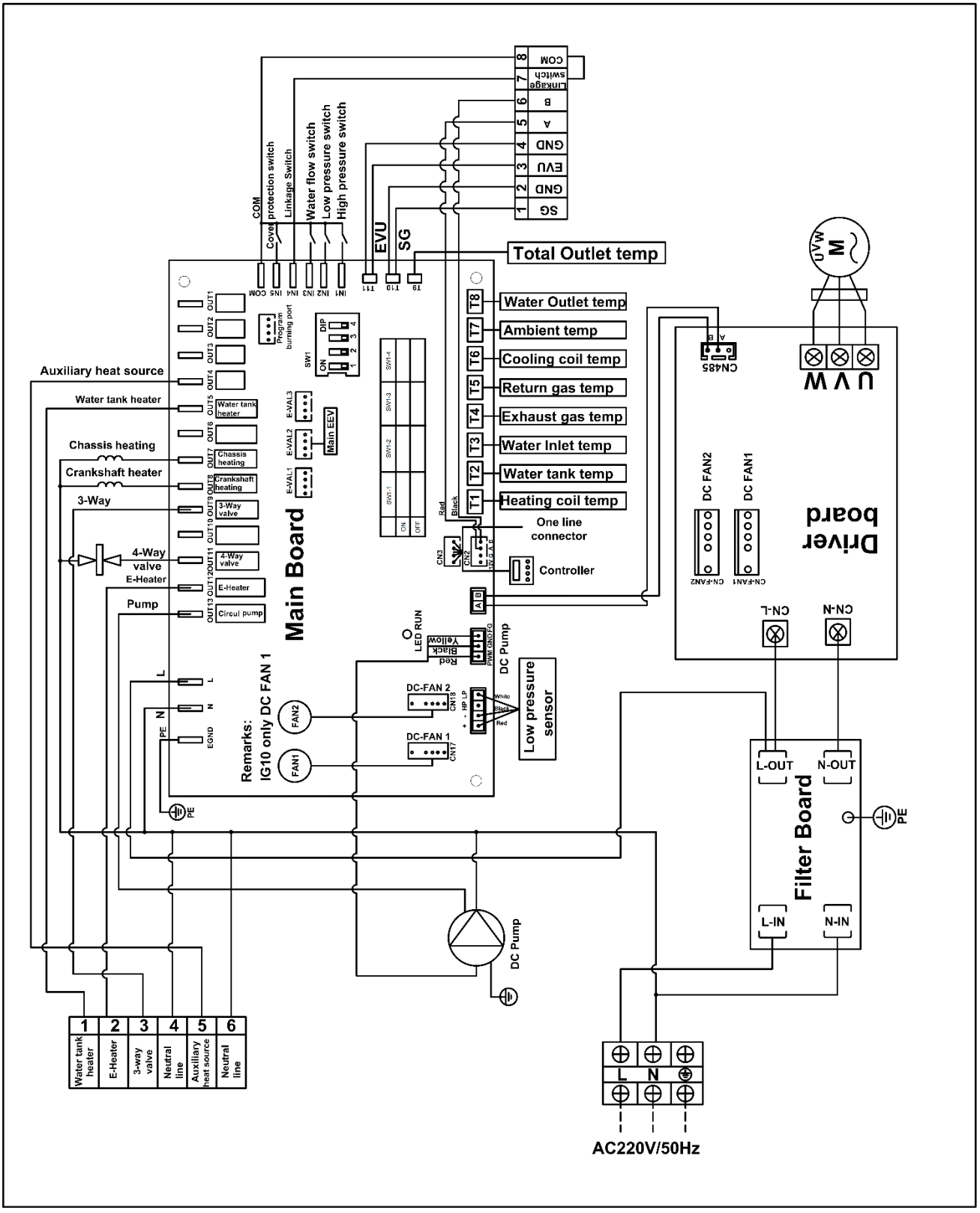
2.14.1. IG4-MP1-A1



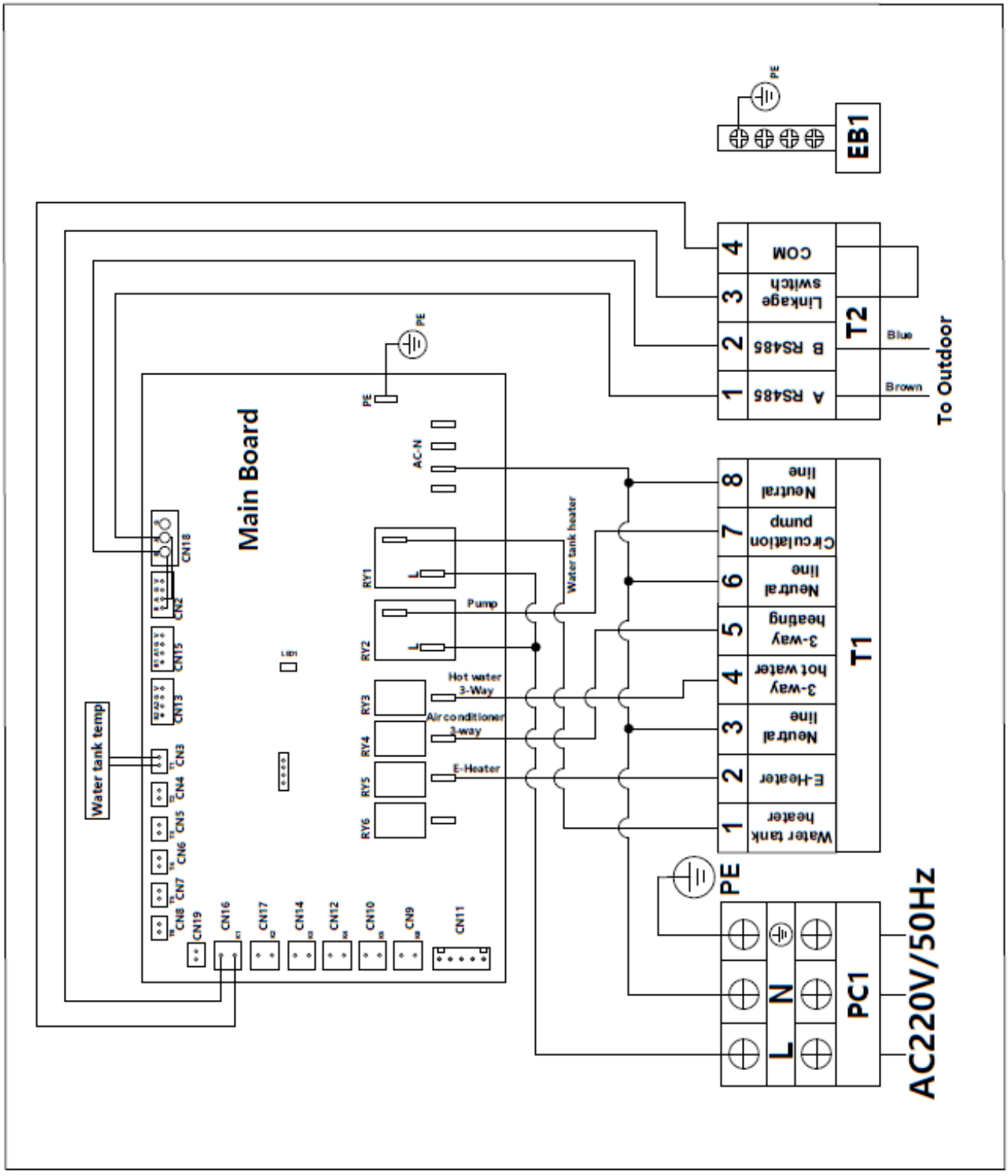
2.14.2. IG6/IG8-MP1-A1



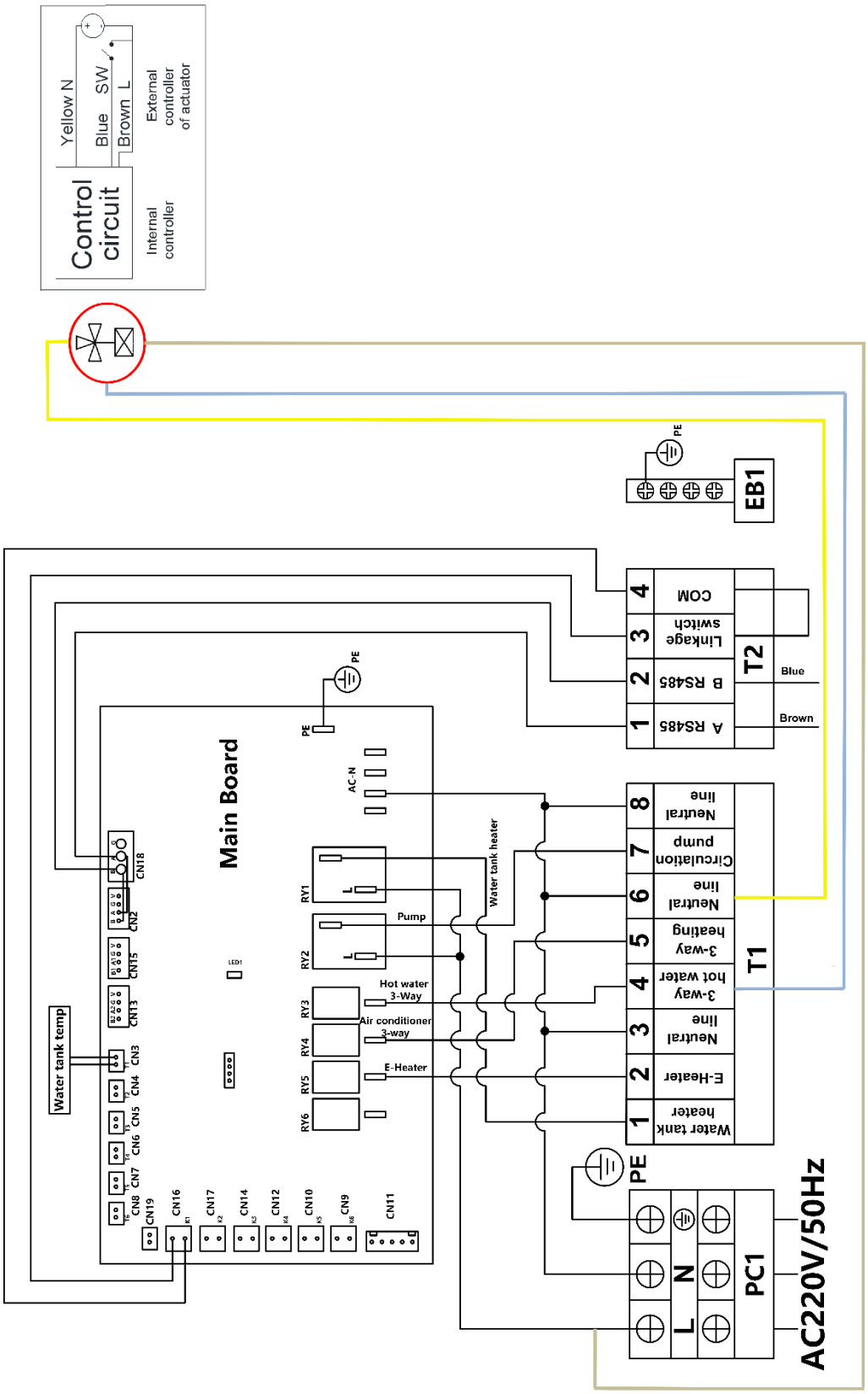
2.14.3. IG10/IG12/IG16-MP1-A1



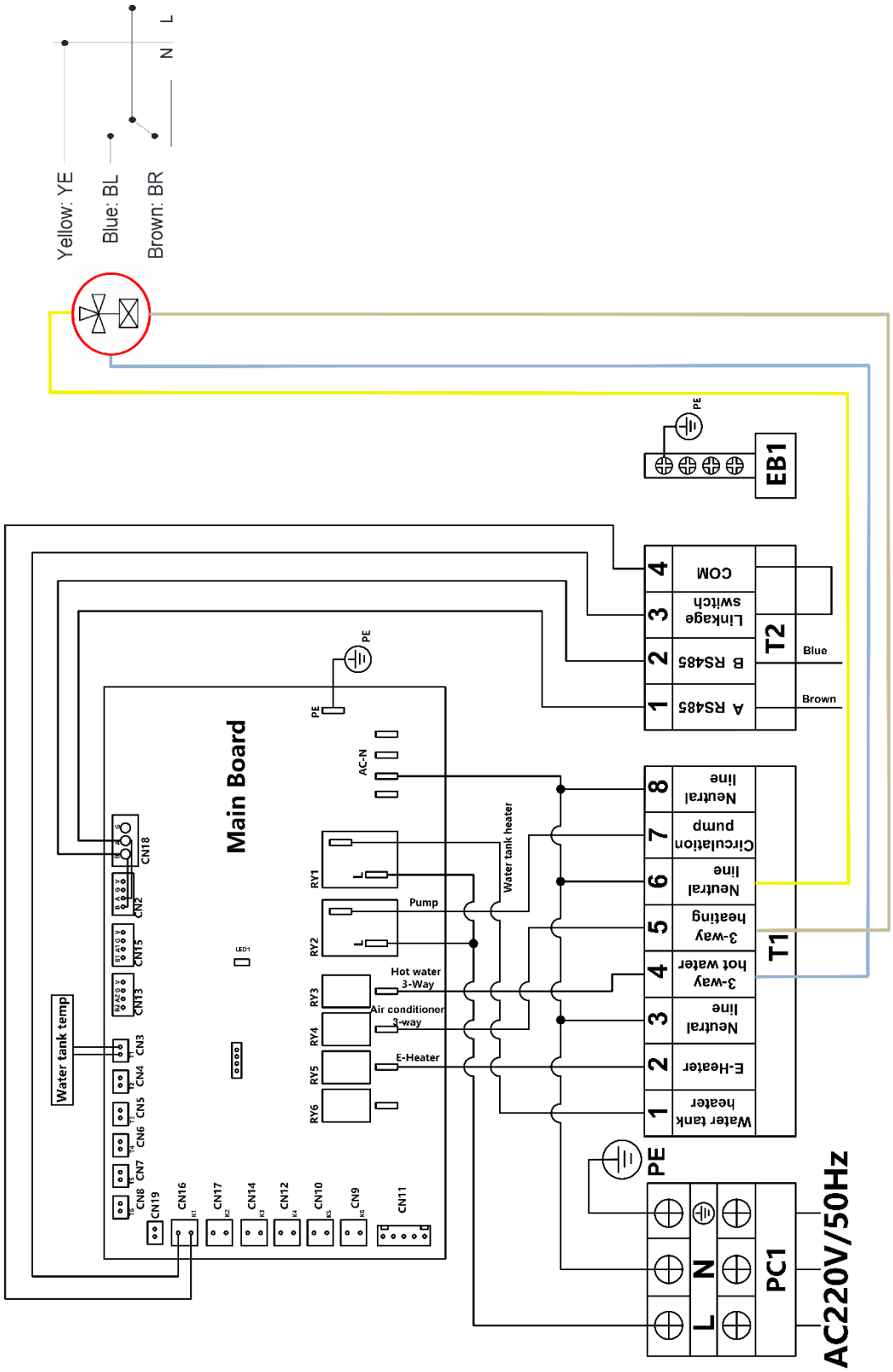
2.14.4. Indoor PCB Box – IG1-PCB-A1



2.14.5. Indoor PCB Box 3-way Valve –Type 1 (3 wires and 1 control type)



2.14.6. Indoor PCB Box 3-way Valve – Type 2 (3 wires and 2 control type)



3. Operating the Air Source Heat Pump



Touchscreen Controller – Home Screen

Touchscreen Controller – Settings Menu Screen

3.1. Display Icons

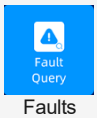
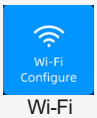
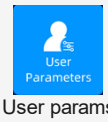
Note: Wording in controller may differ

Heating	Cooling	Hot water	Heating + HW	Cooling + HW	Smart
Silent	Powerful	Holiday	Home screen	Fault	Anti-freeze
Water pump	Fan motor	Compressor	Defrosting	BUH heater	Sec.pump
Wi-Fi	H + HW (hot water)	H + HW (heating)	Aux heat source	Immersion	

Icon Label	Meaning	Icon Label	Meaning
Heating	Space heating active only	**Cooling**	Space cooling active only
Hot water	DHW active only. Feeding Hot Water cylinder only	**Heating + HW**	Combined both heating & hot water active, hot water priority
Cooling + HW	Combined both cooling & hot water active, hot water priority	**Smart**	Recommended, system adjusts itself for optimal performance

Icon Label	Meaning	Icon Label	Meaning
Silent	Quietest operation	**Powerful**	Maximum capacity output
Holiday	Limits flow temperature to avoid freezing of home and system	**Home screen**	Takes you back to home screen
Fault	There is a fault with the system. Contact InstaGroup	**Fan motor**	Fan active
Water pump	Primary pump active	**Defrosting**	Defrost cycle active
Compressor	Flashing = preheating	**Anti-freezing**	Anti-freeze protection active
BUH heater	Backup electric heater working – space heating	**H + HW (hot water)**	Hot water currently running
Wi-Fi	Wi-Fi connected	**Aux heat source**	AHS active
H + HW (heating)	Heating currently running	**Sec.pump**	Secondary side pump active
Immersion	Immersion heater working – Hot Water / Legionella cycle		

3.2. Definition of Buttons

 Mode	 Setting	 Timer	 On/Off	 Temp(single)	 Temp(dual)	 Status
 Faults	 Wi-Fi	 User params	 Factory params	 Oper. Curve	 System info	 Language

Button	Description	Function
Mode	Changes modes	Switch the operating mode of the heat pump
Setting	Settings menu	Query running parameters, check and set system parameters, error code records, Wi-Fi, etc.
Timer	Timer settings	Set timer (working days apply for all timers - recommended for DHW only)
On/Off	Power	Turn unit ON or OFF (recommended to leave on)
+ / – (single)	1 temp setting	Temperature setting for only hot water, only heating, or only cooling mode
+ / – (dual)	2 temp settings	In combined modes: left = heating/cooling temp; right = hot water temp
Status	Status screen	Check the running parameters of the heat pump
Faults	Fault log	Record and shows the most recent error codes
Wi-Fi	Wi-Fi setup	Wi-Fi setting and connection

User Params	User settings	Check and set the user parameters of the heat pump
Factory Params	Advanced settings	Check and set the factory parameters - not advised to amend
Oper. Curve	Performance graph	Shows system data over time in graph format
System info	System info	Check version of the motherboard and remote controller
Language	Language select	Language selection

3.3. Touch Screen Controller Operation

3.3.1. Indoor PCB Box Setting (IG1-PCB-A1)

Press **"SETTING"** on the home screen → **"FACTORY PARAMETERS"** (password: **4180**). Adjust parameter **C17 to the "ON" state**.



Settings menu screen

Factory parameters - set C17 to ON

3.3.2. Start/Stop the Heat Pump

On the home screen of the touch screen controller, press the **"ON/OFF"** key. The "Startup Confirmation" pop-up window appears. After startup is confirmed, the mode symbol is displayed (yellow box). Mode symbol not displayed when system switched off via ON/OFF button.



Home screen – mode symbol shown when system is running

3.3.3. Set Target Water Temperature

Single mode: Click **"+"** and **"–"** on the touch screen controller to adjust the required temperature.

Dual mode (image below): Click **"+"** and **"–"** on the **left side** to adjust heating or cooling temperature; **right side** to adjust hot water storage temperature.



Temperature adjustment – dual mode display

3.3.4. Operating Mode Selection

On the home screen of the touch screen controller, press the **"MODE"** key to enter the Operating Mode, Frequency Mode and Vacation Mode menu, and select required setting.

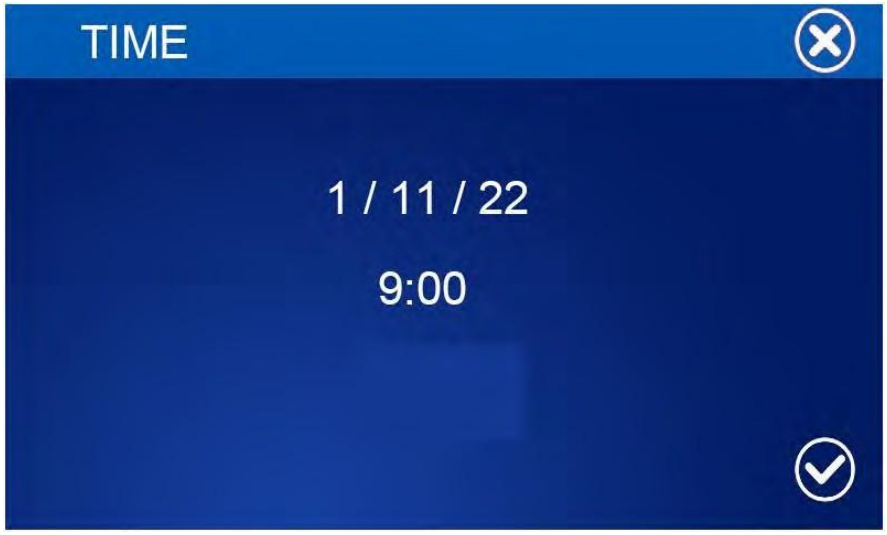


Operating mode selection screen

Mode	Description
Powerful	Runs at maximum capacity. Use only when required.
Silent	Reduces operating noise for quieter operation, particularly useful at night.
Vacation Mode	Heat pump runs in heating mode only, target temperature of 30°C return water temperature - cannot be changed.
Smart (Recommended)	Automatically adjusts output for the best balance of comfort, efficiency, and running costs.

3.3.5. Clock Setting

Press the date/time in the top right corner of the touch screen controller to enter the clock setting interface. Press date (Year/Month/Day) or time (Hour:Minute) to set each using the keyboard. Press **TICK** to save, or **X** to exit without saving.



Clock setting screen

3.3.6. Timer Setting

From the Home Screen, press the **TIMER** button to enter the timer settings interface.

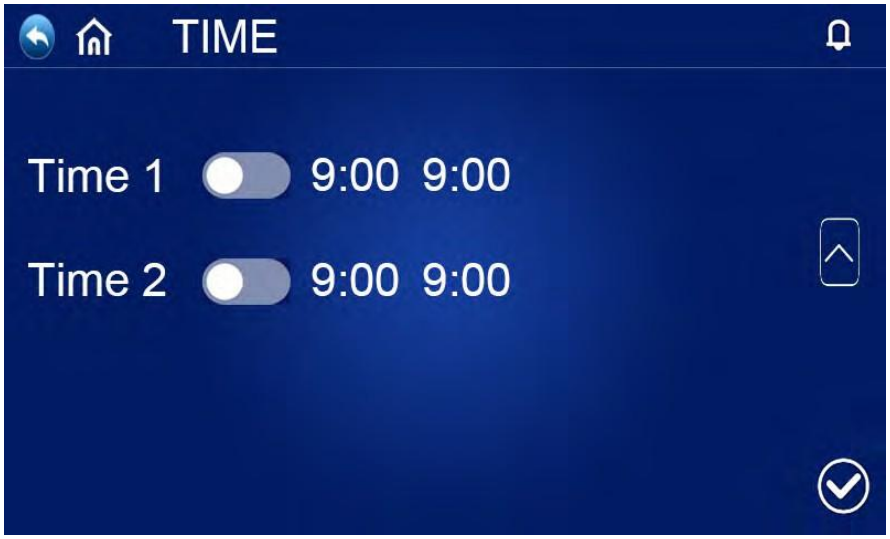
- Select weekdays: white = timer active on that day; grey = inactive. **NOTE: All 3 timers work on the same selected days**
- A maximum of 3 time periods can be set.
- The timer is invalid when the turn ON time equals the turn OFF time.
- Recommended for scheduling Domestic Hot Water only.



Timer setting screen

3.3.7. Silent Mode Timer

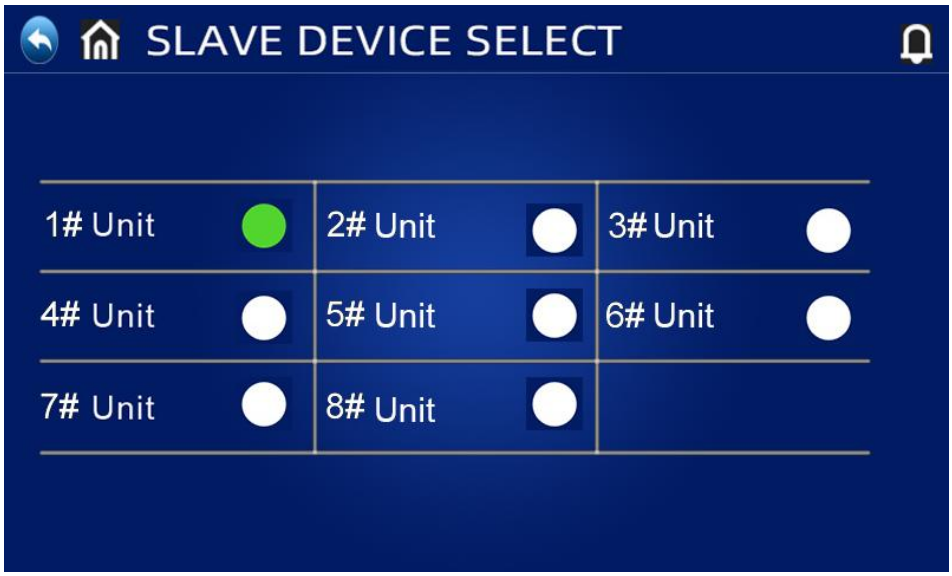
Click the 'down' arrow on the right-hand side in the **"TIMER"** interface to enter the silent timer. The unit will run in **Silent Mode** during scheduled times every day.



Silent mode timer screen

3.3.8. Operation Parameter Query

Press **"SETTING"** → **"OPERATING STATUS"** → select the corresponding unit to enter the Status Screen and check the operation status. Unit 1 will always be available. Unit 2 and upwards only applicable in cascade set up.



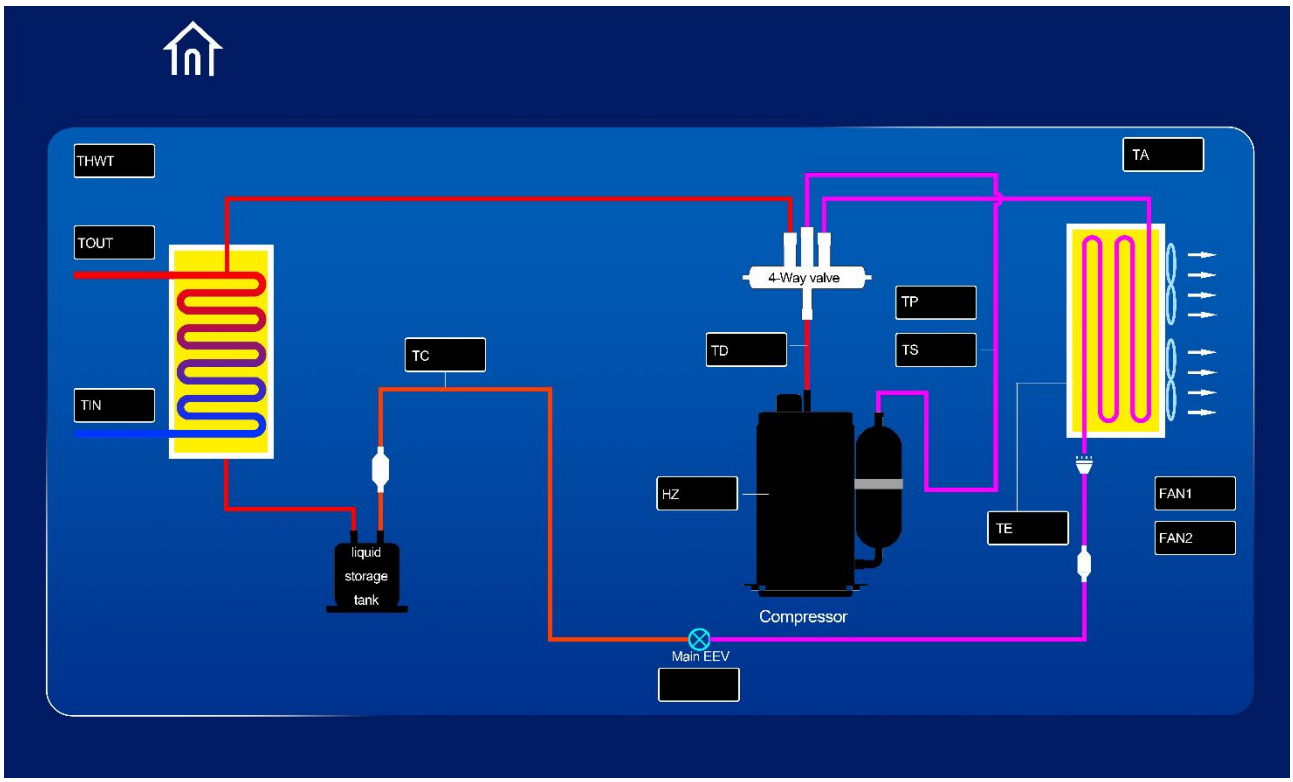
Slave device selection screen

Code	Description	Remark
01	Water inlet temperature	–30 to 99°C
02	Water outlet temperature	–30 to 99°C
03	Ambient temperature	–30 to 99°C
04	Exhaust gas temperature	0 to 125°C
05	Return gas temperature	–30 to 99°C
06	Evaporator coil temperature	–30 to 99°C
07	Inlet temp of economizer	–30 to 99°C
08	Outlet temp of economizer	–30 to 99°C
09	Cooling coil temperature	–30 to 99°C
10	Water tank temperature	–30 to 99°C
11	Opening of main expansion valve	
12	Opening of assistant expansion valve	
13	Compressor current	
14	Heat sink temperature	

Code	Description	Remark
15	Compressor target frequency	
16	Compressor actual frequency	
17	Low pressure gauge pressure value (R290)	
18	Low pressure conversion temperature	
19	Speed of DC fan 1	
20	Speed of DC fan 2	
21	EVU powered signal	
22	SG grid signals	
24	DC bus voltage value	
25	Heating Capacity	
26	Current water flow volume	
27	Current of the entire machine	
28	Voltage	
29	Power Rate	
30	COP (EER)	
31	Target rotation speed of DC water pump	
32	DC pump speed	
33	Emergency switch	
34	Linkage switch	
35	Water flow switch	
36	Low pressure switch	
37	High pressure switch	
38	Heat pump billing costs	
39	Gas billing costs	

Forced Defrosting: From the "Slave Device Select" menu, press and hold the corresponding unit number to pop up the forced defrosting selection interface of the corresponding unit. If yes is selected, the corresponding unit enters forced defrosting.

Refrigerant System Diagram Key: Click the home icon in the upper left corner of the Home Screen only to enter the Heat Pump Refrigerant System Diagram. The meaning and explanation of the abbreviations are as below:



Heat pump refrigerant system diagram

Code	Description	Code	Description
THWT	Water tank temperature (T2)	TOUT	Outlet water temperature (T8)
TIN	Inlet water temperature (T3)	TC	Subcooled temperature (T6)
TD	Exhaust gas temperature (T4)	TP	Low pressure sensor
TS	Superheat temperature (T5)	TE	Evaporator coil temperature (T1)
TA	Ambient temperature (T7)	FAN 1	Fan speed of DC fan 1 (RPM)
HZ	Compressor frequency	FAN 2	Fan speed of DC fan 2 (RPM)
MAIN EEV	Opening steps of expansion valve		

3.3.9. User Parameters Query and Setting

Press **"SETTING"** → **"USER PARAMETERS"** to enter parameter query and setting. Below lists show the codes, definitions, ranges and default values available for users to change.

Press "**SETTING**" → "**FACTORY PARAMETERS**" can be set by the engineer to enter installer mode.

Remaining engineering parameters (P08–H21) require factory parameter access with password 666.

Recommended for qualified engineers only.

Code	Definition	Settable Range	Default
P01	Set back flow temperature for Space Heating & Cooling	2°C–18°C	2°C
P02	Set back temperature for Hot Water Cylinder	2°C–18°C	5°C
P03	Hot water target storage temperature	28°C–70°C	50°C
P04	Cooling target flow temperature	12–30°C (P31=0) / 7–30°C (P31=1)	12°C
P05	Heating target flow temperature	15°C–70°C	35°C
P06	Cooling set room temperature (touch screen as thermostat only)	16–30	26
P07	Heating set room temperature (touch screen as thermostat only)	16–30	20
	Temp difference of room temp and cooling/heating room target temp (touch screen as thermostat only)	1–10	2

P08	Water temperature offset	-5ºC ~15ºC	1
P09	Defrosting frequency	30-120HZ	70HZ
P10	Time between defrost cycles	20MIN~90MIN	45MIN
P11	Defrosting enter temperature	-1ºC ~-1ºC	-3□
P12	Defrosting time	5MIN~20MIN	8MIN
P13	Defrosting exit temperature	1ºC ~4ºC	15□
P14	Defrosting environment and evaporator coil temperature difference 1	0ºC 15ºC	5□
P15	Defrosting environment and evaporator coil temperature difference 2	0□~15□	5□
P16	Ambient temperature for defrosting	0□~20□	17□

P17	Frequency of Legionella cycle in days	0~30 days Disinfection function is not executed when set to 0	**0**
P18	Legionella cycle start time	0~23:00	23

P19	Legionella cycle length / time to get to and hold temperature. No other function operates until this time has elapsed	0~90min	30
P20	Immersions, Legionella cycle target temperature	0~90□	70□
P21	Heat Pumps, Legionella cycle target temperature	40~70□	65□

P22	Weather compensation	0~1 (0 is not enabled, 1 is enabled) (only applicable for space heating)	0
P23	**Curve** - Heating compensation temperature point (ambient temperature)	0-40	23
P24	**Shift** - Target temperature compensation coefficient	1~30 (1 corresponds to actual 0.1)	6
P36	Maximum flow temperature limit for Weather Compensation	20~80	70
P25	Frequency operating mode after constant temperature	0-Non-Decrease Frequency after constant Temp. /1-Decrease Frequency after constant Temp.	1

P26	Ambient temperature for starting electric heating. Back up Heater (space heating / buffer) ambient start temperature.	-20 - 20□	0
P27	Start time for electric heating	0-60 min	30
P28	On-line cascade units	1~8	1
P30	E-heater mode selection	0: Disable 1: Backup E-heater 2: Water tank booster heater 3: Backup e-heater + tank booster heater	0
P31	Water temperature control mode	0: Water inlet temperature 1: Water outlet temperature 2: Room temperature (Touch screen controller)	0

H	Celsius / Fahrenheit switch	0: Celsius / 1: Fahrenheit	0

P32	Temperature difference of compress full power operation	1~20□	10
P33	Loading temperature difference	1~20□	1
P34	Unloading temperature difference	1~20□	1

P35	Cascade mode regulation cycle	10~2500S	60

F01	Heat Pump Function	1: Heating only 2: Heating+Cooling 3: Heating+DHW 4: Heating+Cooling+DHW	4
F02	Primary pump status after reaching target temp.	0: Intermittent 1: All time 2: Stop at constant Temp.	0
F03	Primary pump sample cycle after reaching set temp.	1~120min	15 (OFF 15 min ON 3 min)
F04	Primary circulation pump mode	0: No Start 1: Auto 2: Manual 3: Control water flow	3
F05	Primary pump adjustment cycle	10~100S	60
F06	Primary pump speed	10~100%	100
F08	Minimum speed of Primary pump	10~100%	40

S1	Smart grid capabilities	0: Disabled 1: SG function 2: Power limit function	0
S2	Set DHW temp.increase value in SG mode	0-30□	5□

S3	Three-way valve status in antifreeze mode	0: three-way valve is off and not active 1: three-way valve is active	1
S4	Compressor stop time after 3-way valve switches	0-5min (0-compressor keeps running)	3

H01	Auxiliary heat source	0: Disabled 1: Heating 2: Hot water 3: Heating & hot water	0
H02	Auxiliary heat source operation mode	0: Low carbon mode 1: Eco hybrid mode	1

H03	Eco hybrid mode	0: Fixed pricing 1: Peak-valley pricing 2: Ambient temp judgment	1
H04	Ambient temp of auxiliary heat source operation	-30~30□	-10□
H05	Delay start time of auxiliary heat source	0~180min	30min
H06	Temperature difference to enter auxiliary heat source	2~18□	5□
H07	Standard unit price of electricity	0~2.5	0.08
H08	Low valley unit price of electricity	0~2.5	0.05
H09	Unit price of gas materials	0~2.5	0.25
H10	Work day low price electricity start time	0:00~23:00	0:00
H11	Work day low price electricity end time	0:00~23:00	7:00
H12	Rest day low price electricity start time	0:00~23:00	0:00
H13	Rest day low price electricity end time	0:00~23:00	23:00
H14	Ambient temp change of heat pump restart	-30~30□	5□
H15	Compressor preheating	0: Disable 1: Enable	1
H16	Power off time for preheating detection	2-48	4
H17	Preheating time 1	10-100min	30
H18	Preheating time 2	10-150min	90
H19	Preheating time 3	10-250min	120
H20	Preheating time 4	10-350min	180
H21	Preheating time 5	10-500min	240

R41	**Control address**	**1~128**	**1**

Note 1 - Cooling Mode Below 12°C: When there is a cooling need requiring a lower temperature setting, enter the factory parameters page, input the password "666" to access the settings, change the default value of parameter "P31" to "1", and return to the main interface.

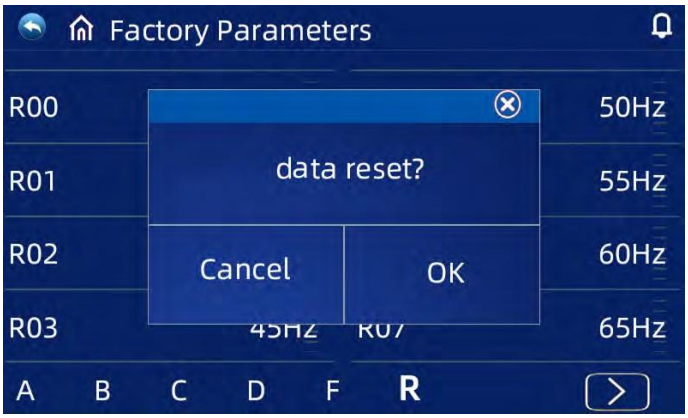
The cooling mode can then be set between 7°C and 30°C.

This operation is recommended for engineers to use. Cooling must be via a water fed fan coil and condensate must be controlled.

Note 2 - Changing the unit address: When needing to change the address of the unit, enter the factory parameter page and use password 4180 to enter the settings, then use setting R41. This operation is recommended for engineers to use.

3.3.10. Restore Factory Settings

To restore factory settings, enter the Factory Parameters page (password: 4180) and use the restore defaults function. **Note: This resets all parameters to factory defaults. Only use if instructed by InstaGroup or a qualified engineer.**



Factory parameter screen – restore defaults option

4. Control Logic

4.1. Legionella Disinfection (P17–P21)

- Legionella cycle is once every x day between 0 off and 30 depending on how P17 is set
- When entering the Legionella cycle, the water tank electric heater will be forced to turn on
- During the Legionella cycle, if the water tank temperature is >65□ (the maximum settable temperature achievable with Heat Pump), then the compressor will not start, but only start electric heating; If the water tank temperature is ≤60□, both the compressor and electric heater will start.
- When the water tank temperature is ≥70□ (P20) and this temperature lasts for 30 minutes (P19), the system exits the Legionella cycle.
- After entering Legionella cycle, if the temperature of the hot water tank does not reach P20 after 1 hour, the Legionella cycle will be forced to exit.

4.2. Weather Compensation (P22–P24)

The target temperature under heating mode can be automatically adjusted according to the ambient temperature.

Users can directly enter the temperature curve interface on the touch screen controller, set P23 (Curve) and P24 (Shift) parameters according to local environmental conditions, and the interface will automatically generate operating curves, as shown in the below figure.

4.2.1. Entry conditions

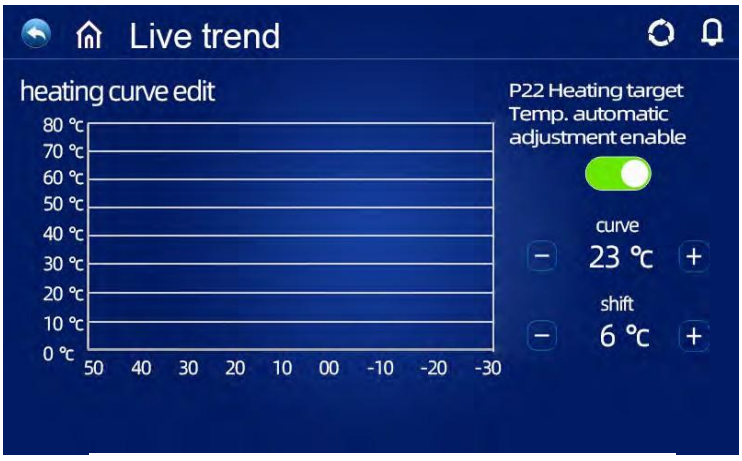
Click on the inlet water temperature on the Home Screen to enter weather compensation settings seen below. The maximum set temperature can be adjusted using parameter P36.

When P22 is enabled, the heat pump automatically adjusts the target water temperature based on the ambient outdoor temperature to improve comfort and efficiency.

4.2.2. Calculation formula of heating target temperature

Pset (heating target temperature) = 20 + (P24/10) x (P23 - current ambient temperature)

P23 is curve , P24 is shift.



Weather compensation graph screen

See Appendix A for the full Weather Compensation Parameter Lookup Table.

4.3. Immersion Heater (P26–P30)

4.3.1. Immersion Heater Start Conditions

The immersion heater will operate only when **all** of the following conditions are met:

- The unit is operating in **Domestic Hot Water (DHW) mode**.
- The compressor has operated continuously for the period defined by **Parameter P27** (factory default: **30 minutes** – suggest setting to 60 minutes) without reaching the DHW temperature setpoint.
- There is an active demand for domestic hot water.
- The stored water temperature is **55°C or below**.
- The system circulation pump is operating.
- The immersion heater function is enabled (**Parameter P30 = 2 or 3**).

4.3.2. Immersion Heater Stop Conditions

The immersion heater will stop operating when any one of the following conditions is met:

- The operating conditions no longer require electric heater assistance.
- There is no domestic hot water demand or constant temperature control demand.
- A fault is detected on the domestic hot water tank temperature sensor.

4.3.3. Automatic Operation During Protection Functions

To protect the system and maintain reliable operation, the immersion heater is automatically energised during the following operating conditions:

- Defrost cycle
- Forced defrost cycle
- Secondary antifreeze protection

4.3.4. Automatic Backup Heating

If the heat pump is unable to operate due to one of the following faults, the controller will automatically switch to electric heater operation after a 5-minute delay:

- High-pressure protection fault
- Low-pressure protection fault
- Exhaust temperature sensor fault
- Excessive exhaust temperature protection
- Compressor locked or unable to start

Under these conditions, the immersion heater provides DHW heating until the fault condition is cleared.

4.4. Auxiliary Electric Heater for Space heating (Backup Heater) – (P26-P30)

4.4.1. Backup Heater Start Conditions

The backup electric heater will operate only when all of the following conditions are met:

- The unit is operating in Heating mode.
- The ambient air temperature is below the value defined by Parameter P26 (factory default: 0°C), or the ambient temperature sensor has reported a fault.
- There is an active space heating demand.

- The inlet water temperature is less than or equal to the heating setpoint (Parameter P05) minus the restart differential (Parameter P01).
- The circulation pump is operating.
- The compressor has operated continuously for the period defined by Parameter P27 without reaching the heating setpoint (factory default: 30 minutes – suggest setting to 60 minutes).
- The backup electric heater function is enabled (Parameter P30 = 1 or 3).

When all of the above conditions are satisfied, the controller will energise the backup electric heater to assist the heat pump.

4.4.2. Backup Heater Stop Conditions

The backup electric heater will switch off when any one of the following conditions is met:

- The unit changes to Cooling mode or Domestic Hot Water (DHW) mode.
- There is no active heating demand or constant temperature control demand.
- A fault or alarm is detected on the inlet water temperature sensor.
- The ambient air temperature rises above the value defined by Parameter P26 + 1°C.
- A water flow fault is detected.
- The circulation pump stops operating.

4.5. Hybrid Control and Operation with AUX Heat Source (H01–H14)

The Auxiliary Heat Source (AHS), such as a gas boiler or external heater, is configured by Parameter H01:

- **H01 = 1:** AHS enabled for Heating mode only.
- **H01 = 2:** AHS enabled for Domestic Hot Water (DHW) mode only.
- **H01 = 3:** AHS enabled for both Heating and DHW modes.

The installer must ensure the 3-way valve position is suitable for the selected AHS operating mode and hydraulic arrangement.

When enabled, the AHS may operate if the return water temperature is too low, the ambient temperature is outside the heat pump operating range, or the heat pump cannot operate efficiently.

4.5.1. AHS Operating Modes

The AHS operating strategy is selected by Parameter H02:

- H02 = 0: Low Carbon Mode
- H02 = 1: Eco Hybrid Mode

4.5.2. Low Carbon Mode - H02 = 0

In Low Carbon Mode, the heat pump remains the priority heat source. The AHS provides additional heat input only when required. The heat pump continues operating while the AHS is active. True hybrid mode.

4.5.3. General Enable Conditions

Low Carbon Mode can operate only when all of the following conditions are met:

- Total system outlet water temperature is below 70°C.
- No water flow fault is present.
- Total outlet water temperature sensor is enabled.

4.5.4. Heating Operation - H01 = 1 or 3

The AHS starts when all of the following are met:

- Total system outlet water temperature is below P05 - H06.
- Ambient temperature TA < H04 - 2°C.
- AHS or electric heating off-time is greater than H05.

The AHS stops when any of the following are met:

- Total system outlet water temperature is above P05.
- Heating mode is stopped.

4.5.5. DHW Operation - H01 = 2 or 3

The AHS starts when all of the following are met:

- DHW tank temperature is below P03 - P02.
- DHW tank temperature is below 40°C.
- Water tank electric heating off-time is greater than or equal to H05.

The AHS stops when any of the following are met:

- DHW tank temperature is greater than or equal to P03.
- Total system outlet water temperature is above 70°C.
- DHW mode is stopped.

4.5.6. Eco Hybrid Mode - H02 = 1

In Eco Hybrid Mode, the controller compares heat pump operating cost against AHS operating cost. The lower-cost heat source is selected. Only one heat source operates at a time; when the AHS operates, the compressor is stopped.

Eco Hybrid Mode is configured by Parameter H03:

- H03 = 1: Fixed pricing mode
- H03 = 2: Peak-valley pricing mode
- H03 = 3: Ambient temperature mode

4.5.7. Fixed Pricing Mode - H03 = 1

The controller compares heat pump and AHS operating costs once per hour.

- If heat pump cost is lower, the heat pump operates and the AHS is off.
- If AHS cost is lower, the AHS operates and the compressor is off.

H14 defines the ambient temperature change required to restart the heat pump for cost reassessment. When the ambient temperature changes cumulatively by **H14** from the temperature recorded when the AHS first started, the heat pump restarts for one hour. The controller then recalculates COP and operating cost to select the most economical heat source.

4.5.8. Peak-Valley Pricing Mode - H03 = 2

In Peak-Valley Pricing Mode, the controller calculates electricity cost hourly using time-based tariff settings:

- **H07:** Standard electricity price
- **H08:** Low valley electricity price
- **H10–H11:** Workday low-price period
- **H12–H13:** Rest day low-price period

Heating Operation:

The AHS starts and the compressor stops when all of the following are met:

- Total system outlet water temperature is below **P05 – H06**.
- AHS off-time is greater than **5 minutes**.
- AHS operating cost is lower than heat pump operating cost.

The AHS stops when any of the following are met:

- Total system outlet water temperature is above **P05 + 2°C**.
- Heating mode is stopped.
- AHS operating cost is greater than or equal to heat pump operating cost.

DHW Operation:

The AHS starts and the compressor stops when all of the following are met:

- DHW tank temperature is below **P03 - P02**.
- AHS off-time is greater than **5 minutes**.
- AHS operating cost is lower than heat pump operating cost.

The AHS stops when any of the following are met:

- DHW tank temperature is greater than or equal to **P03**.
- Total system outlet water temperature is greater than or equal to **70°C**.
- DHW mode is stopped.
- AHS operating cost is greater than or equal to heat pump operating cost.

4.5.9. Ambient Temperature Mode - H03 = 3

Heating Operation:

The AHS starts and the compressor stops when all of the following are met:

- Total system outlet water temperature is below **P05 - H06**.
- AHS off-time is greater than **5 minutes**.
- Ambient temperature **TA < H04 - 2°C**.

The AHS stops when any of the following are met:

- Total system outlet water temperature is above **P05 + 2°C**.
- Heating mode is stopped.
- Ambient temperature is greater than or equal to **H04**.

DHW Operation:

The AHS starts and the compressor stops when all of the following are met:

- DHW tank temperature is below **P03 - P02**.
- AHS off-time is greater than **5 minutes**.
- Ambient temperature **TA < H04 - 2°C**.

The AHS stops when any of the following are met:

- DHW tank temperature is greater than or equal to **P03**.
- Total system outlet water temperature is greater than or equal to **70°C**.
- DHW mode is stopped.
- Ambient temperature is greater than or equal to **H04**

4.6. Smart Grid (S1 &S2)

When the smart grid function parameter is selected to be enabled (S01 = 1), the heat pump starts running the smart grid function.

EVU - Signal controlled by the power company

SG - Smart grid, connect with smart meter, use the electricity from PV

Mode	EVU	SG	Operating Status	Control Logic
1	ON	OFF	Block out	Heat pump forced to shut down compressor and fan (compressor icon flashing)
2	OFF	OFF	Normal operation	Heat pump operates in normal mode
3	OFF	ON	Increased recommendation	Heating/cooling: powerful mode. Hot water: target temp +S02°C (max 70°C).
4	ON	ON	Increased command	Heating/cooling: powerful mode. Hot water: target +S02°C. Backup electric heating forcibly on (P30 must be enabled).

4.7. Preheating Function (H15-H21)

To protect the compressor and maximise service life, the unit incorporates an automatic compressor preheat function following an extended power interruption. The preheat function is available on initial commissioning and after any subsequent power restoration.

If the power-off period exceeds the value set by Parameter H16 (default: 4 hours), the unit enters Compressor Preheat mode when power is restored.

During Compressor Preheat:

- The compressor is inhibited from starting until the preheat cycle is complete.
- The compressor status icon flashes to indicate that preheating is in progress.
- Normal heat pump operation resumes automatically once the preheat cycle has finished.

Ambient Temperature	Preheating Time (Param.)	Default Time
Above 10°C	H17	30 minutes
0°C to 10°C	H18	90 minutes
–10°C to 0°C	H19	120 minutes
–20°C to –10°C	H20	180 minutes
Below –20°C	H21	240 minutes

Forced exit preheating: *Press and hold the mode key on the touch screen controller for 8 seconds.*

5. General Operating Guide

5.1. Initial Start-Up Precautions

1. Ensure the mains power supply matches the required power on the product nameplate
2. Check all electrical connections, ground wire, water pump, and hydraulic device connections
3. Flush all pipework and systems two to three times, ensuring clean and no debris
4. Check water system: ensure sufficient water volume and air is vented; ensure no leakages
5. **First start or restart after long off – ensure power on at least 12 hours beforehand for crankcase warm-up.** Switch on order: water pump → fan → compressor.

5.2. Running Checks (after 20–30 minutes of normal running):

- Flow and return water temperatures
- Check flow rates on both primary and secondary side
- Running current of compressor and fan
- High-and low-pressure values when heating running.

CAUTION!

Refrain from using this heat pump if any electrical components have been in contact with water. Immediately call a qualified service technician to inspect the heat pump.

CAUTION!

Keep all objects clear above the heat pump. Blocking air flow could damage the unit and may void the warranty.

6. Users Guide

6.1. Rights and Responsibility

To ensure you maintain unit warranty, **only a professional and qualified engineer can install and repair the unit**. If you infract this request and cause any loss and damage, InstaGroup will not be liable and deny all responsibility.

After receiving the unit, check for damage on shipment and all parts are complete; any damage or missing parts please inform InstaGroup immediately.

6.2. General Guidance

- All safety protection device are set in unit before leaving factory, don't adjust by yourself.
- Unit has enough refrigerant and lubricating oil, don't fill or replace; if needing additional refrigerant owing to leak, please contact a qualified engineer or InstaGroup, who will refer to the quantity on nameplate and carry out works within F-Gas guidelines.
- External water pump must be connected as shown to be controlled by unit, or alarms will be caused and no flow could result.
- Regularly clean water system according to maintenance request.
- Pay attention to antifreeze when the ambient outdoor temp. is less than zero in winter.

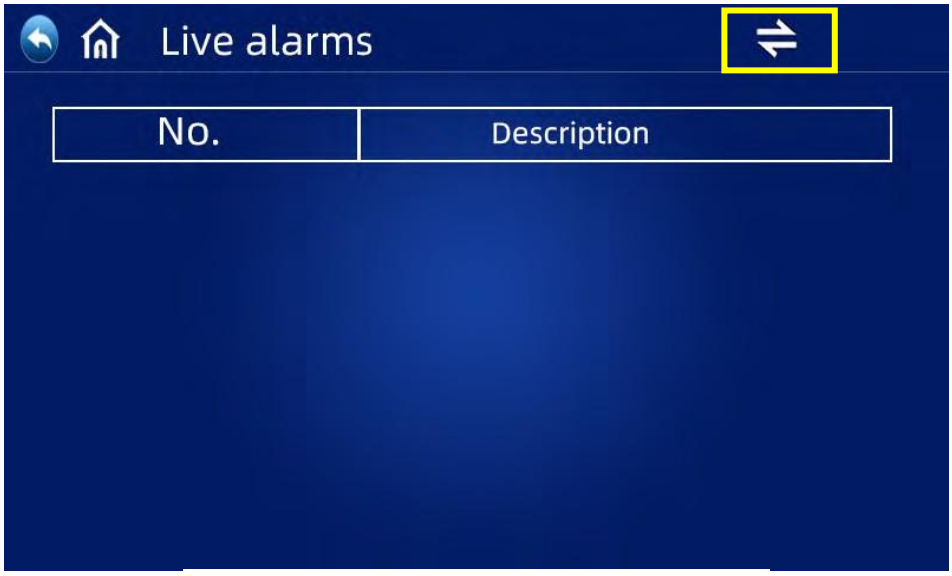
6.3. Safety Precautions

a. Only a professional and qualified engineer can install and repair the unit.
b. Check for damage on shipment and confirm all parts are complete; report any issues to InstaGroup immediately.
c. Ensure correct breaker is installed and suitable for the unit being installed. MCB type C with a Double pole Type B Heat Pump RCD is recommended. Power cable must be correctly sized and in-line with regulations.
d. The unit must have an earth/ground cable - never use without one.
e. The main power switch should be at least 1.5 metres above the unit.
f. Water above 52°C can cause burns - always mix hot and cold water before use.
g. If the unit has been submerged or flooded, contact a qualified engineer before restarting.
h. Never insert any objects or body parts into the unit while operational - especially the fan.
i. Do not use the unit without the fan cover in place.
j. Do not store or use combustible gas or liquid around the unit; do not spray water on it. Doing so can cause fires and/or electric shocks.
k. Only a qualified engineer can adjust switches, valves, controllers or internal.

7. General Maintenance

7.1 Controller Error Codes

If there are errors in the heat pump, the error code and error definition will be displayed on screen, accessed via the bell symbol from the home screen. Saved errors are access via forward/backwards arrows (yellow box below) in the live alarms screen.



Will show current and previous error codes

Fault Code	Definition	Fault Code	Definition
Er 01	Power supply phase loss	**Er 20**	Protection for inverter module abnormality (see detailed codes)
Er 03	Water flow fault	**Er 21**	Ambient temperature sensor fault
Er 04	Antifreeze protection	**Er 23**	Protection for low outlet water temperature
Er 05	High voltage fault	**Er 26**	Radiator temperature fault
Er 06	Low voltage fault	**Er 27**	Water outlet temperature sensor fault
Er 09	Communication failure	**Er 29**	Return gas temperature sensor fault
Er 10	Communication fault of frequency conversion module	**Er 32**	Protection for high outlet water temperature
Er 12	Protection for high exhaust gas temperature	**Er 33**	Evaporator coil temperature is too high
Er 14	Tank temperature sensor fault	**Er 34**	Inverter module temperature is too high
Er 15	Inlet water temperature sensor fault	**Er 42**	Internal coil temperature sensor fault
Er 16	Evaporator coil temperature sensor fault	**Er 46**	DC fan motor failure
Er 18	Exhaust temperature sensor fault	**Er 62**	Economizer inlet temperature sensor fault

Fault Code	Definition	Fault Code	Definition
Er 63	Economizer outlet temperature sensor fault	**Er 74**	Total outlet water temperature sensor failure
Er 64	DC fan 1 fault	**Er 75**	Refrigerant leakage protection
Er 66	DC fan 2 fault	**Er 76**	Refrigerant sensor failure
Er 67	Low pressure switch fault	**Er 79**	Direct water pump under-voltage failure
Er 68	High pressure switch fault	**Er 80**	Direct water pump stall failure
Er 69	Pressure protection too low	**Er 81**	Other faults of direct water pump
Er 70	Pressure protection too high	**Er 82**	Communication failure of direct water pump
Er 72	Fan drive board communication error	**Er 84**	Communication failure between indoor and outdoor units
Er 73	Expansion board communication error	**Er 99**	All communication failure

7.1.1. Er20 (Compressor) – Detailed Error Codes

When an Er20 fault occurs, the controller displays a corresponding sub-code to identify the specific fault. If any of these faults occur contact a qualified engineer or InstaGroup who will refer to the InstaGen Service Manual. An End user / unqualified persons must not attempt to resolve these errors.

- Sub-codes 1–128 are primary fault codes.
- Sub-codes 257–384 are secondary fault codes and displayed only when no primary fault is present.

If multiple faults occur within the same fault class, the displayed sub-code is the sum of the individual fault values. *Example: If fault codes 16 and 32 occur simultaneously, the controller displays 48 (16 + 32).*

Error Code	Name	Description	Solution
1	IPM Over-current	1. The IPM overloaded or overheated 2. The U,V,W driver short-circuited 3. The IPM module fault 4. The compressor damaged	1 Ensure that the ambient temperature, water temperature, water flow, etc. are within the operating range of the unit; 2. Use a multimeter to measure the motor U,V,W in ohmic gear to ensure no short circuit 3. Replace the frequency conversion module 4. Replace the compressor
2	Compressor Phase / Scyn abnormal	1. The compressor overloaded instantaneously 2. The compressor does not match the program 3. The difference between high and low pressure starts the compressor excessively	1. Ensure that the ambient temperature, water temperature, water flow, etc. are within the operating range of the unit; 2. Replace the driver board with the correct program 3. Ensure that the high- and low-pressure difference starts normally

8	Compressor phase lost	1. The U, V, and W cables of the compressor are missing or improperly connected 2. The compressor does not match the program 3. The difference between high and low pressure starts the compressor excessively	1. Check whether the U, V, and W wires of the compressor are missing or in poor contact 2. Update the driver 3. Ensure that the high- and low-pressure difference starts normally
16	DC bus low voltage	1. The power supply unstable 2.AC suddenly power off, the inverter capacitor residual power supply chip detects that the DC voltage will be too low 3. PFC module fault	1. Ensure that the power supply is stable 2. Check the capacitor after it is powered off 3. Replace the faulty frequency conversion module
32	DC bus high voltage	1. The power supply voltage too high. 2. The capacitor fault 3. The PFC module fault	1. Ensure that the power supply voltage is normal 2. Replace the capacitor 3. Replace the faulty frequency conversion module
64	Heat Sink Over Temp	1. The Heat pump main fan is faulty 2. The air duct is blocked	1. Check and replace the fan 2. Ensure proper ventilation
128	Heat Sink temperature error	1. The heat sink sensor is short-circuited or open 2. Heat sink fouling 3. The ambient temperature too high	1. Replace the frequency conversion module 2. Remove dust and scale from the heat sink 3. Lower the ambient temperature
257	Communication failure	1. The connector of the communication cable between the main board and the driver board is in poor contact, broken or missing. 2. Internal components of the heat pump are damaged 3. The output voltage of the power supply board in the module abnormal or no output	1. Reconnect and ensure stability 2. Replace the internal components 3. Replace the power module
258	AC Input phase absent	Input phase absent ((Only applicable to three-phase models (Not compressor))	Inspect input circuit
260	AC Input over-current	Input three phase imbalance ((Only applicable to three-phase models)	Inspect input three phase voltage

7.2. Owner Inspection

We recommend that inspections are carried out frequently, especially after abnormal weather conditions.

- Make sure the front of the unit is accessible for future service and good air flow
- Keep the top and surrounding areas clear of all debris
- Keep all plants and shrubs trimmed and away from the heat pump, especially above the fan
- Keep lawn sprinklers from spraying on the heat pump to prevent corrosion and damage
- Ensure the earth cable is always properly connected
- The filter and strainers must be maintained regularly to ensure clean and healthy water
- Keep inspecting power and electrical components including wiring
- All safety protection devices have been set up - do not change these settings
- If the heat pump is installed under roof without a gutter, ensure measures prevent excessive water flooding the unit
- Do not use this heat pump if any electrical part has been in contact with water
- If an increase in power consumption is not due to colder weather, consult your installer or InstaGroup
- Please turn off the heat pump and disconnect from mains power when not in use for a prolonged period

WARNING - RISK OF ELECTRICAL SHOCK OR ELECTROCUTION

Ensure all high voltage circuits are disconnected before commencing heat pump installation. **DO NOT** open any part of the heat pump as this may result in electrocution.

Keep your hands and hair clear of the fan blades to avoid injury.

DO NOT attempt to adjust or service the unit without consulting your installer, qualified engineer or InstaGroup.

IMPORTANT: Turn off the mains power supply prior to attempting service or repair.

7.3. Maintenance

The InstaGen air source heat pump unit is a highly automated device. Effective and regular maintenance will greatly improve operation reliability and unit lifetime.

a. Clean the water filter annually during service to maintain water quality and prevent blockage.
b. Do not adjust factory-set safety protection devices. Damage caused by unauthorised adjustment is not covered.
c. Keep the area around the unit clean and maintain the required service clearances. Clean the heat exchanger every 1–2 months where required to maintain efficiency.
d. Check water treatment levels and automatic air vents regularly. Air in the system can reduce circulation, cause flow faults, and affect efficiency.
e. Inspect the power supply and electrical wiring during annual service. Ensure all connections are secure, components are in good condition, and the unit is correctly earthed.
f. During annual service, check operating pressures, pipe connections, refrigerant exhaust valve condition, and inspect for refrigerant leaks.
g. Do not store items around the unit. Air inlet and outlet areas must remain clear and unobstructed.
h. If the unit will be shut down for an extended period, isolate the power, drain the water system where required, and cover the unit. Before restart, refill with clean water in accordance with the water quality requirements, complete all system checks, restore power, and allow at least 12 hours compressor warm-up before operation.

Important Notices:

- The unit should be equipped with a dedicated power supply within ±10% voltage range. Circuit breaker should be automatic, set at 1.5 times the running current, with a phase failure relay.
- The unit must be powered on to warm up for at least 12 hours before running after longer off periods.
- The master controller and the unit must be in communication and cannot be powered off to avoid frost damage.
- Forbidden to turn the unit on and off more than 4 times in an hour.
- Protect the electric cabinet from damp. Forbidden to spray the unit **with water.**

7.4. Troubleshooting – Common Faults

The user must hire qualified professionals to fix and maintain the unit.

See full chart below:

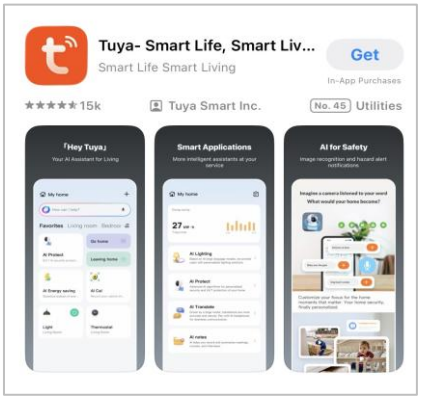
Error Status	Possible Reason	Solution
Heat pump not running	Power fault; wiring loose; fuse blown; thermal overload protection tripped; low pressure trip	Isolate power, check supply, find causes and repair; replace blown fuse; test voltage and current
Water pump working but little to no water flow or high pump noise	Lack of water in system; air in water system; valves not all open; filter/strainer dirty and blocked	Check system water pressure and fill if needed; discharge air; open all valves; clean filter and strainer; ensure system is fully flushed
Low heating capacity output	Lack of refrigerant; poorly insulated pipework; filter dryer blocked; heat pump restricted airflow; insufficient water flow	Check refrigerant system for leaks; fully insulate all water pipework; change filter dryer; clean air heat exchanger; clean water filter; ensure system is fully flushed
Compressor not working	Power supply failure (phase loss/reversal); faulty compressor contactor; loose wiring; compressor overheat protection; excessive outlet water temperature; insufficient water flow; overload protector tripped	Identify and resolve power supply issues; replace compressor contactor; inspect and tighten all terminal connections; check system pressure; adjust temperature set point or check water flow; clean water filter; check running current
Compressor running noise high	Liquid refrigerant entering compressor; inner parts of compressor damaged; voltage too low	Check expansion valve; replace compressor; check power voltage; check refrigerant system for leaks
Fan not working	Fan fastening screw loose; fan motor damaged; contactor damaged	Tighten/reinforce the screw; replace the fan motor; replace the contactor
Compressor running but not heating	Refrigerant leaking; refrigerant fully leaked; compressor fault; compressor reversal	Check for leaks and refrigerant charge; replace the compressor; change the phase order of compressor
Low water flow protection	Insufficient water flow in system; flow switch fault	Clean water filter and discharge air from system; check the flow switch and replace if faulty

8. Wi-Fi Connection and Operation

8.1. App Download

Go to the ***Google Play Store*** or ***Apple App Store*** and search for **'Smart Life'** or **'Tuya Smart'**, then download.





8.2. Wi-Fi Connection

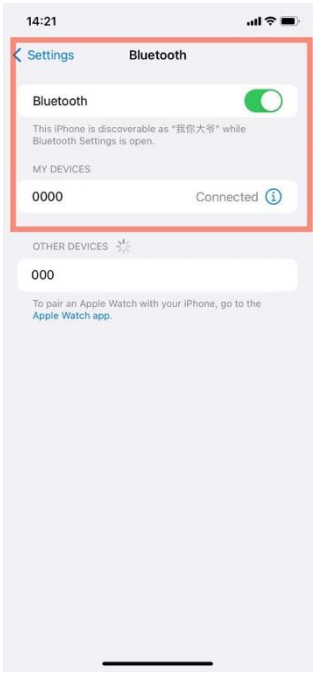
Step 1:

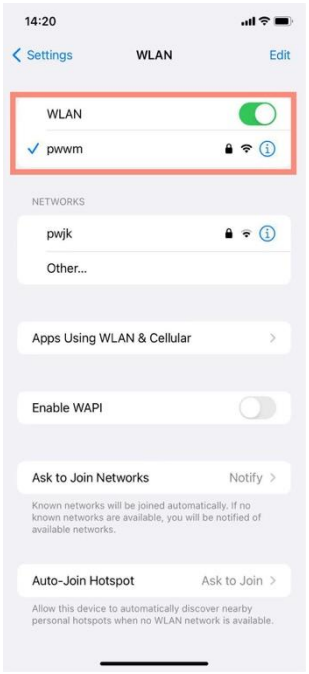
Option 1 (First Power-On): By default, connection can be made within 10 seconds after first power on. After 10 seconds, the button needs to be pressed to connect (10s delay for Wi-Fi to enter low-power mode).

Option 2 (Manual Setup): Click the Settings button on the wired controller home screen → 'WI-FI Configure' → 'Add Device' → select 'SMART Mode' or 'AP Mode'. The Wi-Fi icon will flash - the phone can now start configuring the network.

Step 2:

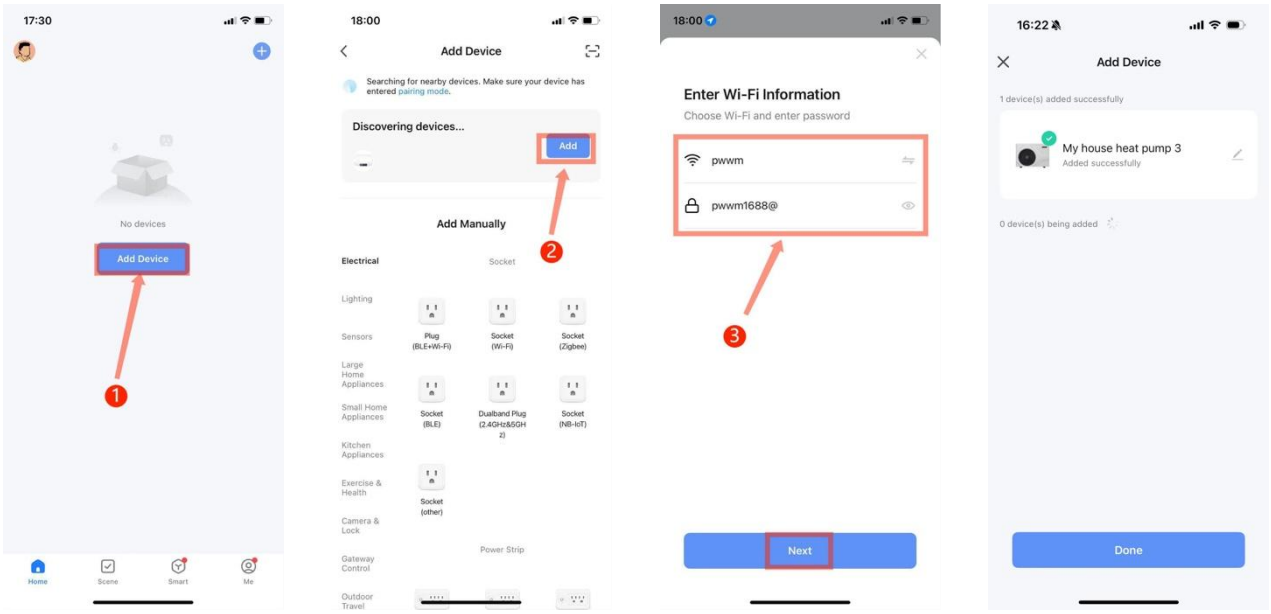
Turn on Bluetooth and Wi-Fi, connect to home network





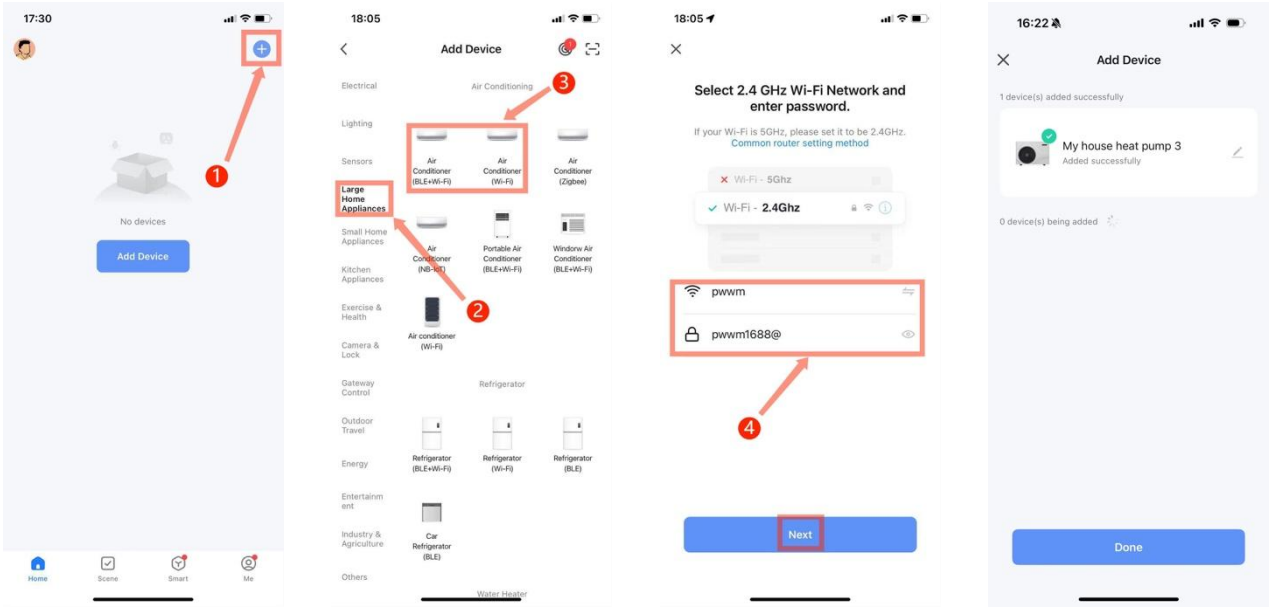
Step 3: Add Device (Method 1)

Open **'Smart Life'** or **'Tuya Smart'** → 'Add Device' → 'Add' → enter Wi-Fi information → complete.



Step 3: Add Device (Method 2)

Open **'Smart Life'** or **'Tuya Smart'** → tap '+' in upper right corner → 'Large Home Appliances' → 'Air Conditioner' → Enter Wi-Fi information → complete.

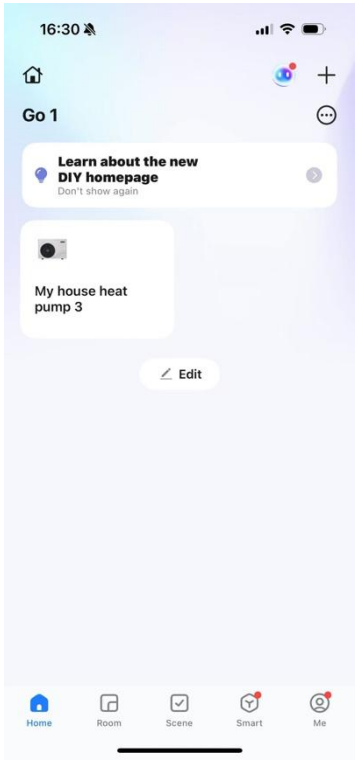


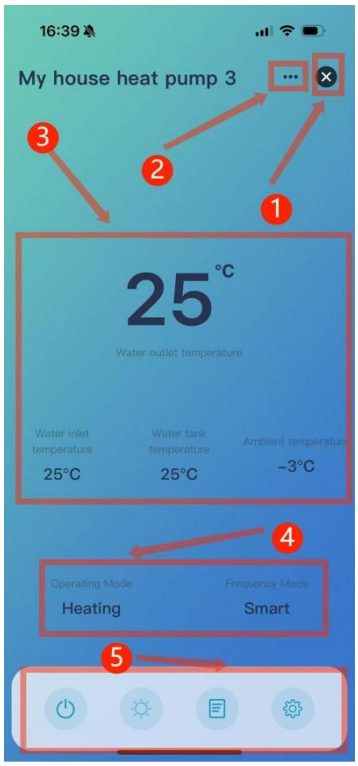
8.3. Function Operation

After successfully connecting the device, click on the device name in the **'Smart Life'** or **'Tuya Smart'** main interface.

8.3.1. Key Controls

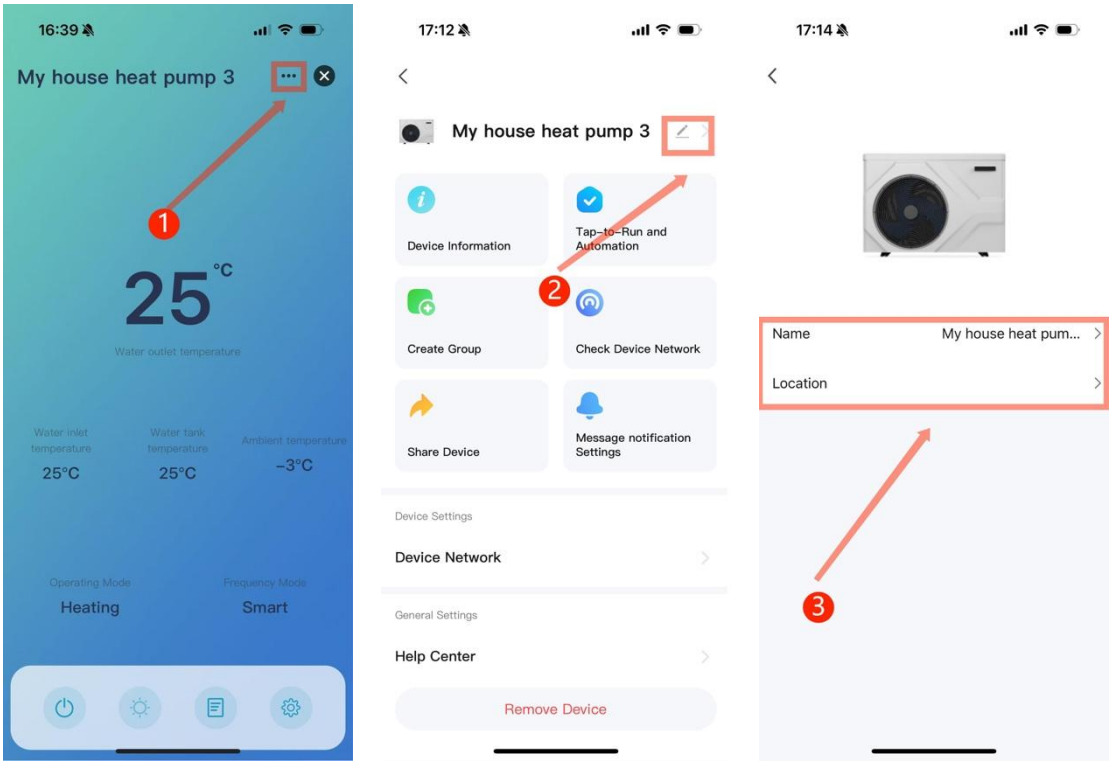
1. Return
2. More (rename, location, network status, sharing)
3. Temperatures (outlet, inlet, tank, ambient)
4. Current mode
5. Power on/off, mode, parameters, settings.





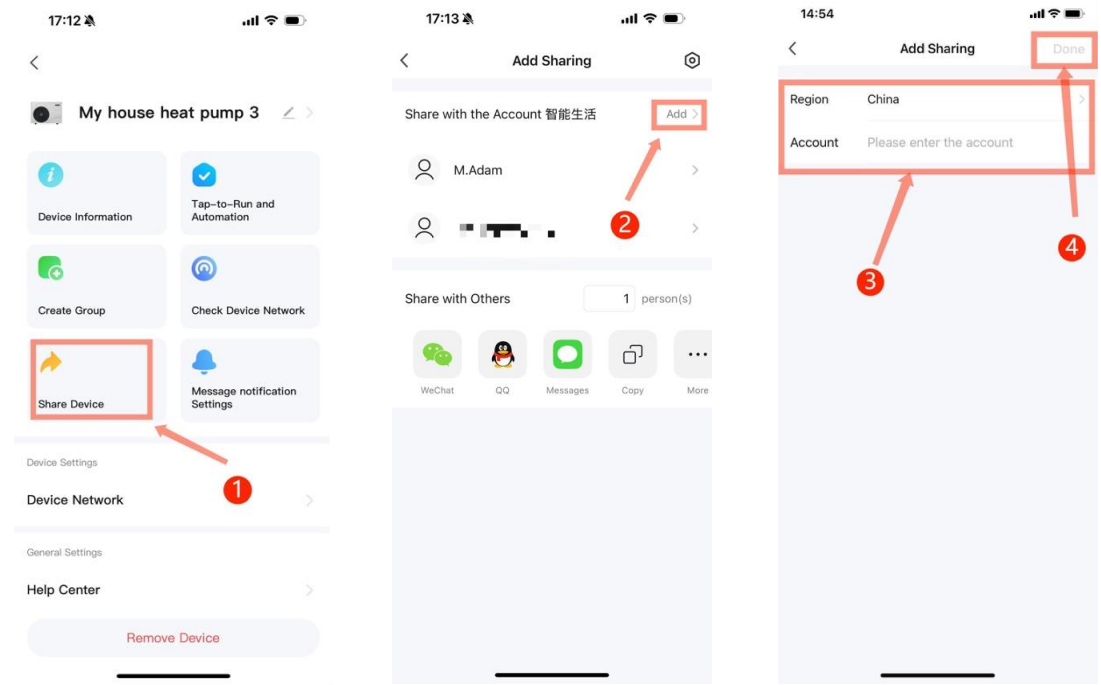
8.3.2. Change Device Name

Tap Settings icon (•••)→ 'Device Details' → click 'Device Name' → rename.



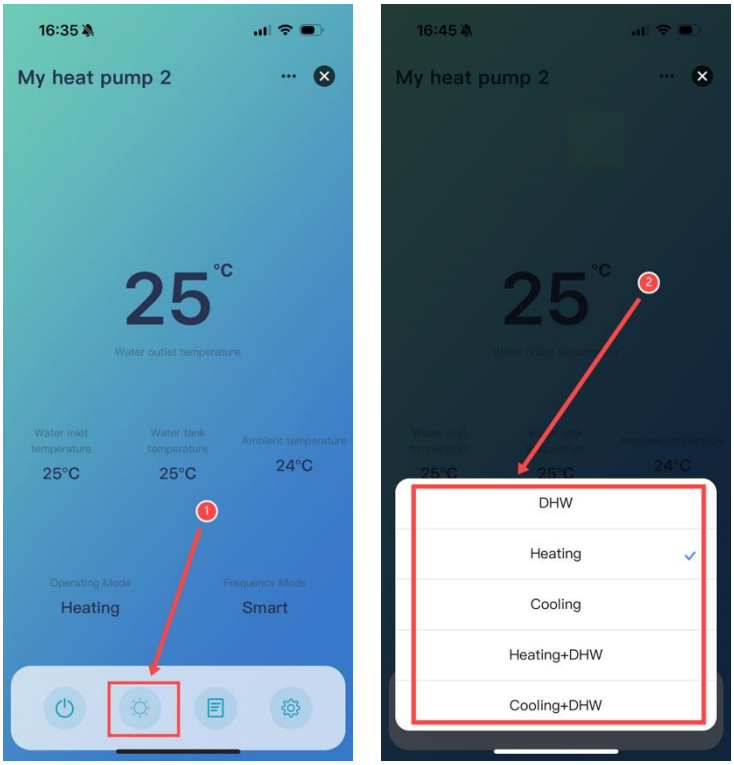
8.3.3. Device Sharing

Tap Settings → 'Shared Devices' → 'Add' → enter recipient's account → 'Done'. To delete: long press the username and click "Delete".



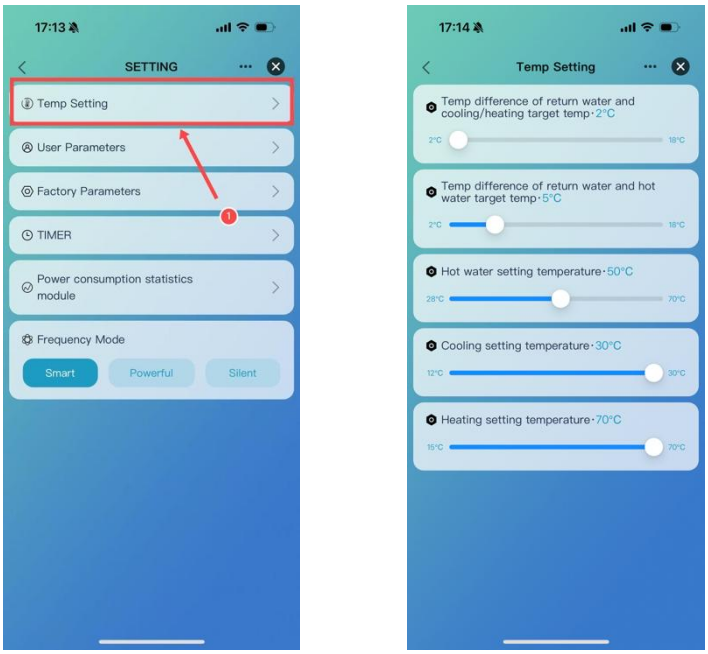
8.3.4. Mode Switch

In ‘power on’ state, tap the mode switch (1) on the main interface to open the mode selection screen. Click on the desired mode to select it.



8.3.5. Water Temperature Setting

Tap the Settings icon on the device operation interface → ‘Settings’ → ‘User Parameters’ → adjust set temperature.

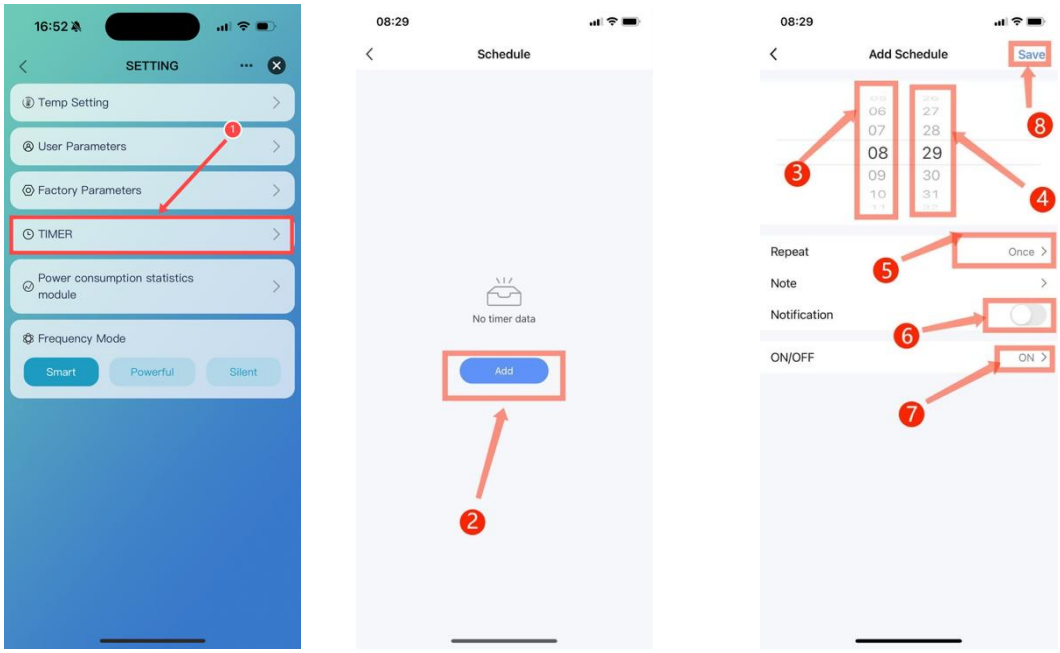


8.3.6. Timer Setting

Settings → 'Timer' → 'Add' → adjust hours and minutes → select days → set ON or OFF → 'Save'.

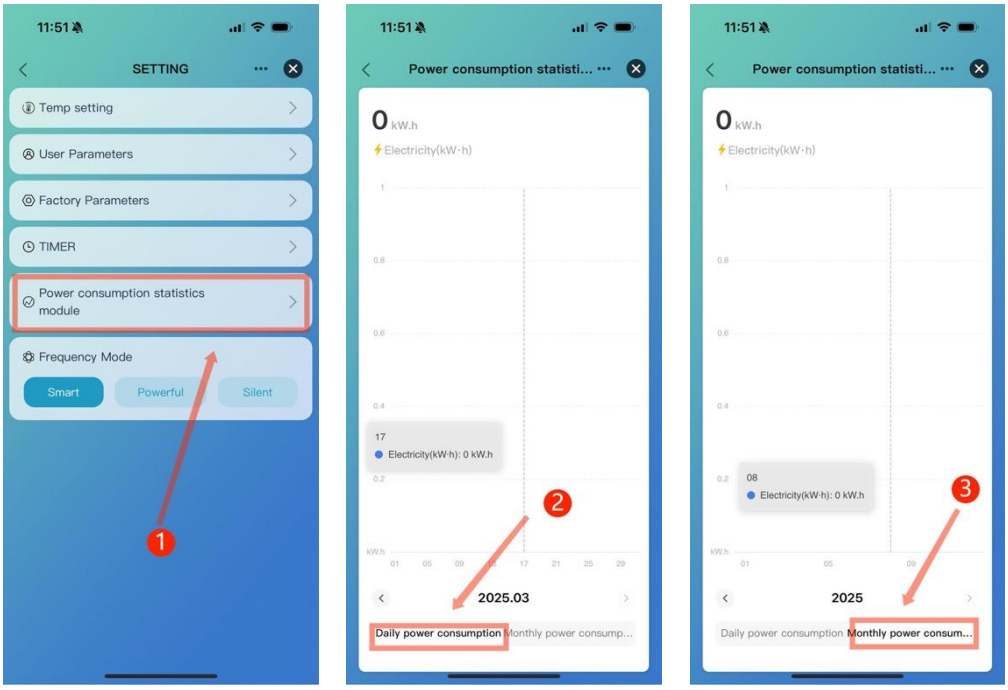
To delete: swipe left on the timer → 'Delete'.

Note: *All 3 timers will work on selected days. Days cannot be customized per timer.*



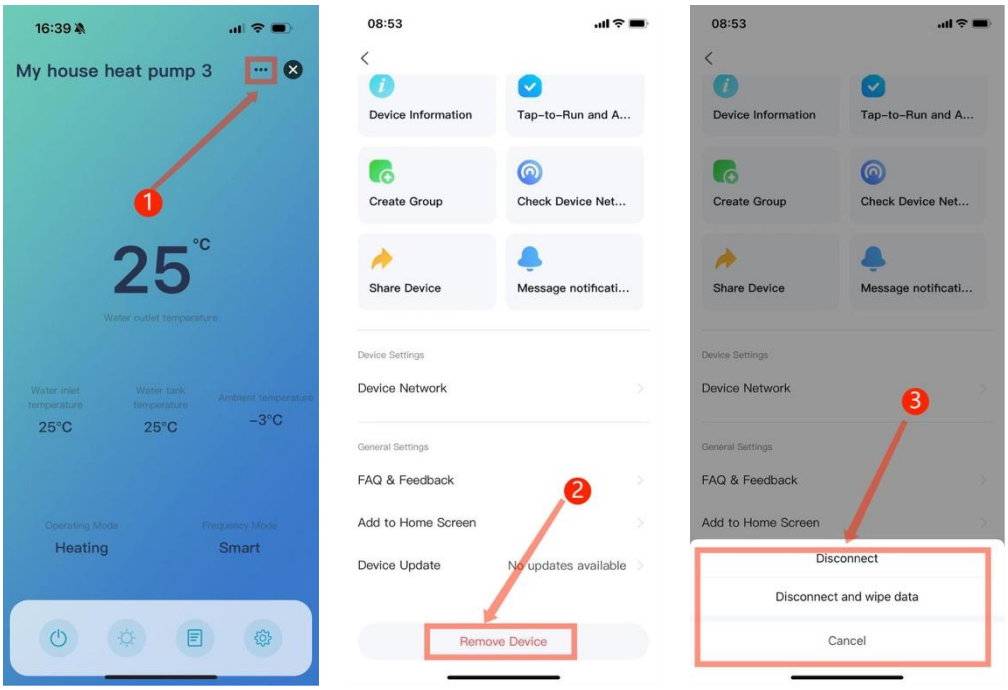
8.3.7. Electricity Statistics Module

Settings → 'Power Consumption Statistics' → view daily and monthly electricity consumption.



8.3.8. Device Removal

Settings → 'Remove Device' → confirm removal. Wired controller will exit the display state.



9. Appendix A – Weather Compensation Parameter Lookup Table

The values for P23 (Curve) and P24 (Shift) are rounded to the nearest whole number (integer), as the controller only accepts integer inputs.

Due to rounding, the actual target water temperature may deviate by ±1°C - this is normal and will not affect heating performance or comfort.

P23 = Curve, P24 = Shift.

9.1. Lowest Target Flow Temperature: 25°C @ 15°C Ambient

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	25	-10	70	18	18
15	25	-10	65	18	16
15	25	-10	60	19	14
15	25	-10	55	19	12
15	25	-10	50	20	10
15	25	-9	70	18	19
15	25	-9	65	18	17
15	25	-9	60	18	15
15	25	-9	55	19	13
15	25	-9	50	20	10
15	25	-8	70	18	20
15	25	-8	65	18	17
15	25	-8	60	18	15
15	25	-8	55	19	13
15	25	-8	50	20	11
15	25	-7	70	17	20
15	25	-7	65	18	18
15	25	-7	60	18	16
15	25	-7	55	19	14
15	25	-7	50	19	11
15	25	-6	70	17	21

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	25	-6	65	18	19
15	25	-6	60	18	17
15	25	-6	55	19	14
15	25	-6	50	19	12
15	25	-5	70	17	23
15	25	-5	65	18	20
15	25	-5	60	18	18
15	25	-5	55	18	15
15	25	-5	50	19	13
15	25	-3	70	17	25
15	25	-3	65	17	22
15	25	-3	60	18	19
15	25	-3	55	18	17
15	25	-3	50	19	14
15	25	-1	70	17	28
15	25	-1	65	17	25
15	25	-1	60	17	22
15	25	-1	55	18	19
15	25	-1	50	18	16
15	25	0	70	17	30
15	25	0	65	17	27
15	25	0	60	17	23
15	25	0	55	18	20
15	25	0	50	18	17
15	25	1	70	17	32
15	25	1	65	17	29
15	25	1	60	17	25
15	25	1	55	17	21
15	25	1	50	18	18

9.2. Lowest Target Flow Temperature: 30°C @ 15°C Ambient

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	30	-10	70	21	16
15	30	-10	65	22	14
15	30	-10	60	23	12
15	30	-10	55	25	10
15	30	-10	50	28	8
15	30	-9	70	21	17
15	30	-9	65	22	15
15	30	-9	60	23	13
15	30	-9	55	25	10
15	30	-9	50	27	8
15	30	-8	70	21	17
15	30	-8	65	22	15
15	30	-8	60	23	13
15	30	-8	55	24	11
15	30	-8	50	26	9
15	30	-7	70	21	18
15	30	-7	65	21	16
15	30	-7	60	22	14
15	30	-7	55	24	11
15	30	-7	50	26	9
15	30	-6	70	20	19
15	30	-6	65	21	17
15	30	-6	60	22	14
15	30	-6	55	23	12
15	30	-6	50	26	10
15	30	-5	70	20	20
15	30	-5	65	21	18
15	30	-5	60	22	15

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	30	-5	55	23	13
15	30	-5	50	25	10
15	30	-3	70	20	22
15	30	-3	65	20	19
15	30	-3	60	21	17
15	30	-3	55	22	14
15	30	-3	50	24	11
15	30	-1	70	19	25
15	30	-1	65	20	22
15	30	-1	60	20	19
15	30	-1	55	21	16
15	30	-1	50	23	13
15	30	0	70	19	27
15	30	0	65	19	23
15	30	0	60	20	20
15	30	0	55	21	17
15	30	0	50	23	13
15	30	1	70	19	29
15	30	1	65	19	25
15	30	1	60	20	21
15	30	1	55	21	18
15	30	1	50	22	14

9.3. Lowest Target Flow Temperature: 35°C @ 15°C Ambient

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	35	-10	70	26	14
15	35	-10	65	28	12
15	35	-10	60	30	10
15	35	-10	55	34	8
15	35	-10	50	40	6
15	35	-9	70	25	15
15	35	-9	65	27	13
15	35	-9	60	29	10
15	35	-9	55	33	8
15	35	-9	50	39	6
15	35	-8	70	25	15
15	35	-8	65	27	13
15	35	-8	60	29	11
15	35	-8	55	32	9
15	35	-8	50	38	7
15	35	-7	70	24	16
15	35	-7	65	26	14
15	35	-7	60	28	11
15	35	-7	55	32	9
15	35	-7	50	37	7
15	35	-6	70	24	17
15	35	-6	65	26	14
15	35	-6	60	28	12
15	35	-6	55	31	10
15	35	-6	50	36	7
15	35	-5	70	24	18
15	35	-5	65	25	15
15	35	-5	60	27	13

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	35	-5	55	30	10
15	35	-5	50	35	8
15	35	-3	70	23	19
15	35	-3	65	24	17
15	35	-3	60	26	14
15	35	-3	55	29	11
15	35	-3	50	33	8
15	35	-1	70	22	22
15	35	-1	65	23	19
15	35	-1	60	25	16
15	35	-1	55	27	13
15	35	-1	50	31	9
15	35	0	70	21	23
15	35	0	65	23	20
15	35	0	60	24	17
15	35	0	55	26	13
15	35	0	50	30	10
15	35	1	70	21	25
15	35	1	65	22	21
15	35	1	60	23	18
15	35	1	55	26	14
15	35	1	50	29	11

9.4. Lowest Target Flow Temperature: 40°C @ 15°C Ambient

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	40	-10	70	32	12
15	40	-10	65	35	10
15	40	-10	60	40	8
15	40	-10	55	48	6
15	40	-10	50	65	4
15	40	-9	70	31	13
15	40	-9	65	34	10
15	40	-9	60	39	8
15	40	-9	55	47	6
15	40	-9	50	63	4
15	40	-8	70	30	13
15	40	-8	65	33	11
15	40	-8	60	38	9
15	40	-8	55	46	7
15	40	-8	50	61	4
15	40	-7	70	30	14
15	40	-7	65	33	11
15	40	-7	60	37	9
15	40	-7	55	44	7
15	40	-7	50	59	5
15	40	-6	70	29	14
15	40	-6	65	32	12
15	40	-6	60	36	10
15	40	-6	55	43	7
15	40	-6	50	57	5
15	40	-5	70	28	15
15	40	-5	65	31	13
15	40	-5	60	35	10

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	40	-5	55	42	8
15	40	-5	50	55	5
15	40	-3	70	27	17
15	40	-3	65	29	14
15	40	-3	60	33	11
15	40	-3	55	39	8
15	40	-3	50	51	6
15	40	-1	70	26	19
15	40	-1	65	28	16
15	40	-1	60	31	13
15	40	-1	55	36	9
15	40	-1	50	47	6
15	40	0	70	25	20
15	40	0	65	27	17
15	40	0	60	30	13
15	40	0	55	35	10
15	40	0	50	45	7
15	40	1	70	24	21
15	40	1	65	26	18
15	40	1	60	29	14
15	40	1	55	34	11
15	40	1	50	43	7

9.5. Lowest Target Flow Temperature: 45°C @ 15°C Ambient

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	45	-10	70	40	10
15	45	-10	65	46	8
15	45	-10	60	57	6
15	45	-10	55	78	4
15	45	-10	50	140	2
15	45	-9	70	39	10
15	45	-9	65	45	8
15	45	-9	60	55	6
15	45	-9	55	75	4
15	45	-9	50	135	2
15	45	-8	70	38	11
15	45	-8	65	44	9
15	45	-8	60	53	7
15	45	-8	55	72	4
15	45	-8	50	130	2
15	45	-7	70	37	11
15	45	-7	65	43	9
15	45	-7	60	52	7
15	45	-7	55	70	5
15	45	-7	50	125	2
15	45	-6	70	36	12
15	45	-6	65	41	10
15	45	-6	60	50	7
15	45	-6	55	68	5
15	45	-6	50	120	2
15	45	-5	70	35	13
15	45	-5	65	40	10
15	45	-5	60	48	8

High Ambient °C	Flow °C	Low Ambient °C	Flow °C	P23: Curve	P24: Shift
15	45	-5	55	65	5
15	45	-5	50	115	3
15	45	-3	70	33	14
15	45	-3	65	38	11
15	45	-3	60	45	8
15	45	-3	55	60	6
15	45	-3	50	105	3
15	45	-1	70	31	16
15	45	-1	65	35	13
15	45	-1	60	42	9
15	45	-1	55	55	6
15	45	-1	50	95	3
15	45	0	70	30	17
15	45	0	65	34	13
15	45	0	60	40	10
15	45	0	55	52	7
15	45	0	50	90	3
15	45	1	70	29	18
15	45	1	65	32	14
15	45	1	60	38	11
15	45	1	55	50	7
15	45	1	50	85	4

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Ref: EN002P-20180007