



User guide and installation manual

All-in-one
Wi-Fi enabled
hot water
heat pump



Residential

EE-HWS-A1-220
EE-HWS-A1-270
EE-HWS-A1-320

EE-HWS-A1-220E
EE-HWS-A1-270E
EE-HWS-A1-320E

Commercial

EE-HWS-A1-220-1/-2
EE-HWS-A1-270-1/-2
EE-HWS-A1-320-1/-2

EE-HWS-A1-220E-1/-2
EE-HWS-A1-270E-1/-2
EE-HWS-A1-320E-1/-2

Installer reference code*

Installer information

Installer company:

Contact number:

Installer full name:

Install date:

Notes:

*Installer Reference Code is used by the customer while pairing to link the heat pump to the installer company.

User guide

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Thank you

Thank you for choosing an Emerald hot water heat pump. Emerald engineers its heat pumps to provide years of efficient and hassle-free, sustainable hot water heating.

Please take time to read this document and keep it for future reference.

Welcome to your Emerald heat pump

The Emerald heat pump and Emerald App offer advanced hot water heating.

Unlike standard electric water heaters, Emerald heat pumps leverage advanced technology to extract heat from the air, delivering exceptional energy and cost savings. Think of it as a reverse refrigerator, which absorbs heat from the air, compresses it, and transfers that heat to your water.

Emerald heat pump's can save up to 80% on your hot water costs while enjoying efficient and eco-friendly hot water heating. Pair with Emerald App for even greater energy saving and convenience.





Registering your warranty gives you more from Emerald

Scan the QR code to download Emerald App.
By connecting your heat pump to the app, your warranty will automatically be registered.

OR

Visit emerald.com.au/warranty and follow the instructions to complete the warranty registration.

Enjoy the benefits when you register your warranty.

- Priority customer support.
- Tips and advice to maximise savings with your Emerald heat pump.
- Exclusive product updates and promotions.
- Peace of mind knowing your hot water heat pump is protected.





Important things to remember

There are a few key points to remember to help keep your heat pump running smoothly.

Allow your heat pump to breathe.

Your heat pump needs air to work properly and heat your hot water. If you block or restrict the air around your heat pump, it won't work as well. Please don't put items next to your heat pump that can get in the way of the air it needs.

A routine clean for your heat pump.

For the best performance of your heat pump, we suggest regular cleaning to prevent the accumulation of dirt and leaves that could impact its operation.

Servicing your heat pump.

For best efficiency, we recommend servicing your heat pump. As with other electrical appliances servicing can identify and resolve issues that could affect your heating system.

Convenient control with the Emerald App

Emerald App provides you with convenient control and monitoring capabilities for your heat pump hot water system.

Here's what you can do with the app:

Monitor electricity consumption

View information on your heat pump hot water systems electricity usage.

Real-time hot water temperature

Access real-time temperature data of your hot water, ensuring you always know the current status.

Remote control anywhere, anytime

Enjoy the flexibility of remotely controlling your heat pump, allowing you to turn it on or off from anywhere via your mobile phone.

Boost your hot water

Activate the Boost feature to speed up the heating process of your hot water tank when you need it to be ready quickly.

Put your heat pump in Silent Mode

Opt for a quieter operation by activating Silent Mode.



Smart Actions to help save even more.

What are Smart Actions?



Smart Actions is a feature designed to automate temperature control. It allows you to set specific rules for your heat pump, enabling it to adjust temperature settings based on your preferences.

How do Smart Actions work?

Smart Actions will maintain your preferred temperature while saving you energy and money according to your preferences.

How can you save with Smart Actions?

Efficiency, Convenience and Control

Smart Actions enhance the energy efficiency of your heat pump by automating its behavior, leading to lower energy consumption and reduced bills. These actions simplify your routine by maintaining the hot water temperature at your desired level without constant adjustments, offering convenience while conserving energy. Additionally, you enjoy personalised control, allowing you to tailor the heat pump settings for optimal operation times and minimising energy waste, enhancing your overall experience.

Examples of Smart Actions

- **Solar Soaker**

Leverage excess solar energy by setting your heat pump to automatically turn on when your solar panels are generating surplus power. This allows you to heat your hot water using free solar energy.

- **Set Schedules to Heat Your Water**

Set your schedules so that your system will only turn on during your off-peak electricity times - saving you money on your electricity bills.

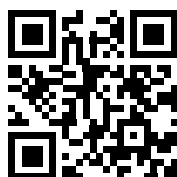
Set up a Smart Action in 3 easy steps:

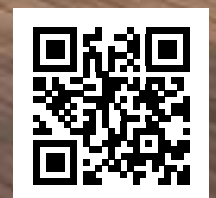
1. In the Emerald app, click Smart Actions
2. Create and name your new Smart Action. Select a 'Trigger' that you want to activate your system e.g. 'Schedule'.
3. Set the 'Action'. This is the device you wish to be activated by the trigger - in this case, it would be your Heat Pump.

For support visit:
emerald.com.au/support



You're out of hot water
Your system will heat as normal.
Activate Boost Mode for faster hot water.





Wi-Fi pairing

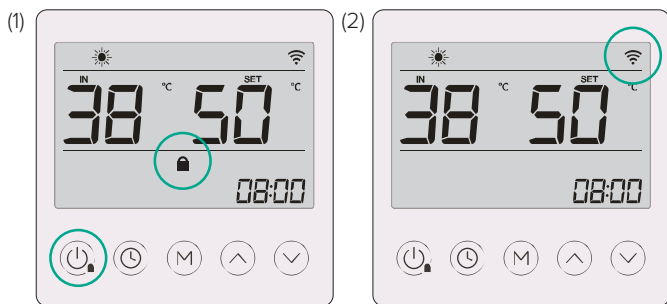
Wi-fi pairing your heat pump

Wi-Fi pairing steps

1. Download Emerald App and log in or create a new account.
2. Tap the (+) button on the app's home screen select "Add Product."
3. Choose between Bluetooth mode (recommended) or AP mode for device pairing.
4. Connect your mobile device to a 2.4GHz Wi-Fi network using the correct password.
5. Ensure the Heat Pump is powered on and the controller's display is active.
6. Follow the in-app instructions to activate Pairing Mode on the Heat Pump based on the chosen mode.

TOP TIP: Ensure child lock is turned off by holding the power button for 5 seconds. (1)

7. Confirm the Wi-Fi symbol is flashing on the Heat Pump's display. (2)



8. Return to the app and follow the on-screen prompts to complete the pairing process.
9. Select the correct model number and scan the heat pump's serial number using the app.
10. Enter the installation date.

Your Heat Pump should now be paired and available for you to access via Emerald App.



Pairing troubleshooting tips

If you are having trouble pairing the Heat Pump, please check the following:

- Ensure your mobile device is connected to a 2.4GHz Wi-Fi network.
- Ensure Wi-Fi password is correct as sometimes 2.4GHz password can be different.
- If possible, move your Wi-Fi router close to your heat pump. Alternatively, set up a Wi-Fi extender to increase signal strength.

TIP: Device will time out after 2 minutes. Even if Wi-Fi icon is still flashing, it is recommended you follow the below steps to put device back into pairing mode.

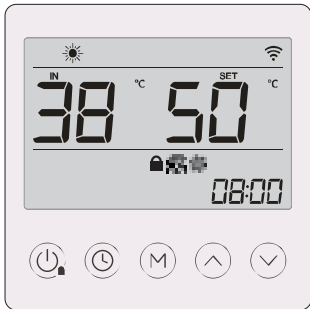
Press the  button +  or  depending on pairing mode.

Need assistance?

Visit online troubleshooting customer support.
emerald.com.au/contact

Controller instructions

Button instructions



POWER ON

- Sun is visible on screen.

STANDBY

- Screen is on but sun is not visible

POWER OFF

- Screen is blank.

	On/Off Button	- Press button for 3 seconds to unlock the controller. - Press button for 2 seconds to turn ON/OFF system. - Press button to return to main control panel screen from any other screen settings.
	Running Mode	When the system is turned on press button to select different running modes.
	Up and Down	- Press UP or DOWN button for 3 seconds to open the system's running conditions. - Under Timer or Clock setting status, press the UP or DOWN button to adjust setting value
	Clock and Timer Setting	- Press button once to enter the real clock setting. - Press button for 3 seconds to enter/exit the timer settings. - Under timer settings, press button once to switch the timer setting value from "hour" to "minute". - Under timer settings, press and hold button for 3 seconds to cancel the current timer setting.

Icon instructions

Symbol	Status	Description
	Visible on screen	System is in standard mode
	Visible on screen	System is in silent mode
	Visible on screen	System is in boost mode
	Visible on screen	System is in defrost
	Visible on screen	Service required
	Visible on screen	Compressor is running
	Visible on screen	Fan motor is running
	Visible on screen	Electric heating element is on for heating (only for the models with element)
	Flashing	Sterilisation (legionella control)
RT	Visible on screen	Current water temperature in the tank
SET	Visible on screen	Set target water temperature in the tank
	Visible on screen	Display actual water temperature, set water temperature, and fault code
°C	Visible on screen	Currently showing Celsius temperature
	Visible on screen	Real clock time
	Visible on screen	Timer is on
ON	Visible on screen	Timer function is activated
OFF	Visible on screen	Timer function is deactivated
1	Visible on screen / Not visible on screen	Timing period 1 set / Timer period 1 not set
2	Visible on screen / Not visible on screen	Timing period 2 set / Timer period 2 not set
3	Visible on screen / Not visible on screen	Timing period 3 set / Timer period 3 not set
	Visible on screen	The controller is locked
	Visible on screen / Flashing	The Wi-Fi is connected / Wi-Fi is searching for connection
	Visible on screen	Timer setting on Monday, Tuesday, Wednesday, etc
	Visible on screen	Factory Mode
STAN	Flashing	Standard mode
SILE	Flashing	Silent mode
BOOS	Flashing	Boost mode
ELE	Flashing	Electric heating element mode
HP	Flashing	Heat pump mode

Controller instructions

Operation instructions

Controller lock and unlock

- In the locked state, press the  button for 5 seconds, control panel will beep once, then the control panel is unlocked.
- The control panel locks automatically when no operation has been detected for 60 second.

Select running mode

Standard Mode

- Under this mode, the  + **STAN** icon lights up (**STAN** will flash).
- The set temperature is locked at 60°C to ensure maximum hot water capacity. (Commercial units may have higher set points of 63°C/70°C).
- Heat pump will cycle (Turn OFF/ON) based on maintaining the target water temperature.

Silent Mode

- Press the  button to switch to Silent mode. Under this mode, the  +  icons light up (**SILE** will flash). The setting range is optional with 15°C - 60°C for target water temperature.
- Heat pump will run with a lower noise signature.
- This is a one-shot function and will return to standard mode after one cycle or 24 hours.

Boost Mode (non-element)

- Press the  button to select Boost mode. Under this mode, the  +  icons light up (**BOOS** will flash).
- The setting range is optional with 15°C - 65°C (Commercial-1: 65°C, Commercial-2: 70°C) for target water temperature.
- In Boost mode, the heat pump will run with a larger heating capacity.
- If the target water temperature $\leq 60^{\circ}\text{C}$, Boost mode will work by increasing the inverter strength to heat the tank faster.
- This is a one-shot function and will return to standard mode after one cycle or 24 hours.

Boost Mode (element)

- Press the  button to select Boost mode. Under this mode, the  +  +  icons light up (**BOOS** will flash).
- The setting range is optional with 15°C - 70°C (Commercial-1: 70°C, Commercial-2: 70°C) for target water temperature.
- In Boost mode, the heat pump will run with a larger heating capacity.
- If the target water temperature $\leq 60^{\circ}\text{C}$, both the heat pump and electric heating element work simultaneously during the entire heating cycle to heat the tank faster.
- This is a one-shot function and will return to standard mode after one cycle or 24 hour.

Element Mode (element system only)

- If the heat pump fails, the electric heating element heats the water up to the target water temperature.
- Control panel will beep intermittently and have an  icon on the control panel screen.

Real time clock setting

1. On the control panel, press the  button once to enter the real-time clock setting.
2. On initial set-up, date will need to be set on real time clock e.g. "YYYY", "MM", "DD".
3. Press the  button once, and the "hour" will flash. To set the hour of the real-time clock, press the  or  buttons.
4. After setting the hour, press the  button again, the "minute" will flash. To set the minute of the real-time clock, press the  or  buttons.
5. Press the  button again to confirm the current clock setting and return to the main control panel screen.

Timer setting

1. Press the  button for 3 seconds to begin setting your timer. You can set 3 different ON/OFF time periods.
2. Press the  or  buttons to interact with the control panel timer settings.
3. The "1" symbol and "hour" of the timer will be visible. Press the  or  buttons, to set the "hour" in which you want the system to turn ON.
4. Press the  button again, the "minute" of the timer will be visible. Press the  or  buttons to set the minutes of the system "1" timer.
5. Press the  button again to enter the OFF setting of system "1" timer, this is the time the system will turn OFF.
6. Press the  button to complete the System "1" timer. The heat pump can have two more system timers (2 and 3). Press the button to exit the timer settings and return to the main control panel screen.
7. If the ON and OFF times are set at the same value for system "2" and "3" timers, system "1" timer will override system "2" and "3" timers.
8. After setting all three system timers in the timer settings, press the  button to confirm the current set value and return to the main control panel screen.
9. The system does not need to have all three timers active.
10. The main control panel screen will show a number (1,2,3) next to your real-time clock, indicating which timer is currently active and what operation status it is currently in (ON/OFF)
11. To deactivate a system timer, access the system timer settings. Press the  button to navigate through each system timer (1,2,3). Press the  button for 3 seconds to deactivate the system timer currently shown on the control panel. The control panel will return to the main interface once completed.

Weekly timer

1. Press the  button once shortly, the systems real-time clock will be flashing. Press the  button for 3 seconds to enter weekly timer.
2. The weekly timer settings can be changed by pressing the  or  button.
3. Weekly timer will turn your system on once per week on the allocated day that has been set on the control panel.
4. To deactivate the weekly timer, press the  button once, the systems real-time clock will be flashing. Press the  button for 3 seconds to cancel the weekly timer and return to the main control panel screen.

Controller instructions

Operation instructions

Memory function and other functions

1. The Control panel has a power-down memory function.
2. The control panel backlight will be on for 60 seconds before turning off if there is not further input.
3. In boost mode, only the current mode, water tank temperature, and time are displayed.

Forced defrosting

1. In the power-on state, press the  +  buttons for 5 seconds to enter the forced defrosting the  icon lights up during forced defrosting.
2. When shutdown or forced defrosting reaches the set time or temperature, the system automatically exits forced defrosting and enters normal heating water status. The  icon goes out during forced defrosting.

Electric heating element control

Only for EE-HWS-A1-220E(-1/2), EE-HWS-A1-270E(-1/2) and EE-HWS-A1-320E(-1/2)

1. When defrosting, electric heating element is forced to be turned on if heating is required; The electric heating element is not allowed to be turned on within 60 seconds after the machine is powered on or after the electric heating element is turned off.
2. When the ambient temperature is $\leq -7^{\circ}\text{C}$, the heat pump will be not allowed to turned on, and the electric heating element is automatically activated to produce hot water.
3. When high pressure protection or exhaust high temperature protection occurs, the compressor will be locked off, and the electric heating element is automatically activated to produce hot water.
4. When exhaust temperature sensor failure, coil temperature sensor failure, gas return temperature sensor failure, the electric heating element will be automatically activated on above conditions, which is not restricted by the ambient temperature requirement.

Legionella control

For legionella control our systems heat at least 45% of the water tank to 60°C daily. This sterilisation process will occur daily regardless of any manual setting changes made to the controller.

Installation guide

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Important notice

Please read this manual carefully before you attempt to install this product. Failure to do so may result in the product not working according to its design.

Safety precautions

Installation and operation

- Ensure the installation adheres to the AS/NZS 5149 Standards.
- Read these instructions thoroughly before attempting to install or operate this system.
- This heat pump must be installed, commissioned, and serviced by an authorised person in accordance with local regulations.
- Only an electrician should handle tasks involving access covers or water heating components, as they involve exposing 240V wiring.
- In case of damage to the system's power supply, it must be replaced by an authorised person. Avoid touching the power connections or plugs with wet hands.
- Be cautious not to touch the pipework, as it may be hot.
- Do not place any objects on or against this heat pump.
- Keep chemicals or flammable materials away from this heat pump.
- Do not operate the heat pump with collectors or covers removed.
- Do not activate the heat pump unless the cylinder is filled with water.
- Ensure the household electrics have a reliable earth connection.
- This heat pump must be safeguarded with a residual current device of the appropriate rating.
- Do not tamper with any permanent labels or warning plates attached to the external cover of this heat pump.
- Always engage a trained personnel if you need to relocate this heat pump after professional installation.
- Maintenance and repair work should only be carried out by trained and qualified personnel.
- The electrical connection to this product should use a suitable RCD/MCB or RCBO with a test button function.
- Ensure that children never use this heat pump.

Installation and operation

- This heat pump uses R290 (propane) refrigerant, classified as a flammable gas in accordance with AS 1677.
To service components that use this refrigerant, such as the compressor, it is essential to engage a refrigeration mechanic with the appropriate Australian refrigerant handling license.
- Do not puncture or subject the heat pump to flames.
- Keep in mind that the refrigerant may not have a detectable odor.
- When storing the heat pump, be sure to adhere to AS/NZS 5601 compliance requirements.
- Both national and state regulations govern the storage, transportation, and handling of hazardous materials, including flammable gases. The maximum quantity and arrangement of equipment allowed for transportation or storage will be determined by heat pump regulations.

Warning

- If you suspect a refrigerant leak, switch off the unit at the mains and contact the service agent. Additionally, avoid smoking or using electrical equipment to prevent injury from refrigerant leaks.
- To minimise the risk of fire, avoid storing chemicals or flammable materials near the heat pump, and never use flammable sprays like hairspray or paint in its vicinity, as a refrigerant leak combined with an external ignition source could lead to fire.
- Avoid storing or transporting this heat pump in areas with potential ignition sources, such as open flames.
- End of life recycling: The refrigerant must not enter the atmosphere. Only have the refrigerant removed by qualified professional.

If the hot water system has not been used for two weeks or longer, there's a chance that a dangerous amount of highly flammable hydrogen gas may have built up inside the water heater. To safely disperse this gas, follow these steps:

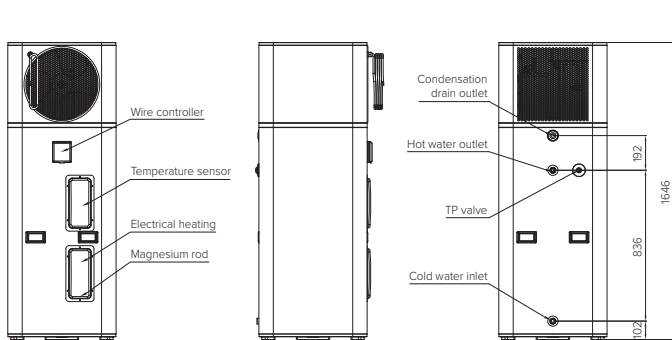
1. Turn on a hot water tap and let it run for several minutes until you no longer hear the discharge of gas. You can use a sink, basin, or bath outlet for this purpose, but avoid using a dishwasher, clothes washer, or any other appliance.
2. While performing this procedure, make sure there is no smoking, open flames, or electrical appliances in the vicinity.
3. If hydrogen gas is released through the tap, it may produce an unusual sound similar to air escaping.

Taking these precautions will help ensure the safe dissipation of any accumulated hydrogen gas in the water heater.

General information

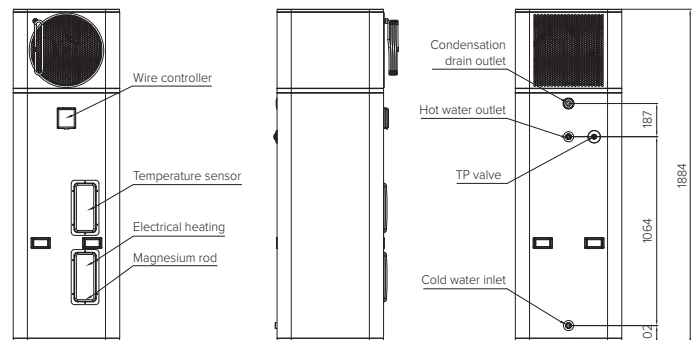
Measurements

Model (Residential)	EE-HWS-A1-220E	EE-HWS-A1-220	EE-HWS-A1-270E	EE-HWS-A1-270	EE-HWS-A1-320E	EE-HWS-A1-320
Model (Commercial)	EE-HWS-A1-220E-1(-2)	EE-HWS-A1-220-1	EE-HWS-A1-270E-1(-2)	EE-HWS-A1-270-1	EE-HWS-A1-320E-1	EE-HWS-A1-320-1
Water Tank Volume	220L		270L		320L	
Optional Running Modes	Standard / Silent / Booster / E-Heater	Standard / Silent / Booster	Standard / Silent / Booster / E-Heater	Standard / Silent / Booster	Standard / Silent / Booster / E-Heater	Standard / Silent / Booster
Unpacked Dimension	600*600*1646mm	600*600*1646mm	600*600*1884mm	600*600*1884mm	600*600*2105mm	600*600*2105mm
Packed Dimension	650*680*1776mm	650*680*1776mm	650*680*2014mm	650*680*2014mm	650*680*2225mm	650*680*2225mm
Net Weight	118kg	118kg	132kg	132kg	146kg	146kg
Gross Weight	126kg	126kg	141kg	141kg	154Kg	154kg



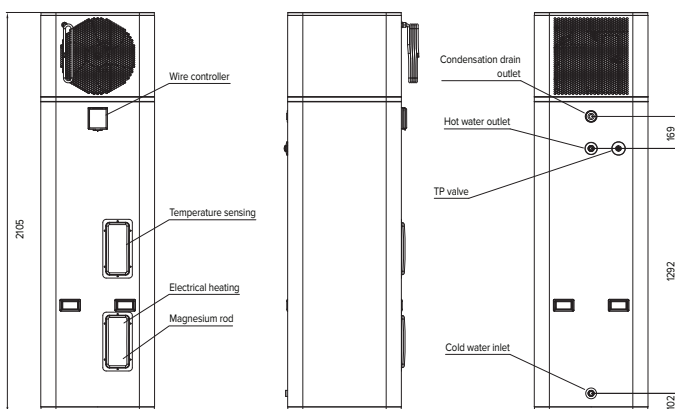
EE-HWS-A1-220E(-1/-2)

(The electric heating element is not included in EE-HWS-A1-220(-1))



EE-HWS-A1-270E(-1/-2)

(The electric heating element is not included in EE-HWS-A1-270(-1))

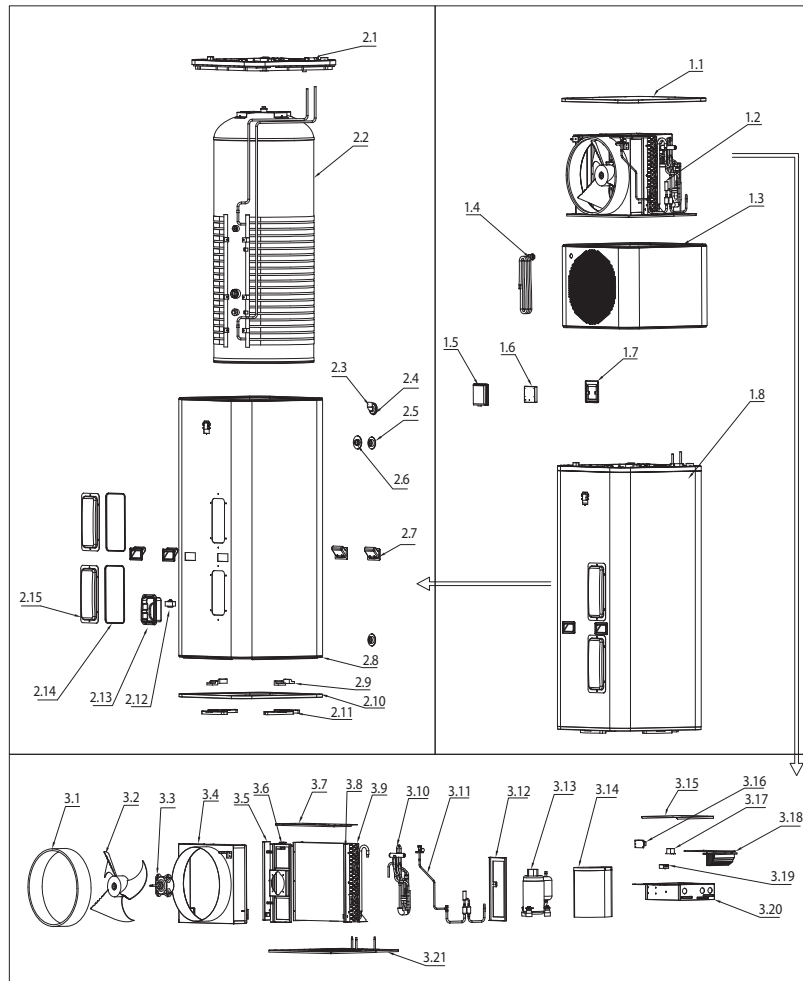


EE-HWS-A1-320E(-1)

(The electric heating element is not included in EE-HWS-A1-320(-1))

General information

Components



No.	Description
1.1	Top cover
1.2	heat pump refrigerant parts
1.3	Top outer casing shell
1.4	Power cord
1.5	Waterproof controller cover
1.6	Wire controller
1.7	Seal pad
1.8	Water tank components

No.	Description
2.1	Dip Tray
2.2	Inner tank parts
2.3	Drain pipe adapter
2.4	Seal cover
2.5	Seal cover
2.6	Seal cover
2.7	Handles
2.8	Outer casing
2.9	Position block
2.10	Bottom tray
2.11	Feet
2.12	Temperature cut off switch
2.13	Electric auxiliary heating fixed box
2.14	Seal tap
2.15	Cover

No.	Description
3.1	Wind guide ring
3.2	Wind blade
3.3	Fan motor
3.4	Fan box
3.5	Left bracket of evaporator
3.6	Motor bracket
3.7	Fan box cover
3.8	Right bracket of evaporator
3.9	Evaporator
3.10	Four way valve ass'y
3.11	Throttle valve ass'y
3.12	Electrical box bracket
3.13	Compressor
3.14	Insulation jacket
3.15	Electrical box cover
3.16	Electricity detection module
3.17	Relay
3.18	Main PCB
3.19	Terminal
3.20	Electrical box
3.21	Chassis

*The electric heating element is not included in EE-HWS-A1-220(-1) & EE-HWS-A1-270(-1)&EE-HWS-A1-320(-1)

Installation

All Emerald Energy heat pumps must be installed by a licensed plumber in compliance with the guidelines specified in AS/NZS 3500.2, which pertains to the "National Plumbing and Drainage Code for Hot Water Supply Systems - Acceptable Solutions."

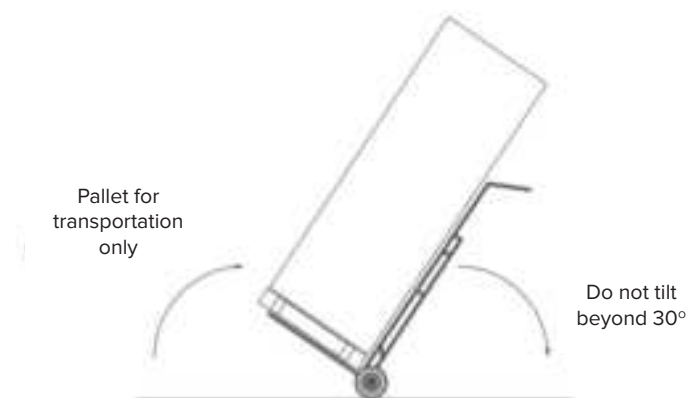
Choose a suitable location

- Ideally, the Heat Pump should be installed outdoors. However, for indoor installations, please ensure that the chosen location complies with the requirements outlined in AS/NZS 5149.
- Make sure there is ample space for installation and maintenance, with a recommended minimum vertical distance of 300mm.
- The product must be installed in a dry environment free from humidity.
- Ensure that the supporting surface is level (with a horizontal angle not exceeding 2°) and capable of bearing the weight of the heat pump when filled with water. Refer to the technical data for the heat pump's weight.
- Choose a suitable outdoor location for the exhaust air vent, and be sure to insulate the exhaust air ducting to prevent condensation when the system is in operation.
- Ensure there is easy access to the system for maintenance purposes.
- Always provide extra space for pipe connections and power cables.
- Avoid installing the product on a surface with loose coverings, as it may produce excess noise during operation.
- Avoid installing the product in areas with toxic gases or mineral oils, as these locations are not suitable.
- When installing near a coastline within 500 meters, be mindful that extra maintenance may be necessary. Insufficient shelter from coastal conditions can shorten the system's lifespan and potentially void the warranty.

 If you install the product in an environment prone to frost, take all necessary precautions to ensure proper insulation of all pipework.

Transporting the heat pump

- To ensure the warranty remains valid, it's crucial to store and transport Emerald heat pumps in an almost upright position with a tilt angle of no more than 30°. Storing or transporting the unit horizontally will void the warranty.
- Always transport the system while it's inside its packaging.
- The packaged system weighs 126KG for models EE-HWS-A1-220(-1) and EE-HWS-A1-220E(-1/-2), and 141KG for models EE-HWS-A1-270 and EE-HWS-A1-270E(-1/-2), and 154KG for models EE-HWS-A1-320 and EE-HWS-A1-320E(-1/-2). For safe handling and to prevent damage, it's necessary to have two people carry the system at all times.
- Please be aware that the external casing of the unit is prone to denting and damage. When moving the unit, exercise care and caution, as any marks caused by improper handling are not considered defects and are not covered under the warranty.



Minimum indoor installation requirements

- The indoor area for heat pump installation should exceed the following sizes:
For a 220L unit, the area should be at least 67m².
For a 270L unit, the area should be at least 47m².
For a 320L unit, the area should be at least 43m²
- If the heat pump must be installed in a smaller indoor space but is connected to an adjacent room, there must be a fixed open door connecting the rooms. A fixed open door cannot be closed under any circumstances.
- Place heat pumps a safe distance away from potential ignition sources or corrosive environments to prevent the risk of fire or damage.
- Consider the serviceability of the heat pump during installation, ensuring there is enough space for maintenance and repair tasks.
- Follow all relevant electrical and safety standards during.
- Regularly perform maintenance and inspections on both the heat pump and the ventilation system to ensure safe and efficient operation.

Always remember installers must diligently adhere to all Australian standards. Our guidelines should be viewed as supplementary information and do not override established standards.

Installation

Ventilation guidelines

These guidelines pertain to the proper operation of the heat pump and are not related to the storage of flammable refrigerants. It's important to ensure that the location complies with AS/NZS 5149 requirements.

Ideally, the heat pump should be installed outdoors. However, for indoor installations, it's crucial to be aware of potential issues and take preventive measures.

One significant concern with indoor installations is the risk of air recirculation. In confined spaces, the air temperature can gradually decrease, leading to a decrease in the heat pump's efficiency and, in some cases, even failure.

To prevent this, make sure the ambient air temperature doesn't drop below 5°C. Continuously monitor the air temperature within the space to ensure adequate ventilation throughout the heat pump's lifetime.

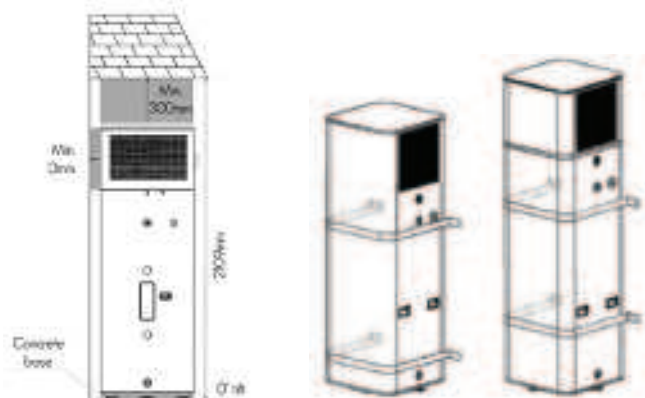
To maintain a stable air temperature, consider the following recommendations:

- For indoor installations, choose spaces with an air volume greater than 53m³.
- If the area is smaller than 53m³, ensure cross ventilation. Cross ventilation can be achieved either naturally or mechanically.
- Natural ventilation occurs when there are appropriately sized openings on opposite ends of the enclosure, facilitating cross airflow.
- When using mechanical ventilation through a supply or extract fan, ensure a minimum air volume of 1000 m³/h (278 L/s).
- In mechanically ventilated areas, establish a make-up air pathway. This can take the form of grilles, undercut doors, open doors, open windows, etc.
- To achieve effective cross ventilation, position the make-up air pathway on the opposite side of the enclosure from the fan.

Installation of the heat pump

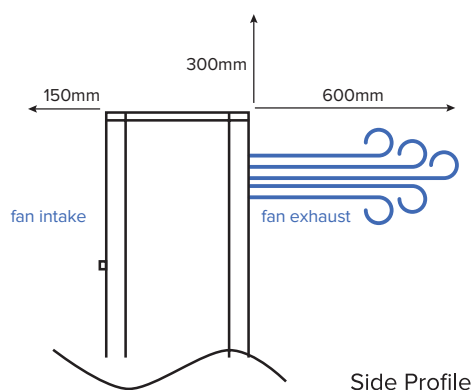
Base

- The unit must be installed on a concrete plinth or a stable structure capable of supporting weights exceeding 400kg. It's crucial that the supporting structure remains stable over time and does not shift, especially due to factors like water drainage. You'll need a concrete base that's at least 50mm thick or a well-seasoned hardwood slat with a minimum thickness of 25mm. If you're using concrete base pavers, make sure they have a minimum dimension of 600mm x 600mm.
- Make sure all four feet of the unit are supported by the base you're using to avoid any potential warranty issues.
- Ensure proper drainage is in place to handle any potential overflow.
- During installation, it's essential to position the unit completely vertically and level to facilitate proper condensate drainage. If the system is installed with a tilt exceeding 3° it could void the warranty.
- If there's a risk of property damage due to water leakage, you must install a safety tray, also known as an overflow tray.
- The front and back faces of the unit feature only Emerald's logo, with no service panels. These units can be installed flush against the wall, provided all other clearance requirements are met.
- According to AS/NZS 60335.2.40:2023 clause 20 requirements, we recommend the fixed method as below image.



Air flow

- Do not install the unit in areas where there is a risk of falling debris, such as leaves, as this could block air vents or cause damage to the unit.
- Avoid placing the system in locations with multiple walls or structures.
- When installing the unit under fixtures or home eaves, follow these clearance requirements:
 - Maintain a minimum clearance of 300mm above the unit.
 - Provide a 600mm clearance at fan exhaust.
 - Allow for a 150mm clearance at fan intake.
- All mechanical components and operational controls must be accessible for maintenance
- Install the unit to ensure that the control interface is easily accessible for users. There should be clear access to the electrical panel located at the back of the system. Improper installation could result in voiding the warranty or require additional charges to rectify the system's compliance.

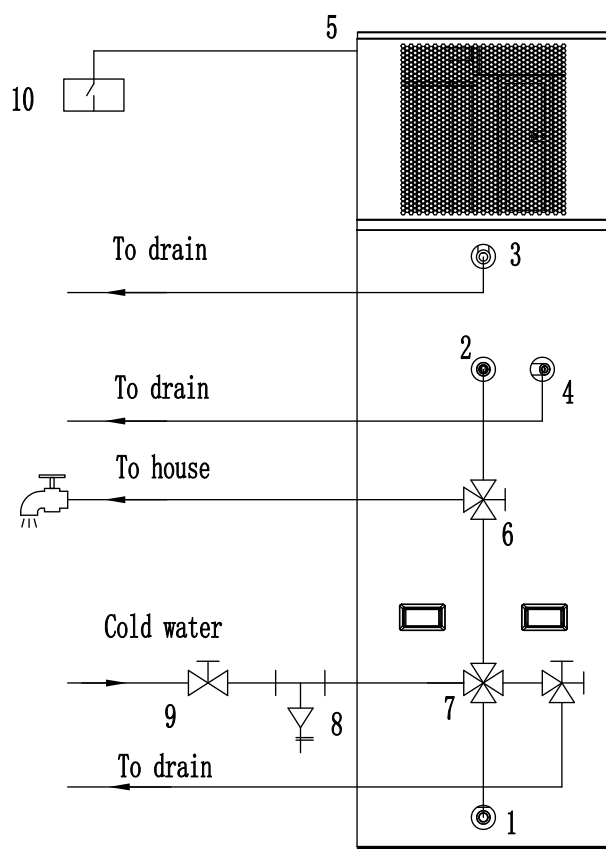


Warning

- A minimum of 20m³ of unobstructed space surrounding the unit.
- For indoor installations the ensure that the location complies with the requirements of AS/NZS 5149.
- The electrical access point and display panel should always be accessible.

Plumbing connections

Plumbing connections



1	Cold water supply outlet (G 3/4" female thread)
2	Hot water outlet (G 3/4" female thread)
3	Condensing drainage Elbow*
4	TPR Valve* (G 1/2" female) (850k Pa) supplied
5	Electrical cable
6	Tempering valve (high performance recommended)
7	Expansion control valve (ECV)
8	Pressure limiting valve (500k Pa)
9	Non-return/Isolation valve
10	Isolation switch (hardwired into 10 amp circuit)
* Supplied with system	

Cold water supply outlet

- The cold water supply connection uses a G 3/4" female thread.
- To connect the cold water supply, use a G 3/4" socket.
- The cold water supply outlet can also serve as a drainage point for emptying the system.

Hot water connection

- The hot water supply connection also uses a G 3/4" female thread.
- Connect the hot water supply using a G 3/4" socket.
- To ensure thermal efficiency, insulate all hot water lines and connections with a minimum 13mm closed-cell insulation.
- All hot water supply components must be made of copper.

Condensate drain

- When heat is extracted from the atmosphere through evaporator coils, it generates condensation in the form of water. In places with higher humidity, this condensation occurs at a faster rate.
- To collect the water by-product, a condensate tray is placed at the base of the heat pump. Any surplus water from this tray is channeled through the condensate drain.
- The system comes with a pre-installed condensate drain connection elbow. It is essential to route the condensate into the nearest storm water drain using a drainage pipe. Failing to do so could lead to issues like termite attraction and the growth of algae and moss.

- Ensure that the condensate line is free of kinks, and since the water relies on gravity for flow, it should only run downward to facilitate unobstructed water flow.

Pressure and temperature relief valve (TPR)

- The system comes with a TPR (Temperature and Pressure Relief) valve that matches the water heater tank's pressure rating. If the TPR valve is missing, please get in touch with your supplier. The valve is rated with a capacity of 850kPa, 10kW, and a set temperature range of 93-99°C.
- Install the provided TPR valve at Point 4, as indicated above.
- Ensure that the TPR valve is insulated with a minimum 13mm closed-cell insulation to minimise heat loss.
- The TPR should be positioned in a way that the drain line always points downward, and the discharge point remains open to the atmosphere.
- When connecting a discharge pipe to the pressure relief valve, make sure it runs continuously downward and is placed in a frost-free environment. Do not connect any pressure relief device to the condensate drain pipe, as water may drip from the pressure relief device's discharge pipe. This pipe should always be left open to the atmosphere. Additionally, regularly operate the pressure relief device to remove lime deposits and confirm it is not blocked.

Plumbing connections

Checking the TPR valve (frequency: every half year - replace if required)

To ensure the TPR valve functions correctly, perform the following steps every six months, and replace it if needed:

- Locate the TPR valve on the left side of the unit.
- Carefully use the lever to release the valve, allowing some water to drain from the tank. Note that the expelled water may be very hot.
- If water flows freely during this process, it indicates that the TPR valve is still in good working condition.
- If water does not flow freely, it suggests that the TPR valve needs replacement.
- In the case of a required replacement, please contact your plumber or reach out to your service team for assistance.

Tempering valve

- Emerald heat pumps are configured to generate hot water at temperatures exceeding 50°C. To comply with AS/NZS3500 regulations, it is imperative to have a Tempering Valve installed.
- We strongly advise using a high-performance or solar-rated tempering valve for more precise control of hot water delivery temperature.
- If your previous hot water system did not have a tempering valve, you may notice a difference in the hot water temperature. This adjustment is both normal and legally mandated by new regulations. If you have any questions or concerns, please get in touch with your installer for assistance.

Expansion control valve (ECV)

- Please adhere to local regulations and requirements when considering the installation of an ECV. Note that this is optional with most councils.
- When installing an ECV, make sure that the diameter of the connecting pipe does not exceed that of the safety valve.
- Ensure that the drain is adequately sized to accommodate water runoff, even in situations where the safety valve has fully opened.
- The drain outlet should always remain open to the atmosphere and should not have any closing function.
- It is recommended that the ECV is rated at no more than 700kPa.

Pressure limiting valve (PLV)

- This water heater comes equipped with a TPR (Temperature and Pressure Relief) valve rated at 850kPa. It is designed for direct connection to the mains water supply, but it is crucial to check the mains water pressure before installation.
- All valves must be installed in compliance with AS/NZS 3500 and all relevant local regulations.



If the mains water pressure exceeds 600kPa, a 500kPa pressure limiting valve (AS1357) must be installed to ensure system efficiency, longevity, and safety.

Min-max filling water pressure

Permitted min-max filling water pressure: Min 200KPA - Max 650KPA.

Non-return/Isolating valve

It is necessary to install a non-return or isolation valve directly in the cold-water supply line that feeds the system. This valve enables the isolation of the hot water system from the rest of the home's water supply, simplifying maintenance, draining, and unit replacement. Do not use a hose-set to connect the system to the water supply.

The non-return or isolation valve can be used in combination with a TPR valve to create a dual valve system.

The demanded quality of water

- Poor-quality water contains higher levels of scale and sand and should be filtered.
- The water quality should be analysed before operating the system to measure the PH value, conductivity, Chloride ion concentration and sulphate ion concentration.
- The acceptable water quality standard is showed as below table.

PH value	Total hardness	Conductivity	Sulphate ion	Chlorine ion	Ammonia ion
7~8.5	< 50ppm	<200µV/cm(25°C)	None	< 50ppm	None
Sulfate ion	Silicon	Iron content	Sodium	Ca	
< 50ppm	< 50ppm	< 0.3ppm	No requirement	< 50ppm	

- Suggest the filter meshes is about 40 meshes.

Checking the anode and replacing if required

The anode is a crucial component that safeguards the inner lining of the hot water tank. Over time, it may degrade, reducing its protective capabilities. It is advisable to periodically inspect the anode for degradation and replace it if needed.

- Turn off the power and shut off the cold water inlet valve.
- Open a hot water tap to relieve pressure within the tank.
- Locate the position of the anode.
- Unscrew the anode.
- Examine it for signs of degradation.
- If it is still in good condition, reinstall it to ensure an effective seal.
- If the anode is in unsatisfactory condition, replace it with a new one.

Failing to replace the anode when necessary will void the warranty for the water tank.

- Reopen the cold water inlet valve.
- Open a hot water tap until hot water flows out, then turn off the tap.
- Turn on the power to restart the unit.
- Your unit can now be used as usual.

Plumbing connections

Cleaning the inner tank and electric heating element

To keep your water heater running efficiently, it's crucial to perform regular maintenance on the inner tank and electric heating element. Follow these steps:

- Switching off the power to the water heater.
- Shut off the cold water inlet valve and open a hot water tap to release any built-up pressure.
- Attach a flexible pipe to the drain outlet and connect it to a suitable sewage drain. Ensure that the drain pipe you use can withstand temperatures of at least 34°C. If the drain pipe doesn't meet this requirement, open the cold water inlet valve and hot water tap until the water temperature is safe for the drain pipe.
- Open the drain outlet of the water heater and allow all the water inside the inner tank to empty out. If needed, use water to rinse the inner tank multiple times to eliminate any deposits.
- After cleaning the tank, close the drain outlet.
- Fill the inner tank with water and turn the power back on.

Filling the system

Here are the steps to follow for filling and pressurising the system after it has been properly connected:

- Once the system is correctly connected, proceed to fill and pressurise the tank.
- To start filling the water system, first, open the non-return valve on the cold-water inlet. Simultaneously, make sure at least one hot water tap inside the property is open. As the system fills with water, you'll hear air escaping from the open hot water tap. This process, called "bleeding the system," ensures that any trapped air is removed from the system. When you consistently see water flowing from the hot water tap, it means the system is fully bled, and you can then close the tap.
- Always ensure that the tank is completely filled with water before connecting and activating the electricity supply.

Warning

Importance of proper installation

Installing the valves correctly is critical to ensure system efficiency, longevity and safety. Improper installation may lead to pressure fluctuations, potential leaks and compromised performance.

Electrical connections

Warning

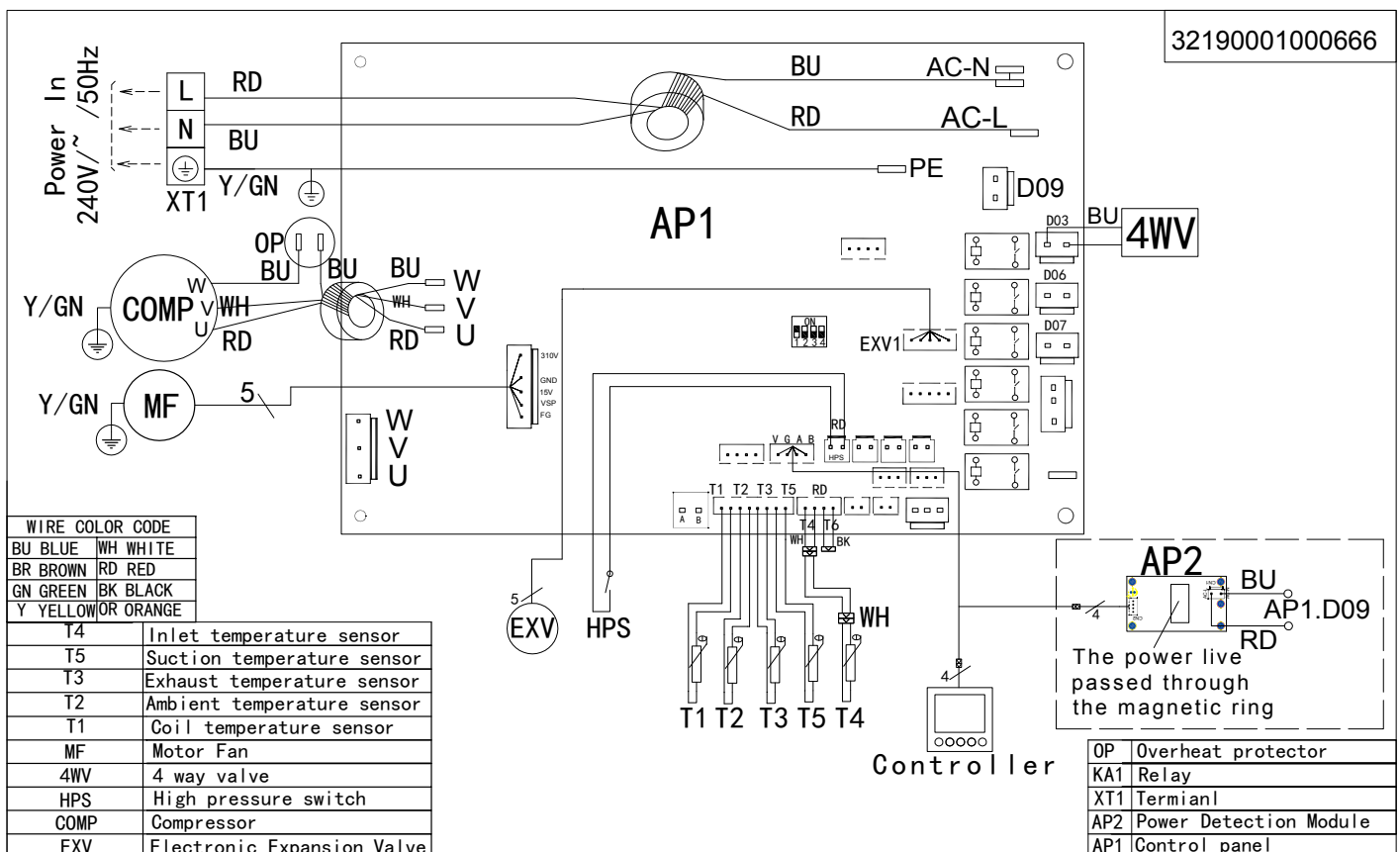
- Only a qualified and trained professional should handle the electrical connections.
- The heat pump power supply circuit must have a reliable ground connection, and both power supply and external grounding wires should be effectively connected.
- The trained installer is responsible for testing the circuit and making the final connections.

Pre-connection and regulations

- When installing the heat pump, electrical work must adhere to local supply authority regulations and AS3000 standards.
- The maximum operation current of the models with element can reach 15A, so the mains power supplying the unit should have a minimum 16 amps circuit breaker installed.
- Please note that this heat pump includes an over-temperature control cut-out. It is absolutely essential that the water heater is never operated without this safety device connected to the circuit. Any resetting or replacement of this device should only be undertaken by a qualified electrical contractor.

- According to AS/NZS 60335-1 Clause 7.12.2, a disconnection feature must be incorporated into the fixed wiring, following the wiring rules.
 - Fuse: 260V, 16A.
 - Wiring should be carried out by professional installation technicians following the provided circuit diagram.
 - Arrange the layout of power and signal lines neatly, ensuring they do not interfere with each other or come into contact with connecting pipes and valve bodies.
 - Ensure that the unit's power lines match the specified requirements; do not use wires that do not conform to the specifications.
 - After completing all wiring construction, carefully inspect it before switching on the power supply.
 - If the supply cord is damaged, it should be replaced by the manufacturer, a service agent, or a similarly qualified person to prevent any potential hazards.
 - Emerald's non-E (without electric element) heat pumps come with a pre-installed plug which meets AS/NZS60335.2.40:2023 standards. The Heat Pump needs to be wired to a suitable GPO i.e. with the correct outdoor IP rating.
- If no additional electrical work is needed on-site, then these heat pumps can be installed without requiring an electrician. The AS/NZS 3000 wiring rules need to be observed and adhered to.

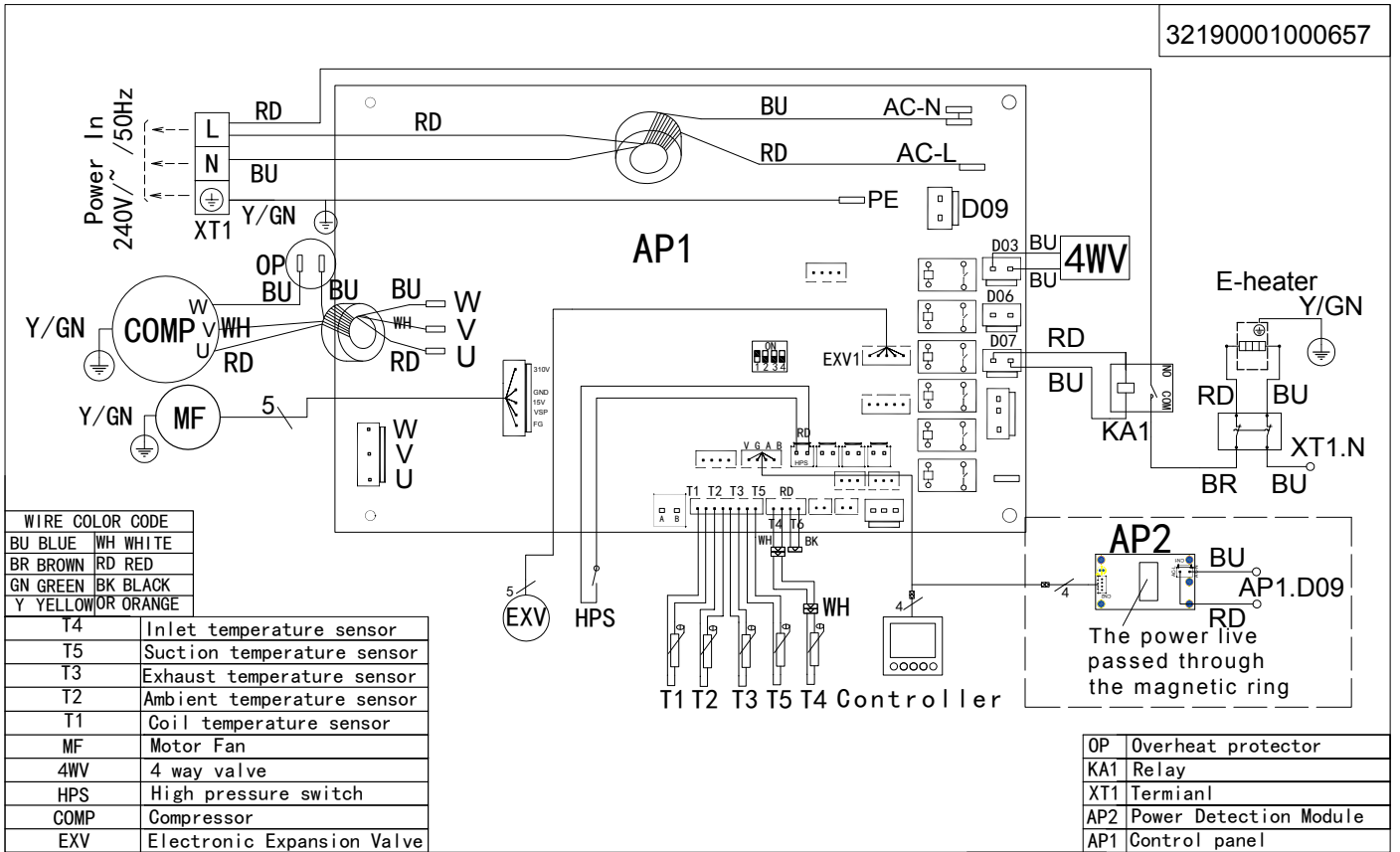
Wiring diagram



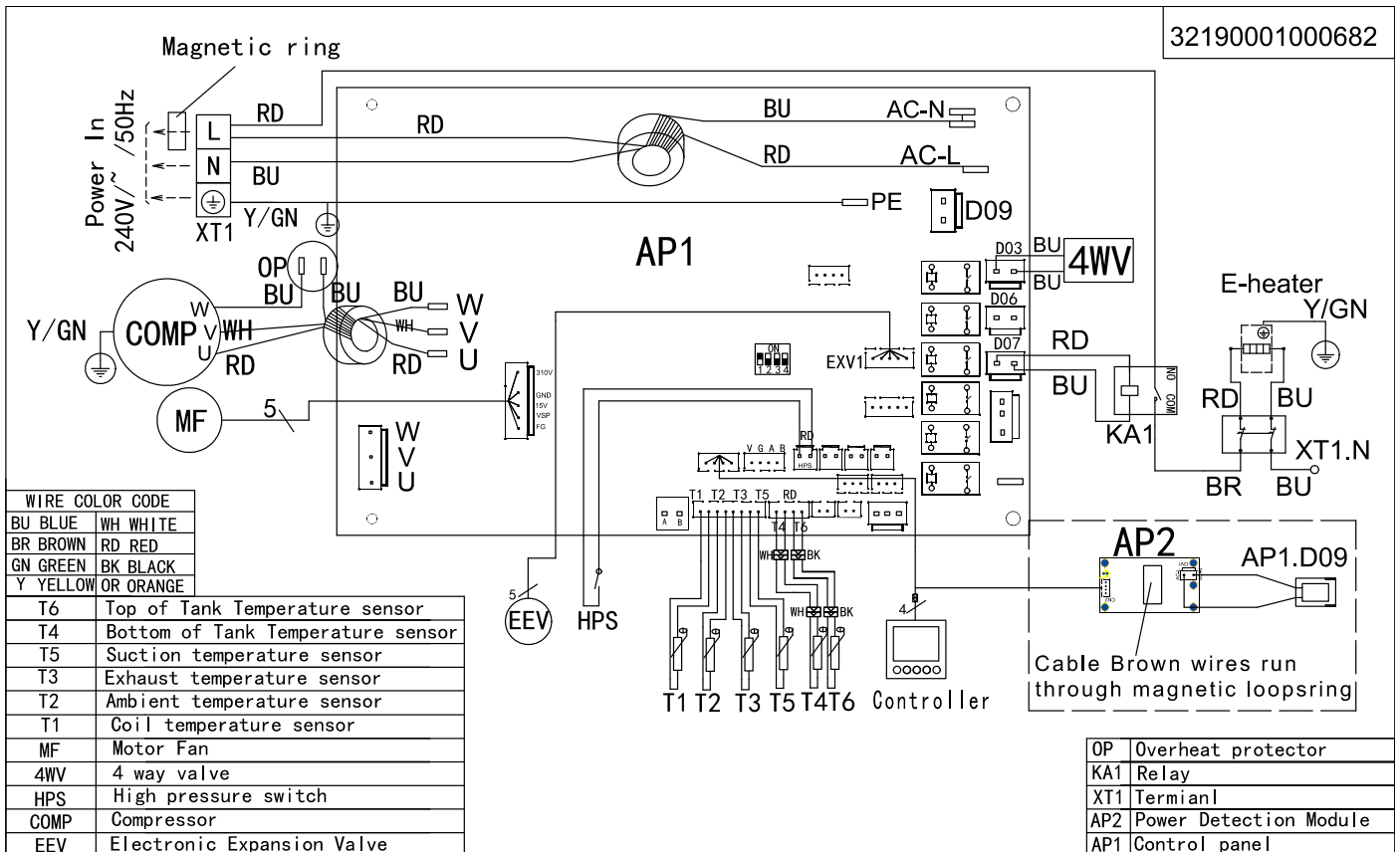
EE-HWS-A1-220(-1), EE-HWS-A1-270(-1) & EE-HWS-A1-320(-1)

Electrical connections

Wiring diagram



EE-HWS-A1-220E(-1), EE-HWS-A1-270E(-1)



EE-HWS-A1-220E-2 & EE-HWS-A1-270E-2 & EE-HWS-A1-320E(-1)

Controller instructions

Compressor driver board failure

The system will stop running immediately once the driver board fails. The error code E88 and below code would appear.

P1	Bit0: IPM over current/IPM module protection
P2	Bit1: Compressor fails to be driven/Software control abnormal/Compressor out of step
P3	Bit2: Compressor over current
P4	Bit3: Input power supply lack of phase(not for single phase)
P5	Bit4: IPM current detection failure
P6	Bit5: Power component overheat to lead system shutdown
P7	Bit6: Pre-charge failure
P8	Bit7: DC bus over voltage
P9	Bit8: DC bus under voltage
P10	Bit9: AC input under voltage
P11	Bit10: AC input over current
P12	Bit11: AC input detection failure
P13	Bit12: Communication failure between DSP and PFC
P14	Bit13: Radiator temperature sensor failure for
P15	Bit14: Communication failure between DSP and communication board
P16	Bit15: Communication failure between main board and driver board
P17	Bit0: Compressor over current alarm
P18	Bit1: Compressor weak magnetic alarm
P19	Bit2: PIM overheat alarm
P20	Bit3: PFC overheat alarm
P21	Bit4: AC input over current alarm
P22	Bit5: EEPROM alarm;
P23	Bit6: NA
P24	Bit7: EEPROM refresh complete (disappear after restart);
P25	Bit8: Temperature sensor failure to lead frequency limit
P26	Bit9: AC under voltage alarm to lead frequency limit
P27	Bit10~Bit15:NA
P28	Bit0: IPM overheat to lead system shutdown
P29	Bit1: Compressor lack of phase
P30	Bit2: Compressor overload
P31	Bit3: Input current detection failure
P32	Bit4: PIM supply voltage failure
P33	Bit5: Pre-charge voltage failure
P34	Bit6: EEPROM failure
P35	Bit7: AC input over voltage failure
P36	Bit8: Micro electronic parts failure
P37	Bit9: Compressor model code failure
P38	Bit10: Bit11~Bit15: NA Over current detection (hardware detection)

No.	Description	Causes
1	High pressure protection	1. Refrigerant over filling; 2. Blockage or air mixed in the refrigerant 3. Pressure switch failure 4. Fan doesn't work normally
2	Gas exhaust temp protection	1. Sensor failure or sensor connection wire failure 2. Lack of refrigerant or air mixed in the refrigerant 3. EEV opening abnormal 4. Fan doesn't work normally
3	Coil temp sensor failure	1. Sensor failure or sensor connection wire failure 2. Main board failure
4	Ambient temp sensor failure	Same as No.3
5	Return water temp failure	Same as No.3
6	Exhaust temp sensor failure	Same as No.3
7	Outlet water temp sensor failure	Same as No.3
8	Gas return temp sensor failure	Same as No.3

Controller instructions

Check heat pump system running readings

1. In the main interface, press the  or the  button for 3 seconds to enter the running status query interface. The controller will show the code number and corresponding running value.
2. Press the  or the  button to check different running readings.
3. See below table about running readings.

Code	Description	Range
1	Compressor running frequency	0~150Hz
2	Fan running frequency	0~999Hz
3	EEV opening	0~480P
4	AC input voltage	0~500V
5	AC input current	0~50.0A
6	Compressor phase current	0~50.0A
7	Compressor IPM temperature	-40~140°C
8	Ambient temperature T2	-40~140°C
9	Evaporator coil temperature T1	-40~140°C
10	Gas suction temperature T5	-40~140°C
11	Gas exhaust temperature T3	0~150°C
12	Tank water temperature T4	-40~140°C
13	4 way valve	0=OFF,1=ON
14	Electric heating element	0=OFF,1=ON
15	High pressure switch	0=OFF,1=ON

Error code list

Error Code	Description
E05	High pressure switch failure
E09	Communication failure between controller and main board
E12	Gas exhaust temperature too high
E15	Water tank temperature sensor failure (bottom)
E16	Evaporator coil temperature sensor failure
E18	Gas exhaust temperature sensor failure
E21	Ambient temperature sensor failure
E27	Water tank temperature sensor failure (top)
E29	Gas suction temperature sensor failure
E38	Fan motor failure
E78	Power detection module communication failure in the error code list
E88	Compressor driver board failure (See appendix 1)
E96	Communication failure between compressor driver board and main board (detected by main board)
E98	Communication failure between fan driver board and main board (detected by main board)

Commissioning the system

Attention

- Make adjustments after electrical safety inspection.
- Once the power is switched on, test the heat pump to check its performance.

Preparation before adjustment

- The system is installed correctly.
- Pipes and lines are installed correctly.
- Accessories are installed correctly.
- Ensure clear drainage from overflow pipe.
- Ensure adequate insulation on pipework.
- The supply voltage meets requirements.
- Air inlet and outlet are functioning properly.
- Electrical leakage protector is functioning properly.

Adjustment process

- Check if the switch on isolator is functioning properly.
- Check if the buttons on the control panel are functioning properly.
- Check if the indicator light on the PCB is lit up.
- Check if the drainage system is functioning properly.
- Check if the system is heating correctly after start up.
- Check if the water outlet temperature is acceptable.
- Check if there is excessive sound when the system is functioning.
- Check if there is refrigerant leakage.
- If any fault occurs, please check the instructions first, to analyse and remove the fault.

Operation and maintenance

Individuals should have professional knowledge when operating the system. To ensure proper functioning, regular checks and maintenance of the system are necessary. During maintenance, please take note of the following points

- To control and protect the equipment, do not make any unauthorised adjustments to the settings.
- During system operation, closely monitor all operational parameters to ensure they remain within normal ranges.
- Regularly inspect the electrical connections for any signs of looseness, and if you find any, promptly secure them.
- After an extended period of downtime, when restarting the equipment, it's essential to perform the following preparations: examine and clean the equipment carefully, clean the water pipeline system, examine the water pump, and fasten all the wire connections.
- Replacement parts must be genuine Emerald heat pump components, and can not be replaced by other similar accessories.

Refrigerant filling

Check the refrigerant filling status by reading the liquid level data on the display screen, as well as the air suction and exhaust pressure. If there is a refrigerant leakage or if components in the refrigeration circulation system need to be replaced, conduct an air tightness examination as the first step.

Leak detection and air tightness experiment

When conducting leak detection and air tightness testing, never introduce oxygen, ethane, or any other flammable or harmful gases into the refrigeration system. Instead, use compressed air, fluoride, or refrigerant for these tests.

To remove the compressor, please follow the following steps

- Turn off the power supply
- Gradually release the refrigerant from the low-pressure end, taking care to reduce the exhaust speed to prevent frozen oil leakage.
- Disconnect the compressor's air suction and exhaust pipes.
- Disconnect the compressor's power cables.
- Unscrew and remove the compressor fixing screws.
- Remove the compressor.

What is the lifespan of an Emerald Heat Pump?

The life expectancy of an Emerald Heat Pump is 10-20 years.

Emerald Energy systems are built to last.

To ensure this heat pump hot water system operates optimally and lasts longer, regularly clean the heat pump to prevent the accumulation of dirt and leaves that could impact its operation.

How can an Emerald Heat Pump save money?

Heat Pumps have an energy saving of up to 80% compared to electric and gas systems.

Heat pump hot water systems are more energy-efficient than traditional hot water systems. This is because it only uses electricity to operate the compressor and fan, rather than using electricity to directly heat the water using an electric element.

What is Legionella control?

To prevent Legionella bacteria growth heat pumps runs a daily cleaning cycle every day at 8:00am. This cycle heats the system to 60°C regardless of the system's current state or user preferences. It's a proactive measure to ensure thorough cleaning.

However, if the system reaches the 60°C target temperature before 8:00am (for example, if it turns on at 3:00am and reaches the desired temperature), the day's cleaning process is considered complete. This approach ensures efficiency, avoids unnecessary heating cycles, and optimises energy usage while maintaining cleanliness and Legionella protection in the system.

What is the kWh usage of an emerald heat pump?

The average kWh usage of an Emerald Heat Pump is 3-4 kWh per day (0.85 kW) compared to the kWh usage of a standard electric standard hot water system, which is 14-18 kWh per day (3.6 kW).

These figures are based on average usage and will vary depending on how often the system needs to heat large amounts of water in the tank.

Environmentally friendly

Heat pump technology stands out for its energy efficiency, contributing to lower greenhouse gas emissions when compared to traditional heating methods.

Designed with energy-efficiency and environmental sustainability in mind, they are an excellent choice for homeowners and businesses looking to reduce their carbon footprint and lower energy costs.

Specifications

EE Model (Residential)		EE-HWS-A1-220E	EE-HWS-A1-220	EE-HWS-A1-270E	EE-HWS-A1-270	EE-HWS-A1-320E	EE-HWS-A1-320
EE Model (Commercial)		EE-HWS-A1-220E-1(-2)	EE-HWS-A1-220-1	EE-HWS-A1-270E-1 (-2)	EE-HWS-A1-270-1	EE-HWS-A1-320E-1	EE-HWS-A1-320-1
Power supply		220V ~ 240V/50HZ/60HZ/1Phase					
Water Tank Volume		220L		270L		320L	
Optional Running Modes		Standard / Silent / Booster / E-Heater	Standard / Silent / Booster	Standard / Silent / Booster / E-Heater	Standard / Silent / Booster	Standard / Silent / Booster / E-Heater	Standard / Silent / Booster
Electric Heating Element		1.6KW	N/A	1.6KW	N/A	1.6KW	N/A
Heating Capacity	Standard mode (Heat pump only)	2.8kW		2.8kW		2.8kW	
Rated Input Power		0.56kW		0.58kW		0.53kW	
COP		4.9		4.8		5.2	
Recharge Rate Per Hour		58L/h		58L/h		58L/h	
Sound Level		49dB(A)		49dB(A)		49dB(A)	
Heating Capacity	*Silent mode (Heat pump only)	2.0kW		2.0kW		2.0kW	
Rated Input Power		0.44kW		0.44kW		0.4kW	
COP		4.6		4.6		5	
Recharge Rate Per Hour		41L/h		41L/h		41L/h	
Sound Level		45dB(A)		45dB(A)		45dB(A)	
Heating Capacity	*Booster mode (Heat pump + Electric heater)	5.2kW	3.6kW	5.2kW	3.6kW	5.2kW	3.6kW
Rated Input Power		2.4kW	0.8kW	2.4kW	0.8kW	2.3kW	0.7kW
COP		4.5	4.5	4.5	4.5	5.1	5.1
Recharge Rate Per Hour		108L/h	75L/h	108L/h	75L/h	108L/h	75L/h
Heating Capacity	*E-Heater mode (Electric heater only)	1.6kW	N/A	1.6kW	N/A	1.6kW	N/A
Rated Input Power		1.6kW	N/A	1.6kW	N/A	1.6kW	N/A
COP		N/A	N/A	N/A	N/A	N/A	N/A
Recharge Rate Per Hour		33L/h	N/A	33L/h	N/A	33L/h	N/A
Max Current (under booster mode)		11.3A	4.6A	11.3A	54.6A	11.3A	4.6A
Refrigerant		R290 (400g)				R290 (450g)	

*As per the AS/NZS 4234 modelling standards the modes (Silent, Booster, E-heater) are one shot functions that will reset to Standard mode.

*Above test results are given based on the test condition ambient 20°C/15°C, Water from 15°C - 55°C.

*Sound tested at 1m distance in a hemi-anechoic chamber.

After sales service

If your hot water heater can not operate normally, turn off the unit and cut off the power supply at immediately.

Contact your service center or technical department.

emerald.com.au/contact

Emerald Energy Pty Ltd

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The information contained within this brochure is accurate as of the time of publish. Please note the Emerald App undergoes regular updates to enhance functionality and introduce new features, which may result in changes to the details provided herein.