

Owner's manual

Sanden Heat Pump Water Heater with Natural Refrigerant



Heat Pump Unit GAU-A45HPC



This appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. Children not to play with the appliance.

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PATENTS

This water heater may be protected by one or more patents or registered designs in the name of Sanden Australia Pty Ltd **TRADE MARKS** ® Registered trademark of Sanden Australia Pty Ltd

Note: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences that may arise as a result of its application. No liability can be accepted for any consequences that may arise as a result of its application. Sanden is in a process of continuous improvement; therefore, specifications may be different to those referenced in this manual – Please contact Rheem New Zealand for the latest specifications at the time of installation.

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Introduction

The EcoPlus Heat Pump Water Heater System has been designed using the latest refrigeration technology to absorb heat from the outside air to heat water. The refrigerant (CO_2) has an extremely low global warning potential (GWP) so it allows us to help keep a clean healthy earth for future generations.

We have also considered the power requirement. By using CO_2 as the refrigerant we have produced one of the most energy efficient units currently available. It's even more efficient when connected to off-peak power* and the noise level is so low it will operate unobtrusively throughout the night.

How it works

The EcoPlus Hot Water Heat Pump System heats water by transferring the heat from the surrounding air to the water using a refrigerant. The refrigerant is heated by a heat exchanger that absorbs heat from the surrounding air (Figure 1).



*Operating conditions may vary depending on the type of off-peak tariff that is available in your area. The unit must have a minimum of 5 hours continuous power available at all times to allow the unit to operate without affecting reliability.

Safety precautions

Please ensure you fully observe the precautions.

The following instructions need to be fully followed to prevent any harm to users and others or damage to your property.

The extent of the possible harm or damage caused by misuse of the product falls into the following classifications.

Warning
 Warning
 Caution
 The column with this classification indicates "the extent of harm that includes the possibility of death or serious injury".
 The column with this classification indicates "the extent of harm/damage that includes the possibility of injury or damage to property".

The type of content to be observed can be explained with the following pictorial classifications.



Indicates content requiring "attention".

Indicates content that is prohibited.

Indicates content with "instructions" that need to be fully followed.

🕂 Warning

Do not touch the tap while hot water is being supplied





Could result in being burnt by hot water.

Check the water temperature before supplying any hot water or taking a shower.



Do not touch the relief valve, drainage pipe, drain outlet or drain elbow when inspecting the relief valve or while draining hot water.





Could result in being burnt by hot water.



Marning

Do not use any damaged, altered, or bundled power cords.



Ensure the product is removed from any gas containers, sources of fire and flammable substances.



Do not open the front board of the hot water storage unit or the heat pump unit cover.





Could result in electric shock.



Any of the pipes freezing up and getting damaged could result in scalding or water leaking.

 $\cdot\,$ Please contact the EcoPlus authorized installer about insulating the pipes.



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Installation details

This EcoPlus Hot Water Heat Pump System must be installed by an EcoPlus authorized technician in consideration of the following standards and regulations:

- Clauses G12 & H1 of the New Zealand Building Code
- AS/NZS3500 National plumbing and drainage code hot water supply systems

 acceptable solutions
- AS/NZS 3000 Electrical installations (known as the Australian/New Zealand wiring rules)
- The unit has been specifically designed for domestic hot water heating and is not suitable for any other purpose.
- The unit is designed to operate when connected to the town water supply with a
 maximum operating pressure of <u>500 kPa</u>. To ensure the mains pressure does not
 exceed this, a pressure-limiting device that complies with AS1357 must be
 connected to the town water supply line.
- This system delivers hot water exceeding 55° C. Reference should be made to AS/NZ3500 and/or local regulations relating to the need for temperature tempering devices.
- The unit must be stored and transported in an upright position. Failure to do so may render the unit faulty. Such failure is not covered under any warranty agreements. Failure to comply with the above conditions will void the warranty.

SAFE TRAY AND SEISMIC RESTRAINTS

The water heater must be installed with a properly drained safe tray where there is the possibility of water damage to furniture, carpets or building. All water heaters must be restrained to protect against seismic forces (refer to the NZ Building Code for acceptable solutions).

Figure 2: Typical installation layout



The water heater must be installed and serviced by an EcoPlus authorized installer and the installation must comply with the New Zealand Building Code G12, Supplied Installations Instructions, AS/NZS 3000 Electrical Installations and all local codes and regulatory authority requirements.

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Trouble Shooting Guide

If you are faced with a problem in using our Hot Water Heat Pump system, please check the following items, before seeking professional help.

Status	Considerable Causes	Action to Take
No hot water comes out of water tap Temperature of hot water is too low	Small or no hot water is left in the storage tank.	 Stop using hot water and wait for about 1 hour Consider a change of the electricity supply off-peak mode (Length of power-supply hours may be too short for the water heating cycle to cover the hot water consumption)
	Air removing procedure from the heat pump system may be insufficient.	- Open the water drain plugs on the Heat Pump Unit to remove air from water circuit. (Be careful for burning)
	Filter on cold inlet connector may be blocked.	- Check the filter and remove if there is any blockage
	Water flow speed may be dropped due to the heat pump piping bend, blockage or crush.	- Check for any piping bend or crush and remove if any
	Pipes may be frozen.	- If frozen area is found on the piping, melt the ice on the pipe and provide heat insulation
	Stop valve is closed.	- Open the valve
	Air absorption is not sufficient due to a blockage on the evaporator.	-Remove the object blocking the air flow through the evaporator (e.g. fallen leaves, grass, snow, etc.)

For those problems not listed in the list above, an inspection provided by a skilled technician is required. Please contact your EcoPlus authorized installer or the Rheem service department.

Caution:

Do not turn off the electricity supplied to the heat pump system even if you go away from home and do not use hot water for a long while. If the system is equipped with freeze protect heaters, also do not turn off the power supply to the heaters. Failure to do so may cause the pipes to crack, due to freezing.

Error Codes

When an error has occurred, a red LED on the operation panel turns on and an error code is displayed on the LED display. The panel does not turn to the display sleep mode while the error code is shown.

Figure 3 Error Code example



Below is the list of the error codes. If the corrective action does not solve the error problem, a malfunction of the PCB board is highly likely.

Error	Error contents	Error	Error contents
code		code	
H9	HP ambient temperature thermistor error	F5	Communication error between main PCB to control PCB
HC	HP water outlet temperature thermistor error	E8	High inlet current error
J3	HP discharge temperature thermistor error	H8	Current error
J5	HP suction temperature thermistor error	L4	High temperature of module error
J6	HP Heat exchanger temperature thermistor error	L5	High outlet current error
J8	HP water inlet temperature thermistor error	P4	Module temperature thermistor error
H7	Tank temperature thermistor error	U2	High voltage error
E6	Compressor booting error	HJ	Water circuit error
H6	Compressor revolution error	EC	High water outlet error
U0	Refrigerant leakage error	E9	Water pump error
E1	Main PCB error	E7	Fan motor locked
E2 L7	Control PCB error	F3	Discharged temperature error

Please note:

Plumbing work can only be completed by an EcoPlus approved plumber.

- The following steps must be taken to ensure all air is removed from the system. Incorrect removal of air may cause the water temperature to vary.
- Plumb pipes to the tank unit and the heat pump unit.
- Push up the lever on the TPR valve to open, and fill the tank unit with water.
- Confirm that the water comes out of the relief valve and then close the lever.
- Open the hot water taps in the home to remove air.
- Close the hot water taps in the home after no air is confirmed in the water.
- Open the water drain plug on the heat pump unit.
- Close the plug after no air is confirmed in the water.
- Connect the power to the heat pump unit.
- Air removing process (Refer to figure 4)
 - 1. Switching to Air Removing Mode Long press the "Up" and "Down" keys to switch to the "Heat Setting Mode".
 - 2. Press the "Up" or "Down" keys to switch to the "Air Removing Mode" and press the "Enter" key. Press the "Up" keys again to display "APon", then press the "Enter" key.

It will automatically go back to the clock display mode after 5 minutes.

- Open the hot water taps in the home to remove air.
- Close the hot water taps in the home after no air is confirmed in the water.

Figure 4: Air removing process



Electrical connections

- Electrical installation should be done only by an EcoPlus approved electrician who carries out the work according to the relevant regulations for electrical safety and wiring.
- Follow the wiring rules for the breaker rating and the thickness of the electrical wiring.
- Verify that the tank unit is full of water and the water valves are open before turning on the power.

System operation, if connected to continuous power

- The system runs its water heating cycle once a day to fill up the storage tank unit with heated water.
- If the block out time function is selected (setting is covered in page 16 of Installation Manual) the unit will not operate during the block out times – this function is typically used on installations that have time of use electricity tariffs
- The water heating cycle operation starts automatically when the residual hot water in the tank unit decreases.
- The system will not run if the electrical power supply is cut off (i.e. if it is connected to off-peak power). However, the system will automatically start operation, once the electricity becomes available.

System operation if connected to off-peak electricity

- There are no special settings for the off-peak connection. The system will run once the power becomes available and the temperature in the tank drops below the set point of the tank thermistor. If connecting the unit to off peak ensure that the off-peak tariff provides a minimum of 5 hours continuous power, as it can take at least four hours to fill the tank unit with hot water at installation. If the ambient temperature is lower than 10°C this can be longer.
- If the unit is connected to off peak power and hot water consumption has been exceptionally high, then hot water may not be available until the next power supply cycle.
- Daily frequency and amount of hot water consumption may also affect the duration of the heating cycle operation.

Select the electrical supply mode that best suits the customer's hot water consumption. The type of off-peak connection may need to be changed if hot water supply is not maintained as required.



Figure 5: Outline of electrical system connections

How to connect power line and thermistor cable

Please note: Electrical installation should only be completed by an EcoPlus approved electrician.

- Remove the piping cover screw clamp fitting.
- Connect the power supply line to the terminal block.
- Hold the power supply line below the terminal block with the screw clamp fitting.
- Connect the thermistor cable line to the terminal block.
- Hold the thermistor cable with the code clip and conduit clip
- Attach the piping cover back on the heat pump unit.

Figure 6: Connect power cables



Water Supply Quality

Chloride. Water Hardness and pH

In high chloride water supply areas, the water can corrode some parts and cause them to fail. Where the chloride level exceeds 200 mg/liter or Water Hardness level exceeds 200 mg/liter warranty does not apply to the heat pump unit and tank unit. pH is a measure of whether the water is alkaline or acid. In an acidic water supply, the water can attack the parts and cause them to fail.

No warranty applies to the heat pump unit and tank unit where the pH is less than 6.5 or more than 8.5. The water supply from a rainwater tank unit in a metropolitan area is likely to be corrosive due to the dissolution of atmospheric contaminants.

Water with a pH less than 6.5 may be treated to raise the pH. It is recommended that an analysis of the water from a rainwater tank be conducted before connecting this type of water supply to the system.



Figure 7

Change of water supply

Changing, or alternating, from one water supply to another can have a detrimental effect on the operation and/or life expectancy of the water tank unit cylinder, TPR valve, water heating circulation and the heat exchanger in the system. Where there is a changeover from one water supply to another, for example, a rainwater tank supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or the water should be tested to ensure it meets the warranty requirements in this manual.

Technical data

Heat pump Unit Dimension



All dimensions displayed in millimeter.

SPECIFICATION

Dimensions	
Weight	48kg
Technical	
Heat Output (at 19°C ambient / 19°C cold water inlet)	4.5kW
Electric Input (at 19°C ambient / 19°C cold water inlet)	0.95kW
COP (at 19°C ambient / 19°C cold water inlet)	4.69^
Refrigerant	CO ² (R744)
Water Temperature Setting (Nominal)	63°C
Compressor	Scroll, with Inverter Control Technology
Electrical Supply	240V/50Hz/Single Phase
Circuit	20Amps
Operating Noise Level (measured 1m from HP unit)	37dB
Ambient Air Operating Temperature	-10°C to +42°C
Maximum Operating Water Pressure	700kPa
Water Connections & Settings	
Inlet	1/2" BSP, 12.7mm
Outlet	1/2" BSP, 12.7mm
Country of Manufacture	Japan

^Tested under AS/NZ5125.1:2014 requirements

Hot water storage tank unit

Refer Drawing provided with tank



Dimensions				
Н	Height	1891mm		
A	Hot Water Outlet & TPR Valve	1693mm		
С	Sensor Port	1086mm		
В	Cold Water Inlet / Heat Pump Flow	208mm		
D	Diameter	580mm		
	Weight	50kg		
	Storage Capacity	300L		
	Inner Tank	Stainless Steel		
	Outer Tank	Colourbond		
V	Diameter including TPR Valve	680mm		
Water Connections & Settings				
Tank Relief Valve Setting (TPR Valve)		850kPa		
Hot and Cold Connection		Rp 20 (3/4") Female		
Watermark Licence No.		WM-022333		
Colour		Surfmist & Ironstone Ends		

Maintenance Requirements

MINOR MAINTENANCE

It is recommended minor maintenance be performed **every six (6) months**. It can be carried out by the dwelling occupant. The minor maintenance includes:

- Temperature & Pressure Relief Valve (TPR); operate valve to open and flush water through
- Expansion Control Valve (ECV); operate valve to open and flush water through

To ensure the water heater is functioning correctly and safely the function of the relief valves, TPR and ECV, must be checked periodically. Refer to the section below RELIEF VALVES for the correct procedure to operate the valves.

• For efficient operation the Heat Pump Unit must have unobstructed air flow. Ensure Heat Pump unit is kept clear of any plant growth or other debris such as; weeds, leaves, sand, dirt, and dust build up. Prevent insect or animal intrusion such as cobwebs and nests.

• In coastal areas subject to salt spray the Heat Pump Unit should be rinsed off regularly with low pressure cold water to remove salt build up which will cause corrosion on metal surfaces. Detergents solvents or other or other cleaning products should not be used.

Failure to do this will void the warranty.

MAJOR SERVICE

It is recommended a major service be conducted on the water heater **every five (5) years**. <u>Warning:</u> Installing and servicing the water heater system must be carried out by an EcoPlus authorized installer. Please contact the Rheem Service team for a list of your local technicians.

Note: The major service and routine replacement of any components, such as the relief valve(s), are not included in the Rheem warranty. A charge will be made for this work. Only genuine replacement parts should be used on this water heater.

The major service includes:

- Replace the Temperature and Pressure Relief Valve
- Inspect and flush the Expansion Control Valve. If required, replace the valve
- Check and clean the heat pump module of dust and residue
- Check and inspect the heat pump module for operation
- Visually check the unit for any potential problems
- Inspect all connections.
- Check the condensate drain.

Note: The water heater may need to be drained during this service. After the completion of the service, the water heater will take some time to reheat the water. Depending upon the power supply connection, hot water may not be available until the next day.

HEAT PUMP SYSTEM

It is recommended the evaporator and refrigeration system is checked every five years. In particularly dusty environments, it may be necessary to have the heat pump system checked and cleaned of dust and residue on a more regular basis.

RELIEF VALVES

The water heater is fitted with a number of valves to ensure correct and safe operation, refer to Figure 2 on page 8 showing a schematic of the installation. There are two safety valves fitted to the water heater, the Temperature and Pressure relief valve and the Expansion Control Valve. To ensure ongoing safe operation of the water heater it is important to manually operate the TPR and ECV valves periodically. Doing so confirms the valves will open and that waterways are not blocked. To flush the valves slowly operate the valve lifting mechanism, lift the lever or turn the knob as indicated on the valve until water is seen to flow from the drain. The lifting mechanism can then be returned to it's initial position slowly.

It is very important that the easing mechanism is operated slowly. The TPR has an auxiliary relief device fitted to the side of the valve body if the TPR is operated suddenly this will open and discharge water from drain line.

Warning: Stand clear of the drain line's point of discharge water discharged from the drain line will be hot. As water is heated it expands by approximately 1/50 of its volume. This expansion causes the pressure in the water heater to rise. To control the pressure in the water heater the Expansion Control Valve will open and relieve a small amount of water during heating, this is normal operation. If dripping is seen from the TPR drain it indicates that there may be a problem with the operation of the ECV; contact the Rheem Service department.

Once heating is complete there should be no sign of dripping from either of the relief valve drains. Continuous leakage of water from the relief valve may indicate a problem with the water heater or valves; contact the Rheem Service department.

Warning: Never block or obstruct drain lines from the water heater. Doing so will prevent the correct operation of the TPR or ECV and cause a hazard.

Warranty Policy

Warranty Conditions

- 1. The EcoPlus Hot Water Heat Pump System must be installed in accordance with the installation instructions supplied with the Heat Pump Water Heater System, and in accordance with all relevant statutory / local requirements of the region in which the water heater is installed.
- 2. The decision of whether to repair or replace a faulty component of the heat pump unit ("Heat Pump") or the Heat Pump itself is the sole discretion of Rheem (on behalf of Sanden).
- 3. Where Rheem determines at its sole discretion that the Heat Pump needs to be removed for repair, Rheem may undertake such removal and may permanently replace the defective Heat Pump with a substitute Heat Pump that is, in the reasonable opinion of Rheem, in a better or equal condition to the repaired Heat Pump.
- 4. Where a failed component or EcoPlus Heat Pump Water Heater System is replaced under warranty, the balance of the original warranty period will remain effective. The replaced part or Heat Pump Water Heater System does not carry a new warranty.
- 5. Where the EcoPlus Heat Pump Water Heater System is installed outside the boundaries of a metropolitan area as defined by Rheem or Sanden or further than 25 kilometers from an accredited service centre, the cost of transport, insurance and traveling costs between the nearest accredited service centre's premises and the installed site shall be the owner's responsibility.
- 6. Where the EcoPlus Heat Pump Water Heater System is installed in a position that does not allow safe, ready access, the cost of accessing the site safely, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility.
- 7. The warranty only applies to the EcoPlus Heat Pump Water Heater System and original or genuine (company) component replacement parts and therefore does not cover any plumbing or electrical parts supplied by the installer and not an integral part of the Heat Pump Water Heater System. Such parts would include pressure regulating valve, isolation valves, check valves, electrical switches, pumps or fuses.
- 8. The Heat Pump Water Heater System must be sized to supply the hot water demand in accordance with the guidelines in the EcoPlus How Water Heat Pump System literature.

Warranty Exclusions

- Repair and replacement work will be carried out as set out in the EcoPlus Heat Pump Water Heater System warranty. However, the following exclusions may void the warranty and may incur additional service charges and/or cost of parts:
- Accidental damage to the Heat Pump Water Heater System or any component, including: Acts of God, failure due to misuse, incorrect installation, attempts to repair the water heater other than by an EcoPlus authorized installer, or the Rheem service department.
- Where it is found there is nothing wrong with the EcoPlus Heat Pump Water Heater System; where the complaint is related to excessive discharge from the temperature and/ or the pressure relief valve due to high water pressure; where there is no flow of hot water due to faulty plumbing; where water leaks are related to plumbing and not the EcoPlus Heat Pump Water Heater System or its components; where there is a failure of electricity or water supplies; where the supply of electricity or water does not comply with relevant codes or acts.
- Where the EcoPlus Heat Pump Water Heater System or its component has failed directly or indirectly as a result of excessive water pressure.
- Overflow vent drain has not been installed or is blocked or corroded
- Where the Heat Pump has rusted as a result of a corrosive atmosphere; eg. Salt water spray, sulfur environments.
- Where the unit fails to operate or fails as a result of ice formation in the piping to or from the EcoPlus Heat Pump Water Heater System.
- Repair and/or replacement of the EcoPlus Heat Pump Water Heater System due to scale formation in the waterways or the effects of either corrosive water or water with a high corrosive water supply or a water supply with a high chloride or low PH level as outlined in the Owner's Manual and Installation Manual.
- Warranty Service is provided to the original owner of the equipment only.

Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpets, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the EcoPlus Heat Pump Water Heater System, or due to leakage from fittings and/or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.

Warranty Period

Subject to the Warranty Conditions and Exclusions stated above, your EcoPlus Heat Pump Water Heater System is warranted in a Residential application as follows:

- **Heat pump unit** Sanden warrants all parts labour on the EcoPlus heat pump unit for a period of 6 (Six) years from date of installation.
- Tank unit –Rheem warrants the tank parts and labour for up to 6 years & up to
10 years for tank replacement warranty only (no labour) from the date
of installation.

In a Commercial or Industrial application, the warranty period on both Heat Pump unit and Tank is reduced to 1 (One) year only with no Labour warranty.

Contact Rheem New Zealand Free Phone: 0800 657 336 www.rheem.co.nz SANDEN ECOPLUS Owners' Manual NZ 320581 Rev A June 2020

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