aufocus

DIESEL COMBI HEATER

USER MANUAL



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Contents

1. Foreword

1.1 Pre-use Instructions 2
1.2 Safety Instructions Notes 2
1.3 Safety Instructions for operation 2
1.4 Safety Instructions for air heater 2

2. Product Structure and Working Principle

2.1 Product Structure & Measurements 3
2.2 Unit Diagram & Measurements 4
2.3 Work Flow Description 6

3. Technical Parameter

3.1 Fuel System 7
3.2 Water System 8
3.3 Heating System 9
3.4 Storage Tank Capacity 9

4. Installation Guide

4.1 Component Packing List 10
4.2 Installation Pre-inspection 11
4.3 Key component installation 11

5. Operation Manual

5.1 Controller Overview 12
5.2 Using the Settings Controller 13
5.2 Using the User Controller 18

6. Maintenence and Fault Handling

6.1 Maintenence Overhaul 21
6.2 Winter anti-freezing measures 22
6.3 Troubleshooting Table 24

1. Foreword

1.1 Pre-Use Instructions

This manual contains critical information for installation, operation, and maintenance. Please read it thoroughly before use and retain it for future reference.

1.2 Safety Instructions Notes

The warnings and important safety instructions in this manual do not cover all possible situations and circumstances. You are responsible for applying care and exercising caution during installation, maintenance and operation procedures.

1.3 Safety Instructions for Operation

Fire and poisoning hazards!
If the heater is operated in an improper installation location, it may cause fire or poisoning due to exhaust gas leakage.

This water heating radiator must not be used in the following locations or conditions:

- Near gas stations or fuel-filling equipment
- In enclosed indoor areas such as garages or parking buildings
- In pre-selected or unattended operation modes
- In areas where flammable materials (e.g. hay, leaves, paper) are present within the exhaust emission area
- In locations where flammable vapors

The heating area must be kept clear at all times. In particular, fuel tanks, oil containers, spray cans, portable gas canisters, fire extinguishers, foam materials, clothing, paper, and similar items must not be stored on or near the heater.

1.4 Safety Warnings

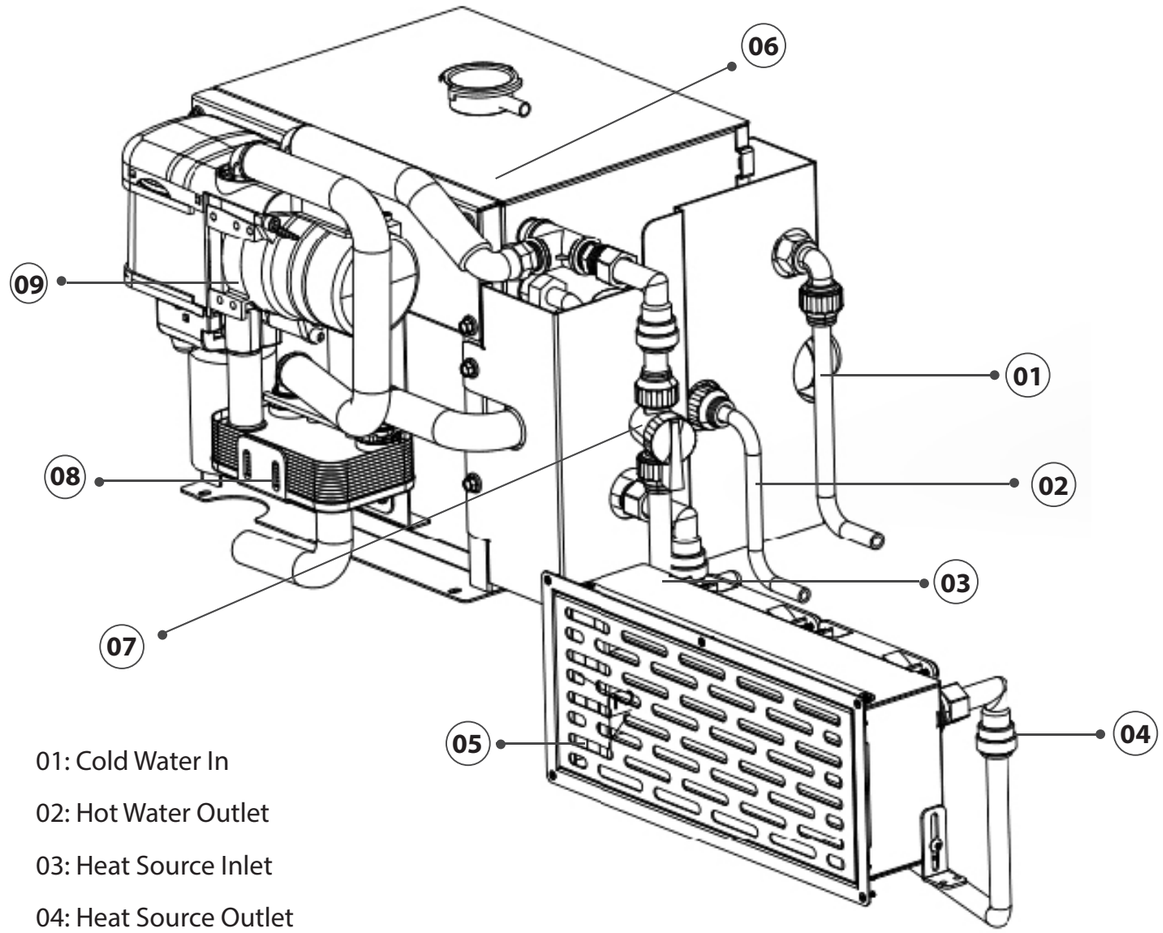
Risk of fire and burns!

If hot air is directed toward flammable materials, a fire may occur.
Contact with heater components or objects heated by hot air may cause burns.

- Do not touch the heater during operation
- Operate the heater only when the air outlet cover is properly installed
- When installing adjustable hot air outlets, ensure that hot air is not directed towards people, animals, or objects that may be damaged by high temperatures.

2. Product Structure and Measurements

2.1 Overall Structure Diagram and Core Component Functions



01: Cold Water In

02: Hot Water Outlet

03: Heat Source Inlet

04: Heat Source Outlet

05: Heater - Warm Air Output Terminal

06: Storage Tank - Store Antifreeze

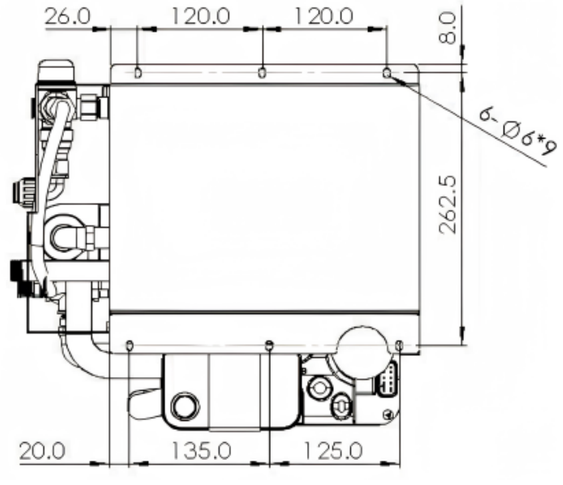
07: Cut-off Valve

08: Heat Exchanger Plate

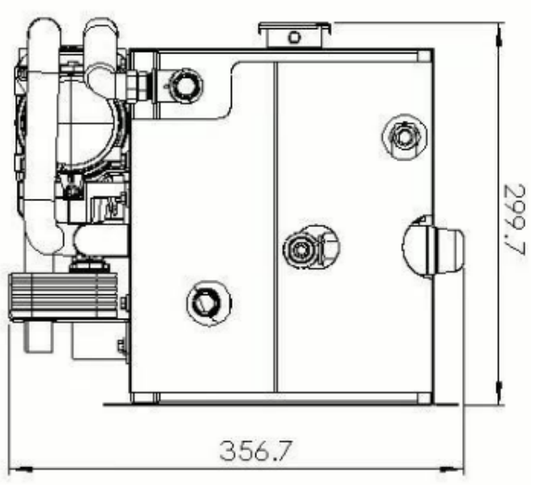
09: Diesel Combustion Chamber

2.2 Unit Diagram & Measurements

Main Unit Diagram

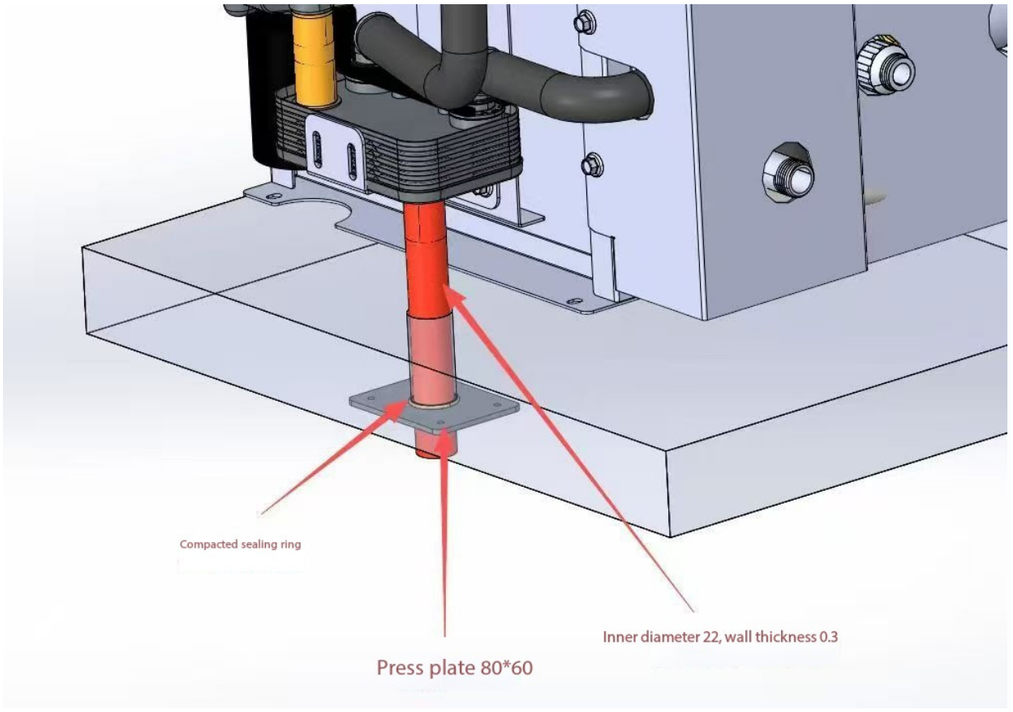


Bottom of Main Unit

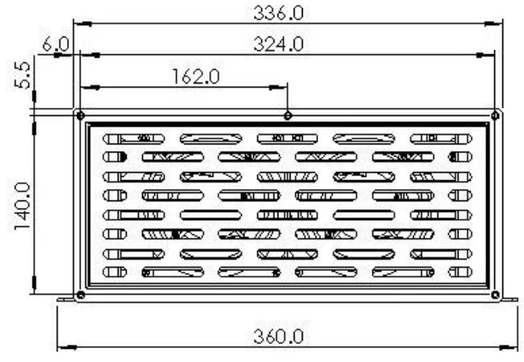


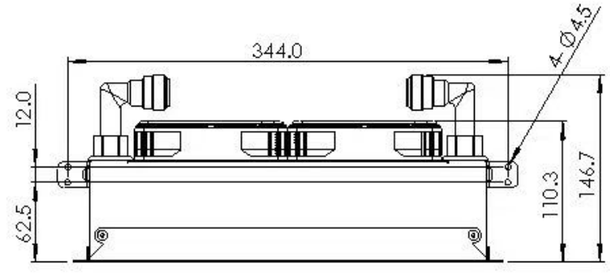
Back of Main Unit

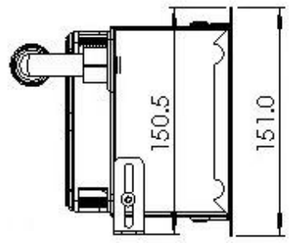
Note: All Measurements are displayed as (mm)

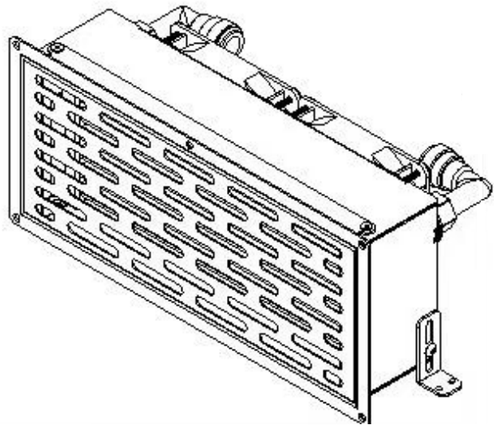


Heater Diagram









Note: All Measurements are displayed as (mm)

2.3 Work Flow Description

■ Launch Phase

Once the installation is complete and the power is connected, start the system by using the Control Panel. The fuel pump draws diesel from the fuel tank, which is filtered and delivered to the combustion chamber. During this process, the spark plug is preheated by electricity.

■ Heating Stage

Diesel is sprayed into the sealed combustion chamber, where it is ignited by the spark plug to generate heat. The combustion chambers' aluminium alloy outer wall conducts heat quickly, which heats the circulating coolant.

■ Heat-Exchange Cycle

The independent water pump drives the low-temperature coolant circulation which absorbs the heat of the combustion chamber. After heating, it is transported to the heat exchanger or the heater. Once the heating process has been completed, it returns the water to the tank.

If the coolant is transported on the plate heat exchanger, the warm water is exchanged with cold water.

If the coolant is transported to the heater, the hot air is blown out by the heater.

■ Temperature Intelligent Regulation

While the hot water system is operational, the water temperature sensor monitors the temperature in real time.

≥70 °C - There is an automatic downshift into constant temperature mode.

≤70 °C - There is an automatic gear shift into enhance combustion intesity. The control panel displays the working status simultaneously.

■ Safety Shutdown Mechanism

Ignition protection: Cuts off the diesel circuit immediately when abnormal ignition is detected. Overheat protection: The system will shutdown when overheating.

3 Technical Parameter

3.1 Fuel System

■ Water heater

Power Output		5KW
Structure Type		A water-heated heater with a steam-blowing burner
Warm Current	Full Load Half Load	5.0KW 2.5KW
Fuel		Diesel
Fuel Consumption ±10%	Full Load Half Load	0.65 L/H 0.32 L/H
Rated Voltage		12V
Working Voltage Range		10.5V Up to 16.5V
Rated Power Consumption of Non-Circulating Pump ± 10%	Full Load Half Load	33W 12W
Allow Working Overpressure		2.5bar
Minimum Amount of Cooling Fluid Circulation Loop		2.0 + 0.5l

■ Heater on/off at regular intervals:

Rated Voltage	12V
Working Voltage Range	9-15V
Size	82mm 37mm 12mm
Use Ambient Temperature	-40 °C to +65°C
Installation Site	Vehicles interior
Timing	7 Start Times can be Preset within a Day.

3.2 Water Systems

■ Technical parameters of heating pump

The following technical parameters are the parameters of the heater at standard ambient temperature +20 ℃ and rated voltage with an allowable tolerance of ± 10%.

circulating pump	TA50E
Volume flow at a drag resistance of 0.14 bar	About 900 l/h
rated voltage	12V
Working voltage range	9-15V
rated dissipation	19W
Circulation pump size	Maximum length 115 mm diameter 50mm
weight	About 0.5kg

3.3 Heating System

■ A. General Specifications (GS)

ITEM		Specifications. Conditions/Specification Condition		
01	Type / Part No.	ZD-FB1212H		
02	External dimensions	120×120×25.4mm		
03	Rated Voltage	12VDC		
04	Start-up Voltage	9 VDC		
05	Operating Voltage	9 ~13. 5VDC		a. Rated Voltage / Rated Voltage b. 25 Degrees C c. 65%RH d.Measured after 5 Mins
06	Rated speed	2800rpm	±10%±10%	
07	Rated Current	0.5A		
08	Rated Power	6W		
09	Maximum Airflow	98.4 CFM 2.79 m^3/Min		a. Air ducting Apparatus: (LW9266-SR) b. Standard: AMCA c. Rated Voltage d. Rated current
10	Maximum static pressure	0.22 Inch-H2O 5.59 MM-H2O		
11	Life Expectancy	70,000hrs at 40 Degrees C		90%.Rated Voltage
12	Noise test/Noise Level	≤39.5dB		e. Non-Echo Chamber Standard: CNS 8753/ ISO3744 d.Test Condition:ISO 7779 Distance/Distance: 1.0M
13	Motor pole count	4		
14	Waterproofing/Waterproof	N/A		

3.4 Storage Tank Capacity

The antifreeze tank of this product is made of SUS304 stainless steel, with a length, width and height of 300*240*280mm, a water tank capacity of 18 liters, and a maximum pressure release value of 0.5MPa.

4 Installation Guide

4.1 List of parts and Components

No.	classification	Part name	part number	quan-tity	specifications and models	material quality
1	drive-by-wire	control switch A		1 set		
2		control switch B		1 set		
3		pencil		1 set		
4	4.5KW heater accessories package	Fan fixing screws		2		stainless steel
5		Self-tapping cross head screws		4		304 stainless steel
6		Self-tapping cross head screws		5		304 stainless steel
7		Fixed feet		2		SPCC
8		Internal thread joint elbow	AFFFCB15078M	2		
9	Fuel	Fuel Pump	A3000013	1	32ml	
10		Fuel Pump rubber bracket	A1310378	1		
11		External hex bolt	Y53011001	1	m6*30	
12		Fuel Line	A1321005	1	5*2; length 5m	
13		Fuel Pick up	A1322632	1	51 5	
14		Filter		1		
15		Flexible pipe connections	a1314855	6	custom	
16		Mini Clamps	A13110947	12	ö9*11	
17	Muffler accessories	intake tube	A1324816	1	22*400	
18		Type R clamp	AST60062	1	25, iron	
19		Exhaust pipe clamp		3	24-26	
20		Exahust pipe	A13224 14	1	22*1m	
21		Exhaust silencer	A1320165	1		
22		Exhaust muffler bracket	Y43041001	1		
23	Muffler accessories package	Exhaust gas connection pipe		1		
24	Screwdriver	Self-tapping bolt-hex socket	Y53011001	1	M6*30	
25		External hex bolt	A0047940	6	M6*30	
26		Flange nuts	AS000010	7	M6	
27	Supporting package	Zip ties	AS000007	15	5*250 black	
28		instructions		1		
29		Internal thread live joint elbow	AEFCB1507M	2	1/2"BSP/15mm	
30		throttle		1		

4.2 Installation Pre-Inspection

- Confirm the fuel interface:

  Confirm whether the specifications, models and designs of the fuel interface are compatible and check whether the interface is damaged or deformed.

- Pipeline compatibility:

  Ensure the pipes are sealed and connected securly to avoid safety risks caused by fuel leakage.

4.3 Key Component Installation

Diesel / Water Heater Position: (Ensure the system is installed away from flammable materials).

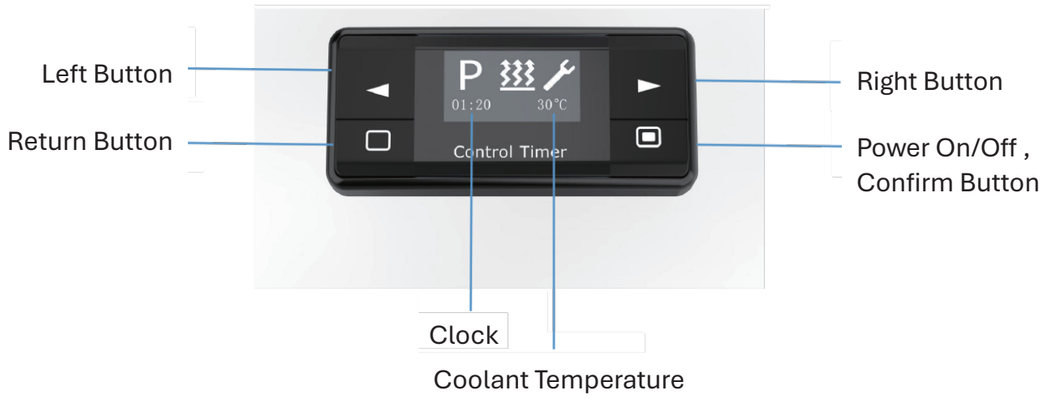
Connection of Plate Heat Exchanger (cold water inlet / hot water outlet direction):

Adjust the air outlet direction of the heater (avoid directly blowing hot air towards Humans, Animals, or any flammable substances)

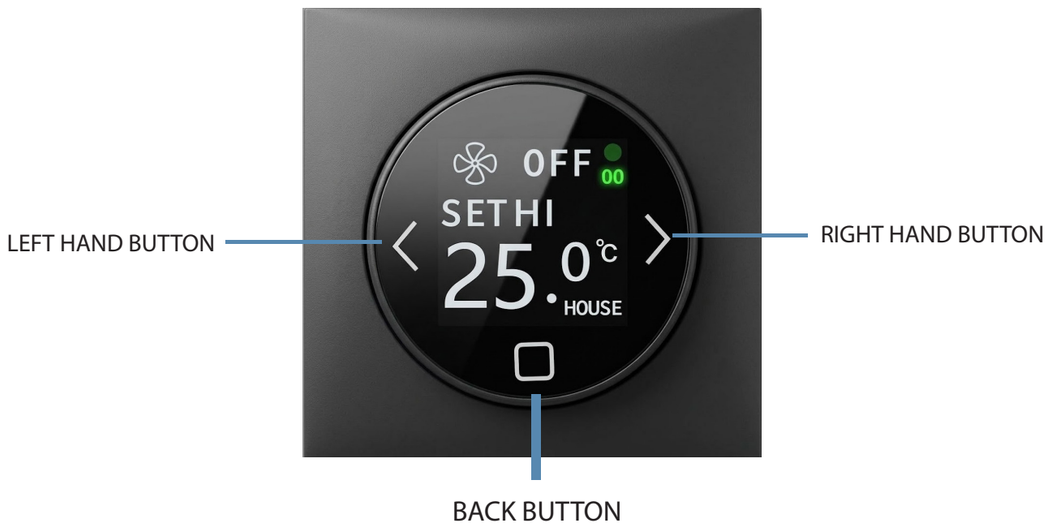
5 Operation Manual

5.1 Controller Overview

■ Settings Controller



■ User Controller



5.2 Using the Settings Controller

The controller displays any error codes and gives you access to the settings you may need during operation. The settings you can adjust are:

- **Timer Function**
- **Preset Settings**
- **Clock**
- **Calendar Day**
- **Coolant Temperature**

To access the different functions, use the left and right arrow buttons on your controller to navigate through the display screen. Press the confirm button to select an option (see 5.1 Controller Overview for button locations). The available options and their icons are shown below.



Timer Function
Set the timer to choose how long the heater runs before turning off. The timer can be set from a minimum of 10 minutes to a maximum of 120 minutes, or to the ∞ symbol for indefinite running.

***Note:** It is set at ∞ by default.*



Preset Settings
Set up to three presets (P1-P3) to turn your heater on automatically at a chosen day and time. Before setting a preset, make sure your clock and calendar day are accurate. If they aren't, see the Clock and Calendar Day settings below to correct them.

For example, say it's Wednesday and you want the heater to turn on Friday at 8am. Enter P1 and set it to Friday 8am, and Preset 1 is saved. To change it later, re-enter P1. To add another, create a new preset at P2 or P3.



Settings
The settings menu gives you access to a range of options, each described below.



Clock
Set the time shown on the display.



Calendar Day
Set the day of the week shown on the display, from Monday to Sunday.

Coolant Temperature
Lowering the coolant temperature makes the system more efficient, so it burns less diesel. The trade-off is less heat at the tap, shower, and heater outlet. For example, if you set it to 70°C, the coolant will heat to 70°C and then allow you to use the heater and hot water, but the output won't be as hot as it would be at the preset 90°C. The only time it may be of use is on a hot day.

It is not recommended to change the coolant temperature, we recommend leaving it at 90°C. But you have the option to change it if you wish.

For the following explanations regarding setting the clock and the day of the week, please ensure you're in the settings menu, which can be accessed by clicking the confirm key on the spanner, while on the main screen.

■ Setting the Clock

Use the left/right keys to select Clock Setting, then press Confirm. The hour display will then flash: adust it with the left/right keys and press confirm. The minute display will flash next: adjust it the same way and press confirm to return to the main menu.

Clock Setting



■ Setting the Day of the Week

Press confirm on the calendar screen, while in the settings menu. Use the left/right keys to choose the day (MON,TUE,WED,THU,FRI,SAT,SUN), then press Confirm to save.

Day Setup



■ Setting the Timer

The timer starts the hot water system at a set time and runs it for a set duration. You can store up to three timers (P1, P2 and P3), on the same day or on different days of the week.

1. Press any button to wake the screen.
2. Use the left and right buttons to select the timer function (P), then press Confirm. The timer screen is now open.
3. Select P1, then press Confirm.
4. Using the left / right buttons, select the day of the week, then press confirm. The time should flash.
5. Set the start time, then press confirm.
6. Set the operation duration, then press confirm.
7. Use the left and right buttons to select ON, then press Confirm. The timer is saved and the screen returns to the main menu.
8. To set P2 or P3, repeat steps 2 to 7, selecting P2 or P3 in step 3.

To turn the timer off, follow the same steps and select OFF in step 7.

Timed Interface



Indicator	Meaning
Dot in the top-left corner	At least one timer is active
√ next to P1, P2 or P3	That timer is active
√ disappears	That timer has finished
Dot turns off	No timers are active

Pairing the User Controller

When the heater is powered off, press and hold the Left Key and the Return Key together for 3 seconds to enter Pairing Mode.

Once in pairing mode, press the ON/OFF button on the Settings Controller once.

If pairing is successful, “OK” will appear on the screen. If it fails, “NOK” will be displayed.

If pairing is unsuccessful, repeat the process. The heater can be paired with up to two remote controls at the same time.

Remote Control Matched



View Operating Data

The operating data screen shows live readings from the hot water system. It is only available while the system is turned on and actively running.

1. Press any button to wake the screen.
2. Press and hold the left and right buttons together for 3 seconds. The operating data screen show display.
3. Either Hold the Return button or wait roughly 15 seconds to return back to the main menu.



Turning the Hot Water System On or Off

The heater can be turned on from either the User Controller or the Settings Controller.

The following steps explain how to operate the hot water system from the **Settings Controller.**

Powering On

1. Press any key to activate the screen. Hold down the power button to turn on the heater. If you’re wanting to set the runtime, check 5.2, under Timer Function.
2. The on state, as shown below should now be the displayed screen on your settings controller.

After activation, the screen goes to sleep after 60 seconds. A breathing light in the centre shows the heater is active.

Once it reaches 120 minutes, or your set time, press the right key again to set the desired time. Use this setting cautiously, as it drains battery power significantly and may make the vehicle difficult to start.

Shutting Down

Press any key to wake the screen, then press and hold the power button for 3 seconds. The heater will turn off and return to the main menu. The screen again, will go to sleep after 60 seconds.

Note: If the heater has been turned on from the settings controller, then the flame will not appear during operation. But if the unit has been turned on from the user controller, then the flame will appear.

Below are what both the settings controller, and the user controller should be displayed as, If the hot water system has been turned on via the settings controller.

This is what the settings controller should look like when the Air & Hot Water System is in an on state.





5.2 Using the User Controller

■ Turning the Hot Water System On

The heater can be turned on from either the User Controller or the Settings Controller.
The following steps explain how to operate the hot water system from the **User Controller.**

1. **Long-press the square button** at the bottom of the control panel until a **flame icon** appears on the screen.
2. The flame icon indicates that the hot water system is switched **ON**.

Note: If the heater has been turned on from the settings controller, then the flame will not appear during operation. But if the unit has been turned on from the user controller, then the flame will appear.

As seen below, if the user controller is used to turn on the hot water system, then the flame will appear on the user controller, but the settings controller will still stay in its “OFF” state. This is completely normal.

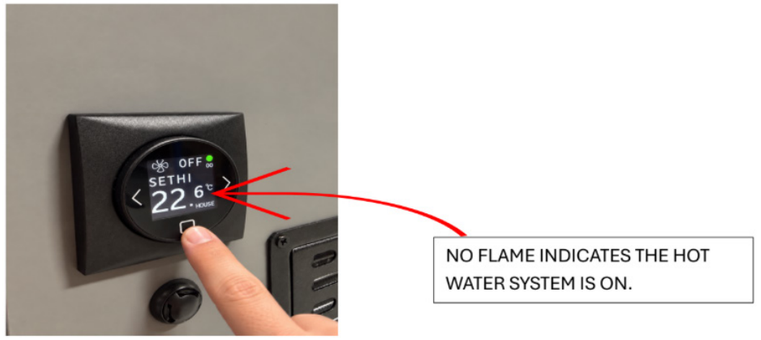
Below are what both of the controllers should look like if the hot water system has been turned on from the User controller.





■ Turning the Hot Water System Off

1. Long-press the square button at the bottom of the control panel until the flame icon disappears.
2. The hot water system is now switched off.



■ Heater Adjustment

Use the **left and right arrow buttons** to adjust the diesel heater fan speed.

- **Right arrow:** Increase fan speed.
- **Left arrow:** Decrease fan speed.

NOTE: To turn the heating element OFF while keeping the hot water system ON, continue pressing the left arrow until “OFF” appears in the top-left corner of the screen.



Set Room Temperature

1. Make sure the hot water system is switched ON and the fan is running.
2. Short-press the square button at the bottom of the control panel once until “SET” appears and the room temperature display turns yellow.
3. Use the right and left arrows to select your desired target room temperature.
4. Once your desired temperature has been selected, leave the control panel untouched.
5. After a few seconds, the display will return to showing the current room temperature.
6. The heater will automatically adjust the fan speed as it works towards your selcted target temperature.

NOTE: Once the target room temperature is reached, the fan will stop. When the room temperature drops approximately 2°C below the target temperature, the fan will automatically restat to bring the room back to the selected temperature.

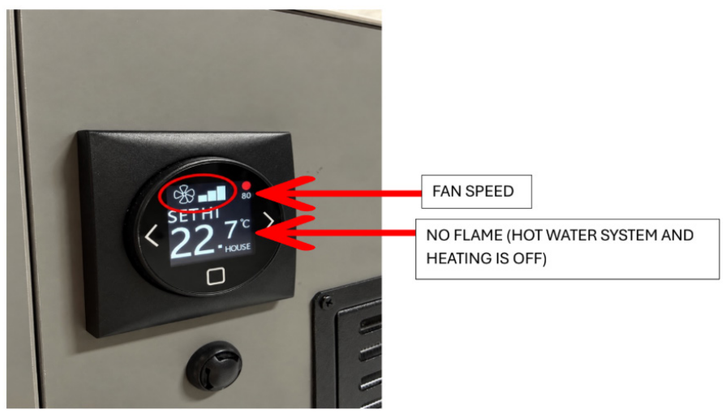


Fan Only Mode

Fan-only mode allows you to circulate air through the RV without heating it.

1. Make sure the **hot water system is switched OFF** , there should be **no flame icon** displayed.
2. Press the **right arrow** to turn the fan ON.
3. Use the **left and right arrows** to adjust the fan speed.

NOTE: Fan-only mode does not produce cold air like an air conditioner. It simply circulates the existing air around the RV.



6 Maintenance and Fault Handling

6.1 Maintenance Overhaul

Fuel Filter Cleaning Cycle

If the vehicle is driven in an environment with dust and wind or if the fuel used is of average quality and has more impurities, the fuel filter may be more likely to clog. It is recommended to clean it every three months.

- 1. Acid Cleaning
  Choose an appropriate acid based on the type of buildup, such as Vinegar (recommended) cleaning solution through the heat exchanger, where it reacts and dissolves the buildup.

- 2. Manual Cleaning
  Use dedicated tools such as wire brushes or scrapers to manually remove scale and deposits from the plate surfaces. This method is simple but may risk surface damage if not performed carefully.

- 3. Alkaline Cleaning
  Suitable for removing diesel, grease and other organic contaminants. Common alkaline solutions include sodium hydroxide or sodium carbonate, which remove buildups through saponification and emulsification.

- 4. Online Cleaning (CIP)
  A cleaning system is installed on the inlet and outlet pipes, allowing cleaning fluid to circulate through the heat exchanger without disassembly. This method can be performed during operation but is generally less thorough than manual cleaning.

- 5. Ultrasonic Cleaning
  Ultrasonic transducers are mounted on the heat exchanger plates. High-frequency vibrations weaken the adhesion of buildups, causing them to detach. This method is environmentally friendly and non-corrosive but involves higher equipment costs.

6.2 Winter Anti-Freezing Measures

Coolant Draining, Flushing & Refilling Procedure

1. Cool the vehicle

Ensure the coolant and heating system are completely cooled before starting work. It is recommended to wait at least 12 hours after parking to avoid burns or pressure-related hazards.

2. Locate the drain point

Locate the first pipe directly at the rear of the coolant chamber in the RV. This pipe connects to the hot air vent, in some cases it may be located underneath the Rv depending on how the vent is installed.

3. Prepare for drainage

Place a suitable container beneath the drain point to collect coolant. Wear protective gloves and eye protection.

4. Drain the coolant

After locating the first pipe coming out of the coolant chamber, gently disconect the white pipe from the elbow joiner and allow the coolant to be drained.

5. Extract coolant if drainage is not possible

If the coolant in the storage tank cannot be drained normally, use manual or electric suction equipment to remove the liquid.

6. Drain the piping system

Starting from the end connected to the coolant chamber, gradually disconnect piping components such as hose clamps, flanges and other nessassery fittings. Retain all removed parts to prevent loss or damage.

7. Remove residual liquid from pipes

Gently shake through the pipelines to expel remaining liquid. For long or curved pipes, disassemble and drain them in sections to ensure complete drainage.

8. Clear flow restrictions

If components restrict liquid flow, remove them or take appropriate measures to open the flow path so the coolant can discharge smoothly.

9. Release system pressure

Slowly open the radiator cap to release any remaining pressure in the cooling system.

10. Flush the cooling system

Connect to a water supply and place hose into the tank inlet. Turn on the tap water and allow clean water to circulate through the system. Start the system so the water circulates fully. Continue flushing until the discharged water runs clear.

11. Drain flushing water

Turn off the water supply and allow all water to drain from the system completely. Once drained, reassemble all components.

12. Refill with Coolant

Using a funnel, fill the tank with coolant not exceeding “MAX” level.

13. Bleed air from the system

Securely install and tighten the tank and reservoir caps. Start the system and let it run, if any error codes apear dissconnect it from a power source, reconnect and restart.

Check the coolant level and top up as necessary to maintain the level between the “MIN” and “MAX” marks.

14. Final inspection

Inspect all hoses, joints, valves, and fittings for leaks. Ensure all components are securely connected and operating correctly.

6.3 Troubleshooting Table

Failure code	fault message	Description of the fault
E-01	The heater failed to ignite	check the oil circuit and intake/exhaust.
E-02	Flame Extinguished	The flame is extinguished during operation. Check the fuel line
E-03	Voltage is too high	The voltage is continuously higher than 16V for 5 seconds
E-04	Voltage below level	The voltage is continuously below 10V for 20 seconds
E-05	Water temperature sensor	Broken or short circuit
E-06	Overheat Sensor	Broken or short circuit
E-07	Fuel Pump Failure	Break in Fuel Pump electrical connection
E-08	Fan failure	Fan is stuck or not enough power to unit
E-09	Ignition failure	Indication of faulty glow plug
E-10	Glow Plug	The ignition plug heat did not reach the set value
E-11	Heater overheating	Water circulation blockage or lack of Coolant, temperature above 120 degrees
E-12	Overheat lockout	Three consecutive overheating failures
E-13	Ignition failure lockout	The heater failed twice E-01 and locked the machine
E-14	Water pump failure	Water pump short circuit
E-15	Airlock failure	Pocket of air that has become trapped inside a plumbing or pump system.
E-16	Flame overtemperature fault	Hot Water has exceeded the safe temperature.
E-17	Plate temperature over temperature fault	Exceeded it's safe maximum opporating temperature, triggering saftey shut off.
E-18	flame sensor	Sensor is faulty

Failure code	fault message	Fault description/solution
Warm breeze, not hot	Fuel supply interrupted	Check Diesel circuit and valve condition
Hot water flow small	Plate heat exchanger is blocked	Backwash or professional descaling
Equipment abnormal alarm	Inadequate combustion/exhaust failure	Stop immediately and contact after-sales service



Conquer the Cold, Embrace the Adventure