



# Diesel Heater: GDH-020A

Installation Instruction & User's Manual



### 1. Overview

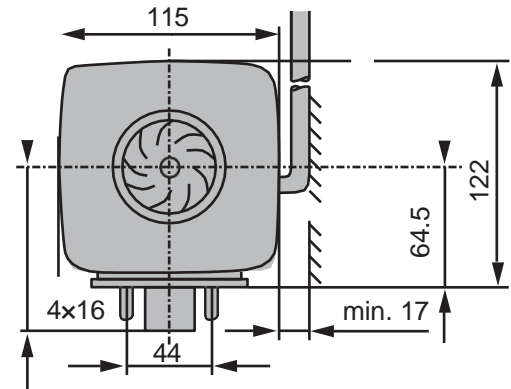
Power Science Diesel Heater (Model: GDH-020A) is a 2kW heater with stainless steel diesel tank and Bluetooth controlled switch specially designed for caravan, motorhome and other vehicles.

All the components are selected, and every machine has been fully tested before coming to the market.

Please refer to the diagram below to get an overview of this product.



1. Main Unit
2. Cold Air (Indoor) Inlet Pipe
3. Hot Air (Indoor) Outlet Pipe
4. LCD Switch
5. Remote Switch
6. Fresh Aire Intake Pipe (Outdoor )
7. Air Filter
8. Exhaust Pipe (Outdoor)
9. Muffler
10. Fuel Pump
11. Fuel Filter
12. Fuel Tank
13. Checker Plate Fuel Tank Cover



- (1) Before installing the device, check if there are obstacles such as water tanks, water pipes, wires, gas lines, or chassis crossbeams under the vehicle.
- (2) Due to the high temperature of exhaust gas, the exhaust pipe should be as short as possible. The exhaust pipe should NOT be installed near the flammable materials, and there should be no obstacles within 75mm of the exhaust outlet. The exhaust outlet should face towards the rear or out of the vehicle.

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- (3) The outdoor air filter should be kept as far away from the exhaust outlet as possible to prevent exhaust gases from being sucked back into the combustion chamber.
  - (4) If the entire diesel heater system is installed indoors, make sure that all exhaust gases can be completely discharged to the outside. Otherwise, there is a risk of carbon monoxide poisoning indoors.
  - (5) The control panel has a built-in temperature sensor to detect indoor temperature. Therefore, the panel should be placed as far away from the air outlet as possible.
  - (6) The optimal distance between the fuel tank and the main unit is 2 to 3.5 meters.
  - (7) The fuel pump should be installed according to the direction indicated by the arrow on the pump. The optimal installation angle for the fuel pump is 30° upwards.
  - (8) The fuel filter should be installed according to the direction indicated by the arrow on the filter.
  - (9) It is recommended to directly connect the system to the power source (battery) without using an adapter to prevent poor contact leading to frequent system restarts.

## **6. Tools Required for Installation**

To install the heater in a caravan, motorhome, or campervan, you'll also need the following tools and supplies:


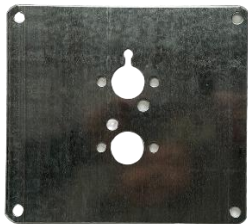





- Drill and drill bits
- Hole saw (105mm and 65mm Diameter)
- Screwdriver
- Socket set
- Wrench set
- Electrical tape
- Silicone Sealant
- Round flange (optional)

**7. Equipment & Components List**

No.	Item Name	Q'ty	Specification	Picture
<b>Equipment</b>				
A	Main Unit	1	Include: Combustion Chamber, Spark Plug, Motor, Fan, Electronic Control Unit, Temperature Sensor,	
B	Diesel Tank	1 set	- 5L Stainless Steel Fuel Tank. - Fuel Level Gauge. - Stainless Steel pickup pipe on the top. - With heavy duty fuel hose	
C	Checker Plate Cover	1	- 2mm Aluminum Checker plate material. - Cover and protect the Diesel tank with 2 holes on the top.	
<b>Bag #1: Fuel System</b>				
1.1	Pulse Pump	1	- Voltage: 12V, Current: <1A - 22ml per 1000 times - Outer Diameter: $\phi 35 \pm 0.3\text{mm}$ - Length: 130mm	
1.2	Pump Mount	1 set	- Rubber Mount: 1 PCS - Self-tapping screw with washer	
1.3	Inline Fuel Filter	1	- 60 Mesh	
1.4	Hard Nylon PA12 Fuel Line	6m	- Outer Diameter: $\phi 4\text{mm}$ - Inner Diameter: $\phi 2\text{mm}$ - Pressure: 7.8Mpa - Temperature: 120°C	
1.5	Rubber Fuel Joiner	1	- Outer Diameter: $\phi 10\text{mm}$ - Inner Diameter: $\phi 4\text{mm}$ - Length: 50cm	
1.6	Fuel Hose Mini Clamp	10	- Working Diameter: $\phi 9 \sim 11\text{mm}$	
1.7	Conduit for Fuel Line	6m	- Outer Diameter: $\phi 10\text{mm}$ - Inner Diameter: $\phi 6.5\text{mm}$	
<b>Bag #2: Vent/Fresh Air/Exhaust</b>				

2.1	Cold & Hot Air Ducting	1	<ul style="list-style-type: none"> <li>- Inner Diameter: <math>\phi</math> 60mm</li> <li>- Length: 1.8m after stretch</li> </ul>	
2.2	Vent	2 set	<ul style="list-style-type: none"> <li>- Outer Diameter: <math>\phi</math> 60mm</li> <li>- Length: 50mm</li> <li>- Height: 10mm</li> <li>- With 6 screws</li> </ul>	
2.3	Stainless Steel Bolt Hose Clamp 1	4	<ul style="list-style-type: none"> <li>- Working Diameter: <math>\phi</math> 44 ~ 64mm</li> <li><i>For Ducting.</i></li> </ul>	
2.4	Fresh Air intake Pipe	1	<ul style="list-style-type: none"> <li>- Inner Diameter: <math>\phi</math> 25mm</li> <li>- Length: 600mm</li> </ul>	
2.5	Fresh Air Filter	1	-	
2.6	Stainless Steel Bolt Hose Clamp 2	2	<ul style="list-style-type: none"> <li>- Working Diameter: <math>\phi</math> 19 ~ 29mm</li> <li><i>For Fresh Air intake pipe</i></li> </ul>	
2.7	Exhaust Pipe	1 set	<ul style="list-style-type: none"> <li>- Inner Diameter: <math>\phi</math> 25mm</li> <li>- Length: 600mm</li> <li>- Pipe Angle: 1 PCS</li> </ul>	
2.8	Exhaust Muffler	1 set	<ul style="list-style-type: none"> <li>- Bracket: 1 PCS</li> <li>- Self Tapping Screw: 2 PCS</li> <li>- Stud Bolt and Washer</li> </ul>	
2.9	Heavy Duty Bolt Hose Clamp	3	<ul style="list-style-type: none"> <li>- Working Diameter: <math>\phi</math> 23 ~ 25mm</li> <li><i>For Exhaust pipe</i></li> </ul>	
2.10	P Clips	2 sets	<ul style="list-style-type: none"> <li>- Inner Diameter: <math>\phi</math> 28mm</li> <li>- Self Tapping Screw: 2 PCS</li> <li><i>For holding the fresh air intake pipe or exhaust pipe.</i></li> </ul>	
<b>Bag #3: Switches &amp; Cable</b>				
3.1	Switches	1 set	<ul style="list-style-type: none"> <li>- LCD Switch</li> <li>- 433MHz Wireless Switch</li> </ul>	
3.2	Wiring Harness	1	<ul style="list-style-type: none"> <li>- Power Cable: 5m, 2.5mm<sup>2</sup></li> <li>- Pump Cable: 3m, 0.5mm<sup>2</sup></li> <li>- Control Cable: 2.5m, 0.5mm<sup>2</sup></li> <li>- Flame Resistant Conduit</li> <li>- Anderson Plug</li> </ul>	

**Bag #4: Others**

4.1	Metal Ring	1	- Outer Diameter: $\phi$ 100mm	
4.2	Mount Plate	1	- 170*140*2(Thickness)mm <i>To mount the main unit to the floor.</i>	
4.3	Stud Bolt	4	<i>To connect the mount plate with the main unit.</i>	
4.4	Clamps with Rubber	3 set	- Working Diameter: $\phi$ 10mm - Self Tapping Screw	
4.5	UV Cable Tie	15	- 7*300mm	
4.6	Metal Screw	4	- Specification: 5.5*32mm <i>To Screw to the Chassis or the metal frame</i>	
4.7	Wood Screw	9	<i>To Screw to the wood floor or timber</i>	



**8. Installation Instructions****(1) Select a right installation location and make an installation hole**

- a. Choose an installation location inside the vehicle. Avoid obstacles such as pipes, water tanks, and chassis beams outside the vehicle;
- b. From the inside of the vehicle, drill a pilot hole to the outside in the area where the heater will be installed.
- c. Double check the pilot hole from the outside of the vehicle and drill a hole with a diameter of 102-105mm.
- d. Apply fireproof silicone sealant along the edge of the installation hole.
- e. Apply fireproof silicone sealant to the outer side of the metal ring and insert the metal ring into the installation hole.



Fig. 8.1: Drill a pilot hole

Fig. 8.2: Drill a  $\phi$  102-105mm hole

Fig. 8.3: Apply Silicon Sealant



Fig. 8.4: Insert the metal ring

**(2) Prepare the heater (Set up the Heater)**

- a. Pass the fuel pump power line from the harness through the cold air hole of the mounting plate, move it into the adjacent small hole, and pull out the fuel pump power line until there is about 100mm remaining.
- b. Securely fasten the mounting plate to the heater unit using 4\*6mm screws and washers. Ensure that the fuel pump power line is also secured between the mounting plate and the heater unit;
- c. Insert the black rubber hose into the fuel inlet of the unit and tighten with a Mini Clam;
- d. Insert the nylon fuel pipe into the other end of the rubber hose, ensuring at least 20mm insertion, and tighten with Mini Clamp;
- e. Insert the air intake pipe into the unit's air inlet and tighten with a Clamp Screw;
- f. Insert the exhaust pipe into the unit's exhaust outlet and tighten with the Heavy-Duty Clamps.

**Tips:**

- Applying some lubricant when inserting the black rubber hose into the unit's fuel inlet or the nylon fuel pipe into the black rubber hose will facilitate these works.
- Position the Clamps for the air intake pipe and exhaust pipe in the middle of the two pipes to avoid interference with the installation hole.

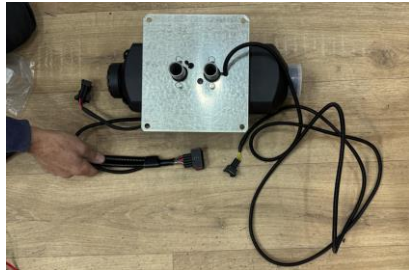


Fig. 8.5: Pass the fuel pump power line



Fig. 8.6: Install 4 pipes

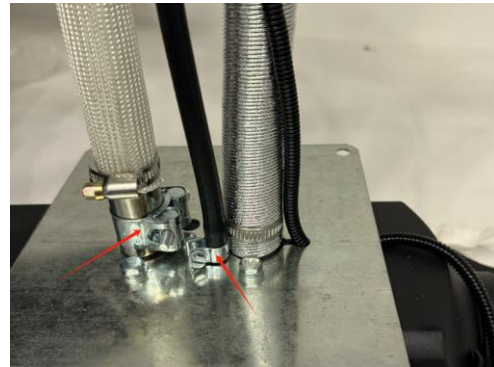


Fig. 8.7: All clamps should be put in center to avoid interference with the installation (Metal Ring) hole

### (3) Install the Heater

- a. Pass all pipes attached to the heater through the installation hole and place them smoothly on the metal ring.
- b. Once the heater unit is centered in the installation hole, secure the mounting plate to the floor with screws.
- c. Seal along the outer edge of the metal ring with fireproof silicone sealant on the outside of the vehicle to prevent outside air from entering the vehicle through the installation hole.
- d. Determine the position of the interior heater vent and cut the heater pipe to the appropriate length.
- e. Use a 65mm diameter hole saw to drill a hole at the determined heater vent position and secure the vent and ducting with clamps.
- f. If the heater is placed in a relatively enclosed space, causing insufficient cold air intake at the heater's cold air inlet, another hole should be made in this enclosed space following *step e* above to connect the vent and cold air ducting.
- g. Connect the signal connector of the wire harness to the LCD screen.
- h. Connect the power connector of the wire harness to the 12V power supply in the RV. Lightly touch the power button on the LCD screen to confirm normal power supply. Touch the button again to turn off the device.

**Tips:**

- The cold air inlet opening should be positioned as far away as possible from the warm air outlet.
- If installing a cold air inlet pipe, the cover at the rear of the heater needs to be removed.
- The LCD screen has a built-in sensor to detect the interior temperature, so it should be avoided being directly installed in the range of warm air blowing from the vent;



Fig. 8.8: Mount the main unit



Fig. 8.9: Install the Vent



Fig. 8.10: Install the cold & hot Ducting



Fig. 8.11: Install the LCD Switch

## (4) Install the Fuel Tank, Fuel filter, the Fuel Pump and the relevant Pipes

- a. The fuel tank is made of 304 stainless steels. Secure the fuel tank in a flat and load-bearing position on the back, such as in a toolbox or the wall of the caravan.
- b. Connect the fuel filter (inlet) with the fuel tank hose. If the fuel filter is far from the fuel tank, you can extend it with a nylon fuel hose.
- c. Insert the Fuel Pump into the Pump Mounting Bracket. Connect the fuel pump (inlet) with the fuel filter (outlet). If the fuel pump is far from the fuel filter, you can extend it with a nylon fuel hose.
- d. Connect the outlet of the fuel pump to the inlet pipe of the heater unit using a nylon fuel hose.
- e. The nylon fuel hose should be covered by the provided conduit.

**Tips:**

- The maximum distance between the fuel pump and the unit should not exceed 2.5 meters.
- Both the fuel pump and fuel filter have directional flow, and the direction of the fuel lines must align with the direction indicated by the product arrows;
- If the nylon fuel hose is used to extend the distance, The nylon fuel hose should be inserted into the rubber hose at least 20mm and should be tightened with a Mini Clamp. You can mark the 20mm distance in the nylon fuel hose before it is inserted into the rubber hose.

## ➤ Fuel Pump Installation Angle

The outlet of the fuel pump shall tilt upwards. The tilt angle can be selected from the range of  $15^{\circ} \sim 90^{\circ}$ , but the range of  $15^{\circ} \sim 35^{\circ}$  will be preferred. (as shown in the following Figure.) When conditions permit, the fuel pipe between the fuel pump and the heater shall go up gradually.

## ➤ Fuel Filter Installation

The range of the fuel filter installation angle can be from  $0^{\circ} \sim 90^{\circ}$ . Fuel filter should be changed after 2 years, fuel pipe and clamps should also be changed.



Fig. 8.12: Install the Fuel pump



Fig. 8.13: Install the Fuel filter



Fig. 8.14: Install the Fuel Tank

## (5) Install the Air Pipes

- Connect the muffler to the exhaust pipe using a Heavy-Duty Clamp. To find a right position to install the muffler by using bracket provided in the product
- Connect the air filter to the intake pipe using a Clamp. Make sure the air filter direction should not be the same direction to the muffler.

### Tips:

- Due to the high temperature of the exhaust pipe, it should be kept away from flammable materials;



Fig. 8.15: Install the Air Filter

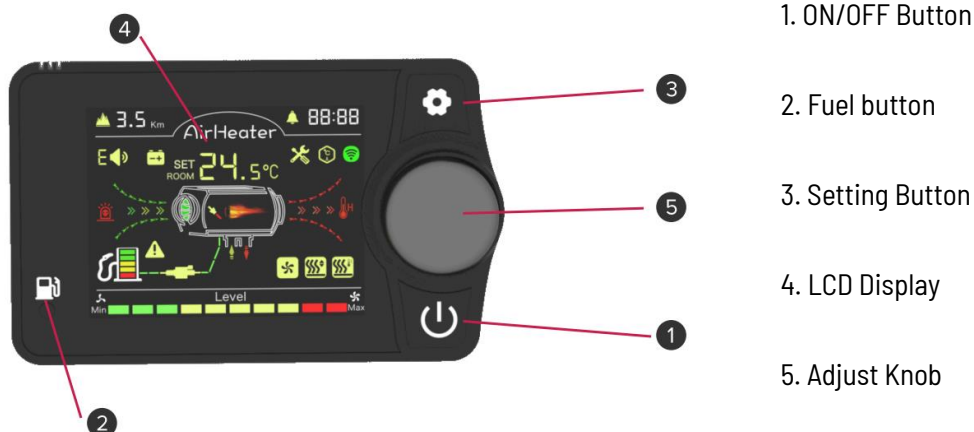


Fig. 8.16: Install the Muffler

At this point, the heater installation work has been completed, and you can now proceed to start using it.

## 9. User Manual

### (1) Display Information



### (2) Operation Mode

There are two operation modes to run the heater: Automatic Mode and Manual mode.

- Automatic Mode. The heater will automatically increase or decrease both the output power and the fan speed to meet the setting temperature. The setting temperature range is between 8°C to 36 °C.
- Manual Mode. The heater will maintain consistent output power and fan speed according to the level the user sets. There are 10 levels, from P1(Lowest) to P10(Highest), can be chosen.

The two Operation Modes will be switched by pressing the *Adjust Knob* button.

### (3) Adjust Output Power and Fan Speed

- Automatic Mode:
  - Turn ON the Heater: Press the *ON/OFF Button* to turn ON the heater.
  - Select *Automatic Mode* by pressing the *Adjust Knob* button.
  - Adjust the setting temperature by turning the *Adjust Knob* clockwise or counterclockwise.
- Manual Mode:
  - Turn ON the Heater: Press the *ON/OFF Button* to turn ON the heater.
  - Select *Automatic Mode* by pressing the *Adjust Knob* button.
  - Adjust the Output Power Level by turning the *Adjust Knob* clockwise or counterclockwise.

### (4) Remote Controller Pairing (4 Buttons)

- Turn ON the Heater: Press the *ON/OFF Button* to turn ON the heater.
- Press the *Setting* and *ON/OFF* buttons simultaneously for 3 seconds till the text of *En00* is shown on the screen.
- Spin the knob clockwise to select *En08*.
- Press and hold the *Adjust knob* for 3 seconds till the text of *P-1* is shown on the screen.
- Press the “+” button of the remote controller, then the text of *P-2* will be shown on the screen.
- Press the “-” button of the remote controller, then the text of *P-3* will be shown on the screen.
- Press the “M” button of the remote controller, then the text of *P-2* will be shown on the screen.



- Press the "Power" button of the remote controller, then the switch will go back to the home page.
- The specific button definitions are as follows:
  - P-1: Button for increments
  - P-2: Button for decrements
  - P-3: Button for mode switching
  - P-4: Power on/off button

### (5) Bluetooth password setup and pairing:

- Turn off the heater.
- Open the app and press the setup icon to set the new password. Once the new password is set, save it and return to the home page.
- Turn ON the heater.
- Simultaneously press both Setup and ON/OFF button and hold them down for at least 3 seconds until the top right corner of the display shows En00.
- Spin the knob until the display shows "bLE" at the center of the display and 4-digits password at the top right corner (default: 1234).
- Press and hold down the knob for at least 3 seconds until the password is blinking.
- Press the Bluetooth icon on the app and choose the heater to connect.
- Once display shows "SUc", the new password set-up succeeds.

### (6) Fundamental Settings

- Turn ON the Heater: Press the *ON/OFF Button* to turn ON the heater.
- Press the *Setting* button for 3 seconds.
- Select the setting by turning the *Adjust Knob*.

Setting	Meaning	Value
F0	Current Time	
F1	Starting Time	
F2	Runing Time (After Start)	
F3	Self-start	
F4	Language	(Chinese, English and Russia)
F5	Temperature Compensation	
F6	Tank Capacity	5~50L, 10L by default
F7	Pump Type	16/22(Default)/28/32 $\mu$ L
F8	Auto ON/OFF	

- Press and Hold the *Setting* button for 3s to save all these settings.

### (7) Heater Fault Code

Error Code	Problem	Reason/Solution
E01	Startup Failure	Check the pump and the fuel pipe. Make sure the pump is in working condition and the fuel pipe is not blocked.
E02	Lack of Fuel	Make sure there is enough fuel in the tank.
E03	Power Supply Failure	1. Power Voltage is not between 9~16Vdc. 2. The power cable is not connected correctly. 3. The power supply can't provide enough power.
E04	Outlet Sensor Fault	1. Make sure the sensor plug is connected correctly. 2. Or replace it with a new one.
E05	Inlet Sensor Fault	1. Make sure the sensor plug is connected correctly. 2. Or replace it with a new one.
E06	Fuel Pump Fault	1. Make sure the pump plug is connected correctly.

		2. Or replace it with a new one.
E07	Fan Fault	1. Make sure the Fan is not blocked. 2. Or replace it with a new one.
E08	Ignition Unit Fault	1. Make sure the ignition plug is connected correctly. 2. Or replace it with a new one.
E09	Overheating Protection	1. Make sure the air inlet and outlet is not blocked. 2. Make sure the fan is in working condition. 3. The installation space is too limited. 4. Stop using and replace it with a new one.
E10	Temperature Sensor in the combustion chamber Fault	1. Make sure the temperature sensor in the combustion chamber is connected correctly. 2. Make sure the temperature sensor is in working condition. 3. Replace the sensor.

## 10. Instructions for Use

- (1) Only diesel fuel should be added to the fuel tank. When using a diesel heater, pay attention to the fuel level in the tank. If the level drops below a certain point, refuel promptly to avoid running out of diesel.
- (2) When starting the heater, the device will go through a preheating process before ignition. This phase typically lasts around 3 minutes. Once preheating is complete, you will see a flame icon on the remote control panel, indicating that the diesel in the combustion chamber is burning, and you will soon feel the heat from the air outlet.
- (3) When shutting down the heater, the device will first cool down before turning off. This phase usually lasts 3-5 minutes. It is essential to allow the remaining diesel to burn completely and cool the combustion chamber. Do not force a power cut before the heater has completely stopped working, as exhaust gases may enter the air filter, increase carbon buildup in the combustion chamber, and reduce device efficiency.
- (4) After installing the heater, it is recommended to start it up regularly every month and let it run for 15 minutes in high-temperature mode.
- (5) Regularly inspect the heater's pipelines and fuel tank will help to promptly identify potential faults and reduce the likelihood of product malfunctions.

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