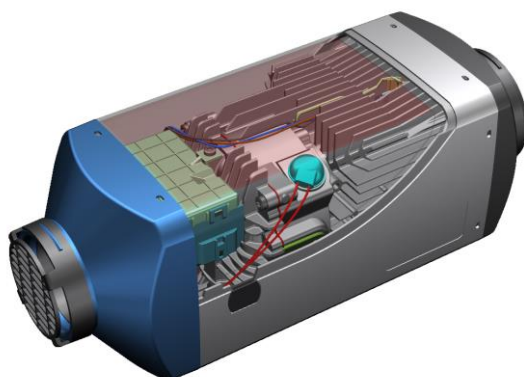




**4Kw/14000BTU Gasoline/Diesel**

**Air Heater User Manual**

**VER 1.3**



Thank you for purchasing this VELIT 4000P Gasoline/Diesel air heater. For safety and best performance, please read and follow the instructions carefully. The electronic version of this document is available under the product page at [velitcamping.com](http://velitcamping.com).

**WARNING** Improper installation or repair of Velit 4000P air heater can cause fire or leakage of deadly carbon monoxide leading to serious injury or death. To install and repair Velit heating and cooling systems, you need to strictly follow this user manual and use only genuine Velit parts. ALWAYS carefully follow Velit installation and repair instructions and heed all **WARNINGS**. Velit rejects any liability for problems and damage caused by improper installation or service.

**WARNING**

1. The heater shall not be used in areas with flammable and explosive gas and dust.
2. The heater is prohibited to be used in the garage and other enclosed spaces to prevent suffocation or exhaust poisoning.
3. When installing heaters on special vehicles, relevant specific rules shall be followed, and it is strictly prohibited to install heaters in violation of industry rules.
4. Explosive and flammable materials such as gas tank, compress air tank, clothing, wood, plastic, etc. are strictly prohibited near the hot air outlet and the exhaust outlet.

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# I. Overview

## 1.1 Product introduction

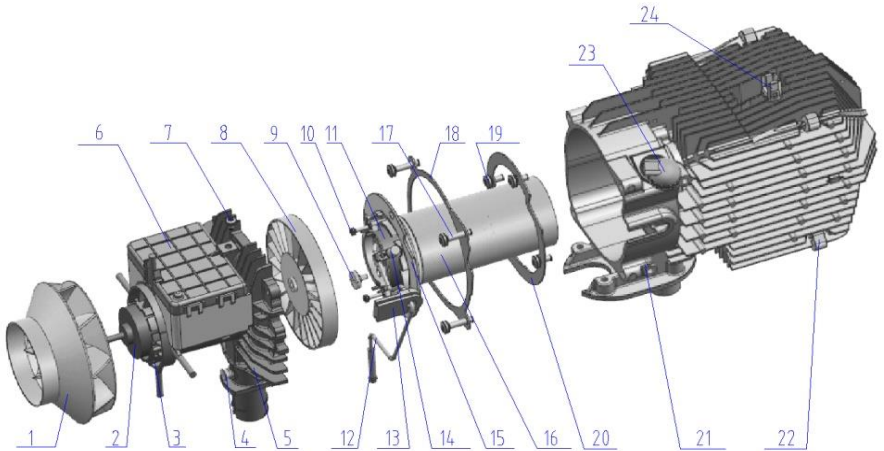
Velit 4000P air heater consists of a drive unit (combustion air fan, heating air fan and drive motor), heat exchanger, burner with combustion chamber, control unit, glow plug and housing. The ignition and fuel supply are automatically controlled by the control unit. After starting up, fuel will be pumped into the combustion chamber and ignited by the glow plug. Meanwhile the heating air fan pulls the indoor cold air into the heat exchange channel. The air will be heated up by the heat exchanger and then pushed into the cabin area.

## 1.2 Technical Specifications

Heat output (Btu/h)	14000	
Fuel	gasoline	diesel
Rated Voltage (V)	12	
Operating voltage (V)	11-16	
Fuel consumption (G/ h)	0.05~0.13	0.05~0.12
Rated power (W)	20~46	
Working temperature	-30°F - 75°F	
Rated elevation (ft)	≤17000	
Weight (Lb)	10	
Dimensions (inch)	14.6*5.5*5.9	

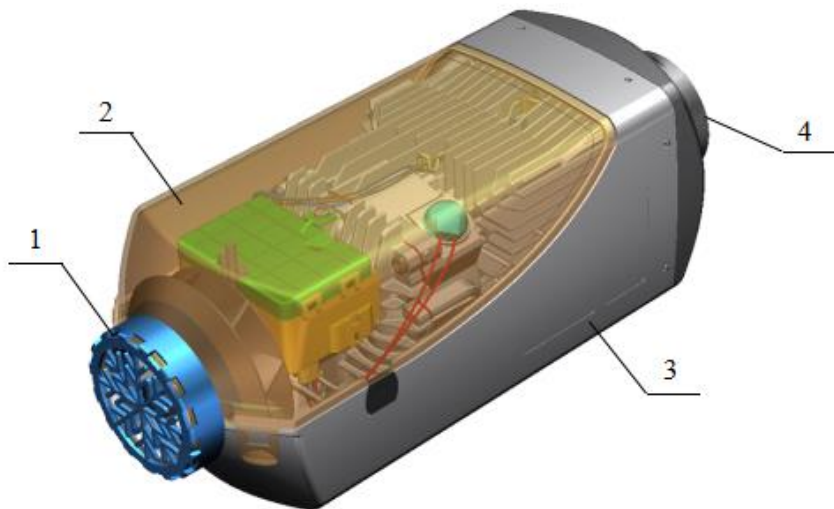
## II. Structure and Components

### 2.1 Heater components



1. Heater fan
2. Motor
3. Support frame
4. Fuel line rubber plug
5. Motor mount
6. Control unit
7. Control unit mounting screw
8. Compressor wheel
9. Screw
10. Screw
11. Burner
12. Fuel inlet
13. Fuel line gasket
14. Glow plug
15. Combustion chamber flange seat
16. Combustion chamber
17. Screw
18. Motor sealing gasket
19. Screw
20. Combustion chamber sealing gasket
21. Heat exchanger
22. Heat exchanger rubber ring
23. Glow plug cap
24. Temperature sensor.

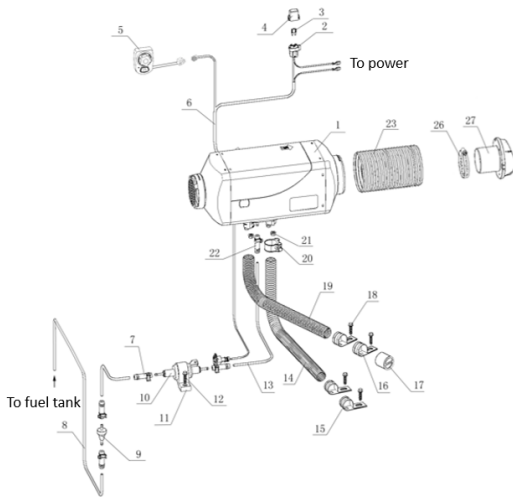
## 2.2 Housing components



1. Inlet cap 2. Upper housing 3. Lower housing 4. Outlet cap

## III. Installation

### 3.1 Accessory diagram



- |                        |                         |
|------------------------|-------------------------|
| 1. Heater              | 22. Fuel line connector |
| 2. Fuse box            | 23. Hot air outlet hose |
| 3. Fuse                | 26. Hose clamp          |
| 4. Fuse box cap        | 27. Outlet vent         |
| 5. Control switch      |                         |
| 6. Main harness        |                         |
| 7. Fuel line connector |                         |
| 8. Fuel line           |                         |
| 9. Fuel filter         |                         |
| 10. Fuel pump          |                         |
| 11. Fuel pump bracket  |                         |
| 12. Fastener           |                         |
| 13. Fuel line          |                         |
| 14. Exhaust pipe       |                         |
| 15. Pipe bracket       |                         |
| 16. Pipe bracket       |                         |
| 17. Intake cap         |                         |
| 18. Fastener           |                         |
| 19. Intake pipe        |                         |
| 20. Exhaust clamp      |                         |
| 21. Nut                |                         |

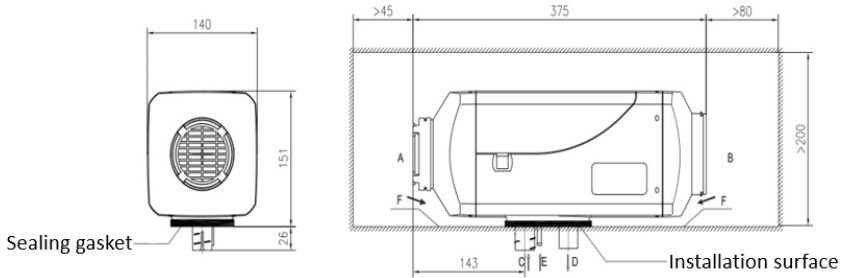
### 3.2 Installation

3.2.1.1 The heater can be installed inside or outside the vehicle. When the heater is installed outside the vehicle, the installation location must not be exposed to rain and debris on the road.

3.2.1.2 Appropriate clearance must be kept in front of the inlet and outlet, as shown in the following to ensure proper air flow. The inlet and outlet must be free of obstruction.

## 4Kw Air Fuel Heaters

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- 3.2.2 The unit **CAN NOT** be installed sideway, meaning that the fuel port (E) must face the ground.
- 3.2.3 The genuine sealing gasket must be used for installation and the mounting surface must be flat.

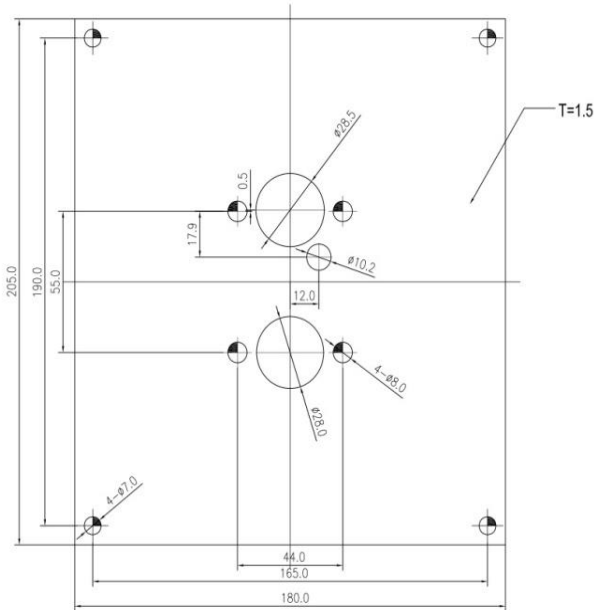
Four M6 nuts for securing the unit need to be tightened at 6-7Nm.

**NOTICE** When the heater is reinstalled, the sealing gasket must be replaced.

- 3.2.4 If the thickness of the installed panel is less than 1.5mm, an additional reinforcing plate must be installed.



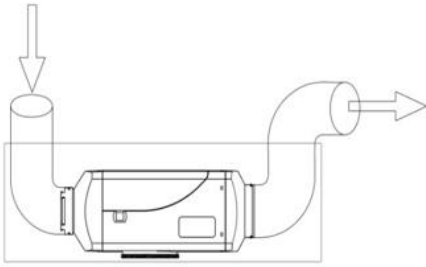
## 4Kw Air Fuel Heaters



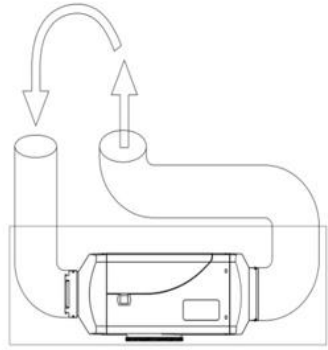
- 3.2.4. When a hose is connected to the hot air outlet, the inner diameter of the hose shall not be less than 60mm, and the material must have a temperature rating higher than 130 °C.
- 3.2.5. The maximum pressure difference between the intake side and the outlet side of the heater shall not be greater than 0.15 KPa.
- 3.2.6. The hot air outlet shall not be directed towards the non-heat-resistant surfaces.
- 3.2.7. When the heater operates in external circulation mode, no water and debris shall enter the cold air intake.
- 3.2.8. When the heater operates in internal circulation mode, the hose placement needs to prevent heated air from entering the air intake again. The intake air should always come from the cooler area.

## 4Kw Air Fuel Heaters

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**Correct**



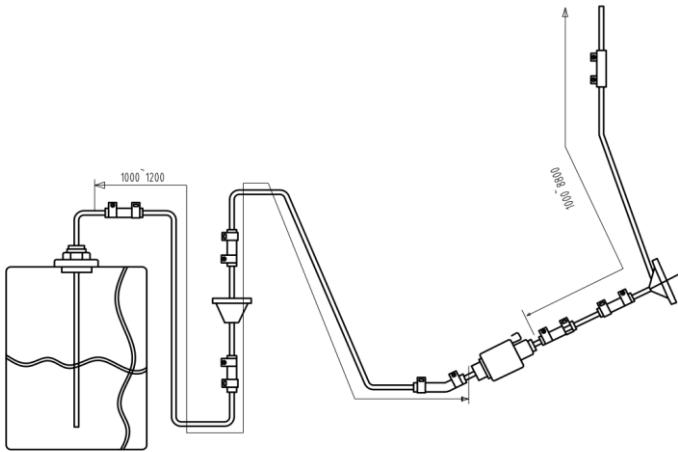
**Wrong**

### 3.3 Installation of fuel supply system

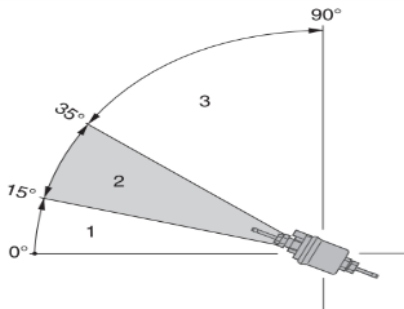
The fuel supply system of the heater is shown in the following figure.

**NOTICE** We strongly recommend installing the standpipe instead of using the auxiliary fuel port for better reliability and performance.

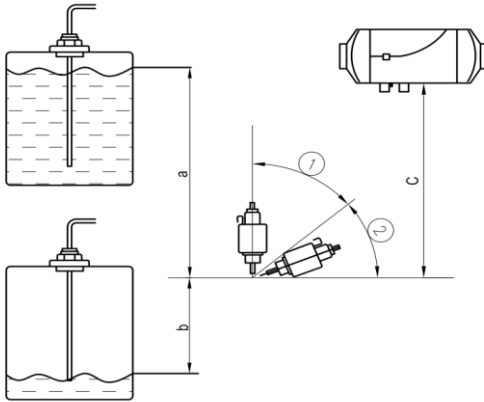
Auxiliary fuel port may be used only under 5000ft ASL. Any standpipe with an internal diameter of 2-2.5mm will work.



3.3.1 The clip with rubber mounting bracket shall be used to secure the fuel pump. The outlet of the fuel pump should be inclined upward at 15~35 degrees. The fuel line from the fuel pump to the heater shall rise gradually.



- 3.3.2 The installation location of the fuel pump shall avoid high temperature components. Do not use the fuel pump at a temperature higher than 20 °C.



### 3.3.3

The height difference between the fuel surface level and the fuel pump, and the height difference between the fuel pump and the heater will generate pressure in the fuel line. As a result, these dimensions should meet the following requirements:  
 $a \leq 3\text{m}$ ,  $b \leq 0.5\text{m}$ ,  $c \leq 2\text{m}$ .

( $b \leq 0.15\text{m}$  is required for a sealed fuel tank due to negative pressure)

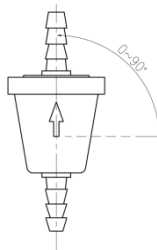
### **NOTICE**

1. Check the air vent of the fuel tank during installation.
2. After the fuel line is cut, ensure that the cut surface is round and does not affect the fuel supply.

### 3.3.4 Installation of fuel filter

The fuel filter must be installed before the inlet of the fuel pump. Notice the fuel flow direction icon. It should point upward at 0-90° as shown.

**NOTICE** The fuel filter needs to be replaced every two years and the fuel line connector and clip must be replaced at the same time.

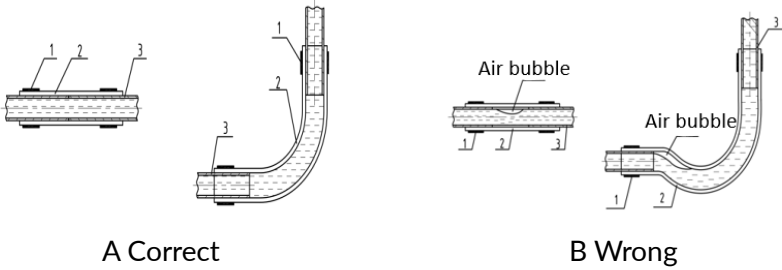


### 3.3.5 Installation of fuel line

3.3.5.1 The fuel pipe shall be installed to prevent scratching and hitting by sharp objects and debris. It should be installed away from hot components of the vehicle. If necessary, nylon corrugated sleeves and other protective accessories shall be installed. The fuel line must be secured with zip tie, and the distance between zip ties shall not be greater than 100cm.

3.3.5.2 To prevent air from entering the fuel line, use the genuine rubber connectors and clamps to connect fuel lines as shown in the images below.

## 4Kw Air Fuel Heaters



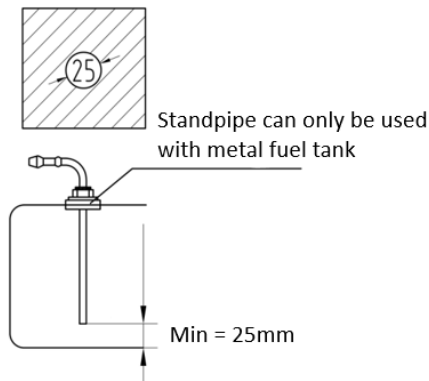
A Correct

B Wrong

### 3.3.6 Installation of fuel standpipe

3.3.6.1 The fuel standpipe draws fuel from the vehicle fuel. A  $\phi 25 \pm 0.2\text{mm}$  hole needs to be opened on a flat surface of the fuel tank or the fuel sender unit. The gap between the lower end of the standpipe and the bottom of the fuel tank needs to be at least of 25mm.

NOTICE: The genuine standpipe can only be used with metal fuel tanks. For plastic fuel tank, alternative standpipe needs to be purchased separately.



### **3.4 Installation of electrical components**

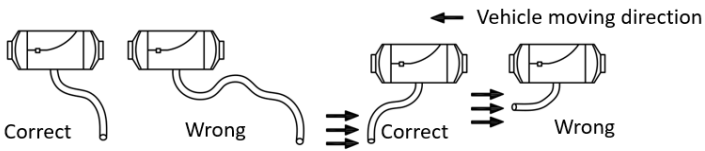
- 3.4.1 The heater control switch is connected with a 4pin connector. Do not install the control switch right near the hot air outlet or the cabin door to avoid constant turning on and off at thermostat mode.
- 3.4.2 A 20A fuse is used at the in-line fuse box. The red and black cable connect to the power supply.
- 3.4.3 The fuel pump connector is not pre-installed for easier routing through the floor. Install the connector by inserting the wires all the way into the connector until hearing a click. The fuel pump cable is non-polarized. Installing the connector is irreversible.

### **3.5 Installation of air intake and exhaust pipe**

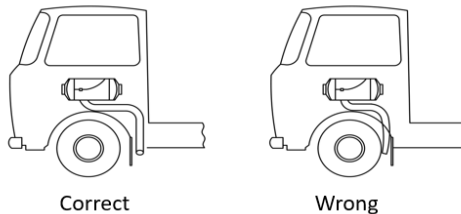
- 3.5.1 The air intake pipe of the heater is an aluminum coated plastic corrugated pipe. It connects to the air intake of the heater and is secured with the clamp. The air intake must be placed outside the vehicle and away from any other exhaust.
- 3.5.2 The air intake pipe shall be arranged to prevent water from entering the pipe, and prevent it from being scratched by sharp objects. The intake pipe shall be fixed on the vehicle with the clamp.
- 3.5.3 Exhaust pipe is stainless steel corrugated pipe. It connects to the exhaust port of the heater and is secured with a clamp. The exhaust gas from the exhaust pipe shall be discharged directly to the outside of the vehicle. The outlet of the exhaust pipe should be at least 4ft away from any openings on the vehicle.

## 4Kw Air Fuel Heaters

- 3.5.4 The caps on the intake and exhaust pipes shall be intact and shall not be damaged or removed. If the working environment contains solid particles or dust for a long time, an air filter should be installed
- 3.5.5 The exhaust pipe shall be arranged to minimize bending to ensure smooth exhaust.
- 3.5.6 The outlet of the exhaust pipe must not have any upward bends and must not face the vehicle moving direction.



- 3.5.7 The intake and exhaust pipe shall be arranged so that the pipe will not be blocked by mud, rain, snow and other objects.



- 3.5.8 When the heater is operating, the temperature of the exhaust pipe is very high. The exhaust pipe should be placed away from non-heat-resistant surfaces. The exhaust outlet shall point vertically downward with an angle of  $90^\circ \pm 10^\circ$ .
- 3.5.9 A heat shield should be installed if there is risk for people to touch the exhaust pipe.



- 3.5.10 The air intake pipe and exhaust pipe shall always bend downward. Otherwise, a  $\phi$  5mm condensate drain hole shall be opened at the lowest point of the pipe. If bending is required, the bending radius of the pipe shall not be less than 50mm. In addition, the sum of all bending angles shall not exceed 270°.

## IV. Operation

### 4.1 Basic Operation

To turn on/off the unit, long press 2s at temp mode/ power mode page. When the unit is turned off, note that the actual fan on the unit will not stop until the heat exchanger reaches a safe temperature. To switch between modes and pages, short press the knob and the screen will cycle through all the pages. To change the setting in a page, turn the knob to move the cursor till the target option is flashing. Short press and turn the knob to edit. To move to the next page, move the cursor to "NEXT" and short press.

To switch between modes, turn the knob in either direction at the desired mode page. You will need to slightly change the set temperature/ output to change the mode. For example, if you want to switch from power mode to thermostat mode, change the set temp from 75 to 76 or 74 and the heater will operate in thermostat mode. The heater always operates in the mode at which you changed settings. The mode can be switched when the heater is operating. A turning fan icon indicates which mode the unit is in.

**WARNING** DO NOT turn the unit on when the cooling program is in progress. The screen will display "COOLING DOWN, DO NOT RESTART". You may restart the unit when the message is gone.

**WARNING** Do not cut off the power from the heater in any other way. Doing so will cause the burner carbon build-up and various damage to the accessories.

### 4.2 Elevation Display

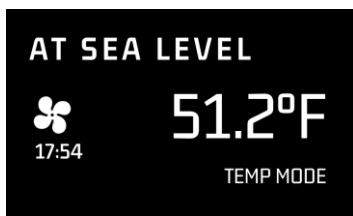
An onboard barometer measures the air pressure and adjust the fuel-air mix ratio depending on the elevation you are at. Due the characteristic of the sensor and the temperature variance, the normal error range for the displayed elevation number is  $\pm 1500$ ft relative to the actual elevation. When operate below 1500ft ASL, the display will show “AT SEA LEVEL” or “000 ft.

### 4.3 Start the heater for the first time

For fuel line within 6ft, no priming is required, and the heater can be started as usual. It may take 2-3 tries for the fuel to reach to heater. For fuel line longer than 6ft, it is recommended to enter “QUICK PUMP FUEL” page to prime the fuel line manually. See detailed instructions in the “QUICK PUMP FUEL” section.

### 4.4 Temp Mode (Thermostat)

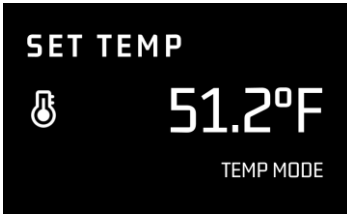
In thermostat mode, the unit will adjustment power output automatically to the maintain the room temperature at the set value. In temp mode page, the screen displays the following info: cabin temperature, system time, elevation, operating status, timer status and error codes. If there is an auto run scheduled, an alarm clock icon will show. Long press 2s to turn/ off the unit. The fan icon rotates when the unit is running.



## 4Kw Air Fuel Heaters

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To set target temperature, rotate the dial. Once set, leave the control switch for 3s and the new target temperature will be saved. Display will go back to main screen and show ambient temperature.



If the ambient temperature is six degrees higher than the set temperature, the heater will automatically enter standby mode. At standby mode, fan icon does not turn, and the display shows SET TEMP REACHED. Once the temperature is six degrees lower than the set temperature, the heater will automatically start.

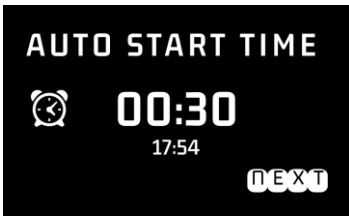
### 4.5 Power Mode

In power mode, the unit always runs at set power output level. There are five output levels. In power mode page, the screen displays the following info: output level, system time, elevation, operating status, timer status and error codes. To change the power output, turn the dial.

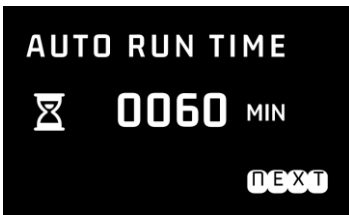


#### 4.6 Auto Run

After an auto run is scheduled, the unit will automatically turn on and operate in the last mode the unit was in with the previous setting (target temperature or power output level). To schedule an auto run, turn on auto run at “AUTO START TIME” page and set a starting time. The second row shows the system time. Toggle the ON/OFF option to ON at the left bottom corner of the screen. When the auto run is scheduled, an alarm clock icon will appear in the mode page. The unit will automatically start every day at the scheduled time till the feature is turned off. Move the cursor to “NEXT” and press the knob to save.

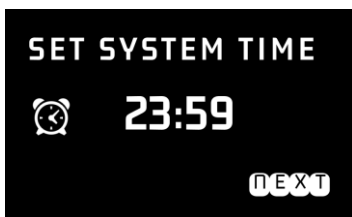


In “AUTO RUN TIME” page, turn the knob to set the duration for auto run. Move the cursor to “NEXT” and press the knob to save.



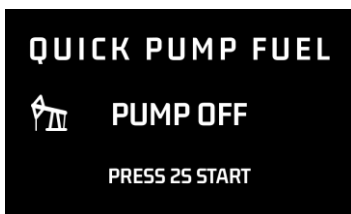
#### 4.7 Set System Time

This page sets the time for the system. Notice the system time resets when the power is disconnected. Move the cursor to “NEXT” and press the knob to save.



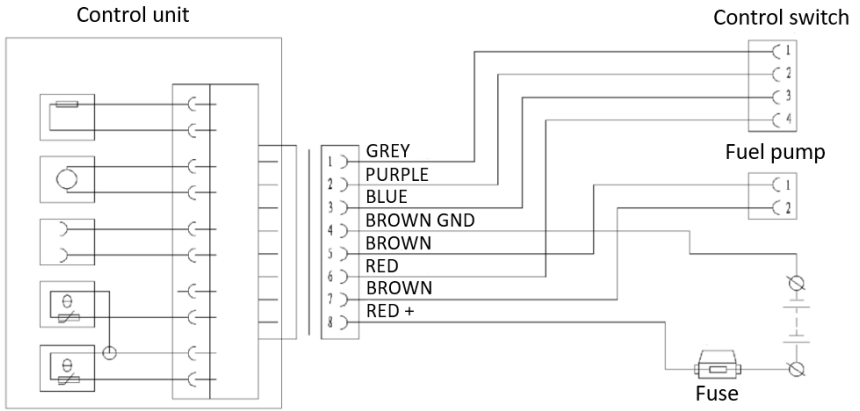
### 4.8 Quick Pump Fuel

The fuel pump can be turned on manually through this page to prime the fuel line. Long press the knob for 2s and the fuel pump will start. Closely monitor the fuel level in the fuel line and short press to stop the fuel pump when the fuel gets close to the unit. Excessive fuel in the combustion chamber could cause incomplete combustion and difficulty in starting up.



***To maximize the lifespan of the unit, the maximum continuous run time is 48h. Once 48h is reached, the unit will power cycle and continue operation.***

## V. Electrical Diagram



## VI. Error Codes and Troubleshooting

Error Code	Failure	Troubleshooting
01	Ignition failure	Check the fuel line to make sure the fuel can flow freely. Add fuel if fuel level is low.
02	Combustion interruption	Check the fuel line to make sure the fuel can flow freely. Add fuel if fuel level is low.
03	Power supply voltage abnormal	Make sure the battery is charged and the voltage matches.
04	Heat exchanger overheat	Check the indoor air intake and outlet and make sure there is no obstruction. Check whether the housing leaks air.
05	Ignition sensor abnormal	Check the green temperature sensor connector or replace the composite sensor
06	Outlet temperature sensor abnormal	Check the blue temperature sensor connector or replace the sensor
07	Fuel pump abnormal	Check the fuel pump wiring harness and connector
08	Fan motor abnormal	Check the motor connector or replace motor
09	Inlet temperature sensor abnormal	Replace control unit
10	Glow plug abnormal	Replace glow plug
11	Environment temperature abnormal	The heater cannot operate below -40°C or above 40 °C
12	Elevation too high or too low	Triggers when lower than -100m ASL or higher than 5100 m ASL. Disregard
13	Fan speed abnormal	Check whether the fan is stuck or blocked

## VII. Maintenance

- 7.1 During the season when the heater is not used, the heater power should be disconnected, and the heater should be kept clean and dry. The heater circuit connector should be routinely inspected for rust and loosening.
- 7.2 The heater should be operated at least once a month, for no less than 15 minutes per run, to prevent mechanical components such as the fuel pump and the motor from malfunctioning.
- 7.3 The fuel line needs to be inspected frequently for leakage.
- 7.4 The inlet end of the housing, air intake. and exhaust ducts should be checked frequently for any foreign materials blocking the channel.
- 7.5 After ten years, the heat exchanger, exhaust pipe and the composite sensor must be replaced with genuine part supplied by the manufacturer.
- 7.6 During welding operations to the vehicle, the positive end of the heater should be removed from the battery and properly isolated to prevent damage to the control unit. During transport, storage, the heater's ambient temperature should not exceed - 40 °C to 85°C.
- 8 The heater may have circuit failure due to the following reasons: corrosion of connector, poor contact of connector, incorrect connector insertion, corrosion of wire or fuse, etc. Quarterly inspection is recommended to prevent circuit failure.