



HotBox MINI

Pressurized Hot Water ... at your finger tip ..

INSTALLATION GUIDE



SAFETY WARNINGS

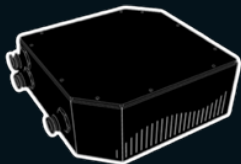
Please make sure to read the following warnings thoroughly as it may pose danger to you, cause damage to your device or your vehicle

WARNINGS:

- This device is intended for use with a vehicle's engine to heat water. use it only as directed and in accordance with the instructions provided. Do not attempt to modify the device or use it for anything other than its intended purpose.
- The Hotbox should only be installed by a qualified technician with experience and good understanding of automotive systems. Incorrect installation could result in damage to the vehicle, the Hotbox, or in personal injury.
- Before starting the installation process of the Hotbox, please ensure that the vehicle's engine and heating system are turned off and have had sufficient time to cool down. Hot coolant can cause serious burns or scalds.
- When connecting the Hotbox to the vehicle's heating system, ensure that all connections are tight and secure to prevent leaks. A leaking connection could cause damage to the vehicle, the Hotbox, or both.
- The Hotbox should be installed in a location where it will not interfere with the safe operation of the vehicle, including the driver's vision and access to vehicle controls.
- Please test the hotbox before installing it in the car to make sure it functions as it should.
- Do not attempt to operate the Hotbox if it appears damaged, cracked, or leaking. This could result in injury, damage to the vehicle, or both.
- To avoid burns, do not touch the heat exchanger or the water coming from it especially when car engine is working since it may reach extremely high temperatures.
- The Hotbox heating mode is limited to raising the water's temperature to 60 °C. However, this restriction does not apply to the external tank mode, so it is crucial to keep monitoring the water's temperature to make sure it does not rise to a very high temperature in order to prevent burns and possible injuries.
- Always use caution when working with hot water or steam, as it can cause serious burns or scalds. After heating the water to the required temperature, make sure to turn off the engine and allow the heat exchanger to cool down before using the shower mode since the water trapped in the pipes can be at a very high temperature and can cause burns and scalds.
- When using the Hotbox's instant heating feature (External Tank), the water can reach high temperatures quickly. Always use caution when handling hot water to avoid burns or scalds.
- This device uses electricity. To prevent the risk of fire or electrical shock, Avoid submerging the device in water, using it when there is a leak coming from it, or touching any exposed wires with wet hands.
- The Hotbox must be connected to a power switch and a fuse rated at 10 amps. Connecting the Hotbox to a higher-rated fuse or failing to use a fuse could cause damage to the Hotbox or pose a fire hazard. Also ensure that the power switch and fuse are located in a position that is easily accessible and visible. This will make it easier to turn off the Hotbox in case of an emergency.
- If the Hotbox trips the fuse or circuit breaker repeatedly, it may indicate a fault in the Hotbox or the electrical system. In this case, turn off the Hotbox and seek assistance from a qualified technician to identify and resolve the issue.
- Always ensure that the Hotbox is properly grounded before connecting it to the power supply. Failure to do so could cause damage to the Hotbox or pose a safety risk.
- Always turn off the Hotbox using the power switch before turning on the engine. Failure to do so could cause damage to the Hotbox.
- The onboard tank must have an air vent. This is essential to prevent dangerous pressure buildup in the tank, which can cause damage to the Hotbox and potentially harm the user. Without an air vent, the pressure inside the tank can increase rapidly and cause the tank to rupture or explode. Therefore, it is crucial to ensure that the air vent is clear and unobstructed at all times to prevent any potential hazards.
- When filling the onboard tank in Fill Tank mode, avoid using pressurized water sources with a pressure exceeding 50 psi to prevent potential damage to the tank.
- Do not operate the Hotbox for shower or heating mode when the onboard tank is empty. This can cause the pump to suck air instead of water, which can lead to cavitation and potential permanent damage to the pump.
- The water heated or passed by the Hotbox is intended for non-consumption purposes only, such as for washing or cleaning. The Hotbox is equipped with a filter that is designed to remove certain types of particles and contaminants. However, please note that the water may still contain trace amounts of bacteria or other microorganisms that could pose a health risk if consumed. Therefore, it is strongly recommended that you do not use the water for cooking or consumption purposes. Always properly maintain the filter and replace it as recommended to ensure that it is working effectively. Failure to follow these warnings could result in serious illness or injury.

SYSTEM COMPONENTS

HOTBOX MINI



The HOTBOX device is a proprietary design of Aphcarios. It contains the pump, set of valves, sensors, and electronics. It is Bluetooth controlled via an Android/iOS app.

WATER TANK



The water tank is NOT supplied with the system and is optional for the user to have it installed on-board the vehicle or have it externally connected. The water tank stores warm water for showering, cleaning the car, and so on.

HOTBOX APP

The HOTBOX app serves as the primary control interface between the user and the HOTBOX allowing the user to control the various modes of operations. The app displays a real-time readout of the following data:

Status of 12V power source - Temperature of the heated water - The water level in the tank



HEAT EXCHANGER

A high-quality stainless steel 10-plate heat exchanger is used to absorb the heat from the vehicle's hot radiator coolant to heat the circulating water.



HOSES

The system comes with 4 sets of hoses:

- i. 12mm PU Tubing – designed to work under 200 PSI of pressure and temp up to 80°C.
- ii. Shower outlet hose – a high-quality self-expanding hose.
- iii. Radiator hoses – connecting the Heat Exchanger to the car radiator side.
- iiii. Stainless Steel flexible hose- designed to work under 200 PSI of pressure and a temp more than 90°C.

WHAT IS IN THE BOX?

No	Part Name	Qty
1	Hotbox Mini Device	1
2	Heat Exchanger	1
3	12mm PU Tube	15m
4	Half-meter Radiator Pipe (Ø16 & Ø19)	1
5	90cm SS Flexible Pipe	2
6	Self-Expanding Hose	1
7	½" Water Tap	1
8	½" & ¾" Female Hose Quick Connector	3
9	½" & ¾" Female Faucet Quick Connector	1
10	½" Female to Tapered Barbed Fitting	2
11	½" Male Union Connector	2
12	½" Male-Female Long Adapter	1
13	½" Jam Nuts	2
14	½" Male Quick Connection Elbow	3
15	Gasket	2
16	½" Male to 12mm Quick Connector	6
17	I/O Port Bracket	1
18	Heat Exchanger Bracket	1
19	3-position Switch Connector	1
20	Power Cable Connector	1
21	M6x18mm Self-Drilling Screw	2
22	M4 washer	4
23	M3.5x16mm Screw	4

MAIN COMPONENTS



HOSES



OUTLET



FITTINGS



BRACKETS



ELECTRIC



FASTENERS



PREPARATIONS

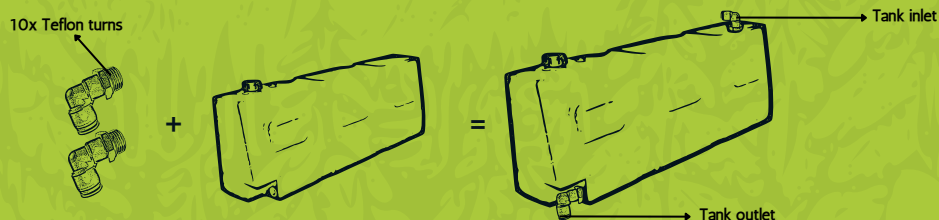
Prepare the hotbox components as shown below. Make sure to use PTFE (Teflon) tape for threaded connections. Also, when screwing the heat exchanger connections, make sure the gasket seals are in place. You can consider using hydraulic seals for more sealing in barbed connections, and using Gasket Sealant (Gasket Shellac) wherever Teflon tape is used.

TOOLS & MATERIAL

- 1- Adjustable spanner
- 2- Screwdriver(+)
- 3- Wire stripper and cutter
- 4- Pipe cutter
- 5- hose clamp plier
- 6- PTFE/Teflon tape
- 7- Gasket Sealant

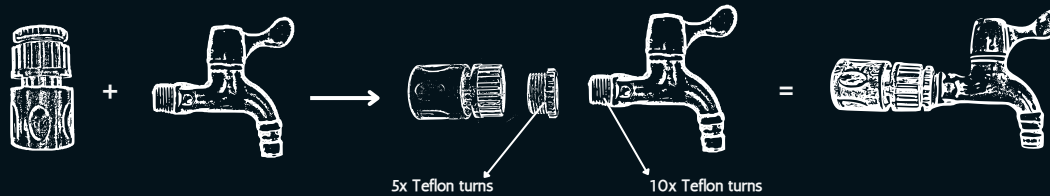


ON-BOARD TANK



1. Apply the Teflon tape to the thread of the elbow quick connector.
2. Fix the elbow quick connector to both sides of the water tank (upper hole is the tank inlet and lower hole is the tank outlet).

WATER TAP



1. Remove the adapter of the hose quick connector and add Teflon tape at the marked places.
2. Connect the adapter to the hose quick connector.
3. Connect the water tap to the hose quick connector.

WATER INLET CONNECTION

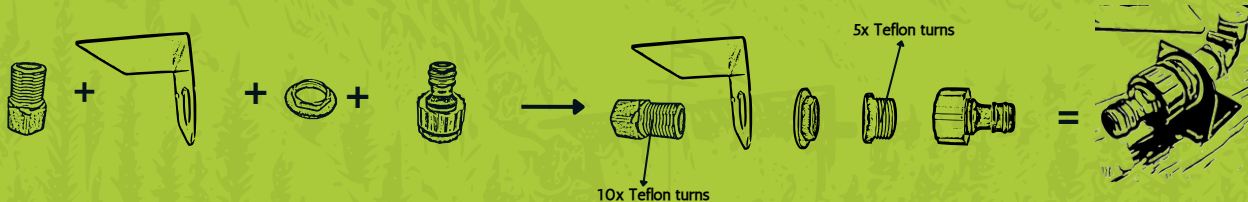


1. Remove the adapter of the hose quick connector and add Teflon tape at the marked places.
2. Connect the adapter to the hose quick connector.
3. Connect the hose quick connector to the male quick connector.

SHOWER SETUP

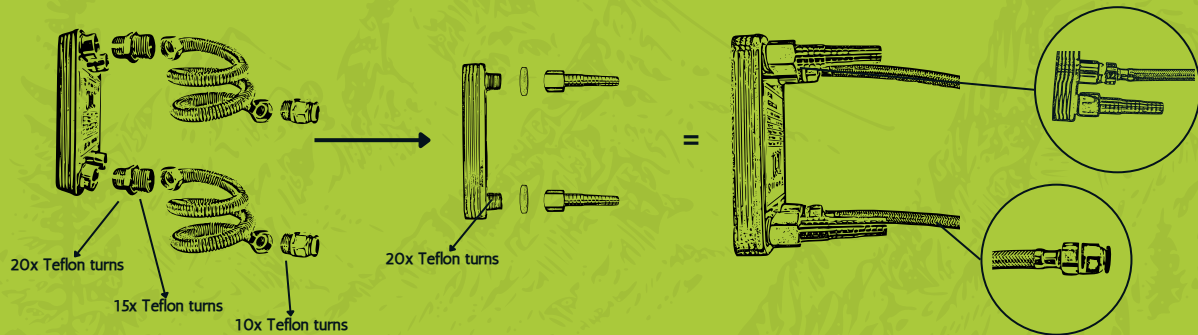


WATER I/O BRACKET



1. Apply Teflon Tape as marked above.
2. Insert the long Female-male adapter in the hole of the I/O port bracket.
3. Fix the long adapter using the jam nuts from the opposite side.
4. Connect the hose quick connector to the long adapter.

HEAT EXCHANGER

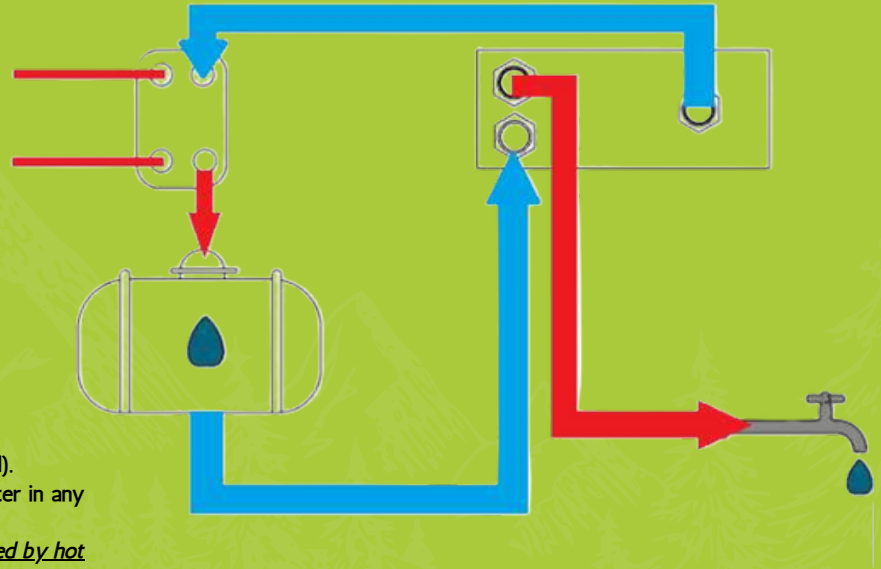


1. Apply Teflon Tape as marked above.
2. Insert the male union connector into the heat exchanger's female side.
3. Fix the SS flexible hose to the male union connector.
4. On the other side of the SS flexible hose connect the male quick connector.
5. On the male side of the heat exchanger connect the female barbed connector after fixing the gasket inside it.

****We supply additional elbow connectors for the barbed connector however, we don't recommend using them as with some cars that have higher pumping pressure it can cause leaks.**

CONFIGURATION

HotBox Mini



In this configuration the user can:

1. Heat the water inside the onboard tank (temp controlled).
2. Cannot Fill on board tank & external tanks & Heat water in any external tank by circulating via the external ports.

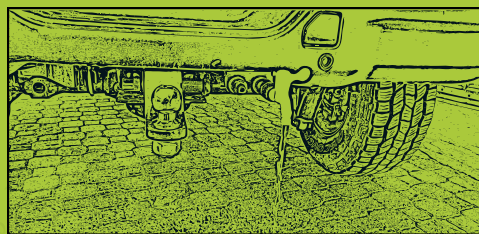
Extreme caution must be used in this case not to get burned by hot water.

Configuration

GENERAL TIPS AND PRECAUTIONS

Before starting the installation process please read the following tips and precautions:

- Plan the installation carefully, and look at supplied examples from our website for more common SUV models.
- Plan the length of the pieces of the PU Tubing needed before starting cutting and make sure to use the proper pipe cutter for the PU tubing, making sure the cut profile is flat. Not doing so may lead to leaks.
- When routing the PU tubing, coolant hoses, or installing the Heat Exchanger unit make sure items do not get trapped between the suspended load and non-suspended load.
- Two sizes of radiator hoses have been supplied (ID 16mm and ID 19mm). This range was found to cover the most known SUVs. In case your car uses a different size then you can obtain this from your local auto parts dealer. Make sure you use a heater hose and not hydraulic hoses as these are too hard to be clamped efficiently and could leak
- The engine might need to be run for some time before all trapped air is circulated out of the system. Trapped air prevents the Heat Exchanger unit from working efficiently.
- When stabbing the PU tubing through the push-in connector, make sure it is pushed in all the way.
- Removing the PU Tubing from the push-in connector can be quite tricky sometimes. The best technique is to first push in the tubing, then push the ring fully in, then pull out the tubing. If that does not work don't continue pulling the tubing by force, that will not help, and instead, repeat the above process.
- Make sure your water tank has a vent port to allow air to escape during filling and enter during pumping out.

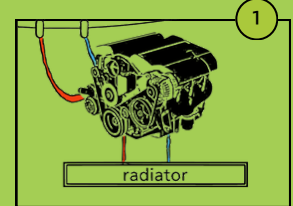
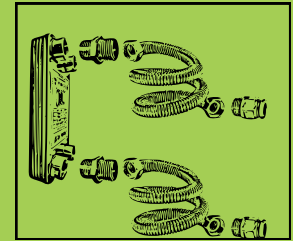
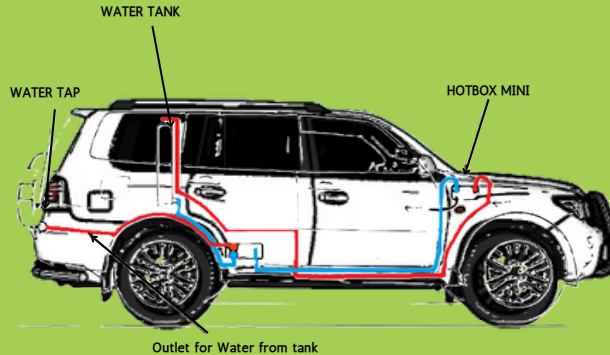


INSTALLATION STEPS

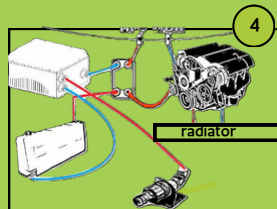
1. Installation of Heat Exchanger

It is recommended to install the heat exchanger in the engine compartment of the vehicle. Follow the steps shown.

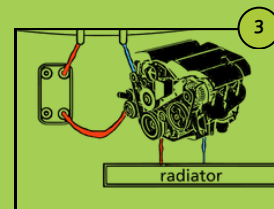
Alternatively, you can disconnect the heater water circuit from your vehicle and connect directly to the Heat Exchange. This method makes the heating process much more efficient and faster but it means you will no longer be able to have heated air in your cabin. Only suitable for areas of the world where temperatures do not drop below 20°C



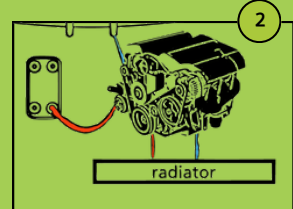
1. Locate the Heater hose



4. Complete the installation by connecting the PU tube as shown above



3. Use the supplied hose to connect back to firewall



2. Disconnect from firewall inlet & connect to Heat Exchanger

INSTALLATION STEPS

2. Installation of the Hotbox

Find a suitable mounting position for the HOTBOX, thereafter begin connecting the HOTBOX inlet/outlet connections as per the labeling on the device unit.

3. Heat Exchanger to the Hotbox Connection

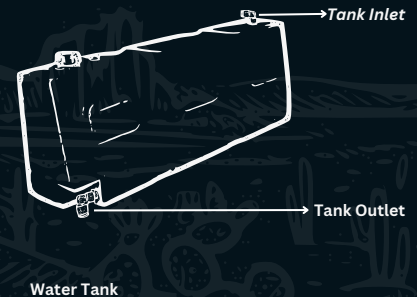
Once the preferred layout strategy is selected, the PU tube from the heat exchanger to the HOTBOX can be connected either through the vehicle cabinet or along the vehicle chassis where ever possible to hide it out of site and protect it. Make sure that water flows opposite direction of the radiator fluid direction.

4. Installation of the Onboard Water Tank

Once a suitable mounting position for the onboard water tank follows the recommended connection strategy,

5. Installation of the Shower Outlet Port

The shower outlet unit is recommended to be installed either at the front or back bumpers. This connection will serve as an outlet port for the hot water through the shower kit.



MANUAL SWITCH WIRE

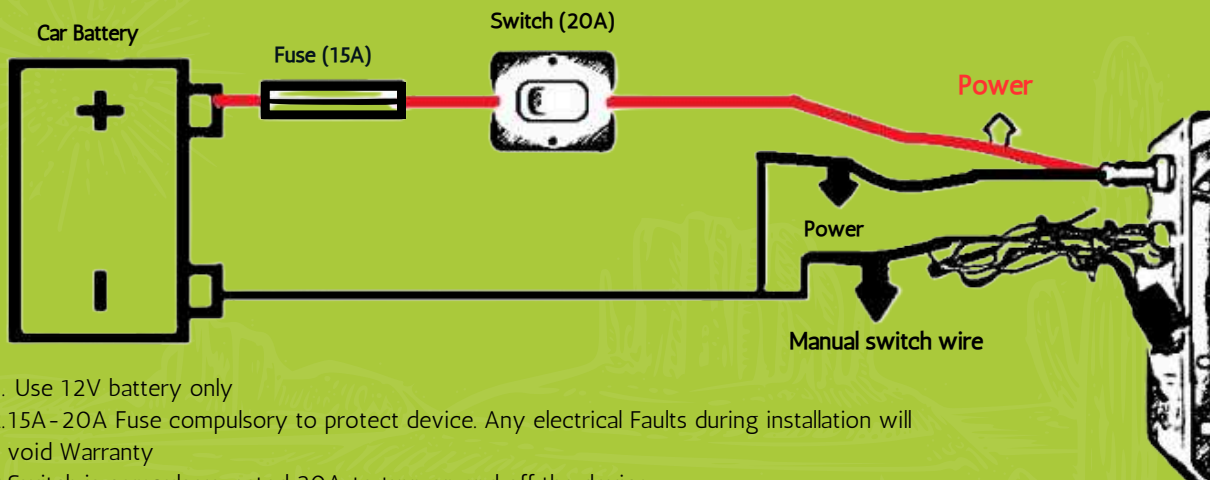
The Hotbox is designed to suit the power system of cars; you can either connect it to a car battery or a backup battery of at least 12V and no more than 15V. Before connecting the hotbox to the power supply, please do the wiring according to the below diagram.



Manual switch connection



Power Connection



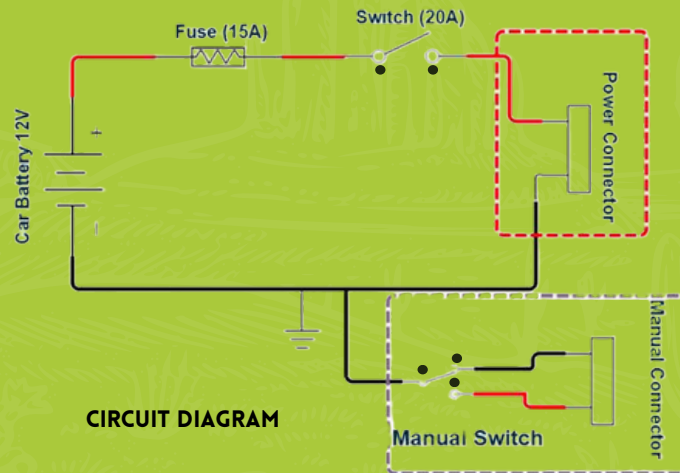
WIRING DIAGRAM

1. Use 12V battery only
2. 15A-20A Fuse compulsory to protect device. Any electrical Faults during installation will void Warranty
3. Switch is compulsory, rated 20A, to turn on and off the device.
4. Do not connect in reverse polarity; this will void warranty
5. Connect the manual switch wire to the must be connected to the same negative power source for the hotbox, whether it is the negative terminal of the battery or the nearest ground point in the car body.
6. Do not connect the manual switch wire to the positive terminal of
7. battery; this will void warranty.

CIRCUIT DIAGRAM

Manual Switch Connection Instructions

- Three-Position Switch Usage:
 - Use the switch to control Shower Mode and Heating Mode without the Hotbox mobile app.
 - The temperature in Heating Mode will default to the last setting used in the app.
- Ground Wire Connection:
 - The switch's middle wire (ground) must connect to the same negative power source as the Hotbox:
 - Either the negative terminal of the battery, or
 - The nearest ground point on the car body.
- Caution:
 - Do NOT connect the ground wire to the positive terminal.
 - Doing so will cause permanent damage to the device and void the warranty.



POST INSTALLATION TEST

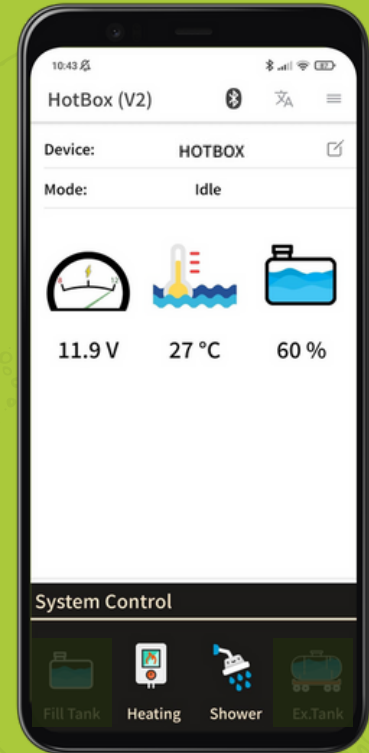
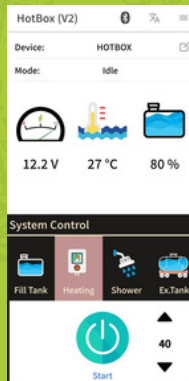
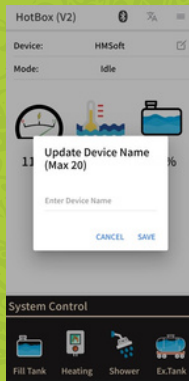
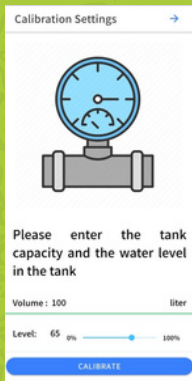
After you have completed the installation as per the given instructions, please perform the following tests before using the device:

1. Install the provided water tap at the Outlet and close it. Now you can plug in your garden hose at the Inlet and observe for any leaks. The objective of this step is to test the suction side of the device to make sure no air will leak during the operation of the device. If you observe any leak, please check the seals and tighten the connection.
2. Now turn the HotBox device ON and on the App (search the App Store/ Play Store for Aphcarios HotBox and pair your device) select the External tank position with the "exit" tap still closed and then check all the connections again. Make sure the filter is installed in the water inlet path and the arrow indicates the direction of the water course. This step aims to pressurize the device's discharge side to the maximum operating pressure. Please note that while the tap is closed, the water in the pipes will reach a certain pressure and then the device will automatically stop. If the device doesn't stop automatically after the tap is turned off, check all the device connections to find out where the leak is.
3. After fixing all the leaks go to the tank calibration and set up the size of the tank (in case you have an onboard tank).
4. Start the engine and monitor any leakage of radiator fluid (with attention to making up for the amount of radiator fluid lost during the installation process).

HOTBOX MOBILE APP

Features:

- You can control the 2 modes of the hotbox MINI_S: **Heating & Shower**.
- You can monitor the temperature of your water tank, battery level, and water level from your app.
- You can calibrate your Onboard tank capacity from settings so that you can monitor the water level inside your tank.
- You can control the temperature you would like the hotbox to heat. *(For safety purposes, the hotbox is limited to 60°C).*
- The standard Bluetooth name is "MINI_S". To change the device name follow these steps:
 1. Click on the "✎" button on the App
 2. Enter the new name and Confirm
 3. Turn OFF the power of the HotBox
 4. Turn ON the power of the HotBox
- The app supports two languages: English, and Arabic.



TROUBLESHOOTING

ISSUE	FIX
Not able to install the software	Update your smartphone's operating system.
Not able to connect to the Hotbox via Bluetooth	Make sure the system is powered - check the fuse - check if you can see the Hotbox on the device Bluetooth list - restart the device - make sure that the App is authorized to use the Location function
The device is connected, but some of the modes are not fonctionning.	Check the water tank level. You'll not be able to fill the tank if the system already showing 100%. In addition, The system will not pump water if the tank level is zero. In heating mode make sure the set temperature is higher than the actual temperature
System is making sound but not pumping	Check the water source, it should not be more than 2m vertically from the Hotbox level - Check if there is no leak in the suction line that allows air to be sucked in - check the air vent line on the tank is open.
Water is not getting heated	Make sure the car engine is running - make sure there is no air trapped in the radiator coolant system - make sure your vehicle still has the factory thermostat installed and is working properly <i>(The system will not work efficiently in cars that have this part removed)</i> - in some car models you might need to turn on the heater inside the car (e.g. Nissan Patrol) for the heater circuit to open.
PU Tubing connection is leaking	Make sure PU tubing is fully pushed in - make sure the end of the tubing is not scratched and is cut vertically. If not recut it - make sure the PU Tubing inserted without too much bending.

ABOUT APHCARIOS

Aphcarios Engineering Solutions was founded with the motto "Innovate For A Better Tomorrow". We take our innovative electro-mechanical product ideas through the development process, starting from concept all the way to production. We leverage our personal experience and passion to produce unique and patent-registered products.



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HELP & SUPPORT

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USEFUL LINKS



SAFE DISPOSAL OF PRODUCT

- This symbol means that electrical products shall not be disposed with normal household waste.
- Please follow your country's rule for the separate collection of electrical products





APHCARIOS

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