

USER MANUAL

TREKHY / PRAGMA H-01

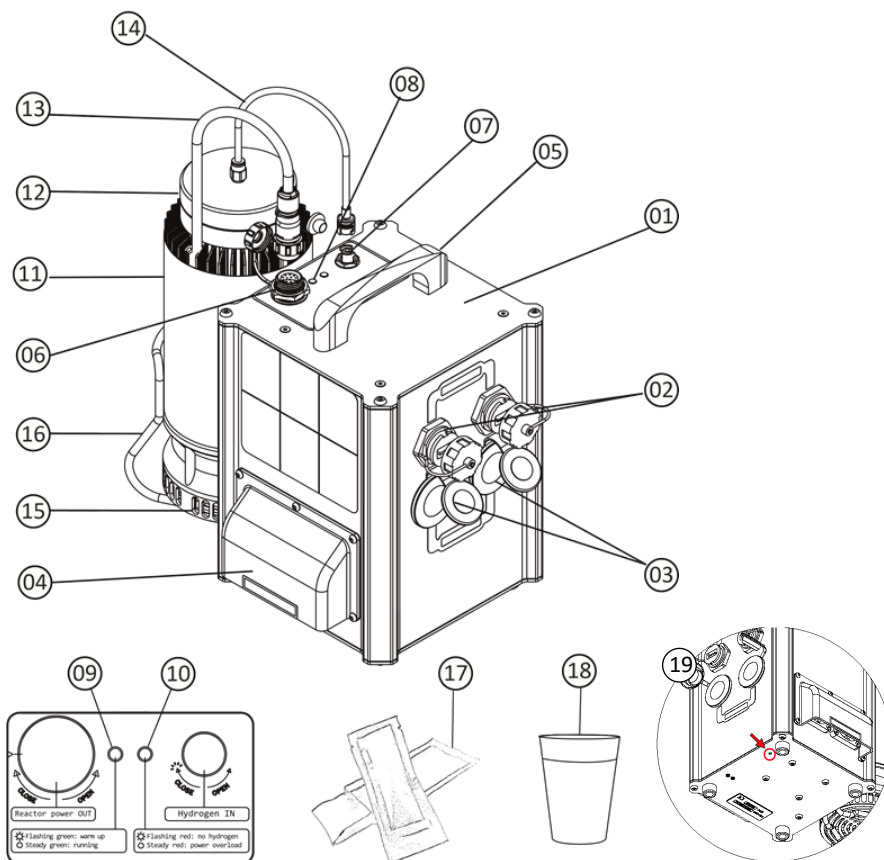


FUEL CELL ELECTRIC GENERATOR



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01	Electric generator
02	USB plug 5V x2
03	Cigarette lighter sockets 12V x2
04	Air inlet / outlet
05	Grip handle
06	Reactor fan female socket
07	Hydrogen female connector
08	LED indicators
09	Green LED indicator
10	Red LED indicator

11	Hydrogen reactor
12	Reactor cap
13	Reactor fan male plug
14	Hydrogen male connector
15	Reactor fan
16	Reactor holder
17	Reactant bag (white color)
18	Water measuring glass
19	Purge port



Read the instructions carefully before use and keep them in safe place for future reference.

Contents of the box

- Fuel cell electric generator
- Hydrogen production reactor
- Connection pipe between the reactor and the generator
- Water measuring glass
- USB charging cable
- Quick Start Guide

Apparatus function

This apparatus is intended for the power supply of small electronic equipment or for recharging batteries through USB 5V or 12V "cigarette lighter" sockets. This product is designed for indoor or outdoor use within the limits of its specifications.

Technical data

Dimensions	7.5x10.4x10.5 inches (W.D.H) 190x264x267mm (W.D.H)
Weight	8.16 Lbs / 3.7kg
USB power sockets x2	USB-A 5V – 2,4 Amp
Cigarette lighter sockets x2	ISO4165 12V – 2,5 Amp
Operating temperature range	+32°F...+113°F / 0°C...+45°C
Guaranteed continuous electric power*	30 Watts
Peak electrical power	60 Watts during 1 seconds
Operating time of one bag*	1 hour
Reactor water volume	7.77 oz / 230mL
Reactor initial water temperature	+34°F...+113°F / +1°C...+45°C

* In operation, the available electrical power may vary between 30W and 45W.

Safety instructions

Before using this device, please read this user manual carefully and keep it for future use.

If you pass this device on to someone else, also pass this manual to them.

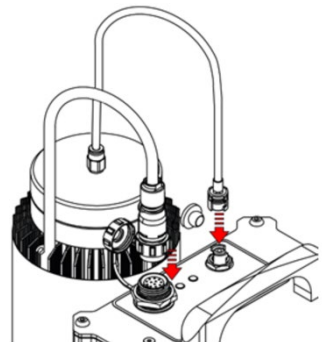
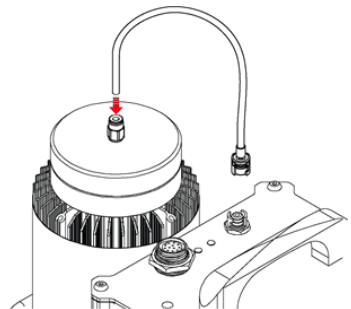
- Use this device as described in this manual. Any mishandling and any contrary use to these instructions will in no way engage the responsibility of the manufacturer.
- There is a risk of injury from improper use.
- Failure to follow the safety and operating instructions may cause electric shock, fire and / or injury to persons.
- Use only parts / spares recommended by the manufacturer; other parts / spares can damage the device and / or cause injury.
- This device may be used by children 12 years of age or older, provided they are supervised or have been instructed in the safe use of the device and that they understand the dangers involved. Cleaning and maintenance shall not be made by children unless they are over 12 years of age and under adult supervision.
- This device may be used by persons with reduced/challenged physical, sensory or mental capacities or whose experience or knowledge is insufficient, provided that they are supervised or have received instructions on how to use the device safely and understand the potential dangers.
- Children should not use the device as a toy.
- Keep the device and its accessories out of the reach of children under 12 years old.
- Install the device in a stable place / space.
- This device may cause water to splash or spill. Use this device on a water-resistant surface.
- Install this device in an upright position. Do not use the device if its orientation exceeds an angle of 10 degrees from the vertical position.
- Chemical reaction with the reactant bag produces hydrogen, which is a flammable gas. All handling of reactant bag and system should be performed away from potential sources of ignition and with all necessary precautions. Do not install the device near sources of naked flames, such as lighted candles.
- Do not install the device:
 - Near radiant heat devices (e.g. electric heaters)
 - Near or on other equipment that produces a lot of heat
 - In places subject to constant vibrations

- In places subject to bad weather that could allow foreign bodies (dust, sand, water, etc.) to enter through the vents and openings of the device
- Directly on soft ground (sand, snow) which could block the ventilation of the device.
- The device is designed to withstand water projections directed downwards, up to an angle of 45 degrees from vertical. Do not expose the device to an immediate environment exceeding these conditions of use.
- Do not immerse the device in water or any other liquid.
- Keep a minimum distance of 4 inches around the device for sufficient ventilation.
- Before use, check that the device and its accessories (in particular cables and connecting elements) are not damaged. In the case of damage, do not use the device and contact your dealer for any inspection or repair.
- Never intentionally open a reactant bag. The internal powder reacts in the presence of water and the direct contact of the powder with water produces significant heat. In the case of a torn and unused reactant bag, set it aside in a dry, heat-resistant place. Never use a torn reactant bag with the device. Avoid powder ingestion and direct unprotected contact.
- Do not disassemble the device yourself. All disassembly, repair and verification must be carried out exclusively by a trained / qualified person. Always check before use whether the tank is filled to appropriate level with water.
- If the device is used with an inadequate water level, it may damage the device and render it unusable.
- The reaction to produce hydrogen also produces heat. The heating of the reactor is normal. The peak of heat is produced during the first 60 minutes of the reaction. Do not open the reactor within 60 minutes of starting the production hydrogen reaction. Wait for the reactor to cool before opening it.
- During use, some parts of the device may be hot. Do not touch the top of the hydrogen reactor.
- The water in the reactor may be hot after use. Take the necessary precautions when draining the reactor to avoid physical contact with hot water.
- The surfaces of the hydrogen reactor may be subjected to residual heat after use, until the device has completely cooled.
- Do not clean the device with cleaners, metal sponges or other abrasive materials.
- Do not clean the device with products containing solvents.
- This device is designed to be used exclusively with the white reactant bags intended for its use. The reactant bags are for single use.
- Keep these instructions.

STARTING PROCEDURE

Step 1 - Connections

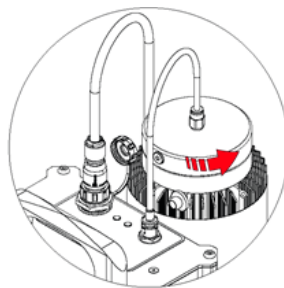
1. Remove the white and blue plugs which respectively protect the generator hydrogen supply socket (7) and the reactor fan power supply socket (6).
 - Pull on the white cap to extract it.
 - Unscrew the blue cap turning counterclockwise
2. Connect the hydrogen supply pipe (14) to the fitting in the center of the reactor cover (12). The hose is connected by pushing it into its fitting until it stops. To disconnect, push the ring of the fitting back while pulling gently on the pipe.
3. Connect the hydrogen supply pipe (14) to the female connector of the generator (7). The connection is of the "bayonet" type socket. It is inserted vertically then locks by turning clockwise until it stops.
4. Connect the reactor fan power cable (13) to the generator socket (6). The socket is fitted with a positioning pin. Do not force the socket. This should fit easily into its counterpart when the pin is correctly aligned.



Step 2 - Preparation of the hydrogen reaction

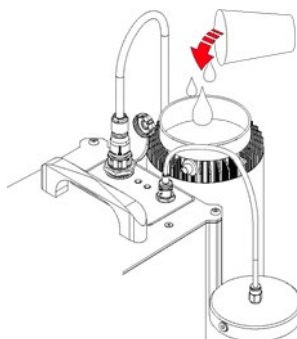
1. Unscrew the reactor cap (12) by turning it counterclockwise.

! Note: make sure that all connections (electrical and gas) between the generator and the reactor cap are done before the filling procedure.



2. Fill the measuring cup (18) with water up to the upper mark. Pour the water into the reactor (11)

! Note: the recommended amount of water is 7.77 oz. The measuring cup is calibrated for this exact volume. The volume of water in the reactor must be between the two lower and upper visible marks on the internal face of the reactor. In no circumstances should the volume of water exceed the upper mark, which would cause water flowing into the fuel cell.



Note: it is recommended that the initial water temperature is not higher than 95°F (35°C) to avoid a too rapid chemical reaction, favoring water splashes.

3. Open the vacuum foil packaging of the reactant bag (17), without using any sharp object (ie. scissors). The vacuum wrap is designed to be hand torn at the side notch.

! Note: In the event a reactant bag is damaged or torn opened when opening its vacuum-packed packaging, do not use it. Set aside in a dry place, avoiding contact with water. Using a damaged reactant bag could cause an uncontrolled hydrogen production reaction with high heat production.

4. Insert vertically the reactant bag into the reactor (11). The hydrogen production starts at contact

with water. The start-up time depends on the water temperature. The higher is the water temperature, the faster the reaction starts. Upon water temperature, typical start-up times are:

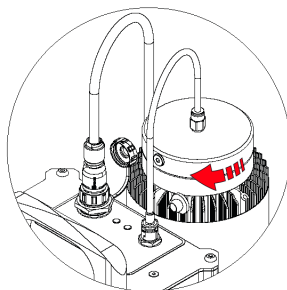
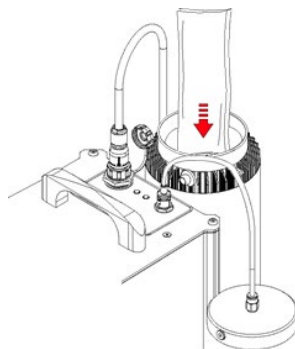
- at 34°F (1°C), 90 seconds
- at 41°F (5°C), 60 seconds
- at 68°F (20°C), 23 seconds
- at 95°F (35°C), 8 seconds
- at 113°F (45°C), 7 seconds

5. Close the reactor cap (12) by rotating it clockwise until it stops (fingers tied). Close the reactor cap immediately after putting the reactant bag, before the reaction starts, to avoid water splashes.

Note: it is preferable to close the reactor quickly after putting the water and the bag inside. During the first seconds of the reaction between the water and the bag, the bag inflates accompanied by significant venting. This phenomenon is normal. This can cause water to splash outside the reactor if it is not closed by its cap. Therefore, it is recommended to have the necessary equipment available to wipe up any water spills. A spill or projection of water from the system is not dangerous and does not interfere with the normal operation of the product.

Note: in rare cases, a bag may inflate more suddenly than normal on contact with water, promoting initial overflow of water from the reactor. This does not disturb the operation of the product, and it is then recommended to quickly close the reactor with its cap.

Note: the reactor cap is fitted with an internal valve which allows the pressure in the system to be limited by discharging the hydrogen produced in excess. This hydrogen is evacuated through the circular slit visible on the cap. It is possible that water will also spill through this slit. This is normal and does not interfere with the proper functioning of the product. The valve, when opening suddenly, may make a clicking noise. This phenomenon is normal.



Step 3 - Getting started

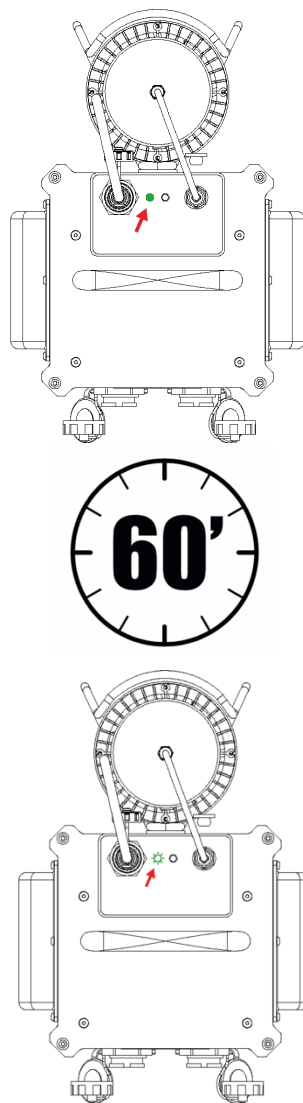
1. The red and green LED indicators light up simultaneously for 2 seconds to indicate proper operation.

2. The green LED indicator (9) flashes: the system is starting up, the USB (2) and cigarette lighter (3) electrical outlets are not yet active.

3. After a period of approximately 60 seconds, the green LED indicator will remain continuously on: the electric generator is operational and the USB and cigarette lighter sockets are active and can be used.

Note: The electric generator starts automatically the moment hydrogen begins to feed the internal fuel cell.

Note: the duration of the start-up phase is approximately 60 seconds. This period may vary depending on parameters such as the outside temperature, the quality of the water, the length of storage of the equipment. It is normal to observe a start-up phase that is slightly less or greater than 60 seconds.



Step 4 - Operation

1. The electrical outlets (2) and (3) are located on the front of the electric generator (1).

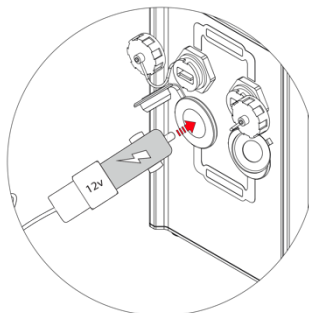
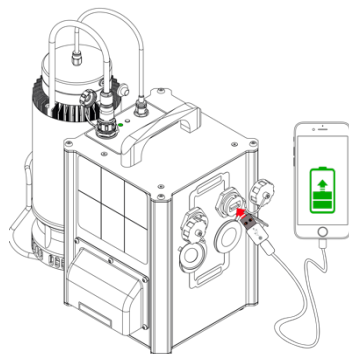
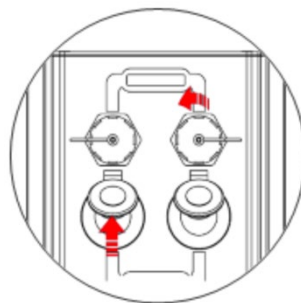
2. The USB sockets (2) are accessible by unscrewing their plugs covers. They are USB-A type and provide a maximum current of 2.4 amps at an electrical voltage of 5 volts.

3. The cigarette lighter sockets (3) are accessible by pulling on their plugs covers. They are ISO4165 type and provide a maximum current of 2.5 amps at an electrical voltage of 12 volts.

Note: The product does not have an on / off switch. Its operation is controlled by the production of hydrogen in the reactor. Once the hydrogen production reaction has started, it cannot be stopped until all the reactant bag is consumed.

4- In the event of electrical over-consumption (electrical power demanded exceeding the production of hydrogen in the reactor), the generator cuts the USB or cigarette lighter electrical outputs according to the power measured on the sockets and the red LED indicator lights up continuously. It is necessary to disconnect the equipment causing over-consumption in order for the generator to continue to operate.

Note: Reactant bags are designed to produce consistence hydrogen for one hour. At the start of the chemical reaction, the production of hydrogen is high enough to reach an electrical power of 45W for a few minutes. The reaction then stabilizes, corresponding to an available electric power of 30 Watts for 60 minutes. From approximately 60 minutes after the start of the reaction, the hydrogen production will gradually decrease, and the available electric power will become less than 30W. The electric power will decrease in proportion to the production of hydrogen. Hydrogen production will stop completely after approximately 100 minutes.



Note: A purge sound is heard periodically. This is part of the normal operation of the device. Likewise, a little water could appear at the base of the device, at the level of the purge orifice (19). This phenomenon is normal.



Note: the device must always be used in an upright position and placed on a stable surface. Never use the device at an angle beyond 10 degrees from vertical.



Note: never close the air inlet and outlet vents (4), nor the fan vents (15), nor the purge port (19) while the device is in operation. This could cause the fuel cell and / or the hydrogen reactor to overheat, causing the device to malfunction.



Note: the chemical reaction between the reactant bag and water produces heat and hydrogen. Do not open the hydrogen reactor cap within the first 60 minutes of the hydrogen reaction to avoid any risk of burns. During this time, the generator shall remain connected to the reactor for temperature control.

Step 5 - System shutdown

1. At the end of the chemical reaction, the production of hydrogen is no longer sufficient to maintain the nominal electric power.

2. The red LED indicator lights up flashing to indicate the end of the chemical reaction of the reactant bag in the reactor.

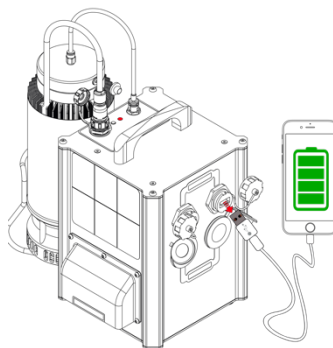
3. The USB and cigarette lighter electrical outlets are automatically deactivated by the electric generator.

4. Once the electrical outlets are disconnected, the reactor's fan and internal electric generator's fans may continue to operate to manage the system's temperature. This is part of the normal operation of the device.

5. The generator can be restarted immediately by replacing the used reactant bag with a new one. Check water level and refill if necessary, without exceeding the top mark.

Note: The volume of the reactant bags increases in the reactor during hydrogen production. This phenomenon is normal. It is possible that a reactant bag will tear inside the reactor. This does not impact the operation of the device. Once the reaction is completed, it is safe to handle the reactant bag because the powder, when used, is inert. The reactant bag will then be disposed normally.

POWER OFF 



Step 6 - Draining the reactor

1. Disconnect the electrical plug (13) and the hydrogen pipe (14) from the reactor.
2. Open the reactor cap (12) by turning it counter-clockwise.

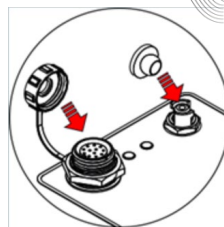
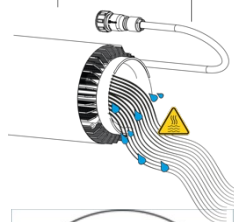
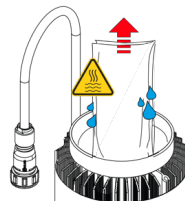
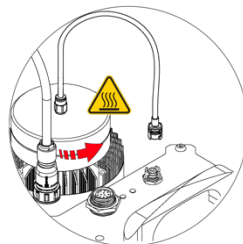
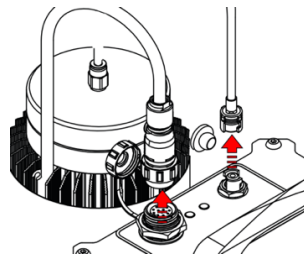
Note: the reactor seal is made up of two parts (lower and upper) which must not be separated under any circumstances. To open the cap, grasp the entire cap to its full height. It must be unscrewed a quarter of a turn without requiring excessive strength.

! Note: The reactor cap may be hot after use. Act cautiously.

3. Drain the reactor: remove the reactant bag first by grasping it by its upper end. Then drain the water from the reactor. It is possible to remove the reactor from its holder to facilitate the emptying operation.

! Note: the water and the reactant bag contained in the reactor may be hot. Take the necessary precautions when emptying the reactor to avoid any risk of burns.

4. For better device protection / maintenance, put back the protective covers over the sockets (6) and (7). If the cover of the socket (7) is missing, it is advised to leave the hydrogen supply pipe connected even when the device is not in use, in order to prevent particles from entering the gas circuit's supply to the fuel cell.



Care and maintenance

The device does not require special maintenance. Following the recommended use and storage procedures in this manual is the most reliable method to ensure the best longevity of your device.

Note: Do not use liquids containing solvents, soap or surfactants to clean the reactor (11) and generator (1). Do not use hard or abrasive surfaces to clean the device.

The reactor does not require specific cleaning during its entire service life. Rinsing the internal part of the reactor and the cap with clean water every two or three cycles of use is sufficient.

During normal use, a deposit of white matter may gradually appear on the internal surface of the reactor. This is a normal phenomenon and it is not necessary to remove this deposit to maintain the performance of the product. If you, however, wish to remove this deposit, use a non-abrasive plastic object (brush, spatula, etc.) without pressing strongly on the internal surface in order to not damage the protective coating of the internal face of the reactor.

If the reactor seal O-ring shows signs of contamination, remove it to clean it with clean water, then replace it.

Note: do not use a compressed air device to clean the generator vents (4). Doing so may damage the internal fuel cell.

Store the device away from humidity and dust, at a temperature between 32 °F (0°C) and 113 °F (45°C). Store the device in the protective plastic bag in which it was delivered, the bag must be closed. This will ensure the best longevity for your device.

Problems shooting / solving

In the event of a device malfunction, contact your dealer for an inspection indicating the serial number of the device. The serial number is located on the underside of the electric generator.

TROUBLE SHOOTING

Problem	Cause/action
LED indicator lights do not light up	<ul style="list-style-type: none"> → Check that the reactor cap is correctly closed. → Check that the hydrogen production reaction has started (the reactor should be getting hot).
Red LED indicator flashes	<ul style="list-style-type: none"> → End of hydrogen reaction production. The hydrogen flow is insufficient. Replace the reactant bag. → Check the correct connection of the pipe (14) between the reactor and the generator. → Reduce the power consumption by unplugging one or more devices from the apparatus. → Check that the reactor cap is correctly closed.
Red LED indicator lights up	<ul style="list-style-type: none"> → Short circuit or excessive power load on one of the power outlets. Disconnect devices plugged to the apparatus one by one until the red LED indicator turns of. → Power over consumption. Unplug one or more devices from the apparatus.
Green LED indicator light flashes for excessive length of time	<ul style="list-style-type: none"> → The duration of the start-up phase depends on the conditions of use of the device, in particular if it has been stored unused for an extended period of time. In this case, the start-up phase can take up to 3 minutes. → If the green light continues to flash beyond 3 minutes, check that the reaction hydrogen production has started (the reactor must become hot) and change the reactant bag or the water if necessary.

Disposal

Used reactant bags can be disposed of with household cleaning products.

Electrical products should not be disposed of with household products. According to European Directive 2012/19 / EU for the disposal of electrical and electronic equipment and its implementation in national law, used electrical products must be collected separately and disposed of in collection points provided for this purpose. Contact your local authorities or your dealer for advice on recycling.

Product made in France by Pragma Industries
40 rue Chapelet 64200 Biarritz
www.pragma-industries.com