2. The LED status indicator light does not turn red after the HYDROSTIK is connected to the HYDROFILL.

SOLUTION A: Disconnect the HYDROSTIK and re-connect it again slowly. Make sure the connection is smooth and the HYDROSTIK is fully inserted into the thread.

SOLUTION B: Check that the water level in the tanks are correct (see operating instructions)

SOLUTION C: Remove and re-connect the AC-DC adapter.

3. The cartridge has been charging for more than 6 hours, but the LED light is still red.

SOLUTION A: Disconnect the cartridge and re-connect it tightly and correctly.
SOLUTION B: Disconnect the cartridge and connect it to a fuel cell product to confirm there is hydrogen in the cartridge.

**One way to check the volume of hydrogen inside a cartridge, is to weigh the HYDROSTIK before and after filling it using a precision scale. The weight difference between a full and an empty HYDROSTIK is around 0.9 grams.*

4. The LED light alternates between red for 1 second and off for 3 seconds.

SOLUTION: Try to add 40°C to 70°C water into the water tank.

5. The LED light alternates between red for 1 second and off for 1 second.

SOLUTION: Check the water level of the water tank and waste water tank is correct. Either add water to the water tank or remove water from the waste water tank as required.

6. The LED light turns green (the cartridge has been charging for 6 hours), but no or little hydrogen is filled.

SOLUTION A: Check the HYDROSTIK to ensure it is connected tightly.

SOLUTION B: Check the water temperature (see 4. SOLUTION A)

If you are still experiencing problems, please contact support@horizonfuelcell.com for help.

FREQUENTLY ASKED QUESTIONS

Q: How is hydrogen stored?

A: Hydrogen is stored in small cartridges (HYDROSTIK) at low pressure. When refueling, hydrogen gas is sent into the cartridge at high pressure, and adsorbed onto the surface area of a special metal alloy which is contained inside the cartridges, thus becoming a solid (hydride). When connected to the fuel cell, the HYDROSTIK cartridges slowly release hydrogen using a heat exchange process with the ambient temperature.

Q: How can I refill HYDROSTIK cartridges with hydrogen?

A: Add water into the unit's water tank, connect the AC-DC adapter and insert a HYDROSTIK cartridge. The HYDROFILL will split water into hydrogen and oxygen, sending hydrogen into the HYDROSTIK cartridge. It will take around 4 hours to fully fill a HYDROSTIK cartridge in normal conditions.

Q: What is the purity level of the hydrogen produced by the HYDROFILL?

A: The purity of the hydrogen produced by the HYDROFILL is 99%. The metal hydrides contained in the cartridge first adsorb hydrogen, then release it at a higher purity into the fuel cell.

Q: When do I need to add water to the water tank?

A: The status indicator light is flashing red for one-second intervals. Slowly and carefully fill de-ionized or distilled water into the water tank until water reaches the ridge level in the tank (for details please refer to the operation instructions).

Q: When should I empty the drainage tank?

A: When the waste tank is full, pour waste water out and refill the water tank.

Q: Should I empty the water tank after use?

A: Not necessarily. De-ionized or distilled water in the water tank can remain inside after use.

Horizon Fuel Cell Technologies

HYDROFILL®

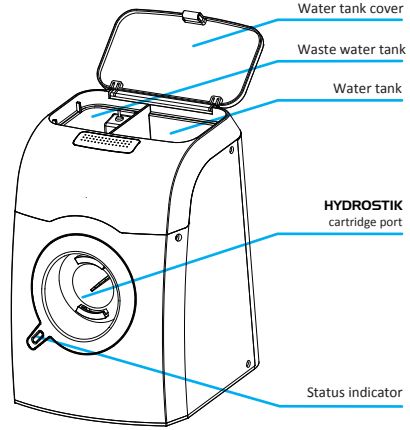
USER MANUAL

WARNING

- **Do not tamper with, or disassemble the HYDROFILL**
- **Keep HYDROFILL away from fire, open flame, or heat sources**
- **Keep HYDROSTIK cartridge away from fire, open flame, or heat sources**
- **Keep HYDROFILL away from children**
- **Keep HYDROFILL in upright position**
- **Add de-ionized or distilled water carefully to avoid over-filling the water tank**
- **Keep HYDROFILL in a ventilated location during operation**
- **Keep all electrical connections dry at all times**

SYSTEM OVERVIEW

The HYDROFILL system uses a proton exchange membrane (PEM) electrolyzer to recharge Horizon's HYDROSTIK metal hydride cartridges automatically.



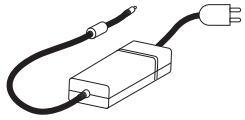
(a) HYDROFILL unit

SYSTEM FEATURES

- Quiet, safe and convenient hydrogen supply
- Compatible with HYDROSTIK cartridge only
- **HYDROSTIK is compatible for use only with approved Horizon products such as MINIPAK**
- High hydrogen purity 99%
- Optional DC solar or wind power supply
- Connects to AC power

INCLUDED IN THIS BOX

a. HYDROFILL unit
b. AC-DC adapter cord
c. User Manual



(b) AC-DC adapter

(c) User Manual

SPECIFICATIONS

Stack type	Proton exchange membrane electrolysis cell
Dimensions (W x D x H)	145 x 153 x 208 mm (5.7 x 6 x 8.2 in)
Weight	1.8Kg ±5% (3.97Lbs ±5%)
Rated power	≤23W
Input voltage	DC: 10V-19V
Water input	De-ionized or distilled water
Water temperature	10-40°C (50-104°F)
Water consumption	Approx. 20ml/hr (1.2in^3/hr)
Hydrogen output pressure	0-3.3 MPaG (0-478.62 PSI)
Hydrogen generation capacity	Up to 3L/hr (0-183 in^3/hr)
Purity	99% (designed for HYDROSTIK only)
Outlet specification	Designed for HYDROSTIK only
Refilling time for one HYDROSTIK	Around 4 hours (at 25C ambient temperature)

The specifications are subject to change without notice.

STATUS INDICATOR LIGHTS

Green	Red	System Status
on		HYDROSTIK cartridge is full
on 1 second, off 1 second		Waiting to fill HYDROSTIK cartridge
	on	HYDROSTIK cartridge is being filled
	on 1 second, off 1 seconds	Add water or empty waste water tank

OPERATION INSTRUCTIONS

1. Open the water tank cover located at the top of the unit (Fig. A). Carefully add de-ionized or distilled water** EXACTLY up to the ridge level inside the water tank as shown below in Fig. B. Close the cover.

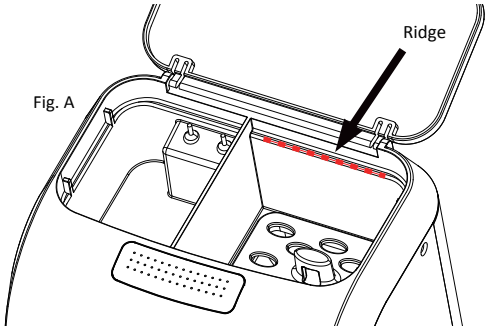


Fig. A

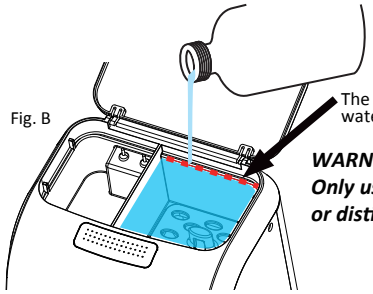


Fig. B

WARNING:
Only use de-ionized or distilled water.

2. Connect the AC-DC adapter to the unit (Fig. C).
Once plugged in to an AC point, the unit's status indicator light should start to flash green.

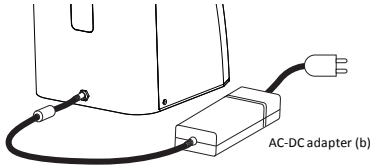


Fig. C

3. Fully insert the HYDROSTIK cartridge into the HYDROFILL unit by turning it clockwise into the cartridge port until firmly secured. During the insertion process, the green indicator light may turn red to indicate a connection (Fig D), but continue turning to make sure the HYDROSTIK is firmly secured (Fig E). Secure the HYDROSTIK tightly to the unit, but be careful not to apply excessive force.

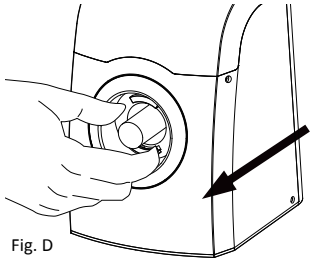


Fig. D

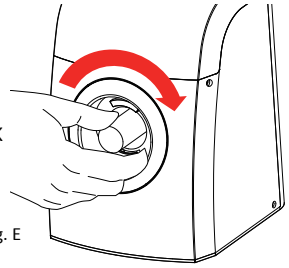


Fig. E

4. While the indicator light is RED, your HYDROSTIK cartridge is being filled with hydrogen. The HYDROSTIK cartridge is fully charged when the indicator lights GREEN. When completed, disconnect the HYDROSTIK cartridge from the HYDROFILL (turn anti-clockwise to disconnect).

Note: 1. It will be normal to hear short bursts or puffs during the refilling procedure, due to water being purged from the system from time to time.
2. It will be normal to hear the sound of air being released when the HYDROSTIK is disconnected from the HYDROFILL.

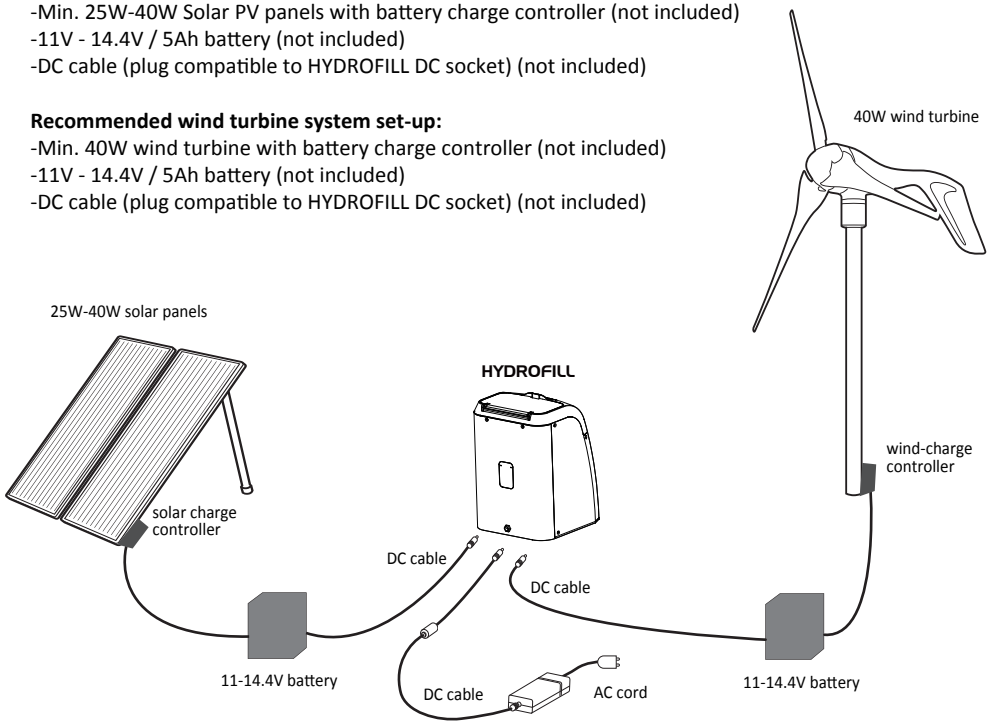
5. Disconnect the HYDROFILL from the AC and empty the water tank if you will not use the HYDROFILL for more than one week. If more cartridges need to be charged, repeat step 3.

SWITCHING FROM AC TO DC SOLAR OR WIND POWER OPTIONS

HYDROFILL can be powered by using the standard (included) AC to DC power cable (b), or can be connected to renewable power sources such as solar PV or small wind turbines. Both sources should include a battery buffer to regulate power supplied to the HYDROFILL.

Recommended Solar PV system set-up:
-Min. 25W-40W Solar PV panels with battery charge controller (not included)
-11V - 14.4V / 5Ah battery (not included)
-DC cable (plug compatible to HYDROFILL DC socket) (not included)

Recommended wind turbine system set-up:
-Min. 40W wind turbine with battery charge controller (not included)
-11V - 14.4V / 5Ah battery (not included)
-DC cable (plug compatible to HYDROFILL DC socket) (not included)



USEFUL INFORMATION / MAINTENANCE

- Only use **de-ionized or distilled water.**
- 4-6 hours of operation will normally be required to fully charge an empty HYDROSTIK.
- The HYDROFILL can still run and generate hydrogen even if the LED status indicator light alternates between red for 1 second and off for 3 seconds, but HYDROSTIK charging time will be slower.
- If the LED status indicator light alternates red for 1 second and off for 1 second, check the water level of the water tank and waste water tank. Either add water to the water tank or remove water from the waste water tank as required. Follow set up instructions carefully.

TROUBLESHOOTING

1. **The LED status indicator light does not flash green after the power supply cord is connected.**
   SOLUTION: Check the connection between the AC-DC adapter and the power supply.