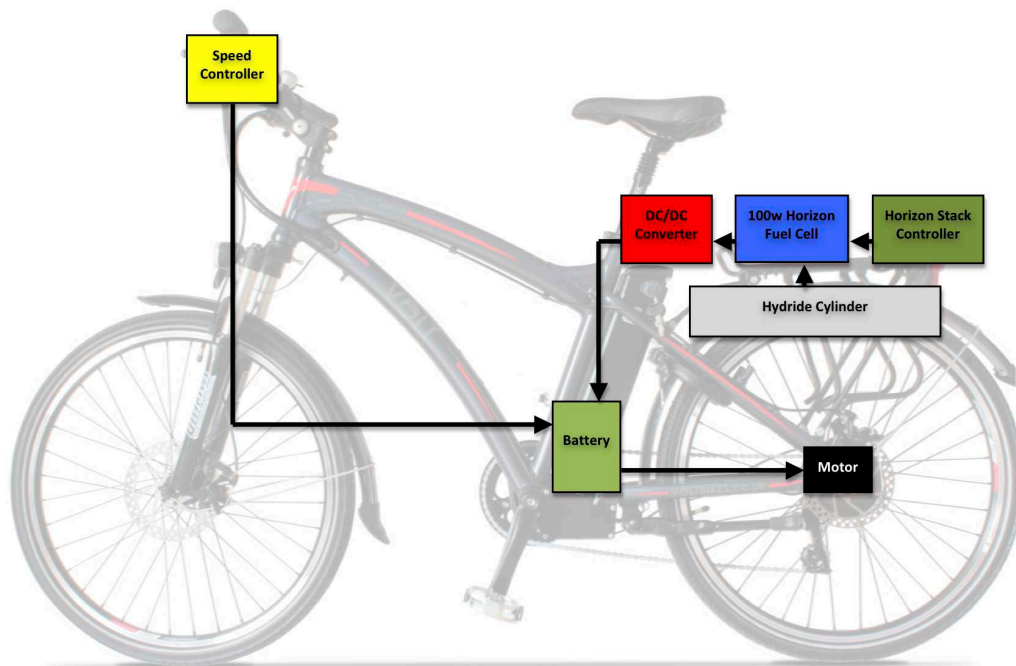


HMX HYDROGEN FUEL CELL ELECTRIC BIKE



The HMX Electric Bike Kit is a Plug-and-Play hydrogen fuel cell system designed to hybridise with existing electric bikes. The system acts as a range extender, increasing the runtime of any electric bike by providing an additional hydrogen fuel cell energy source.

The system comprises a fuel cell generator, hydrogen storage and control systems. It can be supplied with one or two hydrogen storage cylinders, depending on run-time requirements. For example, an electric bike which runs for only 2 hours on batteries alone, could run continuously for 7 hours with a single hydrogen cylinder and for up to 12 hours with two hydrogen cylinders. Most conventional bicycles can be converted into an electric bike using an off the shelf kit, for users exploring this route we recommend Heinzmann E-bike Systems - www.heinzmann.com



Overview:

- 100W PEM fuel cell
- Hydrogen stored in metal hydride canister(s)
- Hybrid power electronics
- 70 to 100W baseload (cruise) from fuel cell
- Peak power (acceleration) from battery
- Robust, secure, all weather case
- Available as retrofit kit or as ready-to-ride bike
- Available with Pedalec or throttle control

Technical Specifications:

Fuel Cell	Horizon H-100	
Rated power	100	W
Weight	0.95	kg

Hydrogen Storage	Horizon MH Series Metal Hydride Canister		
	MH-350	MH-500	
Capacity	350	500	NL ⁽¹⁾
Weight	3.1	3.1	kg
Refilling	Using Horizon MH charging adaptor connected to compressed H2 cylinder (20 bar)		
Canister refill time	1		hour
Canister exchange time (swap empty for full on bike)	30		seconds
Operating temperature	5-50		°C
Typical discharge rate	1.5		NL/min

Electrical system		
Weight	0.4	kg

Recommended electric bicycle kit	Heinzmann E-Bike/Pedelec Kit	
Operating mode	Throttle or Pedelec options available	
Battery and motor voltage	36	V ⁽²⁾
Battery type	Lithium ion ⁽³⁾	
Battery capacity	6	Ah
Battery recharge time	6	hours
Battery weight	2.3	kg
Motor weight	3.5	kg
Configuration	Front hub motor. Fuel cell system plus battery mounted on rear panier rack.	

Performance	MH-350	MH-500	
Electrical energy from battery only	216	216	Wh
Electrical energy from 1 x canister H2	517	738	Wh ⁽⁴⁾
Target average electrical power from fuel cell	70	70	W
Canister discharge rate at fuel cell target power	0.8	0.8	NL/min
System runtime battery only (no fuel cell), average 100W	2	2	hours
System runtime battery plus 1 canister H2, average 100W	7	9	hours

Notes:

1. NL = Normal Litres
2. Alternative 24V version also available
3. Battery is charged via the battery management system so other battery chemistries may be readily used
4. Assuming fuel cell efficiency of 50%
5. Specifications may change as component availability improves

HMX BIKE FAQ

Basics

Does it run on water?

No. Fuel cells do not run on water. Hydrogen fuel cells produce water as a waste-product. Hydrogen can be made from water by electrolysis, but this requires an external energy source.

Can I convert my existing un-powered or electric bike with your fuel cells?

Probably. You can buy an electric bike conversion kit to fit most bikes (see for example Heinzmann) and our fuel cell conversion kit is designed to work with most battery electric bikes.

Can I replace the batteries on my e-bike with a fuel cell?

Partly. Fuel cells are complimentary to batteries. With current technology, batteries are required in fuel cell vehicles to provide peak-power. The most straightforward approach to creating a fuel cell vehicle is to consider the fuel cell a range-extender, charging the batteries to increase the distance between recharging or eliminate the need to plugin altogether.

System Design

What size fuel cell do I need?

Generally we size the fuel cell to meet the average energy consumption for a vehicle in use and definitely not the peak power of the motor. For example if your bike has a 300W motor, but only draws 50W when cruising, a 70W fuel cell may well be appropriate.

Stacks and Components

Can you supply me with fuel cell stacks only?

Visit www.horizonfuelcell.com/stacks.htm

Can you supply me with batteries, capacitors, hydrogen tanks?

We can supply metal hydride cylinders and stacks, but do not presently supply bicycle conversion kits or components.

Complete Bikes

Can you supply me with a complete bicycle?

Yes, we can supply just the fuel cell conversion kit or a complete roadworthy bike.

HMX Bike Distribution

Can I buy HMX in my country?

Yes, we can supply systems anywhere in the world and have Horizon Fuel Cell representatives in many countries

Can I become a distributor of HMX?

If you have an existing bicycle/e-vehicle distribution base please get in touch to discuss

Hydrogen Storage and Supply

How is hydrogen stored? Is it safe?

Hydrogen is supplied at low pressure in a metal hydride cylinder.

How do I recharge my bike

The metal hydride cylinder must be charged with clean hydrogen at approximately 28bar. This must be done by a suitably qualified technician, probably using an industrial hydrogen cylinder.

Do you have a home refueller?

We are working on developing one, but for the moment we do not so the bike cannot presently be used without professional support.

Development & Customisation

Who developed the HMX bike?

The first HMX bike was developed by Horizon HQ engineers. The new model HMX has been developed by Horizon UK in partnership with Arcola Energy.

Can you provide a customised solution for converting my bike/delivery vehicle?

We are working with a number of clients to develop turn-key customised solutions.

Can you provide ongoing service and support?

We are providing ongoing customisation and support services for several clients and will expand this offering as the market develops.

Further Information

Technical information visit: www.horizonfuelcell.com/mobility.htm

Share your ideas and questions at www.arcolaenergy.com/forum/

For customization enquiries contact development@arcolaenergy.com

