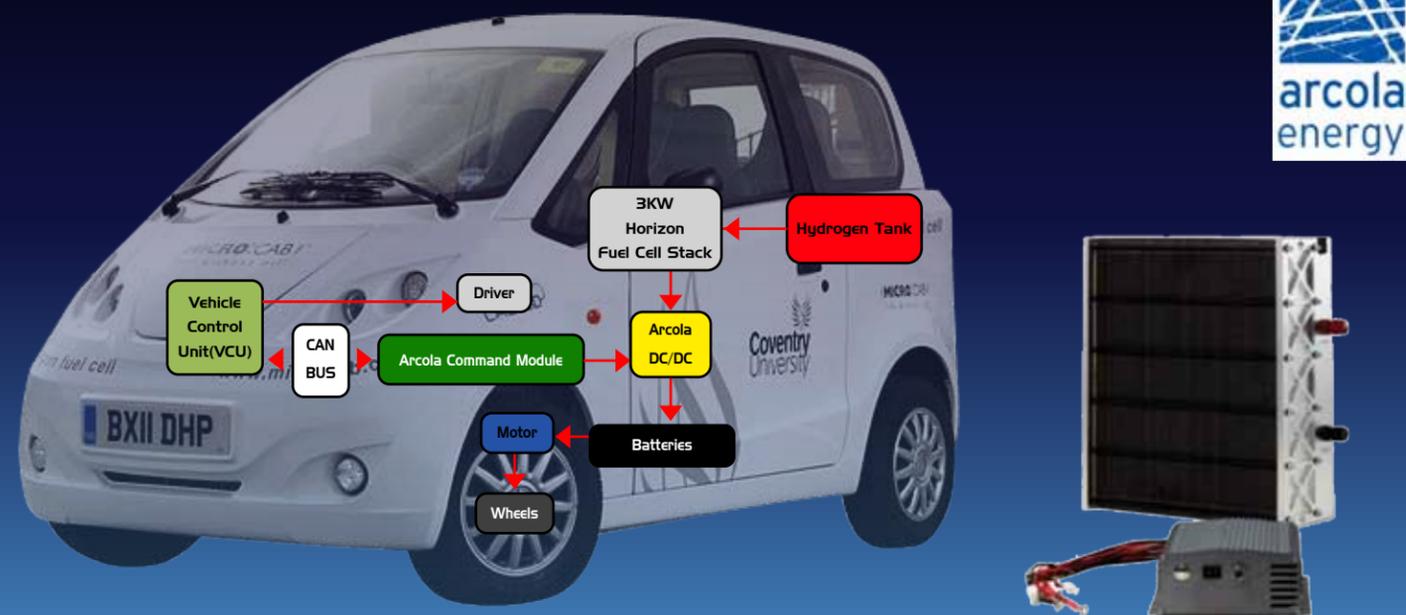


**AUTOPAK**



AUTOPAK is a turnkey automotive hydrogen fuel cell solution using Horizon Fuel Cell's high-performance / low-cost Next Generation H-Series stacks.

AUTOPAK 3kW modules can be supplied individually or combined in parallel configuration to provide higher output power. The system is designed to be used in a 'baseload' or range-extender configuration for high efficiency lightweight electric vehicles in which peak loads are supplied by batteries or super-capacitors.

AUTOPAK makes vehicle integration as straightforward as possible even for companies with little or no fuel cell experience. A robust control strategy and monitoring system protects the fuel cell stack whilst a supportive technical / development team based in London can assist with specific integration requirements.

**Features:**

- 'Next-generation' PEM fuel cell stacks with UK-manufactured Johnson Matthey MEA for improved lifetime and power density.
- Arcola Command Module: smart management of the fuel cell reduces unnecessary start-stop cycles and zero-load idling to minimise stack degradation.
- Nitrogen purge option extends stack lifetime by eliminating degradation mechanism reactants before and after every operation.
- 93% efficient DC-DC converter.
- Output voltage (for vehicle-drive and battery / ultracapacitor charge) adjustable between 70-100V.
- Cold-start preheating enables use in temperatures as low as -5 °C.
- Comprehensive data-logging&remote monitoring (via GSM) provide diagnostics to assist vehicle integrators' design decisions.
- Integration support and after-sales service options available from Arcola Energy Limited.
- Cost-effective customised solutions available on request to meet specific power requirements.



**Technical Specifications:**

Fuel Cell Stack	Horizon H-3000	
Rated power	3	kW
Efficiency	58	%
Hydrogen consumption	39	NI / min <sup>(1)</sup>
Efficiency (Watt hours per gram of H2)	14.4	Wh / g H2
Hydrogen purity (minimum)	99.999	%
Dimensions	431*353*183	mm
Weight	15	kg

Power Electronics (DC-DC stack converter)	Arcola DCDC	
Adjustable output voltage ranges	70-100	V
Maximum output current (adjustable)	50	A
Voltage regulation (peak to peak ripple)	100	mV
Output ripple frequency	40	KHz
Dimensions	300*200*150	mm
Weight	4	kg
Load-sharing capability allows parallel operation of multiple systems to increase power output. Output power interrupted		

Control Electronics	Stack Controller / Command Module	
Communication with Vehicle Control Unit (control & status reporting)	CAN bus	
Data logger	SD Card	
Required power supply (also powers fuel cell cooling fans)	13V(±1V), 10A	
Control of DC-DC converter output	Demand or Command led	
Remote monitoring	Optional via GSM / 3G	
Dimensions	300*200*200	mm
Weight	1.5	kg

Operation		
Operating temperature range	-5 to +35	° C
Can be used with vehicle drive battery up to maximum voltage	100	V

Performance		
Expected lifetime	3600	hours
Expected start - stop cycles	2500	cycles

Hydrogen Storage Options	Quantum Type IV H2 Tank	
High pressure (350 bar) lightweight tank 34 litre capacity	1.32	kg usable H2
High pressure (350 bar) lightweight tank 40 litre capacity	1.55	kg usable H2

n.b. Preliminary data based on tests during development. Figures subject to change upon final specification.