H-Series Fuel Cell Stacks

Horizon Educational

Open-cathode PEM fuel cells

- BETTER FUEL EFFICIENCY
- HIGHER RELIABILITY
- VERY EASY TO SET UP
- EVEN SMALLER AND LIGHTER THAN BEFORE!

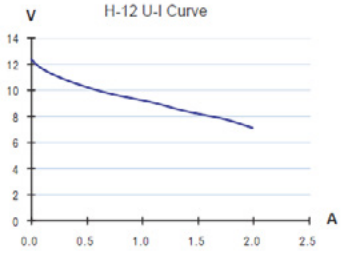
H-Series Fuel Cell Stacks

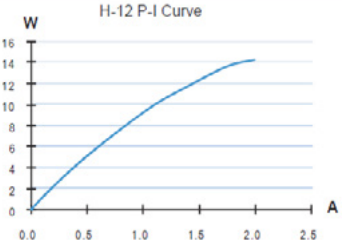
H-12 12W

FCS-B12

Semi-integrated 12W fuel cell system

INCLUDES
- Integrated fan and casing
- 12W stack iwth blower





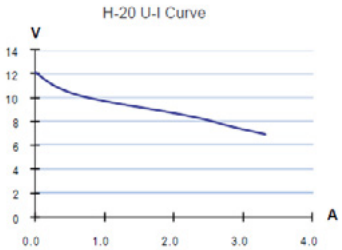
Type of fuel cell	PEM
Number of cells	13
Rated power	12W
Rated performance	7.8V at 1.5A
Purging valve voltage	6V
Blower voltage	5V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	55°C (131°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	275g (±30g)
Stack size	75x47x70mm
Flow rate at max output	0.18L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at full power

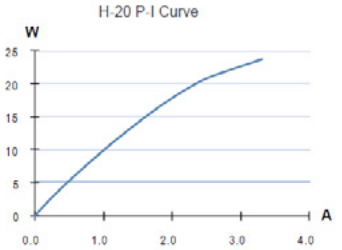
H-20 20W

FCS-B20

Semi-integrated 20W fuel cell system

INCLUDES
- Miniature electronic valve
- Control electronics
- Integrated fan and casing
- Low voltage protection
- 20W stack with blower





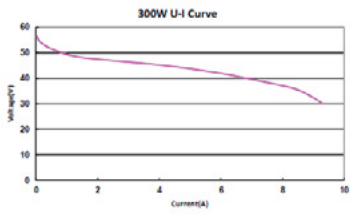
Type of fuel cell	PEM
Number of cells	13
Rated power	20W
Rated performance	7.8V at 2.6A
Purging valve voltage	6V
Blower voltage	5V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	55°C (131°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	275g (±30g)
Controller weight	90g (±10g)
Stack size	75x47x70mm
Flow rate at max output	0.28L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at full power

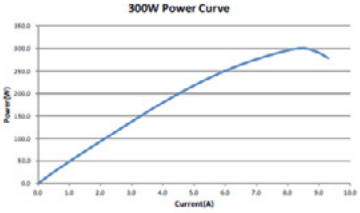
H-30 30W

FCS-B30

Semi-integrated 30W fuel cell system

INCLUDES
- Miniature electronic valve
- Control electronics
- Integrated fan and casing
- Low voltage protection
- 30W stack with blower



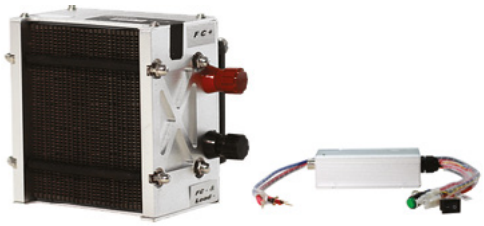


Type of fuel cell	PEM
Number of cells	14
Rated power	30W
Rated performance	8.4V at 3.6A
Purging valve voltage	6V
Blower voltage	5V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	55°C (131°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	280g (±30g)
Controller weight	90g (±10g)
Stack size	80x47x75mm
Flow rate at max output	0.42L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at full power

H-Series Fuel Cell Stacks

Horizon Educational

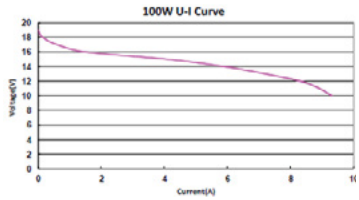
H-100 100W FCS-C100

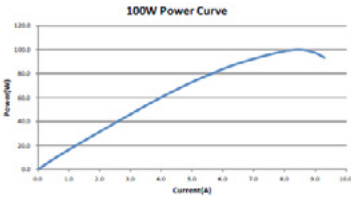


Semi-integrated 100W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 100W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch

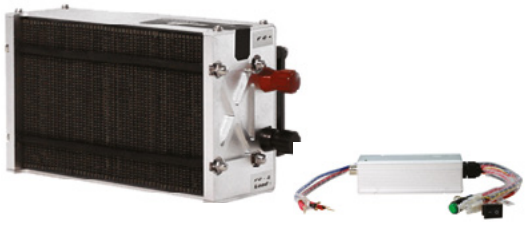
INCLUDES





Type of fuel cell	PEM
Number of cells	20
Rated power	100W
Rated performance	12V at 8.3A
Hydrogen supply valve voltage	12V
Purging supply valve voltage	12V
Blower voltage	12V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	1290g (±50g)
Controller weight	400g (±30g)
Stack size	118x104x94mm
Flow rate at max output	1.3L/min
Hydrogen purity	≥ 99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% @12V
Low voltage protection	10V
Over current protection	12A
Over temperature protection	65°C
External power supply	13V(±1V), 5A

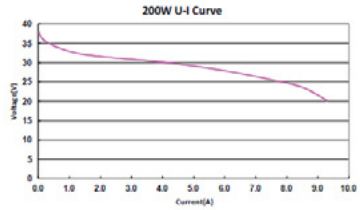
H-200 200W FCS-C200

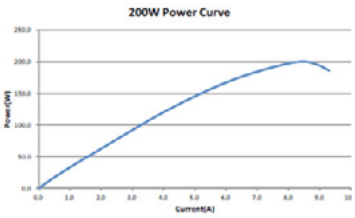


Semi-integrated 200W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 200W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch

INCLUDES





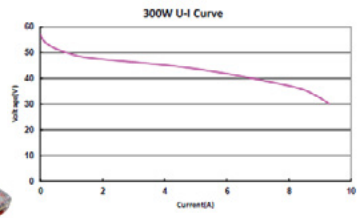
Type of fuel cell	PEM
Number of cells	40
Rated power	200W
Rated performance	24V at 8.3A
Hydrogen supply valve voltage	12V
Purging supply valve voltage	12V
Blower voltage	12V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	2230g (±50g)
Controller weight	400g (±30g)
Stack size	118x183x94mm
Flow rate at max output	2.6L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 24V
Low voltage protection	20V
Over current protection	12A
Over temperature protection	65°C
External power supply	13V(±1V), 5A

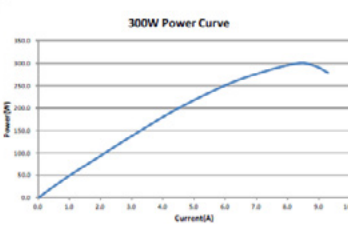
H-300 300W FCS-C300

Semi-integrated 300W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 300W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch

INCLUDES





Type of fuel cell	PEM
Number of cells	60
Rated power	300W
Rated performance	36V at 8.3A
Hydrogen supply valve voltage	12V
Purging supply valve voltage	12V
Blower voltage	12V
Reactants	Hydrogen and Air
Ambient temperature	5-30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	2790g (±50g)
Controller weight	400g (±30g)
Stack size	118x262x94mm
Flow rate at max output	3.9L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 36V
Low voltage protection	30V
Over current protection	12A
Over temperature protection	65°C
External power supply	13V(±1V), 5A

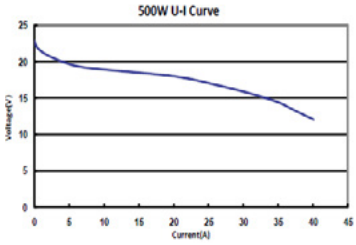
H-Series Fuel Cell Stacks

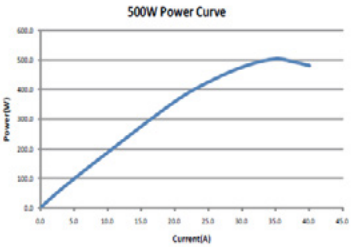
Horizon Educational

H-500 500W FCS-C500

Semi-integrated 500W fuel cell system

INCLUDES
- Connections/Tubing
- Electronic valves
- Electronic control box
- 500W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch



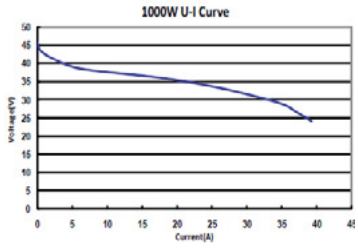


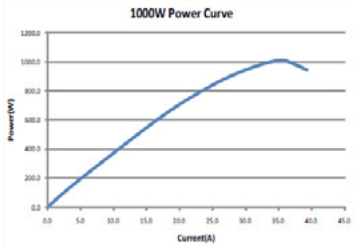
Type of fuel cell	PEM
Number of cells	24
Rated power	500W
Rated performance	14.4V at 35A
Hydrogen supply valve voltage	12V
Purging valve voltage	12V
Blower voltage	12 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	2520g (±50g)
Controller weight	400g (±30g)
Stack size	130x268x123mm
Flow rate at max output	6.5L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 14.4V
Low voltage protection	12V
Over current protection	42A
Over temperature protection	65°C
External power supply	13V(±1V),5A

H-1000 1000W FCS-C1000

Semi-integrated 1000W fuel cell system

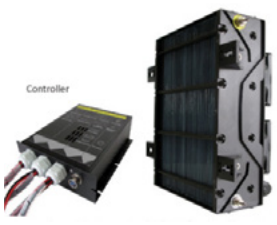
INCLUDES
- Connections/Tubing
- Electronic valves
- Electronic control box
- 1000W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch





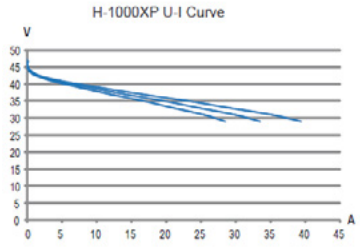
Type of fuel cell	PEM
Number of cells	48
Rated power	1000W
Rated performance	28.8V at 35A
Hydrogen supply valve voltage	12V
Purging valve voltage	12V
Blower voltage	12 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	4kg (±100g)
Controller weight	400g (±30g)
Stack size	268x219x123
Flow rate at max output	13L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 28.8V
Low voltage protection	24V
Over current protection	42A
Over temperature protection	65°C
External power supply	13V(±1V),5A-8A

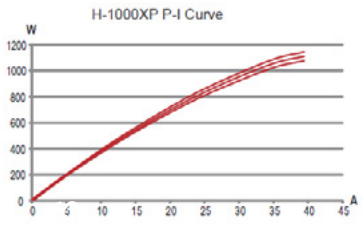
H-1000XP 1000W



Semi-integrated 1kW fuel cell system

INCLUDES
- LCD display
- Hydrogen sensor (optional)
- Ambient temperature sensor
- DC-DC converter
- Ultra capacitor bank
- Electronic control box
- Electronic valves
- RS232 connector
- Blower controller
- Start up battery connector
- Software (optional)
- ON/OFF switch
- Emergency stop switch
- PU tubing





Type of fuel cell	PEM
Number of cells	50
Rated power	1000W
Rated performance	30V at 33.5A
Hydrogen supply valve voltage	12V
Purging supply valve voltage	12V
Blower voltage	12 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 35°C (41-95°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	Approx. 5kg
Controller weight	Approx.1.9kg
Stack size	264x203x104mm
Flow rate at max output	12.5L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	48% at 30V LHV (net)
Low voltage protection	25V
Over current protection	50A
Over temperature protection	68°C
External power supply	12V

H-Series Fuel Cell Stacks

Horizon Educational

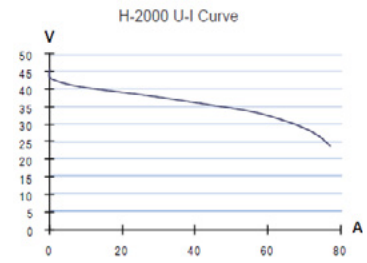
H-2000 2000W

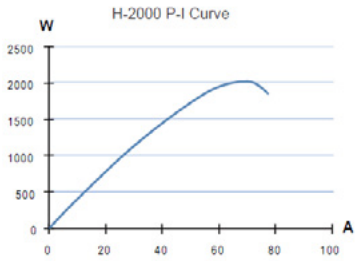
FCS-C2000

Semi-integrated 2000W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 2000W stack with blower
- Fuel cell ON/OFF switch
- LCD display

INCLUDES





Type of fuel cell	PEM
Number of cells	48
Rated power	2000W
Rated performance	28.8V at 70A
Hydrogen supply valve voltage	12V
Purging valve voltage	12V
Blower voltage	12 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	10kg (±200g)
Controller weight	2500g (±100g)
Stack size	303x350x183mm
Flow rate at max output	26L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 28.8V
Low voltage protection	24V
Over current protection	90A
Over temperature protection	65°C
External power supply	13V(±1V),5A-8A

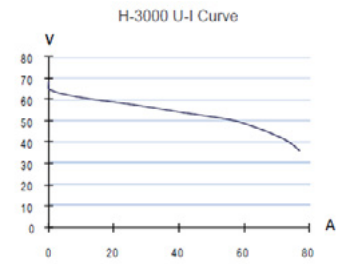
H-3000 3000W

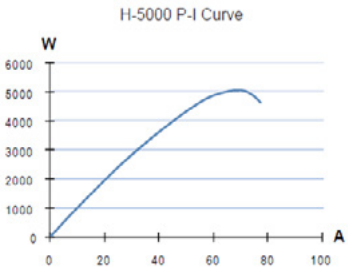
FCS-C3000

Semi-integrated 3000W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 3000W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch
- LCD display

INCLUDES





Type of fuel cell	PEM
Number of cells	72
Rated power	3000W
Rated performance	43.2V at 70A
Hydrogen supply valve voltage	12V
Purging valve voltage	12V
Blower voltage	12 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	15kg (±200g)
Controller weight	2500g (±100g)
Stack size	418x350x183mm
Flow rate at max output	39L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 43.2V
Low voltage protection	36V
Over current protection	90A
Over temperature protection	65°C
External power supply	13V(±1V),5A-8A

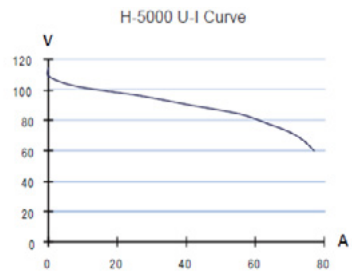
H-5000 5000W

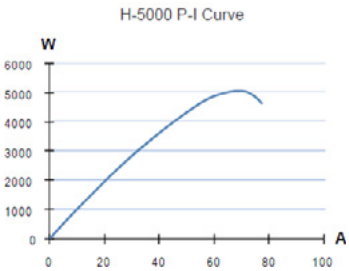
FCS-C5000

Semi-integrated 5000W fuel cell system

- Connections/Tubing
- Electronic valves
- Electronic control box
- 5000W stack with blower
- Fuel cell ON/OFF switch
- SCU ON/OFF switch
- LCD Display

INCLUDES





Type of fuel cell	PEM
Number of cells	120
Rated power	5000W
Rated performance	72V at 70A
Hydrogen supply valve voltage	12V
Purging supply valve voltage	12V
Blower voltage	24 V
Reactants	Hydrogen and Air
Ambient temperature	5 - 30°C (41-86°F)
Max stack temperature	65°C (149°F)
Hydrogen pressure	0.45-0.55 Bar
Humidification	Self-humidified
Cooling	Air (integrated cooling fan)
Stack weight (with fan and casing)	30kg (±200g)
Controller weight	2500g (±100g)
Stack size	650x350x212mm
Flow rate at max output	65L/min
Hydrogen purity	≥99.995% dry H2
Start up time	≤30s (ambient temperature)
Efficiency of system	40% at 72V
Low voltage protection	60V
Over current protection	90A
Over temperature protection	65°C
External power supply	24V(±1V),8A-12A