

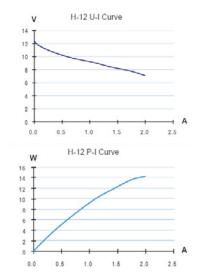
### Open-cathode PEM fuel cells



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



H-12 12W	FCS-B12	
Semi-integrated 12W fuel cell system		
<ul> <li>Integrated fan and casir</li> <li>12W stack with blower</li> </ul>	INCLUDES	



Type of fuel cell
Number of cells
Rated power
Rated performance
Purging valve voltage
Blower voltage
Reactants
Ambient temperature
Max stack temperature
Hydrogen pressure
Humidification
Cooling
Stack weight (with fan and casing)
Stack size
Flow rate at max output
Hydrogen purity
Start up time
Efficiency of system

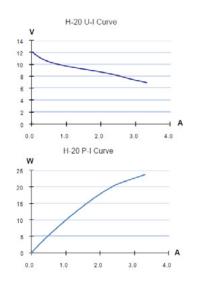
PEM
13
12W
7.8V at 1.5A
6V
5V
Hydrogen and Air
5-30°C (41-86°F)
55°C (131°F)
0.45-0.55Bar
Self-humidified
Air (integrated cooling fan)
275g (±30g)
75x47x70mm
0.18L/min
≥99.995% dry H2
≤30s (ambient temperature)
40% at full power

# H-20 20W FCS-B20



#### Semi-integrated 20W fuel cell system

0	Miniature electronic valve	
0	Control electronics	ß
0	Integrated fan and casing	INCLUD
0	Low voltage protection	S
0	20W stack with blower	



Type of fuel cell	PE
Number of cells	13
Rated power	20
Rated performance	7.8
Purging valve voltage	6V
Blower voltage	5V
Reactants	Hy
Ambient temperature	5-3
Max stack temperature	55
Hydrogen pressure	0.4
Humidification	Se
Cooling	Air
Stack weight (with fan and casing)	27
Controller weight	90
Stack size	75
Flow rate at max output	0.2
Hydrogen purity	≥9
Start up time	≤3
Efficiency of system	40

PEM	
13	
20W	
7.8V at 2.6A	
6V	
5V	
Hydrogen and Air	
5-30°C (41-86°F)	
55°C (131°F)	
0.45-0.55Bar	
Self-humidified	
Air (integrated cooling fan)	
275g (±30g)	
90g (±10g)	
75x47x70mm	
0.28L/min	
≥99.995% dry H2	
≤30s (ambient temperature	)
40% at full power	

### **H-30** 30W

FCS-B30

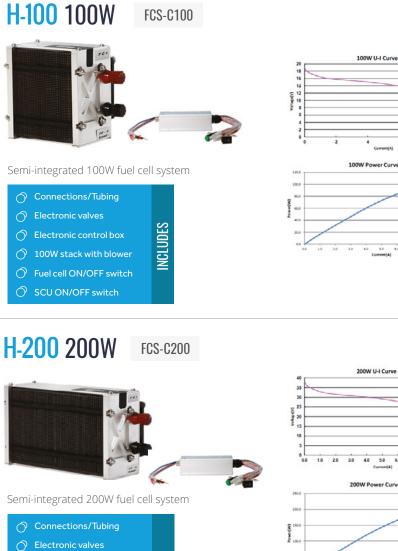


#### Semi-integrated 30W fuel cell system

Miniature electronic valve	
O Control electronics	ŝ
🔿 Integrated fan and casing	INCLUD
O Low voltage protection	NC NC
30W stack with blower	

300W U-I Curve 50 40 Aladerates 20 10 Current(A) 300W Power Curve 300.0 250.0 (W) 200.0 \$0.0 0.0 4.0 5.0 6.0 Current(A) 1.0 7.0 3.0 8.0 2.4

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



NCLUDES

O Electronic control box 200W stack with blower **Fuel cell ON/OFF switch** SCU ON/OFF switch

100W U-I Curve

200W U-I Curve

4.0 5.0 60 7.0 ...

	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
16	Humidification	Self-humidified
	Cooling	Air (integrated cooling fan)
	Stack weight (with fan and casing)	1460g (±50g)
		400g (±30g)
	Stack size	118x104x94mm
	Flow rate at max output	1.3L/min
		≥ 99.995% dry H2
	Hydrogen purity Start up time	
10 104	Start up time	≤30s (ambient temperature) 40% @12V
	Efficiency of system Low voltage protection	40% (a) 12V 10V
	Over current protection	12A
	Over temperature protection	65°C
	External power supply	13V(±1V), 5A
		0514
	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)
9.0 10.0	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)
9.0 10	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
	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)
		6 E 0 0 (4 4 0 0 E)

Max stack temperature Hydrogen pressure

Stack weight (with fan and casing)

Flow rate at max output

Humidification

Controller weight

Hydrogen purity

Efficiency of system

Low voltage protection

Over current protection

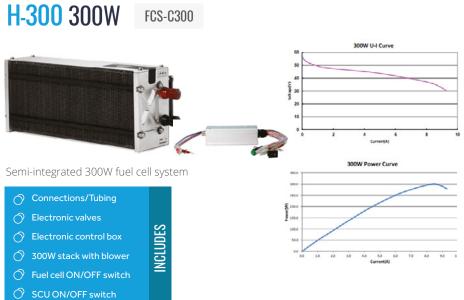
External power supply

Over temperature protection

Start up time

Cooling

Stack size



5-30°C (41-86°F) 65°C (149°F) 0.45-0.55Bar Self-humidified Air (integrated cooling fan) 3000g (±50g) 400g (±30g) 118x262x94mm 3.91 /min ≥99.995% dry H2 ≤30s (ambient temperature) 40% at 36V 30V 12A 65°C 13V(±1V), 5A





#### Semi-integrated 500W fuel cell system

O Connections/Tubing		
O Electronic valves		
O Electronic control box	IDES	
🔿 500W stack with blower	INCLUDI	
O Fuel cell ON/OFF switch	Z	
SCU ON/OFF switch		

#### H-1000 1000W FCS-C1000



#### Semi-integrated 1000W fuel cell system

O Connections/Tubing	
O Electronic valves	
O Electronic control box	DES
1000W stack with blowers	INCLL
O Fuel cell ON/OFF switch	1

SCU ON/OFF switch

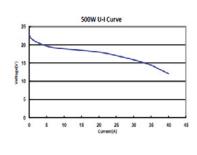


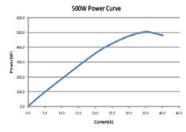
#### INCLUDES

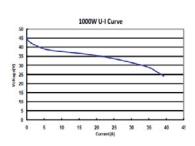
- ⑦ Connections/Tubing
- **Flectronic** valves

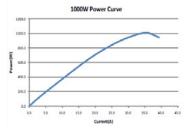
- 1000W stack with blowers ON/OFF switch

- Start up battery connector 0
- LCD display









Type of fuel cell Number of cells 24 Rated power 500W **Rated performance** 14.4V at 35A Hydrogen supply valve voltage 12V **Purging valve voltage** 12V **Blower voltage** 12V Reactants Hvdrogen 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) 3370g (±50g) Controller weight 627g (±30g) Stack size 130x268x123mm 6.5L/min Flow rate at max output 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 65°C Over temperature protection 13V(±1V),5A External power supply 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 12V Reactants Hydrogen and Air 5 - 30°C (41-86°F) 65° Ambient temperature C (149°F) Max stack temperature 0.45-0.55 Bar Hvdrogen pressure Humidification Self-humidified Cooling Air (integrated cooling fan) Stack weight (with fan and casing) 5760g (±100g) Controller weight 627g (±30g) Stack size 219x268x123mm Flow rate at max output 13L/min Hydrogen purity ≥99.995% drv H2 Start up time ≤30s (ambient temperature) Efficiency of system 40% at 28.8V Low voltage protection 24V 42A Over current protection

Over temperature protection

Over current protection

External power supply

**Over temperature protection** 

External power supply

### 500XP 500W

of fuel cell

**OPTIONALS** 

O Ultra capacitor bank

⑦ Hydrogen sensor

⑦ DC-DC converter

PFM 30 500W 18V at 27.8A 12V 12V 12V Hydrogen and Air 5 - 35°C (41-95°F) 65°C (149°F) 0.45-0.55 Bar Self-humidified Air (integrated cooling fan) Approx. 3.9kg Approx.1.9ka 264x130x104mm 5.86L/min ≥99.995% dry H2 ≤30s (ambient temperature) 48% at 18V LHV (net) 15V 50A 68°C 12V

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	12V
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

65°C

13V(±1V),5A-8A

50A

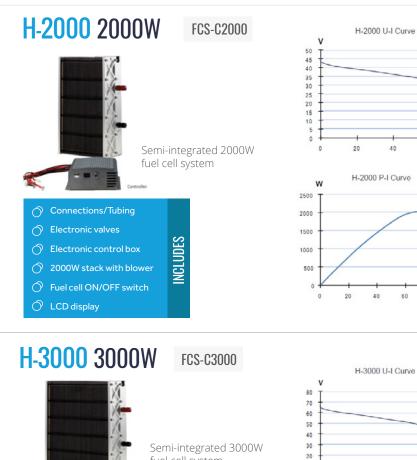
68°C

12V

000W



PEM



fuel cell system

10

Ó 0

w

6000

5000

4000

3000

2000

1000

0

0

20

20

40

60

80

40

H-5000 P-I Curve

60

Controller	
O Connections/Tubing	
O Electronic valves	
O Electronic control box	ŝ
3000W stack with blower	
O Fuel cell ON/OFF switch	INCL
SCU ON/OFF switch	
O I CD display	

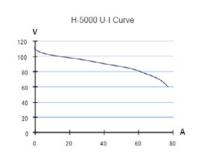
### H-5000 5000W

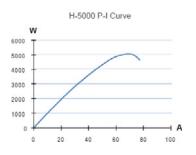


Semi-integrated 5000
fuel cell system

FCS-C5000

O Connections/Tubing	
O Electronic valves	
O Electronic control box	DES
5000W stack with blower	CLU
O Fuel cell ON/OFF switch	Ž
SCU ON/OFF switch	
🔿 LCD Display	





Type of fuel cell
Number of cells
Rated power
Rated performance
Hydrogen supply valve voltage
Purging valve voltage
Blower voltage
Reactants
Ambient temperature
Max stack temperature
Hydrogen pressure
Humidification
Cooling
Stack weight (with fan and casing)
Controller weight
Stack size
Flow rate at max output
Hydrogen purity
Start up time
Efficiency of system
Low voltage protection
Over current protection
Over temperature protection
External power supply

A

80

I A

100

A

A

100

80

60

80

PEM Type of fuel cell Number of cells 72 **Rated power** Rated performance 12V Hydrogen supply valve voltage Purging valve voltage 12V Blower voltage 12V Reactants Ambient temperature Max stack temperature Hydrogen pressure Humidification Cooling Stack weight (with fan and casing) Controller weight Stack size Flow rate at max output Hvdrogen purity Start up time Efficiency of system Low voltage protection 36V Over current protection 90A Over temperature protection External power supply

3000W 43.2V at 70A Hydrogen and Air 5 - 30°C (41-86°F) 65°C (149°F) 0.45-0.55 Bar Self-humidified Air (integrated cooling fan) 15kg (±200g) 2500g (±100g) 418x350x183mm 39L/min ≥99.995% dry H2 ≤30s (ambient temperature 40% at 43.2V 65°C 13V(±1V),5A-8A

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	24V
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 temperatur
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



PEM

2000W

28.8V at 70A

Hydrogen and Air

5-30°C (41-86°F)

65°C (149°F)

0.45-0.55 Bar

14.1kg (±200g)

2500g (±100g)

26L/min

24V

90A

65°C

Self-humidified

Air (integrated cooling fan)

303x350x183mm

≥99.995% dry H2

13V(±1V),5A-8A

≤30s (ambient temperature) 40% at 28.8V

48

12V

12V

12V