

# Fully Integrated, Turn Key 850e Fuel Cell Test System

The 850e Multi-Range Fuel Cell Test System is the ideal solution for research and development of PEM and DM fuel cells. The bench-top unit combines a computer-controlled multi-range electronic load with fuel handling hardware. Many options available to expand the capabilities.

## Features:

Suitable for up to 25 cm<sup>2</sup> cells

Up to 5 mass flow controllers

Fixed, load or stoichiometric-based flow control

Automatic humidifier water fill

All stainless steel flow path

Current, voltage or power control modes

Real-time cell resistance and IR-free voltage by current interrupt

## Benchtop and Portable

Multiple current ranges for flexibility and accuracy

Experimental Methods Manual included

OPTIONS: EIS & HFR, pump, inlet gas selector, humidifier by-pass, gas mixing for reformat simulation or contaminate studies, integrated potentiostat for additional diagnostics such as crossover or ECSA, back pressure and more!





## Specifications:

### Electronic Load:

Load Current Range:	5/25/50 A or 10/50/100 A (configuration dependent)
Load Power:	100 W
Load Resistance:	< 2 m $\Omega$ (100 mV @ 50 A at load terminals)
Current Resolution:	1 mA for 5/25/50 A; 10 mA for 10/50/100 A
Current Accuracy:	0.3% of full scale of selected range

### Voltage Measurement and Data Acquisition:

Max. Whole Cell Voltage:	20 V
Max. Reference Electrode Voltage:	9.999 V
Voltage Resolution:	1 mV
Voltage Accuracy:	$\pm 3$ mV $\pm 0.3\%$ of reading
Voltage & Current Data Update Rate:	100 Hz
Whole Cell Sense Input Resistance:	> 35 k $\Omega$
Reference Electrode Input Resistance:	> 10 <sup>9</sup> $\Omega$

### Impedance Analyzer (Optional 880):

Internal Impedance Analyzer Type:	Single sine, one generator and two gain/phase measurement channels
Internal Analyzer Frequency Range:	1 mHz to 10 kHz
Measurement Channels:	Three: whole cell plus two half-cell vs. Reference Electrode

### Reactant Gas Control System:

All 316 SS construction of humidifiers, flow path, valves and mass flow controllers, with Swagelok® fittings and heated reactant delivery lines

### Mass Flow Control:

Anode to 2 SLPM, Cathode to 5 SLPM  
Software controlled mass flow controllers  
Automatic N<sub>2</sub> purge valves on Anode and Cathode

### Alarms:

Gas supply pressures (3), Humidifier water levels (2), External (1), System alarm output (1)

### Backpressure Control:

Manual or Automatic, 0 - 2 bar (0 - 30 PSIG), requires Optional 850BP accessory

### Temperature Controllers:

Three: cell, anode humidifier, cathode humidifier  
Set & Report Accuracy:  $\pm 0.25\%$  of span,  $\pm 1$  least significant digit

### Sensor Type:

Thermocouple, Type T for cell (Type K optional for high temperature)

### Humidifiers:

Dual sparger-type, passivated 316L

### Dew Point:

Ambient to 99 °C; Optional: 120 °C

### Water Fill Method:

Manual or Automatic (requires pressurized water feed)

### Environment:

Operating Temperature: 5 to 35 °C

### Power Source:

120V 50-60 Hz 10A (Export model 220-240V, 50-60 Hz, 5A)

### Enclosure Type:

Single bench top enclosure  
23 kg, 46 cm x 28 cm x 48 cm (+ 28 cm); (+ 11" for heated gas lines);  
50 lb 18" H x 11" W x 19" D

### Safety Features:

Automatic shutdown and N<sub>2</sub> purge on under-voltage, over-current, over-temperature, loss of reactant or purge gas pressure, low water, communications failure or external alarm, Emergency Stop switch for manual shutdown

Specifications given for 25 °C ambient temperature unless otherwise noted.

