840
Advanced Fuel Cell Test System

Turn-key 1 kW test station in an integrated bench-top unit

The 840 is a fully integrated test system for short stacks and large area single cell testing.

The 840 features

- Ideal for large area single cell cells & short stacks
- 890 Electronic Load: 500W (12/62/125A or 25/125/250A) or 1 kW (50/250/500A), 20 V
- 892 Data Acquisition Module: 16 channels of voltage/temperature measurement integrated with FuelCell® software
- Dual Anode & Cathode mass flow controllers for enhanced accuracy over wide flow range
- Gas Selector Valves for Automated Switching between up to 3 Anode and 3 Cathode Gases
- Automated humidifier by-pass for wet/dry cycling
- Large capacity Anode & Cathode SS humidifiers with automatic water fill
- Flexible SS temperature controlled heated gas transfer lines
- FuelCell® software for user-friendly computer controlled cell operation & experimentation
- Constant or stoichiometric-controlled reactant flow rate
- Current, voltage or power control modes
- Continuous real time cell resistance and IR-free voltage measurement by Current Interrupt
- Whole cell voltage plus two high-impedance reference inputs for half-cell data
- Safety features include detection of alarm conditions and automatic hardware shutdown for safe, reliable operation

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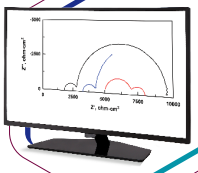
OPTIONS

Automatic Backpressure

885 PotentioStat

Fuel Cell Fixture



Electrochemical Impedance Spectroscopy

Liquid/Gas Cell Fixture

892 Data Acquisition

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Electronic Load:

Maximum Load Current	10/50/100A 125W; 12/62/125A 500W; 25/125/250A 500W; 50/250/500A 1KW; (config. dependent)
Maximum Load Power	125 W, 500 W or 1 kW (configuration dependent)
Minimum Load Resistance:	< 2 mΩ (125 W, 500 W models), 0.7 mΩ (1 kW model), (all are at load terminals, at rated load current)
Current Resolution:	1 mA at low currents – up to 100mA (current setting dependent)
Current Accuracy	±0.3% of full scale current 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	±3 mV ±0.3% of reading
Voltage & Current Data Update Rate	100 Hz
Whole Cell Sense Input Resistance	> 35 kΩ
Reference Electrode Input Resistance	> 10^9 Ω

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

Fuel System:

Reactant Gas Control System	All 316 SS construction of humidifiers, flow path, valves and mass flow controllers, with Swagelok® fittings and temperature controlled heated reactant transfer lines.
Mass Flow Control	Dual, software controlled mass flow controllers per channel, Anode: 6 SLPM (1 + 5 SLPM), Cathode: 12 SLPM (2 + 10 SLPM). Other sizes available on request. Automatic N_2 purge valves available on request.
Alarms	Gas supply pressures(3), Humidifier water levels(2), External (1)
Back Pressure Control	Manual or Automatic: 0 – 3 atm (0 – 30 PSIG). High Capacity forced air condensers with large tanks and SS regulators
Temperature Controllers	Five: cell, anode humidifier, anode line, cathode humidifier, cathode line
Set & Report Accuracy	±0.25% of span, ±1 least significant digit
Sensor Type	Thermocouple, Type T for cell (Type K optional for high temperature)
Humidifiers	Dual sparger-type, passivated 316L, 1650 W heaters per bottle
Temperature Range	Ambient to 99 ° C
Fill Method	Automatic water fill. Requires 3 atm (45 PSIG) minimum water feed or 1.4 atm (20 PSIG) above back pressure

Environment:

Operating Temperature	5 to 35 ° C
Power Source	208-240 V, 50-60 Hz, 16 A
Enclosure Type	Single bench top enclosure
Size and Weight	91 cm H x 61 cm W x 61 cm D (+ 41 cm for heated gas lines), 55 kg 36" H x 24" W x 24" D (+ 16" for heated gas lines), 120 lb.
Safety Features	Automatic shutdown and N_2 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 operator shutdown