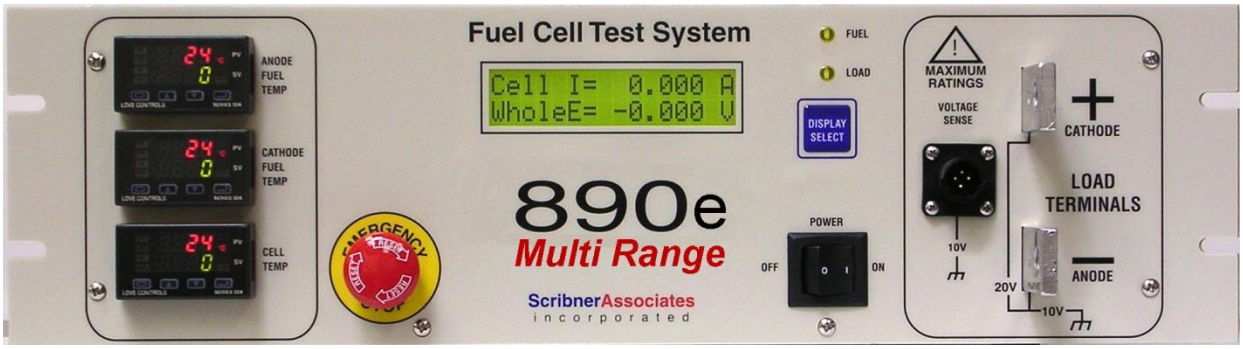
890e Advanced Fuel Cell Test Load



Multi-Current Range
5/25/50 A, 10/50/100 A, 12/62/125 A,
25/125/250 A, and 50/250/500 A
Integrated Multi-Channel Impedance Spectroscopy

The model **890e** is the latest member of the 890 family of versatile fuel cell test loads. These host computer-controlled instruments consist of a multi-range programmable electronic load, mass flow signals, temperature controls and data acquisition functions in a compact, rack mount or bench top unit. The **890e** series loads are targeted at small to medium size (up to 100 A, 125 W or 500 A, 1 kW) single fuel cell or low-power stack research for laboratory and educational use.

The model **890e** has a small footprint, low cost and offers maximum value with extra features including the powerful FuelCell® software with enhanced functionality for the **890e**. The **890e** uses a powerful 32-bit microprocessor combined with improved measurement electronics.

The **890e** is for use with a fuel cell (MEA assembly), custom or third-party fuel management unit, and optional internal **Model 880 Frequency Response Analyzer** (FRA). An optional interface box may be included for non-integrated fuel system designs.

Features:

- Electronic load with three current ranges for accurate measurement over a wide dynamic range
- Analog control signals for two main gas mass flow controllers (or MeOH pump) and up to five additional (reformate) mass flow controllers
- Continuous real-time cell resistance measurement by Current Interrupt
- Optional internal impedance analyzer with continuous real-time high frequency resistance (HFR) capability
- Simultaneous 3 channel impedance measurement using whole cell and reference electrode inputs
- Connections for Solartron impedance analyzer (for models without internal impedance analyzer)
- Automatic shutdown in hardware for over-current, over-power, under-voltage and over load or cell temperature
- Whole cell sense voltage input and two high-impedance reference electrode inputs
- Cell main terminals and sense inputs tolerant of non-isolated cell
- Internal controllers for anode and cathode humidifier and cell temperatures
- Constant current, voltage, or power control mode
- Contact inputs for three pressure sensors or alarms
- Low voltage output signal to control purge gas valves and to indicate alarm condition
- RS485 digital interface for external temperature controllers
- Remote operation from IEEE488 (GPIB) interface

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ADVANCED PRODUCTS FOR ELECTROCHEMICAL RESEARCH

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Specifications:

Electronic Load:	
Maximum Load Current (3 range):	5/25/50 A, 10/50/100 A, 12/62/125 A, 25/125/250 A, 50/250/500 A
Maximum Load Power:	125 W (50 or 100 A), 500 W (125 or 250 A), 1 kW (500 A)
Minimum Load Resistance:	< 2 mΩ (at load terminals, at rated load current)
Current Resolution:	1 mA
Current Accuracy:	0.3% of full scale current of selected range
Voltage Measurement and Data Acquisition:	
Maximum Whole Cell Voltage:	20 V
Maximum Reference Electrode Voltage:	9.999 V
Whole Cell Sense Voltage Input Resistance:	> 35 kΩ
Reference Electrode Input Resistance	> 10^9 Ω
Voltage Resolution:	1 mV
Voltage Accuracy:	±3 mV ±0.3% of reading
Voltage and Current Data Update Rate:	100 Hz
Fuel Interface:	
Outputs for anode, cathode flow controllers:	Two, Analog (0-5 V)
Outputs for reformate flow controllers:	Five, Analog (0-5 V) (optional)
Alarm Inputs:	Six: Three for gas pressures, three auxiliary
Alarm Outputs:	One, 5 V logic.
Fuel Solenoid Control:	One, 5 V output (external relay needed, included with interface box)
Temperature Controllers:	
Quantity:	Three
Type:	On/off 5V output (external SSR required)
Set and Report Accuracy:	±0.25% of span, ±1 least significant digit
Sensor Type:	Thermocouple, Type T, K, or S (user specified)
Impedance Measurement:	
Interface for internal or external analyzers:	Voltage and current output channels with variable DC bias rejection, generator input channel with selectable attenuation
Internal Impedance Analyzer Type:	Single sine, two gain/phase measurement channels, one generator output channel
Internal Analyzer Frequency Range:	1 mHz to 10 kHz
Measurement Channels:	Three: whole cell plus two half-cell vs. reference electrode
Environment:	
Operating Temperature:	0-40 °C ambient; all specs given for 25 °C ambient
Power Source:	100-240 VAC, 50/60 Hz (auto select)
Size (< 1 KW):	3U std rack mount: 19” W x 5.25” H x 21” D
Size (1KW):	Bench-top enclosure: 17” W x 10” H x 19” D
Safety Features:	Manual Emergency Stop switch for manual operator shutdown.

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