

High-power EIS Analysis System

For fuel cell stacks, electrolyzers and batteries

For electrolyzers

Simultaneous multi-channel EIS Acquisition

MegaEIS Product Family



Up to 800 V | 2000 A | 20/800 kW | 1026 EIS channels



Applications

Typical applications include hydrogen fuel cells, water electrolyzers, solid-oxide cells, redox-flow batteries, and lithium batteries with high-current and high-power requirements. Additionally, EIS is utilized in applied research, manufacturing testing, and quality control.

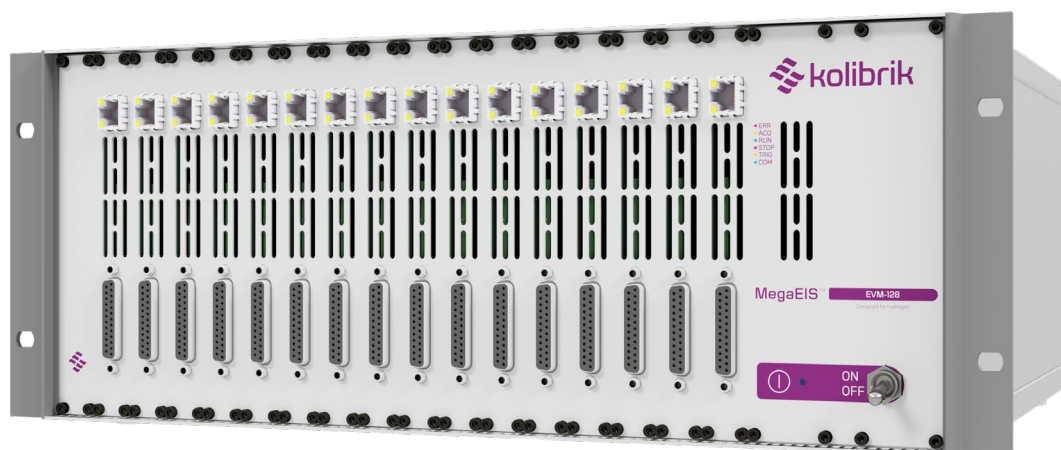
MegaEIS Product Family Description

MegaEIS product family is a precise modular testing system for **EIS analysis** of **fuel-cell stacks** and **electrolyzers**. System consists of power stage which handles the power, and EIS acquisition system which can perform impedance spectroscopy analysis at all cells simultaneously.

For fuel-cell stacks, power stage is built from EIS load modules. Your stack can have up to **1 000 cells** and provide current up to **2 kA**. System is designed for cooperation with external DC load which may handle most of the stack power (up to 300 kW). Maximum internal power dissipation of MegaEIS power stage can be up to **20 kW**. System is **water-cooled**.

For electrolyzers, power stage is extended by internal or external power supply, so the system works as regulated power source, capable of EIS measurement.

EIS acquisition runs simultaneously on all channels, so the system is suitable for rapid and precise analysis in R&D, for QA in manufacturing, or in service diagnostics. StackEIS-M also provides **DC cell voltage monitoring** and enables characterization using important electrochemical methods – **Polarization Curves, Chronopotentiometry and Chronoamperometry, Load Cycling, Current Interrupt Technique**, etc.



Unlock Power with EIS Analysis

Electrochemical Impedance Spectroscopy (EIS) analysis is the ultimate technique to unlock the secrets of your electrochemical devices. Whether you are working with hydrogen fuel cells, electrolyzers, batteries, or any other system that involves electric current and chemical reactions,

EIS analysis can give you a complete picture of what's going on inside your devices. A standout feature of the EIS method is its unique ability to analyze your device seamlessly, during its standard operating conditions.



Technical Parameters

Power supply	110 ... 230 VAC / 50 ... 60 Hz, 3x 400 VAC for high-power devices	
Dimensions	Modular design for 19" rack cabinet	
Protection rating	IP20	
Input voltage	Up to 1000 V *)	
Total input current (internal + external load)	Up to 2000 A *)	
Internal load current	Up to 1200 A *)	
Maximum internal load power dissipation	24 kW *)	
Cooling	Water **)	
Stack electrometer voltage range	Up to ± 1000 V	
Sampling	24-bit ADCs, low-noise 50/60 Hz filtered sampling for DC measurements 24-bit ADCs, up to 1.25 Msps for EIS measurements	
Measurement resolution	0.001% of selected range	
Accuracy Voltage	Voltage	$\leq 0.1\%$ of range + 0.1% of reading
	Current	$\leq 0.1\%$ of range + 0.5% of reading
Acquisition methods	constant V, I, open circuit, manual control chronoamperometry, chronopotentiometry linear sweeps, polarization curves, current interruption load cycling/profiling EIS – electrochemical impedance spectroscopy programmable sequences of all available methods	
EIS frequency	1 mHz ... 100 kHz	
EIS amplitude	Up to 20% of maximum internal current for < 1 kHz	
EIS channel voltage range	± 3 V (can be customized)	
Number of EIS channels	Up to 1000 (limited by max. voltage) 8 channels per one module	
Connection	USB 2.0, Ethernet	
Software	Control software for MS Windows Features: measurement setup and control, data acquisition, processing and visualization, pascal or python scripting, remote control by TCP/IP server for integration with top-level control system, examples for remote control using python or LabVIEW.	

*) According to particular model

**) Please note: A cooling chiller unit and on-site system implementation are available as optional extras upon request.



Standard products/configurations

Multi-channel EIS analyzers with source/load/bi-directional

Model	Number of channels	Type	Current	Voltage	Maximum int. power / with ext. booster	Applications
ME-10S270x20	2-10	Source	270 A	20 V	5.4 kW	Electrolyzers
ME-10S500x20	2-10	Source	500 A	20 V	10kW	Electrolyzers
ME-42L200x50	2-42	Load	200 A	50 V	4 kW	FC stacks
ME-130L500x200	2-130	Load	200 A	200 V	4/40 kW	FC stacks
ME-42L500x50	2-42	Load	400 A	200 V	8/100 kW	FC stacks, redox-flow
ME-130L2000x200	2-130	Load	2000 A	200 V	20/400 kW	FC stacks
ME-514L400x800	2-514	Load	400 A	800 V	20/800 kW	FC stacks
ME-42SL200x200	2-42	Source / Load	-200 A/+200 A	200 V	4/40 kW	FC stacks, electrolyzers, redox-flow, batteries
ME-42SL400x80	2-42	Source / Load	-400 A/+300 A	80 V	8/32 kW	FC stacks, electrolyzers, redox-flow, batteries

Single-channel EIS analyzers

Model	Maximum current	Maximum voltage	Maximum power	P/G *) module	Mode *)	Applications
ME-2ZLP200	200 A	10 V	2 kW	5 V, 100 A	Zeroload + P/G	Electrolyzers
ME-2ZL400	400 A	75 V	4 kW	-	Zeroload	Fuel cells

*) P/G – Full 4-quadrant Potentiostat/Galvanostat. Zeroload – optional true zero-voltage operation for single cells.



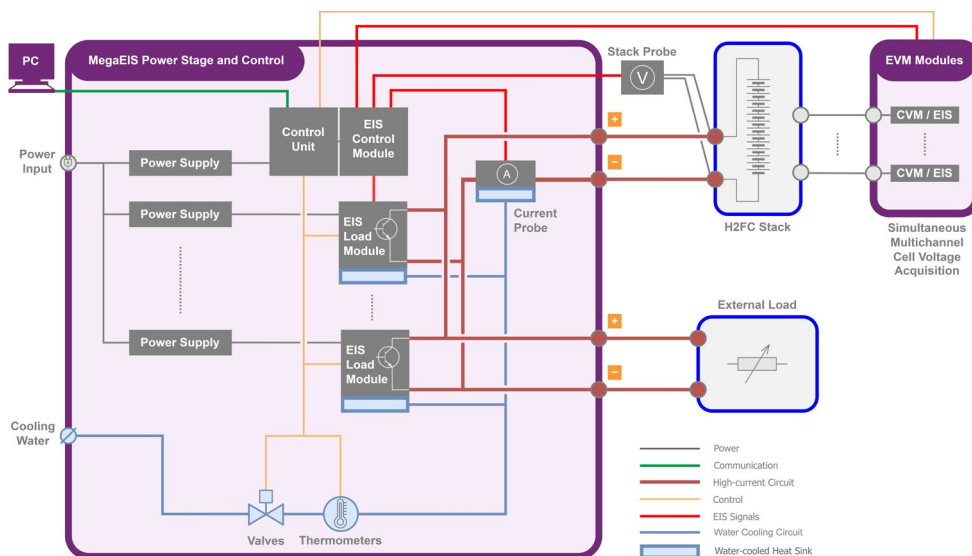
Product customization

Standard configurations can be tailored for your specific needs.

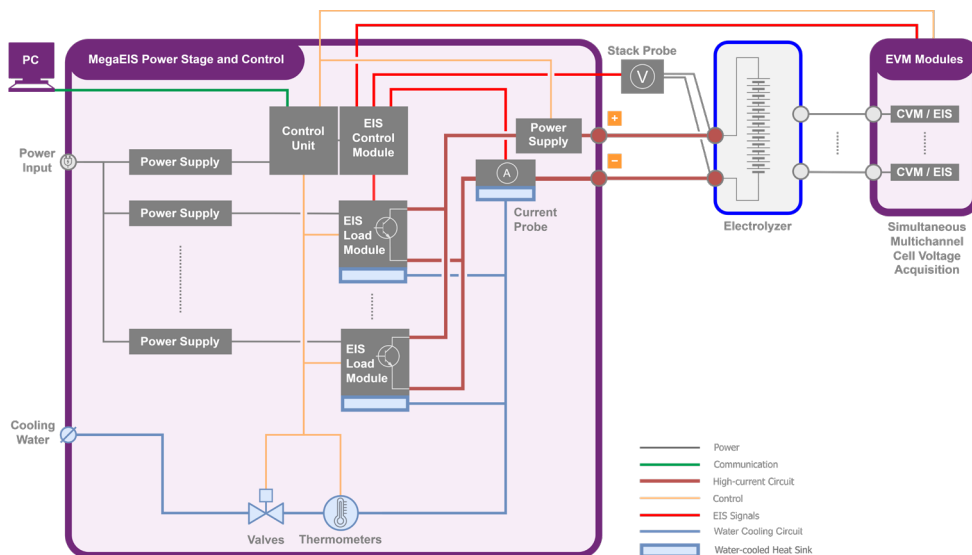
Parameter/propriety	Value
Number of channels	2-1026 channels, step of 8
Voltage	Up to 1000 V
Internal current	Up to 1200 A
Booster	Up to 2000 A
Source mode	Up to 20 kW / up to 70 V
Load mode	Up to 24 kW



MegaEIS for Fuel-cell Stacks



Block diagram of system configuration for fuel-cell stacks.
External load connection and CVM / EIS blocks are optional.



Block diagram of system configuration for electrolyzers.
Power supply can be optionally external. CVM / EIS blocks are optional.

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