

KiloLoad

KiloLoad ZL800-10EW

High-power H₂FC true-zero-voltage load with impedance spectroscopy

Version 1.1
2019-03-11
Preliminary



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Quick summary

❖ Voltage range	0 .. 10 V
❖ Maximum sink current	800 A
❖ Maximum power	4 kW
❖ Minimum voltage on terminals	0.0 V @ 800 A
❖ Current ranges	1 A .. 1000 A
❖ Impedance spectroscopy	1 mHz .. 100 kHz (1 MHz), max. AC amplitude 40 A
❖ Cooling	Water

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is a new range of high-power hydrogen fuel-cell zero-voltage loads equipped with impedance spectroscopy analyzer. This system is primarily designed for use with high-power hydrogen fuel cells and short stacks capable of supplying hundreds of amperes or even more than one kiloampere.

KiloLoad allows to sink high current even with true zero voltage on its terminals – including short-circuit. KiloLoad models are available with maximum current of 200 A up to 2 kA.

Electrochemical Impedance Spectroscopy (EIS) measurements are realized in sink mode, so AC amplitude must be lower than the DC current. Sum of the DC current and AC amplitude must be below maximum rated current of device. The maximum amplitude of the AC component depends on the frequency and impedance of the fuel cell and connecting cables.

EIS module is capable to generate and measure frequencies up to 1 MHz, it has high sensitivity and load high-power path is made to have lowest possible inductance and skin effect. Device is equipped with precise low-inductance and low-skin-effect current sense resistor, internally calibrated with high-precision hall-effect sensor.

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Block diagram

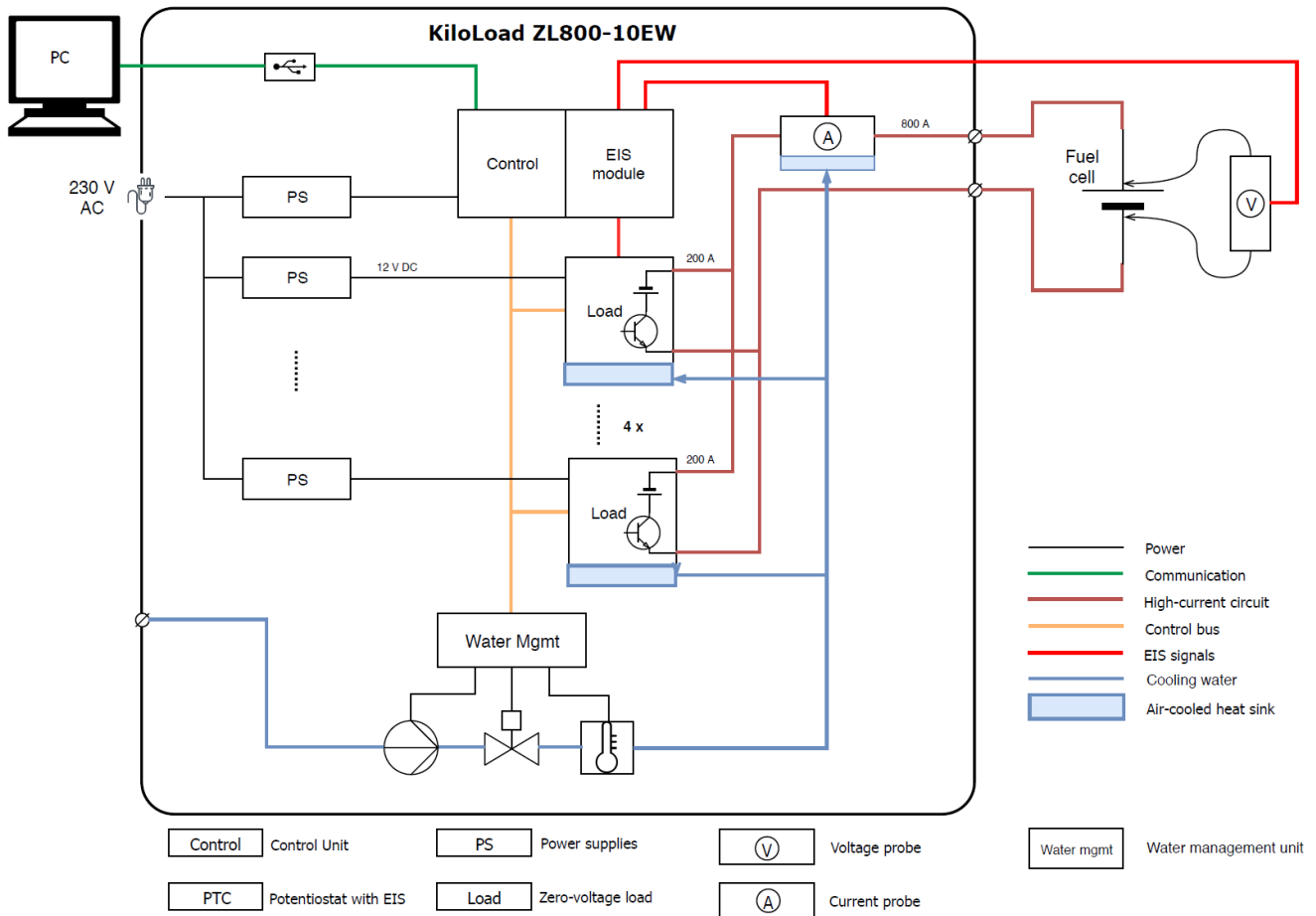


Image 1: Block diagram of KiloLoad ZL800-10EW model

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Technical Parameters

Power supply	230V AC / 50..60 Hz
Dimensions	19" rack cabinet, 11U height, 900mm depth
Cooling	Water
Protection rating	IP20
Electrometer Input voltage range	-10 V ... +10 V
Compliance / Output voltage	0 V ... +10 V
Maximum sink current	800 A
Current ranges	4 current ranges (1 A .. 1000 A)
Sampling	24-bit ADCs, 3 ksps internal, 50 sps filtered sampling 14-bit ADCs, up to 20 Msps for EIS measurements
Measurement resolution	0.001 % of selected range for ≤ 3 ksps sampling
Accuracy	Voltage ≤ 0.1 % of range + 0.1 % of reading Current ≤ 0.1 % of range + 0.5 % of reading calibration Hall-sensor < 0.1 % for < 1 kA
Acquisition methods	constant V, I, open circuit, manual control chronoamperometry, chronopotentiometry linear sweeps, I/V characteristics impedance spectroscopy programmable sequences of all available methods
EIS frequency	1 mHz .. 100 kHz (1 MHz)
EIS amplitude	1 .. 1000 mV, up to 40 A
Connection	USB 2.0