

ZAHNER

PRECISION IN ELECTROCHEMISTRY



IM7x - Made in Germany

IM7x

THE ULTIMATE HIGH PERFORMANCE

Application Fields

Zahner potentiostats are designed as a modular concept, giving users the freedom to customize their potentiostat according to their needs.

Fundamental
Electrochemistry

Batteries, Fuel-
and Electrolysis Cells

Corrosion
and Coatings

Addon Cards

Plug-and-play cards introduce additional input/control signals to the IM7x potentiostat.

MIO

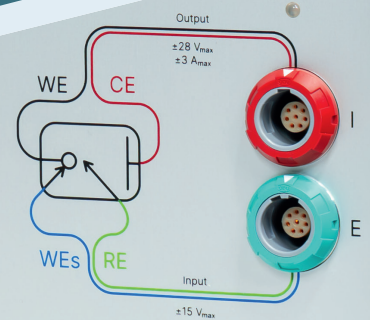
- Additional analog & digital input/output channels for the IM7x potentiostat
- Allows process automation via Custom Experiment Builder or remote integration
- Analog channels provide 16-bit resolution at a range of ± 10 V

PAD42

- For detailed stack characterization
- Enable 24-bit synchronous measurements on each cell in a stacked system (batteries, fuel & electro-lysis cell stacks)
- Simultaneous half-cell characterization for reference electrode setups

TEMP-U2

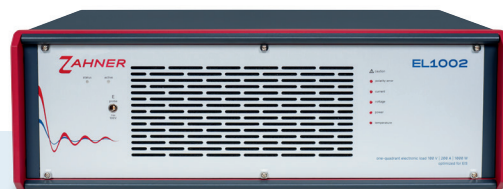
- Two temperature recording channels
- Two configurable input-voltage channels for recording data from external devices like a pH meter, pressure chamber, etc., during electrochemical measurements



Extensions For Power Applications

Extend your IM7x potentiostat for high quality impedance spectra at high currents.

” EXTEND THE FUNCTIONALITY OF YOUR POTENTIOSTAT “



Extension For Medium Power Applications

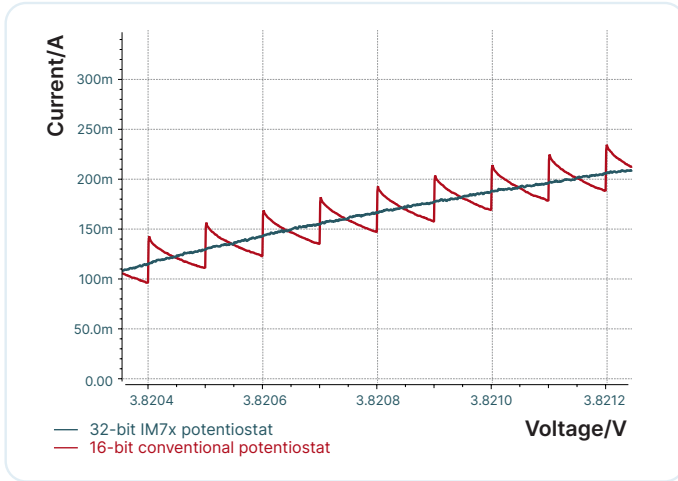
- Power potentiostats (PP) with power up to 200 W
- Current up to ± 40 A, voltage up to ± 20 V
- Remote integration possible via C++ and Python

Extension For High Power Applications

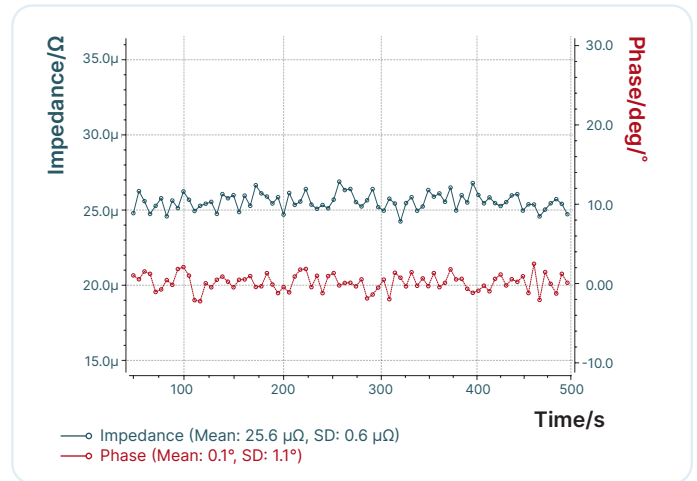
- Electronic load (EL) system with power up to 68 kW
- Current up to ± 680 A, voltage up to ± 100 V
- Remote integration possible via C++ and Python

Main Specifications

- EIS frequency range: 10 μ Hz – 12 MHz
- 32-bit DC and 24-bit AC resolution
- ± 5 V / ± 15 V voltage range
- ± 4 A over 12 current ranges
- Online data processing for outstanding EIS



Slow CV scan with a scan rate of 10 μ V/s on a LFP battery with the IM7 series potentiostat (32-bit DAC resolution) and a conventional potentiostat (16-bit DAC resolution).



Single frequency (1 Hz), single period impedance measurements on a 25 μ Ω resistor vs. time. The measurement is carried out with 1 A amplitude.

” THE HIGH-END POTENTIOSTAT “

Custom Experiment Builder

For extensive measurement routines, the Custom Experiment Builder enables users to design complex and automated measurement sequences with maximum flexibility.

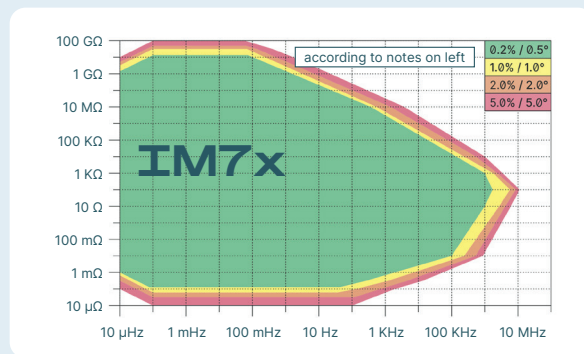
This powerful tool:

- Uses individual measurement techniques as modular building blocks
- Features an intuitive drag-and-drop interface for routine creation
- Supports loops, conditions, variables, and mathematical functions
- Enables fully customized experimental workflows

These capabilities make the Custom Experiment Builder ideal for both routine testing and advanced research applications.

Accuracy Contour Plot

- $Z > 100 \text{ m}\Omega$: potentiostatic mode, amplitude 10 mV
- $Z > 1 \text{ M}\Omega$: potentiostatic mode, amplitude 70 mV, shielded
- $Z < 100 \text{ m}\Omega$: galvanostatic mode, amplitude 100 mA
- $Z < 1 \text{ m}\Omega$: galvanostatic mode, amplitude 2 A
- Without DC bias voltage/current
- Specified at the lemosa terminals



Specifications

General

Potentiostatic modes	potentiostatic, galvanostatic, OCP, FRA, ZRA, off
ADC resolution	32-bit DC, 24-bit AC
Harmonic reject	> 60 dB @ ½ full scale
Cell connection	2-, 3-, 4-terminal kelvin
Ground reference	grounded, floating
Interface	Gigabit Ethernet (GbE)
Dimensions / Weight	160 × 470 × 376 mm ³ / 13.2 kg
Power supply	100/115/230 VAC, 50/60Hz, 400 W
Ambient temperature / humidity	+10 °C to +30 °C / < 60% without derating
Storage	40 GB m.2 SSD
Operating system	Windows, Linux, and macOS

Input

	Low range	High range
Max. input voltage	±5.5 V	±16 V
Voltage resolution	3.2 nV	9.6 nV
Voltage accuracy	±50 μV ±2 ppm of reading	±150 μV ±5 ppm of reading
DC current resolution	2 nA (32-bit)	
DC current accuracy	±0.5% of reading ±0.2% of FS @ 250 mA ... 4 A ±0.05% of reading ±0.02% of FS @ 2.5 μA ... 250 mA ±0.5% of reading ±0.2% of FS @ 25 nA ... 2.5 μA ±0.5% of reading ±125 fA @ < 25 nA	
Input impedance	> 10 TΩ ±5 pF typ	
Input leakage current	< ±200 fA typ., < ±2 pA max.	
Impedance range	10 μΩ to 100 GΩ	see accuracy contour plot for detailed information
Max sampling rate	900 kHz at up to 2 channels, 3 MSps total	
Common mode rejection	> 86 dB @ 10 μHz to 100 kHz > 66 dB @ 100 kHz to 12 MHz	
Input channel phase-tracking acc.	±0.05° @ 10 μHz to 100 kHz ±0.125° @ 100 kHz to 12 MHz	
Equivalent effective input noise	1 μV rms / 100 fA rms @ 1 mHz to 10 Hz	

Output potentiostatic

	Low range	High range
Controlled voltage	±5 V	±15 V
Resolution	2.5 nV	7.5 nV
Accuracy	±150 μV ±5 ppm of reading	±450 μV ±25 ppm of reading
Integral nonlinearity	typ. 1 ppm, max. 2 ppm	typ. 3 ppm, max. 8 ppm
Compliance voltage	±16 V	±32 V
Bandwidth	DC to 15 MHz @ 33 Ω load	
IR compensation	auto AC impedance technique, range 0 to 10 MΩ, resolution 0.012%	
Small signal rise time	150 ns to 200 μs in 5 steps, automatic selection	
Slew rate	15 MV/s	

Output galvanostatic

Controlled current	±4 A
Current range	±2.5 nA to ±4 A in 12 current ranges
Resolution	32-bit ±0.2 ppb of FS
Accuracy	±0.025% of reading ±0.01% of FS, ≥ 2.5 μA to 250 mA ±0.1% of reading ±0.05% of FS, < 2.5 μA or > 250 mA

Frequency generator & analyzer

	Low range	High range
EIS frequency range	10 μHz to 12 MHz	
AC voltage amplitude	0 to 2 V, 24-bit resolution	0 to 6 V, 24-bit resolution
AC current amplitude	0 to 2 A, 24-bit resolution, in 12 current ranges	
Accuracy	< 0.0025%	
Resolution	0.0025%, 10,000 steps/decade	

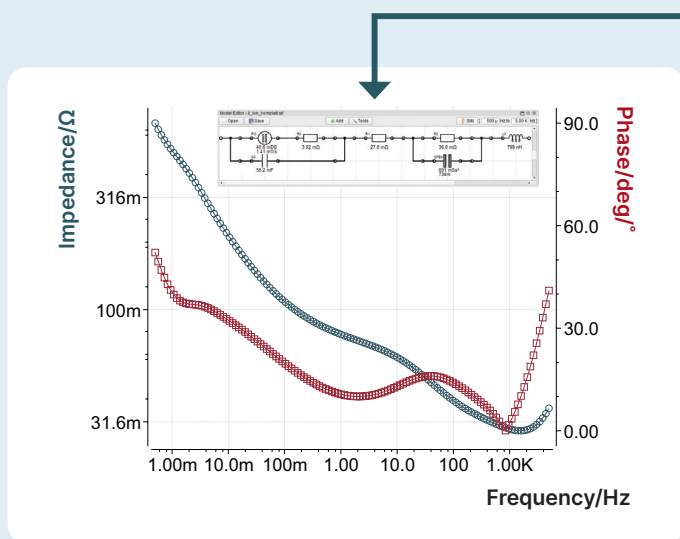
Zahner Analysis

EIS fitting

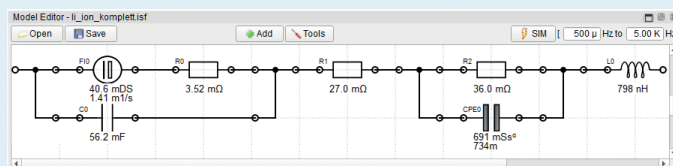
- Create equivalent electrical circuits
- Fit impedance spectra
 - > Single fit
 - > Series fit
- ZHIT tool
- Significance plot
- Fitting accessible via HTTP-API

Other techniques

- Cyclic voltammetry
 - > Peak determination
 - > Charge integration
- Tafel slope measurements
- Butler-Volmer measurements
- Analysis of photoelectrochemical measurements

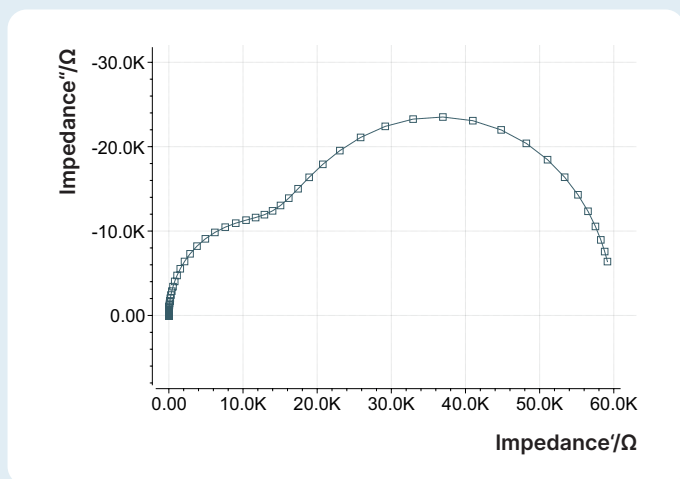


Impedance spectrum (Bode plot) of a battery with the equivalent electrical circuit

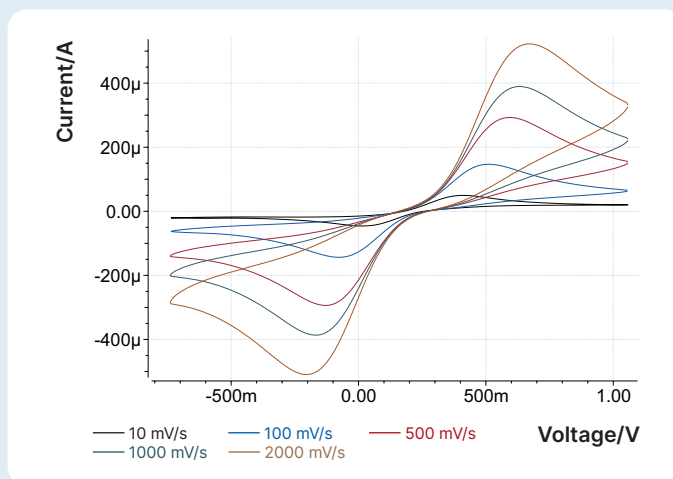


Create your own equivalent electric circuit for EIS fitting

Check out
Zahner
Analysis
videos:



Impedance spectrum (Nyquist plot) with two time constants



CV scans measured at different scan speeds

ZHIT

The Zahner Analysis software features the unique **ZHIT** tool, which helps identifying artifacts in impedance spectra and allows reconstruction of artifact-free impedance spectra for fitting.

Significance Plot

Zahner Analysis software features an exclusive tool called the **significance plot**, which evaluates the frequency-dependent significance of equivalent circuit elements in the fitting.

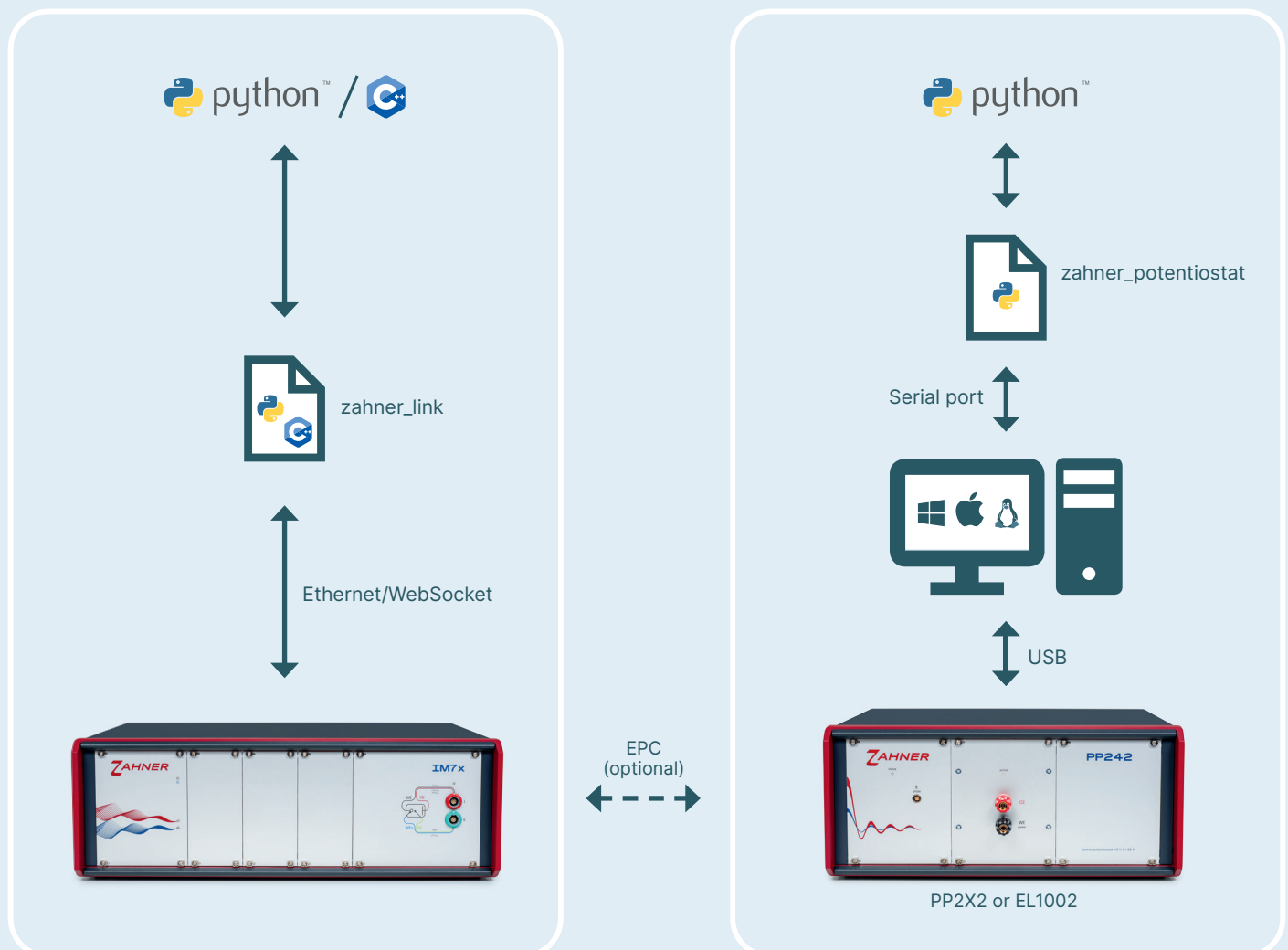
Remote Integration Possible With:

- C++
- Python
- WebSocket

” FROM REMOTE MEASUREMENT TO REMOTE DATA ANALYSIS “

Automate Your Electrochemistry

Integrate our potentiostats into your test bench for seamless operation. Zahner offers flexible remote control of the devices with ease. By integrating multiple potentiostats into a test bench, the user can create a high-quality multichannel system.



Check out the QR code for useful examples and complete API documentation.



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