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Find the *BioLogic Test Box-4* at our website: ***Click HERE***

SP-50/150

Simple and Powerful...



BioLogic
Science Instruments

APPLICATIONS

- Fundamental electrochemistry
- Energy storage
- Corrosion
- Sensors

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SP-50/150



The **SP-50/150** are economical, value oriented potentiostats/galvanostats designed to address applications in general electrochemistry and corrosion. They offer good performance with a small price tag. Contained in simple, compact chassis, this series addresses all applications in the area of classical electrochemistry.

The **SP-50** is provided in a fixed DC configuration offering no upgrade capability. The **SP-150** potentiostat can be upgraded at purchase or at a later date with an EIS measurement option, a low current option (1 nA range) and external power boosters (2 A, 5 A, 10 A, 20 A, 80 A, 100 A).

The **SP-50/150** are controlled from a PC by a USB or an Ethernet connection. Using the Ethernet connection, the **SP-50/150** can be installed on a Local Area Network to remote access to the instrument.

The instrument has two analog inputs and one analog output to interface with external instruments, such as a rotating electrode, or a quartz crystal microbalance, and record the generated data.

The **SP-50/150** are supplied with **EC-Lab®** software package. **EC-Lab® Express** software has been designed to be easy to use and allows for quick set up of an experiment. With a variety of basic electrochemical techniques that can be linked in a sequence or used individually, it is an ideal combination for teaching. **EC-Lab®** is recommended for advanced users. Both of them come with complete analysis capabilities to provide meaningful interpretation of electrochemical data.

FEATURES

- Current ranging: 10 µA to 1 A
- Control voltage: ±10 V
- Compliance: ±10 V for SP-50
  20 V range for SP-150
  adjustable from [-20;0] V to [0;+20] V
- Voltage resolution: 300 µV down to 5 µV
  by adjusting dynamic range
- Acquisition time: 200 µs with EC-Lab®
  20 µs with EC-Lab® Express

SP-150 OPTIONS

- EIS: 10 µHz to 1 MHz
- Low current: 1 µA to 1 nA
  resolution: 76 fA
- External boosters: 2 A, 5 A, 10 A, 20 A,
  80 A, 100 A
- Load boxes: 150 A/50 V, 50 A/5 V

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Software

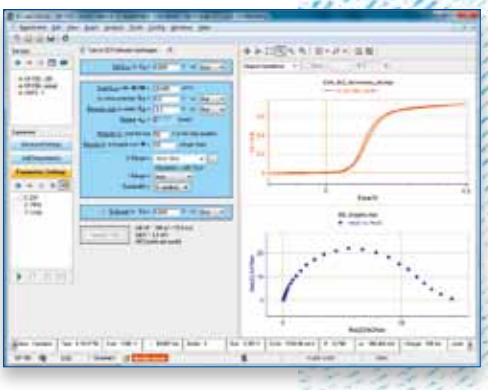
EC-Lab®: modular and powerful for advanced users

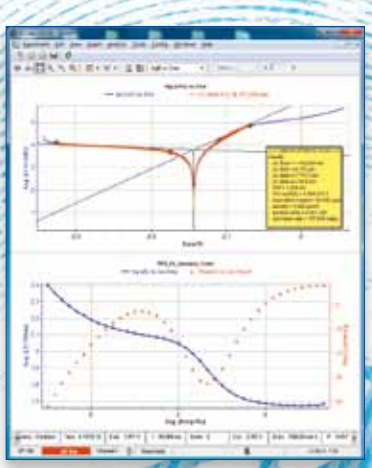
Over 70 techniques are now available. The user can also create new protocols with the "technique builder".

Two view modes are available in flow charts and in columns. Many parameters can be modified during the run, with the changes stored into the raw data file.

Active data can be shown in multiple graph windows, each with a double y-axis view. The axes (unit, scaling), color, style, and other graphic properties can be modified easily.

The user can select multiple graph windows to show the active experiment while analyzing previously stored data.





Techniques

- **Voltammetric techniques:** OCV, CV, CVA, CA, CP, SV, LASV, ACV, LSV
- **Impedance (SP-150):** GEIS, PEIS, SGEIS, SPEIS, PEISW (Mott-Schottky)
- **Pulsed techniques:** DPV, SWV, DPA, DNPV, NPV, RNPV
- **Technique builder:** Modular Potentio/Galvano, Loop, Trigger in/out, Wait, RDEC
- **Ohmic drop determination:** MIR, ZIR, Current Interrupt
- **Battery:** GCPL (1 to 7), PCGA, CLD, CPW, APGC, Urban cycle simulation, ModuloBat
- **Corrosion:** Linear and Cyclic Polarization, Generalised Corrosion, Pitting, ZRA, ZVC, Corrosimetry, VASP, CASP
- **Fuel cell/photovoltaic:** I-V characterization, CLD, CPW

EC-Lab® Express: easy to learn software for new users

More than 45 techniques with up to 100 sequences can be linked in **EC-Lab® Express** software.

This software is very easy-to-use. The settings and graph are shown on one screen view. An experiment selector enables the user to quickly switch between techniques.

The **SP-50/150**'s advanced digital design allows the user to set data sampling and recording conditions without any limit on the number of data points taken. The **SP-50/150** operate independently from the PC during an experiment.

With this software the **SP-150** is able to perform EIS measurements simultaneously on the working and on the counter electrodes.



Techniques

- **Voltammetric techniques:** OCV, CV, CVA, CA, CP, Potentio/Galvano Dynamic
- **Pulsed techniques:** DPV, DNPV, SWV, DPA, LSV, NPV
- **Corrosion:** Linear and Cyclic Polarization, Generalized Corrosion, Pitting, ZRA
- **Impedance (SP-150):** PEIS, GEIS, SPEIS, SGEIS
- **Technique builder:** Loop, Trigger in/out

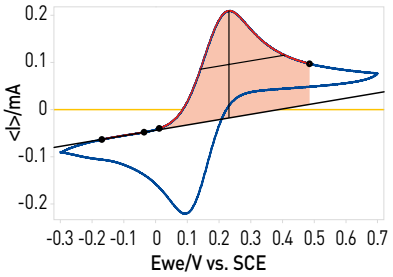
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Specifications

Analysis tools

Analysis tools (peak, convection wave, integral), with classical fits (linear, circular) and processes are available with both **EC-Lab®** modes.

EIS modeling is included using the well known circuit descriptor code approach. More than 150 circuits with two minimization algorithms are available. The user can define and build his own circuit using a range of thirteen elements (R, C, L, L_a, Q, W, G, G_a, G_b, Wd, M, M_a, M_g). This tool is able to fit successive EIS data cycles.



- Linear fit
- Tafel fit with minimization
- Circular fit
- Rp determination
- Min/max determination
- Integral calculation
- Derivative calculation
- Peak analysis
- Wave analysis (convection)
- Mott-Schottky
- Impedance data fitting
- Pseudocapacitance
- Impedance simulation
- Kramers-Kronig
- Statistical processes
- File subtraction
- Numerical filtering
- Fourier transform
- Interpolation
- Electrochemical noise analysis
- CV simulation/fit

CHANNEL BOARD

Cell control

Connection	2, 3, 4 or 5 terminals (+ ground)
Compliance	20 V adjustable from ±10 V to [0-20] V (SP-150 only)
Maximum current	±800 mA continuous
Maximum potential resolution	300 µV on 20 V programmable down to 5 µV on 200 mV
Maximum current resolution	0.004% of the dynamic range 760 pA on the 10 µA range
Accuracy (DC)	< 0.1% FSR*
Rise time	(10% - 90%) < 2 µs (No load)
Acquisition time	20 µs

Current measurement

Ranges	Automatic on every range ±10 µA to ±1 A (7 ranges)
Maximum resolution	0.004% of the range, 760 pA on the 10 µA range
Acquisition speed	200,000 samples/second
Accuracy (DC)	< 0.1% FSR*

Potential measurement

Ranges	±2.5 V, ±5 V, ±10 V, ±10 V adjustable
Maximum resolution	0.0015% FSR*, down to 75 µV
Acquisition speed	200,000 samples/second
Accuracy (DC)	< 0.1% FSR*

Electrometer

Inputs	3 potential measurements
Impedance	> 10^{12} ohms in parallel with < 20 pF
Bias current	< 5 pA

Additional inputs/outputs

2 Analog inputs	16-bit resolution with automatic ±2.5 V, ±5 V, ±10 V ranges
1 Analog output	±10 V 16-bit resolution
1 External trigger input	TTL level
1 External trigger output	TTL level

General

Dimensions	197 x 136 x 377 mm (H x W x D)
Weight	SP-50 4 kg, SP-150 4,5 kg
Power	85-264 V, 47-440 Hz
PC configuration	Windows 32/64 bits

IMPEDANCE OPTION (SP-150 only)

Impedance

Frequency range	10 µHz to 1 MHz (accuracy: 1%, 1°)
Amplitude	1 mVpp to 1 Vpp, 0.1% to 50% of the current range

LOW CURRENT OPTION (SP-150 only)

Cell control

Maximum current	±100 mA continuous
Maximum current resolution	0.004% of the dynamic range, programmable:76 fA on the 1 nA range
Applied current accuracy	< 1% FSR* on the 1 nA range < 0.5% FSR* on the 10 nA range < 0.1% FSR* on the other ranges

Current measurement

Ranges	±1 nA, ±10 nA, ±100 nA, ±1 µA
Maximum resolution	0.004% of the range down to 76 fA
Accuracy	< 1% FSR* on the 1 nA range < 0.5% FSR* on the 10 nA range < 0.1% FSR* on the other ranges

Electrometer

Impedance	10^{14} ohms in parallel with 1 pF
Bias current	60 fA typical, 150 fA max at 25 °C
Bandwidth	1 MHz

* FSR: Full Scale Range
Specifications subject to change

Brochure released on may 2013 - connivence - 1305014

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