Electrochemistry & Battery Testing instruments.

CATALOG

Potentiostats/Galvanostats/FRA
Battery Cyclers
Scanning Electrochem. Systems

BioLogic

Shaping the future. Together.

A unique and comprehensive range of product

As one of the world's foremost designers and manufacturers of high-performance electrochemical measurement instruments, BioLogic has forged its place as a leader in its field.

A comprehensive product portfolio covers cutting-edge products and accessories across every possible area of electrochemistry including battery, fuel cell/electrolyzer and material testing.

And a culture of innovation, continuous improvement and a commitment to customer satisfaction help BioLogic continue to develop high-performance products that meet the needs of industry and science.

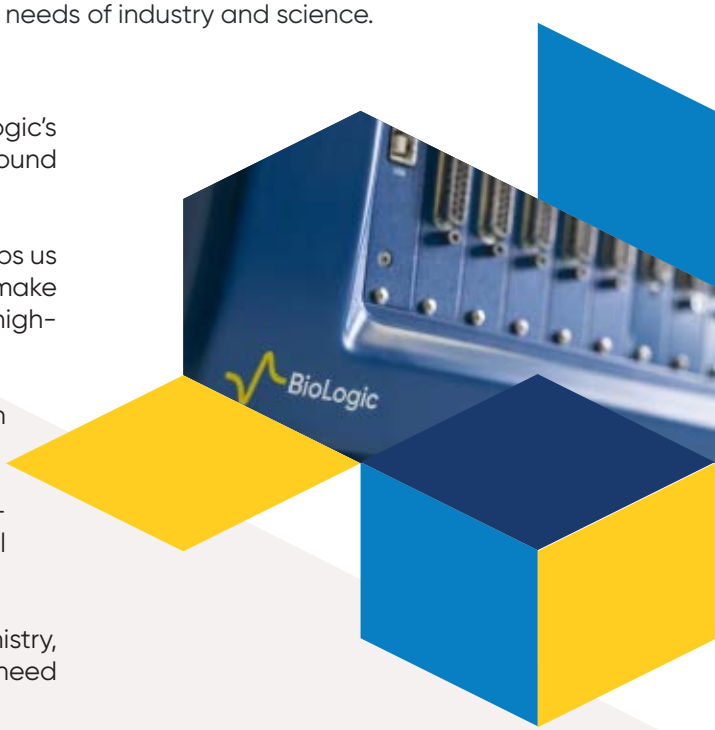
The quality, reliability, and innovation that lies behind BioLogic's product portfolio help shape the future of innovative projects around the world.

Our close proximity with both academic and industrial users helps us understand our clients' needs and develop solutions that truly make a difference – through a marriage of cutting-edge, reliable, high-performance hardware and innovative, user-friendly software.

Our highly qualified support engineers will first work closely with you to fully understand your project and your needs.

Only then will we start to develop a modular, user-friendly, high-performance measurement solution; one supported by a global technical support network.

So, wherever you are and whatever your field of electrochemistry, BioLogic can provide you with the measurement solution you need to take your research to the next level.



Modular systems

- Single to multichannel potentiostats/galvanostats
- Mix and match battery cycler systems
- High current boosters up to 800 A
- Extended voltage range up to 60 V
- Low current options down to pA
- ARG (Analogic Ramp Generator) for voltage ramp
- Scanning workstations with up to 9 different local techniques (dc-SECM, ac-SECM, LEIS, SKP, SVET…)
- Fully featured impedance analyzer with temperature control
- EIS up to 11 MHz

Controlled by a powerful suite of software

- Intuitive user interface
- Pre-set techniques for common applications
- Multiple user systems
- Multi-technique experiment builder
- Control of external devices
- Multiple graph display
- Data analysis & fit
- Safety & experimental limits
- Software calibration

Potentiostats/Galvanostats

Premium Range 4
Essential Range 8
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Detailed specifications 16

Battery Test Stations & Cyclers

A full range of battery testers 18
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Premium Potentiostats / Galvanostats.

Potentiostats with unparalleled quality, precision, performance and speed.

Premium range potentiostats are unparalleled in terms of precision, performance and speed. The range includes single and multi-channel potentiostats, as well as bipotentiostats. BioLogic designed the Premium range for researchers who require the fastest, most precise potentiostats available. With up to 16 channels, this state-of-the-art range of potentiostats boasts the highest specifications available on the market:

- EIS capability 10 µHz to 11 MHz
- Sampling rate as fast as 1 data point every µs
- Up to 13 current ranges:
  - Low current options down to ±100 fA measurement capability
  - Up to 150 A with internal boosters

Single Channel

SP-200

Transportable potentiostat/galvanostat

An accessible entry point into research-grade electrochemistry, without compromising on accuracy. The SP-200 is ideal for general electrochemistry and corrosion studies, offering **100 fA** ultra-low current measurement option in a portable, field-ready design.
Available with standard DC or EIS capability, it includes floating mode, analog filtering, and a built-in calibration board.

Applications
General electrochemistry • Sensors • Corrosion • Coatings • Materials • Batteries • Electrolysis/anodizing • Energy

Options

- Ultra Low Current: Accuracy down to ±100 fA on 1 pA range
- Built-in EIS analyzer: up to 11 MHz
- Analog Ramp Generator: 1 MV/s, acquisition 1 µs
- ±30 A, 48 V external booster (HCV-3048)

SP-300

Fast, sensitive, stable and modular

A high-performance potentiostat/galvanostat that grows with your research. The **SP-300** supports adaptive current ranges with max currents from **500 mA to 10 A**, with integrated EIS up to **11 MHz**. Its modular chassis accepts high current/high voltage expansion, a second potentiostat board for bipotentiostat operation, or simultaneous use by two independent researchers.
Includes floating mode, analog filtering, built-in calibration, and selectable stability bandwidths.

Applications
General electrochemistry (RRDE measurements) • Sensors • Corrosion • Electrolysis/anodizing • Coatings • Energy

Options

- Ultra Low Current: Accuracy down to ±100 fA on 1 pA range
- Built-in EIS analyzer: up to 11 MHz
- Internal boosters: ±1 A/±48 V, ±2 A/±30 V, ±4 A/[-3;14] V, ±10 A/[-1;6] V
- ±30 A, 48 V external booster (HCV-3048)
- Bi-potentiostat (RRDE, permeation, multi-electrodes...)
- Analog Ramp Generator: 1 MV/s, acquisition 1 µs

All BioLogic potentiostats are **powered by EC-Lab®**, widely recognized by leading scientists as the benchmark software for potentiostat control and electrochemical analysis.
EC-Lab® brings instrument control and data analysis together in a single environment, eliminating the need to switch between applications and freeing up more time for your research.

Multichannel

VSP-300

Small footprint, multichannel potentiostat

A versatile multichannel solution with up to **6 channels**, designed for labs needing to maximize space while running parallel experiments. Ethernet LAN connectivity allows multiple computers to connect to a single unit at the same time.
Each channel supports optional Ultra Low Current measurements and **EIS up to 11 MHz**. Up to 4 booster boards can be plugged in parallel for extended current range up to 40 A or connected to external boosters.

VMP-300

The ultimate multichannel potentiostat

The most flexible instrument in the range. With 16 configurable channels, the **VMP-300** adapts to virtually any experimental setup. The modular design means that channels can be added autonomously, so it can adapt and grow with your research needs.
Scale up current with internal boosters, reaching up to **150 A** in parallel or run up to 16 independent measurements simultaneously. **EIS up to 11 MHz** and Ultra Low Current options are available.
Ethernet LAN connectivity allows multiple users to connect at the same time for collaborative group workflow.

Applications
Batteries/supercapacitors • Fuel/photovoltaic cells • General electrochemistry • Corrosion • Sensors • Materials • Energy storage

Options

- Ultra Low Current: Accuracy down to ±100 fA on 1 pA range.
- EIS measurement: up to 11 MHz
- Analog Ramp Generator: 1 MV/s, acquisition 1 µs
- Internal boosters:
  - ±1 A/±48 V
  - ±2 A/±30 V
  - ±4 A/[-3;14] V
  - ±10 A/[-1;6] V
- ±30 A, 48 V external booster (HCV-3048)
- Additional potentiostat/galvanostat/EIS

Premium Boosters

HCV-3048

An unparalleled combination of power and speed

The **HCV-3048** is designed for battery stack/pack characterizations and electrolyzer/fuel cell testing. The continuous maximum current of **±30 A** for a single unit can be extended up to **±120 A** by connecting four units in parallel. The control voltage range is **0-48 V.**
Impedance spectroscopy (EIS) provides valuable information on energy storage and conversion devices, helping to identify the kinetic properties of multiple processes within the device under test. The HCV-3048 brings unmatched insight to high-power systems.

Features

- Max current ±30 A
- Voltage range 0-48 V
- EIS up to 500 kHz
- Stackable up to ±120 A

Options

- Ultra Low Current: Accuracy down to ±100 fA on 1 pA range
- Built-in EIS analyzer: up to 11 MHz
- ±30 A, 48 V external booster (HCV-3048)
- Bi-potentiostat
- Analog Ramp Generator: 1 MV/s, acquisition 1 µs

Internal boosters

High current and high-voltage boosters

A range of internal boosters has been designed to increase the current and the voltage specifications of the **SP-300, VSP-300, VMP-300.** Four models are available (see below).
Depending on the instrument chassis, several similar boosters can be connected in parallel to expand the maximum current of the system, up to 150 A.

Features

- Autoranging: automatically adjusts current measurements to include booster range
- EIS capability up to 2 MHz
- Plug-in modules
- Plug-and-play
- 5-lead connection type
- Boost max current by paralleling booster units.

Configurations

- ±1 A/±48 V
- ±2 A/±30 V
- ±4 A/[-3;14] V
- ±10 A/[-1;6] V

Essential Potentiostats / Galvanostats.

Powerful, workhorse potentiostats for academia & industry.

BioLogic's Essential range is made up of purpose-built, workhorse potentiostats, designed for researchers who need robust, high-quality electrochemical workstations with standard acquisition times. The series includes single and multi-channel potentiostats, as well as bipotentiostats. With up to 16 channels, BioLogic designed the Essential range to fit almost any need with specifications to match:

- EIS capability 10 µHz to 1 MHz
- Sampling rate of 1 data point every 20 µs
- Up to 6 current ranges:
  - Down to ±20 nA measurement capability
  - Up to 800 A with external boosters

Single Channel

SP-50e

Affordable and easy-to-use

A robust, single-channel general-purpose electrochemical workstation suited to both research and teaching environments.
With a **±1 A current range**, the SP-50e is well matched to energy applications including battery, supercapacitor, fuel cell, and electrolysis research.

Applications
General electrochemistry • Education/training

Options

- Built-in EIS analyzer: up to 1 MHz
- RDE control kit

SP-150e

A research grade workstation

A two-channel, EIS-capable workstation covering a wide range of general electrochemistry applications. Compatibility with external boosters from **2 A to 100 A**, as well as the FlexP series (Page 12) makes it particularly well suited to energy research and is the only ampere workstation that can be extended **up to 800 A with external boosters**.
The SP-150e is backed by the power of EC-Lab®, which includes EIS Quality Indicators (THD, NSD, NSR) for measurement validation, and network connectivity for groups.

Applications
General electrochemistry • Sensors • Corrosion • Energy sources • Coatings

Options

- Built-in EIS analyzer: up to 1 MHz
- External current boosters: Up to 800 A
- RDE/RRDE control kit

Multichannel

VSP-3e

Tailor-made for energy applications

A research-grade multichannel potentiostat/galvanostat purpose-built for energy research, with up to **8 channels and ±1 A per channel expandable to 800 A** with external boosters. Built-in EIS and Ethernet LAN connectivity make it well suited to battery research and collaborative lab environments. Includes energy-specific features unique to BioLogic: fast CCCV shift, stack mode for monitoring individual cells within a pack, battery capacity determination (BCD), and automatic Coulombic efficiency plotting.

VMP-3e

16-channel benchmark workstation

A modular, research-grade multichannel potentiostat/galvanostat adaptable to a wide range of applications. Each of the up to **16 channels** can be connected to an external booster up to **800 A**, making it particularly well suited to battery research and testing. A standard voltage range of **±10 V is adjustable from -20 V to +20 V.**
For high-end EIS measurements, a 1 MHz specification is complemented by EIS Quality Indicators. The unique CE to GND mode allows users to switch between independent channel and multi-electrode configurations, while network connectivity supports multi-user working.

Applications
Batteries/supercapacitors • Corrosion• Fuel/Photovoltaic Cells • General Electrochemistry • Sensors • Materials

Options

- Built-in EIS analyzer: up to 1 MHz
- External current boosters: Up to 800 A
- SAM 50 for stack (50 V) measurement (up to 30 elements with three SAM-50)

VSP

Affordable, research-grade multichannel potentiostat/galvanostat

A research-grade 5-channel modular potentiostat with optional EIS per channel and a maximum current of **±400 mA**. An internal **4 A booster option** is available using two chassis slots, with external boosters from 2 A to 800 A supported on each channel.

Applications
Batteries/supercapacitors • Corrosion• Fuel/Photovoltaic Cells • General Electrochemistry • Sensors • Materials

Options

- Built-in EIS analyzer: up to 1 MHz
- External current boosters: Up to 800 A
- SAM 50 for stack (50 V) measurement (up to 30 elements with three SAM-50)

High Current

HCP-803

High current potentiostat for supercapacitors & fuel cells

The **HCP-803** is a High Current Potentiostat capable of handling **±80 A** with a voltage range of **±3 V**. It is primarily designed for applications in the fuel cell/electrolyzer and supercapacitor areas.

It is a combination of a research quality potentiostat and an 80 A booster built into the same chassis. The potentiostat has the same specifications as the VMP-3e potentiostat boards (with EIS option) when not connected to the booster portion of the unit.

Applications
Fuel cells/Electrolyzers • Photovoltaic systems • Supercapacitors • Electroplating • Batteries

HCP-1005

More power for battery testing

The **HCP-1005** is a compact High Current Potentiostat specially designed to study high capacity secondary batteries. With a voltage range of **0.6 to 5 V** and a current range of **±100 A**, this unit can be used to test Li-ion high current cells. The EIS capability integrated in the chassis is ideal for aging tests.

The HCP-1005 structure is similar to the HCP-803. It combines a research potentiostat and a 100 A booster built into the same chassis.

Applications
Lithium-ion • Nickel-Cadmium • Nickel-Metal hydride • Batteries

Options

- Booster range included in the autoranging (for boosters up to 20 A)
- EIS capability
- Plug-in module or external chassis
- Standalone unit
- 5-lead connection type

Essential Boosters

FlexP external booster

Power EIS with FlexP

EIS provides valuable information about working electrical devices. It helps identify the kinetic properties of multiple processes within the device under test.
Power EIS brings unmatched insight to very high-power units that have been out of reach until now.
Driven by SP-150e, VSP, VSP-3e or VMP-3e potentiostat/galvanostats, the **FlexP** brings unparalleled electrochemical knowledge and methodology to high-power applications.

Features

- Voltage up to 60 V
- Current up to 200 A
- Parallel ability (x4)
- 10 kHz - 1 mHz EIS capable
- Up to 2.4 kW continuous with water cooling
- Cell temperature measurement included

Configurations

FlexP 0060:
- 60 V/50 A (or 200 A with 4 in parallel) for battery pack characterization

FlexP 0012:
- 12 V/200 A (or 800 A with 4 in parallel) for fuel cell/ electrolyzer characterization

Internal & external Boosters

Deliver more power to your application

SP-150e, VSP, VSP-3e and VMP-3e potentiostats can be interfaced to a separate current booster unit. These modular booster units can be filled with different booster boards (2, 5, 10, or 20 A). The standard booster chassis offers 8 available booster slots, each of them connected to a potentiostat board.

For higher current, 80 and 100 A booster units are available. They also exist as stand-alone systems (HCP-803, HCP-1005 see page 15).

Applications
Fuel cells/Electrolyzers • Photovoltaic systems • Super-capacitors • Electroplating • Batteries

Configurations

External:
- ±2 A, ±5 A, ±10 A, ±20 A on ±10 V adjustable from −20 to +20 V
- ±80 A on ±3 V
- ±100 A on [0.6 - 5] V

Internal kit (only for VSP):
- ±4 A, ±10 V adjustable from −20 to +20 V

How to make reliable EIS measurements with EIS QI™

Three quality indicators are only available in EC-Lab® to ensure the reliability of EIS measurements.

Total Harmonic Distortion (THD)

THD indicates if the amplitude of the current or potential modulation applied to the system is small enough to consider that the system behaves linearly. If it behaves non-linearly, the output signal will contain some harmonics. THD quantifies the non-linearity by evaluating the amplitudes of the N harmonics.
THD is expressed as a percentage. Generally, it is considered that a THD below 5% is acceptable. In EC-Lab®, it is calculated on the potential and on the current and over 7 harmonics including the fundamental.

Linearity

$$\mathrm{THD}_N = \frac{1}{|Y_f|}\sqrt{\sum_{k=2}^{N}|Y_k|^2}$$

Non-Stationary Distortion (NSD)

We can distinguish two causes for the non-stationarity of a system: i) the response of the system has not reached its permanent regime; ii) the parameters defining the system are changing with time.
The response of a non-stationary system will contain, in addition to the fundamental frequency, some adjacent frequencies.
NSD is expressed as a percentage and calculated on the potential and on the current.

Stationary

$$\mathrm{NSD}_{\Delta f} = \frac{1}{|Y_f|}\sqrt{|Y_{f-\Delta f}|^2 + |Y_{f+\Delta f}|^2}$$

Noise to Signal Ratio (NSR)

In an ideal EIS measurement, all the signal energy is contained in the fundamental frequency, but because of various factors such as the accuracy and precision of the measuring device or external perturbations, there might be some energy in other frequencies than the fundamental frequency, the harmonics and the adjacent frequencies. In this document, this additional signal is called noise.
It represents all the signals not contained in:

- The fundamental frequency,
- The 7 harmonics used to calculate THD
- The signal at frequencies adjacent to the fundamental frequency used to calculate NSD.

Nose to signal Ratio

$$\mathrm{NSR}_f = \frac{1}{|Y_f|}\sqrt{\sum_{k}|Y_{k\Delta f}|^2}$$

How do I use them?

Observation	Reason		Solution
High THD		Your system is not linear	Decrease the perturbation amplitude of the input signal
High NSD		Your system is not yet stationary	Increase the time of the rest period before the EIS measurement
High NSR		Your output signal is too small	Increase the perturbation amplitude of the input signal

EC-Lab® Software

As powerful as it is user-friendly

Your hardware is only as good as your software. BioLogic's EC-Lab® software unlocks the full potential of your potentiostat. With over 30 years of continuous development and a commitment to user feedback, EC-Lab® has become the benchmark in electrochemistry control software. This powerful, user-friendly suite offers unmatched functionality, allowing you to run a wide range of techniques, analyze data with ease, and ensure your experiments are efficient and reliable. Regular updates based on user input keep EC-Lab® at the forefront of the field, guaranteeing you'll always have the most advanced and user-friendly techniques available.

Experiment sequence builder

EC-Lab® software contains more than **80 techniques.** These techniques can address applications in voltammetry, EIS, corrosion and energy source/storage development.
A **powerful technique builder** can execute a series of different modular techniques as well as wait and loop tasks to create complex experimental sequences.
Moreover, within each technique, the user can create **up to 100 linkable sequences** of an experiment with different parameters. An email can be sent to the user, if desired, to inform him/her when a certain step of the experiment has been reached. Battery cycling can be synchronized with a **temperature control unit.**

Applications

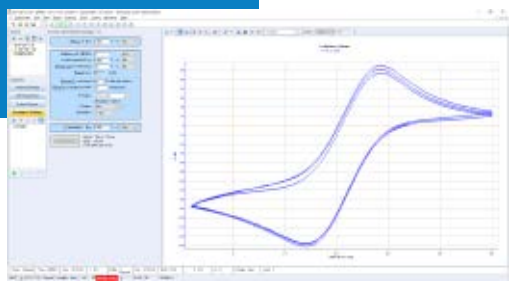
- Impedance spectroscopy
- General electrochemistry
- Electro-analytical
- Corrosion
- Battery
- Super-capacitor
- Fuel cell/Electrolyzer
- Photovoltaic cell

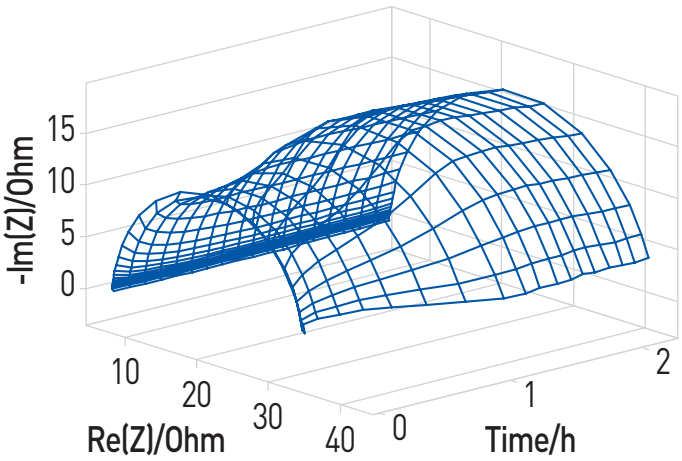
Display mode

Most of the experimental parameters can be **modified "on the fly"** during the experiment, with the changes stored into the raw data file.
The software interface is **adjustable** to create the best possible working environment for the user.
EC-Lab®'s graphics package provided with the software includes a powerful 3D plot feature and a tool to create **unique graph templates.**
Using our advanced "Process" function, the user can create new variables for each axis. This enables mathematical functions to be performed on data plotted **on any axis** (x, y1 and y2).

EIS measurements

EIS measurements can be made in both controlled potential and controlled current modes from 10 µHz to 11 MHz.
The patented **"drift correction"** algorithm and multiple stability parameters allow users to acquire high-quality data from their EIS measurements.





EC-Lab® Analysis package

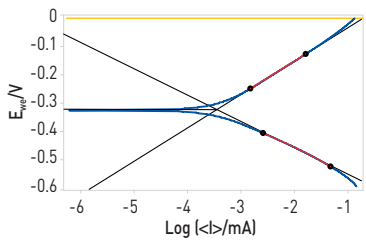
An extended range of analyses

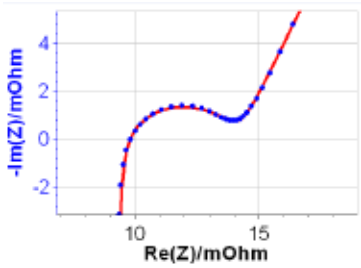
Display

Powerful electro-analytical analysis tools (such as peak find/height, convection wave, integral, Tafel fit, Rp determination) are available in EC-Lab®. These analyses incorporate typical fit routines (linear, polynomial, multi-exponential) and algorithms. All the analysis results are stored in a separate file.

Fitting

EC-Lab®'s EIS modeling package, ZFit, utilizes the equivalent circuit approach. There are over 150 standard circuits and two minimization algorithms available to help understand impedance plot information.
The user can define and build his own circuit model using a range of fourteen simple elements (R, C, L, Q, W, G, W_{δ}, W_{inf} M, G_{α}, G_{β}, L_{α}, M_{α}, M_{γ}). The last elements can be assimilated to transmission lines.
A batch processing feature allows the fitting of multiple cycles in an impedance experiment. Cable effects can be compensated by using cable compensation tool.





Simulation

Several tools are available to simulate CV curves, Tafel plots or EIS data and can be used as training tools.
CV Sim allows the user to create data with different mechanisms such as single (E) or multi (up to EEEEE) electron transfer. Electron transfer reactions can also be mixed with chemical reactions to simulate an EC mechanism.

General electrochemistry

- Peak Analysis...
- Wave Analysis...
- CV Fit...
- Levich...
- Koutecky-Levich...

Corrosion

- R_p Fit...
- Tafel Fit...
- Electrochemical Noise...
- Corr Sim...
- VASP Fit...
- CASP Fit...

EIS

- Z Fit...
- Z Sim...
- Mott-Schottky...
- Compensation...
- Kramers-Kronig...

Battery process

- Process data (capacity, efficiency, energy...)

Photovoltaic

- Photovoltaic analysis (fill factor, efficiency...)

Math

- Polynomial Fit...
- Multi-Exponential Fit...
- Line Fit...
- Subtract Files...
- Integral...
- Min Max...
- Filter...
- Fourier Transform...
- Linear Interpolation...

Detailed Specifications

Channels

		Premium	Essential
General			
EIS capability		10 µHz to 11 MHz	10 µHz to 1 MHz
EIS Quality Indicators		Yes	Yes (with "e" type channel board)
Analog Ramp Generator		Yes (1 MV/s), sampling rate 1 µs	N.A.
Floating option		Floating, WE to Ground, CE to Ground	CE to Ground
Permeation (WE to Ground)		Yes	No
Multi-electrode (CE to Ground)		Yes	Yes
Filters		Hardware/software	Software
Acquisition time		20 µs (1 µs with ARG option)	20 µs
Electrodes connections		2, 3, 4, 5	2, 3, 4, 5
IR compensation		Manual, EIS, current interrupt (software and hardware)	Manual, EIS, current interrupt (software)
Current			
Maximum current		±500 mA	±1A for "e" series chassis ±400 mA for VSP
Current ranges	standard board	9: 10 nA to 1 A	6: 10 µA to 1 A
	low current option	13: 1 pA to 1 A	N.A
Lowest accuracy	standard board	±100 pA on 10 nA range	±20 nA on 10 µA range
	low current option	±100 fA on 1 pA range	N.A
Lowest resolution	standard board	0.8 pA on 10 nA range	0.8 nA on 10 µA range
	low current option	80 aA on 1 pA range	N.A
Current booster	internal	1 A, 2 A, 4 A, 10 A, Up to 150 A	4 A for VSP only
	external	Premium External: HCV-3048 (±30 A/48 V)	2, 5, 10, 20, 80, 100 A, FlexP0060, FlexP0012 *
Input impedance		1 TΩ (//25 pF), ULC: 100 TΩ (//6 pF)	1 TΩ (//20 pF)
Voltage			
Compliance		±12 V	±10 V
Max applied potential		±10 V (±48 V with 1 A/48 V booster)	±10 V adjustable between [-20 ; +20] V *
Resolution		1 µV on 60 mV	5 µV on 300 mV
Accuracy		< ±1 mV	< 20 mV
Range		±2.5 V, ±5 V, ±10 V, ±25 mV, ±250 mV	±2.5 V, ±5 V, ±10 V
Maximum scan rate		200 V/s (1 MV/s with ARG option)	200 V/s
Control amplifier			
Potentiostat bandwidth		8 MHz	1 MHz
Potentiostat rise/fall time		< 500 ns	< 2 µs
General			
I/O (analog/TTL)		3/2	3/2
Interfaces		Ethernet, USB 2.0	Ethernet, USB 2.0

N.A.: not available **Except for SP-50e*

Chassis

Premium	SP-200	SP-300	VSP-300	VMP-300
Slots available	1	2	6	16
Dimension (WxDxH)	167 x 410 x 225 mm	205 x 410 x 225 mm	254 x 517 x 337 mm	534 x 565 x 315 mm
Weight	7.2 kg	7.5 kg	20 kg	30 kg
Power Requirement	350 W	350 W	650 W	1500 W

Essential	SP-50e	SP-150e	VSP	VSP-3e	VMP-3e
Slots available	1	2	5	8	16
Dimension (WxDxH)	136 x 372 x 209 mm	136 x 372 x 209 mm	435 x 335 x 95 mm	225 x 320 x 405 mm	448 x 455 x 280 mm
Weight	3.9 kg	3.9 kg	8 kg	12 kg	15 kg
Power Requirement	110 W	110 W	300 W	1000 W	1000 W

Applications

	Premium					Essential		
	Std	EIS	ULC*	Booster(1)	ARG**	Std	EIS	Booster (2)
Education	■	■				■	■	
General electrochemistry	■	■	■▒			■	■	
Electroanalytical	■	■	■			■▒	■▒	
Electro-catalysis	■▒	■▒	■▒	■	■	■▒	■▒	■▒
Nanotechnology/sensors	■▒	■▒	■	■▒	■▒	■▒	■▒	
Battery	■	■		■		■	■	■
Supercapacitor	■	■		■	■	■	■	■
Fuel cell/Electrolyzer	■	■		■	■	■	■	■
Solar cells	■	■		■		■	■	■
Electrolysis				■				■
Pack of cells	■▒	■▒		■▒		■▒	■	■
Corrosion	■	■	■			■▒	■▒	
Coatings	■▒	■	■	■▒	■▒	■▒	■▒	
Materials	■▒	■	■	■▒		■▒	■▒	

For each instrument, modules can be mixed together

▒ suitable ▒■ recommended ■ excellent

* ULC: Ultra Low Current ** ARG: Analog Ramp Generator (1) more details on page 11 (2) more details on pages 14-15.

Premium Boosters

	±1 A/±48 V	±2 A/±30 V	±4 A/[-3;14] V	±10 A/[-1;6] V	HCV-3048
Current					
Compliance	±1 A	±2 A	±4 A	±10 A	±30 A (±120 A with 4 units)
Accuracy	< 1 mA on 1 A range	< 2 mA on 2 A range	< 4 mA on 4 A range	< 10 mA on 10 A range	< 40 mA on 30 A range
Auto-ranging	yes	yes	yes	yes	yes (0.3 A; 3 A; 30 A)
Voltage					
Compliance	±49 V	±30 V	-3 V ; +14 V	-1 ; +6 V	-1 ; +50 V
Control	±48 V	±30 V	-3 V ; +10 V	-1 ; +6 V	0 ; +48 V
Features					
EIS frequencies	2 MHz - 10 µHz	1 MHz - 10 µHz	1 MHz - 10 µHz	1 MHz - 10 µHz	500 kHz - 10 µHz
Bandwidth (-3 dB)	> 2 MHz	> 3 MHz	> 4 MHz	> 8 MHz	120 kHz
Slew rate (no load)	> 15 V/µs	> 50 V/µs	> 50 V/µs	> 50 V/µs	> 20 V/µs
Rise/fall time (no load)	< 250 ns	< 200 ns	< 200 ns	< 200 ns	< 3 µs
Floating mode	yes	yes	yes	yes	yes
Parallel ability	yes	yes	yes	yes	yes up to 4
Connection	2, 3, 4, 5 leads	2, 3, 4, 5 leads	2, 3, 4, 5 leads	2, 3, 4, 5 leads	2, 3, 4 leads

Essential Boosters

	2/4/5 A	10/20 A	80 A/HCP-803	100 A/HCP-1005
Current				
Compliance	2 A: ±2 A, 4 A: ±4 A, 5 A: ±5 A	10 A: ±10 A, 20 A: ±20 A	±80 A	±100 A
Accuracy	2 A: < 4 mA on 2 A range, 4 A: < 8 mA on 4 A range, 5 A: < 10 mA on 5 A range	10 A: < 20 mA on 10 A range, 20 A: < 40 mA on 20 A range	< 800 mA on 80 A range	< 1 A on 100 A range
Auto-ranging	yes	yes	no	no
Voltage				
Compliance	±10 V adjustable between [-20 ; +20] V	±10 V adjustable between [-20 ; +20] V	±5 V (At 1 A) ±3 V (At 80 A)	0.1 - 5.9 V
Control				0.6 - 5 V
Features				
EIS max frequencies	2 A: up to 150 kHz, 4 A: up to 130 kHz, 5 A: up to 125 kHz	10 A: up to 80 kHz, 20 A: up to 30 kHz	up to 20 kHz	up to 10 kHz
Rise time and fall time (no load)	15 µs (potentio) 40 µs (galvano)	25 to 60 µs (potentio) 50 to 120 µs (galvano)	95 µs (potentio) 150 µs (galvano, 10 mΩ)	1.7 ms (potentio) 4 ms (galvano, 20 mΩ)
Parallel ability	no	no	no	no
Connection	2, 3, 4, 5 terminal leads	2, 3, 4, 5 terminal leads	2, 3, 4, 5 terminal leads	2, 3, 4, 5 terminal leads
General				
1 external input	security to open circuit (TTL level)	security to open circuit (TTL level)	security to open circuit (TTL level) Emergency push button	Security to open circuit (TTL level) Emergency push button

FlexP Essential Boosters

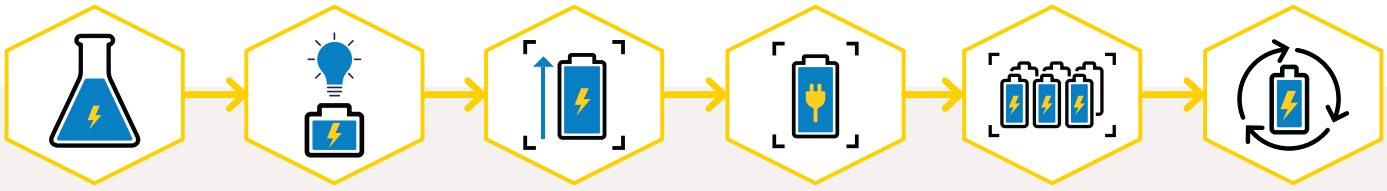
	FlexP 0060	FlexP 0012
Current		
Compliance	50 A up to 200 A (4 in parallel)	200 A up to 800 A (4 in parallel)
Accuracy	< 200 mA at 50 A	< 800 mA at 200 A
Voltage		
Compliance	[-2.5 ; +60] V	[-2.5 ; +11.9] V
Control		
Features		
EIS frequencies	10 kHz	
Bandwidth (-3dB)	-	
Rise time and fall time (no load)	< 10 µs	< 20 µs
Parallel ability	yes up to 4	
Connection	2, 3, 4 terminal leads	
General		
1 external input	Embedded (cell temperature and emergency)	

Battery Test Stations & Cyclers.

Testing throughout the battery value chain

Throughout the full battery value chain every single component must be thoroughly tested: electrodes, binder, separator, electrolyte, all the way to the commercial cell, and in a fast-paced research field, instruments need to keep up with innovation challenges:

- Channels must have high reliability to run lengthy, high-stakes cycling tests
- Battery tests require high safety levels
- Testing equipment and techniques must adapt to novel chemistries



Cell materials & components research → Research cell performance & characterization → Scale-up optimization Performance validation → Fast charging protocol optmization → Aging & benchmarking endurance High volume testing → Screening & second life evaluation

A solution for each cell format

From 15 µA to 300 A

Premium BCS range

8-channel modules

BCS-975R / 75 A // 300 A

- 3 ranges: 75 A / 7.5 A / 750 mA
- Parallelization: 4*150 A / 2*300 A
- Regenerative
- 0 V to 5 V

BCS-915 / 15 A // 120 A

- 5 ranges: 15 A down to 1.5 mA
- Parallelization: 1*120 A / 2*60A / 4*30A
- 0 V to 9 V

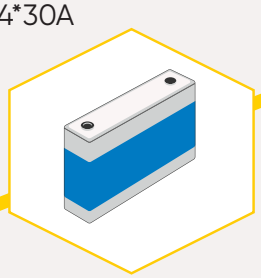
BCS-910 / 1.5 A

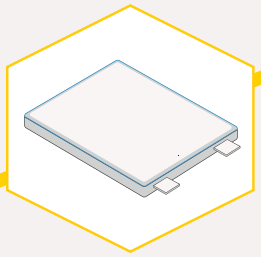
- 5 ranges: 1.5 A down to 150 µA
- 0 V to 10 V
- or -5 V to +5 V (/n)

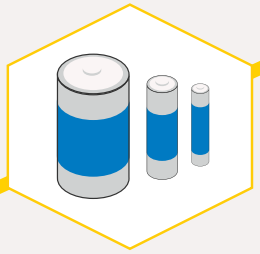
BCS-905 / 150 mA

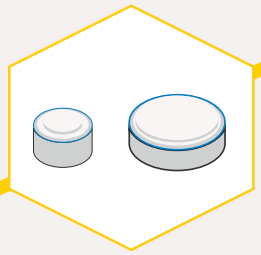
- 5 ranges: 150 mA down to 15 µA
- 0 V to 10 V
- or -2.5 V to +7.5 V (/n)

300 A









15 µA

Essential BCS range

32-channel modules (8U)

BCS-1012 / 6 A

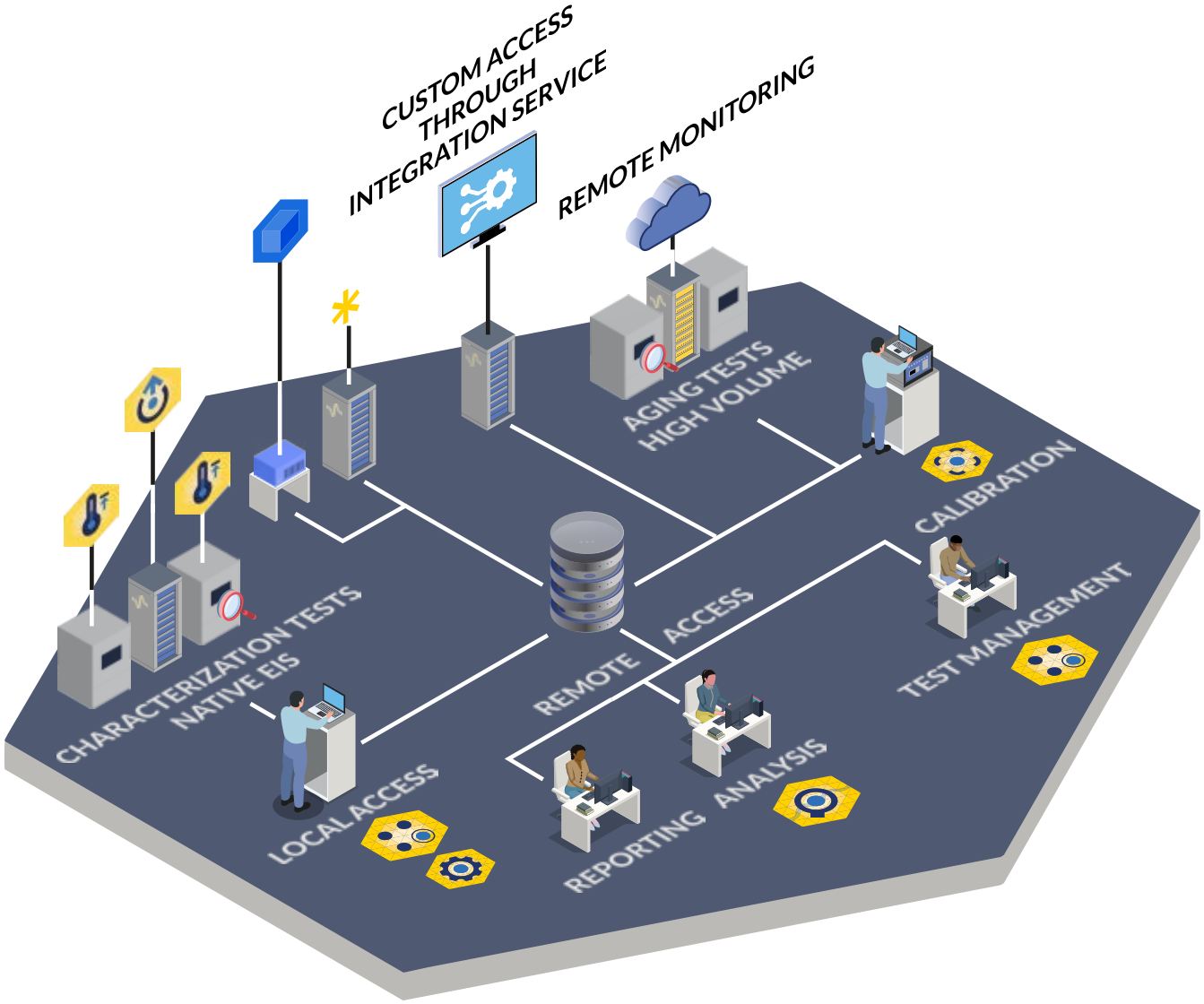
- 2 ranges: 6 A / 600 mA
- 0 V to 5 V

All-in-one adaptable and evolutive systems

- 4 cabinet sizes (6U, 12U, 24U, 38U)
- Systems running independantly without external PC required
- Get started and add modules autonomously at anytime during system operation
- Add more channels without stopping the test
- Update BT-Analysis™ without stopping the test

A global testing environment

From early development to high-throughput testing, our cyclers are built to accelerate innovation. At the heart of it all, BT-Lab® Suite empowers you with intuitive on-site & remote access, smart batch data analysis, and effortless reporting.



Climatic Chamber Control

Add climate chamber control & automation for a fully integrated testing solution

- Synchronize temperature ramp: start when all channels are ready
- Stability conditions check up
- A wide range of chamber compatibilities
- Integration support on new chambers or controllers

Why BioLogic for cycling?

Unique benefits for battery cell tests

Run reliable & safe tests

Our Battery Cycler architecture is specifically designed to meet the long term and high stakes battery cycling challenge with:

- A **dedicated, embedded operating system: not PC dependant.**
- Local storage redundancy.
- Real time **channel status updates** with the Global View.
- **Accessibility** either **remotely or on-site** at **any time**.
- Automatically stop tests - **safety limits** & BCS-Stop Button.

Adapt to evolving needs

Battery technologies and testing needs are constantly evolving. Stay ahead with our multi-channel battery cyclers.

- Autonomously **add more channels** to existing systems any time: hot connection with no impact on tests currently running.
- Achieve measurement from a few µA to 300 A.
- BT-Lab® software suite is **continuously upgraded**
- Run tests in **negative voltage** domain **down to -5 V**

Comprehensive from test to analysis

Our Battery Cyclers start with a turnkey installation and feature an **application-oriented design,** refined through years of experience and user feedback.

- **Automate test profiles & variables** with flexible test plan settings.
- **Monitor graph data in real time**.
- Automatically **generate and display graphs**.
- Analyze multiple sets of data simultaneously.

Last but not least, with fully **integrated EIS,** operation is seamless from the software interface, for an **all-in-one system**.

Control & measure with precision

Our Battery Cyclers integrate technology and expertise to ensure needs are met: offering precision, accuracy and resolution at its best.

- **1 ms** continuous sampling and **processing rate**
- **Up to 5 current ranges** adapt to various battery capacities and C-rates - maintaining the highest level of accuracy
- Smooth CC-CV switch
- **Low standard deviations** between channels
- Oversampling - **very low signal to noise ratio**
- **Voltage & current control**
- **Integrated coulometer** (onboard charge calculations)
- Multi-control instrument: galvano/potentio/rest/EIS

Premium Battery Cyclers

When cell design decisions demand precision & accuracy

The **BCS-900 series** represents the pinnacle of battery testing technology, featuring **four distinct modules**, engineered for the most demanding testing and cycling applications. Built with uncompromising performance in mind, these **high-performance** instruments deliver exceptional precision and versatility through their modular design.

Advanced Technical Specifications:

- Industry-leading 8-channel modular design
- Up to 5 scalable current ranges **from 15 µA to 300 A**
- Comprehensive voltage testing capability from **-5 V to 10 V**
- Superior measurement voltage precision
- **Native EIS from 10 mHz to 10 kHz**
- Fast control and sampling rate down to 1 ms
- Integrated temperature measurement

Native EIS

Negative voltage

BCS-900 series

BCS-905/910/915

High-end cycler for demanding needs

Continuing BioLogic's legacy of reliable instrumentation, the BCS-900 Battery Cycler is a trusted solution for advanced battery testing. It delivers high performance with a user-focused design, powered by the proven BT-Lab® Suite software.

With five current ranges, high resolution, high-precision coulometry, fast bandwidth response, and seamless integration with external equipment, it offers a full suite of advanced functions.

Optional fully native EIS capability provides fast, high-quality impedance measurements on every channel. Key parameters like SOC, SOH, and internal resistance can be tracked precisely—with no compromise on data quality.

The result is a modular platform suited to battery testing across industry, academia, quality control, and certification.

Specifications

- 8 channels rackable modules
- **BCS-905** (150 mA), **BCS-910** (1.5 A) and **BCS-915** (15 A)
- Extendable current **up to 120 A**
- **5 current ranges** on each module
- Cell tests **up to 10 V and down to -5 V**
- Fully **Native EIS:** From 10 mHz to 10 kHz
- HPC measurement down to 6 ppm
- Mix for **modularity** in 4 cabinet sizes: 6U, 12U, 24U, 38U
- A **high-end** measurement chain completed by 4-point connection cell holders

BCS-975R

High-power regenerative battery cycler

Designed for high-power performance testing, the BCS-975R is a regenerative battery cycler ideal for pouch and prismatic cell applications.

It combines precision and efficiency, tailored to demanding battery development. With native EIS and an extendable current range up to 300 A, the BCS-975R delivers advanced capabilities for high-current cycling and measurement.

Each unit supports up to eight channels, with up to 75 A per channel, up to three current ranges for precise control, and integrated temperature monitoring

Operation is fully supported by the BT-Lab® Suite, including BT-Test™ and BT-Analysis™, ensuring powerful test management and data processing.

Specifications

- 8 channels
- 3 ranges: 75 A / 7.5 A / 750 mA
- Parallelization allows 4 x 150 A / 2 x 300 A
- Cell tests from **0 V to 5 V**
- Fully integrated **native EIS** from 10 mHz to 2 kHz
- 16U cabinet
- Regenerative

Essential Battery Cyclers

When aging & screening tests require high volume cell cyclers

BCS-1000 series

BCS-1012

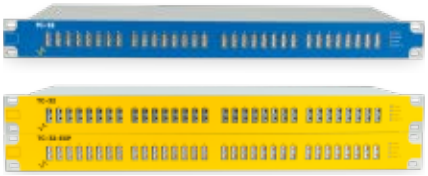
High-volume cycler for consistent performance

The **BCS-1012** is the first model in BioLogic's Essential Battery cycler series. It purpose-built for high-volume battery testing environments.
Ideal for cylindrical cells, it is designed for screening and aging studies that prioritizes efficiency and scalability, where throughput and reliability are critical.
By focusing on core capabilities, the BCS-1012 optimizes cost without compromising the quality and reliability expected from BioLogic instrumentation.

Features

- High channel density, optimizing floor space: 32-channels in 8U
- Up to 6 A, ideal for cylindrical cells & small pouches
- 2 current ranges for control & measurement
- Auxiliary temperature monitoring
- Local data processing capabilities - keep test data secure.

Auxiliary Temperature Modules



TC-32 & TC-32 Exp

32-channel thermocouple module

The **TC-32** is an auxiliary temperature measurement add-on thermocouples and can be used with both the Premium Series and Essential Battery Cyclers. There are two modules, the TC-32 for the first 32 thermocouple channels and the TC-32-EXP for an additional 32 thermocouple channels. Both modules integrate seamlessly into the BCS System and are controlled by BT-Lab® Suite.

Features

- **2 modules**, 32-channel base and 32-channel expansion
- Mounted in **BCS-cabinets** (1U per module)
- **Flexible mapping**: up to 3 TC for one channel
- **Climate chamber** temperature monitoring
- Live data acquisition and transfer

Precision Calibration Modules

BCS-CAL

Automated calibration kit for BCS Cyclers

Designed to perform fast verification and calibration, and outputs NIST traceable certificates.

The BCS-CAL offers 8-channel calibration, perfectly matched to the channel configuration of BioLogic's Premium Battery Cyclers – **NO need for human intervention during calibration of a module.**

With the ability to calibrate **BCS channels for voltage, current and temperature**, the BCS-CAL provides a robust solution for maintaining the highest standards of measurement, critical for large battery testing installations.

Features

- 8-channel verification and calibration in 20 minutes
- Calibrate and verify current, voltage and temperature
- Long term stability of metrological specifications
- On-site or at maintenance center calibration
- Require service or get equipped with BCS-Cal for optimal equipement availability

Battery Cables & Holders

A range of durable high quality 4-point cell holders and cables are available for coin, pouch, cylindrical & prismatic cells, assuring users get:

- True cell values
- More reliable measurements especially during EIS testing
- Higher fidelity
- Easy & quick connections

All details can be found in the Accessory Catalog

BT-Lab® Suite: from reliable tests...

BT-Test™

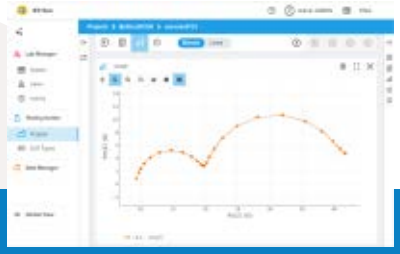
BT-Test™ acts as the central hub for designing, running, & monitoring battery testing experiments. It provides a user-friendly interface to configure various testing protocols.

Flexible & automated test plan design

- Application oriented software
- Modern interface
- User-friendly grid to program tests (CCCV, HPPC, GITT, Duty cycles...)
- Control in Rest, galvanostatic, potentiostatic mode
- Native built-in EIS
- Dynamic variables
- User management for confidentiality

Test run monitoring & acquisition

- Global view of channel status
- Activity log access
- On-the-fly test modifications
- Live data display
- Automatic test export using tags with BT-Export™
- Flexible manual export



Native EIS

EIS is native and **fully integrated into BCS cyclers**

- Seamless operation: no third-party instrument necessary
- Data fit to a predefined circuit thanks to Zfit analysis

Evolutive cycling with dynamic variables

- No need to record at high frequencies, the instrument does all the calculations at the end of each task (task variables) and during the "CALCULATE" task (user variables).
- Calculated by BT-Test™ embedded in the instrument, at the time base (1 ms for BCS-900).

Safe & secure data with BCS-CORE

With embedded BT-Test™ Edge in the BCS-CORE and redundant storage, data has never been more secure!

- Embedded BT-Test™ Edge, using a WebApp
- Autonomous system
- Local and remote setup and monitoring
- Redundant storage for data safety

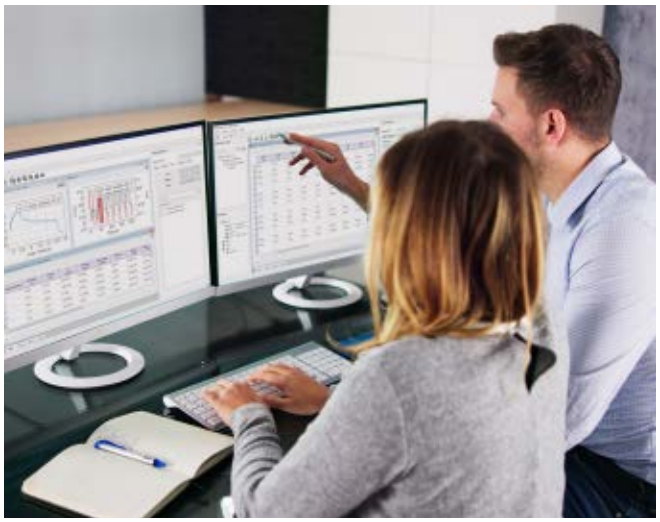
BT-Clim™ option featuring the Set Temp task

Cycle under controlled environmental conditions, ensuring superior automation, optimized chamber usage, high channel occupancy rate, operator efficiency, and safety for tests.

... to efficient analysis

BT-Analysis™

BT-Analysis™ simplifies the process of analyzing large datasheets from battery cycling experiments. It can import data from multiple tests simultaneously, then apply the same analysis to each dataset using the Recipes tool. These Recipes automate common analytical tasks, saving time and ensuring consistent results.



Automated & flexible battery test analysis

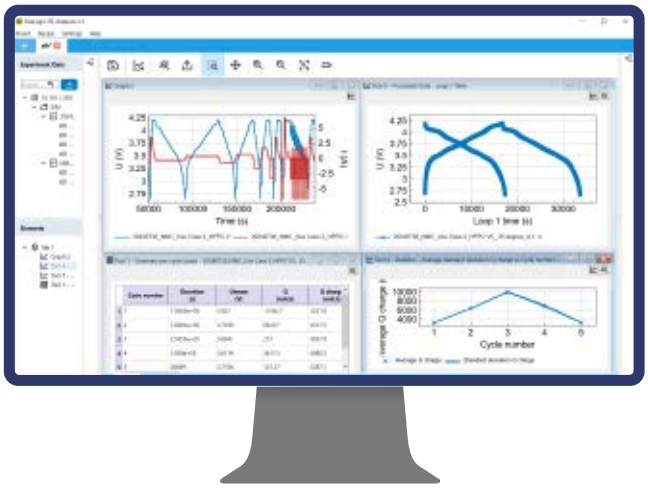
- Save work with Boards
- Online and offline access
- Direct access to BCS-900 system
- Compatible with BCS-800 .mpr files
- Tree view panel for easy navigation

Powerful data analysis

- Tools with statistics
- Easily plot and customize display
- Automate data processing (Recipe)
- Live data importation (Refresh)
- Fast learning curve

Modern interface built for batteries

- Application oriented
- Cycle and Loop analysis and filter
- Battery comparisons
- EIS analysis with ZFit with predefined equivalent circuit



Test reporting & export

- Generated displays for reports during tests
- Easy-to-use: flexible and customizable
- Recipes for automatic graph and table generation
- Export tables and formatted graphics

BT-Export™

BT-Export™ acts as the batch and bulk automatic data export that support multiple file types, enabling both data and metadata export with real-time processing and automatic tag-based screening. It provides direct access to BCS-900 systems and remains compatible with BCS-800 .mpr files.

BT-Cal™

BT-Cal™ is used in coordination with the BCS-CAL module to automate the calibration of BioLogic BCS instruments. This software features a flexible interface, that streamlines the calibration process. It also enables the creation of customized calibration and verification reports.

Native EIS

Electrochemical Impedance Spectroscopy (EIS) is a valuable tool for researchers and developers in the field of battery technology. It offers a non-destructive way to gain insights into the internal processes of a battery, providing information that traditional DC measurements cannot. BioLogic's instruments, with their fast bandwidth controllers, offer both potentio- and galvano- control for EIS measurements in a 10 kHz to 10 mHz frequency range.

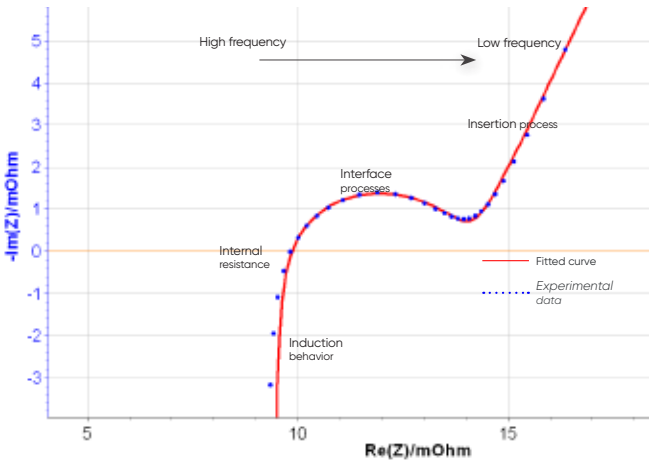
Why EIS for battery testing?

By applying a small AC signal across a range of frequencies, EIS measures the battery's impedance. Analyzing this data unlocks details about various aspects of the battery's operation, including:

- Charge transfer kinetics at the electrode/ electrolyte interface
- Ionic transport properties within the electrolyte
- Solid Electrolyte Interface (SEI) formation and stability
- Equivalent circuit modeling for battery performance prediction
- Indicate degradation mechanisms like electrode aging or electrolyte breakdown.

Benefits of Native and Integrated EIS

Integrated EIS eliminates the need for third-party instrumentation, offering a more streamlined and user-friendly experience. With native EIS, the entire testing process, from setting parameters to data acquisition and analysis, can be performed within a single platform, improving efficiency, and reducing risk of errors during data transfer between instruments.



MPG-200 series

MPG-2/205

Premium Research Battery Cyclers

The **MPG-200 series** is offered in two fixed configurations with or without EIS on every channel:

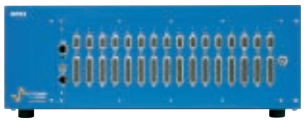
- **MPG-2**: 16 channels/100 mA each
- **MPG-205**: 8 channels/5 A each

The **MPG-200 series** can be provided in a rack capable of supporting up to 5 units.

Only one computer is necessary to control all units thanks to the solution's Ethernet capability. With this connection, the **MPG-200 series** can be installed on a Local Area Network to allow multiple users to access instruments and follow battery cycling remotely.

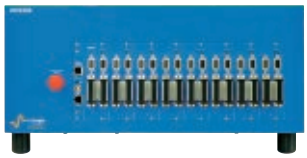
The **MPG-200 series** offers temperature measurement and three optional connection modes to the battery (battery holder, short or long cables). Each channel has two analog inputs and one analog output to interface with external instruments.

MPG-2



- 16 channels
- 100 mA
- 3 electrodes/5 points

MPG-205



- 8 channels
- 5 A
- 2 electrodes/4 points

Specifications

- Current ranging: 10 µA up to max current with a resolution 0.004% of the range
- Resolution of 300 µV programmable down to 5 µV by adjusting the dynamic range (100 µV resolution on 5 V range)
- Acquisition time: 200 µs
- No limit in time and data recording

Options

- EIS (100 kHz to 10 µHz)
- Rack (5 units)
- Short (25 cm) or long cables (2.5 & 3 m)
- Temperature probe
- Coin cell, cylindrical and pouch cell holders (see Accessories catalog)
- 5 A booster for MPG 2

Software

Like BioLogic potentiostat / galvanostats, the MPG-200 series is supplied with **EC-Lab® software.** It provides techniques specifically designed for batteries and general electrochemistry applications, such as cyclic voltammetry. An extended range of analyses are also available (capacity, efficiency, energy, etc). Note that **EC-Lab®** allows the control of several VMP-3e/VMP-300 or MPG-200 instruments from one session.

Detailed Specifications

	BCS-905 & BCS-905/n	BCS-910 & BCS-910/n	BCS-915	BCS-975R
Channels	8			
Voltage				
Range	0 V to 10 V -2.5 V to 7.5 V for /n model	0 V to 10 V -5 V o 5V for /n model	0 V to 9 V	0 V to 5 V
Control resolution	150 µV			100 µV
Measurement resolution	40 µV (18 bit)			0.360 µV (24 bit)
Accuracy	0.3 mV + 0.01% of setting			1.5 mV + 0.05% of setting
Slew rate	150 kV/s	150 kV/s	3 kV/s	2.5 kV/s
Current				
Max (continuous) per channel	±150 mA	±1.5 A	±15 A	±75 A
Ranges	5: 100 mA down to 10 µA	5: 1 A down to 0.1 mA	5: 10 A down to 1 mA	3: 75 A down to 750 mA
Control resolution	Down to 0.8 nA	Down to 8 nA	Down to 80 nA	Down to 360 nA
Measurement resolution	Down to 0.2 nA (18 bit)	Down to 2 nA (18 bit)	Down to 20 nA (18 bit)	Down to 89 nA (24 bit)
Accuracy	0.015% of FSR* + 0.05% of setting	0.015% of FSR* (100 mA) + 0.05% of setting 0.015% of FSR* (1 A) + 0.1% of setting	0.015% of FSR* (100 mA) + 0.05% of setting 0.015% of FSR* (1 A) + 0.1% of setting 0.04% of FSR* (10 A) + 0.3% of setting	0.03% of FSR* + 0.3% of setting
Parallel ability	No	No	Yes, Up to ±120 A with 8 channels	Yes, Up to 2 x ±300 A with 4 channels
EIS				
Built-in	Optional on each module			
Range	10 kHz - 10 mHz			2 kHz - 10 mHz
Measurement				
Acquisition time	1 ms			1 ms
Time base	1 ms			5 ms
Additional measurement				
Thermocouple	NA	K Type on each channel -25 °C +200 °C; accuracy of ±2 °C		Optional Auxiliary
Cell connection				
	4 terminal leads + Ground		4 terminal leads	
General				
Height	1U	2U	4U	16U
Weight	6.5 kg	11 kg	24.5 kg	120 kg
Power consumption	60 W	220 W	1700 W	5000 W

* FSR: Full Scale Range / Pictures and specifications subject to change / Specifications given with 2.5 m cell cable.

Software	BT-Lab® Suite
General	• Grid for programming, pop-up global view window to visualize all channels • Powerful monitoring system: DUT status, activity log, grid and graph (BT-Test™) • Easy data access and data management • Modify on-the-fly settings
Tasks**	REST, CC, CV, AUP, CALCULATE, CC_CV, CLD, CPW, CS, DCIR, G-ACIR, GEIS, PEIS, LOOP, VS
Task Parameters	• Up to 6 task limits among: t, U, ΔU, I, |I|, Q, Q_{charge}, $Q_{discharge}$, P, |P|, E, E_{charge}, $E_{discharge}$ • Up to 3 record conditions among: Δt, |ΔU|, |ΔI|, |ΔQ| • Ranges from 10 µA to 10 A
Safety Limits	U_{min}, U_{max}, $\|I\|_{min}$, $\|I\|_{max}$, $\|Q\|_{min}$, $\|Q\|_{max}$, T_{min}, T_{max}, AUX
Grid	Up to 128 steps. Up to 4 Loops: self-contained or nested. Accessible tool bar to edit the steps of the grid. Intelligible task display for control, limits and records
Graph	Accessible toolbar to adjust graph display, application oriented predefined graph representations, easily customizable display of traces, high performance graphics adapted to large volume of data, filters by steps, cycle and/or loop, unlimited number of traces, graphs or tabs (BT-Analysis™)
Cycles	Customizable cycles: Charge - Discharge or Discharge - Charge
Variables	• Creation of user variables to dynamically program Test Plans • Use of task variables and DUT variables
Analyses	Summary tables, statistic tools, automatic tool for dQ/dV analysis and export, Zfit

** Available task may depend on module type

	BCS-1012
Channels	32
Voltage	
Range	0 V to 5 V
Control resolution	200 µV
Measurement resolution	0.83 µV (24 bit)
Accuracy	0.5 mV + 0.04% of setting
Slew rate	5 kV/s
Current	
Max (continuous) per channel	±6 A
Ranges	2: ±6 A, ±600 mA
Control resolution	Down to 1.2 µA
Measurement resolution	Down to 8.9 nA (24 bit)
Accuracy	0.06% of FSR 0.06% of FSR (6 A) + 0.3% of setting
Parallel ability	No
EIS	
Built-in	No
Measurement	
Acquisition time	5 ms
Time base	5 ms
Additional measurement	
Thermocouple	Optional Auxiliary
Cell connection	
	4 terminal leads + Ground
General	
Height	8U
Weight	36.5 kg
Power consumption	1750 W

	MPG-2	MPG-205
Channels/module	16	8
Cell connection	2, 3, 4 or 5 terminal leads	2 or 4 terminal leads
Cell control		
Compliance	±10 V @ 100 mA	-2 V; 9 V @ 5 A
Maximum current	±100 mA continuous	±5 A continuous
Maximum potential	10 V @ 100 mA	9 V @ 5 A
Potential resolution	300 µV down to 5 µV	
Current resolution	0.004% of FSR* /0.8 nA	
Current accuracy	±0.1% of control ±0.01% of FSR*	
Voltage measurement		
Ranges	±10 V, ±5 V, ±2.5 V	0 - 5 V, 0 - 10 V
Accuracy	±0.1% of control ±0.01% of FSR*	
Resolution	0.004% of FSR*	
Acquisition speed	200 µs	
Noise (peak to peak 0-100 kHz)	600 µV	
Curent measurement		
Ranges	±100 mA, ±10 mA, ±1 mA, ±100 µA, ±10 µA, auto-range	±5 A, ±1 A, ±100 mA, ±10 mA, ±1 mA, ±100 µA, ±10 µA, autorange
Accuracy	±0.1% of control ±0.01% of FSR*	
EIS option		
Frequency range	100 kHz to 10 µHz	
Amplitude	1 mVpp to 1 Vpp, 0.1% to 50% of the current range	
Mode	Single Sine, Multi Sine, FFT analyis	
General		
Dimensions (W x D x H)	260 x 495 x 465 mm	254 x 494 x 454 mm
Power requirements	350 W, 85-264 V, 47-440 Hz	860 W, 85-264 Vac, 47-440 Hz
Weight	17 kg	25 kg

*FSR: Full Scale Range

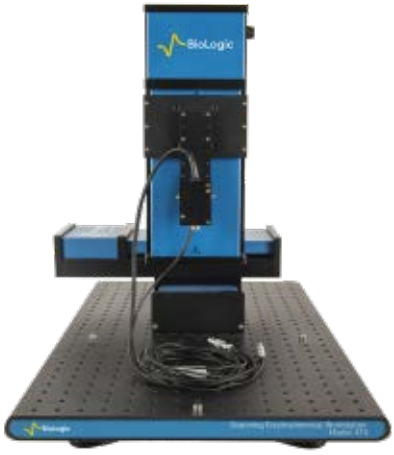
Scanning Electrochemical Workstations

Systems for localized electrochemistry measurement industry.

The traditional potentiostat/galvanostat measures an average response of the electrode material, which is often considered to be homogeneous. However, for more detailed studies, it is interesting to look beyond this homogeneity to study the spatial dependence of electrode properties.

Our modular localized electrochemistry platform can include up to 9 distinct localized measurement techniques. The table below summarizes the techniques, the type of information that can be obtained, the resolution and typical applications.

M470



M470

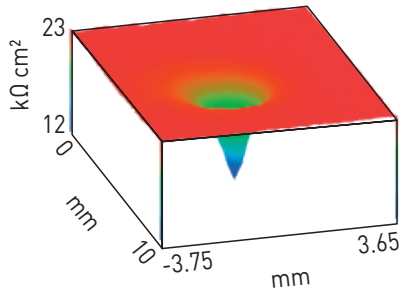
Ultra-high-resolution scanning stage with multiple modular techniques

The M470 is the 4th generation of scanning probe systems, which includes a high-resolution scanning stage and the most comprehensive range of modular scanning probe techniques.
The M470 achieves the perfect balance of scan speed, resolution and accuracy to deliver the highest standard in spatially resolved electrochemical measurements.
The fast, precise, closed-loop positioning system is designed specifically for the demands of scanning probe electrochemistry.

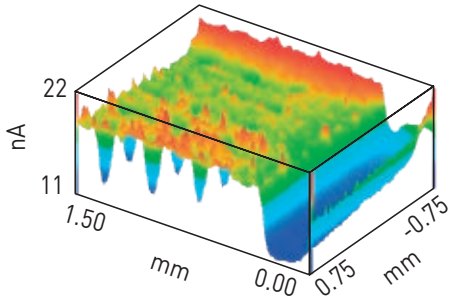
Scanning techniques		Information	Resolution	Applications
SECM	Scanning ElectroChemical Microscopy	Reactivity, conductivity	Probe size	Biology, catalysis, corrosion and coatings, materials, sensors, and sustainable energy, including fuel cells and batteries
ac-SECM	Alternating Current Scanning ElectroChemical Microscopy	Reactivity, conductivity, or localized EIS (no mediator required)	Probe size	Catalysis, corrosion and coatings, materials, sensors, and sustainable energy, including fuel cells and batteries
ic-SECM	Intermittent Contact Scanning ElectroChemical Microscopy	Topography and reactivity or conductivity or localized EIS.	Probe size	Biology, catalysis, corrosion and coatings, materials, sensors, and sustainable energy, including fuel cells and batteries
LEIS	Localized Electrochemical Impedance Spectroscopy	Local impedance of the sample	Hundreds of µm	Batteries, and corrosion and coatings
SVP (SVET)	Scanning Vibrating Probe (Scanning Vibrating Electrode Technique)	Electrochemical activity	Tens of µm	Biology, batteries, and corrosion
SDS (SDC)	Scanning Droplet System (Cell)	dc electrochemistry in a droplet of electrolyte	Hundreds of µm	Catalysis, corrosion and coatings, and materials
ac-SDS	Alternating Current Scanning Droplet System	Impedance in a droplet of electrolyte	Hundreds of µm	Catalysis, corrosion and coatings, and materials
SKP	Scanning Kelvin Probe	Contact potential difference related to work function, and/ or corrosion potential/ topography	Probe size	Corrosion and coatings, materials, and sustainable energy, particularly photovoltaics
OSP	Optical Surface Profiler	Topography	100 nm (Z) 30 µm (X & Y)	Any field, complementary to the above

	M470
Number of techniques	9 techniques
Modular upgradability	yes
Positioning resolution	20 nm
Scanning range	110 mm
Max. scan speed	10 mm/s
Piezo positioning	yes (ic-SECM)
Potential range	±10 V
Current ranges	1 A to 100 pA
Analog to digital resolution	24-bit
Impedance range (VMP 300)	10 µHz to 3 MHz
VMP 300 family compatibility	yes

Scan-Lab® Software

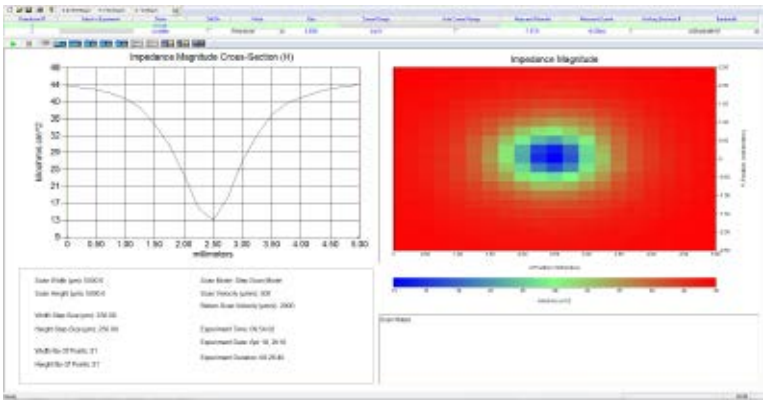


SECM area scan



LEIS area scan

All scanning probe microscopy systems come with **software updates** that allow the user to benefit from new features.
The user is able to select an experiment from within the technique to provide a powerful user interface, fully configurable with options to save and recall complex setups.
Data can be manipulated within the experiment and allows 2D and **3D heat map** presentations as well as advanced analysis features. All experiments can be combined in a cutting-edge sequencing engine that incorporates logic elements such as loops, delays, probe movement and more, to provide a powerful research tool now and for the future.
3DIsoPlot adds a further component to the line-up by providing fully rendered **3D data** display. 3DIsoPlot allows data to be rotated, angled, flipped, scaled, zoomed and more to provide beautifully rendered imagery over a huge range of scales suitable for large posters or projections.
The Microscopic Image Rapid Analysis (MIRA) package rounds off the line-up with 2D and 3D surface analysis features for experiments such as approach curves and area scan imagery. This truly powerful package is gaining popularity due to its strong analytical capabilities.



The M470 is compatible with a large range of potentiostat /galvanostats:

- Single potentiostat: SP-200.
- Multichannel potentiostat: SP-300, VSP-300 and VMP-300

Any SP-/VSP-/VMP-configuration offers high dc-current measurement sensitivity and increased EIS bandwidth. Owners of Premium potentiostats have the option of purchasing the M470 system with a hardware interface to connect to their existing potentiostat.

To facilitate the mounting of low current amplifiers near the electrochemical cell, adjustable stands and brackets are provided which mount directly to the M470 base plate.

Probes

The foundation of a great measurement is a great probe, that's why we provide one of the most comprehensive range of probes, each individually characterized.

Technique	Materials	Options / sizes
SECM / ic-SECM	fused silica & platinum: Ø 4 mm	10, 15, 25 µm
SECM	borosilicate & platinum: Ø 2 mm	1 µm †
SVP (SVET)	LDPE & platinum	> 5 µm
LEIS	LDPE & platinum	> 5 µm
SKP	brass & tungsten	150 or 500 µm
SDS	PEEK	100 or 500 µm

† Each pack includes a 2 mm to 4 mm adaptor.

SECM

LEIS

SKP

Tools

µTricell ™

A wide variety of optional accessories are also available, including various probe options, cell options (**environmental TriCell™, µTriCell™, shallow µTriCell™, Foil Cell**) and long working distance optical video microscope (**VCAM3**). Additionally, the **USB-PIO** module allows the M470 to monitor digital signal levels and switch external hardware synchronized with experiments and movements.

Tricell™

Glove Box Cables

Optional glove box cables are available for the M470. The cables replace the standard cables of the M470 allowing the control unit to remain outside of the glove box, while the scan head and attached devices are used inside the glove box. Each set includes the necessary cables and bulk head connector.

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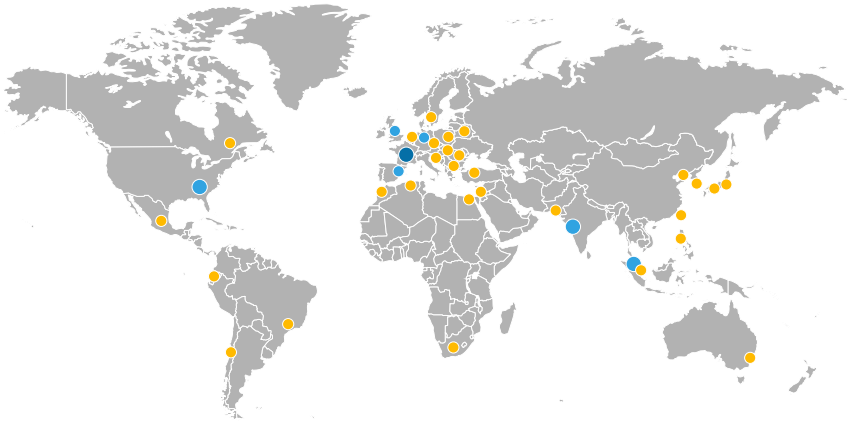

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We here at BioLogic pride ourselves on the quality and robustness of our instruments. However if you, for whatever reason, encounter a problem with your instrument, our global support network will help find you a solution quickly and effectively.

If you need more information, or perhaps a little inspiration, you can browse our ever-growing support database with hundreds of Learning Center articles, application/technical notes and support videos at www.biologic.net.

Catalog EC-BR-034-g released April 2025 - Specifications and pictures subject to change.

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