BioLogic

BATTERY CYCLERS

BCS Systems & BT-Lab® Suite.





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Charge ahead with battery innovation

From research to industry

In a fast-paced research field, demands require instruments to keep up with innovation challenges:

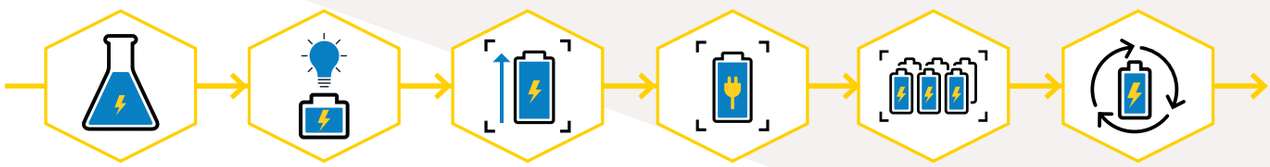
- Cycling tests are lengthy, require many channels, and therefore must have **high reliability**
- Battery tests represent high stakes and require a high safety level
- **Novel chemistries** push research scientists to **adapt testing equipment** and techniques

Efficiency is key: **Electrochemical Impedance Spectroscopy (EIS)**, in addition to classical techniques, allows rapid and accurate evaluation of key cell criteria during its life cycle.



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 there are unique challenges at every step:



Materials for cell components research

Research cell performance & characterization

Scale-up & Manufacturing optimization – Commercial cell performance validation

Fast charging protocol optimization

Aging & benchmarking – Endurance & High volume testing

Screening & second life evaluation



40 years of experience

For more than 40 years BioLogic has dedicated itself to the research and development of electrochemical instruments for research in energy storage. This dedication has earned BioLogic a reputation as **a global leader in the production of battery testing and analysis instruments.**

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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.

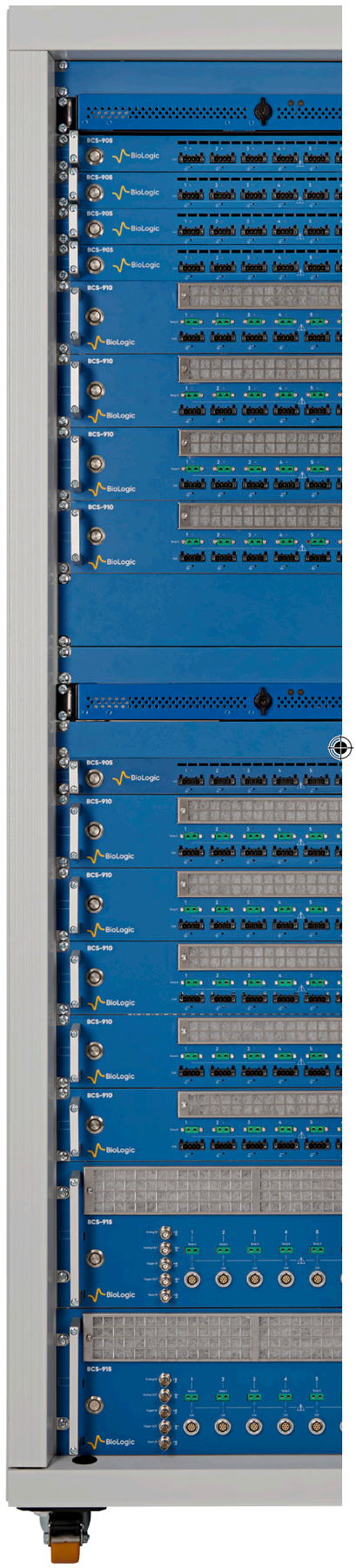
- **Automate test profiles & variables** with flexible test plan settings.
- **Monitor graph data in real time**.
- Automatically **generate and display graphs**.
- Analyze multiple sets of data simultaneously.

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



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Premium Battery Cyclers

BCS-900 series

When cell design decisions deserve 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: **40 µV resolution**
- **Native EIS from 10 mHz to 10 kHz**
- Fast control and sampling rate down to 1 ms
- Integrated temperature measurement

Native EIS

Electrochemical Impedance Spectroscopy (EIS) is fully integrated into both the hardware and software, enabling impedance measurements to be seamlessly included in your test protocol. There's no need to interrupt the test, disconnect the cells, or add an external multiplexer to the setup.

Negative voltage

When testing research cells, especially symmetrical or half cells it is often required to control and measure in the negative voltage domain: for that purpose the negative version (/n) of the BCS is available.

Essential Battery Cyclers

BCS-1000 series

When aging & screening tests require high volume cell cyclers



The BCS-1012 represents our entry into the Essential 1000 series, designed specifically for **high-volume battery testing** facilities. Built specifically for battery screening and aging studies, this instrument delivers focused functionality that optimizes costs without sacrificing the quality standards you expect from BioLogic, including:

- **High channel density**, optimizing testing floor occupancy
- Up to **6 A**
- Up to 3 current ranges for precise control
- Auxiliary **temperature monitoring** system
- Ideal for **cylindrical cells**
- Local data processing capabilities - keep test data secure.

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A solution for each cell format

From 15 µA to 300 A

Premium BCS range

8-channel modules

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)

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-915 / 15 A / 120 A



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

BCS-975R / 75 A / 300 A



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



Essential BCS range

32-channel modules (8U)

BCS-1012 / 6 A

- 3 ranges: 6 A / 600 mA / 60 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



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BT-Lab® Suite: from reliable tests...

BT-Test™

Performance based software for cycling control, acquisition & monitoring



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

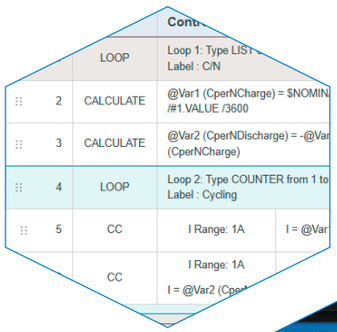
- Global view of channel status
- Activity log access
- On-the-fly test modifications
- Live data display
- Automatic test export using tags with BT-Export™
- Flexible manual export



Native EIS

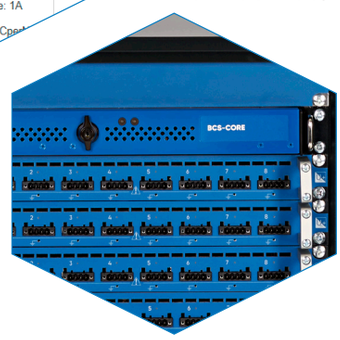
EIS is native and **fully integrated into BCS cyclers:**

- 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.

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... to efficient analysis

BT-Analysis™

Efficiency through custom & automated batch data processing and display



Automated & flexible battery test analysis

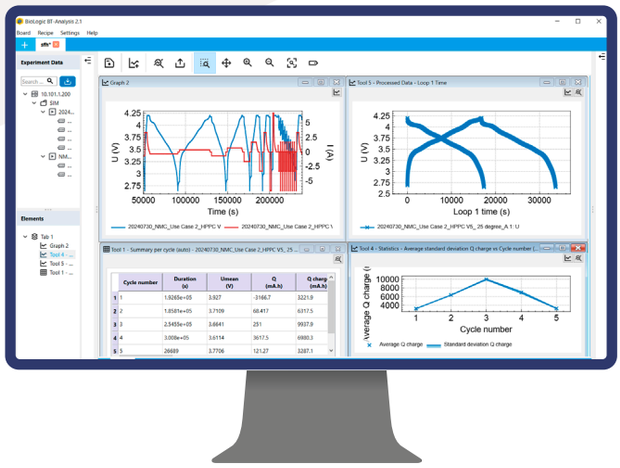
- Save work with Boards
- Online and offline access
- Direct access to BCS-900 system
- Compatible with BCS-800 .mpr files
- Tree view panel for easy navigation

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™

Batch & bulk automatic data export support multiple file types

- Data and meta data export
- Automatic screening of “tag” to export
- Real time export
- Direct access to BCS-900 system
- Compatible with BCS-800 .mpr files

BT-Cal™

The automated calibration tool

BT-Cal™, the software automating the BCS-CAL tool, features a flexible interface allowing optimized efficiency when verifying and calibrating BCS instruments. Generate personalized calibration and verification reports.

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Integrated in a global testing environment

Flexibility & modularity at every stage

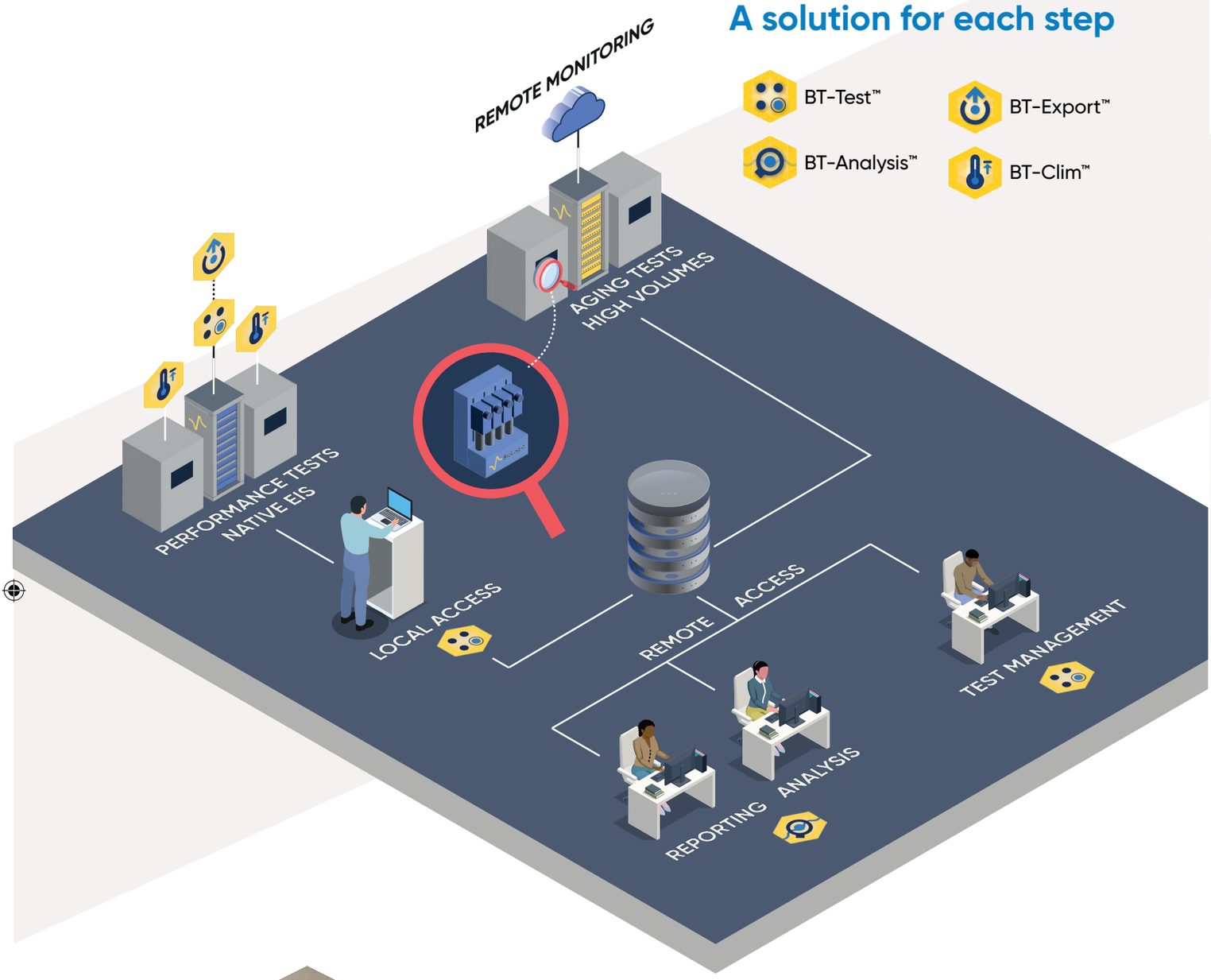
A solution for each step

BT-Test™

BT-Export™

BT-Analysis™

BT-Clim™





Climatic Chamber Control

- 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

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One battery partner from A to Z

Master the full measurement chain using high quality equipment & accessories



For connecting test cells

A range of durable high quality cell holders with **4-point connections ensure high accuracy measurements**.
Available cell holders for coin cell, pouch cell, cylindrical cell and prismatic cell assure users get:

- True cell values.
- More reliable measurements.
- Higher fidelity.
- Easy and quick connections.

Get access to Battery Cyclers accessories: a one-stop-shop to suit every need.

Metrology verification & calibration with the BCS-CAL

BCS-CAL: the tool to guarantee specifications

- 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



For tests that require more

Our Battery Cyclers may be complemented with other **high-precision** electrochemical workstations from BioLogic.



Validate material components for cell design with the VMP-3e

- **Wide EIS frequency range** for characterization of insertion processes
- Quality indicators for the best impedance measurements
- Research cell with 3 electrode system
- Measurements down to -10 V

Increase power capabilities with the FlexP for Pack & Stack

- Highly suitable for Redox Flow Batteries and fuel cell stacks
- DC and AC instruments with EIS up to 10 kHz
- **Extended voltage range** up to 60 V

Find out more about EC-Lab: potentiostats built to handle almost any application imaginable.

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Detailed Specification

	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}
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 analysis and export, Zfit

** Available task may depend on module type

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	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	3: ±6 A, ±600 mA, ±60 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

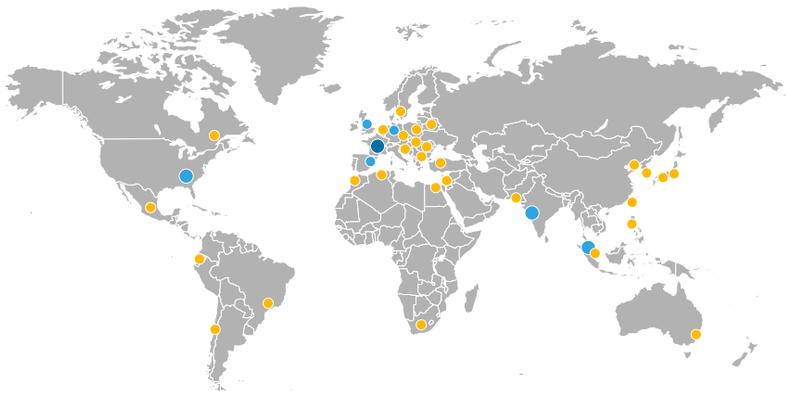


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Brochure BT-BR-062-a released April 2025 – Specifications and pictures subject to change.

Always by your side. Wherever you are.

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 Battery Cycler, 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.

Application notes **Learning center** **Tutorials** **Videos**

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Shaping the future. Together.

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