

EC Frontier

Electrochemical Instruments & Systems

Electrochemical Analysis, Rotating Electrode Measurements
and Batch Electrosynthesis



ORIGINAL MANUFACTURER
EC Frontier Co., Ltd., Japan



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Best for: Electrochemical Analysis & Battery Testing

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RDE / RRDE Measurements
80-8,000 rpm
360 Shaft Positioning*



Best for: Rotating Electrode Studies

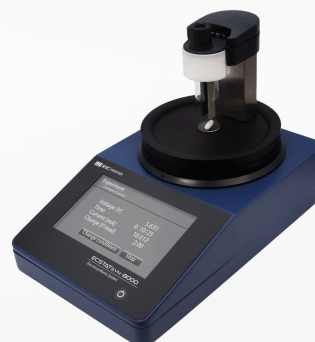
*ECR-6100c only

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ECSTATsyn-8000

Batch Electrosynthesis System

Standalone Touchscreen Control
Integrated Magnetic Stirring
Six Measurement Techniques



Best for: Standalone Batch Electrosynthesis

Laboratory Equipment Series —Electrochemical Testing & Analysis

ECstat-302c

Potential / Galvanostat Analyzer

A compact single-channel platform for multi-potential monitoring and automated electrochemical testing.

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Product Overview

The ECstat-302c is a compact single-channel potential / galvanostat for electrochemical research and battery testing. It supports multi-potential monitoring and a broad range of routine electrochemical measurements. Optional ECstat Advance software enables automated sequences and coordinated multi-device workflows, while the optional ECboost-4002c extends the system for expanded-current-range electrochemical and charge-discharge measurements.

Multi-Potential Monitoring

Measurement Context	Electrode Pair	Recorded Data
General electrochemistry	WE-RE	VoltageWR
	CE-RE	VoltageCR
	WE-CE	VoltageWC
Three-electrode battery	Positive-Negative	VoltagePN
	Positive-Reference	VoltagePR
	Negative-Reference	VoltageNR

Model Designation: The suffix "c" identifies the overseas version. The model number shown on the product or in certain product images may not include this suffix.



Key Features

- Multi-Potential Monitoring**
Simultaneously records WE-RE, WE-CE, and CE-RE voltages, providing enhanced visibility into electrode behavior and cell-voltage distribution.
- Automated Experimental Workflows**
Supports user-defined sequences, repeated cycles, event-based control, and coordinated operation of multiple compatible devices through the optional ECstat Advance software.
- Versatile Electrochemical Testing**
Supports routine electrochemical measurements, electrode-resolved potential monitoring, and dedicated charge-discharge workflows for electrochemical cells and battery systems.
- Expandable Current Capability**
Provides standard operation up to ± 30 mA and can be expanded to ± 300 mA using the optional ECboost-4002c current booster.





Measurement Capabilities and Technical Specifications

Item		Specification
Measurement Techniques	Potential sweep	Cyclic Voltammetry (CV); Linear Sweep Voltammetry (LSV)
	Open-circuit monitoring	Open Circuit Potential (OCP)
	Time-domain measurements	Amperometry (i-t); Chronoamperometry (CA); Potentiometry (v-t); Chronopotentiometry (CP)
	Pulse voltammetry	Normal Pulse Voltammetry (NPV); Differential Pulse Voltammetry (DPV); Square Wave Voltammetry (SWV)
	Pulse control	Pulsed Amperometry (PA); Voltage Pulse
	Battery workflows*	Battery OCP; CC Charge; CV Charge; CC Discharge; CV Discharge
Potentiostat	Max. output voltage / current	± 13 V / ± 30 mA
	Control potential	± 6.4 V
	Current ranges	± 3 μ A, ± 30 μ A, ± 300 μ A, ± 3 mA, and ± 30 mA (Total of 5 ranges + Auto range)
	Min. voltage / current resolution	0.2 mV / approx. 180 fA at the ± 3 μ A range
Galvanostat	Max. output current / voltage	± 30 mA / ± 13 V
	Voltage range	± 12.8 V (Total of 1 range)
	Min. current / potential resolution	100 pA at 3 μ A or below / approx. 800 nV
Channels		1
A/D converter		22 bit
Sweep speed		1 μ V/s to 2 V/s
Sampling interval		1 ms or longer
IR compensation		Up to 25 M Ω , subject to the selected current range
Noise filter		1 Hz, 10 Hz, 100 Hz, OFF
Control Interface		USB
Power supply		DC 6 V, 1.8 A; AC adapter not included
Dimensions / Weight		W190 $\times$ D100 $\times$ H43 mm, excluding protrusions / approx. 0.9 kg
Standard accessories		Cell cable, alligator clips, USB cable, USB memory, fixed resistor, manuals, and test report

* Optional ECstat Advance software is required for dedicated battery workflows.

Software, Connectivity and Expansion

Software and Automated Workflows

Compatible with ECstat Basic, ECstat Advance, and ECstat Analyze. ECstat Basic supports routine measurement control, the optional ECstat Advance software enables user-defined sequences and multi-device workflows, and ECstat Analyze provides charting, battery analysis, and data export.

Connectivity and Glovebox Compatibility

Supports direct USB connection and operation in inert-atmosphere gloveboxes.

Current-Output Expansion with ECboost-4002c

Parameter	ECstat-302c	ECstat-302c with ECboost-4002c
Max. output current	±30 mA	±300 mA
Current ranges	Five ranges up to ±30 mA	Six ranges up to ±300 mA
Galvanostatic voltage ranges	±12.8 V	±0.64, ±1.28, ±6.4 and ±12.8 V
Independent operation	Yes	No - requires the ECstat-302c

Compatibility Note: The ECboost-4002c is not compatible with ECstat-302c units with serial numbers up to and including 05241. Confirm compatibility before ordering.



The ECboost-4002c is an optional current-output expansion module for the ECstat-302c. Connected through a dedicated harness, it adds a ±300 mA current range while retaining a maximum output voltage of ±13 V and a control potential of ±6.4 V. The ECboost-4002c cannot operate independently and requires the ECstat-302c.

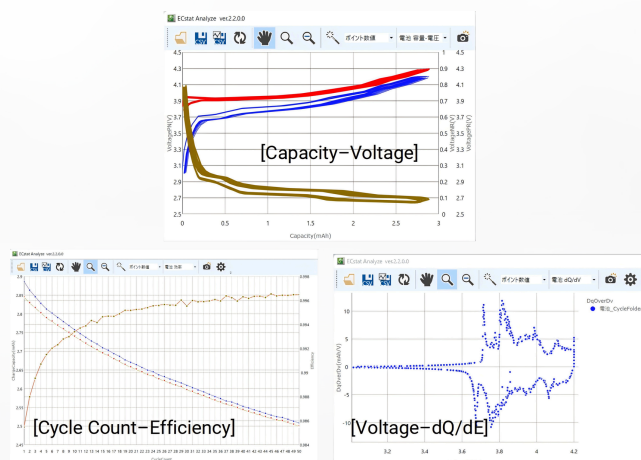
Demonstrated Three-Electrode Battery Workflow

Three-Electrode Battery Charge–Discharge Analysis

The ECstat-302c supports automated charge-discharge testing of three-electrode lithium-ion cells using the optional ECstat Advance software. In the supplier demonstration, a LiCoO_2 positive electrode, graphite negative electrode, and lithium reference electrode were tested at 1/5 C using 1 M LiPF_6 in EC/DEC (1:1). The system recorded the full-cell voltage and the positive- and negative-electrode potentials relative to the reference electrode, enabling electrode-resolved analysis throughout cycling.

Demonstrated capabilities

- Full-cell and electrode-resolved voltage tracking
- Capacity–voltage analysis
- Cycle-count and efficiency analysis
- Voltage–dQ/dE analysis
- Time–voltage/current visualization and CSV export



Note: Supplier-demonstrated three-electrode battery charge–discharge and analysis workflow; the displayed data are for illustration only and do not constitute guaranteed cell-performance or instrument-accuracy specifications.

Laboratory Equipment Series —Electrochemical Testing & Analysis

ECboost-4002c

ECstat Current Booster

A purpose-built expansion accessory that extends the ECstat-302c's current measurement and control capabilities.

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Product Overview

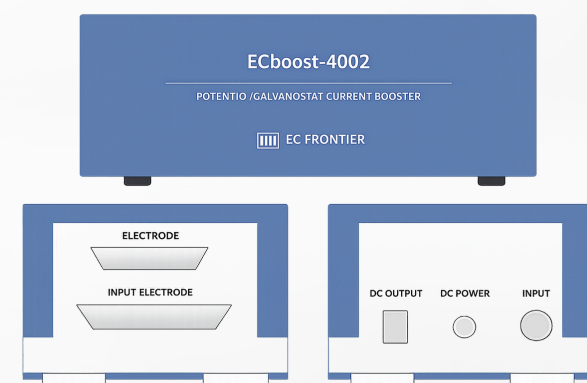
The ECboost-4002c is a dedicated current-output expansion accessory for the ECstat-302c, increasing its maximum output current from ± 30 mA to ± 300 mA. It operates as part of the ECstat-302c system and is controlled through the host instrument and its PC software.

Technical Specifications

Potentiostat	Max. output voltage / current	± 13 V / ± 300 mA
	Control voltage	± 6.4 V
	Current range	± 3 μ A, ± 30 μ A, ± 300 μ A, ± 3 mA, ± 30 mA, ± 300 mA (Total of 6 ranges)
	Min. voltage / current resolution	0.2 mV / 100 pA (at 3 μ A range)
Galvanostat	Max. output current / voltage	± 300 mA / ± 13 V
	Voltage range	± 0.64 V, ± 1.28 V, ± 6.4 V, ± 12.8 V (Total of 4 ranges)
	Min. current / voltage resolution	100 pA / 20 μ V (at ± 0.64 V range)
General	Control interface	Connector harness
	Power supply	100–240 VAC, 50/60 Hz
	Dimensions	W190 × D100 × H75 mm, excluding protrusions
	Weight	Approx. 0.85 kg
	Operating temperature / humidity	5–40 °C / 10–90% RH, non-condensing

Key Features

- 10× Current-Output Expansion**
 Extends the maximum output current of the ECstat-302c from ± 30 mA to ± 300 mA for higher-current electrochemical and charge-discharge measurements.
- Automated and Synchronized Control**
 Supports automated measurement sequences and synchronized device control through the ECstat-302c when used with the optional ECstat Advance software.
- Retains Multi-Potential Monitoring**
 When paired with the ECstat-302c, the system retains multi-potential monitoring and iR compensation while extending the current-output range to ± 300 mA.



Model Designation: The suffix "c" identifies the overseas version. The model number shown on the product or in certain product images may not include this suffix.

System Requirements & Compatibility

Required Host System

The ECboost-4002c is designed exclusively for use with the ECstat-302c. It functions as a dedicated current-output expansion accessory and is controlled through the host instrument and compatible ECstat software.

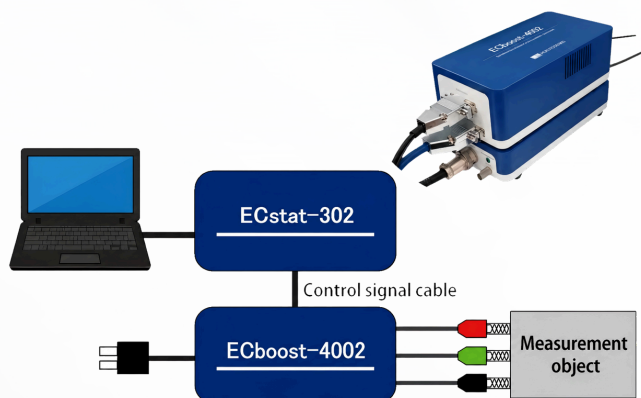
Connection and Compatibility

The booster connects to the ECstat-302c through a dedicated connector harness. ECstat-302c units with serial numbers up to and including 05241 are not supported; compatibility should therefore be confirmed before ordering.

Current-Output Expansion & System Connection

System Connection

The ECboost-4002c connects to the ECstat-302c through a dedicated connector harness. Measurement control is performed from a PC via USB through the ECstat-302c, while the booster extends the maximum output current to ± 300 mA for the connected electrochemical cell.



Supplier-demonstrated connection configuration for the ECstat-302c and ECboost-4002c.

Laboratory Equipment Series —Electrochemical Testing & Analysis

ECR-6000c / ECR-6100c

Rotating Electrode Device

A compact rotating electrode system for RDE/RRDE measurements, with standard vertical operation on the ECR-6000c and 360° shaft positioning on the ECR-6100c.

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Product Overview

The ECR-6000c and ECR-6100c form a compact, modular rotating electrode system for electrochemical research. The lightweight rotating unit and common controller are separate components, allowing flexible placement within the experimental setup. The ECR-6000c supports standard vertical operation, while the ECR-6100c provides 360° shaft rotation and locking at any position. A brushless motor, continuous rotation monitoring, and an electrically insulated shaft-to-motor coupling support low-maintenance, low-noise operation. The system supports rotating disk electrodes (RDEs), rotating ring-disk electrodes (RRDEs), and rotating-electrode sample holders with compatible cells.

Key Features

Compact, Modular Design

The compact rotating unit and lightweight controller are ordered separately and independently positioned for flexible, space-saving installation.

Inert-Gas Shaft Purge

The inert-gas shaft purge helps control the cell atmosphere and protects rotating components from corrosive vapors.

Flexible Control

Front-panel, PC, external-command and voltage-input control enable flexible system integration.

Technical Specifications

Main Unit

Item	ECR-6000c	ECR-6100c
RPM range	80–8000 rpm	
Rotational Speed Resolution	1 rpm	
Rotational Accuracy	80–200 rpm: ±2 rpm of reading; 200–8000 rpm: ±1% of reading	
Motor	Brushless motor	
Power supply	Supplied from the controller	
Axis Rotation	—	360°, lockable at any position
Dimensions	W140 × D175 × H270 mm, excluding protrusions	
Weight	Approx. 4 kg	
Operating Temp./Hum. Range	10–40 °C / 30–80% RH, non-condensing	
Accessories	Cable, silicone tubing, spanner, test report, and manual (both models); splash guard (ECR-6100c only)	

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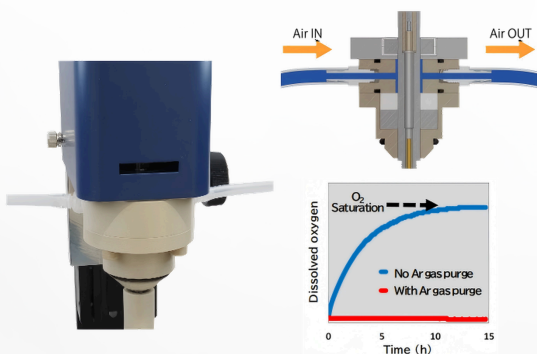
Controller

Setting operation and control method	Manual front-panel control / PC-based remote control
External Rotation Control Input	1 rpm/mV, 2 rpm/mV, 4 rpm/mV
External Rotation Control Output	2 rpm/mV
Power supply	DC 24 V, 2.5 A; AC adapter not included
Dimensions	W160 × D120 × H70 mm, excluding protrusions
Weight	Approx. 0.9 kg
Operating Temp./Hum. Range	10–40 °C / 30–80% RH, non-condensing
Accessories	USB flash drive with ECstat Software, interconnection cable, USB cable, external I/O connector, test report, and instruction manual

System Control & Protection

Inert-Gas Shaft Purge

A dedicated inert-gas path supports atmosphere control inside the cell and helps protect the motor and bearings from organic-solvent and acid vapors.



Flexible Rotation Control

Speed and start/stop operation can be controlled from the front panel, a PC via USB, RS-232C commands, or analog voltage input/output, enabling integration with compatible external systems.



Angle-Adjustable ECR-6100c

The ECR-6000c is designed for standard vertical rotating-electrode measurements, while the ECR-6100c adds a 360° rotatable shaft that can be locked at any desired position, providing flexible electrode positioning for different experimental setups.

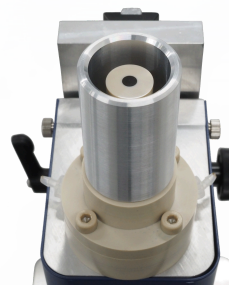
Adjustable Shaft Positioning

The ECR-6100c shaft can be rotated through 360° and locked at any position.



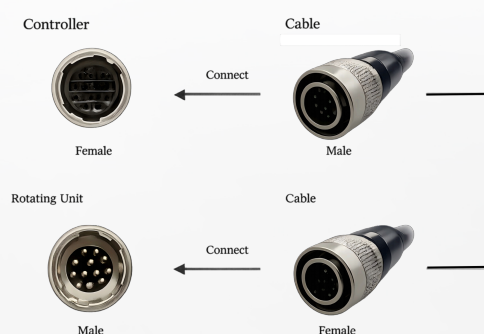
Splash Guard

A splash guard is supplied with the ECR-6100c.



Controller and Rotating Unit Connection

The ECR-6000c or ECR-6100c rotating unit connects to the common ECR-6000c/6100c controller through the interconnection cable. The controller supplies power and rotation-control signals to the connected rotating unit, allowing the controller and rotating unit to be positioned separately within the experimental setup.



Laboratory Equipment Series —Electrochemical Testing & Analysis

ECSTATsyn-8000

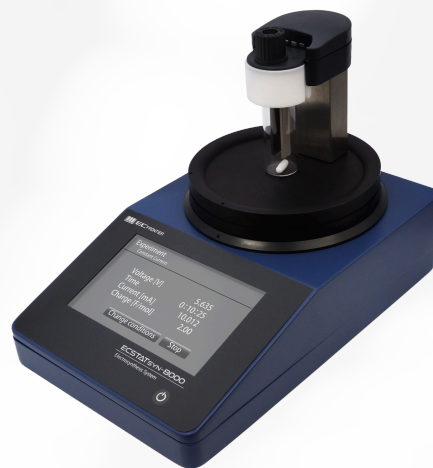
Batch Electrosynthesis System

An integrated, standalone platform for batch electrosynthesis and electrochemical analysis.

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Product Overview

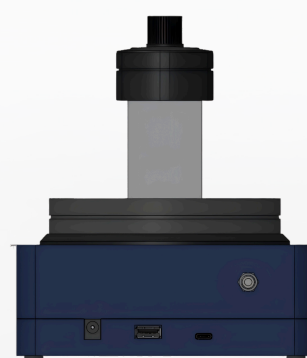
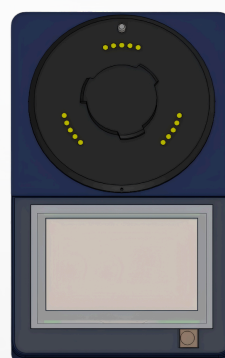
The ECSTATsyn-8000 is a compact, all-in-one batch electrosynthesis system combining a potentiostat and magnetic stirrer. Its intuitive touchscreen enables easy setup of electrolysis conditions, while experimental parameters and measurement data can be exported to a USB drive in CSV format for analysis and record keeping.

Technical Specifications

Max. output / Control voltage	±10 V
Control potential / Voltage resolution	1 mV
Measured potential / Voltage resolution	1 mV
Max. output current	±200 mA
Current ranges	±200 µA and ±200 mA
Control current resolution	10 µA
Measured current resolution	1 nA at 200 µA range; 1 µA at 200 mA range
Stirrer speed	50–1,000 rpm, in 10 rpm increments
Power supply	DC 24 V, 0.75 A; AC adapter not included
Dimensions	W150 × D250 × H180 mm, excluding protrusions
Weight	Approx. 2.2 kg
Operating Temp. / Hum. Range	10–40 °C / 30–80% RH, non-condensing

Key Features

- Integrated Electrosynthesis System**
Combines a potentiostat and magnetic stirrer in a compact, all-in-one benchtop instrument.
- Six Measurement Techniques**
Supports constant current, constant voltage with voltage or potential control, fast-pulse constant current, fast-pulse constant voltage, cyclic voltammetry (CV), and differential pulse voltammetry (DPV).
- Fast-Pulse Control**
Provides polarity reversal intervals as short as 5 ms in the fast-pulse current and voltage modes.
- Standalone and Intuitive Operation**
Operates independently without a PC through an intuitive touchscreen interface, while experimental conditions and measured data can be saved to a USB flash drive in CSV format.





Measurement Techniques & Electrode Configurations

The ECSTATsyn-8000 supports six operating modes: four electrosynthesis modes and two analysis modes. Depending on the selected technique, either a two-electrode or three-electrode configuration is used.

Technique	Electrode Configuration	Key Capability
Constant Current	2-electrode	Applies a constant current of up to 200 mA between the anode and cathode
Constant Voltage	2-electrode (voltage control) 3-electrode (potential control)	Controls the cell voltage or working-electrode potential up to 10 V
Fast-Pulse Constant Current	2-electrode	Applies current up to 200 mA with polarity reversal intervals as short as 5 ms
Fast-Pulse Constant Voltage	2-electrode (voltage control) 3-electrode (potential control)	Controls voltage or potential up to 10 V with polarity reversal intervals as short as 5 ms
Cyclic Voltammetry	3-electrode	Determines substrate redox potentials relative to a ferrocene reference
Differential Pulse Voltammetry	3-electrode	Determines oxidation and reduction peak potentials, with enhanced sensitivity for μM -level samples

Typical Applications

Pharmaceutical and Agrochemical Development

Controlled-current and controlled-voltage electrosynthesis, supported by CV and DPV for substrate redox characterization.

New Synthetic Method Development

Constant-current, constant-voltage, fast-pulse, and polarity-reversal electrolysis with time- or charge-based endpoints.

Natural Product and Metabolite Synthesis

Batch electrosynthesis with adjustable current, voltage, stirring speed, reaction time, and accumulated charge.

Metal-Complex Catalyst Development

Controlled electrolysis and CV/DPV analysis for investigating catalyst-related redox behavior.

Note: Users of the ECSTATsyn-8000 include Mahito Atobe and Naoki Shida of Yokohama National University, Hyunwoo Kim of Pohang University of Science and Technology, Fu-Ming Wang of National Taiwan University of Science and Technology, and Kazuhiro Okamoto of the University of Toyama. Application studies using this model are currently underway.