HEFALab
TEST INSTRUMENTS

New generation electrochemical analyzers...

HEFA Teknoloji A.Ş.

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HEFA
TEKNOLOJİ

Established in 2018, HEFA Technology Inc. designs high-tech laboratory test equipments, under the HEFAlab brand for its valued customers by following the innovations in the sector with its experienced electronic engineers and chemists.

We are proud of using the laboratory devices we have designed in our R&D projects. Especially, HEFASTAT product series, developed with the knowledge of our team in the field of "Electrochemistry", offers low noise and high accuracy analyzers for use in physical electrochemistry studies, electroanalytical chemistry applications, corrosion science, battery developments, fuel cell research, sensor development studies and etc. HEFASTAT product series are preferred in academia, industry and government research centers.

We know the importance of "Electrochemistry" and we realize that it is important to learn electrochemistry by experiencing it. Therefore, we are providing high accuracy analyzers while keeping the prices at affordable range.

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ELECTROCHEMISTRY

Electrochemistry is; the study of relationship between electrical quantities such as current, voltage and the chemical reactions. Some applications include:

BIOSENSORS
Amperometric, impedimetric and potentiometric sensor development.

BATTERY TESTING:
Battery capacity, number of cycles, charge/discharge testing

CORROSION TESTING
Determining corrosion damages, corrosion rates

ELECTROCHEMICAL COATING
Deposition of thin coatings on metal, semiconductor etc.

PHOTOELECTROCHEMISTRY
Characterization and development of photovoltaic cells

BIOELECTROCHEMISTRY
Electrode reactions of redox enzymes, cell electron-proton transfer and transport

HEFASTAT ECP100

Product type:
Potentiostat

Compliance voltage:
±8V

Current range:
1 µA - 10 mA

DEVICE SPECIFICATIONS

System	
Cell Connections	2 or 3 electrode
Min Current	1 µA
Min Current	10 mA
Current Steps	4
Min Potential Step	152.5 µV
Potential Scan Range	±5V
Min Measured Potential Resolution	187.5 µV
Measured Potential Accuracy	± 1mV ± 0.1% of range
Min Applied Potential Resolution	152.5 µV
Applied Potential Accuracy	±610 µV ± 0.1% of range
Min Measured Current Resolution	20pA
Measured Current Accuracy	±50pA ± 0.1% of range
Min Applied Current Resolution	X
Applied Current Accuracy	X
Control Amplifier	
Compliance Voltage	±8V
Output Current	±50mA
Unity Gain Bandwidth	100 kHz
Electrometer	
Input Impedance (CM)	$>10^{12}$ Ω
Input Leakage Current (Typical)	<50pA
Bandwidth (Typical)	>2 MHz

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HEFASTAT ECM100B

Product type:
Potentiostat&Galvanostat

Compliance voltage:
±10V

Current range:
100nA – 10mA

DEVICE SPECIFICATIONS

System	
Cell Connections	2 or 3 electrode
Min Current	100 nA
Max Current	10 mA
Current Steps	5
Min Potential Step	61 µV
Potential Scan Range	±8V
Min Measured Potential Resolution	61 µV
Measured Potential Accuracy	±40 µV ± 0.2% of range
Min Applied Potential Resolution	61 µV
Applied Potential Accuracy	±500 µV ± 0.2% of range
Min Measured Current Resolution	3 pA
Measured Current Accuracy	±30pA ± 0.2% of range
Min Applied Current Resolution	6pA
Applied Current Accuracy	±30pA ± 0.3% of range
Control Amplifier	
Compliance Voltage	±10V
Output Current	±100mA
Unity Gain Bandwidth	200 kHz
Electrometer	
Input Impedance (CM)	$>10^{13}$ Ω
Input Leakage Current (Typical)	<20pA
Bandwidth (Typical)	>2 MHz

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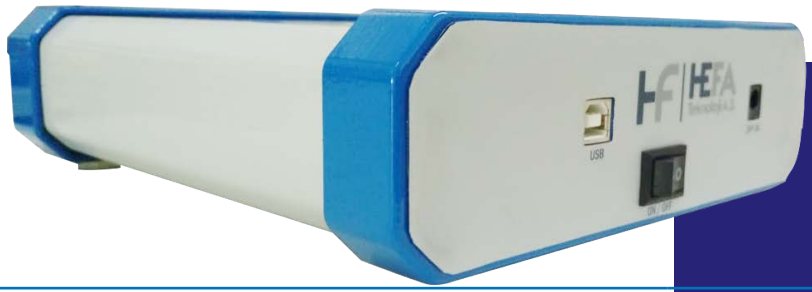
HEFASTAT ECM100E

Product type:
Potentiostat&Galvanostat

Compliance voltage:
±12V

Current range:
10nA – 100mA



DEVICE SPECIFICATIONS

System	
Cell Connections	2,3 or 4 electrode
Min Current	10 nA
Max Current	100 mA
Current Steps	7
Min Potential Step	19.1 µV
Potential Scan Range	±12V
Min Measured Potential Resolution	5.7 µV
Measured Potential Accuracy	±10 µV ± 0.2% of range
Min Applied Potential Resolution	19.1 µV
Applied Potential Accuracy	±180 µV ± 0.2% of range
Min Measured Current Resolution	300 fA
Measured Current Accuracy	±20pA ± 0.3% of range
Min Applied Current Resolution	3 pA
Applied Current Accuracy	±20pA ± 0.5% of range
Control Amplifier	
Compliance Voltage	±12V
Output Current	>±200mA
Unity Gain Bandwidth	1 MHz
Electrometer	
Input Impedance (CM)	$>10^{13}$ Ω
Input Leakage Current (Typical)	<20pA
Bandwidth (Typical)	> 5 MHz
EIS	
Scan Range	10 µHz – 1 MHz

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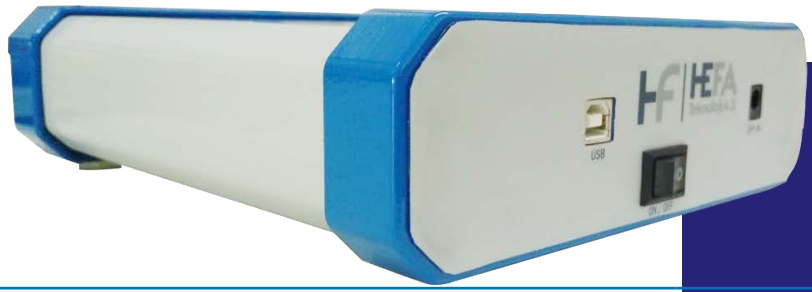
HEFASTAT ECM100A

Product type:
Potentiostat&Galvanostat

Compliance voltage:
±17V

Current range:
1nA – 1A



DEVICE SPECIFICATIONS

System	
Cell Connections	2,3 or 4 electrode
Min Current	1 nA
Max Current	1A
Current Steps	9
Min Potential Step	4.8 µV
Potential Scan Range	±15V
Min Measured Potential Resolution	1.8 µV
Measured Potential Accuracy	±20 µV ± 0.3% of range
Min Applied Potential Resolution	4.8 µV
Applied Potential Accuracy	±25 µV ± 0.3% of range
Min Measured Current Resolution	40 fA
Measured Current Accuracy	±20pA ± 0.3% of range
Min Applied Current Resolution	1 pA
Applied Current Accuracy	±5pA ± 0.3% of range
Control Amplifier	
Compliance Voltage	±17V
Output Current	>±1A
Unity Gain Bandwidth	1 MHz
Electrometer	
Input Impedance (CM)	$>10^{13}$ Ω
Input Leakage Current (Typical)	<5pA
Bandwidth (Typical)	>10 MHz
EIS	
Scan Range	10 µHz – 1 MHz

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HEFASTAT ECM100S

Product type:
Potentiostat&Galvanostat
Custom design

Compliance voltage:
Special design

Current range:
Special design

DEVICE SPECIFICATIONS

System	
Available Cell Connections	2,3 or 4 electrode
Min Available Current Limit	≥100 pA
Max Available Current Limit	≤ 1A
Max Potential Scan Range Limit	≤±17V
Control Amplifier	
Max Compliance Voltage Limit	±17V
Max Output Current Limit	>±1A
Unity Gain Bandwidth	1 MHz
EIS	
Scan Range	10 µHz – 1 MHz

HEFA Technology Inc. offers design services for its customer for their research specific needs. From custom design table, the researcher can select min and max ranges of voltage and current values and HEFA will design the custom electrochemical analyser. For example, custom electrochemical analyser that includes EIS and has 200 pA as lower current limit, 500mA as upper current limit, and ±15 V as potential scan range can be designed for research specific needs.

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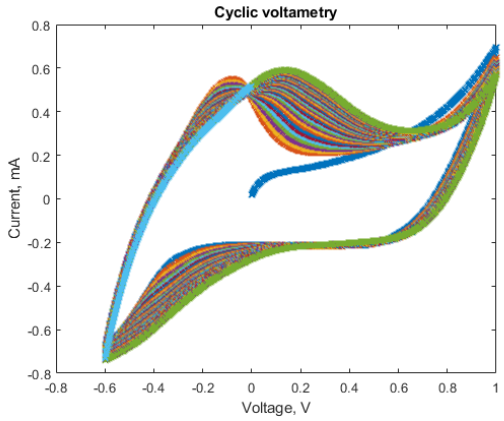
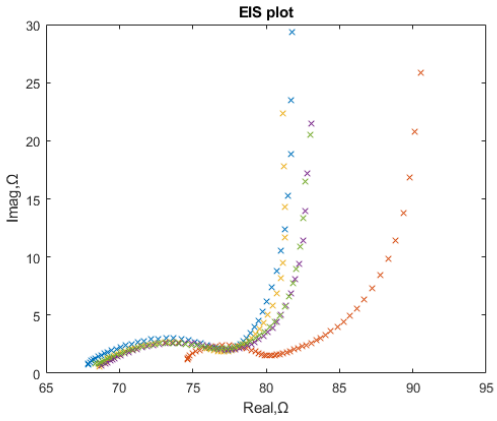
HEFASTAT MODELS COMPARISON

System	ECP100	ECM100B	ECM100E	ECM100A
Cell Connections	2 or 3 electrode	2 or 3 electrode	2,3 or 4 electrode	2,3 or 4 electrode
Min Current	1 µA	100 nA	10 nA	1 nA
Max Current	10 mA	10 mA	100 mA	1A
Current Steps	4	5	7	9
Min Potential Step	152.5 µV	61 µV	19.1 µV	4.8 µV
Potential Scan Range	±5V	±8V	±12V	±15V
Min Measured Potential Resolution	187.5 µV	61 µV	5.7 µV	1.8 µV
Measured Potential Accuracy	± 1mV ± 0.1% of range	±40 µV ± 0.2% of range	±10 µV ± 0.2% of range	±20 µV ± 0.3% of range
Min Applied Potential Resolution	152.5 µV	61 µV	19.1 µV	4.8 µV
Applied Potential Accuracy	±610 µV ± 0.1% of range	±500 µV ± 0.2% of range	±180 µV ± 0.2% of range	±25 µV ± 0.3% of range
Min Measured Current Resolution	20pA	3 pA	300 fA	40 fA
Measured Current Accuracy	±50pA ± 0.1% of range	±30pA ± 0.2% of range	±20pA ± 0.3% of range	±20pA ± 0.3% of range
Min Applied Current Resolution	X	6pA	3 pA	1 pA
Applied Current Accuracy	X	±30pA ± 0.3% of range	±20pA ± 0.5% of range	±5pA ± 0.3% of range
Control Amplifier				
Compliance Voltage	±8V	±10V	±12V	±17V
Output Current	±50mA	±100mA	>±200mA	>±1A
Unity Gain Bandwidth	100 kHz	200 kHz	1 MHz	1 MHz
Electrometer				
Input Impedance (CM)	$>10^{10}$ Ω	$>10^{13}$ Ω	$>10^{13}$ Ω	$>10^{13}$ Ω
Input Leakage Current (Typical)	<50pA	<20pA	<20pA	<5pA
Bandwidth (Typical)	>2 MHz	>2 MHz	>5 MHz	>10 MHz
EIS				
Scan Range	X	X	10 µHz – 1 MHz	10 µHz – 1 MHz





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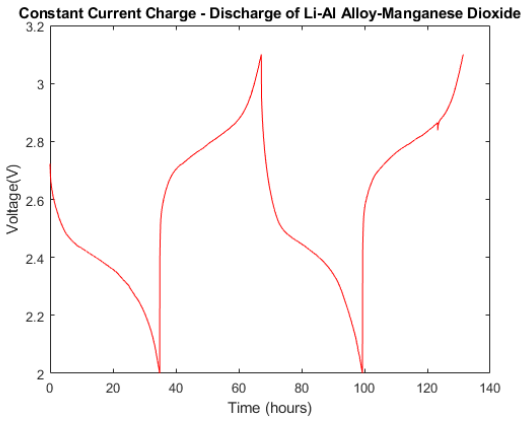
HEFACYCLE BA100-E

Product type:
Analyzer

Compliance voltage:
0.001 – 1mA

Current range:
0.1V – 5V

Power Input	12-24V DC 3A adapter
Test Method	Constant current charge, constant current discharge, constant Voltage Charge, rest, etc
Current Range (Programmable)	0.001 – 1mA (<0.1% max reading error + 0.1% of range)
Voltage Range (Programmable)	0.1 – 5V (0.05% max reading error)
# of Channels	8 channel
Independent Channels	Yes
Software	- Threshold adjustment, -Different curves such as current vs time, voltage vs time, capacity vs time and etc can be monitored - Excel output with voltage, time, current, capacity, time, columbic efficiency values and etc
Sample Time (Adjustable)	Minimum 1 s
PC Interface	RS485 to USB converter
Optional	Temperature sensor (-10 – 100 °C)



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HEFACYCLE BA100-A

Product type:
Analyzer

Compliance voltage:
0.001 – 1mA

Current range:
0.1V – 5V

Power Input	12-24V DC 3A adapter
Test Method	Constant current charge, constant current discharge, constant Voltage Charge, rest, etc
Current Range (Programmable)	0.01 – 10mA (<0.1% max reading error + 0.1% of range)
Voltage Range (Programmable)	0.1 – 5V (0.05% max reading error)
# of Channels	8 channel
Independent Channels	Yes
Software	- Threshold adjustment, - Different curves such as current vs time, voltage vs time, capacity vs time and etc can be monitored - Excel output with voltage, time, current, capacity, time, columbic efficiency values and etc.
Sample Time (Adjustable)	Minimum 1 s
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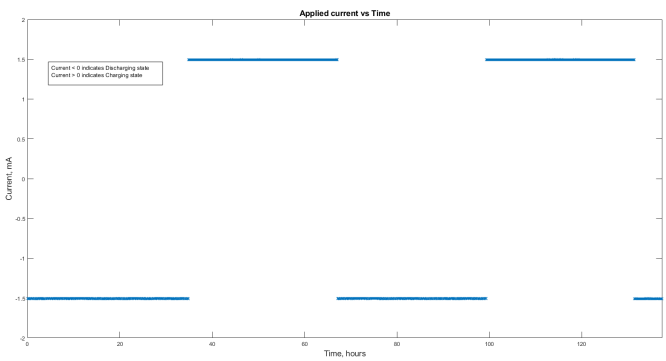

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HEFALab TEST INSTRUMENTS

HEFA TECHNOLOGY INC.

A: Maslak Mahallesi Taş Yoncası Sokak T4 APT No:1U/B91 Sarıyer/İSTANBUL
T: +90 212 706 16 32 E: info@hefalab.com.tr