IVIUM TECHNOLOGIES

Multichannel Battery Cyclers

innovative solutions for battery testing

OctoStat

High performance rack-mountable battery test system with integrated impedance analyser

The OctoStat is a multi-channel test system with a fixed number of 8 channels per unit. Each channel is equipped with its own dedicated FRA/EIS and an input for temperature measurement. The OctoStat has an integrated DataSecure that stores all data independent of the PC to ensure that in the event of communication loss or computer crash, the measurement will continue and measurement data is never lost. This system stability makes the OctoStat a perfect system for long term testing applications. The OctoStat is built into a 19inch rack mountable housing.

AVAILABLE

- OctoStat30: ±30mA / ±10V per channel
- OctoStat200: ±200mA / ±10V per channel
- OctoStat5000: ±5A / ±10V per channel

POWERBOOSTER

- OctoBoost16000: ±16A each channel; can be combined to increase power, for example 4 x ±32A, 2 x ±64A, 1 x ±64A and 4 x ±16A, 1 x ±128A, etc.

CONNECTION

- USB
- LAN / Ethernet

EXPANDABILITY

Different OctoStats can be combined in the same rack and connected/controlled from the same computer. Upon connection to the PC all channels of each unit are automatically assigned ascending channel names. These channel names are also automatically stored in all data files for easy data retrieval.

19INCH RACK MOUNTABLE HOUSING

Each OctoStat unit is built into 19inch rack mountable housing. Multiple units and combinations of OctoStats can be built into the same rack.

SIMULTANEOUS CONTROL

The IviumSoft control software allows control of separate channels or all channels simultaneously with synchronized start. Data can be plotted per channel or simultaneously for all channels on a single screen.

Each Channel

- Dedicated embedded FRA/EIS
- Dedicated software for battery testing
- Automated advanced impedance spectroscopy
- Also capable of EIS during DC charge/discharge
- Overload handled via clamping (not shut-off) so measurements continue

	OctoStat30	OctoStat200	OctoStat5000	OctoBoost16000
System				
Current compliance	±30mA	±200mA	±5A	±16A
Maximum output voltage	±10V	±10V	±10V	-2 to +9V, or ±5V
FRA/EIS	10µHz to 100kHz	10µHz to 100kHz	10µHz to 100kHz	10µHz to 10kHz
Analog I/O	16bit analog I/O channels	16bit analog I/O channels	16bit analog I/O channels	
Channel combination	No	No	No	Yes*
Potentiostat				
Applied potential range	±10V	±10V	±10V	-2 to +9V, or ±5V
Resolution	0.08mV	0.08mV	0.08mV	0.08mV
Applied potential accuracy	0.2%, or 2mV	0.2%, or 2mV	0.2%, or 2mV	0.2%, or 2mV
Current ranges	±100pA to ±10mA	±100pA to ±100mA	±100pA to ±10A	±10A, ±100A
Measured current resolution	18bits, min. 0.3pA	18bits, min. 0.3pA	18bits, min. 0.3pA	defined by controlling potentiostat
Measured current accuracy	0.2%	0.2%	0.2%	0.2%
Galvanostat				
Current ranges	±10nA to ±10mA	±10nA to ±100mA	±10nA to ±10A	
Applied current resolution	0.008% of range	0.008% of range	0.008% of range	0.008% of range
Applied current accuracy	0.2%	0.2%	0.2%	0.2%
Measured potential resolution	18bits, 0.0008% of range min. 7nV	18bits, 0.0008% of range min. 7nV	18bits, 0.0008% of range min. 7nV	18bits, 0.0008% of range min. 7nV
Measured potential accuracy	0.2%, or 2mV	0.2%, or 2mV	0.2%, or 2mV	0.2%, or 2mV
Dimensions				
Width	44.2cm	44.2cm	44.2cm	44.2cm
Height	1U	1U	2U	3U

**Channels can be combined to increase current, for example 4 x ±32A, 2 x ±64A, 1 x ±64A and 4 x ±16A, 1 x ±128A, etc.*

All channels

Channel Performance	
4 Electrodes	WE, CE, RE and S
Potentiostat bandwidth	>500kHz
Stability settings	High speed, Standard and High Stability
Programmable response filter	1MHz, 100kHz, 10kHz, 1kHz, 10Hz
Dual channel signal acquisition	Dual channel 18bit ADC, 100,000 samples/s
Impedance analyser	
Frequency range	10µHz to 100kHz (10kHz)
Amplitude	0.015mV to 1.0V, or 0.03%to 100% of current range
DC offset	16bit DC offset subtraction, and 2 DC-decoupling filters
Electrometer	
Input impedance	>1000Gohm // <10pF
Input bias current	<20pA
Bandwidth	>5MHz
Connection	
Connectors	GND and combined EMO: emergency off control
Communication	USB/LAN (Ethernet)
Integrated DataSecure	Stored no. of data points: 20M each channel

DataSecure included

IviCycle

High channel count rack-mountable battery test system with optional impedance analyser

The IviCycle is a multi-channel test system with a fixed number of channels per unit. The channels are divided over four modules each. It is possible to mix and match modules to get the desired number of 30mA and 200mA channels. The IviCycle unit can optionally be equipped with FRA/EIS in such a way that each channel has its own integrated FRA/EIS for parallel impedance testing (it is not multiplexed). The IviCycle has an integrated DataSecure that stores all data for each channel independent of the PC to ensure that in the event of communication loss or computer crash, the measurement will continue and measurement data is never lost. This system stability makes the IviCycle perfect for high throughput long term testing applications. The IviCycle unit is built into a 19inch rack mountable housing.

	C030	C200	C3000
System			
Number of modules per system	4	4	4
Number of channels per module	8	8	4
Current compliance	±30mA	±200mA	±3A
Maximum output voltage	±10V	±10V	±5V
FRA/EIS	10µHz to 20kHz	10µHz to 20kHz	10µHz to 20kHz
Analog I/O	16bit analog input	16bit analog input	16bit analog input
Channel combination	No	No	No
Potentiostat			
Applied potential range	±10V	±10V	±5V
Resolution	0.08mV	0.08mV	0.08mV
Applied potential accuracy	0.2%, or 1mV	0.2%, or 1mV	0.2%, or 1mV
Current ranges	±10nA to ±100mA	±10nA to ±100mA	±1mA to ±1A
Measured current resolution	18bits, min. 0.3pA	18bits, min. 0.3pA	18bits, min. 30nA
Measured current accuracy	0.2%	0.2%	0.2%
Galvanostat			
Current ranges	±10µA to ±100mA	±10µA to ±100mA	±1mA to ±1A
Applied current resolution	0.008% of range	0.008% of range	0.008% of range
Applied current accuracy	0.2%	0.2%	0.2%
Measured potential resolution	18bits, 0.0008% of range, min. 7nV	18bits, 0.0008% of range, min. 7nV	18bits, 0.0008% of range, min. 7nV
Measured potential accuracy	0.2%, or 1mV	0.2%, or 1mV	0.2%, or 1mV
Dimensions			
Width	44.2cm	44.2cm	44.2cm
Height	5U	5U	5U
Depth	26cm	26cm	26cm
Weight	12.5kg	12.5kg	12.5kg

AVAILABLE

- 4 x C030: 32 channels of ±30mA / ±10V per channel
- 4 x C200: 32 channels of ±200mA / ±10V per channel
- 4 x C3000: 16 channels of ±3A / ±5V per channel
- MIX & MATCH C030 and C200 modules

CONNECTION

- USB
- LAN / Ethernet

AUTOMATIC CHANNEL DESIGNATION

When the IviCycle is connected to the PC all channels are automatically connected and assigned ascending channel names. These channel names are also automatically stored in all data files for easy data retrieval.

19INCH RACK MOUNTABLE HOUSING

The IviCycle unit is built into a 19inch rack mountable housing. Multiple units and combinations of IviCycle can be built into the same rack.

SIMULTANEOUS CONTROL

The IviumSoft control software allows control of separate channels or all channels simultaneously with synchronized start. Data can be plotted per channel or simultaneously for all channels on a single screen.

OPTIONAL FRA/EIS

The IviCycle unit (all channels) can optionally be equipped with an integrated FRA/EIS for impedance measurements. Each channel will have its own dedicated FRA/EIS for parallel testing (not multiplexed):

- 10µHz to 20kHz each channel
- Channel-dedicated EIS
- Automated advanced impedance spectroscopy
- Also capable of EIS during DC charge/discharge

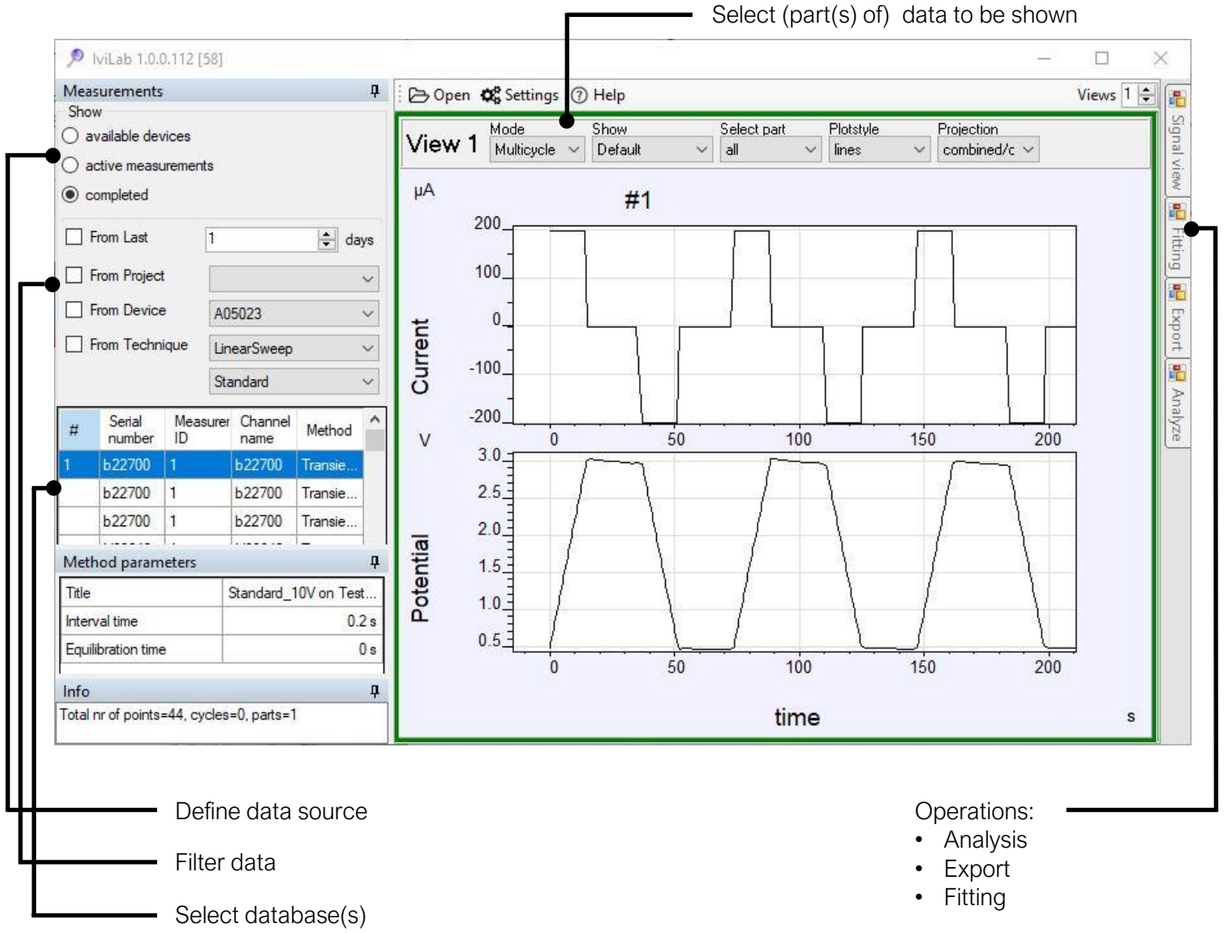
DataSecure included

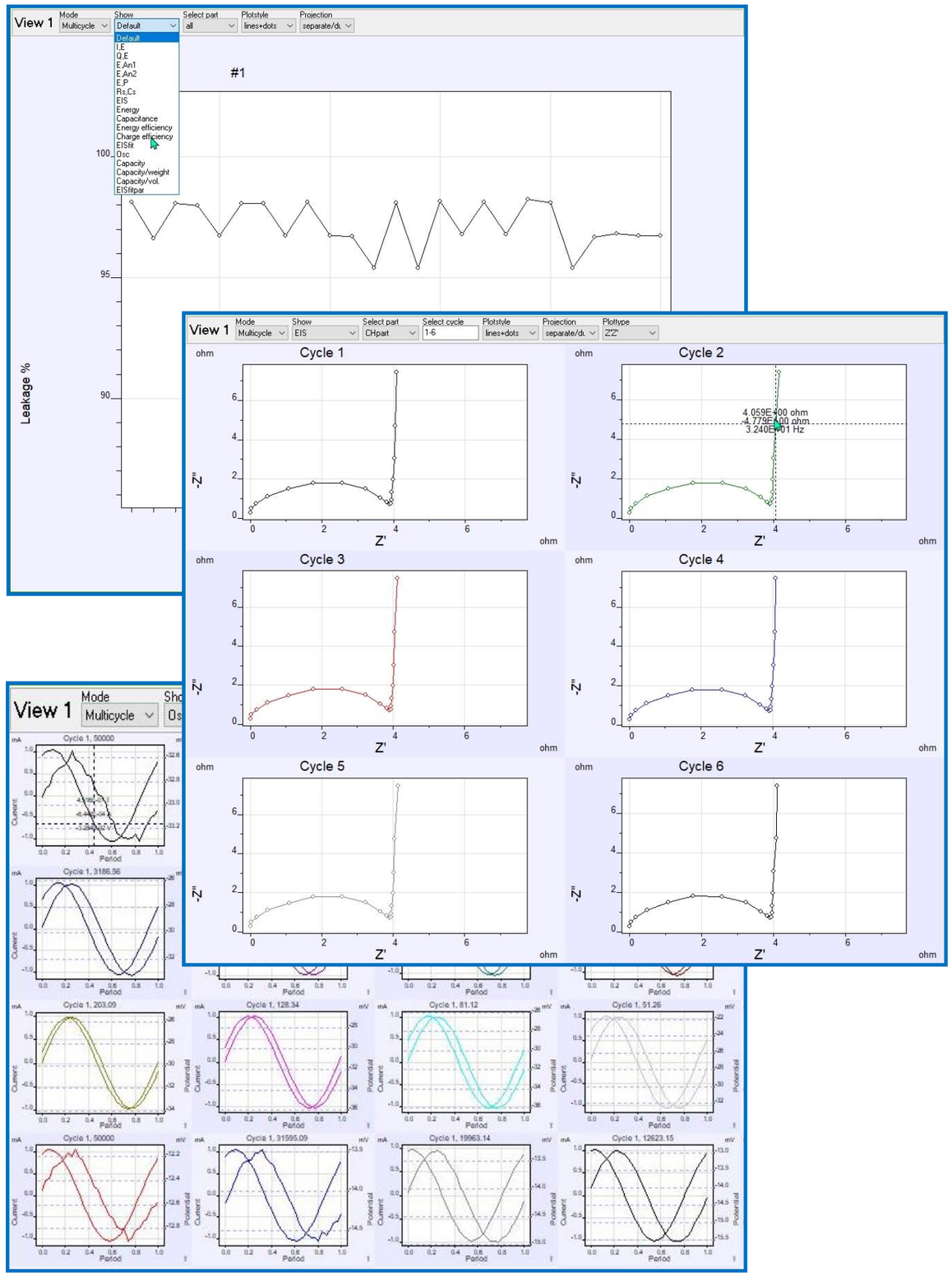
All channels

Channel Performance	
4 Electrodes	WE, CE, RE and S
Potentiostat bandwidth	>500kHz
Stability settings	High speed, Standard and High Stability
Dual channel signal acquisition	Dual channel 18bit ADC, 100,000 samples/s
Impedance analyser	
Frequency range	10µHz to 20kHz
Amplitude	0.15mV to 1.0V, or 0.03%to 100% of current range
Electrometer	
Input impedance	>1000Gohm // <20pF
Input bias current	<20pA
Bandwidth	>5MHz
Connection	
Communication	USB/LAN (Ethernet)
Integrated DataSecure	Stored no. of data points: 20M each channel

IviLab

Battery Evaluation Software

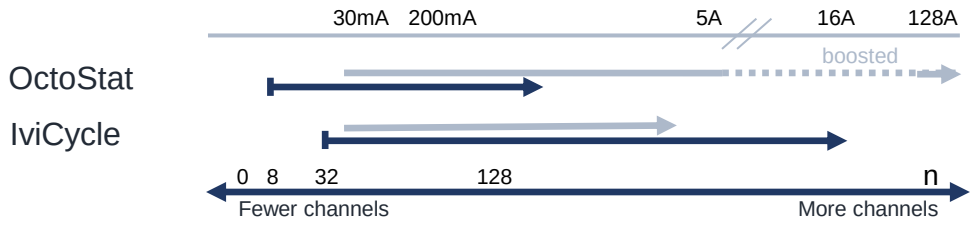




- Analysis of multiple charge-discharge cycles...
  ...with embedded EIS stages
- Automated EIS/impedance batch-fitting
- Verification of measurement reliability
- Automatic calculation of battery performance indicators
- Handle large datasets > 20M datapoints per channel

OctoStat vs. IviCycle

The OctoStat and IviCycle are multi-channel cyclers that have been designed for battery testing, for short term as well as long term measurements. Both instruments have on-board data storage to compensate for computer and connection instability. Both instruments also have channel-dedicated impedance capability. To help you select the appropriate model for you, a comparison on key aspects is given below.



Comparison	OctoStat	IviCycle
Application	Medium volume testing	High volume testing
Pricing	Competitive price per channel	Low price per channel
Characteristics	Minimum order: 8 channels; multiple units can be connected to 1 PC	Minimum order: 4 modules; MIX&MATCH modules
	Impedance: included in each channel	Impedance: optional
Key technical specs		
Channel current	30mA, 200mA, 5A, 16A	30mA, 200mA, 3A
Impedance	10µHz - 100kHz (1MHz optional), multisine EIS, DC offset subtraction	10µHz - 20kHz
IR compensation	Yes	No
Expansion	Yes: power booster, multiplexer, LinScan, etc.	---
Peripheral I/O per channel	Analog I/O, temperature measurement	1 Analog input or temperature measurement
Filters	5 user selectable analog filters, digital filtering	Digital filtering only

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