

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: $\pm 30\text{mA}$ / $\pm 10\text{V}$ per channel
- OctoStat200: $\pm 200\text{mA}$ / $\pm 10\text{V}$ per channel
- OctoStat5000: $\pm 5\text{A}$ / $\pm 10\text{V}$ per channel

POWERBOOSTER

- OctoBoost16000: $\pm 16\text{A}$ each channel; can be combined to increase power, for example 4 x $\pm 32\text{A}$, 2 x $\pm 64\text{A}$, 1 x $\pm 64\text{A}$ and 4 x $\pm 16\text{A}$, 1 x $\pm 128\text{A}$, 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	$\pm 30\text{mA}$	$\pm 200\text{mA}$	$\pm 5\text{A}$	$\pm 16\text{A}$
Maximum output voltage	$\pm 10\text{V}$	$\pm 10\text{V}$	$\pm 10\text{V}$	-2 to +9V, or $\pm 5\text{V}$
FRA/EIS	10 μHz to 100kHz	10 μHz to 100kHz	10 μHz to 100kHz	10 μHz to 10kHz
Analog I/O	16bit analog I/O channels	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	$\pm 10\text{V}$	$\pm 10\text{V}$	$\pm 10\text{V}$	-2 to +9V, or $\pm 5\text{V}$
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	$\pm 100\text{pA}$ to $\pm 10\text{mA}$	$\pm 100\text{pA}$ to $\pm 100\text{mA}$	$\pm 100\text{pA}$ to $\pm 10\text{A}$	$\pm 10\text{A}$, $\pm 100\text{A}$
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	$\pm 10\text{nA}$ to $\pm 10\text{mA}$	$\pm 10\text{nA}$ to $\pm 100\text{mA}$	$\pm 10\text{nA}$ to $\pm 10\text{A}$	0.008% of range
Applied current resolution	0.008% of range	0.008% of range	0.008% of range	0.2%
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 $\pm 32\text{A}$, 2 x $\pm 64\text{A}$, 1 x $\pm 64\text{A}$ and 4 x $\pm 16\text{A}$, 1 x $\pm 128\text{A}$, 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	10 μHz 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.



AVAILABLE

- 4 x C030: 32 channels of $\pm 30\text{mA}$ / $\pm 10\text{V}$ per channel
- 4 x C200: 32 channels of $\pm 200\text{mA}$ / $\pm 10\text{V}$ per channel
- 4 x C3000: 16 channels of $\pm 3\text{A}$ / $\pm 5\text{V}$ 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):

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



	C030	C200	C3000
System			
Number of modules per system	4	4	4
Number of channels per module	8	8	4
Current compliance	$\pm 30\text{mA}$	$\pm 200\text{mA}$	$\pm 3\text{A}$
Maximum output voltage	$\pm 10\text{V}$	$\pm 10\text{V}$	$\pm 5\text{V}$
FRA/EIS	10 μHz to 20kHz	10 μHz to 20kHz	10 μHz to 20kHz
Analog I/O	16bit analog input	16bit analog input	16bit analog input
Channel combination	No	No	No
Potentiostat			
Applied potential range	$\pm 10\text{V}$	$\pm 10\text{V}$	$\pm 5\text{V}$
Resolution	0.08mV	0.08mV	0.08mV
Applied potential accuracy	0.2%, or 1mV	0.2%, or 1mV	0.2%, or 1mV
Current ranges	$\pm 10\text{nA}$ to $\pm 100\text{mA}$	$\pm 10\text{nA}$ to $\pm 100\text{mA}$	$\pm 1\text{mA}$ to $\pm 1\text{A}$
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	$\pm 10\mu\text{A}$ to $\pm 100\text{mA}$	$\pm 10\mu\text{A}$ to $\pm 100\text{mA}$	$\pm 1\text{mA}$ to $\pm 1\text{A}$
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

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 10 μHz to 20kHz
 Amplitude 0.15mV to 1.0V, or 0.03% to 100% of current range

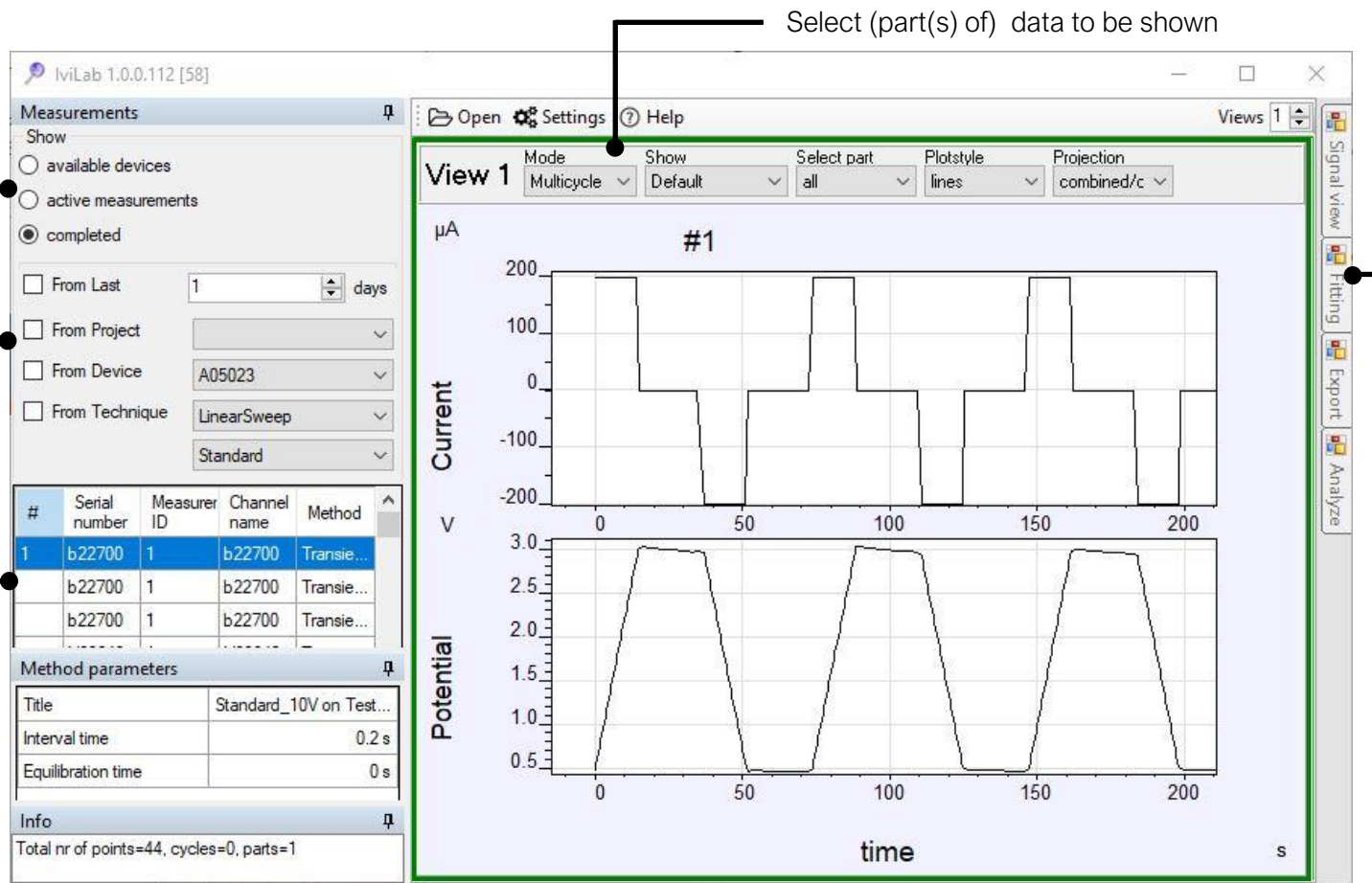
Electrometer

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

Battery Evaluation Software



Select (part(s) of) data to be shown

Define data source

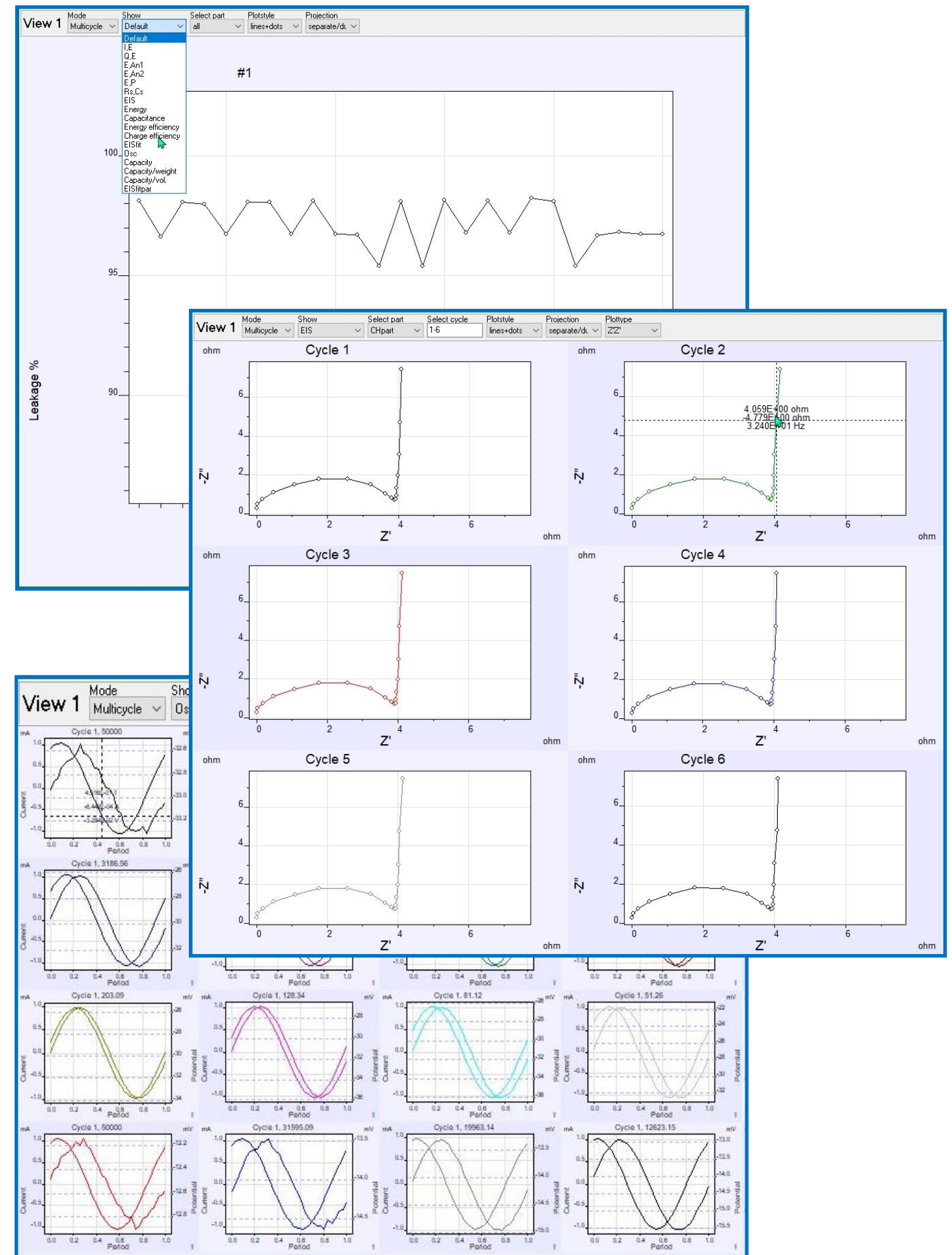
Filter data

Select database(s)

Operations:

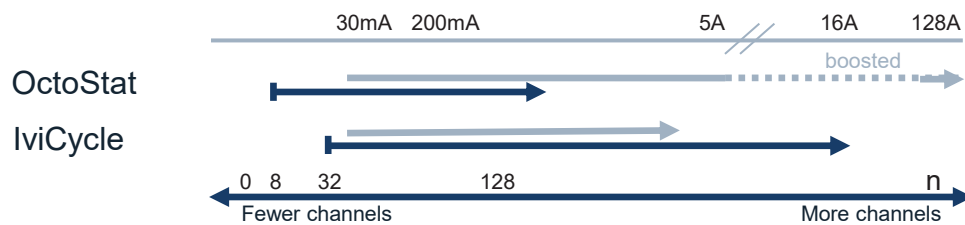
- Analysis
- Export
- Fitting

- 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