



# VIONIC powered by INTELLO

Full Specifications

Metrohm  
means ...  
Spectroscopy!



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Selected specifications. The specified values are typical values which are reached in optimal working conditions at 25 °C. Specifications are subject to change without notice.

Potentiostat, applied potential and applied current	
Compliance voltage	±50 V
Maximum applied potential	±10 V
Maximum applied current	±6 A (up to ±10 V), ±3 A (up to ±50V)
Applied potential: accuracy	± 0.2% of setting ± 2 mV
Applied potential: resolution	100 µV
Applied current: accuracy (10 nA current range or higher)	±0.2% of current ± 0.2% of current range
Applied current: resolution (10 nA current range) (0.2 pA)	0.002% of current range
Rise time (typical)	200 ns
Control loop bandwidth (typical)	10 kHz / 100 kHz / 1 MHz, selectable
Measured potential (S-RE)	
Maximum measured potential	±10 V
Measured potential: accuracy	0.2% ± 2 mV
Measured potential: resolution (ADC resolution)	100 µV
Measured potential: resolution (system, DC signals)	1.5 µV
Measured potential: resolution (system, AC signals, < 20 Hz)	12 nV
Input impedance of the electrometer	>1 TΩ
Bandwidth of electrometer (-3 dB)	>10 MHz

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Second Sense potential (S2-RE)	
Maximum measured S2 potential	±50 V
Measured S2 potential: accuracy	0.3% ± 5 mV
Measured S2 potential: resolution (ADC resolution)	2 mV
Measured S2 potential: resolution (system, DC signals)	7.5 µV
Measured S2 potential: resolution (system, AC signals, < 20 Hz)	60 nV
Measured current	
Maximum measured current	±6 A
Measured current: accuracy	±0.2% of current ± 0.2% of current range
Measured current: resolution (ADC resolution, 1 nA current range)	20 fA
Measured current: resolution (system, DC signals, 1 nA current range)	300 aA
Measured current: resolution (system, AC signals, <20 Hz, 1 nA current range)	2.3 aA
Lowest current range	1 nA
Total number of current ranges	11

Highest combined specifications in one single instrument.



VIONIC's dual mode compliance voltage puts you in control of your experiment.

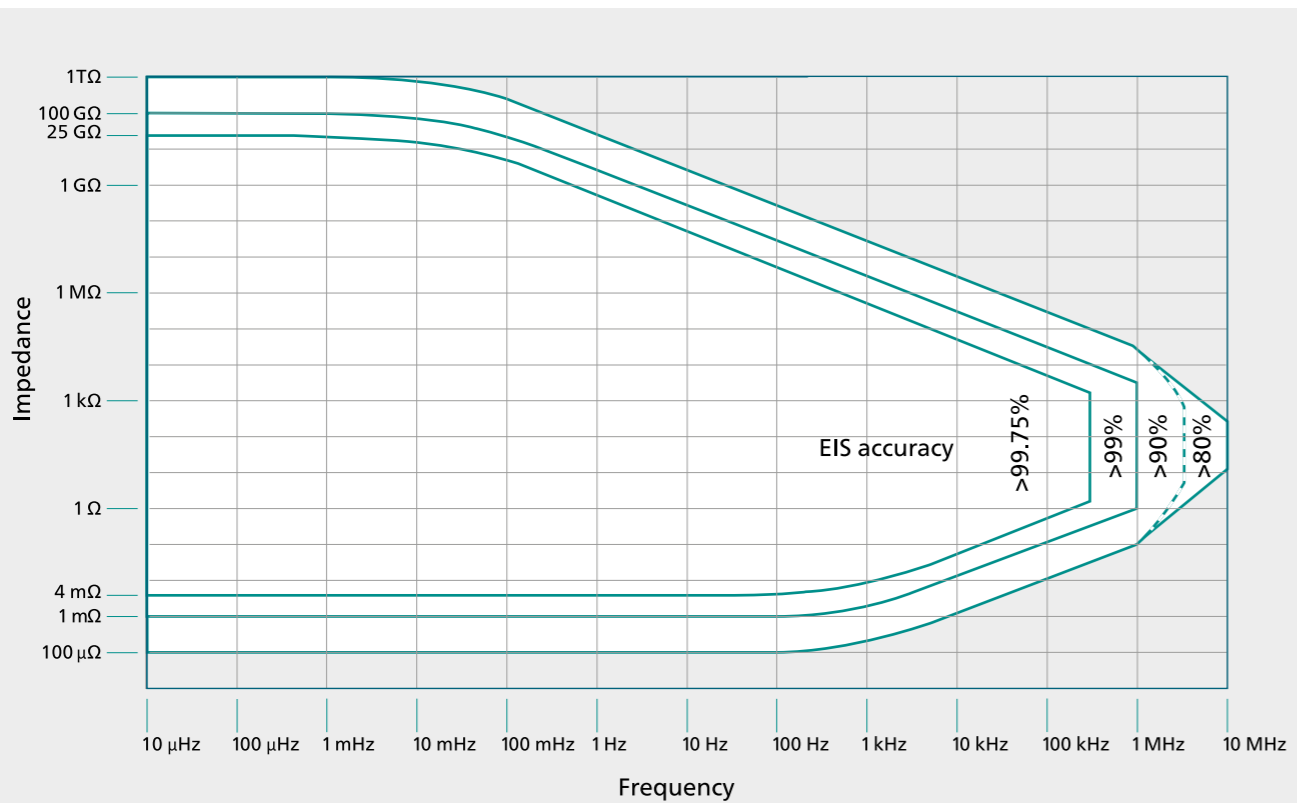


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## Electrochemical Impedance Spectroscopy

Maximum Frequency	10 MHz
Minimum Frequency	10 $\mu$ Hz
Max AC amplitude P-stat	10 V
Max AC amplitude G-stat	6 A
Minimum AC amplitude P-stat	0.1 mV
Minimum AC amplitude G-stat	0.5 pA
Maximum measurable impedance (accuracy %)	25 G $\Omega$ (>99.75%) 100 G $\Omega$ (>99%) 1 T $\Omega$ (>90%) See Contour Plot
Minimum Measurable impedance (accuracy %)	4 m $\Omega$ (>99.75%) 1 m $\Omega$ (>99%) 100 $\mu$ $\Omega$ (>90%) See Contour Plot
Full EIS Accuracy	See Contour Plot

## Contour plot



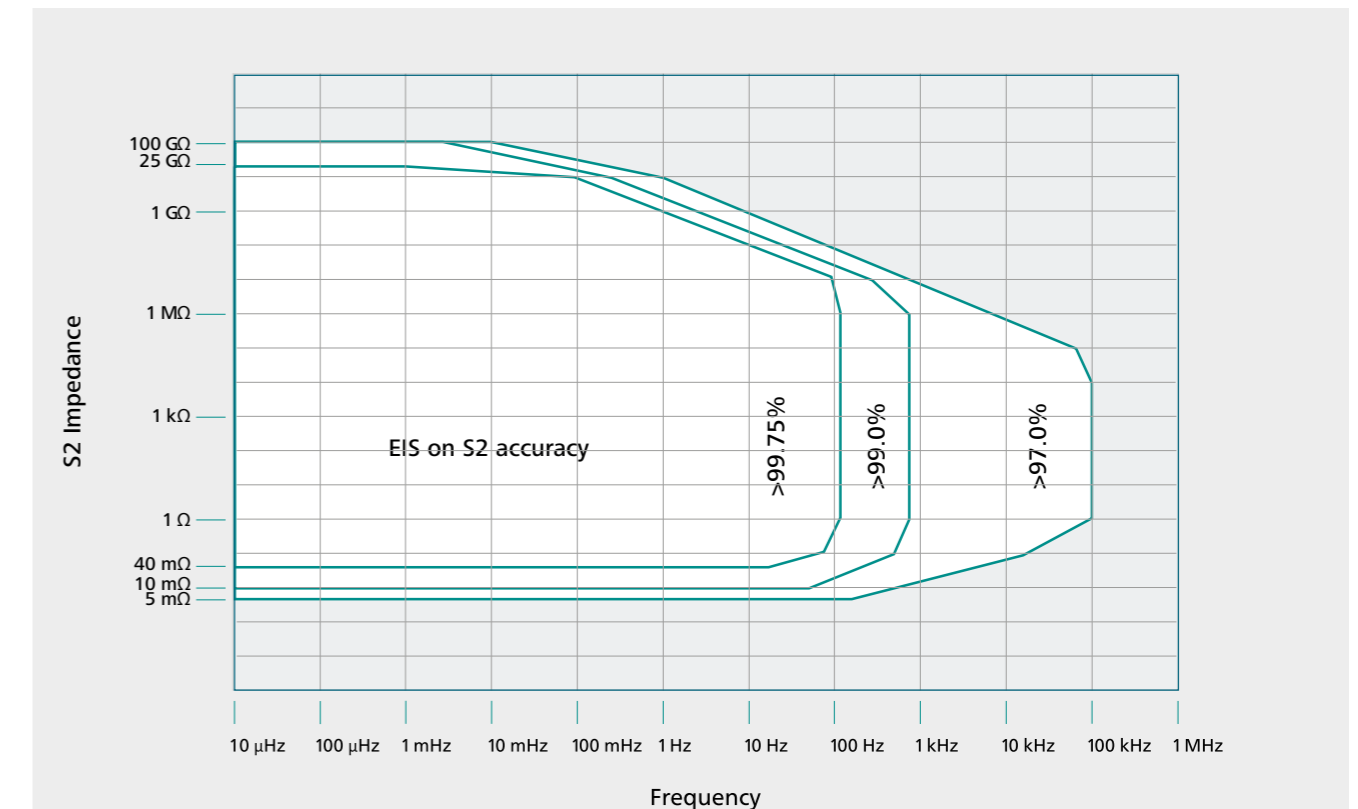
The presented accuracy applies for both the measured Impedance and Phase. Optimal measurement conditions were used.

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## Electrochemical Impedance Spectroscopy on the Second Sense (S2-RE)

Maximum Frequency	100 kHz
Minimum Frequency	10 $\mu$ Hz
Maximum S2 potential (AC + DC)	$\pm$ 50 V See specifications of Second Sense potential
Maximum measurable S2 impedance (accuracy %)	25 G $\Omega$ (>99.75%) 100 G $\Omega$ (>99%) See EIS on S2 Contour Plot
Minimum Measurable S2 impedance (accuracy %)	40 m $\Omega$ (>99.75%) 10 m $\Omega$ (>99%) 5 m $\Omega$ (>97%)
Full EIS on S2 Accuracy	See EIS on S2 Contour Plot

## Contour plot



The presented accuracy applies for both the measured Impedance and Phase. Optimal measurement conditions were used. S2 connected to the Counter electrode,  $Z_{S2-RE}$  typical  $10 \times Z_{S-RE}$ .

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General	
EIS	Yes
Analog scan	Yes
Floating mode	Selectable with 4 options
iR drop (Ru) measurement	yes, based on EIS
iR drop (Ru) compensation	yes, manual and automatic
Cell Cables	1m fixed with additional 0.5m removable Adaptive Cables with 4mm banana connectors. Optionally available: 2mm, alligator and BNC connectors
Maximum scan rate – analog scan	100 V/s
Minimum scan rate – analog scan	50 $\mu$ V/s
Maximum scan rate – staircase scan (@10 mV step potential & 100 $\mu$ s duration)	100 V/s
Minimum scan rate – staircase scan (@ 100 $\mu$ V step potential & 1 s duration)	100 $\mu$ V/s
Number of cell connections	5 (WE, CE, RE, S, S2)
Earth ground connection	Yes
Analog ground connection	Yes
Maximum output power (maximum power applied to a passive cell)	150 W
Analog (remote) control of the Autolab RDE	Yes
DIO (TTL) triggering of external devices	Yes
Maximum input power (maximum dissipated power from active cells)	50 W @ 25 °C
Cell isolation	Automatic
Dynamic interface	7-segment LED with color signage
Connection type	Ethernet
True parallel data acquisition	Yes
Seamless measurements	Yes
Untethering (Remove and use the computer for other tasks while the experiment is in progress.)	Yes

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Timing	
Time gap between 2 seamless measurement commands	0 ns (no gap)
Clock resolution (internal clock)	10 ns
Lowest sampling interval (acquisition) time (i, E, S2)	1 $\mu$ s
Memory	
On-board data buffer (with sampling rate <10000 data points/s)	10 million data points (samples)
On-board data buffer (with sampling rate $\geq$ 10000 data points/s)	1 million data points (samples)
Footprint	
Dimensions (w x h x d), excl. cables	20 cm x 27 cm x 40 cm
Weight	13 kg
Power requirements	300W, 100..240V, 50/60Hz

## VIONIC external components

Component	Material
Instrument transparent frontplate	Polymethyl methacrylate (PMMA)
Instrument back, bottom and green rims	Polypropylene (PP, 20% mineral filled)
Instrument side and top panels	Stainless steel (SS)
Fixed cables	Polyvinyl chloride nitrile (PVC Nitrile)
Buffer and splitter box	Aluminium (Al), black anodized with silicone protective rings
Adaptive cables	Polyvinyl chloride (PVC) with Au-plated contacts
Test Cell	Acrylonitrile butadiene styrene (ABS)

VIONIC's components have been carefully selected based on their chemical compatibility with the laboratory environment.

One for all,  
and all in one  
instrument.





## Metrohm Autolab



The research and development of VIONIC powered by INTELLO was based upon over 30 years of customer insight. Each feature was created to meet the requirements of electrochemical research and improve your day-to-day discoveries.

Metrohm Autolab provides an industry-leading **3 year warranty** on all instruments and accessories.

### Benefits

Pure Efficiency	VIONIC and the INTELLO software are bursting with time-saving features that optimize any workflow.
Pure Versatility	With unmatched standard specifications, VIONIC is the instrument of choice for your electrochemical applications.
Pure Safety	Smart hardware and software safety features protect your cell, your lab, and your data.
Pure Discovery	VIONIC powered by INTELLO offers a unique combination of features that observes electrochemical processes, in real time with no gaps or missed information: complete data, pure discovery.

**Dedicated to research**

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