



VIONIC powered by INTELLO

Hardware features that
bring #purediscovery to
your lab.



reddot award
product design 2022



 **Metrohm**
Autolab



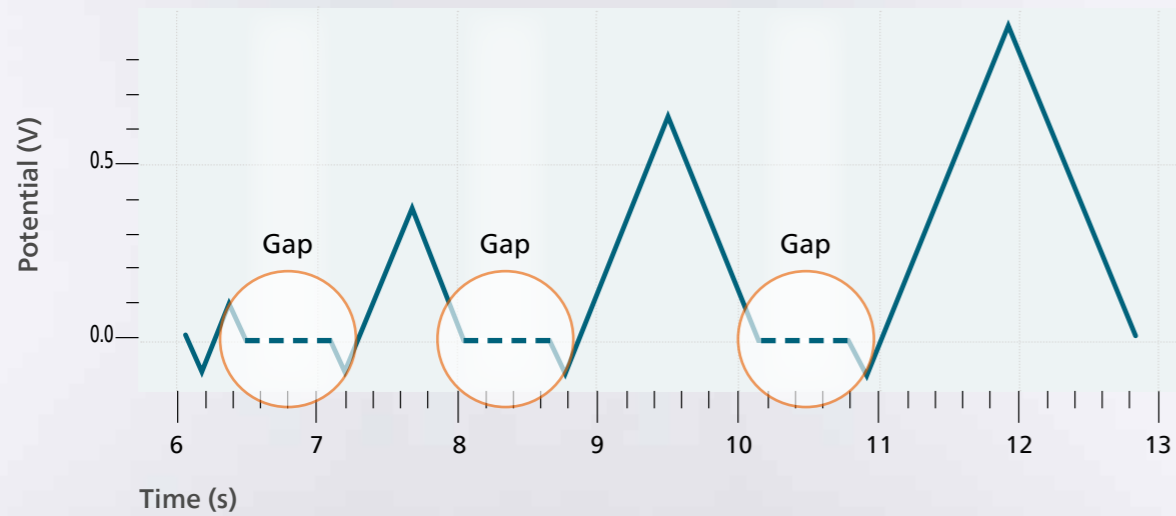
VIONIC offers the highest combined specifications in one single instrument, plus:

- **Seamless** measurements with the most complete data.
- **Untethering** for computer-free measurements.
- Communicative **Dynamic Interface**.
- **Pure signal bridge** for noise-free measurements.

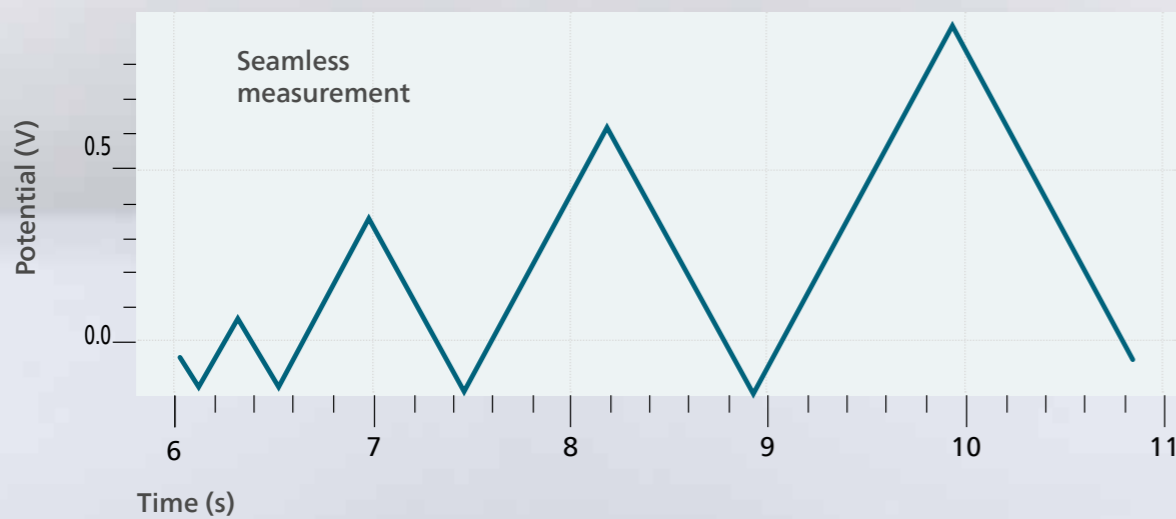
metrohm.com/demoVIONIC

Seamless measurements

Conventional computer-controlled PGSTAT



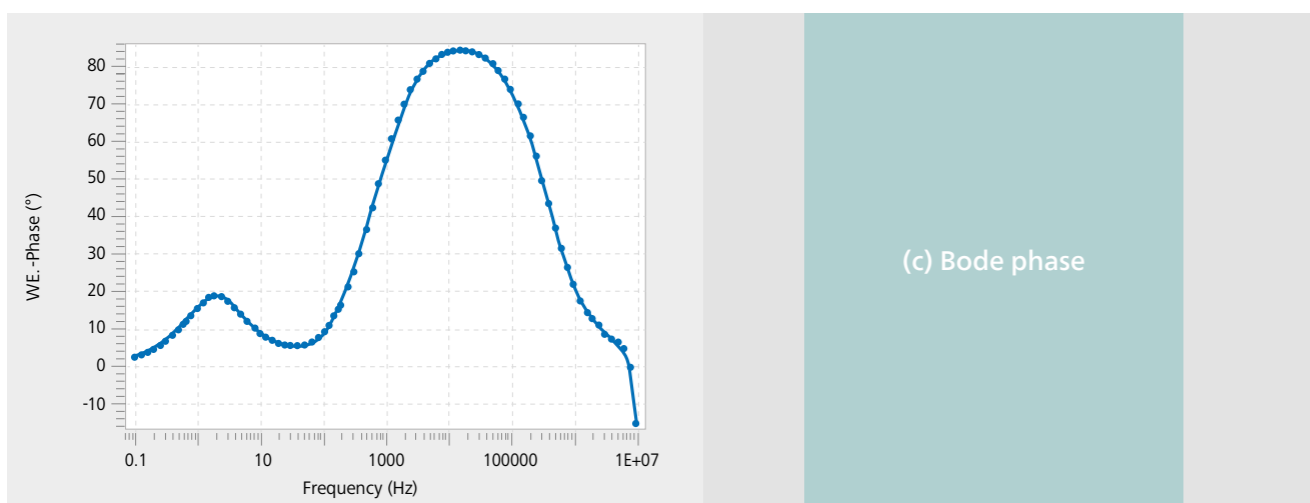
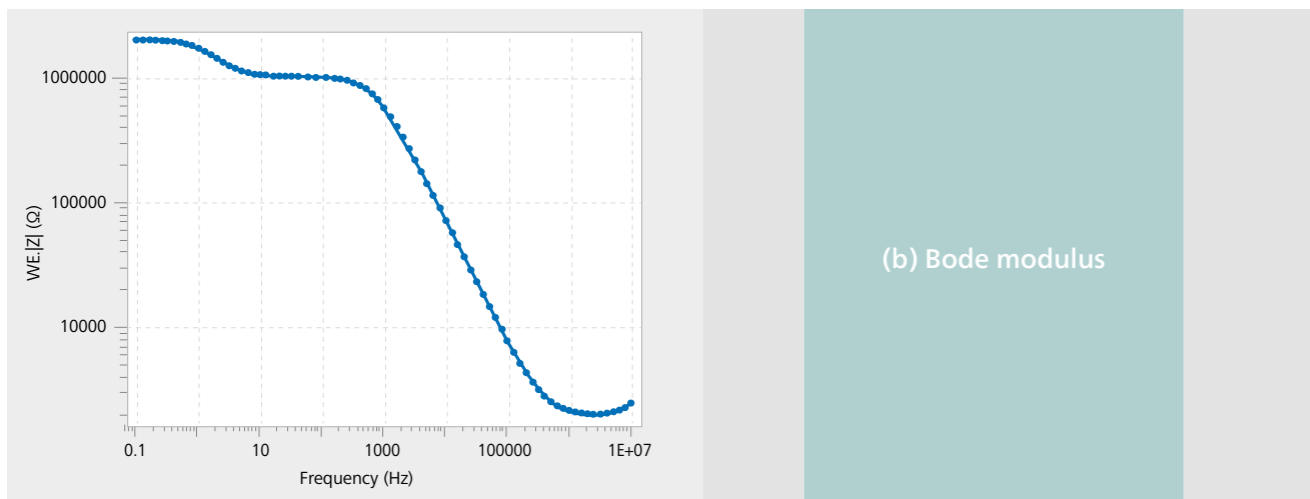
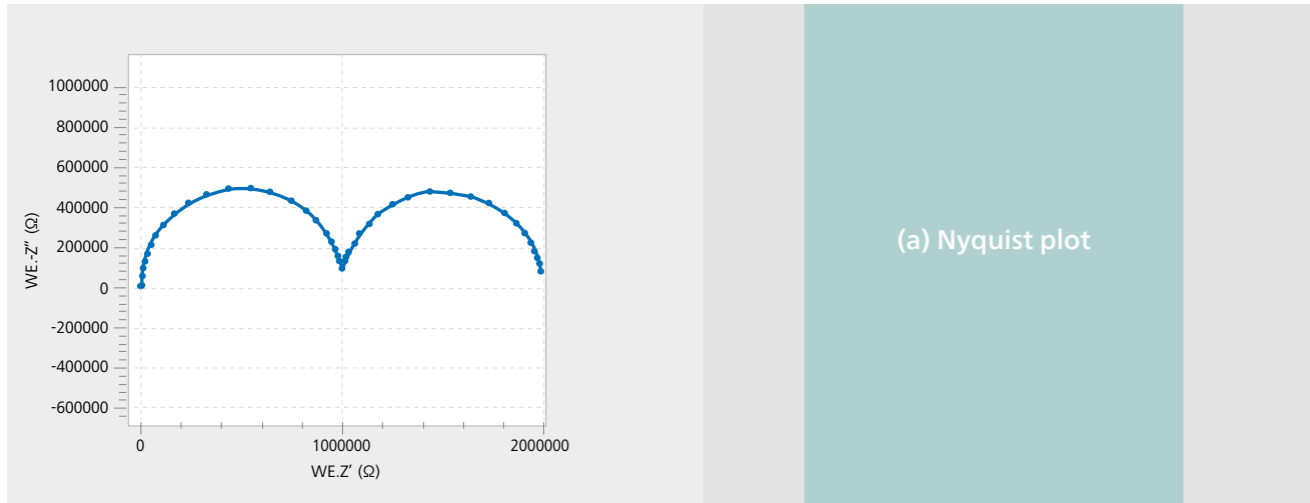
VIONIC powered by INTELLO



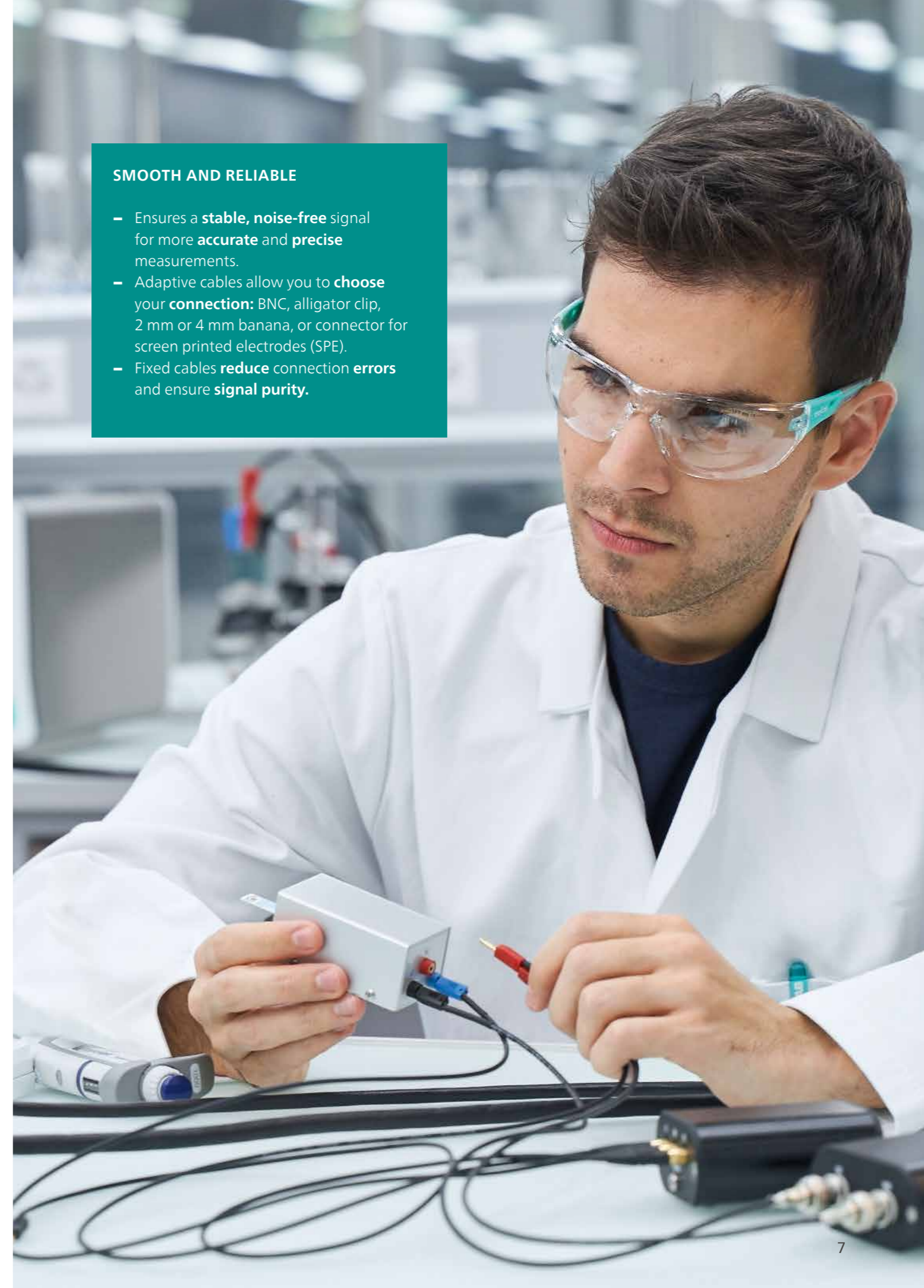
- **Seamless** measurements observe nature **without interference** or perceptible **delay**.
- VIONIC measures what is happening, in real-time with **no gaps** or **missed reactions**.
- With the VIONIC **real-time** digital signal processor you can collect **complete data** that is a **pure** reflection of electrochemical processes in nature.



Pure Signal Bridge



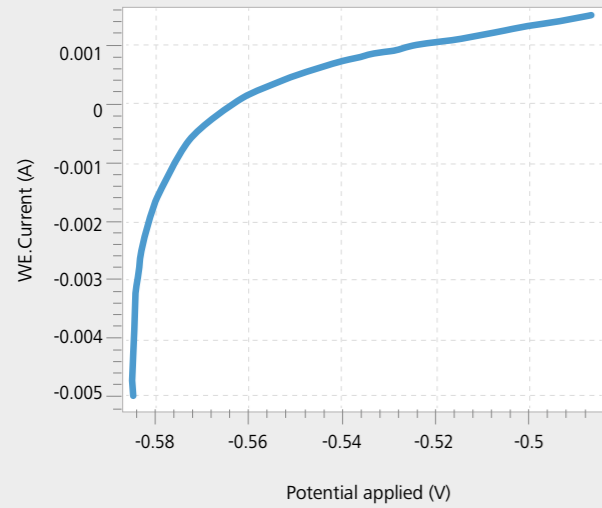
Nyquist plot (a) Bode modulus (b) and Bode phase (c) from an electrochemical impedance spectroscopy experiments performed on a dummy cell with two time constants. The data were taken from 10 MHz to 100 mHz, 10 frequencies per decade; 0 V offset and 10 mV amplitude top.



SMOOTH AND RELIABLE

- Ensures a **stable, noise-free** signal for more **accurate** and **precise** measurements.
- Adaptive cables allow you to **choose** your **connection**: BNC, alligator clip, 2 mm or 4 mm banana, or connector for screen printed electrodes (SPE).
- Fixed cables **reduce** connection **errors** and ensure **signal purity**.

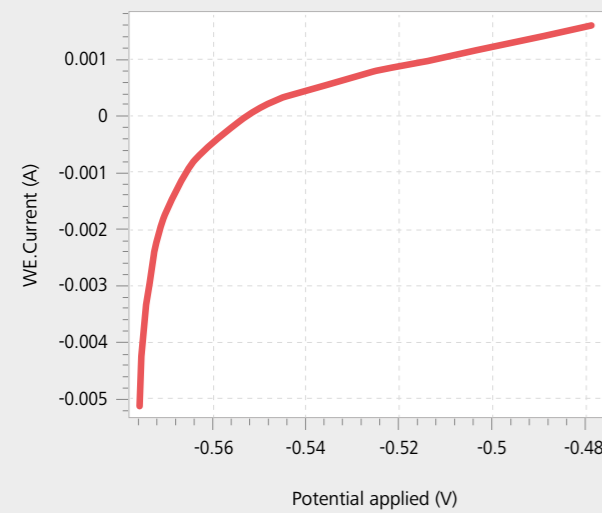
Selectable Floating



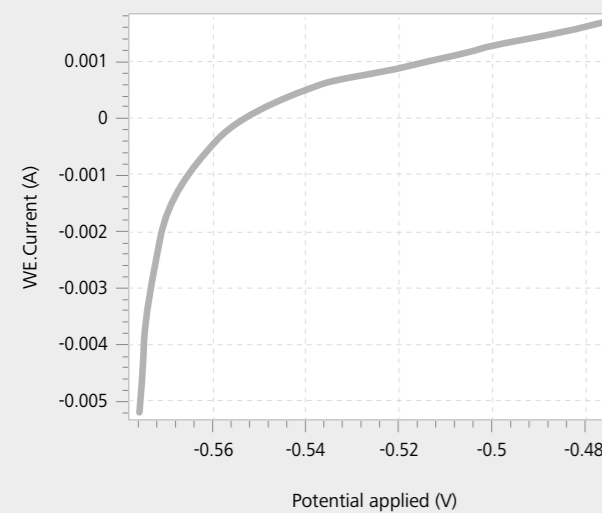
The i vs. E curve with floating mode OFF.

THREE GROUNDED OPTIONS, ONE CLICK

- **Consistent, smooth** signal with all **grounded** options.
- **Flexibility** to ground WE, CE or cell vessel.
- INTELLO provides a **convenient connection** guide.



The i vs. E curve with cross-floating mode ON, WE grounded.



The i vs. E curve with floating mode on, CE grounded.



Untethering

COMPUTER-FREE MEASUREMENTS

- Untether your computer and get on with **other tasks** while your experiment is running.
- INTELLO tells you **how long** you can keep your computer **untethered**.
- Up to **10 million** data points can be stored, more than enough for typical electrochemical measurements.





Untethering Overnight

You can reconnect at any point to check on the progress of your experiment

Connect with efficiency:

- Use your computer to **prepare** for department meeting the **next day**.
- **Continue writing** a journal article.

Untethering Working day



Connect with efficiency:

- Present **results** to colleagues using your computer.
- Virtual **meeting** with remote collaborators.



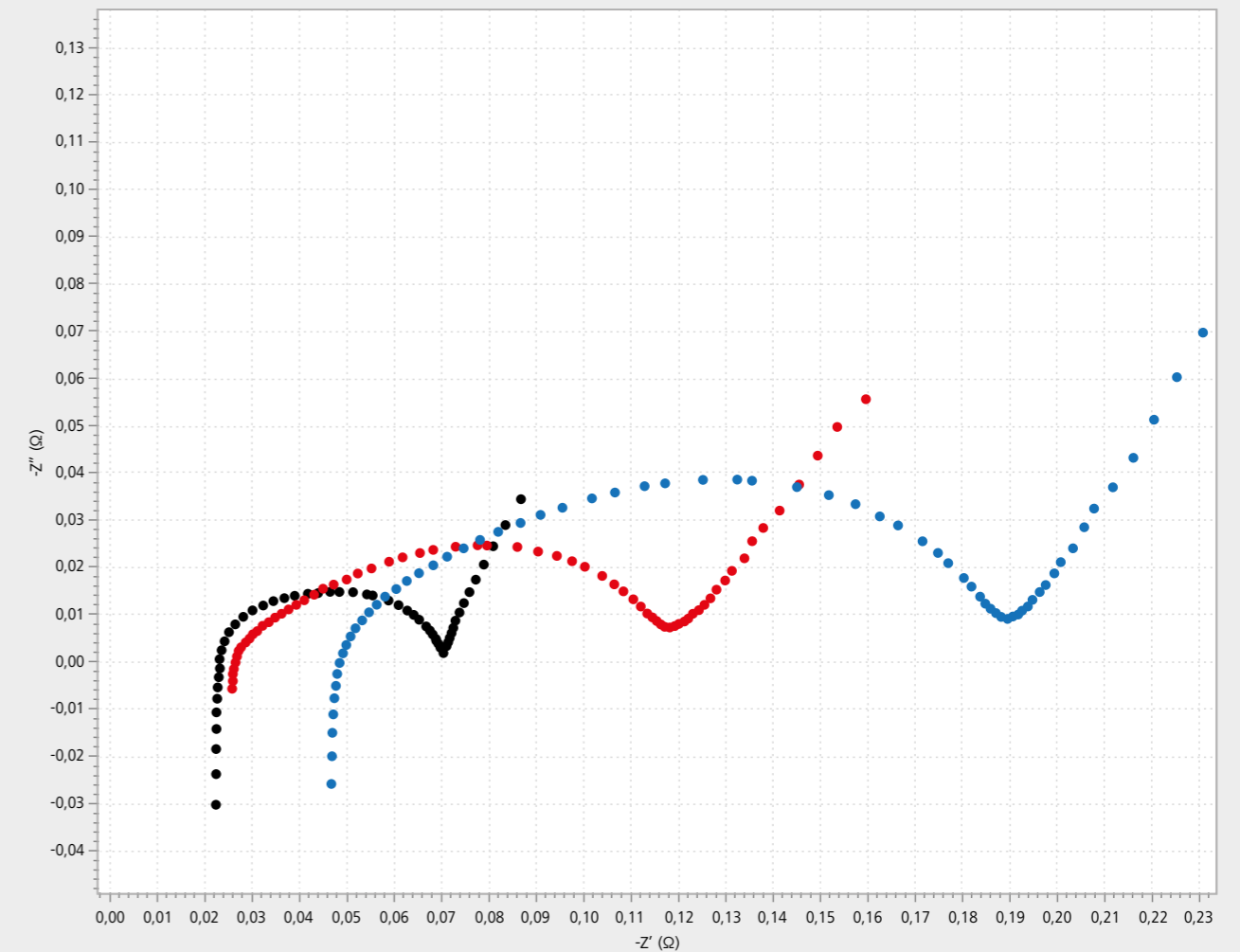
Second Sense (S)

ADDITIONAL POTENTIAL MEASUREMENT

- Gather additional insight **simultaneously**
- **Simultaneous** Electrochemical Impedance Spectroscopy (EIS) on **2 electrodes** in the **same cell**.
- Included at **no additional cost**.

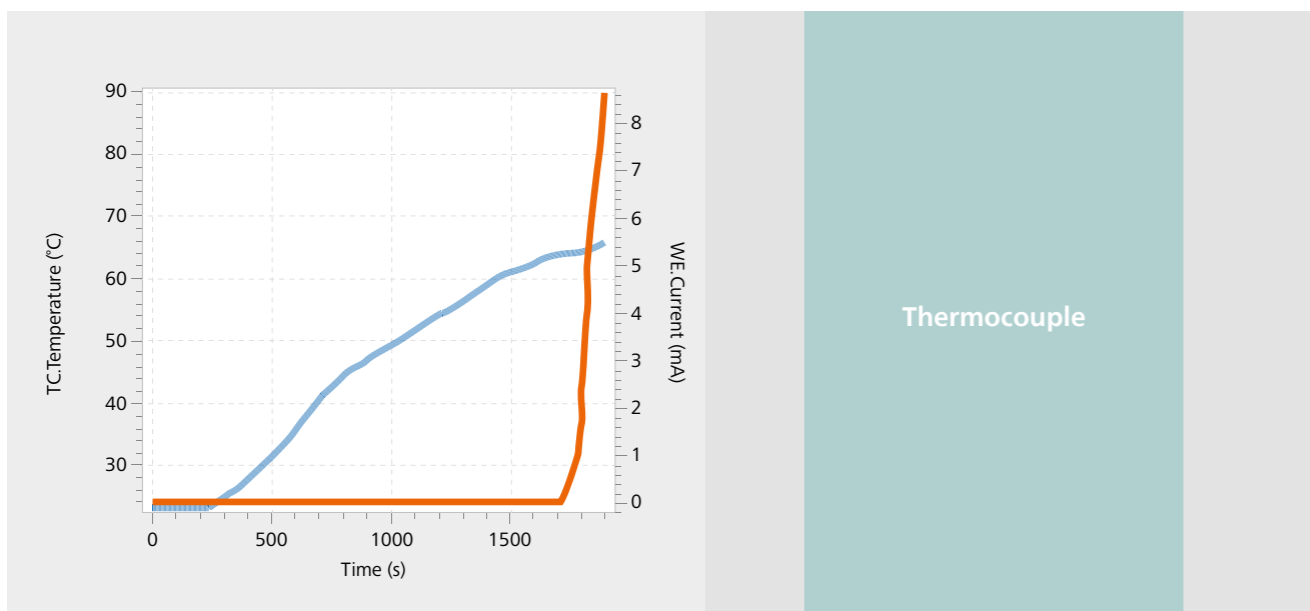
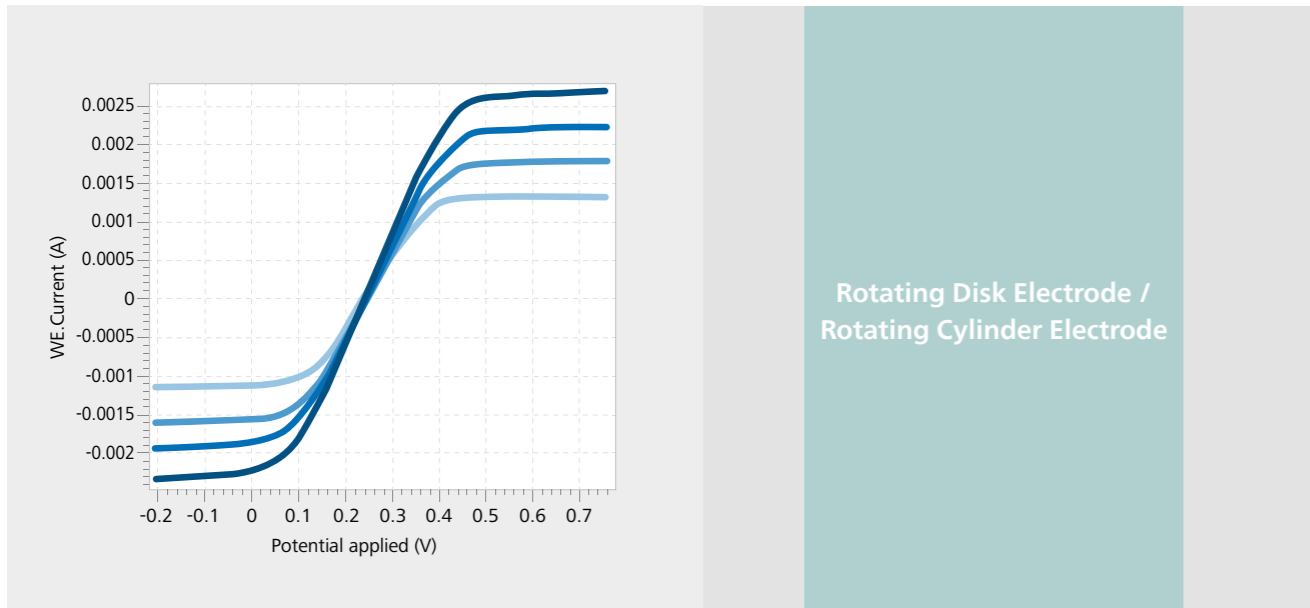


Simultaneous EIS characterization of the Anode and Cathode of a battery



- ✓ ● EIS on the Cathode (vs Reference)
- ✓ ● EIS on the Anode (vs Reference)
- ✓ ● EIS on the Battery (Anode vs Cathode)

Connect External Accessories



Thermocouple specifications

| | |
|------------------------------------|--------------------------------------|
| Temperature sensor type | Thermocouple, K-Type |
| Temperature measurement resolution | 0.1 °C |
| Temperature measurement accuracy* | 2.2 °C or 0.75%, whichever is higher |
| Thermocouple conversion rate | 2 Hz |

*Subject to thermocouple specifications



EXTERNAL DEVICES INTEGRATED

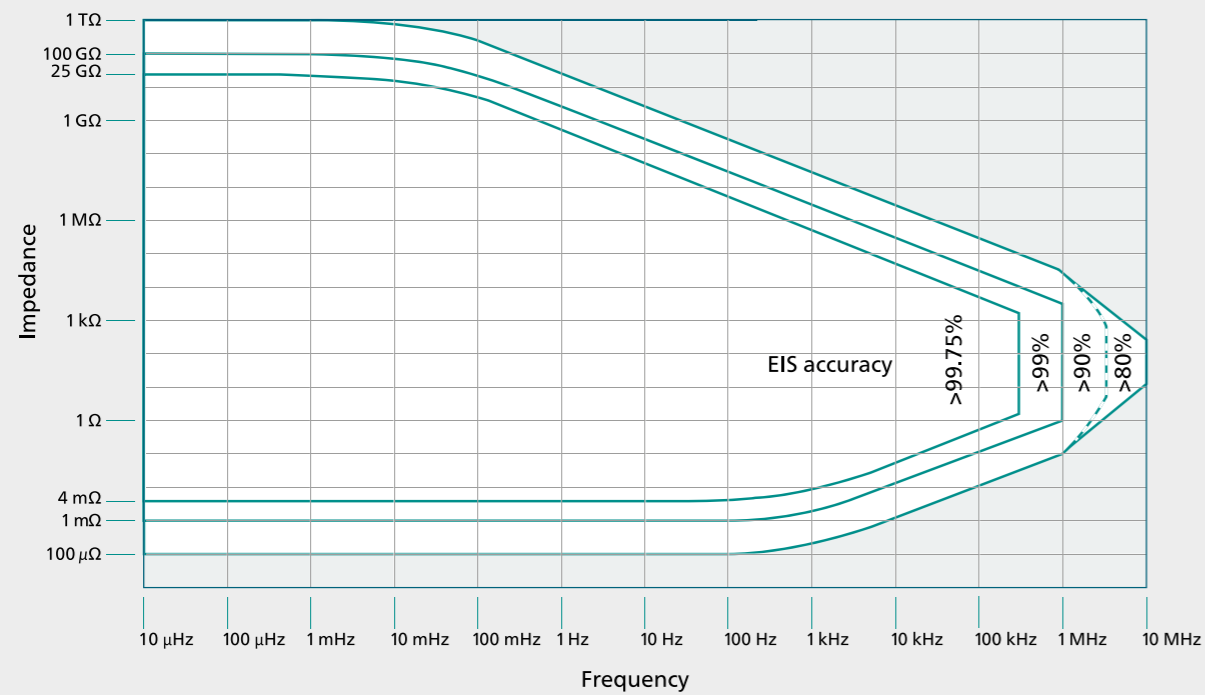
- Easily include **external accessory control** in your procedure for trouble-free experimental execution.
- Analog connection and remote control available for **rotating disk** and **rotating cylinder** electrodes (RDE and RCE).
- **Real-time temperature monitoring** is possible using a thermocouple.

Highest accuracy for your EIS data.

99.75% accuracy

For typical EIS measurement performed with VIONIC powered by INTELLO.

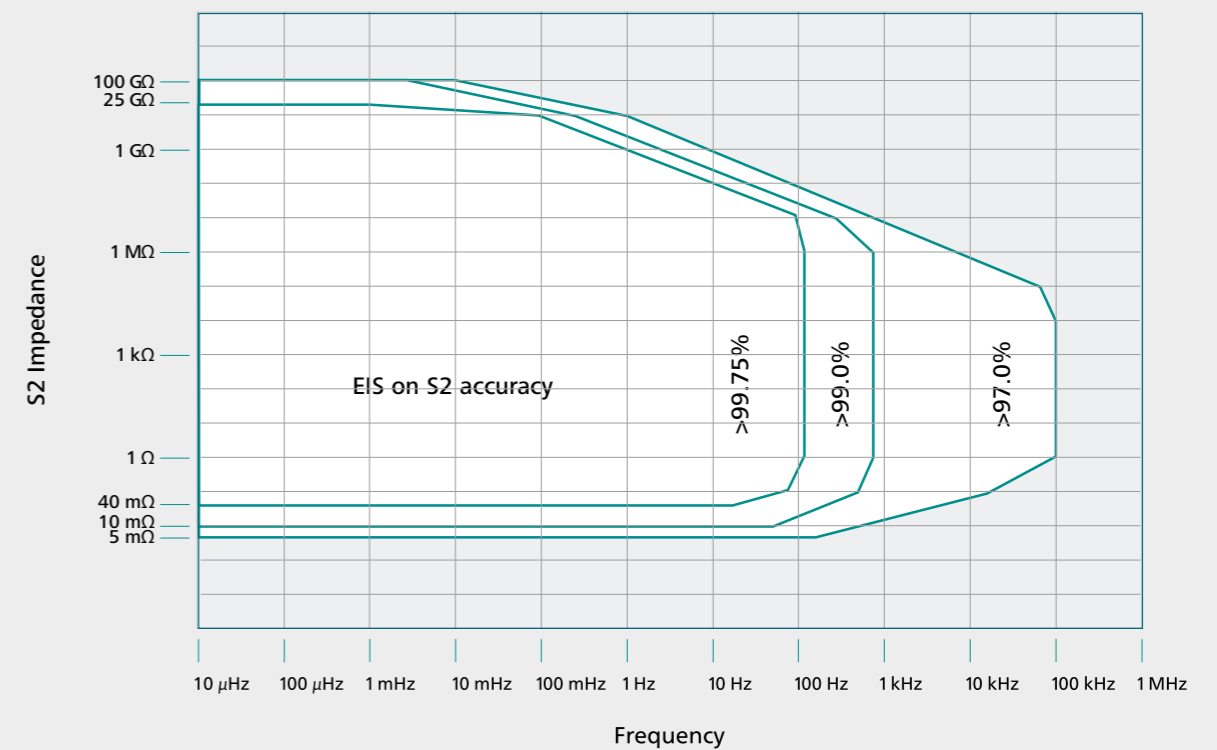
EIS contour plot



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

- Analyze a variety of materials (liquid and solid electrolytes, high and low impedance) with **guaranteed accuracy between 1 TΩ and 100 μΩ** over **16 decades** with a maximum **frequency up to 10 MHz**.

EIS S2 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 $10 \times Z_{S-RE}$.

- Record the **EIS spectra simultaneously** on the **anode** and the **cathode** of your battery.

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.

Metrohm Autolab is an ISO 9001 certified company.

Dedicated to research
metrohm.com/electrochemistry