



# ExaMight

## ALL-IN-ONE BATTERY QUALITY ASSURANCE SYSTEM

ExaMight is a comprehensive modular system for battery quality assessment and management. With the innovative real-time electrochemical impedance spectroscopy (EIS) process for high-precision and ultra-fast cell evaluation, ExaMight can be used for end-of-line testing, incoming cell inspection or 2nd-life qualification.

### Ensure consistent battery quality

Battery-powered products have very precise demands on the performance and service life of each individual cell. Varying cell qualities not only affect the performance, but also the safety of your products. Safion's innovative technology provides maximum insight into every battery cell you produce or purchase, ensuring that your cells deliver what they promise.

With its hardware modules for signal processing and cell contacting as well as the comprehensive software suite, the ExaMight system offers efficient tools and automated workflows for all fields of battery analysis.

### Main Features

- Fully automatic measurement of the electrochemical battery impedance
- Superimposed measurement of 32 impedance points in 1 second
- Automatic quality assessment based on customizable criteria
- Fully scalable from low to high throughput
- Applicable for all lithium-ion geometries and chemistries

### Know your batteries



Innovative real-time  
EIS measurement



One second  
measurement time



Automatic quality  
assessment



Ready to use  
out-of-the-box

## Easy Setup And Integration

The modular design allows seamless integration into any working environment and adaptation to varying throughput rates. Whether used as a compact stand-alone desktop setup or integrated into a fully automated system, ExaMight meets your application-specific requirements and always has the individual battery benefit in mind.

### Option 1

#### Stand-Alone Setup Working Out-Of-The-Box

For low to medium throughput rates, the desktop set-up is the perfect solution. All ExaMight components fit on a single desk and can be operated with a conventional monitor, keyboard, mouse and barcode scanner. There is no need for any other equipment to perform precise quality diagnosis and assessment of your batteries. Focused on maximum usability, the system is set up and ready to use by connecting just a few cables and requires no specific user qualifications.

### Option 2

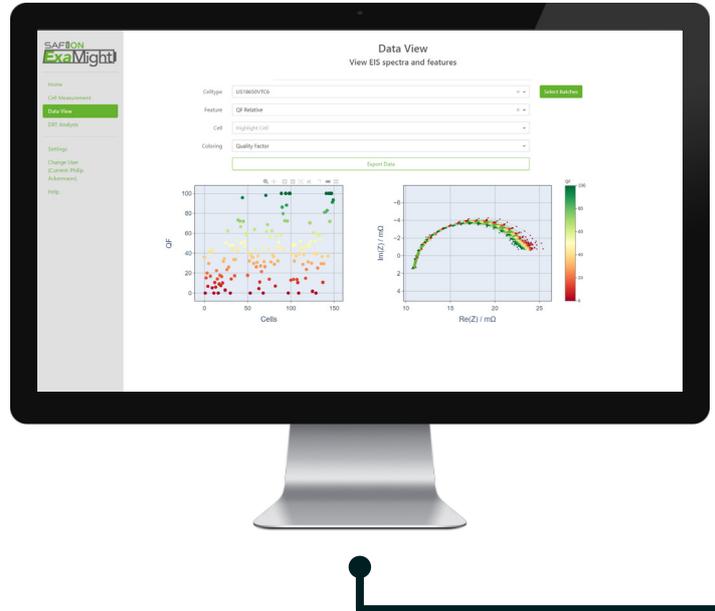
#### Seamless Integration Into Your Facility

For larger volumes with automated facilities, the ExaMight hardware components and the ExaMight software suite can be easily integrated into existing systems. Considering the measurement time of only one second, the number of cells assessed per day only depends on the contacting time of your facility and the amount of cells processed in parallel. Safion provides automation kits on request and offers close collaboration with your individual automation specialist to chose the best way of integrating the ExaMight components for perfect results.



## One Software For All Processes

The comprehensive ExaMight software suite provides tools for precise measurement and in-depth analysis of lithium-ion batteries and their properties. Identify flawed batches and single cells, track incoming and outgoing cell quality or select high-performance cells for demanding and safety-critical applications.



#### Automatic Quality Assessment

Using intelligent algorithms and machine learning for feature extraction and weighting, the software evaluates each battery automatically and matches it with the user's individual requirements.

#### In-Depth Quality Analysis

To select the highest performing cells for special applications or to set a quality gate, an instantaneous digital twin can be parameterized. For this purpose, application-oriented metrics like allowed maximum heat generation or allowed voltage drop can be used.

#### Reporting & Documentation

All measurement data including meta data for traceable cell identification are stored in a central database that can be accessed and exported easily via various interfaces. This not only facilitates controlling processes significantly, but also allows you to identify the right suppliers for constant, optimum battery quality.

## Real-Time EIS For Ultra-Fast And Precise Measurement

The electrochemical impedance spectrum (EIS) can be seen as the fingerprint of the battery and contains highly relevant information for predicting future capacity, life time and performance in your application. However, classical EIS measurement systems are too slow to be used for large-scale screening of battery cells in a production environment.

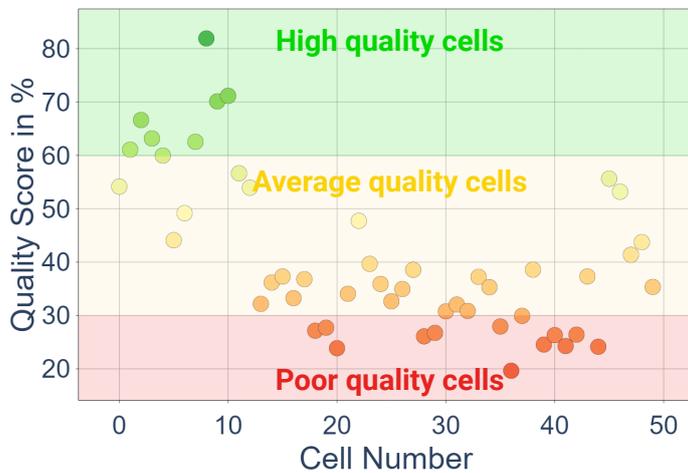
Safion's real-time EIS method uses superimposed excitation to measure up to 32 impedance points simultaneously. This reduces the measurement time from minutes or even hours to seconds, enabling a high throughput.



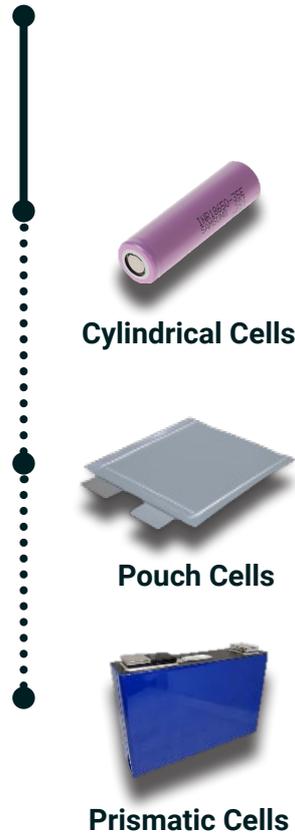
## Semi-Automatic Contacting Units for All Cell Designs

The ExaMight system can be used with all current cell geometries and lithium-ion battery chemistries. Even future battery chemistries can be screened precisely. Safion offers lean and robust semi-automatic contacting units for common cell geometries and even builds customized systems based on individual customer preferences.

The cylindrical cell contacting unit works with 18650 and 21700 cells. After laying a cell inside the tray, scanning its bar code with the included hand scanner triggers the automatic contacting.



Even within the same cell type from a single manufacturer, significant quality discrepancies can occur. In contrast to conventional battery screening techniques, the electrochemical impedance spectrum reveals hidden degradation mechanisms and thus, can reliably identify cells of different quality. The ExaMight software automatically analyzes EIS data and assigns precise quality scores to each measured cell.



## QA Process Parameters

Throughput	6 seconds per cell
Measurement time	1 second per cell
Quality assessment	Based on EIS and OCV data
Cell grading	Predefined or application-specific
Cell temperature measurement	Contactless temperature measurement
Cell ID tracing	Barcode scanner (optional)
Operation system	ExaMight Software Suite

## Device Specifications

Battery voltage range	0 - 5 V
Input power	< 60 W
Input voltage	12 VDC (power supply included)
EIS frequency range	1 Hz - 10 kHz
AC excitation	Parallel multi-sine, up to 32 frequency points
Interfaces	4 x USB, 2 x Ethernet, DisplayPort
Casing measurement unit (W x D x H)	36 x 23 x 12 cm
Casing contacting unit	On demand (depending on cell geometry)
Ambient temperature	+10°C to +30°C

### Schedule a product demonstration!

You would like to see how to assess battery cells with the ExaMight system live in action? On demand, Safion offers product demonstrations via web conferences or in person at our headquarter in Aachen and on several exhibitions around the world.

Our team will be happy to show you through all functionalities and answer your questions. Get in touch with us and make an individual appointment.



Safion GmbH  
Tempelhofer Straße 12  
52068 Aachen, Germany

✉ [info@safion.de](mailto:info@safion.de)  
☎ +49 241 475 921 24

Learn more at [www.safion.de](http://www.safion.de)