Warranty: 24 months

Battery Measuring Module for fast 100% checking of battery cells and modules in automation systems

MODEL **2511** NEW

Preliminary data sheet

Display device

Highlights

- Internal resistance ranges: 10 … 100 mΩ
- Frequency ranges: 1kHz, 100 Hz, 10 Hz, 1 Hz
- Resolution: up to 0.01 µΩ
- 5 Measurement channels, temperature measurement via PT100
- Accuracy: from ±0.4 % d.A. ± 0.2 % of reading
- Fast, individually adjustable analysis programs
- Compact design, state of the art interfaces

Options

- Desktop device with display
- Wall mounting
- Top hat rail mounting

Areas of application

- Manufacture of battery cells and modules
- Quality assurance of battery cells and modules
- Checking of contact weld connections

Product description

The 2511 battery tester is particularly suitable for fast , multi-channel measurement of battery cells and modules in automation systems. The device operates in accordance with the well-tried four-conductor measuring method, and combines the functionality of a battery tester and a battery analyzer, making it possible to carry out rapid testing of batteries and accumulators irrespective of the technology. A rapid analysis can be carried out starting at 73 ms. The testing can be carried out with individually adjustable parameters.

The device corresponds with the latest CE directives, and is designed for laboratory operation and also for deployment under harsh industrial conditions in automation systems.

The PROFINET field bus interface makes it easy to integrate into your production sequence control. Fully automatic testing can be carried out in this way.

Technical data

Operating modes and measuring times						
Operating mode		3 parameter slow	3 parameter standard	2 parameter standard	3 parameter fast	2 parameter fast
Parameters		U, 1 kHz, 1 Hz	U, 1 kHz, 10 Hz	U, 1 kHz	U, 1 kHz, 100 Hz	U, 1 kHz
Measuring time 1 channel/ms		1233	333	233	93	73
Measuring time 5 channel/ms		6215	1715	1215	515	415
Measuring principle		Internal resistance (ohmic component), discharging, polarity-independent				
Number of measuring channels		Up to 5 individual cells, one module measuring channel (60 V)				
Internal resistance						
Measuring ranges		10 mΩ, 30 mΩ, 100 mΩ				
Measuring frequencies		1kHz, 100 Hz, 10 Hz, 1 Hz				
Resolution		0.01 µΩ				
Measuring current		200 mA				
Measuring error		from ±0.4 % d.A. ± 0.2 % of reading (23 ±5 °C) (Standard measuring time)				
Temperature measurement (PT100)						
Measuring range		0 … 100 °C				
Resolution		0.1 °C				
Measuring error		0.1 °C				
Temperature recording		via external PT100 sensor				
Temperature compensation		Temperature coefficient for the 10 Hz measurement, freely selectable depending on the battery technology that is used				
Voltage						
Measuring ranges		0 … ±5 VDC 0 … ±60 VDC single channel				
Resolution		1 µV or 10 µV				
Measuring error		from ±0.01 % d.A. ± 0.005 % of reading (0 … ±5 V) from ±0.03 % d.A. ± 0.005 % of reading (0 … ±60 V)				
Housing						
Material		Aluminum				
Dimensions (WxHxD)		104 x 54.6 x 120 mm				
Weight		approx. 500 g				
Protection type		IP54				
Connections		PROFINET, PT100, measuring inputs, USB				
General data						
Supply voltage		11… 30 VDC, galvanic isolation, inverse polarity protection, overvoltage protection				
Power consumption		Approx. 3 W				
Communication		PROFINET				
Operating temperature range		0 °C … +50 °C				
Storage temperature range		-10 °C … +70 °C				
Humidity		0 … 70 % non-condensing				
Installation		4 rubberized feet (fitted as standard) Wall mounting (accessory only for panel mounting) Mounting rail installation (accessory) (Mounting rail in accordance with DIN EN 50022)				

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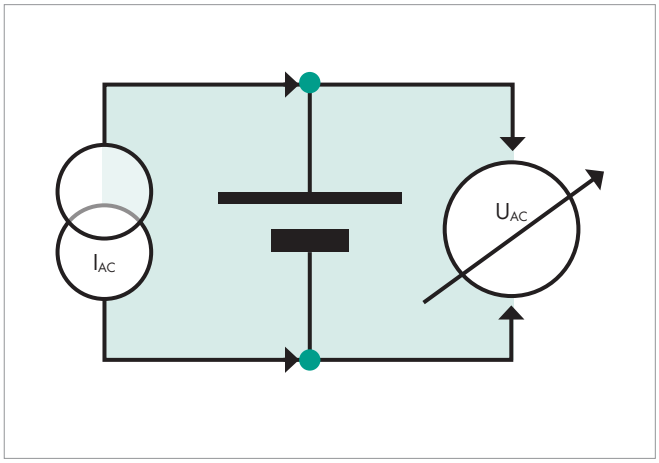
Principle of operation

Battery measuring module model 2511 is optimized for rapid testing of cells and for testing welded connections. It operates in accordance with the well-tried four-conductor method (Kelvin connection) and has 4 connections for impedance measurement: 2 cables for supplying the test current and 2 cables for the voltage measurement. The battery tester applies an AC current IAC that is relatively small in relation to the load current to the test object (battery cell or module), and measures the resulting voltage drop UAC in the mV range. The AC voltage measurement takes place selectively and synchronously, with results in accordance with the real and imaginary component. Dividing the AC voltage and the AC current results in the complex (AC current) impedance Z. The real component represents the ohmic component, whereby a negative imaginary component means capacitance, and a positive proportion means inductance. The input voltage is measured in parallel to this.



The 3 main battery parameters (AC internal resistance, DC internal resistance and battery voltage) are measured within < 0.1 seconds. Another measuring mode makes a temperature measurement and automatic temperature compensation possible.

Operating modes

The 2511 battery measuring module and the associated PC software provide a large number of measuring and evaluation functions.

3 parameters slow/fast
In this operating mode, the internal resistance is measured with 2 preset frequencies (1 Hz ... 1 kHz) and the open circuit voltage.

2 parameters slow/fast
In this operating mode, the internal resistance is measured with a preset frequency (1 Hz ... 1 kHz) and the open circuit voltage is measured.

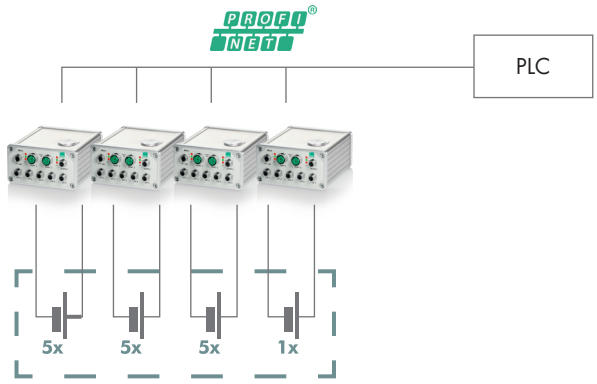
Voltage measurement
In a separate operating mode, the voltage of a battery module (0 ... 60 VDC) can be measured via measuring channel 1.

Applications

16-channel high-speed application – 100 % monitoring in vehicle battery module received goods checking

Many battery cells are required to manufacture and install high-performance battery modules for electric vehicles. In the received goods checking area, important battery parameters of each individual cell must be reliably measured and evaluated within very short cycle times.

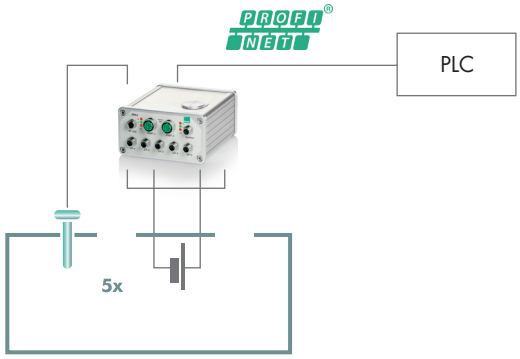
After contacting the prismatic cells, the internal resistance **with 1 kHz** and the cell and module voltage of **all 16 cells** are **measured and evaluated within approx. 1.6 s** with the cascadable battery measuring module and transferred to a PLC in real time.



Measuring and evaluation parameters
U_{cell} .....≈ 0...3.4 to 3.7 VDC
U_{module} .....≈ 54.4...59.2 VDC
R_{AC} (1 kHz) .....≈ 0...0.85 mΩ

5-channel application – matching of battery cells for large-scale storage

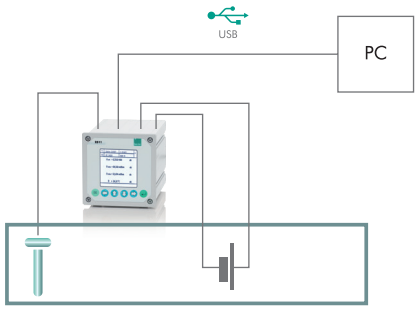
Many round cells are often used in battery operated large-scale storage systems. Before these are installed, different battery parameters of each individual cell must be exactly and quickly measured and evaluated in order to achieve qualitative matching. The contacting of the round cells takes place using the **four-conductor measuring method** (for each current and voltage cable). The two-frequency impedance measurement is used to determine the **series resistance (electrolyte)** and the **parallel resistance (electrodes)**. In parallel to this, the respective **cell voltage** and **temperature** are recorded and evaluated. At the control side, the data is transferred via PROFINET. All measuring and evaluation data is archived for traceability.



Measuring and evaluation parameters
U_{cell} .....≈ 0...3.3 to 3.8 VDC
U_{module} .....≈ 16.5...19 VDC
R_{AC} (1 kHz) .....≈ 0...0.95 mΩ
R_{DC} (10 Hz) .....≈ 1.75 mΩ
ϑ .....≈ 22...28 °C

Single-channel application for quick testing of battery cells

Battery cells with a relatively high internal resistance can generate more heat; chemical processes can accelerate the capacitance reduction and the internal resistance increases. The resistance can change due to transport or handling movements. In order to ensure that there is consistent quality in the assembly of power tools and the integration of the batteries, test objects are taken at random at individual workplaces and subjected to a quick test with regard to impedance and temperature behavior, including a cell voltage measurement.



Measuring and evaluation parameters
U_{cell} .....≈ 0...18.2 to 18.8 VDC
R_{AC} (1 kHz) .....≈ 0...8.80 mΩ
R_{DC} (10 Hz) .....≈ 0...3.12 mΩ
ϑ .....≈ 20...29 °C

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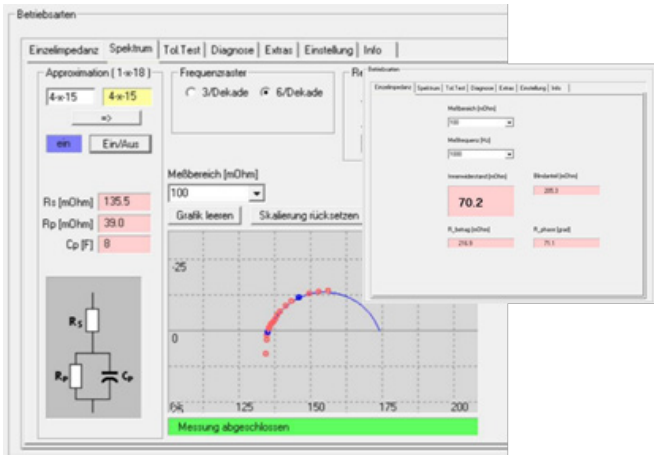
DigiControl PC software

The innovative, intuitively operated PC software for battery measuring module 2511 is used wherever diagnoses, battery condition determination or target/actual comparisons are to be carried out on battery cells or battery modules.

- Convenient device configuration via USB interface
- Management/configuration of different operating modes
- Backup of settings
- Measurement data logging
- Entry of test object designations for measurement data logging
- Exporting the measurement data in an Excel file or as plain text
- Evaluation of the measuring results



Accessories

Order code		
9900-K251		Measuring cable MK-X5 1.0 m in length, 2 pairs of twisted measuring leads, 4-pin M8 socket on open cable ends for universal connecting options
9900-K253		Measuring cable MK-X5 3.0 m in length, 2 pairs of twisted measuring leads, 4-pin M8 socket on open cable ends for universal connecting options
2592-V001		Pt100 temperature sensor with 2.5 m shielded connecting cable and 5-pin M8 connector
2511-Z001		Mounting kit for wall mounting
2511-Z002		Mounting kit for mounting rail installation
		Field bus communication 5.0 m cable length, M12 connector D-coded, straight on RJ45 connector
		4-pin M8 socket for the measuring inputs
		5-pin M8 socket for the power supply
		4-Pin M12 connector, D-coded

Generate order code

						Standard			
						2	5	0	3
2	**5**	**1**	**1**	**–**	**V**	**2**		**0**	**3**

Housing	
■ Panel-mount unit without display 24 V/DC	2

Number of channels	
■ 1-channel	1
■ 2-channel	2
■ 3-channel	3
■ 4-channel	4
■ 5-channel	5

Fieldbuses	
■ PROFINET	3

						Standard			
						1	2	0	3
2	**5**	**1**	**1**	**–**	**V**	**1**	**2**	**0**	**3**

Housing	
■ Desktop device with display	1

Number of channels	
■ 2-channel	2

Channel 1 voltage measuring range 0 … ±60V

Fieldbuses	
■ PROFINET	3

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