burster

Universal High Voltage Battery Controller for analysis, testing and diagnosis

MODEL **2550** NEW
Preliminary data sheet

Highlights

- Voltage measurement of 0…100 VDC to 0…900 VDC
- AC resistance range (impedance) 0…100 mΩ and 0…100 Ω
- Resistance measuring range 0 … 1 mΩ and 0 … 3 Ω
- Frequency range 1 Hz … 1 kHz
- Extremely compact, easy to operate

Areas of application

The extremely compact, universal battery controller is one of the world's first devices for measuring the spectral impedance of low and high voltage battery systems. It is predestined for troubleshooting in development/laboratory or manufacturing areas, for analyzing operating behavior in the test phase or for "rapid diagnostics" in the support area. Irrespective of the technology, batteries or accumulators can be tested in a reliable, fast and safe way.

- Standard battery tests
- Target/actual comparisons
- Diagnosis function (status determination)
- Battery analyses

Product description

The model 2550 universal battery controller 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. As well as high-voltage batteries, low voltage batteries (e.g. 12 VDC, 24 VDC or 48 VDC) can also be measured and diagnosed.

The power is supplied and the measurements are read out via the galvanically isolated USB interface. Parameterization, visualization and operation take place via the intuitively operated PC software.

The battery test function records the battery voltage and the internal resistance at a fixed frequency. An OK/NOK statement can be derived by means of comparison with target values. The charge status and capacitance (health) can be diagnosed by comparing the battery data. Signs of aging can be detected at an early stage in this way by examining changes over time.

With the battery analysis function, the battery voltage and also the internal resistance can be measured via the frequency (spectral impedance). Other battery parameters can be derived using the frequency curve, e.g. the model parameters of the equivalent circuit, from which conclusions can be drawn about the load behavior of the battery. For example, information about damage can be obtained via deviations of the curve from characteristic values.

Technical data

| DC battery voltage measurement			
Range (adjustable)		0 … 100 V	0 … 900 V
Resolution		10 mV	100 mV
Measuring accuracy		±0.2 % d.A. ±0.03 % of reading	
Input impedance		550 kΩ	
AC resistance measuring ranges			
Impedance measuring range (Uac ≤ 200 mVss at the battery)		0 … 100 mΩ	0 … 1 Ω
Measuring current		200 mAss, discharging (unipolar)	
Resolution		100 µΩ	
Measuring accuracy		±1 % d.A. ± 0.3 % of reading / ±2° Phase	
Frequency range			
Range		1 Hz … 1 kHz	
Time interval for single measurement		1 s … 10 s, frequency dependent	
Time interval for entire spectrum		17 s / 29 s	
Type of measurement		Single measurement	
Ambient conditions			
Operating temperature		0 °C … +40 °C	
Storage temperature		-40 °C … +80 °C	
Humidity		< 80 %, non-condensing	
General data			
Communication interface		USB	
Power supply		Via USB, galvanically isolated	
Current consumption		max. 500mA	
Size		230 x 150 x 90 (L x W x H / mm)	
Weight		1 kg	
Protection class		II (reinforced insulation)	
Protection type		IP 40	
Measuring category		CAT I	
EMV / CE symbol		The measuring system corresponds to the requirements of EC directive 2004/108/EC (EMC directive)	
Test connection		4 x 4 mm Ø safety sockets (four-lead measurement)	

Calibration / test interval

We recommend periodic checking at 12 monthly intervals. To do this, please send the device to us.

Principle of operation

The battery controller operates in accordance with the four-conductor method (Kelvin connection) and has 4 connections for impedance measurement: 2 connections for power input (Force + and Force -) and 2 connections for voltage measurement (Sense + and Sense -). The battery controller applies an AC current IAC that is relatively small in relation to the load current to the test object (battery, accumulator), 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, the imaginary component and the capacitive (or inductive) component, whereby a negative imaginary component means capacitance, and a positive proportion means inductance. The input voltage is measured in parallel to this.
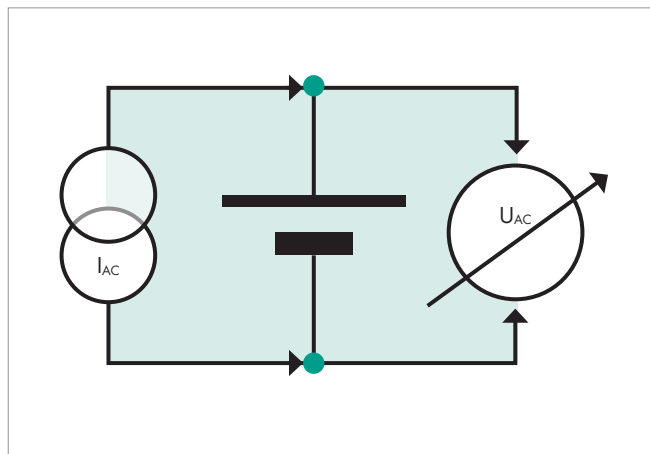
Operating modes

Battery controller 2550 and the associated PC software provide a large number of measuring and evaluation functions.

Single frequency impedance measurement measuring function

In this operating mode, the single impedance of a test object is measured with a previously defined measuring frequency (selectable between 1 Hz and 1 kHz) with regard to internal resistance (real component, amount) and reactive component (imaginary component, phase).
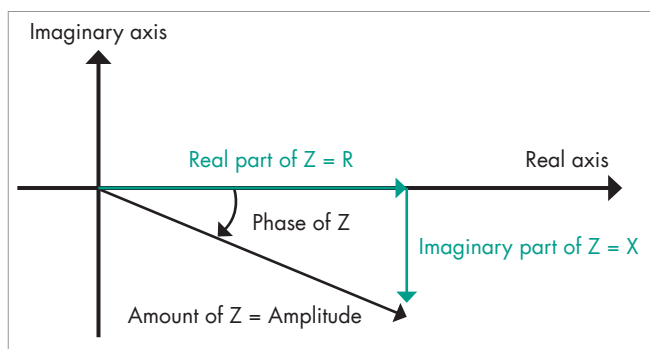
Spectral measuring function – impedance measurement

In the spectral measurement measuring type, periodic frequency sweeps are set. Starting with the highest frequency (1 kHz) all measuring frequencies are automatically run through. The results are depicted in a locus curve (real component, imaginary component with the frequency as a measuring parameter). Locus curves which have been determined can be used for comparison or referencing purposes. An approximation curve is inserted between two selectable measuring points with the aid of an approximation function.

Parameters such as the series resistance (Rs), the parallel resistance (Rp) and the charge status of the test object (Cp) can be calculated and information about the battery status can be obtained.

Referencing and evaluation function

The function makes it possible to compare measurements with target values (reference values). The reference values are defined in an envelope band. Locus curves (spectral curves), model parameters or single frequency impedance values can be used as target values. After successful completion of a measurement an OK/NOK evaluation result is available, displayed in the software and can be logged.

Diagnosis measuring function

The "Diagnosis tool" makes it possible to carry out a comprehensive evaluation of the battery status with regard to the status parameters of charge capability (capacitance) and charge status. The status is determined via indirect measurements, whereby advantage is taken of the connection between the open circuit voltage (OCV → depending on the charge status, appropriate technologically specific test object parameters are stored in the software) and the AC internal resistance (Rac → increases as the capacitance decreases). Support is provided by a visual capacitance display coupled with a classification function during the qualitative evaluation of the respective test object.

Voltage measurement

In parallel to the single frequency or spectral impedance measurement, the terminal voltage (0 … 100 VDC; 0 … 900 VDC) is measured.

Analysis and diagnosis PC software

The innovative, intuitively operated PC software for battery controller model 2550 is used wherever comprehensive visual analyses, diagnoses, battery condition determination or target/actual comparisons are to be carried out on battery cells or accumulators.

- Convenient device configuration via USB interface
- Management of different operating modes can be defined
- Viewer function
- Backup of settings
- Measurement data logging of the analysis and diagnosis data, including results
- Handover of test object designations for measurement data logging
- Exporting of measurement data and results into Excel
- Classification function
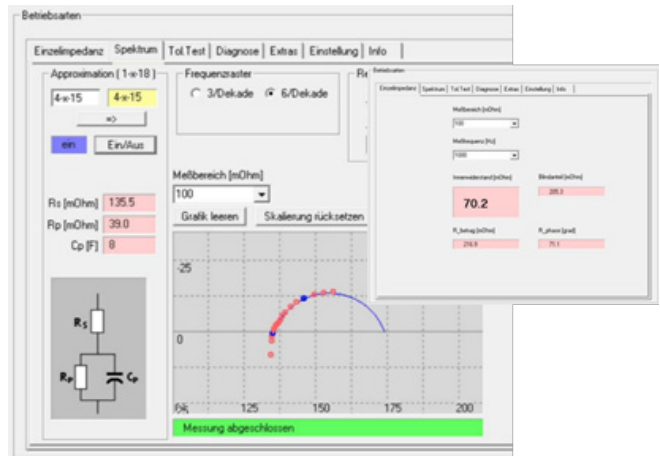
Accessories

Order code	
	Measuring cable MK-L 1.0 m cable length, 4 measuring cables with 4 mm laboratory connector for universal connection of standard test terminals or probes
	Measuring cable MK-L SET 1.0 m cable length, 4 measuring cables with 4 mm laboratory connector for universal connection of standard test terminals or probes, including 4 crocodile clips/cable shoe adapters M4/M6/M8 each.
	Measuring cable MK-HV 1.0 m cable length, 2 pairs of twisted measuring cables with 4 mm safety connectors
	RS-232 connecting cable, length 3.0 m
	USB connecting cable, can 2.0 m cable length be used, included in scope of delivery

Test object connection

The customer-provided twisted pairs of measuring cables are connected to the test object via the 4 mm input sockets attached to the front. Separate routing of the pairs of leads to the test object from different sides is recommended. These should be brought together and connected to the test object (battery, accumulator) in pairs.

Measuring socket	Meaning	Battery connection	Measuring cable
red	Force +	Positive terminal	Twist together!
black	Force -	Negative terminal	
Green	Sense +	Positive terminal	Twist together!
blue	Sense -	Negative terminal	

(See operating instructions for further information)
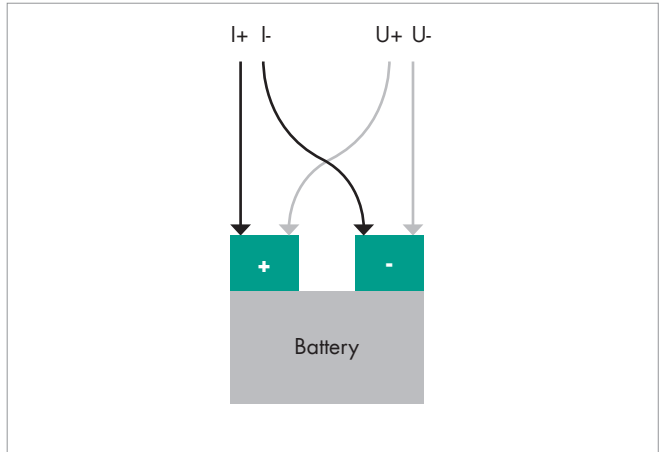
Order code

Item number	Functions
2550-V20000	Version with U, RAC, RDC, RS, RP,CP