GOSSEN METRAWATT

METRACELL BT PRO

Portable Battery Tester

3-447-057-03
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- Measurement of block voltages up to ± 24.5 V_{DC}
- Measurement of overall voltages up to 600 V_{DC} and 300 V_{AC}
- Capacity tests of individual blocks and entire batteries
- Internal resistance measurement with simultaneous measurement of the electric resistance (R_{el})[1] and electrochemical (charge-transfer) resistance (R_{ct})[2] for the determination of the battery status with the highest possible degree of accuracy
- Measurement of losses at connectors
- Automated recording of voltage and current curves (current curves with optional sensor technology)
- Measurement of block temperatures (with optional sensor technology)
- Ascertainment of acid densities by directly connecting a DMA 35 density sensor from Anton Paar GmbH
- Mobile and safe application in the field thanks to convenient carrying options and rugged design
- Battery identification by means of RFID tag reader
- Storage of up to 300,000 data records
- Battery tester management software for the management of battery databases and measurement data as well as for the analysis of measurement data including the generation of meaningful reports
- Non-contacting transmission of measurement data

Applications

Periodic testing and well-organized maintenance are necessary in order to assure the availability of stationary battery systems. The METRACELL BT PRO is a universal, multifunctional test instrument for user-friendly, professional maintenance of these battery systems. It can be used to determine the current status of the battery or battery block and pinpoint concealed battery defects. The battery tester is used primarily for testing stationary battery systems.

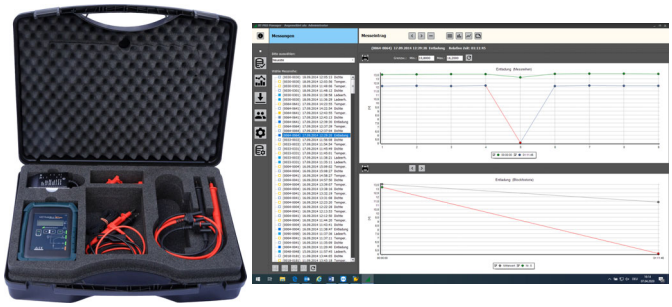

Figure 1: Carrying case (left), analysis of measurement data (right)

Features

- Simple and intuitive menu prompting
- Easy-to-understand measured value display
- Illuminated high-contrast display
- Compact design and shockproof ABS housing with additional rubber holster
- Unrestricted motion thanks to carrying strap, fastening clip and magnet
- Acoustic feedback for unimpeded view of the display
- Integrated Bluetooth® interface
- Integrated infrared interface
- Operating time approx. 10 hours
- Battery operation, equipped with 4 NiMH rechargeable batteries and battery charger as standard equipment
- Kelvin probes for 4-wire measurement (suppress influence of cable and contact resistances on the resistance measurement results)
- Carrying case for the safe storage of test instrument and accessories
- PC-aided management, evaluation and storage of measured values

1) Electrical Resistance R_{el}
is a measure of strictly electrical losses. These losses occur at, for example, plate straps, plate grids and electrolytes. The battery delivers rapidly changing currents via this resistance, for example for switched-mode DC/DC converters. Together with R_{ct}, it adds up to the R_{DC} (direct current resistance) of a battery.

2) Charge Transfer Resistance R_{ct}
Characterizes the ability of a block to accumulate and release a charge. This makes it possible to identify battery blocks (with electro-chemical defects) which are operating at a loss during float. Together with R_{el}, it adds up fto the R_{DC} (direct current resistance) of a battery.

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Measurements

Measurement	Description
MULTIMETER	DC and AC voltage measurements without storing measured values.
FLOAT	Periodic measurement of block voltages. This measurement is used for quarterly recording of float voltage, for example in UPS systems.
DISCHARGE	Multiple measurement of block voltages at short intervals during discharging (capacity tests of blocks).
CHARGE	Multiple measurement of block voltages at short intervals during charging (capacity tests of blocks).
RESISTANCE	Periodic measurement of the internal resistance of the blocks
TEMPERATURE	Measurement of block temperature with an IR temperature sensor
CONNECTOR	Measurement of voltage drop to determine connector loss between blocks
INTERVAL U	Measurement of the voltage of a battery at any desired time interval (voltage curve / capacity test of the entire battery).
INTERVAL U + I	Measurement of the voltage and current of a battery at any desired time interval (voltage and current curves) / capacity test of the entire battery). Example: Recording of discharge current during discharging.
DMA 35 (IrDA)	Measurement of acid density and electrolyte temperature within a block. Measurements are performed with the DMA 35 density meter (version 3) from Anton Paar GmbH.
DMA 35 (BT)	Measurement of acid density and electrolyte temperature within a block. Measurements are performed with the DMA 35 density meter (version 4) from Anton Paar GmbH.

Measurement Inputs

Measurement Input	Function	Measurement Input	Function
S–	Input for measuring DC voltage. Measuring range: ±2450.00 mV_{DC} Resolution: 0.01 mV Input impedance: >10 MΩ Sensing lead to minus pole during resistance measurement.	**S+**	Measurement input for direct and alternating voltage measurements. Measuring ranges: ±24.5000 V_{DC} Resolution: 0.1 mV ±600.000 V_{DC} Resolution: 1 mV 0…300.00 V_{AC} Resolution: 10 mV Input impedance: 1.6 MΩ Sensing lead to plus pole during resistance measurement.
P–/COM	Reference potential (ground potential) of all measurement inputs. Current conducting cable to minus pole during resistance measurement.	**P+**	Current conducting cable to plus pole during resistance measurement. **Attention!** **Max. 24 VDC** Maximum test voltage must not exceed 24 V_{DC} at input P+. The instrument is damaged if this value is exceed.

Note
600 V CAT III refers to measurement inputs S+, S– und P–/COM.

Relevant Standards

The battery tester has been manufactured and tested in accordance with the following safety regulations::

IEC 61010-1 EN 61010-1 VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements
EN 60529 VDE 0470 Teil 1	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

Characteristic Values

Measuring Function		Multimeter/ Connector	Multimeter/ Float/ Discharge/ Charge	Multimeter/ Interval U / Internal U+I	Multimeter	Resistance	Temperature
Measured Quantity		V_{DC}	V_{DC}	V_{DC}	V_{AC}	$R_{el} + R_{ct}$	°C
Display Range		–2450.00 … +2450.00 mV	–24,5000 … +24,5000 V	–600,000 … +600,000 V	0,00 … 300,00 V	00,00 … 1000,00 mΩ	–230,0… +230,0 °C [1]
Measuring Range		–2450.00 … +2450.00 mV	–24,5000 … +24,5000 V	–600,000 … +600,000 V	0,00 … 300,00 V	00,10 … 1000,00 mΩ	
Resolution		0.01 mV	0.1 mV	1 mV	10 mV	0.01 mΩ	0.1 °C
Input Impedance/ Test Current		>10 MΩ	1.6 MΩ	1.6 MΩ	1.6 MΩ	I_p approx. 2A	>10 MΩ
Intrinsic Uncertainty		±(0.05 % rdg. + 10d)	±(0.05 % rdg. + 10d)	±(0.05 % rdg. + 50d)	±(2.0 % rdg. + 10d) [2]	±(3.0 % rdg. + 8d)	
S+	Measuring Connections		•	•	•	•	
S–		•				•	•
P+						•	
P–/COM		•	•	•	•	•	•

[1] only applicable if the temperature sensor is connected to the battery tester.

[2] within a frequency range of 45 to 500 Hz.

Note
The characteristic values of the AC/DC current clamp sensors and the DMA 35 density meter, as well as additional characteristic values for the temperature sensor, can be found in the respective product documentation.

Technical Data

Power Supply	Rechargeable NiMH battery, 4 × 1,2 V type AA, round cells (recommended: Ansmann maxE 2500 mAh)	
Input Impedance	Measuring input S+:	1,6 MΩ
	Measuring input S-:	>10 MΩ
Ambient Conditions	Operating temperatures:	+5 … +40 °C
	Storage temperatures:	–20 … +60 °C
	Relative humidity:	max. 75 %, no condensation allowed
	Elevation:	max. 2000 m
Elektrical Safety	Measuring category:	600 V CAT III
	Pollution degree:	2
	Protection class:	II per IEC 61 010-1/EN 61010-1/ VDE 0411-1
	Fuse link:	1 x SIBA 600 V/10 A FF
	Test voltage:	Test voltage at measuring connection P+ may not exceed 24 VDC.
Electromagnetic Compatibility (EMC)	Interference emission:	EN 61326-1:2013 class A
	Interference immunity:	EN 61 326-1:2013 EN 61326-2-1:2013
Mechanical Design	Protection:	Housing IP40 per DIN VDE 0470 part 1/EN 60 529 (protection against foreign object ingress: ≥ 1.0 mm ∅; protection against water ingress : not protected)
	Housing:	approx. 9.6 × 15.4 × 3.3 cm (W × H × D)
	Weight:	approx. 0.45 kg (without rubber holster)
	Display:	LCD, monochrome, luminous
Data Interfaces	IrDA:	Connection for DMA 35 Basic density meter (version 3)
	RFID:	Connection for RFID tag
	Bluetooth®:	Connection for PC, headset and DMA 35 density meter (version 4)
Internal Memory	up to 300,000 data records	

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Scope of Delivery

1 METRACELL BT PRO
4 1.2 V round cells
1 Power pack
1 Rubber holster
1 Carrying strap
1 Carrying case
2 Alligator clips (KY95-3)
1 Set of multimeter test probes (KS29)
1 Set of Kelvin probes for 4-wire measurement
1 BT PRO Manager
(Batteriy tester management software)
1 Test report/factory calibration certificate
1 Condensed operating instructions

Optional Accesssories

– AC/DC current clamp sensor
  – CP1800 (Z204A) for measurements up to1250 A_{DC} or
  – CP330 (Z202B) for measurements up to 300 A_{DC}
– Temperature sensor METRATHERM IR BASE (Z680A)
– Spring-loaded contact pins as replacement parts for the Kelvin probes (Z227F)

Figure 2: Battery tester with AC/DC current clamp sensor CP1800 (Z204A)

Figure 3: Battery tester with temperature sensor METRATHERM IR BASE (Z680A)

Figure 4: Kelvin probes with spring-loaded contact pins

Order Information

Description	Type	Article number
Portable, multifunctional device for the testing of batteries and battery blocks; including rechargeable batteries and power pack, alligator clips, set of multimeter test probes, Kelvin probes, software and transport accessories	METRACELL BT PRO	B100B
AC/DC current clamp sensor	CP1800	Z204A
	CP330	Z202B
Temperature sensor	METRATHERM IR BASE	Z680A
Spring-loaded contact pins as replacement parts for the Kelvin probes		Z227F

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