

## SOLAR-4000 (Solar analyzer)

Peak performance and I-V characteristic curve analyzer for PV systems

### Portable measurement device (SOLAR-4000 ANALYZER)

The new SOLAR-4000 is capable of determining current characteristic values not just from individual PV modules, but also from module strings. The I-V characteristic curve, the short circuit current, open circuit voltage, power, irradiance, temperature and inclination angle are recorded by a 16-bit processor. For each measurement the SOLAR-4000 determines the optimal range and sampling rate. The instrument is simple and intuitive to operate via a menu-driven colour touch screen. The characteristic curve measured by the SOLAR-4000 will be extrapolated to standard test conditions by using of the measured values of the sensor and then displayed. In addition, the manufacturer's STC ideal characteristic curve can be displayed as well using the integrated module database.

### Wireless sensor (SOLAR-4000 SENSOR)

The wireless sensor measures the cell temperature without direct contact, as well as the inclination angle and the irradiation in the solar module level. The measurement values are transmitted directly to the main device by radio signal. To measure the irradiation, the device switches the reference cell automatically from a monocrystalline to a polycrystalline cell.

### Evaluation software

The module data measured can be evaluated, managed and stored on a PC using the software. The performance data is computed and can be compared with STC values. In just a few steps, the measurement data is stored by using a wizard in the respective customer folder or plant folder as part of a tree-type file structure.

Further measurements from the same plant can be added with date stamp at will and compared with the software.

- Quick and precise measurement - approx. 15...30 s
- Simple identification of errors and defects affecting PV plants and modules
- Very light and easy-to-handle measurement device
- Wireless communication between ANALYZER and SENSOR
- Contactless temperature measurement
- Measurement of monocrystalline and polycrystalline cells (measurement of thin-layer modules on request, without STC computation)
- Easy menu guidance via colour touch screen
- Large measurement range: 1.0...1000 V and 0.1...15.0 A
- Reporting: plant and maintenance certificates
- Performance comparison for a plant over several years
- Built-in battery allows measurement over several hours
- Measurement device and software includes over 5000 module data items
- Regularly available module data updates free of charge
- Quick and easy sensor assembly using quick-fix mounting (in scope of supply) directly to solar module
- Evaluation software included in scope of supply

ANALYZER



SENSOR



**SOLAR-4000 (ANALYZER + SENSOR)**
**Technical Data**

	SOLAR-4000 ANALYZER	SOLAR-4000 SENSOR
Measurement	I-V characteristic curve, short circuit current, open circuit voltage, power, MPP current, MPP voltage	Global irradiation, module temperature, inclination angle
Calculated values	STC values (short circuit current, open circuit voltage, MPP current, MPP voltage), fill factor, MPP power, manufacturer's ideal characteristic curve	-
Voltage measurement range	1.0...1000 V (<math>\pm 1\%</math>) ( $U_{oc} > 5\text{ V}$ )	-
Current measurement range	0.1...15.0 A (<math>\pm 1\%</math>)	-
Temperature measurement range	-	0...100 °C ( $\pm 3\%$ with reference to a black body)
Irradiation measurement range	-	100...1200 W/m <sup>2</sup> ( $\pm 5\%$ )
Measuring connection	Standard 4 mm test leads to PV module	Infrared (contactless)
Characteristic curve measurement duration	approx. 15...30 seconds	-
Storage space for measurement curves	dependent on SD memory card size (> 1000 measurement curves per GB)	-
Reference cells	-	1 x monocrystalline cell, 1 x polycrystalline cell
Display	3.2" colour LCD touch screen (240 x 320 pixels, RGB)	S/W LC display (2 lines, 16 characters)
Power supply	Lithium polymer accumulator, operating time approx. 8 hours	Lithium polymer accumulator, operating time approx. 8 hours
Auto-Power-Off	adjustable (1...15 minutes)	-
Interface	Wireless connection to SENSOR, SD/SDHC memory card for PC	Wireless connection to ANALYZER
Ambient temperature	0...+50 °C	0...+60 °C
Protection degree	IP20	IP20
Protection class	Class II	-
Measurement category	CAT II / 1000 V, CAT III / 600 V	-
Dimensions (L / W / H)	210 mm / 105 mm / 41 mm	160 mm / 82 mm / 41 mm
Weight	approx. 500 g	approx. 200 g
Warranty	2 years	2 years
Safety according to	EN 61010-1, EN 61010-31	

**Scope of supply**

- 1 pc. SOLAR-4000 ANALYZER
- 1 pc. SOLAR-4000 SENSOR
- 1 pc. hard case with foam inlay
- 6 pc. PV test lead set (MC3, MC4, Huber+Suhner, Tyco, SunClix as well as without PV connectors)
- 1 pc. SENSOR (quick-fix) mounting
- 1 pc. SD card (PC software with manual)
- 1 pc. USB SD/SDHC card reading device,
- 2 pc. charging devices
- 2 pc. user manuals

**AMPROBE TEST TOOLS EUROPE  
BEHA-AMPROBE GmbH**

In den Engematten 14 · 79286 Glottertal, Germany  
E-Mail: [info@amprobe.eu](mailto:info@amprobe.eu) · Internet: [www.amprobe.eu](http://www.amprobe.eu)



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