

# MINI-KLA

## PV I-V Curve Analyser

*Now dreams become reality: I-V curve tracing of PV modules without using expensive and complex laboratory equipment. The new I-V curve analyser Mini-KLA can be handled by using only two buttons, it works automatically like a multimeter.*

*Settings for measuring ranges, sampling rates, I-V curve storing and downloading to a PC are optimised within the device itself. Newest technology and optimization within data tracing lead to highest comfort in user interface at an affordable price.*



### Description of Function

The Mini-KLA is designed as a complete measuring system for I-V curve tracing of PV modules and generators up to a maximum open-circuit voltage  $V_{oc}$  of 120 V and a maximum short-circuit current  $I_{sc}$  of 8 A. By recording solar irradiance and cell temperature (sensor Si-01TC-T) at the same time all relevant data for a calculation to Standard Test Conditions (STC) are registered. Working with the Mini-KLA is as easy as it could be. The user is led through a combination of graphical menus and has to press only two buttons.

Optimal measuring ranges are controlled automatically by measuring  $V_{oc}$  and  $I_{sc}$  of the PV module or generator before taking the I-V curve. For this module the best sampling rate is calculated out of these two values in combination with measured irradiance. So for every module type the I-V curve taken with the Mini-KLA has about 500 usable voltage-current points.

The Mini-KLA is based on the well-known principle of a capacitor load as it is used in our I-V curve analyser PV-KLA (400 V, 32 A) as well. Innovations within the I-V curve tracing led to a cheap and rugged construction without reducing accuracy.

Many technical innovations led to a compact casing and maximum portability by using only 4 accus of mignon type. The actual state-of-charge is permanently displayed as a bargraph.

The graphical LC Display shows the I-V curve directly after finishing of the measurement. The internal 256 kBit memory can store up to 25 I-V curves with 500 measuring points each, which are buffered in switched-off mode (luxus version: 1 MBit; up to 100 I-V curves).

A software for downloading data to PC via RS 232 is delivered with the Mini-KLA. So the user is able to work with the measured I-V curves in other programs as for example Excel.



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## MINI-KLA PV I-V Curve Analyser

### Technical Data

- Basic accuracy:  $\pm 0,4$  % fsr
- Voltage ranges: 30, 60 and 120 V
- Current ranges: 4 and 8 A
- Irradiance range: 1300 W/m<sup>2</sup>
- Temperature range: - 20 to + 100 °C
- Every current and voltage range can be combined with each other
- Automatic setting of the optimal measuring rate
- Automatic setting of the optimal sampling rate
- Maximum sampling rate for one voltage-current pair: 45 ksamples/s
- Solution of the analog-to-digital converter: 12 bit, no missing codes
- Solution of the graphical LC display: 128\*64 pixel
- Operational control: 2 buttons
- Power supply: 5 V, 4\*accu, mignon type
- PC port: RS232 (19,2 kBaud)
- Weight (incl. accu): 600 g

## SI-01TC-T Silicon Solar Irradiance Sensor

### Technical Data

- Silicon irradiance sensor with active temperature compensation and embedded temperature sensor
- Monocrystalline solar cell, embedded into Ethylen-Vinyl-Acetat (EVA) between glass and Tedlar
- Powder-coated aluminium case
- Calibration value of irradiance: 1 V for every 1000 W/m<sup>2</sup>
- Calibration value of temperature: 10 mV for every K  
0 °C is 1,235 V

## EXTEND OF SUPPLY

### Standard Version

Complete Mini-KLA is delivered with the following equipment:

- Serial RS232 port
- Data cable and Windows download software for IBM compatible PC with RS232 com port
- Graphical LC display
- 4\*NiCd akku (mignon size of 700 mAh)
- Internal memory (256 kBit) for up to 25 I-V curves
- Silicon solar irradiance sensor Si-01TC-T with active temperature compensation and integrated active temperature sensor (incl. 2 m sensor cabling, uv- and heat resistant)
- Manual

### Luxus Version

Same as standard version, but additionally or in exchange:

- 4\*NiMH accu for extension of working time (mignon size with 2500 mAh)
- Internal memory (1 MBit) for up to 100 I-V curves
- External charging unit for direct charging of accu within the Mini-KLA

Patent pending