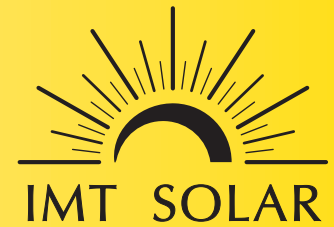


Mini-KLA

Hand Held, Low Cost PV I-V Curve Analyzer



Application

The IMT GmbH Mini-KLA is a small, full featured, low cost, accurate stand-alone IV curve tracing system. The Mini-KLA system is designed for field (PV installation warranty documentation) or in-plant quality assurance testing of photovoltaic (PV) generators. It is as easy to use as a multi-meter and incorporates firmware that automatically optimizes the systems internal functions to produce the most accurate IV curve measurement possible. These functions include; voltage and current ranges and sampling rate. The Mini-KLA is available in two versions. The Mini-KLA luxury and Mini-KLA 8/16 Luxus. The primary difference between them is the Mini-KLA Luxus uses a two wire measurement and has a maximum current measurement capability of 8 amps, while the 8/16 Luxus version uses a four wire measurement and has a maximum current measurement capability of 16 amps. The Mini-KLA has an internal data memory that can store data for up to 100 IV curves. Each curve is displayed on a high resolution graphics liquid crystal display. The system is powered by 4 rechargeable NiMH batteries. Software provided with the Mini-KLA system will automatically calculate STC values for an IV curve and allows the user to enter unique temperature coefficients for each PV panel type tested. The Mini-KLA system is provided as a complete measurement system including silicon irradiance sensor, batteries and charger, software, PV test cables and all interfacing cabling. The system is contained within a hard sided case for portability.

Function

The Mini-KLA is designed as a complete measuring system providing PV I-V curve data for PV panels and modules with open circuit voltages up to 120 Volts and short circuit currents up to 16 Amps (8amps maximum for Luxus version). A four wire measurement system for PV module current and voltage is used for accurate PV module performance measurement (Luxus version uses two wire measurement). Parallel sampling of solar irradiance and cell temperature are employed to provide calculation of STC values for the PV module being tested. The Mini-KLA embedded firmware provides a menu based control system that requires only two buttons to use (Menu and Select buttons).



Mini-KLA I-V Curve Analyzer

Measurement resolution is optimized by measuring both the open circuit voltage and short circuit current of the PV module prior to initiating the I-V curve measurement. Following this measurement the firmware determines the optimal voltage and current ranges and sampling rate for the I-V curve measurement. This technique provides up to 500 voltage/current pairs for each I-V curve measurement. The Mini-KLA system uses a capacitive load for the measurement of PV I-V curves. This load method eliminates the requirement for high power dissipating loads which reduces the system cost, size and provides high resolution, repeatable PV I-V measurements. The graphic LC Display used for the Mini-KLA provides a display of the I-V curve upon completion of the measurement. The battery state of charge and the amount of data memory available for I-V curve storage is also displayed. The internal memory can store up to 100 I-V curves with 500 measuring point pairs each. The memory is non-volatile and will maintain the integrity of stored data without power. Software provided with the system allows all stored data to be downloaded to a computer via an RS-232C port. Data for each curve is stored in ASCII format for easy importing into programs such as Excel™ for further analysis.

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Mini-KLA 8/16 Luxus and Luxus Specifications

General Information

- Basic accuracy: ± 0.4 % Full Scale Value
- 4-wire Kelvin measurement system for 8/16 Luxus
- 2-wire measurement system for Luxus
- Voltage ranges: 30, 60 and 120 V
- Current ranges: 8 and 16 A for 8/16 Luxus
- Current range: 8 for Luxus
- Irradiance range: 0 to 1300 W/M²
- Temperature range: - 20 to + 100 °C
- Every current and voltage range can be combined
- Automatic setting of the optimal measuring ranges for Voltage and Current
- Automatic setting of the optimal sampling rate
- Maximum sampling rate for one voltage-current pair: 45K samples per second
- Analog-to-digital converter: 12 bit, no missing codes
- Graphic LC display: 128*64 pixel
- Operational control: 2 button menu system
- Power supply: 4 NiMh high capacity batteries
- PC Interface: RS232 (up to 19.2 K Baud)
- Weight (including batteries): 600 g

System Components

The Mini-KLA system contains the following equipment:

- Serial RS232C Interface and interface cable
- Windows XP™ based software
- Graphical LC display
- 4 NiMh AA high capacity batteries
- Silicon solar irradiance sensor Si-01TC-T with active temperature compensation and integrated cell temperature sensor output
- Irradiance sensor 2 meter interface cable with IP67 connectors
- 2 sets of PV test cables for 8/16 Luxus
- 1 sets of PV test cables for Luxus
- Manual
- Charging unit for batteries within the Mini-KLA
- Aluminum carrying case for system components

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