

BENNING**PV 1-1+ photovoltaic installation tester, Type: PV1-1****Order data**

Order number	473425 PV1-1
GTIN	4014651421011
Item class	47A

Description

Version:

Commissioning testing, repeat testing and troubleshooting on PV systems: Testing in accordance with DIN EN 62446 (VDE 0126-23) Simple – operated using buttons Fast – test conducted in mere seconds Safe – safe measurement connection, even if the PV system is delivering energy Before commissioning and during repeat tests, photovoltaic systems must be tested and documented in accordance with VDE 0126-23. In addition, electrical measurements are also useful after cleaning and maintenance work in order to guarantee that the photovoltaic system is still working at its best with minimal losses. The test includes a continuity test of the protective and equipotential bonding conductors between the PV generator and the main earth terminal, and measurement of the open circuit voltage and short-circuit current in the PV string and the insulation resistance between the active DC conductors (+ / -) of the PV generator and earth. The BENNING PV 1-1+ uses contact-protected test leads with standardised plug connectors for directly connecting to PV modules or strings. The automatic test sequence warns against incorrect DC polarity and handles all necessary circuitry to ensure a safe measurement. These tests can be carried out easily and quickly as well as reliably and safely with the BENNING PV 1-1+ photovoltaic installation tester. This device is recommended for solar engineers and photovoltaic experts as well as service, cleaning and maintenance teams. Special features: Clear and unambiguous display of all measuring results. Safe measurement connection, even if the PV system is delivering energy. Automatic test sequence (open circuit voltage 1000 V DC, short-circuit current 15 A DC, insulation resistance). Automatic display of voltage polarity with acoustic/visual warning in the case of reverse polarity. Test lead zeroing function to ensure that they do not affect the measuring resistance. Measurement memory for 200 display readouts for

(automatic) string-to-string comparison incl. warning in the case of a 5% deviation in the open circuit voltage and short-circuit current. USB port and download software for creating test logs in MS Excel. ISO measuring result with pass/fail indicator. Integral real-time clock for storing measured values with date and time stamp. WirelessSunLink wireless connection to the BENNING SUN 2 insolation and temperature measuring device. Direct connection to all PV modules with MC4 or Sunclix plug connector. Easy handling for off-grid and mobile testing. LC display with backlight. Switches off automatically after 60 seconds. The test can relate to PV modules or the entire PV system. Measurement functions: Protective conductor resistance measurement with test current of 200 mA. Open circuit voltage measurement for the solar modules / PV strings up to 1000 VDC. Short-circuit current measurement via an internal circuit up to 15 A DC without any danger for the user. Insulation resistance measurement between the active DC conductors (+ / -) and earth with adjustable test voltage (250 V, 500 V, 1000 V). Functional test via current measurement up to 40 A AC / DC (optional BENNING CC 3 current clamp adapter, art. no. 044038). Display and storage of the solar insolation (W / m²) and the PV module / ambient temperature (optional BENNING SUN 2, art. no. 050420). Clear symbols – easy to use Four steps for simple and safe PV testing: Disconnect the PV module from the inverter. Connect the PV module to the BENNING PV 1-1+ using standardised plug connectors. Press the AUTO button and follow the measurements on the LCD display. Press the STORE button to save the complete display readout. BENNING SOLAR data logger (download software): Download the measurements from the BENNING PV 1-1+ in CSV format. The measurements can be processed further in MS Excel. Free to download.

Feature:

Display: graphic display (illuminated) Protective conductor resistance: 0.05 Ω – 199 Ω Test current: ± 200 mA DC Open circuit voltage: 5 V – 1000 V DC Short-circuit current: 0.5 A – 15.00 A DC Insulation resistance (Riso) with test voltage 250/500/1000 V: 0.05 MΩ – 199 MΩ Test voltage: 250 V, 500 V, 1000 V DC Load current: 0.2 A – 40 A AC/DC (via clamp) Measurement memory with real-time clock (date/time): over 200 PV strings (auto measurements) Interface: USB (measurement download) / wireless (SUN 2) Voltage measurement via 4 mm test lead: 100 W/m² - 1250 W/m² PV module/ambient temperature via BENNING SUN 2: -30°C – +125°C Dimensions / weight: 270 x 115 x 80 mm / 1.2 kg

Advantage:

The BENNING PV 1-1+ has taken the BENNING PV 1-1 one step further and offers improved testing compatibility for the latest-generation, high-efficiency PV modules. The optimised overload protection provides 300% better protection against transient short-circuit currents caused by high module capacities. The modified housing with all-round rubber guard allows a carrying strap to be attached, keeping your hands free. This ensures improved testing compatibility, reliability and ease of use.

Supplied with:

Transport/storage bag Set of test leads with test probes (L = 1.2 m, red/black) Set of crocodile clips (red/black) PV test leads for MC4 plug connector (red/black) PV test leads for Sunclix plug connector (red/black) USB cable 6 × 1.5 mignon batteries (AA, IEC LR6)

Optional extras:

BENNING SUN 2 insolation and temperature measuring device (050420) The BENNING PV 1-1+ is able to receive the measurements (insolation, PV module / ambient temperature) of the

BENNING SUN 2 insolation and temperature measuring device wirelessly. For this purpose, the BENNING PV 1-1+ must be paired with the BENNING SUN 2; this only needs to be done once. Temperature sensor with suction cup for the BENNING SUN 2 for mounting on the rear of the PV module (050424). PV module holder for the BENNING SUN 2 for securely mounting on the PV module (050425). BENNING CC 3 AC/DC current clamp adapter (044038) for connecting to the BENNING PV 1-1+. The measured AC/DC current values can be stored and called up in the memory of the BENNING PV 1-1+. The BENNING CC 3 enables the current of each individual PV string to be measured and compared with the expected values. Alternatively, the current of each individual PV string can also be directed through a current clamp with a DC current measurement: we recommend the digital current clamps BENNING CM 10-PV (for measuring currents up to 600 A AC/DC, art. no. 044683), BENNING CM 5-1 (for measuring currents up to 600 A AC/DC, art. no. 044066) or BENNING CM 2-1 (for measuring currents up to 400 A AC/DC, art. no. 044689). 40 m BENNING TA 5 test lead (044039) with handy rewriter and wrist strap. Connected via 4 mm safety test socket/plug (044039). Next test date test stickers, 300 pieces (756212).

Note:

The latest-generation PV modules use PV cell technologies with higher efficiencies and a higher effective capacity. This additional capacity means that in the event of a short circuit, these PV modules may generate inrush currents that are far above the specified short-circuit currents (I_{sc}).

Technical description

Number of batteries contained	6
Power supply	Battery-powered
Type of product	Multimeter