2013

BENNING

World Class Test Equipment

IEC/EN 61243-3
DIN VDE 0682-401

Testing, Measuring and Safety Instruments

The new generation of DUSPOL® voltage testers
safe voltage testing up to 1000 V

The international standard for voltage testers IEC/EN 61243-3 (DIN VDE 0682-401):2011 increases safety for work under voltage

Your work as an expert requires safe testing. Therefore, you should not make any compromises concerning safety! Voltage testers which are used on electrical systems of up to 1000 V have to comply with the standard IEC/EN 61243-3 (DIN VDE 0682-401):2011. The standard creates uniform testing and safety criteria on an international level and remarkably which concentrates on user safety.

The new generation of *DUSPOL*® voltage testers exceeds the demands of the standards concerning both the protection category for housings (IP 65) and overvoltage protection (CAT IV 600 V). The nominal voltage range has been increased to a minimum of 1000 V AC/DC in order to ensure safe testing of increased system voltages of industrial applications, photovoltaic systems and wind power plants as well as of hybrid automotive engineering.

CAT IV 600 V
DUSPOL® analog

CAT IV 600 V
DUSPOL® expert

CAT IV 600 V
DUSPOL® digital

Stand-by case 010911
(see page 18)

All *DUSPOL*® voltage testers are equipped with a direct display system without loading the test point. In case of need, a load circuit can be connected via a push-button which suppresses inductive and capacitive reactive voltages. Thus, it is possible to clearly distinguish between high-energy and low-energy electric circuits.

A vibrating motor can be activated additionally. The vibrating power of this motor increases proportionally to the applied voltage. This is an additional indication of voltage being applied.

The *DUSPOL*® voltage testers underlines once again the BENNING expertise in the field of testing, measuring and safety technology. With a *DUSPOL*® voltage tester you acquire an innovative product which has been tested and approved by the independent VDE Test and Certification Institute.

DUSPOL® voltage testers
The original!

Product safety at the highest level:

- safe voltage testing up to 1000 V AC/DC
- direct display without actuating a push-button (high-impedance testing)
- load connection via push-button (low-impedance testing)
- battery-independent voltage indication from 50 V AC/DC on
- vibration alert in the test handle
- robust round housing with rubberized gripping surface for outdoor use (protection category IP 65)
- tested and approved in compliance with the current DIN EN 61243-3 (VDE 0682-401):2011 standard

DUSPOL® voltage testers – the testers with the VDE mark of conformity
safe, reliable and powerful

The new generation of *DUSPOL*® voltage testers

- safe voltage testing up to 1000 V AC/DC
- load connection with vibration alert
- intentional tripping of a 30 mA RCD
- phase sequence test in a three-phase mains
- single-pole external conductor test (phase)

Additionally for *DUSPOL*® *expert*, *DUSPOL*® *digital*:

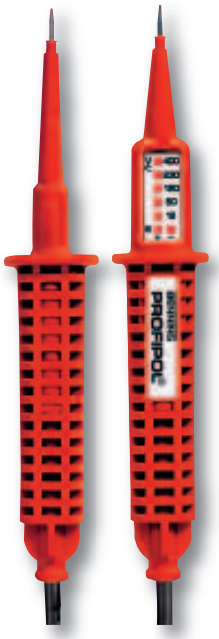
- acoustic continuity test with loud test buzzer and visual indication by means of yellow LED
- measuring point illumination by means of white high-power LED
- phase sequence test by means of green LED (left/right)
- detector for non-contact localization of cable breaks on exposed and live lines

Additionally for *DUSPOL*® *digital*:

- voltage testing up to 1000 V AC TRUE RMS/1200 V DC
- TRUE RMS measuring method
- low-volt range: 1.0 V to 11.9 V
- frequency indication up to 1000 Hz
- resistance measurement up to 300 kΩ
- conducting-state voltage measurement of diodes
- automatic LC display illumination by means of a light sensor

Voltage and Continuity Tester

	DUSPOL® *analog*	*DUSPOL*® *expert*	*DUSPOL*® *digital*	*PROFIPOL*®
indication	plunger system (illuminated)/LED	LED	LED/LCD (illuminated)	LED
indication steps	12 – 1000 V AC/DC	12 – 1000 V AC/DC	1.0 – 1000 V AC/1200 V DC	6 – 400 V AC/DC
frequency range	–	–	1 – 1000 Hz	–
acoustic and visual continuity test	–	buzzer + yellow LED 0 – 100 kΩ	buzzer + yellow LED 0 – 100 kΩ	–
diode test	–	conducting-state/ non-conducting direction	0.3 – 2.0 V	–
resistance measuring range	–	–	0.1 kΩ – 300 kΩ	–
phase-sequence test	LCD ("R" symbol)	green LEDs (right/left)	green LEDs (right/left)	–
single-pole outer conductor test	LCD ("R" symbol)	red "lightning" LED	red "lightning" LED	–
polarity test	LED (+/-)	LED (+/-)	LCD (+/-)	LED (+/-)
cable break detector	–	yellow LED (flashing)	yellow LED (flashing)	–
load connection via push button	I_S = 600 mA (1000 V) 30 mA RCD trip	I_S = 550 mA (1000 V) 30 mA RCD trip	I_S = 550 mA (1000 V) 30 mA RCD trip	–
vibrating alarm	yes	yes	yes	–
measuring point illumination	–	white LED	white LED	–
protection class	IP 65	IP 65	IP 65	IP 65
item no.	050261	050262	050263	020022



PROFIPOL®

Digital Multimeter BENNING MM P3, MM 1-1 – MM 1-3, MM 1 – MM 4
reliable and precise in each and every situation


MM P3

BENNING MM P3
Pocket-Size Digital Multimeter

- top-class functionality and design
- even smaller and narrower with lower weight (only 130 g)
- minimum dimensions: 132 x 86 x 19 mm
- for all-purpose use with leather case and measuring leads

BENNING MM 1-1, MM 1-2 and *MM 1-3*
Digital Multimeters with Volt Sensor Function

- the integrated Volt sensor signalises phase voltages by means of an acoustic signal and a red LED signal
- it localizes cable breaks and defective lamps in exposed cables (cable reel, light chains) via the feeding side of the phase

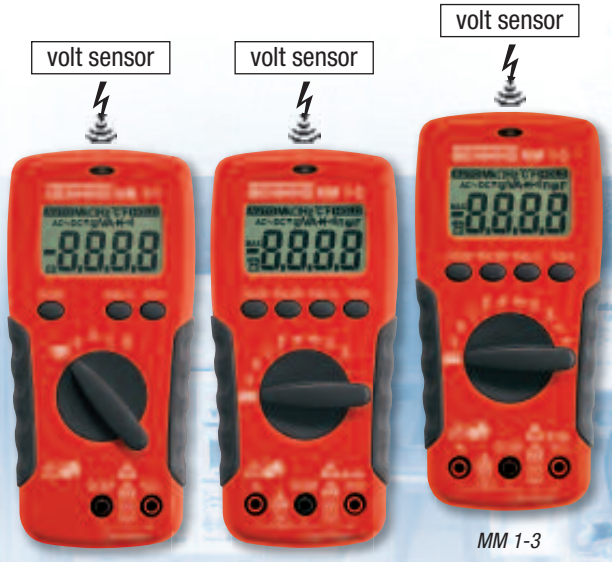

MM 1


MM 2


MM 3

tested and approved

IEC/EN 61010-1
(DIN VDE 0411-1)



MM 1-1 MM 1-2 MM 1-3

BENNING MM 1, MM 2, MM 3 and *MM 4*
Digital Multimeter
Technology that inspires, Quality that convinces

Million fold proven as well as tested and approved by the independent VDE Test and Certification Institute according to current international standards.

- basic measuring for current, voltage, resistance, continuity, diode, capacity and frequency
- automatic and/or manual measuring range selection
- safe current measuring up to 300 A AC via attachable current clamp adapter (*MM 4*)


MM 4

Digital Multimeter

	BENNING MM P3	*BENNING MM 1-1*	*BENNING MM 1-2*	*BENNING MM 1-3*	*BENNING MM 1*	*BENNING MM 2*	*BENNING MM 3*
indicating range	5000	2000	2000	2000	3200	2000	2000
basic accuracy	0.6 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %
AC voltage	0.1 mV – 600 V	0.1 mV – 750 V	0.1 mV – 750 V	0.1 mV – 750 V	1 mV – 600 V	0.1 mV – 750 V	0.1 mV – 600 V
DC voltage	0.1 mV – 600 V	0.1 mV – 1000 V	0.1 mV – 1000 V	0.1 mV – 1000 V	0.1 mV – 600 V	0.1 mV – 1000 V	0.1 mV – 600 V
AC current	–	–	1 mA – 10 A	1 mA – 10 A	–	0.1 µA – 20 A	0.1 µA – 20 A
DC current	–	–	1 mA – 10 A	1 mA – 10 A	0.1 µA – 3.2 mA	0.1 µA – 20 A	0.1 µA – 20 A
resistance	0.1 Ω – 40 MΩ	0.1 Ω – 20 MΩ	0.1 Ω – 20 MΩ	0.1 Ω – 20 MΩ	0.1 Ω – 32 MΩ	0.1 Ω – 20 MΩ	0.1 Ω – 20 MΩ
continuity/diode	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
frequency	1 mHz – 5 MHz	–	1 Hz – 20 MHz	1 Hz – 20 MHz	–	–	1 Hz – 200 kHz
capacity	10 pF – 100 µF	–	1 pF – 2 mF	1 pF – 2 mF	–	–	1 pF – 200 µF
temperature	–	–	–	-20 °C up to +800 °C	–	–	–
volt sensor	–	yes	yes	yes	–	–	–
interface	–	–	–	–	–	–	–
software	–	–	–	–	–	–	–
memory	HOLD	HOLD	HOLD, MAX/MIN	HOLD, MAX/MIN	HOLD	–	–
Data Log function	–	–	–	–	–	–	–
measuring method	RMS	RMS	RMS	RMS	RMS	RMS	RMS
measuring category	CAT III 300 V	CAT III 600 V	CAT III 600 V	CAT III 600 V	CAT III 600 V	CAT III 600 V	CAT III 300 V
item no.	044084	044081	044082	044083	044027	044028	044029

Digital Multimeter BENNING 7-1 – MM 11
safety and functional diversity without any compromises

BENNING MM 7-1
Digital Multimeter offering highest safety for industrial applications

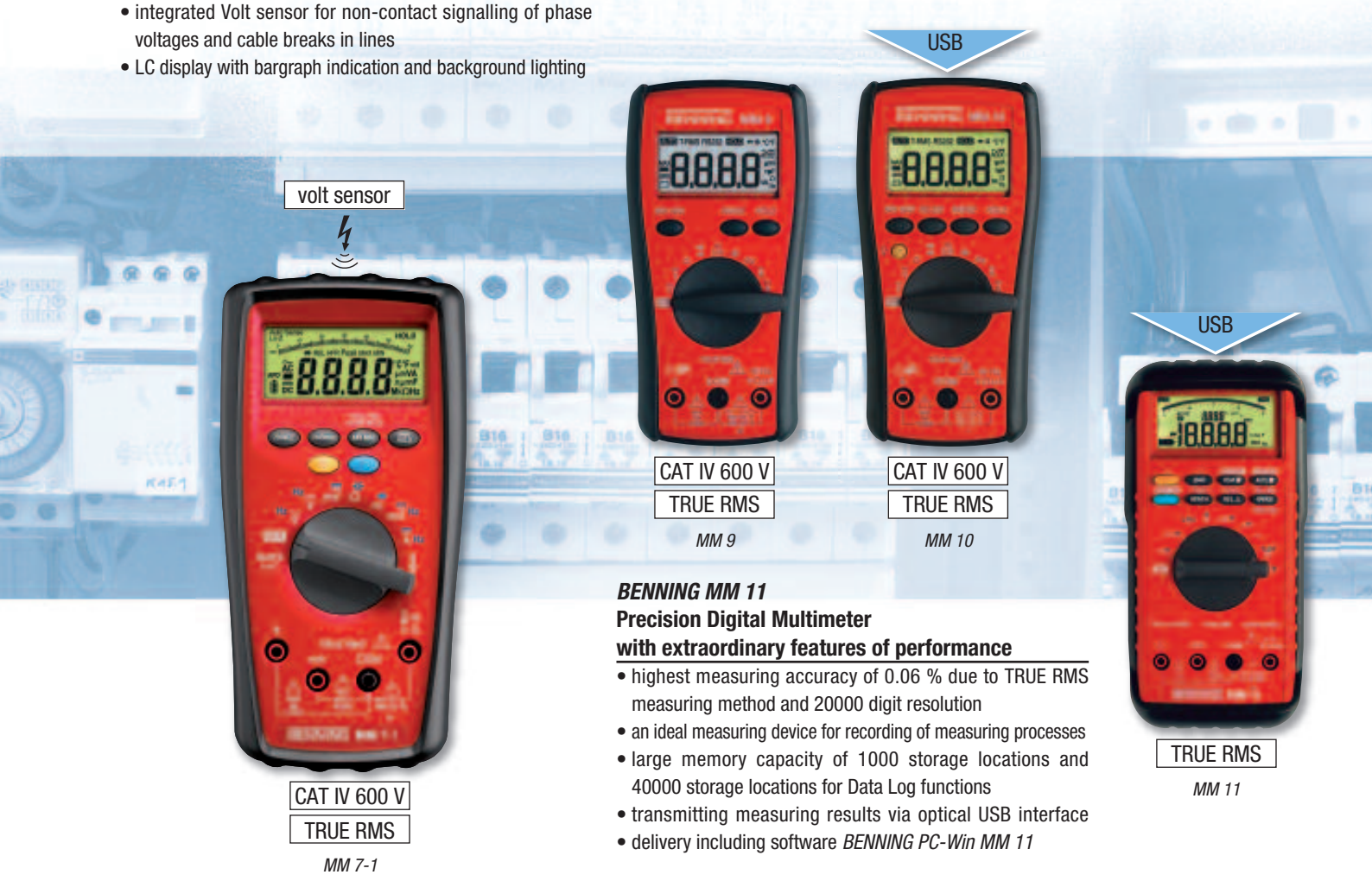
- TRUE RMS measuring method for precise measuring results even for non-sinusoidal signal characteristics
- highest measuring category CAT IV 600 V for highest safety
- AutoV function for automatic AC/DC voltage detection and low input impedance (LoZ) to suppress capacitively/inductively induced voltages
- integrated Volt sensor for non-contact signalling of phase voltages and cable breaks in lines
- LC display with bargraph indication and background lighting

BENNING MM 9, MM 10
Digital Multimeter of the highest measuring category CAT IV

- highest measuring category CAT IV 600 V allows measurements direct at the source of the low-voltage installation
- precise due to TRUE RMS measuring method
- transmitting measuring results via optical USB interface
- delivery including software *BENNING PC-Win MM 10*

tested and approved

IEC/EN 61010-1
(DIN VDE 0411-1)



BENNING MM 11
Precision Digital Multimeter with extraordinary features of performance

- highest measuring accuracy of 0.06 % due to TRUE RMS measuring method and 20000 digit resolution
- an ideal measuring device for recording of measuring processes
- large memory capacity of 1000 storage locations and 40000 storage locations for Data Log functions
- transmitting measuring results via optical USB interface
- delivery including software *BENNING PC-Win MM 11*

Digital Multimeter

	BENNING MM 4	*BENNING MM 7-1*	*BENNING MM 9*	*BENNING MM 10*	*BENNING MM 11*
indicating range	4200	6000	6000	6000	20000
basic accuracy	0.5 %	0.08 %	0.5 %	0.5 %	0.06 %
AC voltage	1 mV – 600 V	10 µV – 1000 V	0.1 mV – 750 V	0.1 mV – 750 V	1 µV – 750 V
DC voltage	1 mV – 600 V	10 µV – 1000 V	0.1 mV – 1000 V	0.1 mV – 1000 V	1 µV – 1000 V
AC current	0.1 A – 300 A	10 µA – 10 A	1 mA – 10 A	1 mA – 10 A	1 µA – 10 A
DC current	–	10 µA – 10 A	0.1 µA – 10 A	0.1 µA – 10 A	1 µA – 10 A
resistance	0.1 Ω – 42 MΩ	0.1 Ω – 40 MΩ	0.1 Ω – 60 MΩ	0.1 Ω – 60 MΩ	10 mΩ – 2 GΩ
continuity/diode	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
frequency	–	0.01 Hz – 100 kHz	1 Hz – 60 MHz	1 Hz – 60 MHz	0.01 Hz – 1 MHz
capacity	–	1 nF – 10 mF	1 pF – 6 mF	1 pF – 6 mF	1 pF – 40 mF
temperature	–	-40 °C up to +400 °C	–	–	-200 °C up to +1200 °C
volt sensor	–	yes	–	–	–
interface	–	–	–	USB	USB
software	–	–	–	*PC–Win MM 10*	*PC–Win MM 11*
memory	HOLD	HOLD, MAX/MIN	HOLD, MAX/MIN	HOLD, MAX/MIN	1000 memory locations
Data Log function	–	–	–	–	40000 memory locations
measuring method	RMS	TRUE RMS	TRUE RMS	TRUE RMS	TRUE RMS
measuring category	CAT III 300 V	CAT IV 600 V	CAT IV 600 V	CAT IV 600 V	CAT III 600 V
item no.	044073	044085	044078	044079	044080

BENNING PC-Win MM 10/MM 11
Software for logging and analysis

- software for reading and logging of measurement series
- visualisation of measurement series via line diagram and table
- scanning rate variable from 0.5 sec. up to 10 min.
- storage of measurement series as text file

Software ***PC-Win MM 10/MM 11***

All Digital Multimeters including protective case, safety leads and battery set.

Digital Current Clamp Multimeter
BENNING CM 1-1 – CM 1-3, CM 2, CM 3, CC 1 – CC 3

BENNING CM 1-1, CM 1-2 and *CM 1-3*
Digital Current Clamp Multimeter for AC current
Innovative technology, practical design

- safe current measuring up to 400 A AC
- measuring inputs for voltage, resistance, continuity and diode test
- integrated volt sensor signalises phase voltages by means of an acoustic signal and a red LED signal (*CM 1-3*)
- it localizes cable breaks and defective lamps in exposed cables (cable reel, light chains) via the feeding side of the phase (*CM 1-3*)

BENNING CM 2 and *CM 3*
Digital Current Clamp Multimeter for AC/DC current

- safe and non-contact measuring of high currents
- DC and AC current measuring up to 600 A AC/DC
- measurement of low currents (automotive, photovoltaics, industry) (*CM 2*)
- measuring inputs for voltage, resistance and continuity test (*CM 2*)


CM 1-1

CM 1-2

CM 1-3

CM 2

CM 3

BENNING CC 1, CC 2 and *CC 3*
AC and AC/DC current clamp adapters

- safe AC current measuring up to 200 A/400 A
- connection via 4 mm safety measuring leads


CC 1

output: 1 mV AC per 1 A AC

suitable for *BENNING ... MM 1-1/1-2/1-3, MM 2/3/7-1/9/10/11*


CC 2

output: 1 mA AC per 1 A AC

suitable for *BENNING ... IT 120 B, MM 1-2/1-3, MM 2/3/7-1/9/10/11*


CC 3

output: 1 mV/10 mV AC/DC per 1 A AC/DC

suitable for *BENNING ... PV 1-1, MM 1-1/1-2/1-3, MM 2/3/7-1/9/10/11*

Digital Current Clamp Multimeter/Current Clamp Adapter

	BENNING CC 1	*BENNING CC 2*	*BENNING CC 3*	*BENNING CM 1-1*	*BENNING CM 1-2*	*BENNING CM 1-3*	*BENNING CM 2*	*BENNING CM 3*
indicating range	–	–	–	2000	2000	2000	4000	2000
basic accuracy	1.9 %	1 % – 3 %	1 % – 2 %	2 %	1 %	1 %	0.5 %	1.9 %
AC voltage	–	–	–	–	0.1 V – 600 V	0.1 V – 750 V	0.1 mV – 600 V	–
DC voltage	–	–	–	–	0.1 V – 600 V	0.1 V – 1000 V	0.1 mV – 600 V	–
AC current	1 A – 400 A	0.5 A – 200 A	0.2 A – 300 A	10 mA – 400 A	0.1 A – 400 A	0.1 A – 200 A	10 mA – 300 A	0.1 A – 600 A
DC current	–	–	0.2 A – 300 A	–	–	–	10 mA – 300 A	0.1 A – 600 A
resistance	–	–	–	–	0.1 Ω – 20 MΩ	0.1 Ω – 20 MΩ	0.1 Ω – 40 MΩ	–
continuity/diode	–/–	–/–	–/–	–/–	yes/–	yes/yes	yes/–	–/–
frequency	–	–	–	–	–	–	–	–
effective power	–	–	–	–	–	–	–	–
power factor (cos φ)	–	–	–	–	–	–	–	–
temperature	–	–	–	–	–	–	–	
volt sensor	–	–	–	–	–	yes	–	–
memory	–	–	–	HOLD, MAX	HOLD	HOLD	HOLD, MAX	HOLD
measuring method	–	–	–	RMS	RMS	RMS	RMS	RMS
max. clamp opening	30 mm	21 mm	25 mm	30 mm	30 mm	16 mm	25 mm	38 mm
measuring category	CAT III 300 V	CAT III 600 V	CAT III 600 V	CAT III 600 V	CAT III 600 V	CAT IV 600 V	CAT III 300 V	CAT III 300 V
item no.	044037	044110	044038	044061	044062	044063	044035	044031

Digital Current Clamp Multimeter

BENNING CM 4 – CM 9

BENNING CM 4, CM 6, CM 7

Digital Current Clamp Multimeter of the highest measuring category

- precise due to TRUE RMS measuring method
- safe current measuring up to 1000 A AC/DC
- highest measuring category CAT IV 600 V offering optimum safety

tested and approved

IEC/EN 61010-1
(DIN VDE 0411-1)

CAT IV 600 V
TRUE RMS

CM 5-1

CAT IV 600 V
TRUE RMS

CM 7
(CM 6 fig. similar)

BENNING CM 5-1

Digital Current-Clamp Multimeter

- automatic selection of the correct measuring function for TRUE RMS voltage/current (AC/DC), resistance, continuity and diode test
- safe and easy operation – measuring errors due to incorrect measuring range selection are excluded
- short response time due to 5 scanning values per second
- voltage measurement with low input impedance (LoZ) to suppress capacitively/inductively induced voltages

BENNING CM 8

Power Current-Clamp Multimeter
Power analysis for single-phase and three-phase mains

- TRUE-RMS measurements up to 1000 V, 600 A AC/DC
- effective power measurements up to 600 kW
- calculation of the power factor cos φ
- indication of the load type (inductive, capacitive)
- bipolar phase sequence test in three-phase mains
- measuring inputs for voltage, resistance, continuity, diode, frequency and temperature
- measurement of inrush currents (motors etc.)

TRUE RMS

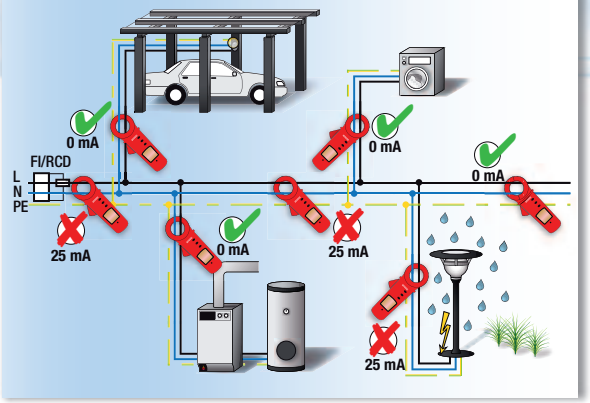
CM 8
(CM 4 fig. similar)

BENNING CM 9

Leakage Current Clamp with a Resolution of 1 µA
The alternative solution for insulation measurements

- measurement of leakage currents and differential currents in electrical systems (VDE 0100) and devices (VDE 0701-0702, BGV A3, BetrSichV (= German Health and Safety at Work Regulations))
- highest resolution of 1 µA in the 6 mA measuring range
- measurement without switch-off during normal operation of the system/device, the perfect solution for preventive maintenance
- precise and reproducible measuring results up to 100 A
- optimum screening against external magnetic fields

Differential current measurement method with *BENNING CM 9*



Leakage

CM 9

Digital Current Clamp Multimeter

	BENNING CM 4	*BENNING CM 5-1*	*BENNING CM 6*	*BENNING CM 7*	*BENNING CM 8*	*BENNING CM 9*
indicating range	4000	9999	4000	4000	6000	6000
basic accuracy	0.7 %	0.9 %	0.7 %	0.7 %	0.7 %	1 %
AC voltage	0.1 V – 600 V	1.3 V – 750 V	0.1 V – 750 V	0.1 V – 750 V	10 mV – 1000 V	–
DC voltage	0.1 V – 600 V	0.7 V – 1000 V	0.1 V – 1000 V	0.1 V – 1000 V	10 mV – 1000 V	–
AC current	0.1 A – 600 A	0.9 A – 600 A	0.1 A – 1000 A	0.1 A – 1000 A	0.1 A – 600 A	1 µA – 100 A
DC current	–	0.9 A – 600 A	–	0.1 A – 1000 A	0.1 A – 600 A	–
resistance	0.1 Ω – 400 Ω	1 Ω – 10 kΩ	0.1 Ω – 400 Ω	0.1 Ω – 400 Ω	0.1 Ω – 20 kΩ	–
continuity/diode	yes/–	yes/yes	yes/–	yes/–	yes/yes	–/–
frequency	1 Hz – 400 Hz	–	1 Hz – 400 Hz	1 Hz – 400 Hz	0.1 Hz – 4 kHz	–
effective power	–	–	–	–	1 W – 600 kW	–
power factor (cos φ)	–	–	–	–	± 0.00 – 1.00	–
temperature	–	–	–	–	-50 °C up to +1000 °C	–
volt sensor	–	–	–	–	–	–
memory	HOLD, MAX/MIN PEAK	HOLD	HOLD, MAX/MIN PEAK	HOLD, MAX/MIN PEAK, ZERO	HOLD, MAX/MIN PEAK, INRUSH	HOLD, PEAK
measuring method	RMS	TRUE RMS	RMS	TRUE RMS	TRUE RMS	RMS
max. clamp opening	37 mm	35 mm	53 mm	53 mm	40 mm	40 mm
measuring category	CAT III 600 V	CAT IV 600 V	CAT IV 600 V	CAT IV 600 V	CAT III 600 V	CAT III 300 V
item no.	044056	044066	044058	044059	044064	044065

differential current measurement method

BENNING ST 710 Appliance Tester (VDE 0701-0702)
mobile and network-independent testing of electrical appliances

BENNING ST 710
Battery-operated Appliance Tester for mobile testing of electrical devices

- testing in compliance with DIN VDE 0701-0702 (EN 62638), BGV A3, BetrSichV (German Health and Safety at Work Regulations), ÖVE/ÖNORM E 8701, NEN 3140
- easy - operation by means of three keys
- quick - complete testing within 10 seconds
- mobile - testing can be made network-independently

Application

Safety-related testing of electrical devices/work equipment such as e.g. electrical devices/tools with ON/OFF switch, motorized equipment, lamps, cable reels, multiple distributors and household appliances. The protective conductor current/ contact current is measured by means of the **alternative leakage current measurement method**.

Features *BENNING ST 710*

- automatic testing procedure for devices of class I (key 1), class II/III (key 2) and line test (key 3)
- testing of cable reels, multiple distributors and device connecting cables with rubber connector
- measuring result with "pass/fail" information
- limiting values preset in compliance with DIN VDE standard
- indication of correct function key in case of incorrect operation and if the test sample is not switched on
- sufficient battery capacity (6 x 1.5 V, mignon, AA, IEC LR6) for > 2500 test samples
- three-phase test objects can be tested by means of optional measuring adapter

Measuring functions

- protective conductor resistance with a testing current of 200 mA DC and automatic polarity reversal
- insulating resistance with a testing voltage of 500 V DC
- protective conductor current and contact current by means of alternative leakage current measurement method
- voltage measurement on external shock-proof socket (L-N, L-PE, N-PE)

ST 710
050309: with socket of type E (B/F/CZ/SK/PL)
050315: with socket of type CH (CH)

Forms for test certificates for "Testing of electrical devices" are available for download free of charge at www.benning.de!

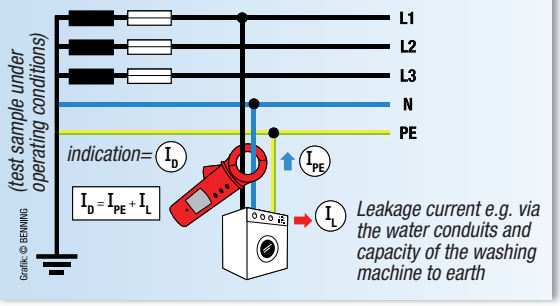
Test badges

Shock-proof socket onto shock-proof plug for CM 9

16 A/32 A CEE coupling onto CEE plug, 5-pin, for CM 9

Leakage
CM 9

Differential current measurement method with *BENNING CM 9*



Leakage current e.g. via the water conduits and capacity of the washing machine to earth

Scope of delivery BENNING ST 710

BENNING ST 710
Battery-operated Appliance Tester

	BENNING ST 710
indication	graphic display
protective conductor resistance	0.05 Ω – 20 Ω
insulation resistance (500 V DC)	0.1 MΩ – 20 MΩ
protective conductor current/ contact current by means of alternative leakage current measurement method	0.1 mA – 20 mA
line test	R_{PE}, R_{ISO}, short–circuit test and continuity test of phase conductor (L) and neutral conductor (N)
voltage	50 V – 270 V
scope of delivery	carrying case, test cable with alligator clip, appliance cable, battery set
item no.	050308

Optional accessories for *BENNING ST 710/ST 720/ST 750 A*

test badges "next test" (300 pieces)
item no. 756212

measuring adapters for three-phase loads (passive)
(see page 9) **item no. 044122/044123**

leakage Current Clamp *BENNING CM 9* for the measurement of differential current, protective conductor current and load current of single-phase and three-phase loads
(see page 7) **item no. 044065**

measuring adapters for leakage current clamp *BENNING CM 9*
single-phase, conductors led through individually and with double insulation
shock-proof socket/shock-proof plug **item no. 044131**
three-phase, conductors led through individually and with double insulation
16 A CEE coupling-CEE plug, 5–pin **item no. 044127**
32 A CEE coupling-CEE plug, 5–pin **item no. 044128**

See page 18 + 19 for further accessories

BENNING ST 720 Appliance Tester (VDE 0701-0702)
testing of electrical appliances under operating conditions

BENNING ST 720
Mains-operated and battery-operated Appliance Tester for mobile testing of electrical devices

- testing in compliance with DIN VDE 0701-0702 (EN 62638), BGV A3, BetrSichV (German Health and Safety at Work Regulations), ÖVE/ÖNORM E 8701, NEN 3140
- quick – testing within a few seconds
- all-in-one – appliance tester and RCD tester in one single device
- unique – testing of single-phase and three-phase devices under operating conditions

Application

Testing of devices **with mains voltage-dependent switching elements/mains-supply units/relays** such as controlled devices/tools, devices of information and communication technology as well as of devices which can be tested completely with mains voltage only.
In mains operating mode, the protective conductor current/contact current is measured by means of the required **differential current/direct measurement method**.

Features *BENNING ST 720*

- mains operating mode for tests under operating conditions
- battery operating mode for mobile testing
- automatic testing procedure for devices of class I (key 1), class II/III (key 2) and line test (key 1)
- reduction of the ISO testing voltage to 250 V/ 500 V for devices with overvoltage arresters/electronic devices
- testing of RCDs with 30 mA
- measuring result with “pass/fail” information
- limiting values preset in compliance with DIN VDE standard
- indication of correct function key in case of incorrect operation, overload and if the test sample is not switched on
- sufficient battery capacity (6 x 1.5 V, mignon, AA, IEC LR6) for > 2500 test samples

Measuring functions

- protective conductor resistance with a testing current of 200 mA DC and automatic polarity reversal
- insulating resistance with a testing voltage of 250 V/500 V DC
- mains operating mode: protective conductor current/contact current by means of differential current/direct measurement method with automatic mains pole reversal
- battery operating mode: protective conductor current/contact current by means of alternative leakage current measurement method
- tripping time measurement of RCDs with 30 mA
- voltage measurement on external shock-proof socket (L-N, L-PE, N-PE)
- active testing of three-phase devices under operating conditions by means of optional measuring adapters (item no. 044140/044141)

- differential current measurement method
- testing of RCDs with 30 mA
- active testing of three-phase loads
- ISO testing voltage of 250 V

ST 720
050313: with socket of type E (B/F/CZ/SK/PL)

16 A/32 A CEE 5-pin, active, for ST 720

16 A/32 A CEE coupling, 5-pin onto shock-proof plug (passive) for ST 710/ST 720/ST 750 A

16 A/32 A CEE coupling, 3-pin onto shock-proof plug for ST 710/ST 720/ST 750 A

Shock-proof 4 mm plug for devices without shock-proof plug for ST 710/ST 720

BENNING ST 720
Mains-operated and battery-operated Appliance Tester

	BENNING ST 720
indication	graphic display
protective conductor resistance	0.05 Ω – 20 Ω
insulation resistance (250 V/500 V DC)	0.1 MΩ – 20 MΩ
protective conductor current/ contact current by means of	
- differential current measurement method	0.25 mA – 20 mA
- alternative leakage current measurement method	0.25 mA – 20 mA
- direct measurement method	0.1 mA – 2 mA
line test	R_{PE}, R_{ISO}, short-circuit test and continuity test of phase conductor (L) and neutral conductor (N)
testing current of RCD	30 mA
tripping time	10 ms – 500 ms
protective conductor current of three-phase test objects under operating conditions (optional)	0.25 mA – 10 mA
voltage	50 V – 270 V
scope of delivery	carrying case, test cable with alligator clip, mains connection cable, appliance cable, battery set
item no.	050312

Optional accessories for *BENNING ST 720*

measuring adapters for three-phase loads (active)
for measuring R_{PE} and I_{PE} under operating conditions

16 A CEE 5-pin active	**item no. 044140**
32 A CEE 5-pin active	**item no. 044141**

BENNING ST 710/ST 720/ST 750 A

measuring adapters for three-phase loads (passive)
for measurement of R_{PE}, R_{ISO} and I_{EA}

16 A CEE coupling, 5-pin - shock-proof plug	**item no. 044122**
32 A CEE coupling, 5-pin - shock-proof plug	**item no. 044123**

measuring adapters for single-phase loads
for measurement of R_{PE}, R_{ISO} and I_{EA}

16 A CEE coupling, 3-pin - shock-proof plug	**item no. 044143**
32 A CEE coupling, 3-pin - shock-proof plug	**item no. 044144**

shock-proof 4 mm plug for devices without shock-proof plug — **item no. 044142**

See page 18 + 19 for further accessories

Scope of delivery BENNING ST 720

BENNING ST 750 A Appliance Tester (VDE 0701-0702, VDE 0751)
testing of electrical appliances and medical electrical devices

AddIn for Mebedo test software ELEKTROmanager and fundamed

BENNING ST 750 A
Appliance Tester for testing electrical appliances and medical electrical devices

- testing according to
  - **DIN VDE 0701-0702 (EN 62638):** testing of electrical appliances/equipment
  - **DIN VDE 0751-1 (EN 62353):** testing of medical electrical devices, such as hospital bed
  - **German Health and Safety at Work Regulation**
- innovative - indication and operation via colour LCD touchscreen
- powerful - 2 GB memory card for more than 100000 tests
- all in one - one appliance tester for all VDE tests

Features

- automatic and auto-configurable testing procedures
- complete test sample/customer database can be stored on SD card and thus is directly available at the place of inspection
- management of large test sample inventories with more than 100000 storable device tests per 2 GB SD card
- direct entry via touchscreen and external keyboard/mouse
- measuring result with “pass/fail” indication and acoustic warning signal, if the test has been failed
- help function and schematic connecting diagrams
- separate 4 mm test sockets and IEC connector
- 3 x USB interface for PC, external keyboard and RFID reader/writer
- 1 x RS 232 interface for barcode scanner, printer and SD card slot
- free firmware update possible via SD card/USB stick

Measuring functions

- protective conductor resistance with 200 mA DC and a testing current of 10 A AC
- insulating resistance with a testing voltage of 50 V to 500 V (adjustable)
- protective conductor current/contact current via differential current measurement method, alternative leakage current measurement method or direct measurement
- functional test with indication of leakage current, mains voltage, load current, effective power, apparent power and measuring time
- testing of device connecting cables and extension cables
- testing of three-phase loads by means of optional measuring adapters
- additionally for VDE 0751-1: device leakage current, leakage current of application part type B, type BF and type CF

ST 750 A

Touchscreen

Leakage

CM 9

Active testing of three-phase loads by means of test procedures with BENNING CM 9 differential current clamp and measuring adapter

044127/044128

BENNING ST 750 A Appliance Tester (VDE 0701-0702, VDE 0751)

	BENNING ST 750 A
display	5.7“ colour LCD touchscreen, ¼ VGA
protective conductor resistance	1 mΩ – 20 Ω
insulation resistance	0.1 MΩ – 100 MΩ
protective conductor current/ contact current via differential current measurement method, alternative leakage current measurement method or direct measurement	0.05 mA – 25 mA
device leakage current and leakage current of the applied part for medical electrical devices	0.05 mA – 25 mA
line test	R_{PE}, R_{ISO}, I_{PE}, short-circuit test and continuity test of phase conductor (L) and neutral conductor (N)
voltage/current	1 V - 360 V/0.1 A - 16 A
effective power/apparent power	20 W - 4000 W
interface	3 x USB, 1 x RS 232
dimensions/weight	405 x 330 x 165 mm/approx. 6 kg
scope of delivery	tester in waterproof (IP 67), break-proof case, test cable with alligator clip, appliance cable, input stylus, 2 GB SD card
item no.	050310

Order recommendation

• appliance tester ***BENNING ST 750 A***	**item no. 050320**
• software ***BENNING PC-Win ST 750***	**item no. 047001**
• barcode scanner	**item no. 009369**
• barcode labels (1000 pieces)	**item no. 756301**
• test badges “next test” (300 pieces) (see page 8)	**item no. 756212**

Optional accessories for *BENNING ST 750 A*

measuring adapters for three-phase loads (passive)
for measurement of R_{PE}, R_{ISO} and I_{EA}

16 A CEE coupling, 5-pin - shock-proof plug	**item no. 044122**
32 A CEE coupling, 5-pin - shock-proof plug	**item no. 044123**

Leakage Current Clamp *BENNING CM 9* for measurement of differential current, protective conductor current, load current of loads (see pages 7/8) **item no. 044065**

measuring adapters for leakage current clamp *BENNING CM 9*

single-phase, conductors led through individually and with double insulation shock-proof socket/shock-proof plug	**item no. 044131**
three-phase, conductors led through individually and with double insulation	
16 A CEE-CEE, 5-pin	**item no. 044127**
32 A CEE-CEE, 5-pin	**item no. 044128**

See pages 18 and 19 for further accessories

BENNING PC-Win ST 750 documentation software
helpful accessories for efficient testing

Software PC-Win ST 750

Software *BENNING PC-Win ST 750*

- professional PC software for the management and documentation of recorded measuring values
- explicit database structure with customer, department, test sample and test result including the test date
- easily creating and copying customers and test samples
- printing of the test results as single log and serial log
- bidirectional data transmission PC ↔ *BENNING ST 750 A*
- import and export function of existing test sample and customer databases via MS Excel®
- free software update to the latest version available per download

Portable log printer *BENNING PT 1* with Bluetooth®

- the perfect solution for printing test records rapidly on site
- high printing speed due to direct thermal printing process
- data transmission via Bluetooth® or RS232 interface
- power supply by means of rechargeable NiMH battery pack
- width/length of thermographic paper rolls: 58 mm/13 m
- included in delivery: 6 V battery pack, mains supply unit, belt clip, wall fastening, Bluetooth® dongle for *BENNING ST 750*, 2 rolls of thermographic paper and RS232 cable


BENNING PT 1 printer


Roll of thermographic paper


Barcode label

Test sample identification via barcode scanner/labels

- particularly suited for repetitive testing and identification of large test sample inventories in offices, administrations etc.
- highly adhesive PVC barcode labels with barcode and consecutive numbering (reels of 1000 pieces)
- barcode scanner with RS 232 interface supports all conventional barcodes such as UPC/EAN/JAN, Code 39, Code 128 etc.


Barcode scanner

Compact industrial keyboard

- high-quality functional keyboard with integrated trackball for comfortable input of test sample/customer data on site
- compact keyboard dimensions for safe transport in the *BENNING ST 750 A* appliance tester
- data transmission via Bluetooth® or USB interface
- increased protection against dust and splash water


industrial keyboard

Test sample identification via RFID reader/writer or transponder

- test sample identification via radio frequency ("Radio Frequency Identification") without visual contact or direct contact of the transponder
- RFID technology stores the test sample data/measuring values directly onto a memory chip (transponder) on the test sample
- particularly suited for rough industrial environments
- tag-type transponder for attachment by means of cable ties
- ring clip transponder for attachment to the mains supply line
- epoxy resin transponder (self-adhesive) for attachment into the housing or onto the surface of the housing
- transponder frequency: HF 13.56 MHz; memory depth:10 kbit


RFID reader/writer


Tag-type transponder


Ring clip transponder


Self-adhesive epoxy resin transponder

Optional accessories for *BENNING ST 750 A*

software *BENNING PC-Win ST 750* on CD-ROM incl. USB cable	**item no. 047001**
barcode scanner with RS 232 interface	**item no. 009369**
barcode labels with consecutive numeric representation (1000 pieces)	**item no. 756301**
printer *BENNING PT 1* with Bluetooth® and RS 232 interface	**item no. 044150**
roll of thermographic paper (20 pieces)	**item no. 044151**
industrial keyboard with USB interface	**item no. 044154**
RFID reader/writer with USB interface	**item no. 009370**
RFID transponder, tag-type, height/width: 43 x 34 mm (100 pieces)	**item no. 044139**
RFID transponder, ring clip, inside diameter: 7.5 mm (100 pieces)	**item no. 044138**
RFID transponder, self-adhesive, diameter/height: 17 mm/2.5 mm (100 pieces)	**item no. 044137**

See pages 18 and 19 for further accessories

Safety Instruments BENNING IT 101, IT 110 and IT 120 B
testing of electrical systems in compliance with the standards

BENNING IT 101
Insulation and Resistance Measuring Device

- measurement of insulating resistance and calculation of the resulting leakage current
- testing voltages of 50 V, 100 V, 250 V, 500 V and 1000 V
- selectable limiting values for ISO measurement, green LED for “PASS”, red LED for testing voltage/external voltage
- resistance measurement with a testing current of 200 mA for testing protective conductor connections
- measurement of polarization index (PI) and dielectric absorption rate (DAR)
- switchable probe tip for triggering the measuring process
- internal memory for 100 measuring values per measuring function
- TRUE RMS voltage measurement with low-pass filter
- including case, switchable probe tip, silicone measuring leads, magnetic hook, alligator clips, rubber protective frame and batteries

BENNING IT 110, BENNING IT 120 B
Installation Testers
For safety tests on electrical systems according to DIN VDE 0100 and IEC 60364

Multifunctional installation testers for complete testing and efficient troubleshooting of electrical systems

- measurement of the protective conductor line and of the equipotential bonding line with a testing current of 200 mA
- measurement of the insulation resistance with testing voltages of 100 V, 250 V, 500 V and 1000 V
- line impedance and loop impedance measurement (optional without tripping of the RCD) with calculation of the short-circuit current (PFC/PSC)
- complete testing of RCDs with nominal fault currents of 10/30/100/300/500/1000 mA
- measurement of contact voltage (without tripping), tripping time and tripping current (ramp test) of residual current operated device (RCD)
- phase-sequence testing in three-phase mains
- voltage measurement up to 500 V and online voltage monitoring

IT 101

BENNING TA 5

IT 110

Scope of delivery BENNING IT 101

BENNING IT 101
Insulation and Resistance Measuring Device

	BENNING IT 101
indicating range	4000 digits (illumination)
low-impedance resistance	0.01 Ω – 40 Ω
insulation resistance	1 kΩ – 20 GΩ
resistance	0.01 Ω – 40 kΩ
voltage	0.1 V – 600 V AC/DC TRUE RMS
supplementary function	leakage current, polarization index (PI), dielectric absorption rate (DAR), automatic discharge function, null balance of the measuring leads
measured value memory	500 measuring results
measuring category	CAT IV 600 V
item no.	044033

BENNING IT 110
Installation Tester

	BENNING IT 110
display	graphic display (illuminated)
low-impedance resistance	0.01 Ω – 2000 Ω
insulation resistance	1 kΩ – 1000 MΩ
line impedance (L-N/L)	0.01 Ω – 2000 Ω
loop impedance (L-PE)	0.01 Ω – 2000 Ω
short-circuit current	0.01 A – 24.4 kA
RCD testing type AC, A	tripping time, tripping current, contact voltage
phase sequence	yes
voltage, frequency	1 V – 500 V, 45 Hz – 65 Hz
item no.	044100

Optional accessories for *BENNING IT 101/IT 110/IT 120 B*

40 m measurement cable ***BENNING TA 5*** with practical winder, strap, for the measurement of protective and bonding conductors, connection: Ø 4 mm safety test

item no. 044039

BENNING IT 110, IT 120 B Installation Testers
the perfect solution for efficient testing

Features
BENNING IT 110, BENNING IT 120 B

- all measuring functions can be selected directly by means of a rotary switch
- switchable probe tip for releasing the measuring process
- graphic display and help function with connecting diagram
- complete measuring result with measuring parameters, limiting value and symbols for PASS/FAIL
- current supply by means of 6 NiMH storage batteries (AA) with charger

Additional functions
BENNING IT 120 B

in addition to the *BENNING IT 110*:

- testing of universal current-sensitive RCDs of type B
- current measurement (TRUE RMS) by means of current clamp adapter (optional)
- illumination measurement by means of lux sensor (optional)
- earthing measurement by means of three-wire measuring method (optionally with earthing set)
- integrated measured value memory for 500 measurements
- USB and RS 232 interface
- *BENNING PC-Win IT 120 B* software included in delivery

Logging software with Test Log according to ZVEH
BENNING PC-Win IT 120 B

- PC software for reading the stored test data
- creation of test logs with handover and status report according to ZVEH
- structuring and export function of the test data

Test log according to ZVEH

Scope of delivery of the BENNING IT 120 B

AddIn for Mebedo test software ELEKTROmanager and fundamed

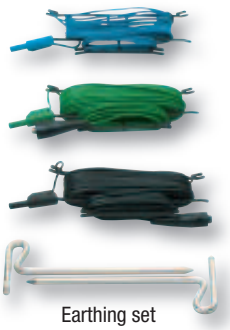
IT 120 B

Testing of universal current-sensitive RCDs of type B

INFORMATION:
RCDs of type B are increasingly used for multi-phase equipment of power electronics. In case of a fault, these devices also detect smooth DC fault currents and high-frequency AC fault currents.

BENNING CC 2

BENNING luxmeter type B



Earthing set

BENNING IT 120 B Installation Testers

	BENNING IT 120 B
display	graphic display (illuminated)
low-impedance resistance	0.01 Ω – 2000 Ω
insulation resistance	1 kΩ – 1000 MΩ
line impedance (L-N/L)	0.01 Ω – 2000 Ω
loop impedance (L-PE)	0.01 Ω – 2000 Ω
short-circuit current	0.01 A – 24.4 kA
RCD testing type AC, A, B	tripping time, tripping current, contact voltage
phase sequence	yes
voltage, frequency	1 V – 500 V, 45 Hz – 65 Hz
earth resistance	0.01 Ω – 2000 Ω
current (TRUE RMS)	0.1 mA – 20 A (by means of the clamp)
luminous intensity	0.01 lux – 20 klux (by means of sensor)
measured value memory	500 measuring results
interfaces	USB, RS 232
incl. software	*BENNING PC-Win IT 120* B
item no.	044102

Scope of delivery of the installation testers

	BENNING IT 110	BENNING IT 120 B
tester incl. carrying case / carrying strap	x	x
switchable probe tip	x	x
test cable with shock-proof plug	x	x
universal test cable, 3 x L = 1.5 m	x	x
3 x test probe, 3 x crocodile clips	x	x
charger with 6 NiMH storage batteries (AA)	x	x
PC software BENNING PC-Win IT 120 B		x
USB and RS 232 cable		x

Optional accessories for *BENNING IT 120 B*

current clamp adapter ***BENNING CC 2***
0.5 A – 20 A AC (200 A AC) **item no. 044110**

illumination sensor ***BENNING luxmeter type B***
Accuracy: 5 % **item no. 044111**

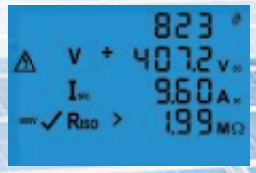
earthing set consisting of 2 earth rods and 3 test cables
(2 x L = 20 m, 1 x L = 4.5 m) **item no. 044113**

BENNNG PV 1-1 installation tester for photovoltaic systems
Commissioning tests and periodic inspection of PV systems

BENNING SOLAR

BENNING PV 1-1
PV installation tester for testing grid-connected PV systems

- tests in compliance with VDE 0126-23 (DIN EN 62446) standard
- easy – operation by means of keys with AUTO test procedure
- quick – testing within a few seconds only
- safe – contacting by means of PV connectors



Measured values transmitted via wireless connection

Application

For commissioning tests and periodic inspection of grid-connected PV systems according to VDE 0126-23. Meets all requirements necessary for system documentation of the DC side. Ideal for troubleshooting, maintenance work and performance evaluation of PV systems.

Features of the *BENNING PV 1-1*

- easy and safe operation by means of keys
- automatic test procedure for polarity, open-circuit voltage, short-circuit current and insulating resistance
- RISO measurement with "PASS/FAIL" indication
- memory of measured values for 200 PV strings
- integrated real-time clock with date/time stamp for each measurement
- USB interface and download software for the preparation of test certificates in MS Excel®
- safe contacting even during energy supply of the PV system
- direct connection by means of MC4 and "Sunclix" connectors

Measuring functions

- continuity test of the protective conductor and of the equipotential bonding conductor with a testing current of 200 mA
- polarity test of the DC current cables
- open-circuit voltage for each PV string of up to 1000 VDC
- short-circuit current for each PV string of up to 15 ADC
- insulating resistance with a testing voltage of 250 V, 500 V and 1000 VDC
- DC string current and AC current by means of *BENNING CC 3* current measuring clamp up to 40 A AC/DC (optional)

Radio interface "Wireless SUN Link"

- wireless connection to the insolation and temperature measurement instrument *BENNING SUN 2* (optional)
- direct display of the insolation value in W/m²
- storage of the electric quantities to be measured considering the insolation and the module/ambient temperature in real time

BENNING CC 3

BENNING TA 5

BENNING PV 1-1 Installation tester for photovoltaic systems

	BENNING PV 1-1
display	graphic display (illuminated)
protective conductor resistance	0.05 Ω – 199 Ω
insulating resistance	0.2 MΩ – 199 MΩ
open-circuit voltage with polarity	5 V to 1000 V DC
short-circuit current	0.5 A to 15 A DC
DC string current/ AC current	0.2 A to 40 A DC/AC (by means of *BENNING CC 3*)
insolation	100 to 1250 W/m² (by means of *BENNING SUN 2*)
PV module/ambient temperature	-30 °C to +125 °C (by means of *BENNING SUN 2*)
voltage via 4 mm sockets	30 to 440 V AC/DC
Interface/radio interface	1 x USB/433 MHz signal
dimensions/weight	270 x 115 x 55 mm/2.6 kg
scope of delivery	carrying case, measuring lines, alligator clips, MC4 and "Sunclix" PV measuring lines, batteries, USB cable, download software on CD-ROM
item no.	050421

BENNING PV 1-1 scope of delivery

Optional accessories for *BENNING PV 1-1*

Current clamp adapter *BENNING CC 3* for AC/DC current measurement
0.2 to 300 A AC/DC — **item no. 044038**

Measuring line *BENNING TA 5* for protective conductor measurement
Line length: 40 m — **item no. 044039**

Insolation and temperature measuring instrument BENNING SUN 2 with digital compass and inclinometer

BENNING SUN 2

Insolation and temperature measuring instrument for PV systems and solar thermal systems

Ideal for the planning, commissioning tests and periodic inspection of grid-connected PV systems according to VDE 0126-23 as well as for testing solar thermal systems.

Features of the *BENNING SUN 2*

- universal 4-in-1 measuring instrument for all testing and maintenance work as well as for economic efficiency analysis
- temperature-compensated PV reference cell for precise insolation measurement
- precise temperature measurement by means of high-precision sensors
- data logger for 5000 data records, including insolation and module/ambient temperature
- integrated real-time clock with date/time stamp
- USB interface and download software for the preparation of test certificates in MS Excel®
- data logger with energy-saving stand-by mode
- shock-absorbing protective rubber holster

Radio interface – "Wireless SUN Link"

- wireless transmission of insolation, module temperature and ambient temperature including date/time stamp to the *BENNING PV 1-1*

Wireless transmission of measuring data (alternatively import of measuring data by means of date/time stamp)

Measuring functions

- insolation measurement in W/m² or BTU/h/ft²
- dual-channel temperature sensor for measuring the module temperature and the ambient temperature
- digital compass for determining the cardinal direction
- inclinometer for determining the module/roof pitch

Insolation, angle of inclination and compass bearing

Insolation, PV module/ambient temperature

BENNING SUN 2 Insolation and temperature measuring instrument

	BENNING SUN 2
display	graphic display
insolation	100 to 1250 W/m²
PV module/ambient temperature	-30 °C to +125 °C
compass bearing (orientation)	0° to 360°
angle of inclination measurement	0° to 80°
real-time clock	date/time stamp
measured value memory	5000 data records for insolation and temperature
interface/radio range	1 x USB/approx. 30 m for unobstructed view conditions
dimensions/weight	150 x 80 x 33 mm/350 g
scope of delivery	case, protective rubber holster, module/ambient temperature sensor, battery set, USB cable, download software on CD-ROM
item no.	050420

BENNING SUN 2 scope of delivery

Demonstration case for practice-oriented application of testers, measuring instruments and safety instruments

For further information visit our website **www.benning.de**

BENNING DB 1

Demonstration case for testing and measuring primary quantities of electrical engineering

particularly suited for teaching and education purposes, training courses and product presentations

BENNING DB 2

Demonstration case for practice-oriented application and training concerning VDE 0100 installation testers

portable case for simulation of electrical systems conforming to standards according to DIN VDE 0100/105

Demonstration case

	BENNING DB 1
power supply	230 V, 50/60 Hz mains connection
dimensions/weight	405 x 330 x 160 mm, approx. 6 kg
scope of delivery	case with mains connection cable
item no.	044132

Demonstration case

	BENNING DB 2
power supply	230 V, 50/60 Hz mains connection
dimensions/weight	450 x 330 x 110 mm, approx. 4.5 kg
scope of delivery	case with mains connection cable
item no.	044133

Recommendation for the workshop equipment for enterprises of electrical engineer-craft according ZVEH and VDEW guidelines (Electricity Association)

Required test and measurement	***Tester/meter complying with standard***	***Single unit version I***	***Single unit/device combination version II***	***Single unit/device combination version III***
Two-pole voltage tester	DIN VDE 0682-401 IEC/EN 61243-3	*DUSPOL® analog* item no. 050261	*DUSPOL® expert* item no. 050262	*DUSPOL® digital* item no. 050263
Voltage (min. 600 V) and current meter (min. 15 A)	DIN VDE 0411-1 IEC/EN 61010-1	*MM 2* item no. 044028	*MM 1-3 + CC 1* item no. 044084 + 044037	*MM 7-1 + CC 1* item no. 044085 + 044037
Clip-on ammeter (min. 300 A)	DIN VDE 0411-1 IEC/EN 61010-1	*CM 2* item no. 044035	*CM 5-1* item no. 044066	*CM 8* item no. 044064
Insulation tester	DIN VDE 0413-2 IEC/EN 61557-2	*IT 101* item no. 044033		
Loop ohmmeter	DIN VDE 0413-3 IEC/EN 61557-3	–		
Ohmmeter	DIN VDE 0413-3 IEC/EN 61557-4	*IT 101* item no. 044033	*IT 110* item no. 044100	*IT 120 B* item no. 044102
FI/RCD-meter	DIN VDE 0413-6 IEC/EN 61557-6	–		
Phase sequence indicator	DIN VDE 0413-7 IEC/EN 61557-7	*TRITEST®* item no. 020050		
Instrument for testing electrical equipment (DIN VDE 0701-0702, 0751-1)	DIN VDE 0404-1 DIN VDE 0404-2	*ST 710* item no. 050308	*ST 720* item no. 050312	*ST 750 A* item no. 050320
Additional recommendation ZVEH				
Grounding gauge	DIN VDE 0413-6 IEC/EN 61557-6	–	–	*Earthing set for IT 120 B* item no. 044113
Continuity tester	DIN VDE 0413-7 IEC/EN 61557-7		*DUTEST®* item no. 050155	
Light meter lux meter	–	–	–	*Luxmeter type B for IT 120 B* item no. 044111
Additional recommendation of BENNING				
Differential current clamp for error current determination in electric equipment and systems	DIN VDE 0411-1 IEC/EN 61010-1	*CM 9* item no. 044065	*CM 9* item no. 044065	*CM 9* item no. 044065

Voltage and Continuity Tester
Phase-Sequence Indicator

PROFIPOL®
Voltage Testers for universal applications

- indicating DC and AC voltage within the range of 6 – 400 V
- indicating steps 6, 12, 50, 120, 230, 400 V
- polarity test for DC voltage
- shock-proof housing made of rugged high-pressure PE material
- compact dimensions and increased grip
- dustproof and waterproof, protection category IP 65

DUTEST®
Continuity and line tester

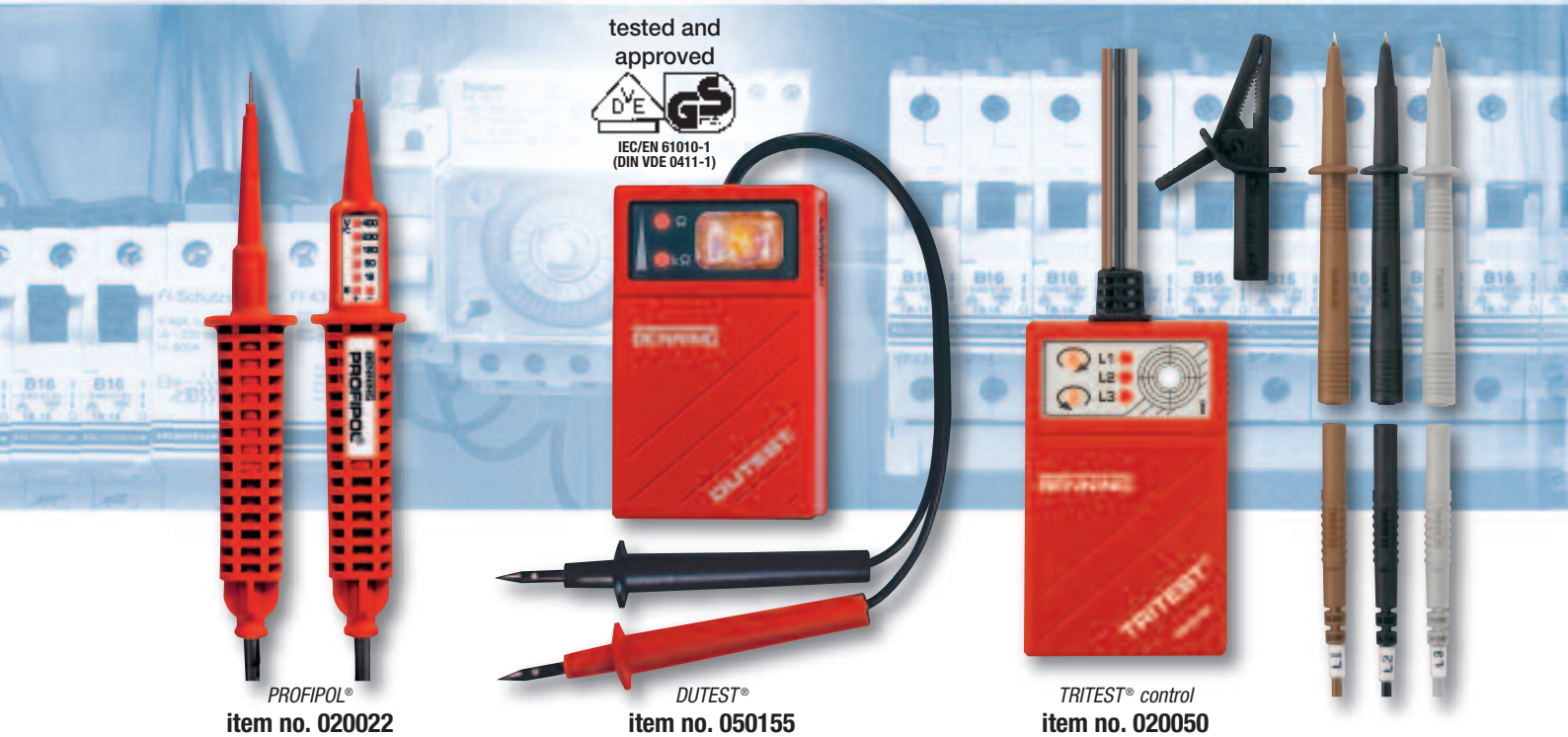
- reliable detection of faulty wiring, contacting errors and cable interruptions
- quick localization of defective fuses, lamps, lines and short-circuits
- indication of high-impedance (0 – 90 kΩ) and low-impedance (0 – 900 Ω) resistances
- acoustic indication by means of loud testing buzzer
- visual indication by means of high-contrast light-emitting diodes (LED)
- powerful torch function
- protected against external voltages of up to 400 V

TRITEST® *control*
Phase-sequence indicator for testing the phase sequence in three-phase mains

- indication of clockwise and anti-clockwise phase sequence
- indication of phase voltages (L1, L2, L3) by means of high-contrast LEDs
- voltage range: 400 – 690 V (50 – 60 Hz)
- bright LED pocket lamp function
- including safety probe tips and alligator clip

tested and approved

IEC/EN 61010-1
(DIN VDE 0411-1)



PROFIPOL®
item no. 020022

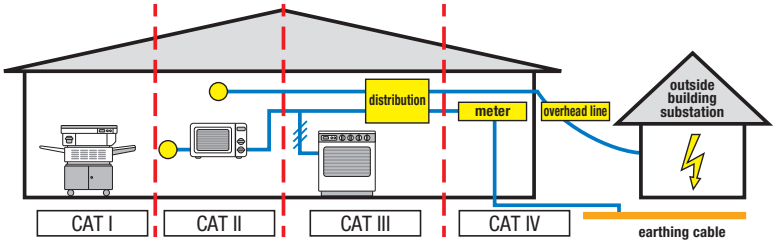
DUTEST®
item no. 050155

TRITEST® *control*
item no. 020050

Tips for practical use

- Always observe the five safety rules for “working under voltage”!
- For determining the absence of voltage on electrical systems of up to 1000 V, only use two-pole voltage testers complying with the current IEC/EN 61243-3 standard.
- Always check voltage testers for correct functioning immediately before and after use.
- Voltage testers with connectable load suppress capacitively and inductively induced voltages. Thus, incorrect measurements are excluded!
- Standard-compliant voltage testers must comply at least with protection category IP 54.
- *DUSPOL*® voltage testers are designed for safe working under voltage. Operating errors due to incorrect measuring range selection are excluded. The handles with grip limit offer the highest safety possible and sufficient distance to the measuring object. The display is arranged directly in the user's field of vision.
- A standards-compliant design of a voltage tester/measuring instrument is confirmed by independent testing and certification institutes by granting a mark of conformity (e.g. VDE/GS mark of conformity).
- Digital multimeters and current clamps with TRUE RMS measuring method offer increased accuracy in case of distorted and non-sinusoidal signal characteristics in industrial use.
- Please take into consideration the high-impedance input resistance (~10 MΩ) of a digital multimeter which indicates capacitively and inductively induced voltages and which very often might only simulate the existence of voltage.
- Use digital multimeters and current clamps only for the area of application for which they are designed. The measuring inputs must be marked unambiguously with the measuring category (CAT I – CAT IV) and the maximum nominal voltage to earth.

Measuring categories CAT I to CAT IV:



Accessories for BENNING testers and measuring instruments
safe – functional – indispensable

Hard-top case for testers and measuring instruments
item no. 711020

High-quality hard-top case with foam insert and three compartments for professional storage of testers and measuring instruments.
Compartment dimensions: approx. 110 x 300 x 50 mm,
Case dimensions: approx. 450 x 380 x 110 mm

DUSPOL® stand-by case
item no. 010911

Practical stand-by case with Velcro fastener and belt loop made of hard-wearing nylon fabric suitable for *DUSPOL*® *digital*, *DUSPOL*® *expert* and *DUSPOL*® *analog*.
Dimensions: 330 x 100 x 60 mm

BENNING TA 1
item no. 044124

Ø 4 mm safety crocodile clips, two pieces, red/black, professional equipment, CAT III 1000 V

BENNING TA 2
item no. 044125

set of Ø 4 mm safety measuring leads, six pieces, red/black, professional equipment, consisting of:
- safety measuring leads (silicone), CAT III 1000 V
- safety test probes (4 mm measuring tip), CAT II 1000 V
- safety crocodile clips, CAT III 1000 V

BENNING TA 3
item no. 044126

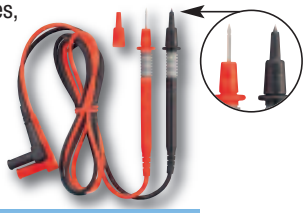
set of Ø 4 mm safety measuring leads, eight pieces, red/black, professional equipment, CAT III 1000 V, consisting of:
- safety measuring leads (silicone)
- safety test probes (slender measuring tip)
- safety claw clamps
- safety crocodile clips

BENNING TA 4
item no. 044120

magnetic holder for Multimeter and BENNING IT 101, 3 pieces, consisting of:
- magnetic holder
- adapter and belt, for attachment of BENNING Multimeters to switching cabinets, machine and system parts

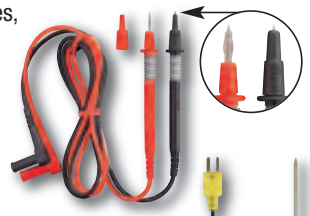
Ø 4 mm safety measuring leads with 2 mm measuring tip
item no. 044146

Ø 4 mm safety measuring leads 2 pieces, red/black, L = 1.40 m, with 2 mm measuring tip CAT IV 600 V/ CAT III 1000 V (with protective caps), CAT II 1000 V (without protective caps)



Ø 4 mm safety measuring leads with 4 mm measuring tip
item no. 044145

Ø 4 mm safety measuring leads 2 pieces, red/black, L = 1.40 m, with 4 mm measuring tip CAT IV 600 V/ CAT III 1000 V (with protective caps), CAT II 1000 V (without protective caps)



BENNING TA 5
item no. 044039

40 m measurement cable with practical winder, strap, for the measurement of protective and bonding conductors,
Connection: Ø 4 mm safety test

Set of safety measuring leads for *BENNING MM 4*
item no. 044119

set of Ø 4 mm safety measuring leads, 3 pieces, consisting of:
- safety measuring leads with 2 mm measuring tip
- 2 measuring probes with 2 mm measuring tip

Temperature probe (type K)
item no. 044121

insertion probe (V4A steel tube) for flexible substances, liquids, gases and air, measuring range:
-196 °C to +800 °C, suitable for *BENNING MM 1-3*, *MM 7-1*, *MM 11* and *CM 8* digital measuring instruments

Measuring adapters for BENNING ST 710/ST 720/ST 750 A appliance testers and BENNING CM 9 leakage current clamp

Measuring adapters for *BENNING ST 710/ST 720/ST 750 A*

Measuring adapters for single-phase loads (passive)

for measuring R_{PE}, R_{ISO} and I_{EA}, CEE coupling (3-pin) with shock-proof plug

16 A CEE (3-pin) **item no. 044143**
32 A CEE (3-pin) **item no. 044144**


for ST 710/720/750 A

Measuring adapters for three-phase loads (passive)

for measuring R_{PE}, R_{ISO} and I_{EA}, CEE coupling (5-pin) with shock-proof plug

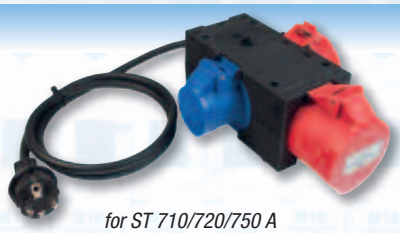
16 A CEE (5-pin) **item no. 044122**
32 A CEE (5-pin) **item no. 044123**


for ST 710/720/750 A

Measuring adapter for single-phase and three-phase loads (passive)

for measuring R_{PE}, R_{ISO} and I_{EA}, triple CEE coupling with shock-proof plug

Triple CEE coupling: 16 A CEE (5-pin), 32 A CEE (5-pin),
16 A CEE (3-pin) **item no. 044147**


for ST 710/720/750 A

Measuring adapter for *BENNING ST 710/ST 720*

Shock-proof plug with 4 mm plug for appliances without shock-proof plug

item no. 044142


for ST 710/720

Measuring adapters for *BENNING ST 720* (active)

Measuring adapters for three-phase loads for measuring R_{PE} and I_{PE} (direct measurement method) by means of current transformer, CEE (5-pin) with shock-proof plug

16 A CEE (5-pin) **item no. 044140**
32 A CEE (5-pin) **item no. 044141**


for ST 720

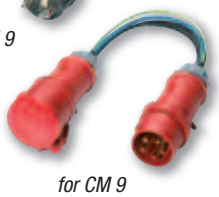
Measuring adapters for *BENNING CM 9* leakage current clamp (active)

for measuring the differential/protective conductor/load current, conductors led through individually, with double insulation

Single-phase,
shock-proof plug/coupling **item no. 044131**

Three-phase,
16 A CEE (5-pin) **item no. 044127**
32 A CEE (5-pin) **item no. 044128**

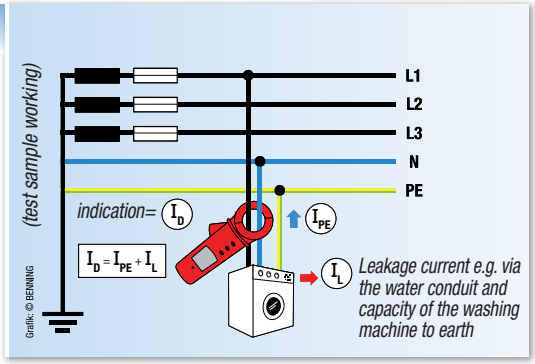

for CM 9


for CM 9

BENNING CM 9 leakage current clamp

for measuring the differential/protective conductor/load current of single-phase and three-phase loads (1 µA to 100 A AC)
(see page 7)

item no. 044065



Professional VDE seminars
Service hotline with 24h service

VDE 0701-0702 seminar
Testing of electrical appliances/equipment

Features:

The seminar addresses qualified electricians, competent persons as well as electrotechnically trained persons who have to do the testing and its documentation according to the DIN VDE 0701-0702 standard for repaired or modified electrical devices or the repetitive testing of electrical devices.
The participants of the seminar will be given an intensive training in order to be able to do this inspection according to regulations considering the optimum use of the *BENNING ST 710/ST 720/ST 750 A* testers as well as of the *BENNING PC-Win ST 750* logging software. At the end of the seminar, the participants will get a certificate of attendance.

Content:

Regulations, definitions, measurements (continuity of the protective conductor, insulation, protective conductor current/contact current), test sample management and documentation according to ZVEH.

VDE 0126-23 seminar
Testing of grid-connected photovoltaic systems

Features:

The seminar is intended for qualified electricians who have to carry out commissioning tests and periodic inspection of grid-connected photovoltaic systems in compliance with the VDE 0126-23 standard. The participants of the seminar will be given an intensive training in order to be able to do this inspection according to regulations considering the optimum use of the photovoltaic tester *BENNING PV 1-1* as well as of the insolation and temperature measuring instrument *BENNING SUN 2*.

Content:

Regulations, testing of the AC side, testing of the DC side (polarity test, open-circuit voltage, short-circuit current, insulating resistance and operating current measurement for each PV string of the PV generator) as well as minimum requirements for system documentation in compliance with VDE 0126-23.

Factory II, Robert-Bosch-Straße 20, D-46397 Bocholt

Your distributor:

VDE 0100 seminar
Testing of electrical installations of up to 1000 V

Features:

The seminar addresses qualified electricians who have to do the testing and its documentation of electrical installations of up to 1000 V according to the DIN VDE 0100 standard.
The participants of the seminar will be given an intensive training in order to be able to do this inspection independently and according to regulations considering the optimum use of the *BENNING IT 101/IT 110/IT 120 B* testers as well as of the *BENNING PC-Win IT 120 B* logging software. At the end of the seminar, the participants will get a certificate of attendance.

Content:

Regulations, definitions, measurements (insulation, continuity of the protective conductor, loop impedance/line impedance, short-circuit current, FI/RCD testing, earthing, rotary field, voltage, frequency), management of measuring data and documentation according to ZVEH.

Seminar venue:	BENNING GmbH & Co. KG, Robert-Bosch-Straße 20, 46397 Bocholt
Seminar dates:	to be agreed upon
Seminar fee:	We are happy to make you an offer: phone +49 (0) 28 71/93 - 470
Duration:	4 or 6.5 hours
Scope of services:	Intensive training in small groups of up to 6 persons, training material, certificate of attendance and refreshments during the seminar

We are pleased to send you our directions and to recommend to you hotels in direct vicinity of the seminar venue.

free
24h service
Service Hotline:
+49 (0) 28 71/93 - 555

Testing, measuring and safety instruments
The whole range of testers from one supplier

Developing safe and practical testing and measuring instruments which comply with the relevant standards is an integral part of BENNING's product philosophy for more than 65 years now. Today, BENNING offers a comprehensive product range of high-quality testing, measuring and safety devices the quality requirements of which are orientated according to the demands of professional users. With the generation of *DUSPOL*® voltage testers and with the measuring and safety devices, BENNING sets pioneer standards worldwide concerning safety, functionality and design.

BENNING
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