

World Class Test Equipment



## Testing, Measuring and Safety Instruments

The whole range of testers from one supplier:

- Voltage and Continuity Tester
- Phase-Sequence Indicator
- Digital Multimeter
- Digital Clamp Meter
- Safety Devices
- Accessories

Voltage Testers which are used on electric systems of up to 1000 V have to comply with the standard IEC/EN 61243-3.



IEC/EN 61243-3  
DIN VDE 0682-401



# Catalogue 2005

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### Measuring devices

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### Seminar

#### **Seminar "Tests according to DIN VDE 0701/0702, BGV A2"**

**Contents:** The seminar is addressed to experts and technically instructed persons who have to carry out tests and their documentation according to the standard DIN VDE 0701 for repaired or modified electric devices or according to the standard DIN VDE 0702 for repetitive tests of electric devices.

The seminar participants will be trained intensively in order to be able to carry out these tests independently, in accordance with the relevant regulations and by optimum use of the appliance tester *BENNING 700* as well as of the protocol and analysis software *BENNING PC-Win 700*.

At the end of the seminar, the participants will get a certificate of participation.

**Duration:** approx. 4 hours

**Seminar fee:** 260.00 € per company

#### **No. of participants**

**per company:** 1-5 persons

**Seminar venue:** Theo Benning GmbH & Co. KG

Münsterstraße 135 - 137, 46397 Bocholt

Tel: ++ 49 (0) 28 71/93-0, fax: ++ 49 (0) 28 71/93-429

Email: [dupol@benning.de](mailto:dupol@benning.de), internet: [www.benning.de](http://www.benning.de)

**Seminar dates:** according to arrangement



**Hotline:**

**Free**  
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#### **Service around the clock!**

The BENNING Service Hotline offers technical support around the clock by qualified service staff and answers your questions concerning all BENNING testing, measuring and safety testing devices you have purchased.

We have pleasure in sending you an approach sketch and in recommending hotels near our seminar venue.

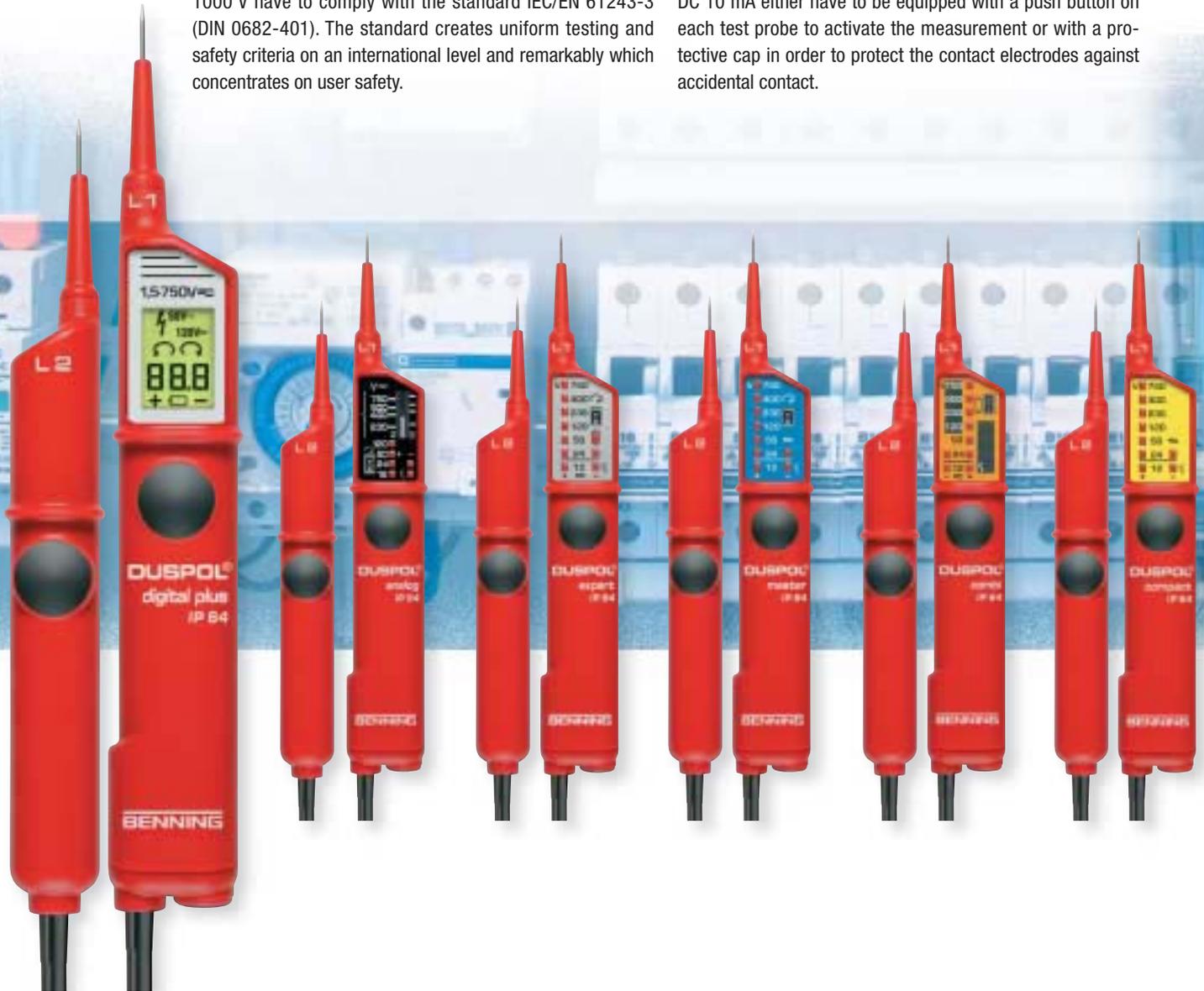


## Top class testers DUSPOL® Voltage Testers - those with the VDE mark of conformity

### The international standard for Voltage Testers IEC/EN 61243-3 (DIN 0682-401) 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 0682-401). The standard creates uniform testing and safety criteria on an international level and remarkably which concentrates on user safety.

An essential safety aspect of the international standard requires that Voltage Testers which load the measuring point with an operating current higher than AC 3.5 mA or DC 10 mA either have to be equipped with a push button on each test probe to activate the measurement or with a protective cap in order to protect the contact electrodes against accidental contact.



All testers of the *DUSPOL*® generation of Voltage Testers load the measuring point by actuating the two membrane push buttons. Thus, irritating inductive and capacitive voltages can be suppressed.

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 Tester generation 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

Product safety on the highest level:

- vibrating alarm for safe voltage detection
- load connection via two membrane push buttons
- continuity check via buzzer and LED or LCD respectively
- precise illumination of the measuring point

# Top class testers DUSPOL® expert, the measure of all things

## Top class testers

### DUSPOL® Voltage Testers

- tested and approved according to the international standard IEC/EN 61243-3 (DIN VDE 0682-401)
- vibrating alarm for safe voltage detection
- no measuring errors due to irritating capacitive and inductive voltages by means of intended load connection via push buttons
- intended release of a 30 mA safety switch
- acoustic continuity check via buzzer and LED/LCD
- phase-sequence indication with arrows “↻,↺”
- safe single-pole phase test
- precise illumination of the measuring point
- shock-resistant, dust-proof and splash-proof housing (protection class IP 64)
- LC display illumination that is activated automatically by means of a light sensor

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**LC display with background lighting**

**DATA HOLD** storage of the testing result

**phase-sequence test**

**measuring point illumination**

**single-pole phase test: "R" symbol for AC voltage**

**LED 90 kΩ** acoustic and optical continuity and semiconductor test

**LED** voltage indication 12 - 750 V, full operative even without batteries

**polarity test (+/-) with DC voltage**

**FI/RCD OFF/ON** load connection via push buttons

**VIBRATION** vibrating alarm for safe voltage detection

**IP 64** shock-resistant, dust-proof and splash-proof housing (protection class IP 64)

**SOLAR** integrated power supply means of solar cell and round cell

**Voltage Testers which are used on electric systems of up to 1000 V have to comply with the standard IEC/EN 61243-3.**

**approved**

tested and approved

IEC/EN 61243-3  
(DIN VDE 0682-401)

### Tips for practical operation:

- Always observe the basic electrotechnical rules for safe working with electrical devices and equipment.
- **Five safety rules:** 1. clearing, 2. securing against restart, 3. determining the absence of voltage, 4. earthing and short-circuiting, 5. covering or screening adjacent live parts.
- In order to determine the absence of voltage on electrical installations of up to 1000, only use two-pole Voltage Testers complying with the valid standard IEC/EN 61243-3. Digital measuring devices or electric testers according to IEC 61010-1 are not approved for determining the absence of voltage.
- Test the Voltage Tester for correct function immediately before use. Test all functions by means of known voltage sources.
- The conformity of the design of the measuring instruments with the relevant standards is confirmed by independent testing and certification institutes by granting a mark of conformity (e.g. VDE/GS marks of conformity).
- Important for the range of application of two-pole Voltage Testers is the indication of the nominal voltage range and the safety class. Classification is made in the voltage classes A and B. Class A: AC 500 V/DC 750 V, class B: AC 1000 V/DC 1500 V. Voltage Testers for outdoors use have to show at least protection class P 44.
- Voltage Testers with integrated load connection load the testing point and suppress undesirable capacitive and inductive reactive voltages.



## Top class testers DUSPOL® digital plus, for highest precision

**Digital Voltage Tester with load connection, phase-sequence indication, measuring point illumination and vibrating alarm**

### DUSPOL® digital plus

The DUSPOL® digital plus is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) via an illuminated 3 digit LC display. The display illumination is activated automatically via a light sensor. The voltage is indicated continuously within a range from 1.5 V to 750 V. The voltage value can be stored by means of the "Data-Hold" function. You can perform polarity tests with direct voltage (DC) and single-pole phase tests with alternating voltage (AC).

The DUSPOL® digital plus is equipped with a special function to test the phase sequence of a three-phase mains (LC display with arrows "right"/"left").

A very bright light-emitting diode (LED) is intended to illuminate the measuring point very precisely in case of unfavorable light conditions.

The load connection occurs via two membrane push buttons. Thus, the measuring point is loaded with a maximum testing current of  $I_s \leq 200$  mA in order to suppress inductive and capacitive voltages.

By actuating the two membrane push buttons, a vibrating motor is activated. The vibrating power of this motor increases proportionally to the applied voltage. The vibrating power indicates the level of the applied testing voltage.

The energy supply is provided via two 1.5 V micro batteries. The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.



### Technical Data

<b>indication:</b>	3 digit LC display with illumination 1.5 V - 750 V
<b>phase-sequence test:</b>	via LCD (symbol "↻")
<b>single-pole phase test:</b>	via LCD (symbol "⚡")
<b>polarity test:</b>	via LCD (symbol "+ -")
<b>measuring point illumination:</b>	by means of a very bright LED, 10 Lux in 30 cm
<b>vibrating alarm for voltage detection:</b>	from approx. 200 V on
<b>voltage range I:</b>	up to approx. 80.0 V with one decimal place
<b>voltage range II:</b>	from approx. 80 V on, without decimal place
<b>current consumption, measuring circuit:</b>	$I_N \leq 3.5$ mA (500 V AC)
<b>current consumption, load circuit:</b>	$I_N \leq 1.7$ mA (750 V DC)
<b>internal resistance, measuring circuit:</b>	$I_s \leq 200$ mA (750 V)
<b>internal resistance, load circuit:</b>	440 kΩ, in parallel 4.7 nF
<b>internal resistance, frequency range:</b>	approx. 3.7 kΩ ... (150 kΩ)
<b>operating temperature range:</b>	both push buttons actuated
<b>max. permissible operating time (ED):</b>	0 - 150 Hz
<b>protection class:</b>	- 10 °C to + 55 °C
<b>indicating accuracy:</b>	30 seconds
<b>batteries:</b>	IP 64 (dust-proof/splash-proof)
	± 2 % from ultimate value voltage range (I-II) 5 V - 750 V (for frequencies of 20 - 150 Hz sinusoidal and DC)
	2 micro batteries 1.5 V IEC LR03 AAA One battery set is enclosed in the delivery.



DUSPOL® digital plus  
item no. 050255

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



accessories:  
tester case  
item no. 010910

## Top class testers

# DUSPOL® analog, the original

### Voltage Tester with solenoid operated voltage indicator and phase-sequence indication

#### DUSPOL® analog

The DUSPOL® analog is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) by means of high-contrast light-emitting diodes (LED) and by means of a solenoid operated voltage indicator. The voltage is indicated in the steps of 12, 24, 50, 120, 230, 400, 500 and 750 V. You can perform polarity tests with direct voltage (DC) and single-pole phase tests with alternating voltage (AC).

The DUSPOL® analog is equipped with a special function to test the phase sequence of a three-phase mains (LC display). Press the two membrane push buttons to connect the solenoid operated voltage indicator.

The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.



#### Technical Data

<b>indicating steps:</b>	12, 24, 50, 120 V diode indication (LED) 230, 400, 500, 750 V (solenoid operated voltage indicator)
<b>phase-sequence test:</b>	via LCD (symbol "R")
<b>single-pole</b>	
<b>phase test:</b>	via LCD (symbol "R")
<b>polarity test:</b>	via LED ("+" "-")
<b>current consumption,</b>	
<b>measuring circuit:</b>	$I_N \leq 3.2 \text{ mA}$ (500 V AC/DC)
<b>current consumption,</b>	
<b>load circuit:</b>	$I_s \leq 32 \text{ mA}$ (500 V)
<b>internal resistance,</b>	
<b>measuring circuit:</b>	180 k $\Omega$
<b>internal resistance,</b>	approx. 24 k $\Omega$
<b>load circuit:</b>	both push buttons actuated
<b>frequency range:</b>	0 - 60 Hz
<b>operating temperature</b>	
<b>range:</b>	- 10 °C to + 55 °C
<b>max. permissible</b>	
<b>operating time (ED):</b>	30 seconds
<b>protection class:</b>	IP 64 (dust-proof/splash-proof)
<b>indicating accuracy:</b>	$\pm 15 \%$



accessories:  
tester case  
item no. 010910



- LED 90 k $\Omega$
- FI/RCD OFF/ON
- VIBRATION
- IP 64
- DATA HOLD
- SOLAR

DUSPOL® analog  
item no. 050256

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



# Top class testers DUSPOL® expert, the measure of all things

**Voltage and Continuity Tester with load connection, phase-sequence indication, measuring point illumination and vibrating alarm**

**DUSPOL® expert**

The DUSPOL® expert is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) by means of high-contrast light-emitting diodes (LED).

The voltage is indicated in the steps of 12, 24, 50, 120, 230, 400 and 750 V. You can perform polarity tests with direct voltage (DC) and single-pole phase tests with alternating voltage (AC).

The DUSPOL® expert is equipped with a special function for continuity and semiconductor tests up to 90 kΩ and a function to test the phase sequence of a three-phase mains (LC display).

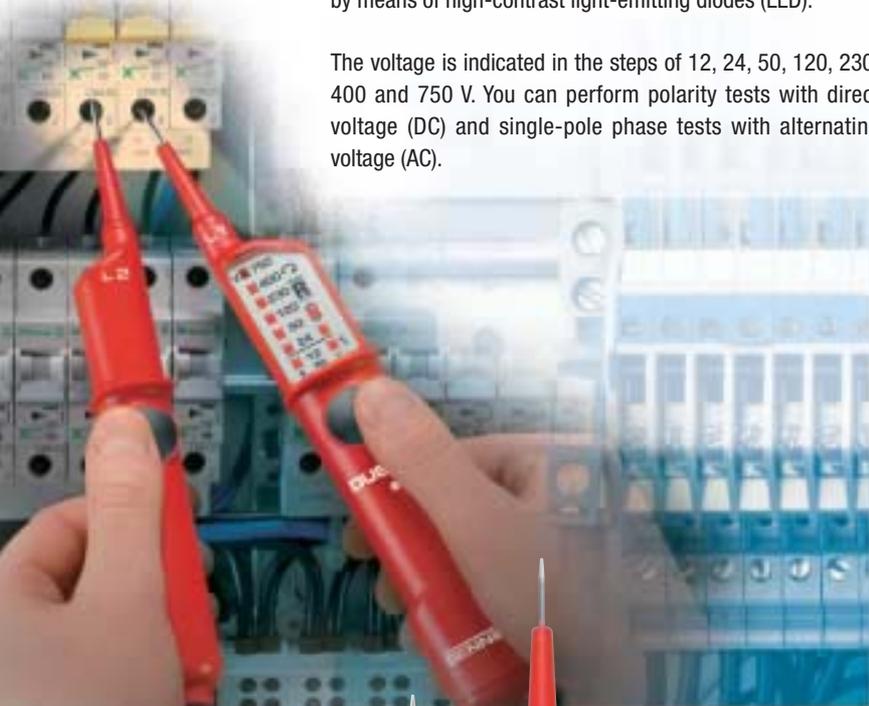
The continuity and semiconductor test is done by means of both, visual indication via a high-contrast light-emitting diode (LED) and acoustic indication via test buzzer. A very bright light-emitting diode (LED) is intended to illuminate the measuring point very precisely in case of unfavorable light conditions.

The load connection occurs via two membrane push buttons. Thus, the measuring point is loaded with a maximum testing current of  $I_s \leq 200$  mA in order to suppress inductive and capacitive voltages.

By actuating the two membrane push buttons, a vibrating motor is activated. The vibrating power of this motor increases proportionally to the applied voltage. The vibrating power indicates the level of the applied testing voltage.

The energy supply is provided via two 1.5 V micro batteries. The voltage test can also be performed with the batteries being discharged or removed.

The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.



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- LED))) 90 kΩ FI/RCD OFF/ON
- VIBRATION L3 L1 L2
- IP 64
- DATA HOLD SOLAR

DUSPOL® expert  
item no. 050253

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



accessories:  
tester case  
item no. 010910

**Technical Data**

<b>indicating steps:</b>	12, 24, 50, 120, 230, 400, 750 V diode indication (LED)
<b>continuity test:</b>	0 - 90 kΩ, acoustically via buzzer (55 dB), visually via LED testing current: max. 4 μA
<b>phase-sequence test:</b>	via LCD (symbol "R")
<b>single-pole phase test:</b>	via LCD (symbol "R")
<b>polarity test:</b>	via LED ("+" "-")
<b>vibrating alarm for voltage detection:</b>	from approx. 200 V on
<b>measuring point illumination:</b>	by means of a very bright LED, 10 Lux in 30 cm
<b>current consumption, measuring circuit:</b>	$I_N \leq 3.5$ mA (400 V AC)
<b>current consumption, load circuit:</b>	$I_N \leq 4.4$ mA (750 V DC)
<b>internal resistance, measuring circuit:</b>	$I_s \leq 200$ mA (750 V)
<b>internal resistance, load circuit:</b>	180 kΩ, in parallel 4.7 nF
<b>frequency range:</b>	approx. 3.7 kΩ ... (150 kΩ)
<b>operating temperature range:</b>	both push buttons actuated
<b>max. permissible operating time (ED):</b>	0 - 60 Hz
<b>protection class:</b>	operating temperature range: - 10 °C to + 55 °C
<b>indicating accuracy:</b>	30 seconds
<b>batteries:</b>	IP 64 (dust-proof/splash-proof)
	± 15 %
	2 micro batteries 1.5 V IEC LR03 AAA
	One battery set is enclosed in the delivery.

# Top class testers DUSPOL® master, the master of its class

## Voltage Tester with load connection, phase-sequence indication and vibrating alarm

### DUSPOL® master

The DUSPOL® master is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) by means of high-contrast light-emitting diodes (LED). The voltage is indicated in the steps of 12, 24, 50, 120, 230, 400 and 750 V.

You can perform polarity tests with direct voltage (DC) and single-pole phase tests with alternating voltage (AC).

The DUSPOL® master is equipped with a special function to test the phase sequence of a three-phase mains (LC display).

The load connection occurs via two membrane push buttons. Thus, the measuring point is loaded with a maximum testing current of  $I_s \leq 200$  mA in order to suppress inductive and capacitive voltages.

By actuating the two membrane push buttons, a vibrating motor is activated. The vibrating power of this motor increases proportionally to the applied voltage. The vibrating power indicates the level of the applied testing voltage.

The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.

### Technical Data

**indicating steps:** 12, 24, 50, 120, 230, 400, 750 V diode indication (LED)

**single-pole phase test:** via LCD (symbol "R")

**polarity test:** via LED ("+" "-")

**vibrating alarm for voltage detection:** from approx. 200 V on

**current consumption, measuring circuit:**  $I_N \leq 3.3$  mA (400 V AC)  
 $I_N \leq 4.4$  mA (750 V DC)

**current consumption, load circuit:**  $I_s \leq 200$  mA (750 V)

**internal resistance, measuring circuit:** 180 k $\Omega$ , in parallel 4.7 nF

**internal resistance, load circuit:** approx. 3.7 k $\Omega$  ... (150 k $\Omega$ )  
both push buttons actuated

**frequency range:** 0 - 60 Hz

**operating temperature range:** - 10 °C to + 55 °C

**max. permissible operating time (ED):** 30 seconds

**protection class:** IP 64  
(dust-proof/splash-proof)

**indicating accuracy:**  $\pm 15$  %



accessories:  
tester case  
item no. 010910



DUSPOL® master  
item no. 050252

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



## Top class testers

# DUSPOL® combi, the all-rounder

### Voltage and Continuity Tester with load connection and vibrating alarm

#### DUSPOL® combi

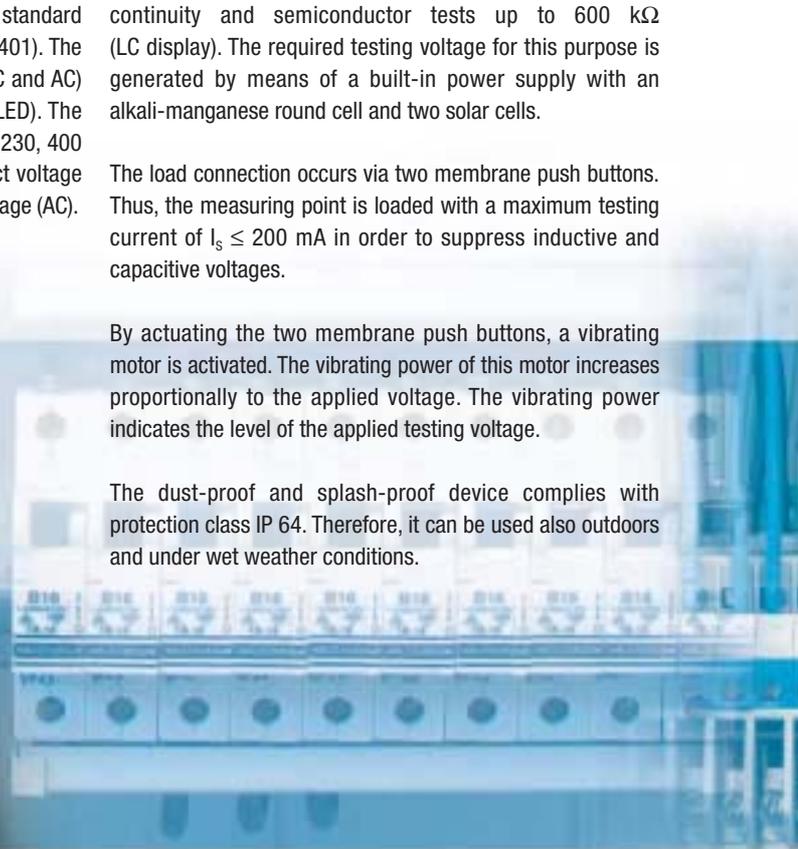
The DUSPOL® combi is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) by means of high-contrast light-emitting diodes (LED). The voltage is indicated in the steps of 12, 24, 50, 120, 230, 400 and 750 V. You can perform polarity tests with direct voltage (DC) and single-pole phase tests with alternating voltage (AC).

The DUSPOL® combi is equipped with a special function for continuity and semiconductor tests up to 600 k $\Omega$  (LC display). The required testing voltage for this purpose is generated by means of a built-in power supply with an alkali-manganese round cell and two solar cells.

The load connection occurs via two membrane push buttons. Thus, the measuring point is loaded with a maximum testing current of  $I_s \leq 200$  mA in order to suppress inductive and capacitive voltages.

By actuating the two membrane push buttons, a vibrating motor is activated. The vibrating power of this motor increases proportionally to the applied voltage. The vibrating power indicates the level of the applied testing voltage.

The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.



DUSPOL® combi  
item no. 050254

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



accessories:  
tester case  
item no. 010910

#### Technical Data

<b>indicating steps:</b>	12, 24, 50, 120, 230, 400, 750 V diode indication (LED)
<b>continuity test:</b>	0 - 600 k $\Omega$ , visually via LCD (symbol "R/ $\Omega$ "), testing current: max. 5 $\mu$ A
<b>single-pole phase test:</b>	via LCD (symbol "R/ $\Omega$ ")
<b>polarity test:</b>	via LED ("+" "-")
<b>vibrating alarm for voltage detection:</b>	from approx. 200 V on
<b>current consumption, measuring circuit:</b>	$I_N \leq 3.3$ mA (400 V AC) $I_N \leq 4.4$ mA (750 V DC)
<b>current consumption, load circuit:</b>	$I_s \leq 200$ mA (750 V)
<b>internal resistance, measuring circuit:</b>	180 k $\Omega$ , in parallel 4.7 nF
<b>internal resistance, load circuit:</b>	approx. 3.7 k $\Omega$ ... (150 k $\Omega$ ) both push buttons actuated
<b>frequency range:</b>	0 - 60 Hz
<b>operating temperature range:</b>	- 10 °C to + 55 °C
<b>max. permissible operating time (ED):</b>	30 seconds
<b>protection class:</b>	IP 64 (dust-proof/splash-proof)
<b>indicating accuracy:</b>	$\pm 15$ %

# Top class testers

## DUSPOL® compact, the robust one

### Voltage Tester with load connection

#### DUSPOL® compact

The DUSPOL® compact is a Voltage Tester which has been tested and approved according to the international standard for Voltage Testers IEC/EN 61243-3 (DIN VDE 0682-401). The device indicates direct and alternating voltages (DC and AC) by means of high-contrast light-emitting diodes (LED). The voltage is indicated in the steps of 12, 24, 50, 120, 230, 400 and 750 V. You can perform polarity tests with direct voltage (DC) and the external conductor can be determined against the protective conductor (PE) with alternating voltage (AC).

The load connection occurs via two membrane push buttons. Thus, the measuring point is loaded with a maximum testing current of  $I_s \leq 200$  mA in order to suppress inductive and capacitive voltages.

The dust-proof and splash-proof device complies with protection class IP 64. Therefore, it can be used also outdoors and under wet weather conditions.



#### Technical Data

<b>indicating steps:</b>	12, 24, 50, 120, 230, 400, 750 V diode indication (LED)
<b>phase test:</b>	via LED
<b>polarity test:</b>	via LED ("+" "-")
<b>current consumption, measuring circuit:</b>	$I_N \leq 3.3$ mA (400 V AC) $I_N \leq 4.4$ mA (750 V DC)
<b>current consumption, load circuit:</b>	$I_s \leq 200$ mA (750 V)
<b>internal resistance, measuring circuit:</b>	180 k $\Omega$ , in parallel 4.7 nF
<b>internal resistance, load circuit:</b>	approx. 3.7 k $\Omega$ ... (150 k $\Omega$ ) both push buttons actuated
<b>frequency range:</b>	0 - 60 Hz
<b>operating temperature range:</b>	- 10 °C to + 55 °C
<b>max. permissible operating time (ED):</b>	30 seconds
<b>protection class:</b>	IP 64 (dust-proof/splash-proof)
<b>indicating accuracy:</b>	$\pm 15$ %



accessories:  
tester case  
item no. 010910

- LED 90 k $\Omega$
- FI/RCD OFF/ON
- VIBRATION
- L3 L1 L2
- IP 64
- LCD
- DATA HOLD
- SOLAR

DUSPOL® compact  
item no. 050251

OEM version available on demand



tested and approved  
IEC/EN 61243-3  
(DIN VDE 0682-401)



# Universal Voltage Tester PROFIPOL® Continuity and Circuit Tester DUTEST®

## Universal Voltage Tester PROFIPOL®

The universal Voltage Tester PROFIPOL® indicates DC and AC voltages in the range 6 - 400 V.

The voltage is displayed visually by LEDs that indicate whether DC or AC voltage is present. Polarity tests (LED display) for DC voltage and phase tests against non-fused earthed conductors (PE) for AC voltage can also be performed.

The display is located above the handle and can therefore be easily read.

This dust and waterproof device conforms to protection standard IP 65 and is approved for indoor and outdoor use.

### Technical Data

<b>indicating steps:</b>	6, 12, 50, 120, 230, 400 V AC/DC diode indication (LED)
<b>phase-sequence:</b>	via LED
<b>polarity display:</b>	via LED ("+" "-")
<b>current consumption:</b>	$I_N \leq 3.1$ mA (400 V)
<b>internal resistance:</b>	130 k $\Omega$
<b>frequency range:</b>	0 - 500 Hz
<b>operating temperature range:</b>	- 10 °C to + 55 °C
<b>max. permissible operating time (ED):</b>	30 seconds
<b>protection class:</b>	IP 65
<b>indicating accuracy:</b>	$\pm 15$ %

## Continuity and Circuit Tester DUTEST®

The continuity and Circuit Tester DUTEST® indicates the continuity of dead electrical wiring, networks, systems, units and components up to measuring resistor value of 90 k $\Omega$ . With this unit the polarity of semiconductor components such as diodes, transistors etc. can be determined.

The continuity and semiconductor test is made via a visual indication by ultra bright LEDs as well as via an acoustic indication by a buzzer. The LEDs indicate whether there is a low-valued (0 - 900  $\Omega$ ) or high-valued measuring (0 - 90 k $\Omega$ ) resistor.

For the unit operation three Mignon-batteries 1.5 V are necessary. The DUTEST® has a pocket torch function with a big reflector.

The housing conforms to protection class IP 30. The unit is protected against external voltage up to 400 V.

### Technical Data

<b>indication steps:</b>	diode indicating (LED)
<b>low-valued measuring resistors:</b>	from 0 - approx. 900 $\Omega$
<b>high-valued measuring resistors:</b>	from 0 - approx. 90 k $\Omega$
<b>polarity display:</b>	via LED
<b>nominal voltage range:</b>	max. 400 V AC/DC
<b>no-load voltage:</b>	max. 5 V
<b>test current:</b>	max. 60 $\mu$ A
<b>internal resistance:</b>	approx. 82 k $\Omega$
<b>frequency range:</b>	0 - 60 Hz
<b>operating temperature range:</b>	- 10 °C to + 50 °C
<b>protection class:</b>	IP 30
<b>battery:</b>	3 Mignon-batteries 1.5 V IEC/DIN/LR 6



BENNING PROFIPOL®  
item no. 020022

OEM version available on demand



accessories:  
tester case  
item no. 010910



BENNING DUTEST®  
item no. 050155



tested and approved  
IEC/EN 61010-1/A2  
(DIN VDE 403)

# Phase-Sequence Indicator TRITEST® control Load Meter for electrical meters Z-TESTER

## Phase-Sequence Indicator TRITEST® control

The phase-sequence indicator TRITEST® control is a three-pole measuring instrument for testing the phase sequence in three-phase mains. The applicable voltage range of 400 to 690 V is designed for industrial mains and systems.

The phase-sequence test is done by means of two light-emitting diodes (LEDs) which indicate clockwise or anticlockwise phase sequence. The phase voltages are indicated by means of additional LEDs for the phases L1, L2 and L3.

As supplementary device, the TRITEST® control is equipped with a bright LED pocket lamp function which requires three 1.5 V round cells (R6).

## Load Meter for electrical meters Z-TESTER

With the load meter Z-TESTER you can test the start ability of directly measuring low voltage meters. The functional test is made with the connection of power of 50 Watt or 100 Watt.

A LED optically indicates the connection of power. The start ability of a meter is given, if the counter disc starts securely at the power connection and if you can see how it turns forward.

With the Z-TESTER the test of the correct meter connection and the check of the phase voltages (230 V/400 V AC) are possible as well.

At overheat of the device, the integrated temperature monitoring switches off the electrical load and the LED indication. After cooling down, the connection of power is possible again.

Technical Data	
<b>nominal voltage:</b>	3-phase alternating current 400 - 690 V
<b>display:</b>	Indication via diodes (LED)
<b>phase-sequence test:</b>	via LEDs for clockwise/anticlockwise phase sequence
<b>phase voltage:</b>	via LEDs for phases L1, L2 and L3
<b>testing current:</b>	≤ 3.5 mA
<b>frequency range:</b>	50 - 60 Hz
<b>illumination of LED pocket lamp:</b>	approx. 30 Lux in a distance of 50 cm
<b>operating temperature range:</b>	- 10 °C to + 55 °C
<b>protection class:</b>	IP 30
<b>battery:</b>	3 round cell batteries 1.5 V (R6) IEC LR6 AA
<b>scope of delivery:</b>	Phase-sequence indicator with firmly connected cables and all-insulated connectors, three safety probe tips and an alligator clip

Technical Data	
<b>nominal voltage:</b>	230 V
<b>nominal power:</b>	50 Watt and 100 Watt
<b>current consumption load circuit:</b>	approx. 0.27 A (50 Watt)/0.47 A (100 Watt) at 230 V
<b>current consumption measuring circuit:</b>	approx. 0.012 A at 230 V
<b>internal resistance measuring circuit:</b>	approx. 20 kΩ
<b>internal resistance load circuit:</b>	approx. 490 Ω
<b>overloadable:</b>	to 400 V, with delayed switch off
<b>indicating stages:</b>	230 and 400 V (overload) diode indicating (LED red)
<b>meter testing (Z-Test):</b>	diode indicating (LED green)
<b>frequency range:</b>	50 - 60 Hz
<b>max. permissible operating time (ED):</b>	30 seconds
<b>protection class:</b>	IP 20

Start switch as change-over switch with OFF-position in the middle-position, 50 W and 100 W for meter testing (Z-Test)



   
TRITEST® control  
item no. 020050



accessories:  
tester case  
item no. 010910

   
BENNING Z-TESTER  
item no. 050190

   
tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



## Top class measuring instruments Uncompromising Safety and Functional Variety

### Safety instructions for electrical measuring instruments

The internationally valid standard IEC/EN 61010-1 (DIN VDE 0411-1) guarantees standardized testing criteria worldwide for Multimeters, Current clamps and Safety testing devices. The compliance with the relevant standards of all BENNING Multimeters and Current clamps is tested by the independent VDE Test and Certification Institute and confirmed by being granted the VDE/GS mark of conformity.

The large program of BENNING measuring instruments offers optimum solutions for all fields of application in industry, craft and service.

The product range consists of devices with the common RMS measuring method and of devices which indicate the true RMS value (TRUE RMS measuring method). BENNING measuring instruments distinguish by precise measuring results and guarantee safety up to the highest measuring category CAT IV.



delivery with software  
PC-Win MM 10

CAT IV  
600 V



Digital Multimeter

CAT IV  
600 V



Digital Current  
Clamp Meter

CAT III  
600 V



Safety Devices

### Measuring method for determining the RMS value

Common methods for determining the RMS value by means of digital measuring instruments are the RMS measuring method and the TRUE RMS measuring method. For a large number of applications, the common RMS measuring method is precise enough to determine the RMS value. However, it is important to know that the RMS measuring method assumes a purely sinusoidal signal form. If the signal form is not sinusoidal or not linear, the measuring result is faulty and the indicated value may be up to 50 % lower than the real value.

Nevertheless, measuring instruments using the TRUE RMS measuring method offer precise measuring results even in case of non-sinusoidal or distorted curve behaviour. TRUE RMS measuring instruments are preferable to RMS measuring instruments particularly for industrial applications.

### Measuring categories CAT I to CAT IV

The standard IEC/EN 61010-1 divides current circuits into the measuring categories CAT I to CAT IV in order to design measuring instruments for different fields of application. The measuring categories give information on the fields of application in which a measuring instrument can be used without any danger. The protection of a measuring instrument against transient overvoltage is determined by the indicated measuring category (overvoltage category) and the indicated operating voltage (nominal voltage against earth) such as e.g. CAT IV 600 V, CAT III 1000 V.

On principle, a transient load due to lightning into the mains or due to connection or disconnection of bigger loads has its strongest effect at the domestic power supply and becomes weaker inside the installation (see diagram page 15).

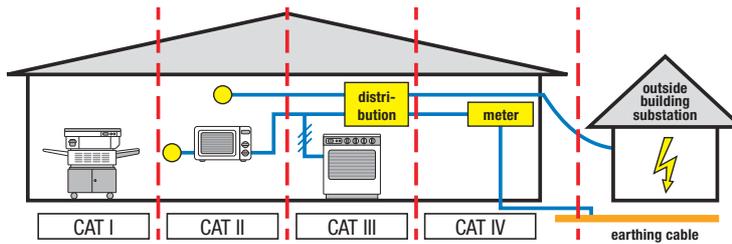
# Multimeters and Current Clamps by BENNING

## Tested and approved according to IEC 61010-1

### The measuring categories

#### CAT I to CAT IV

- CAT I** valid for measuring on current circuits that are not directly connected with the mains (e.g. specially protected devices)
- CAT II** valid for measuring on current circuits that are electrically connected to the low-voltage mains (e.g. household appliances)
- CAT III** valid for measuring within domestic installation (e.g. distribution, cabling, sockets, switches)
- CAT IV** valid for measuring at the source of low-voltage installations (e.g. meter, main connection, primary overcurrent protection devices)



optical RS 232 interface

LC display with background lighting

resistance measuring up to 2 GΩ

DC/AC voltage measuring up to 750 V AC/1000 V DC

number of memory locations:  
- 40000 (Data-log function)  
- 1000 (memory function)

including protocol and analysis software  
**BENNING PC-Win MM 11**

**DATA HOLD** storage of the measuring result

continuity/diode test

**10 A<sub>AC/DC</sub>** DC/AC current measuring up to 10 A AC/DC

**mF** capacity measuring up to 40 mF

**Hz** frequency measuring up to 1 MHz

temperature measuring from -200 °C to 1200 °C

**TRUE RMS** TRUE RMS measuring

**CAT III 600 V** measuring category CAT III 600 V

### Tips for practical operation:

- Unlike *DUSPOL*® Voltage Testers, measuring instruments are provided with a very high input resistance in the MΩ range.
- For determining the RMS value of unknown signal behaviors, TRUE RMS measuring instruments are preferable compared to RMS measuring instruments.
- Only use measuring instruments for the range of application for which they are designed. The overvoltage category as well as the nominal voltage has to be indicated unequivocally on all measuring inputs.
- The conformity of the design of the measuring instruments with the relevant standards is confirmed by independent testing and certification institutes by granting a mark of conformity (e.g. VDE/GS marks of conformity).
- Measuring instruments with automatic cut-off when not in use prolong the battery lifetime and increase readiness for operation.
- Measuring instruments without sufficient overload protection are dangerous for the user and increase downtimes of the instrument.
- For any questions and problems, please contact the free 24 hours service of our qualified service staff. Service Hotline tel: ++49 / (0) 28 71 / 93 - 555



## Digital Multimeter DIGIPOL

### the practical alternative

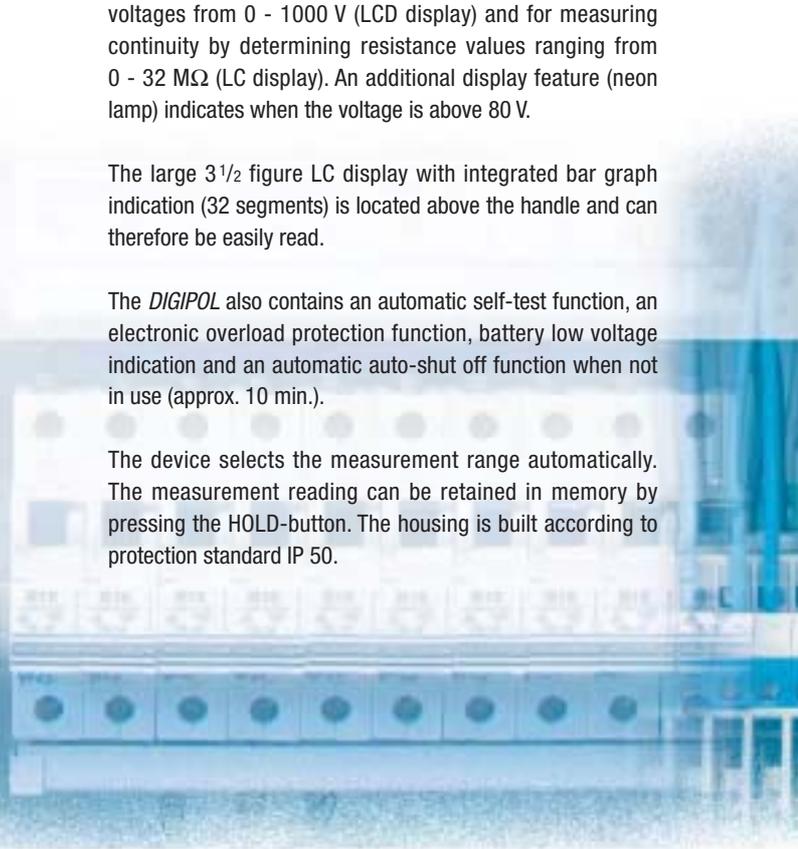
#### Digital Multimeter DIGIPOL

The hand-held multimeter *DIGIPOL* is a two-pole measuring device with a digital display for measuring DC and AC voltages from 0 - 1000 V (LCD display) and for measuring continuity by determining resistance values ranging from 0 - 32 M $\Omega$  (LC display). An additional display feature (neon lamp) indicates when the voltage is above 80 V.

The large 3 1/2 figure LC display with integrated bar graph indication (32 segments) is located above the handle and can therefore be easily read.

The *DIGIPOL* also contains an automatic self-test function, an electronic overload protection function, battery low voltage indication and an automatic auto-shut off function when not in use (approx. 10 min.).

The device selects the measurement range automatically. The measurement reading can be retained in memory by pressing the HOLD-button. The housing is built according to protection standard IP 50.



1000 V AC/DC	20 A AC/DC
32 M $\Omega$	Hz
$\mu$ F	$^{\circ}$ C $^{\circ}$ F
TRUE RMS	RS-232
	SOFTWARE
LCD	CAT II 1000V

BENNING DIGIPOL  
item no. 050174



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)

#### Technical Data

indication:	3 1/2 digit LC display (3200 pixels) with 32 segment bar graph display and neon lamp
<b>DC voltage:</b>	326.0 mV/3.260 V/32.60 V/ 326.0 V/1000 V
resolution/accuracy:	max. 0.1 mV/max. $\pm$ 0.5 % + 2 digit
<b>AC voltage:</b>	326.0 mV/3.260 V/32.60 V/ 326.0 V/1000 V
resolution/accuracy:	max. 0.1 mV/max. $\pm$ 1 % + 3 digit
input impedance:	1 M $\Omega$ /approx. 370 k $\Omega$ (neon lamp ignited)
measuring method:	RMS value
over load protection:	1000 V effective
<b>resistance:</b>	3.260 M $\Omega$ /32.60 M $\Omega$ /326.0 $\Omega$ / 3.260 k $\Omega$ /32.60 k $\Omega$ /326.0 k $\Omega$
resolution/accuracy:	max. 0.1 m $\Omega$ / $\pm$ 1.5 % + 3 digit
range switching:	auto ranging
function of hold button:	measuring data storage, energizing the device
operating temperature range:	0 $^{\circ}$ C to + 45 $^{\circ}$ C
max. permissible operating time (ED)	up to 550 V AC/DC permanent operation from 550 V AC/DC: max. 1 minute
protection class:	IP 50
over voltage category:	CAT II 1000 V
battery type:	2 micro-batteries 1.5 V IEC/LR03/AAA One set of batteries is included in delivery.

further accessories of your choice: see page 42

accessories:  
tester case  
item no. 010910

# Digital Multimeter **BENNING MM 1**

## handy and compact

### Digital Multimeter with automatic and manual ranging

#### **BENNING MM 1**

The digital **BENNING MM 1** is a robust service device with a 3½ digit LC display for the quick fault search in the test field.

The **BENNING MM 1** contains DC and AC voltage ranges up to 600 V, AC current ranges up to 3.2 mA and resistance ranges up to 32 MΩ as well. The **BENNING MM 1** has got an automatic range selection function, in which the range in demand can also be chosen manually with the RANGE button.

An acoustic continuity test detects resistance values less than 20 Ω and the diode test makes it possible to test semiconductor components.

The measuring data can be stored with the HOLD button. The **BENNING MM 1** also contains a battery low voltage indication and an automatic auto-shut off function when not in use (approx. 10 min.).

The included protective rubber holster protects the Digital Multimeter against mechanical stress. In addition, all the ranges are electronically protected against overload.



#### Technical Data

display:	3½ digit LC display (3200 pixels) with 30 segment bar graph display
<b>DC voltage:</b>	320 mV/3.2 V/32 V/320 V/600 V
resolution/accuracy:	max. 0.1 mV/max. ± 0.5 % + 2 digit
<b>AC voltage:</b>	3.2 V/32 V/320 V/600 V
resolution/accuracy:	max. 1 mV/max. ± 1.5 % + 5 digit
measuring method:	RMS value
<b>DC current:</b>	320 μA/3200 μA
resolution/accuracy:	max. 0.1 μA/max. ± 1.0 % + 2 digit
<b>resistance:</b>	320 Ω/3.2 kΩ/32 kΩ/320 kΩ/3.2 MΩ/32 MΩ
resolution/accuracy:	max. 0.1 Ω/max. ± 0.8 % + 2 digit
<b>continuity test:</b>	20 Ω, acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
over voltage protection:	600 V effective
range switching:	auto ranging/manual ranging
over voltage category:	CAT III 600 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	165 x 80 x 36 mm
weight:	310 g
battery type:	2 micro-batteries 1.5 V IEC/LR03/AAA
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag enclosed in delivery

**BENNING MM 1**  
item no. **044027**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



## Digital Multimeter **BENNING MM 2** Technology that inspires

### Digital Multimeter with manual ranging **BENNING MM 2**

The **BENNING MM 2** offers all advantages of a Digital multimeter with manual measuring range selection such as fast response time due to the manually selectable measuring ranges and easy handling due to color-marked measuring ranges.

The device is provided with DC and AC voltage ranges of up to 1000 V<sub>DC</sub>/750 V<sub>AC</sub> as well as with DC and AC current ranges of up to 20 A. Further measuring functions are resistance measuring up to 20 MΩ as well as an acoustic continuity and diode test.

The **BENNING MM 2** has an automatic switch-off function when not in use (approx. 30 min.) and a battery low voltage indication as well.

The included protective rubber holster makes it possible to use it under roughest environmental conditions. The measuring ranges of the **BENNING MM 2** are protected against overload.

#### Technical Data

display:	3 1/2 digit LC display (1999 pixels)
<b>DC voltage:</b>	200 mV/2 V/20 V/200 V/1000 V
resolution/accuracy:	max. 0.1 mV/max. ± 0.5 % + 2 digit
<b>AC voltage:</b>	200 mV/2 V/20 V/200 V/750 V
resolution/accuracy:	max. 0.1 mV/max. ± 1.3 % + 5 digit
measuring method:	RMS value
<b>DC current:</b>	200 µA/2 mA/20 mA/200 mA/20 A
resolution/accuracy:	max. 0.1 µA/max. ± 1.0 % + 2 digit
over voltage protection:	1 A, 16 A (500 V) fuse, fast
<b>AC current:</b>	200 µA/2 mA/20 mA/200 mA/20 A
resolution/accuracy:	max. 0.1 µA/max. ± 1.5 % + 3 digit
over voltage protection:	1 A, 16 A (500 V) fuse, fast
measuring method:	RMS value
<b>resistance:</b>	200 Ω/2 kΩ/20 kΩ/200 kΩ/ 2 MΩ/20 MΩ
resolution/accuracy:	max. 0.1 Ω/max. ± 0.75 % + 2 digit
continuity test:	50 Ω, acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
over voltage protection:	750 V effective resp. 500 V effective
range switching:	manual ranging
over voltage category:	CAT III 600 V, CAT II 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	192 x 95 x 50 mm
weight:	550 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, battery, double insulated safety test leads

further accessories of your choice: see page 42

750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

20 A<sub>AC/DC</sub>

20 MΩ

Hz

µF

°C  
°F

TRUE  
RMS

RS-232

SOFTWARE

LCD  
CAT III  
600 V

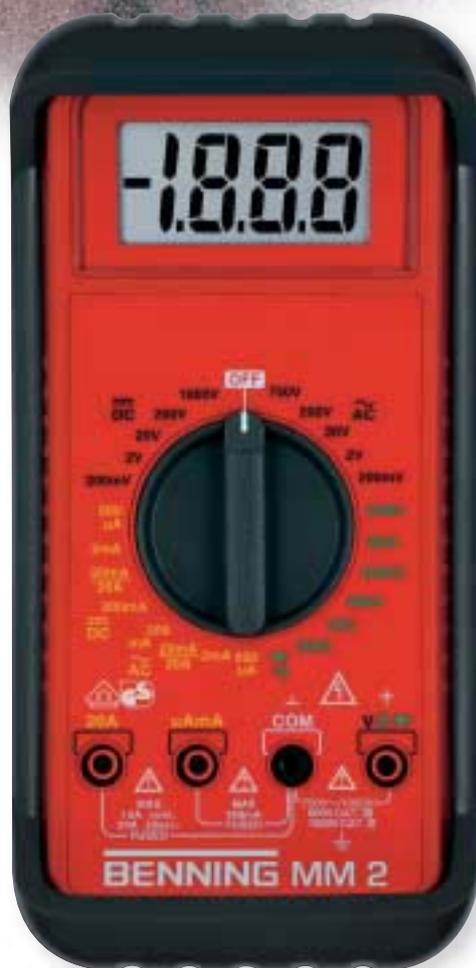
compact protective bag  
enclosed in delivery

**BENNING MM 2**

item no. **044028**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



# Digital Multimeter BENNING MM 3

## Quality that convinces

### Digital Multimeter with manual ranging and capacity and frequency range

#### BENNING MM 3

The *BENNING MM 3* offers all advantages of a Digital multimeter with manual measuring range selection. The color-marked measuring ranges are selected manually and allow a fast response time of the Multimeter.

The device has DC and AC voltage ranges up to 600 V, DC and AC current ranges up to 20 A, resistance measurements up to 20 M $\Omega$  as well as continuity- and diode test. Additional three capacity- (2 nF - 200  $\mu$ F) and six frequency ranges (2 kHz - 200 kHz) are available.

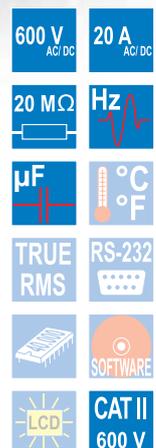
The *BENNING MM 3* has an automatic switch-off function when not in use (approx. 30 min.) and a battery low voltage indication as well.

The included protective rubber holster makes it possible to use it under roughest environmental conditions. The measuring ranges of the *BENNING MM 3* are protected against overload.

#### Technical Data

display:	3 1/2 digit LC display (1999 pixels)
<b>DC voltage:</b>	200 mV/2 V/20 V/200 V/600 V
resolution/accuracy:	max. 0.1 mV/max. $\pm 0.5\%$ + 2 digit
<b>AC voltage:</b>	200 mV/2 V/20 V/200 V/600 V
resolution/accuracy:	max. 0.1 mV/max. $\pm 1.3\%$ + 5 digit
measuring method:	RMS value
<b>DC current:</b>	200 $\mu$ A/2 mA/20 mA/200 mA/20 A
resolution/accuracy:	max. 0.1 $\mu$ A/max. $\pm 1.0\%$ + 2 digit
over voltage protection:	1 A, 16 A (500 V) fuse, fast
<b>AC current:</b>	200 $\mu$ A/2 mA/20 mA/200 mA/20 A
resolution/accuracy:	max. 0.1 $\mu$ A/max. $\pm 1.5\%$ + 3 digit
over voltage protection:	1 A, 16 A (500 V) fuse, fast
measuring method:	RMS value
<b>resistance:</b>	200 $\Omega$ /2 k $\Omega$ /20 k $\Omega$ /200 k $\Omega$ / 2 M $\Omega$ /20 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm 0.8\%$ + 2 digit
<b>continuity test:</b>	50 $\Omega$ , acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
<b>capacity:</b>	2 nF/20 nF/200 nF/2 $\mu$ F/20 $\mu$ F/200 $\mu$ F
resolution/accuracy:	max. 1 pF/max. $\pm 2.0\%$ + 4 digit
<b>frequency:</b>	2 kHz/20 kHz/200 kHz
resolution/accuracy:	1 Hz/max. $\pm 1.0\%$ + 3 digit
over voltage protection:	600 V effective
range switching:	manual ranging
over voltage category:	CAT III 300 V, CAT II 600 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	192 x 95 x 50 mm
weight:	550 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, battery, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag enclosed in delivery

BENNING MM 3  
item no. 044029



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



## Digital Multimeter **BENNING MM 4** The quick-change artist

### Digital Multimeter with AC Current clamp transducer **BENNING MM 4**

The **BENNING MM 4** consists of a separate Digital Multimeter with DC and AC voltage ranges up to 600 V, resistance ranges up to 42 M $\Omega$  and offers the possibility of an acoustic continuity- and diode test.

The plug-in AC current clamp transducer makes it possible to measure AC current securely up to 300 A. The measuring value is indicated directly in A (ampere).

Because of the one-hand operation and the solid construction, the **BENNING MM 4** is an all-purpose service instrument.

The 3<sup>3</sup>/<sub>4</sub> digit LCD display has got a maximum reading of 4200 segments. The **BENNING MM 4** has an automatic switch-off function when not in use (approx. 30 min.), a battery low voltage indication, measuring data storage (HOLD) and a relative function (REL) for differential measurement. The measuring ranges are electronically protected against overload.



600 V  
AC/DC

300 A  
AC

42 M $\Omega$

Hz

$\mu$ F

$^{\circ}$ C  
 $^{\circ}$ F

TRUE  
RMS

RS-232

SOFTWARE

LCD  
CAT II  
600 V

compact protective bag  
enclosed in delivery

**BENNING MM 4**

item no. **044073**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)

### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4200 pixels)
<b>DC voltage:</b>	4.2 V/42 V/420 V/600 V
resolution/accuracy:	max. 1 mV/max. $\pm$ 0.5 % + 2 digit
<b>AC voltage:</b>	4.2 V/42 V/420 V/600 V
resolution/accuracy:	max. 1 mV/max. $\pm$ 1.5 % + 5 digit
measuring method:	RMS value
<b>AC current:</b>	300 A (direct indication, A)
resolution/accuracy:	max. 0.1 A/max. $\pm$ 1.5 % + 5 digit
measuring method:	RMS value
<b>resistance:</b>	420 $\Omega$ /4.2 k $\Omega$ /42 k $\Omega$ /420 k $\Omega$ / 4.2 M $\Omega$ /42 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm$ 0.9 % + 4 digit
<b>continuity test:</b>	50 $\Omega$ , acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
Overvoltage protection:	600 V effective
over voltage category:	CAT II 600 V
maximum jaw opening:	30 mm
operation temperature:	0 $^{\circ}$ C to + 50 $^{\circ}$ C
dimensions (l x w x h):	225 x 77 x 35 mm
weight:	230 g
battery type:	2 micro batteries 1.5 V IEC LR03/AAA
<b>delivery includes:</b>	multimeter, adapter for AC current transducer, carrying case, set of batteries, double insulated test leads, insulated test clips

further accessories of your choice: see page 42

# Digital Multimeter **BENNING MM 5**

## Reliable and precise in each and every situation

### Digital Multimeter **BENNING MM 5**

The digital **BENNING MM 5** is an ergonomic built digital hand Multimeter designed for highly technical requirements. The slim structural shape enhances the grip of the unit, thus making it easier for the user to operate. The 3<sup>3</sup>/<sub>4</sub> digit LC display offers a resolution of 3400 pixels and an analogue 70 segment bar graph display.

Apart from the standard test measurements of voltage up to (750 V<sub>AC</sub>/1000 V<sub>DC</sub>), current up to (10 A<sub>AC/DC</sub>), resistance up to 30 MΩ, as well as continuity and diode testing, the **BENNING MM 5** can also indicate frequency up to 30 MHz and rev counts up to 300 MRPM.

The **BENNING MM 5** has got an automatic range selection function in which the range is demand can also be chosen manually with the RANGE button. The Hz button offers the option of a direct frequency measurement of the alternating voltage and current range.

The measuring data can be stored with the HOLD button. The over voltage category 600 V CAT III/1000 V CAT II makes it possible to use the Digital Multimeter in other industrial application ranges ensuring higher safety.



### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC Display (3400 pixels) with 70 segment bar graph display
<b>DC voltage:</b>	300 mV, 3 V, 30 V, 300 V, 1000 V
resolution/accuracy:	max. 100 µV/max. ± 0.25 % + 1 digit
<b>AC voltage:</b>	3 V, 30 V, 300 V, 750 V
resolution/accuracy:	max. 1 mV/max. ± 1.3 % + 5 digit
measuring method:	RMS value
<b>DC current:</b>	30 mA, 300 mA, 10 A
resolution/accuracy:	max. 10 µA/max. ± 1.5 % + 2 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
<b>AC current:</b>	30 mA, 300 mA, 10 A
resolution/accuracy:	max. 10 µA/max. ± 2 % + 5 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
measuring method:	RMS value
<b>resistance:</b>	300 Ω, 3 kΩ, 30 kΩ, 300 kΩ, 3 MΩ, 30 MΩ
resolution/accuracy:	max. 0.1 Ω/max. ± 0.7 % + 3 digit
<b>continuity test:</b>	30 Ω, acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
<b>frequency:</b>	3 kHz, 30 kHz, 300 kHz, 3 MHz, 30 MHz
resolution/accuracy:	max. 1 Hz/max. ± 0.01 % + 1 digit
<b>rev:</b>	30 kRPM, 300 kRPM, 3 MRPM, 30 MRPM, 300 MRPM
resolution/accuracy:	max. 30 RPM/max. ± 0.01 % + 10 digit
conversion factor:	RPM (rotations per minute) = frequency x 60
over voltage protection:	750 V effective resp. 600 V effective
range switching:	autoranging/manual ranging
over voltage category:	CAT III 600 V, CAT II 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	188 x 94 x 40 mm
weight:	440 g
battery type:	2 micro batteries 1.5 V IEC LR03/AAA
<b>delivery includes:</b>	Multimeter, protective rubber holster, carrying case, battery, double insulated safety test leads, magnetic hanging kit

further accessories of your choice: see page 42



750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

10 A<sub>AC/DC</sub>

30 MΩ

Hz

µF

°C  
°F

TRUE  
RMS

RS-232

LCD

SOFTWARE

CAT III  
600 V

CAT III  
600 V

compact protective bag  
enclosed in delivery

magnetic holder  
enclosed in delivery

**BENNING MM 5**  
item no. **044074**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



## Digital Multimeter BENNING MM 6 for reproducible measuring results

### Digital Multimeter with True RMS Reading BENNING MM 6

Industrial applications are continually placing higher demands on the measuring equipment. A clear sinus curve can be expected in the smallest application fields.

In order to alleviate test errors with non-sinus curve or non-linear curves, the test value of the *BENNING MM 6* is determined by the true RMS reading. Independent from the outline of the curve an exact measurement is possible.

The 3<sup>3</sup>/<sub>4</sub> digit LC display offers a resolution of 4000 pixels and an analogue 82 segment bar graph display. Apart from the standard test measurements of voltage (750 V<sub>AC</sub>/1000 V<sub>DC</sub>), current (10 A<sub>AC/DC</sub>), resistance (40 M $\Omega$ ), as well as continuity and diode testing, the *BENNING MM 6* can also indicate frequency (40 MHz), rev counts (400 MRPM) and capacitance measuring range (40 mF).

The Hz button offers the option of a direct frequency measurement of the alternating voltage and current range. The measuring data can be stored with the HOLD button.

The over voltage category 600 V CAT III/1000 V CAT II makes it possible to use the Digital Multimeter in other industrial application ranges ensuring higher safety.



750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

10 A<sub>AC/DC</sub>

40 M $\Omega$

Hz

mF

°C  
°F

TRUE RMS

RS-232

SOFTWARE

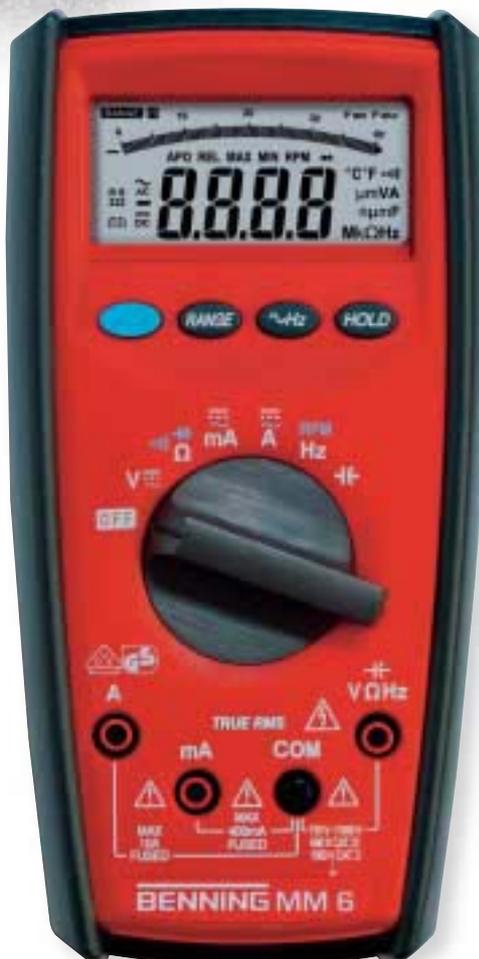
LCD

CAT III  
600 V

compact protective bag  
enclosed in delivery

magnetic holder  
enclosed in delivery

BENNING MM 6  
item no. 044075



### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4000 pixels) with 82 segment bar graph display
<b>DC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 1000 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm$ 0.25 % + 1 digit
<b>AC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 750 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm$ 1.3 % + 5 digit
measuring method:	True RMS value
<b>DC current:</b>	40 mA, 400 mA, 10 A
resolution/accuracy:	max. 10 $\mu$ A/max. $\pm$ 0.7 % + 2 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
<b>AC current:</b>	40 mA, 400 mA, 10 A
resolution/accuracy:	max. 10 $\mu$ A/max. $\pm$ 2 % + 5 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
measuring method:	True RMS value
<b>resistance:</b>	400 $\Omega$ , 4 k $\Omega$ , 40 k $\Omega$ , 400 k $\Omega$ , 4 M $\Omega$ , 40 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm$ 0.4 % + 3 digit
<b>continuity test:</b>	30 $\Omega$ , acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
<b>frequency:</b>	4 kHz, 40 kHz, 400 kHz, 4 MHz, 40 MHz
resolution/accuracy:	max. 1 Hz/max. $\pm$ 0.01 % + 1 digit
<b>rev:</b>	40 kRPM, 400 kRPM, 4 MRPM, 40 MRPM, 400 MRPM
resolution/accuracy:	max. 10 RPM/max. $\pm$ 0.01 % + 10 digit
conversion factor:	RPM (rotations per minute) = frequency x 60
capacity:	4 nF, 40 nF, 400 nF, 4 $\mu$ F, 40 $\mu$ F, 400 $\mu$ F, 4 mF, 40 mF
resolution/accuracy:	max. 1 pF/max. $\pm$ 2.0 % + 5 digit
over voltage protection:	750 V effective resp. 600 V effective
range switching:	autoranging/manual ranging
over voltage category:	CAT III 600 V, CAT II 1000 V
operation temperature:	0 °C to +50 °C
dimensions (l x w x h):	188 x 94 x 40 mm
weight:	440 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, battery, double insulated safety test leads, magnetic hanging kit

further accessories of your choice: see page 42



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)

# Digital Multimeter **BENNING MM 7** for industrial applications

## Digital Multimeter with temperature measuring range and True RMS Reading

### **BENNING MM 7**

In order to alleviate test errors with non-sinus curve or non-linear curves, the test value of the **BENNING MM 7** is determined by the true RMS reading. Independent from the outline of the curve an exact measurement is possible. The 3<sup>3</sup>/<sub>4</sub> digit LC display is lit up at the back and it offers a resolution of 4000 pixels as well as an analogue 82 segment bar graph display.

Apart from the standard test measurements of voltage (750 V<sub>AC</sub>/1000 V<sub>DC</sub>), current (10 A<sub>AC/DC</sub>), resistance (40 M $\Omega$ ), as well as continuity and diode testing, the **BENNING MM 7** can also indicate frequency (40 MHz), rev counts (400 MRPM) as well as capacitance (40 mF) and temperature measuring range (800 °C/1472 °F).

Furthermore the **BENNING MM 7** has important additional functions such as REL measurement (differential measurement), PEAK measurement (peak value storage) and a MIN/MAX measurement (minimum and maximum value storage). The measuring data can be stored with the HOLD button. The over voltage category 600 V CAT III/1000 V CAT II makes it possible to use the Digital Multimeter in other industrial application ranges ensuring higher safety.



### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4000 pixels) with 82 segment bar graph display
<b>DC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 1000 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm$ 0.25 % + 1 digit
<b>AC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 750 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm$ 1.3 % + 5 digit
measuring method:	True RMS value
<b>DC current:</b>	40 mA, 400 mA, 10 A
resolution/accuracy:	max. 10 $\mu$ A/max. $\pm$ 0.6 % + 2 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
<b>AC current:</b>	40 mA, 400 mA, 10 A
resolution/accuracy:	max. 10 $\mu$ A/max. $\pm$ 2 % + 5 digit
over voltage protection:	1 A, 10 A (500 V) fuse, fast
measuring method:	True RMS value
<b>resistance:</b>	400 $\Omega$ , 4/40/400 k $\Omega$ , 4/40 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm$ 0.4 % + 3 digit
<b>continuity test:</b>	30 $\Omega$ , acoustic: buzzer, optic: LCD
<b>diode test:</b>	1.5 mA
<b>frequency:</b>	4 kHz, 40 kHz, 400 kHz, 4MHz, 40 MHz
resolution/accuracy:	max. 1 Hz/max. $\pm$ 0.01 % + 1 digit
<b>rev:</b>	40/400 kRPM, 4/40/40/400 MRPM
resolution/accuracy:	max. 10 RPM/max. $\pm$ 0.01 % + 10 digit
conversion factor:	RPM (rotations per minute) = frequency x 60
<b>capacity:</b>	4/40/400 nF, 4/40/400 $\mu$ F, 4/40 mF
resolution/accuracy:	max. 1 pF/max. $\pm$ 2.0 % + 5 digit
<b>temperature:</b>	- 20 °C up to + 800 °C
resolution/accuracy:	max. 1 °C/max. $\pm$ 1.0 % + 3 °C
over voltage protection:	750 V effective resp. 600 V effective
range switching:	autoranging/manual ranging
over voltage category:	CAT III 600 V, CAT II 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	188 x 94 x 40 mm
weight:	440 g
battery type:	9 V battery IEC 6LR61

**delivery includes:** multimeter, protective rubber holster, carrying case, battery, double insulated safety test leads, magnetic hanging kit, temperature sensor type K (wire length approx. 100 cm) with adapter further accessories of your choice: see page 42



compact protective bag enclosed in delivery

magnetic holder enclosed in delivery

**BENNING MM 7**  
item no. **044076**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



# Digital Multimeter **BENNING MM 8**

## Highest safety due to measuring category IV

**CAT IV**

### Digital Multimeter of measuring category IV **BENNING MM 8**

The Digital Multimeter **BENNING MM 8** is particularly compact and handy. Simultaneously, the demands on electrical safety (CAT IV) could be additionally increased.

The Digital Multimeter **BENNING MM 8** shows the highest measuring category IV for measuring instruments according to the standard IEC 61010-1 and allows measuring at the source of low-voltage installations such as e.g. measuring at the main distribution, the meter and the primary overvoltage protection.

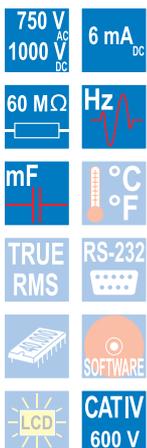
The 3<sup>5</sup>/<sub>6</sub> digit LC display with a measuring value indication of 16 mm allows easy reading of the measuring results for voltage (600 V<sub>AC/DC</sub>), current (6 mA<sub>DC</sub>), resistance (60 MΩ), capacity (6 mF) and frequency (60 MHz).

The device is equipped with an automatic/manual measuring range selection and with important additional functions for the storage of measuring values (HOLD), maximum values (MAX) and minimum values (MIN).

### Technical Data

display:	3 <sup>5</sup> / <sub>6</sub> digit LC display (6000 pixels)
<b>DC voltage:</b>	600 mV/6 V/60 V/600 V/1000 V
resolution/accuracy:	max. 100 µV/max. ± 0.5 % ± 2 digit
<b>AC voltage:</b>	600 mV/6 V/60 V/600 V/750 V
resolution/accuracy:	max. 100 µV/max. ± 0.5 % ± 2 digit
measuring method:	RMS value
<b>DC current:</b>	0.6 mA, 6 mA
resolution/accuracy:	max. 0.1 µA/max. ± 1.0 % ± 2 digit
<b>resistance:</b>	600 Ω/6 kΩ/60 kΩ/600 kΩ/6 MΩ/60 MΩ
resolution/accuracy:	max. 0.1 Ω/max. ± 0.7 % ± 2 digit
<b>continuity test:</b>	100 Ω, acoustic: buzzer, optical: LCD
<b>diode test:</b>	1.5 mA
<b>capacity:</b>	6 nF, 60 nF, 600 nF, 6 µF, 60 µF, 600 µF, 6 mF
resolution/accuracy:	max. 1 pV/max. ± 1.9 % ± 8 digit
<b>frequency:</b>	6 kHz, 60 kHz, 600 kHz, 6 MHz, 60 MHz
resolution/accuracy:	max. 1 Hz/max. ± 0.01 % ± 1 digit
over voltage protection:	750 V effective resp. 600 V effective
range switching:	auto ranging/manual ranging
over voltage category:	CAT IV 600 V, CAT III 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	164 x 82 x 44 mm
weight:	340 g
battery type:	2 micro-batteries 1.5 V IEC/LR03/AAA
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag enclosed in delivery

**BENNING MM 8**  
item no. **044077**



# Digital Multimeter **BENNING MM 9**

## Safety inspires confidence

### Digital Multimeter of measuring category IV and TRUE RMS measuring method

#### **BENNING MM 9**

The Digital Multimeter **BENNING MM 9** offers the highest degree of device and user safety due to the highest measuring category IV for measuring instruments according to the standard IEC 61010-1. Devices of measuring category IV allows measuring at the source of low-voltage installations such as e.g. measuring at the main distribution, the meter and the primary overvoltage protection.

The TRUE RMS measuring method guarantees a precise measuring result even in case of non-sinusoidal signal forms.

The 3<sup>5</sup>/<sub>6</sub> digit LC display with a measuring value indication of 16 mm allows easy reading of the measuring results for voltage (600 V<sub>AC/DC</sub>), current (10 A<sub>AC/DC</sub>), resistance (60 M $\Omega$ ), capacity (6 mF) and frequency (60 MHz).

The device is equipped with an automatic/manual measuring range selection and with important additional functions for the storage of measuring values (HOLD), maximum values (MAX) and minimum values (MIN).

**CAT IV**


#### Technical Data

display:	3 <sup>5</sup> / <sub>6</sub> digit LC display (6000 pixels)
<b>DC voltage:</b>	600 mV/6 V/60 V/600 V/1000 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm 0.5\% \pm 2$ digit
<b>AC voltage:</b>	600 mV/6 V/60 V/600 V/750 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm 0.5\% \pm 2$ digit
measuring method:	True RMS value
<b>DC current:</b>	0.6 mA, 6 mA, 6 A, 10 A
resolution/accuracy:	max. 0.1 $\mu$ A/max. $\pm 1.0\% \pm 2$ digit
over voltage protection:	10 A (500 V) fuse, fast
<b>AC current:</b>	6 A, 10 A
resolution/accuracy:	max. 1 mA/max. $\pm 1.0\% \pm 5$ digit
over voltage protection:	10 A (500 V) fuse, fast
measuring method:	True RMS value
<b>resistance:</b>	600 $\Omega$ /6 k $\Omega$ /60 k $\Omega$ /600 k $\Omega$ /6 M $\Omega$ /60 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm 0.7\% \pm 2$ digit
<b>continuity test:</b>	100 $\Omega$ , acoustic: buzzer, optical: LCD
<b>diode test:</b>	1.5 mA
<b>capacity:</b>	6 nF, 60 nF, 600 nF, 6 $\mu$ F, 60 $\mu$ F, 600 $\mu$ F, 6 mF
resolution/accuracy:	max. 1 pF/max. $\pm 1.9\% \pm 8$ digit
<b>frequency:</b>	6 kHz, 60 kHz, 600 kHz, 6 MHz, 60 MHz
resolution/accuracy:	max. 1 Hz/max. $\pm 0.01\% \pm 1$ digit
over voltage protection:	750 V effective resp. 600 V effective
range switching:	auto ranging/manual ranging
over voltage category:	CAT IV 600 V, CAT III 1000 V
operation temperature:	0 $^{\circ}$ C to + 50 $^{\circ}$ C
dimensions (l x w x h):	164 x 82 x 44 mm
weight:	365 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag enclosed in delivery

**BENNING MM 9**  
item no. **044078**



# Digital Multimeter **BENNING MM 10**

## Technical perfection

### Digital Multimeter with RS 232 interface, PC software and TRUE RMS measuring method **BENNING MM 10**

The **BENNING MM 10** is a Digital Multimeter with optical RS 232 infrared interface, **BENNING PC-Win MM 10** software and highest demands on electrical safety.

The device belongs to the highest measuring category IV for measuring instruments according to the standard IEC 61010-1 and

# CAT IV

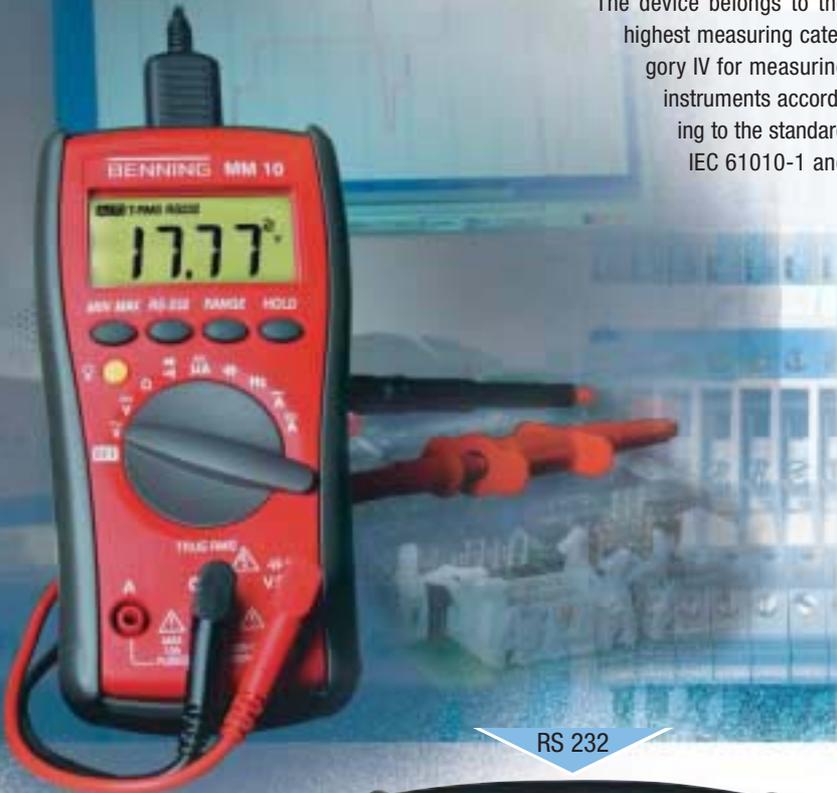
allows measuring at the source of low-voltage installations such as e.g. measuring at the main distribution, the meter and the primary overvoltage protection.

The 3<sup>5</sup>/<sub>6</sub> digit LC display with a measuring value indication of 16 mm allows easy reading of the measuring results for voltage (600 V<sub>AC/DC</sub>), current (10 V<sub>AC/DC</sub>), resistance (60 M $\Omega$ ), capacity (6 mF) and frequency (60 MHz). In case of dark light conditions, a display lighting (symbol lamp) can be connected for easier reading.

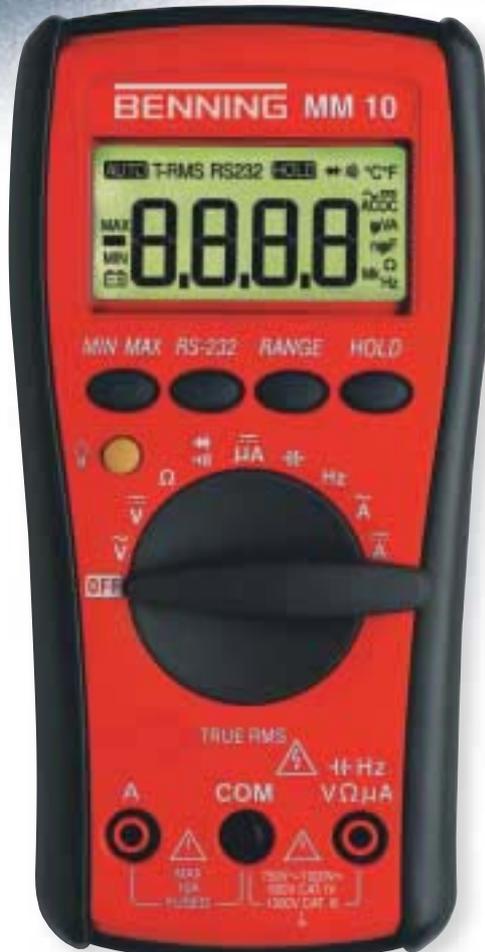
If the signal behavior is not totally sinusoidal, it is recommended to use measuring instruments provided with the TRUE RMS measuring method only.

The **BENNING MM 10** detects the measuring values for current and voltage by means of the TRUE RMS measuring method by means of which even non-sinusoidal curve behavior can be detected correctly and precisely.

The device is equipped with an automatic/manual measuring range selection and with additional functions for the storage of measuring values (HOLD), maximum values (MAX) and minimum values (MIN).



RS 232



750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

10 A<sub>AC/DC</sub>

60 M $\Omega$   
Hz

mF  
°C  
°F

TRUE RMS  
RS-232

SOFTWARE

LCD  
CAT IV  
600 V

compact protective bag  
enclosed in delivery

**BENNING MM 10**  
item no. **044079**

### Technical Data

display:	3 <sup>5</sup> / <sub>6</sub> digit LC display (6000 pixels)
interface:	optical RS 232 interface
<b>DC voltage:</b>	600 mV/6 V/60 V/600 V/1000 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm 0.5\% \pm 2$ digit
<b>AC voltage:</b>	600 mV/6 V/60 V/600 V/750 V
resolution/accuracy:	max. 100 $\mu$ V/max. $\pm 0.5\% \pm 2$ digit
measuring method:	True RMS value
<b>DC current:</b>	0.6 mA, 6 mA, 6 A, 10 A
resolution/accuracy:	max. 0.1 $\mu$ A/max. $\pm 1.0\% \pm 2$ digit
over voltage protection:	10 A (500 V) fuse, fast
<b>AC current:</b>	6 A, 10 A
resolution/accuracy:	max. 1 mA/max. $\pm 1.0\% \pm 5$ digit
over voltage protection:	10 A (500 V) fuse, fast
measuring method:	True RMS value
<b>resistance:</b>	600 $\Omega$ /6 k $\Omega$ /60 k $\Omega$ /600 k $\Omega$ /6 M $\Omega$ /60 M $\Omega$
resolution/accuracy:	max. 0.1 $\Omega$ /max. $\pm 0.7\% \pm 2$ digit
<b>continuity test:</b>	100 $\Omega$ , acoustic: buzzer, optical: LCD
<b>diode test:</b>	1.5 mA
<b>capacity:</b>	6 nF, 60 nF, 600 nF, 6 $\mu$ F, 60 $\mu$ F, 600 $\mu$ F, 6 mF
resolution/accuracy:	max. 1 pF/max. $\pm 1.9\% \pm 8$ digit
<b>frequency:</b>	6 kHz, 60 kHz, 600 kHz, 6 MHz, 60 MHz
resolution/accuracy:	max. 1 Hz/max. $\pm 0.01\% \pm 1$ digit
over voltage protection:	750 V effective resp. 600 V effective
range switching:	auto ranging/manual ranging
over voltage category:	CAT IV 600 V, CAT III 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	164 x 82 x 44 mm
weight:	365 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, set of batteries, double insulated safety test leads, software <b>BENNING PC-Win MM 10</b> on CD ROM, RS 232 cable with optical infrared adapter

further accessories of your choice: see page 42

## Measuring data acquisition at the most progressive level

### Measuring data acquisition by means of PC/laptop

(running under Windows® '98/ME/NT 4.0/2000/XP)

The *BENNING MM 10* is equipped with an integrated RS 232 interface at its front which can be activated by means of the RS 232 key. The measuring values acquired by the *BENNING MM 10* can be transmitted "on-line" to a PC or laptop.

The transmission of the measuring values is made via a RS 232 cable with optical coupling in order to ensure galvanic separation between the PC/laptop and the measuring signal. Delivery of the *BENNING MM 10* includes the protocol and analysis software *BENNING PC-Win MM 10* and a RS 232 interface cable.

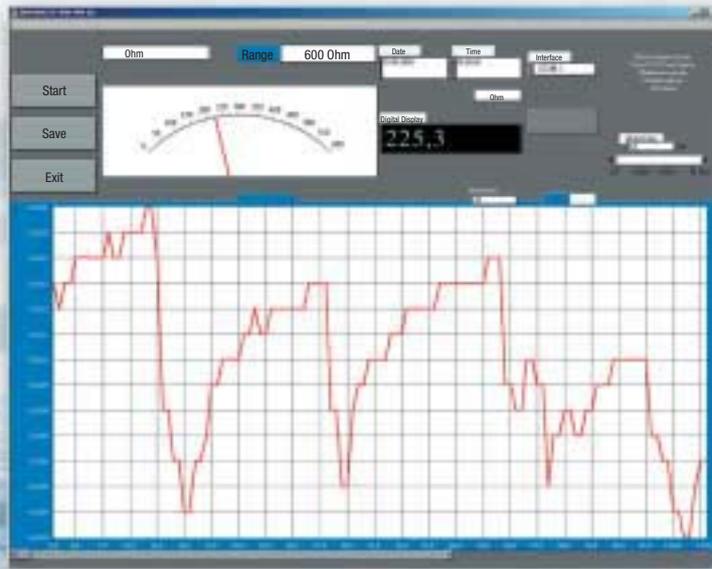


fig.: software  
*BENNING PC-Win  
MM 10*

### Protocol and analysis software

#### *BENNING PC-Win MM 10*

The software *BENNING PC-Win MM 10* is intended for the visual presentation of the measuring values detected by the Digital Multimeter *BENNING MM 10* on PC or laptop. The software allows the detection, presentation and analysis of measuring series of up to 4000 measuring values.

Besides the recording of time, date and measuring range, the presentation of the measuring values is clearly arranged and is available in digital and analogue form.

The scanning rate (duration of two successive measurements) can be set in an interval between 0.5 seconds to 10 minutes and allows long-term measuring of up to 11 hours. A clearly arranged line diagram allows representation of the curve behavior and easy recognition of measuring trends.

The recorded measuring series can be stored in MS Excel® files or text files for logging and further processing.

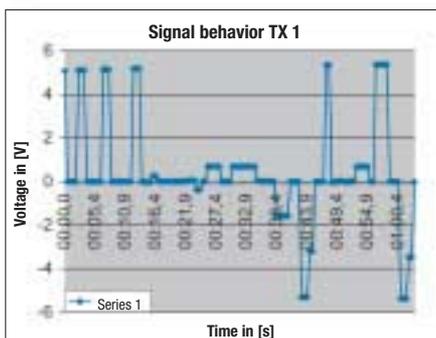


fig.: further processing in MS Excel®





## Digital Multimeter **BENNING MM 11** A top-class measuring instrument

**Precision Digital Multimeter with TRUE RMS measuring method, RS 232 interface, memory, data logger and PC software**  
**BENNING MM 11**

The **BENNING MM 11** is a multi-functional, high-performance Digital Multimeter with integrated RS 232 interface for all demanding measuring tasks.

The device is equipped with an integrated measuring value memory with 1000 storage locations and a data-log function with 40000 storage locations for long-term measuring.

The scanning rate (duration of two successive measurements) can be set in an interval between 0.5 seconds to 10 minutes.

Memory and data logger can be read directly on site at the Digital Multimeter or via the RS 232 interface.

The 4 1/2 digit, illuminated double LC display with a measuring value indication of 13 mm is provided with a maximum indicating range of 20000 dots.

Besides the basic measuring functions for voltage (600 V<sub>AC/DC</sub>), current (10 A<sub>AC/DC</sub>), resistance (60 MΩ), capacity (6 mF) and frequency (60 MHz), the **BENNING MM 11** is equipped with additional functions for pulse-duty factor (20 - 80 %), temperature (- 200 °C up to + 1200 °C) and level measuring in dB (- 80 dB up to + 50 dB).

The measuring values for voltage and current are detected by means of the TRUE RMS measuring method (AC, AC+DC). Thus, even non-sinusoidal curve behavior can be detected correctly and precisely.

The **BENNING MM 11** is one of the best Multimeters of its class due to its functions concerning peak value (PEAK), measuring value (HOLD), maximum/minimum/average value storage (MAX/MIN/A) and relative measuring (REL).

RS 232

750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

10 A<sub>AC/DC</sub>

2 GΩ  
Hz

mF  
°C  
°F

TRUE RMS  
RS-232

SOFTWARE

LCD  
CAT III  
600 V

compact protective bag enclosed in delivery

magnetic holder enclosed in delivery

**BENNING MM 11**  
item no. 044080



### Technical Data

display:	4 1/2 digit LC display (20000/40000 pixels)
interface:	optical RS 232 interface
memory/data log function:	1000/4000 memory locations
<b>DC voltage:</b>	20 mV/200 mV/2 V/20 V/200 V/1000 V
resolution/accuracy:	max. 1 μV/max. ± 0.06 % + 10 digit
<b>AC voltage:</b>	20 mV/200 mV/2 V/20 V/200 V/750 V
resolution/accuracy:	max. 1 μV/max. ± 0.7 % + 50 digit
measuring method:	True RMS value (AC, AC+DC)
<b>DC current:</b>	20 mA, 200 mA, 2 A, 10 A
resolution/accuracy:	max. 1 μA/max. ± 0.2 % + 40 digit
over voltage protection:	1 A (10kA), 15 A (100kA), (600V) fuse, fast
<b>AC current:</b>	20 mA, 200 mA, 2 A, 10 A
resolution/accuracy:	max. 1 μA/max. ± 0.8 % + 50 digit
over voltage protection:	1 A (10kA), 15 A (100kA), (600V) fuse, fast
measuring method:	True RMS value (AC, AC+DC)
<b>resistance:</b>	200 Ω, 2/20/200 kΩ, 2/20/200 MΩ, 2 GΩ
resolution/accuracy:	max. 10 mΩ/max. ± 0.3 % + 30 digit
continuity/diode test:	50 Ω/1.1 mA
<b>capacity:</b>	4/40/400 nF, 4/40/400 μF, 4/40 mF
resolution/accuracy:	max. 1 pV/max. ± 0.9 % + 5 digit
<b>frequency:</b>	20 Hz, 200 Hz, 2 kHz, 20 kHz, 200 kHz, 1 MHz
resolution/accuracy:	max. 0.01 Hz/max. ± 0.01 % + 10 digit
<b>pulse-duty factor:</b>	20 % up to 80 %
resolution/accuracy:	max. 0.1 %/max. ± 1 %
<b>temperature:</b>	- 20 °C up to + 1200 °C
resolution/accuracy:	max. 0.1 °C/± 0.1 % + 3 °C
<b>level in dB/dBm:</b>	- 80 dB to + 50 dB, - 15 dBm to + 55 dBm
over voltage protection:	750 V effective resp. 600 V effective
range switching:	auto ranging/manual ranging
over voltage category:	CAT III 600 V, CAT II 1000 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	212 x 100 x 55 mm
weight:	595 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	multimeter, protective rubber holster, carrying case, batteries, Wire temperature probe, safety test leads, magnetic hanging kit, <b>BENNING PC-Win MM 11</b> (CD ROM), RS 232 cable with optical infrared adapter
	further accessories of your choice: see page 42

# Monitoring, logging and analysis of signal behavior

## Measuring data acquisition by means of PC/laptop

The *BENNING MM 11* is equipped with an integrated RS 232 interface at its front for the transmission of measuring values to the PC or laptop. The transmission of the measuring values is made via an optical infrared interface in order to ensure galvanic separation between the PC/laptop and the measuring signal.

## Protocol and analysis software

### *BENNING PC-WIN MM 11*

The software *BENNING PC-Win MM 11* is intended for read-out, representation and processing of measuring data and consists of the program parts *BENNING PC-Win MM 11* "On-line" and *BENNING PC-Win MM 11* "Download".



fig.: software *BENNING PC-Win MM 11* "Online"

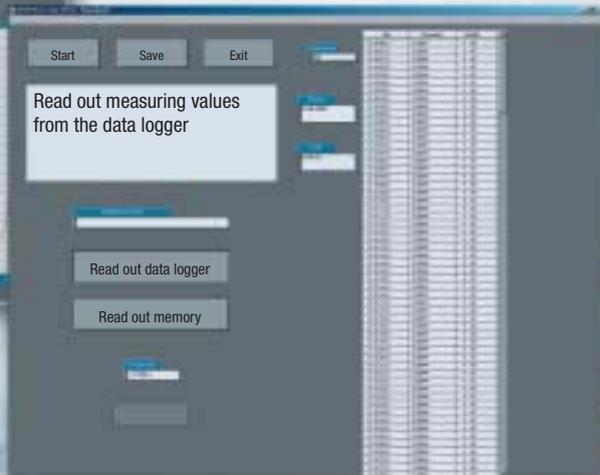


fig.: software *BENNING PC-Win MM 11* "Download"

### *BENNING PC-Win MM 11* "On-line"

The program allows the transmission of the measuring values indicated by means of the Digital Multimeter *BENNING MM 11* to the PC or laptop. The scanning rate (duration of two successive measurements) can be set in an interval between 0.5 seconds to 10 minutes.

Measuring series with up to 8000 measuring values including measuring range, time and date indication are represented in digital, analogue and tabular form. A clearly arranged line diagram allows representation of the curve behavior and easy recognition of measuring trends.

The recorded measuring series can be stored in MS Excel® files or text files for logging and further processing.

### *BENNING PC-Win MM 11* "Download"

The program allows read-out of the memory (1000 measuring values) or of the data logger (40000 measuring values) of the Digital Multimeter.

The measuring series including measuring value, measuring range and time indication are represented in tabular form. The measuring series read in via the memory or the data logger can be stored in MS Excel® files or text files for logging and further processing.

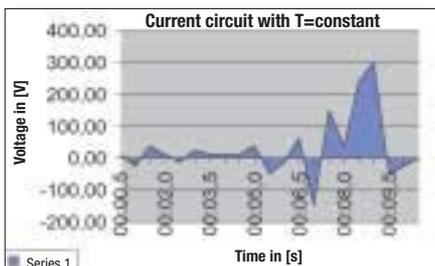


fig.: further processing in MS Excel®



*BENNING MM 11*: magnetic holder enclosed in delivery





# Digital Current Clamp Meter **BENNING CM 1**

## technical innovation

### Digital Current Clamp Meter with a Fork Clamp Head

#### **BENNING CM 1**

The innovative Digital Current Clamp Meter **BENNING CM 1** has a fork clamp head which measures a safe alternating current measurement up to 200 A.

The new technology makes it possible, by means of its thin structural form, to measure in almost inaccessible test fields by placing the measuring head over the conducted wire.

The 3½ digit LC display offers a resolution of 1999 pixels. The integrated instrument leads can be plugged into the back on the unit. They serve as a contact for direct current (DC) and alternating current (AC) up to 600 V, measure resistance up to 2000 Ω as well as an acoustic continuity check.

All the ranges are protected against overload. The measuring data can be stored with the HOLD button. The **BENNING CM 1** has a battery low voltage indication and an auto-shut off function when not in use (approx. 13 min.).

The over voltage category 600 V CAT III makes it possible to use the Digital Clamp Meter in other industrial application ranges ensuring higher safety.



600 V  
AC/DC

200 A  
AC

2 kΩ

Hz

TRUE  
RMS

LCD

CAT III  
600 V

compact protective bag  
enclosed in delivery

**BENNING CM 1**  
item no. **044034**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)

#### Technical Data

display: 3½ digit LC display (1999 pixels)

**DC voltage:** 600 V

resolution/accuracy: max. 1 V/max. ± 1.0 % + 2 digit

**AC voltage:** 600 V

resolution/accuracy: max. 1 V/max. ± 1.5 % + 3 digit

measuring method: RMS value

**AC current:** 200 A

resolution/accuracy: max. 0.1 A/max. ± 3 % + 3 digit

measuring method: RMS value

**resistance:** 2000 Ω

resolution/accuracy: max. 1 Ω/max. ± 1.0 % + 2 digit

**continuity test:** 25 Ω up to 400 Ω,

acoustic: buzzer, optic: LCD

over voltage protection: 750 V effective 200 A effective

range switching: autoranging

jaw opening: max. 12.5 mm,

inner diameter: 16 mm

over voltage category: CAT III 600 V

operation temperature: 0 °C to + 50 °C

dimensions (l x w x h): 188 x 67 x 41 mm

weight: 265 g

battery type: 9 V battery IEC 6LR61

**delivery includes:** current Clamp Meter, carrying case, battery, integrated double insulated safety test leads

# Digital Current Clamp Meter *BENNING CM 2* compact and precise

## Digital Current Clamp Meter for DC and AC currents measurements

### **BENNING CM 2**

The Digital Current Clamp Meter *BENNING CM 2* combines the advantages of a Digital Multimeter with a current Clamp Meter. The 3<sup>3</sup>/<sub>4</sub> digit LC display offers a resolution of 3999 pixels and allows the recording of the measured value and the maximum value in all measuring ranges by means of the H/MAX button.

The *BENNING CM 2* contains DC and AC current ranges up to 300 A and because of its maximum measurement resolution of 10 mA it is ideally suitable for measuring smaller current ranges. The optimum zero setting for the direct current range can be set to the ZERO button.

Additionally the *BENNING CM 2* reads direct voltage and alternating voltage up to 600 V, resistance up to 40 MΩ and it has an acoustic continuity test. All the ranges are protected against overload.

Relative measurements (differential measurements) can be made via ZERO button in voltage and current range.

The *BENNING CM 2* has a battery low voltage indication and an auto-shut off function when not in use (approx. 30 min.).



### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (3999 pixels)
<b>DC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 600 V
resolution/accuracy:	max. 100 µV/max. ± 0.5 % + 2 digit
<b>AC voltage:</b>	400 mV, 4 V, 40 V, 400 V, 600 V
resolution/accuracy:	max. 100 µV/max. ± 1.5 % + 5 digit
measuring method:	RMS value
<b>DC current:</b>	40 A, 200 A, 300 A
resolution/accuracy:	max. 10 mA/max. ± 1.0 % + 2 digit
<b>AC current:</b>	40 A, 200 A, 300 A
resolution/accuracy:	max. 10 mA/max. ± 1.0 % + 3 digit
measuring method:	RMS value
<b>resistance:</b>	400 Ω, 4 kΩ, 40 kΩ, 400 kΩ, 4 MΩ, 40 MΩ
resolution/accuracy:	max. 100 mΩ/max. ± 0.9 % + 3 digit
<b>continuity test:</b>	50 Ω up to 300 Ω, acoustic: buzzer, optic: LCD
over voltage protection:	600 V effective 400 A effective
range switching:	autoranging
jaw opening:	max. 25 mm
over voltage category:	CAT III 300 V, CAT II 600 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	192 x 66 x 27 mm
weight:	205 g
battery type:	2 micro batteries 1.5 V IEC LR03/AAA
<b>delivery includes:</b>	current Clamp Meter, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag enclosed in delivery

**BENNING CM 2**  
item no. **044035**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)



# Digital Current Clamp Meter **BENNING CM 3**

*proven technology*

## Digital Clamp Meter for DC and AC current up to 600 A

### **BENNING CM 3**

The Digital Clamp Meter **BENNING CM 3** measures DC and AC current up to 600 A without connection.

The current is determined by means of a hall sensor without opening the live conductor. The two available current measuring ranges of 200 A and 600 A can be manually adjusted with a slide switch.

A balancing potentiometer allows the best zero balance at DC current measurements. Measuring values can be saved at measurement point difficult to get to by means of the Hold-function (HOLD).

The **BENNING CM 3** has a battery low voltage indication and an automatic switch-off function when not in use (approx. 30 min.).



750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

600 A<sub>AC/DC</sub>

40 M $\Omega$   
Hz

TRUE  
RMS  
LCD

CAT II  
600 V

compact protective bag  
enclosed in delivery

**BENNING CM 3**  
item no. **044031**



tested and approved  
IEC/EN 61010-1  
(DIN VDE 0411-1)

### Technical Data

display:	3 1/2 digit LC display (1999 pixels)
<b>DC current:</b>	200 A/600 A
resolution/accuracy:	max. 0.1 A/max. $\pm 1.9\%$ + 3 digit
<b>AC current:</b>	200 A/600 A
resolution/accuracy:	max. 0.1 A/max. $\pm 1.9\%$ + 5 digit
over voltage protection:	600 A effective
measuring method:	RMS value
over voltage category:	CAT II 600 V
jaw opening:	max. 38 mm
operation temperature:	0 °C to 50 °C
dimensions (l x w x h):	203 x 81 x 39 mm
weight:	320 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	Clamp Meter, carrying case with velcro fastening, battery

# Digital Current Clamp Meter BENNING CM 4

## High performance, small dimensions

### Digital current clamp multimeter for AC Current up to 600 A

#### **BENNING CM 4**

A slight, compact design and a LC display with background lighting are the best prerequisites for current measuring on inaccessible measuring points with unfavorable lighting conditions.

Despite its very compact design, the Current Clamp Multi-meter **BENNING CM 4** offers the user measuring functions and a current measurement range of up to 600 A<sub>AC</sub>.

All ranges for current (600 A<sub>AC</sub>), voltage (600 V<sub>AC/DC</sub>), resistance (400 Ω), frequency (400 Hz) and continuity test can be set via the rotary switch by means of single-hand control.

Besides the digital measuring value indication, the 3<sup>3</sup>/<sub>4</sub> digit LC display is provided with an analogue bargraph indication for the detection of measuring trends.

All measuring ranges dispose of a maximum (MAX) and a minimum value storage function (MIN). Momentary voltage and current peaks are detected by means of the PEAK function.



#### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4000 pixels)
<b>DC voltage:</b>	400 V, 600 V
resolution/accuracy:	max. 0.1 V/max. ± 0.7 % + 2 digit
<b>AC voltage:</b>	400 V, 600 V
resolution/accuracy:	max. 0.1 V/max. ± 1 % + 5 digit
measuring method:	RMS value
<b>AC current:</b>	60 A, 400 A, 600 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 5 digit
measuring method:	average value rectification RMS value
<b>resistance:</b>	400 Ω
resolution/accuracy:	max. 0.1 Ω/max. ± 1 % + 3 digit
<b>continuity test:</b>	30 Ω, acoustic: buzzer, optic: LCD
<b>frequency:</b>	400 Hz
resolution/accuracy:	max. 1 Hz/max. ± 0.1 % + 2 digit
over voltage protection:	600 V effective 600 A effective
range switching:	autoranging
jaw opening:	max. 37 mm
over voltage category:	CAT III 600 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	220 x 83 x 45 mm
weight:	324 g
battery type:	2 micro batteries 1.5 V IEC LR03/AAA
<b>delivery includes:</b>	current Clamp Meter, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag  
enclosed in delivery

**BENNING CM 4**  
item no. **044056**



# Digital Current Clamp Meter **BENNING CM 5**

## For demanding applications

### Digital current clamp multimeter for DC and AC current up to 600 A and TRUE RMS measuring method **BENNING CM 5**

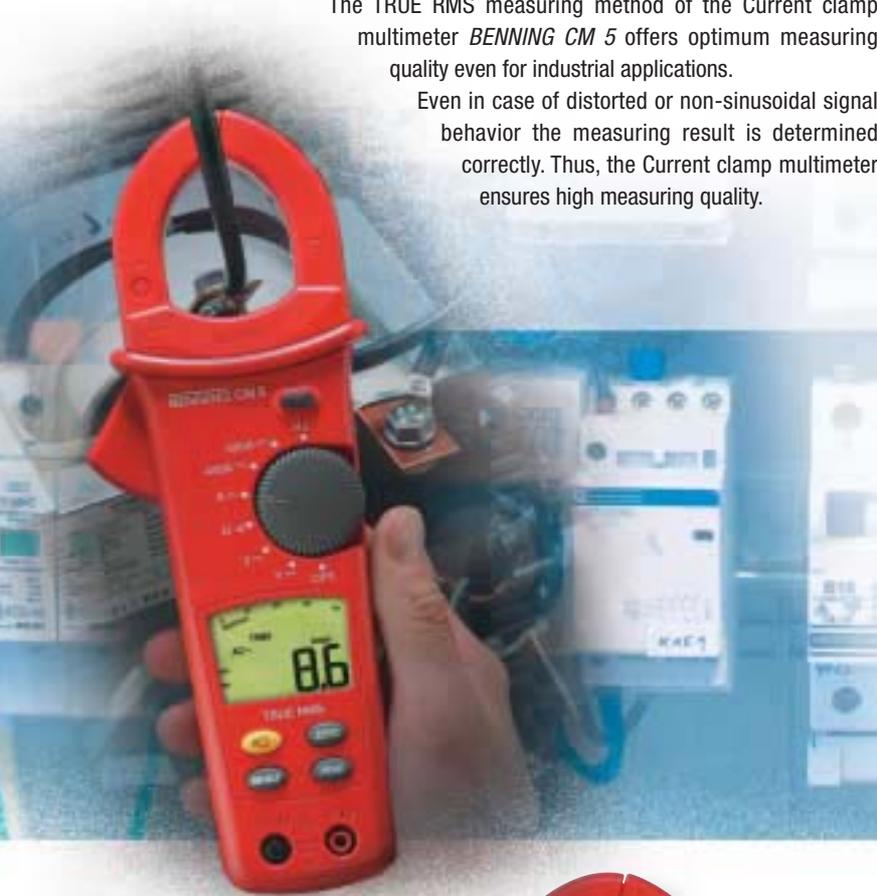
The TRUE RMS measuring method of the Current clamp multimeter **BENNING CM 5** offers optimum measuring quality even for industrial applications.

Even in case of distorted or non-sinusoidal signal behavior the measuring result is determined correctly. Thus, the Current clamp multimeter ensures high measuring quality.

A slight, compact design and a LC display with background lighting are the best prerequisites for current measuring on inaccessible measuring points with unfavorable lighting conditions. Despite its very compact design, the Current Clamp Multimeter **BENNING CM 5** offers the user measuring functions and a current measurement range of up to 600 V<sub>AC/DC</sub>.

All ranges for current (600 A<sub>AC/DC</sub>), voltage (600 V<sub>AC/DC</sub>), resistance (400 Ω), frequency (400 Hz) and continuity test can be set via the rotary switch by means of single-hand control. Besides the digital measuring value indication, the 3<sup>3</sup>/<sub>4</sub> digit LC display is provided with an analogue bargraph indication for the detection of measuring trends.

All measuring ranges dispose of a maximum (MAX) and a minimum value storage function (MIN). Momentary voltage and current peaks are detected by means of the PEAK function. The ZERO key function allows null balance for DC current measuring and compensation of the measuring leads for resistance measuring.



600 V<sub>AC/DC</sub> 600 A<sub>AC/DC</sub>

400 Ω Hz

TRUE RMS LCD

CAT III  
600 V

compact protective bag  
enclosed in delivery

**BENNING CM 5**  
item no. 044057

#### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4000 pixels)
<b>DC voltage:</b>	400 V, 600 V
resolution/accuracy:	max. 0.1 V/max. ± 0.7 % + 2 digit
<b>AC voltage:</b>	400 V, 600 V
resolution/accuracy:	max. 0.1 V/max. ± 1 % + 5 digit
measuring method:	True RMS value
<b>DC current:</b>	60 A, 400 A, 600 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 5 digit
<b>AC current:</b>	60 A, 400 A, 600 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 5 digit
measuring method:	average value rectification, RMS value
<b>resistance:</b>	400 Ω
resolution/accuracy:	max. 0.1 Ω/max. ± 1 % + 3 digit
continuity test:	30 Ω, acoustic: buzzer, optic: LCD
<b>frequency:</b>	400 Hz
resolution/accuracy:	max. 1 Hz/max. ± 0.1 % + 2 digit
over voltage protection:	600 V effektiv 600 A effektiv
range switching:	autoranging
jaw opening:	max. 45 mm
over voltage category:	CAT III 600 V
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	235 x 85 x 31 mm
weight:	375 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	current Clamp Meter, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42

# Digital Current Clamp Meter BENNING CM 6

## Highest safety due to measuring category IV

### Digital current clamp multimeter for AC current measuring up to 1000 A

#### **BENNING CM 6**

The Current clamp multimeter *BENNING CM 6* is the right choice for all measuring applications with high power and high currents. The large AC current measurement range of up to 1000 A offers reserve capacities for manifold fields of application.

The highest measuring category IV for measuring instruments according to the standard IEC 61010-1 allows measuring at the source of low-voltage installations such as e.g. measuring at the main distribution, the meter and the primary overvoltage protection.

The measuring ranges for current (1000 A<sub>AC</sub>), voltage (750/1000 V<sub>AC/DC</sub>), resistance (400 Ω), frequency (400 Hz) and continuity test can be selected by means of single-hand control.

The values are indicated by means of an illuminated 3<sup>3</sup>/<sub>4</sub> digit LC display with analogue bargraph indication. The device is equipped with a measuring value (HOLD), maximum value (MAX) and minimum value storage function (MIN). Momentary voltage and current peaks are detected by means of the PEAK function.

**CAT  
IV**


#### Technical Data

display:	3 <sup>3</sup> / <sub>4</sub> digit LC display (4000 pixels)
<b>DC voltage:</b>	400 V, 1000 V
resolution/accuracy:	max. 0.1 V/max. ± 0.7 % + 2 digit
<b>AC voltage:</b>	400 V, 750 V
resolution/accuracy:	max. 0.1 V/max. ± 1 % + 5 digit
measuring method:	RMS value
<b>AC current:</b>	60 A, 400 A, 1000 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 5 digit
measuring method:	RMS value
<b>resistance:</b>	400 Ω
resolution/accuracy:	max. 0.1 Ω/max. ± 1 % + 3 digit
<b>continuity test:</b>	30 Ω, acoustic: buzzer, optic: LCD
<b>frequency:</b>	400 Hz
resolution/accuracy:	max. 1 Hz/max. ± 0.1 % + 2 digit
over voltage protection:	750 V effective resp. 600 V effective, 1000 A effective
range switching:	autoranging
over voltage category:	CAT IV 600 V, CAT III 1000 V
jaw opening:	max. 53 mm
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	275 x 105 x 47 mm
weight:	534 g
battery type:	2 micro batteries 1.5 V IEC LR03/AAA
<b>delivery includes:</b>	current Clamp Meter, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42



compact protective bag  
enclosed in delivery

**BENNING CM 6**  
item no. **044058**



# Digital Current Clamp Meter **BENNING CM 7**

## Multi-functional and powerful

**CAT IV**

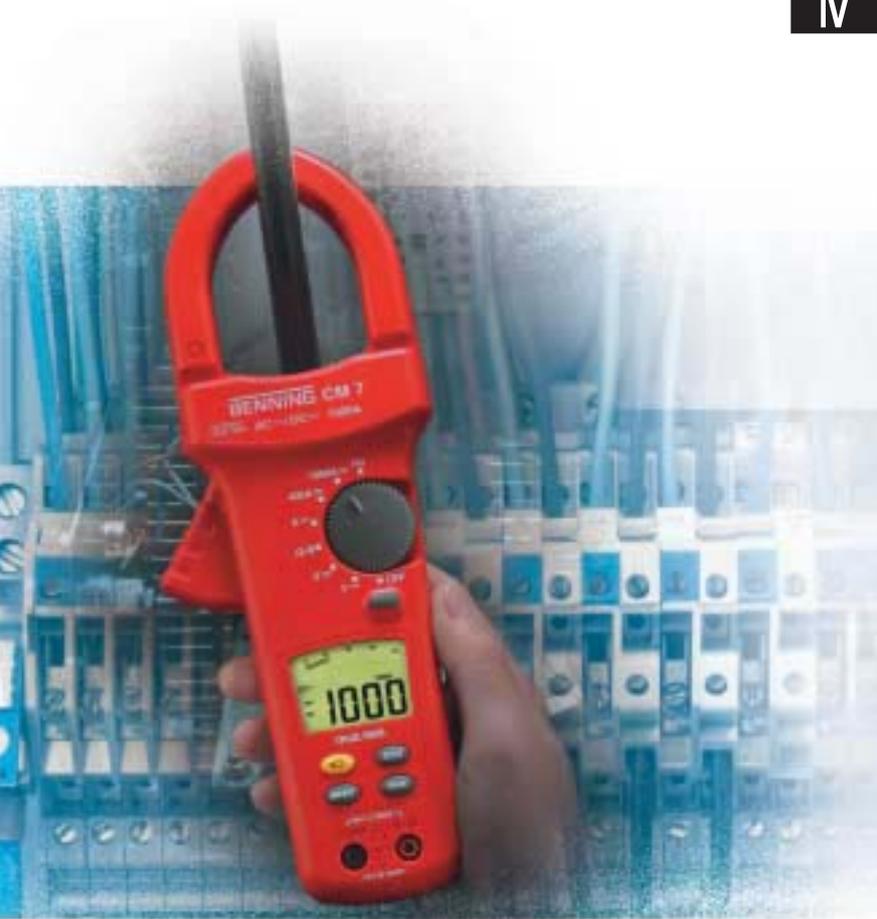
**Digital current clamp multimeter for DC and AC current up to 1000 A and TRUE RMS measuring method**  
**BENNING CM 7**

A Current clamp multimeter with uncompromising safety and exceptional features for all applications in AC and DC mains. The accuracy and quality of measuring is essentially characterized by the measuring method applied. The **BENNING CM 7** detects alternating quantities by means of the TRUE RMS measuring method. Thus, even non-sinusoidal signal behaviour can be detected correctly.

The device is designed for safe current measuring up to 1000 A<sub>AC/DC</sub> with the measuring clamp allowing to "grasp" conductors with a diameter of up to 51 mm. The highest measuring category IV for measuring instruments according to the standard IEC 61010-1 allows measuring at the source of low-voltage installations such as e.g. measuring at the main distribution, the meter and the primary overvoltage protection.

The measuring ranges for current (1000 A<sub>AC/DC</sub>), voltage (750/1000 V<sub>AC/DC</sub>), resistance (400 Ω), frequency (400 Hz) and continuity test can be selected by means of single-hand control.

The values are indicated by means of an illuminated 3¾ digit LC display with analogue bargraph indication. The device is equipped with a measuring value (HOLD), maximum value (MAX) and minimum value storage function (MIN). Momentary voltage and current peaks are detected by means of the PEAK function.



750 V<sub>AC</sub>  
1000 V<sub>DC</sub>

1000 A<sub>AC/DC</sub>

400 Ω  
Hz

TRUE RMS  
LCD

CAT IV  
600 V

compact protective bag  
enclosed in delivery

**BENNING CM 7**  
item no. **044059**

### Technical Data

display:	3¾ digit LC display (4000 pixels)
<b>DC voltage:</b>	400 V, 1000 V
resolution/accuracy:	max. 0.1 V/max. ± 0.7 % + 2 digit
<b>AC voltage:</b>	400 V, 750 V
resolution/accuracy:	max. 0.1 V/max. ± 1 % + 5 digit
measuring method:	True RMS value
<b>DC current:</b>	200 A, 400 A, 1000 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 2 digit
<b>AC current:</b>	200 A, 400 A, 1000 A
resolution/accuracy:	max. 0.1 A/max. ± 1.9 % + 2 digit
measuring method:	RMS value
<b>resistance:</b>	400 Ω
resolution/accuracy:	max. 0.1 Ω/max. ± 1 % + 3 digit
<b>continuity test:</b>	30 Ω, akustisch: Summer, optisch: LCD
<b>frequency:</b>	400 Hz
resolution/accuracy:	max. 1 Hz/max. ± 0.1 % + 2 digit
over voltage protection:	750 V effective 1000 A effective
range switching:	autoranging
over voltage category:	CAT IV 600 V, CAT III 1000 V
jaw opening:	max. 53 mm
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	275 x 105 x 47 mm
weight:	538 g
battery type:	9 V battery IEC 6LR61
<b>delivery includes:</b>	current Clamp Meter, carrying case, set of batteries, double insulated safety test leads

further accessories of your choice: see page 42

## Current Clamp Adapter BENNING CC 1

### Measuring high currents with maximum safety

#### Current clamp adaptor for AC current measuring up to 400 V

##### **BENNING CC 1**

The Current clamp adaptor *BENNING CC 1* is a universal measuring adaptor for Multimeters and is intended for AC current measuring up to 400 A.

The AC voltage applied proportionally to the measured AC current at the output of the *BENNING CC 1* is connected directly to the voltage input of the Multimeter.

Due to the transmission ratio of 1 mV<sub>AC</sub> per 1 A<sub>AC</sub> measured AC current, even Multimeters without own current measuring range can be used. The *BENNING CC 1* converts the detected current value into the following indicating values at the Multimeter:

<b>Current in A:</b>	<b>output:</b> (indicating value at the Multimeter)
1 A	1 mV
30 A	30 mV
350 A	350 mV
400 A	400 mV

The Current clamp adaptor is connected by means of a safety measuring lead with two 4 mm safety connectors. The spiral safety measuring lead can be extended to a length of more than 2 m.



(delivery take place without multimeter)

#### Technical Data

<b>AC current:</b>	400 A
output per A <sub>AC</sub>	1 mV (1 mV <sub>AC</sub> = 1 A <sub>AC</sub> )
resolution/accuracy:	3 A - 350 A/1.9 % ± 0.5 A 350 - 400 A/3.2 % ± 1 A
over voltage category:	CAT III 300 V, CAT II 600 V
jaw opening:	max. 30 mm
operation temperature:	0 °C to + 50 °C
dimensions (l x w x h):	148 x 72 x 36 mm
weight:	250 g
connection:	spiral type safety measuring cable with 4 mm safety connector
<b>delivery includes:</b>	current clamp adapter, double insulated safety test leads and carrying case



400 A<sub>AC</sub> CAT II  
600 V

compact protective bag  
enclosed in delivery

BENNING CC 1  
item no. 044037



## Portable appliance tester **BENNING 700** the specialist for electrical safety

### Portable appliance tester **BENNING 700** for safety- and periodic testing acc. to standards DIN VDE 0701/0702 and BGV A2 (VBG4)

#### **DIN VDE 0701**

Part 1 Repair, alteration and testing of electrical appliances

Part 240 Safety regulations for data-processing equipment and office machines

#### **DIN VDE 0702**

Part 1 Periodic testing on electrical appliances

### **Performance requirements**

Electrical appliances have to be tested after each repair operation or alteration to the unit according to standard DIN VDE 0701. Additionally, in the entire commercial area, in industrial plant as well as in the administration and business area, periodic testing for electrical appliances have to be carried out according to standard DIN VDE 0702 at fixed regular intervals. Due to the complexity, it is not easy to put the regulations into practice.

### **Benefit of **BENNING 700****

The portable appliance tester **BENNING 700** and software **BENNING PC-Win 700** allowed the test regulations according to standard DIN VDE 0701/0702 to be carried out in a reliable, safe and time-saving way.

Test record for electrical devices VDE 0701/0702, BGV A2 (VBG 4)			
drill machine	Pause		
Workshop	Customer		
Order no.	Group 7		
10015	Order group		
	half-yearly		
	Test interval		
285500	Baumeister		
Order number	Tester		
463700RCC			
REVISION: 700 Operating device			
Inspection	Case ok		
	Other mechanical parts ok		
	Connecting cables and plugs ok		
Test reason	Repetition test		Next test 19.05.2005
Test from 19.11.2004			
Test	Limit value	Measurement value	Test ok
Earth continuity test (0.1m)	—	—	—
Earth continuity test (reversed polarity) (0.1m)	—	—	—
Earth bond test (10 A) (0.1m)	—	—	—
Insulation test (MΩ)	2	10	Yes
Earth leakage test (mA)	3,5	0,7	Yes
Earth leakage test for information technology (mA)	—	—	—
Earth leakage test for information technology (reversed polarity) (mA)	—	—	Yes
Test passed			
Signature			
Schott, 19.11.2004			



**BENNING 700**  
item no. **050305**



compact protective bag  
enclosed in delivery

Standard type with memory, interface for computer, interface for barcode reader. Accessories at option: barcode reader, barcode labels, test badges and software **BENNING PC-Win 700** (see page 39).

### **Test routines either in automatic or manual mode**

- Measurement of protective-conductor resistance with test current 200 mA/10 A
- Measurement of insulation resistance
- Measurement of protective-conductor current and contact-current using differential current process
- Measurement of substitute earth leakage test
- Test of voltage absence by measuring differential current
- Function test after safety test passed (voltage, current)



free **BENNING 700** information-CD on request:  
Tel. ++49/ (0) 28 71/ 93-4 20 or fax ++49/ (0) 28 71/ 93-4 29

# BENNING 700

## for rational tests

### BENNING 700 special features

- Automatic or manual execution of test routines.
- Storing of measurement figures (for 199 test objects) for subsequent display or data acquisition by computer and printer.
- RS 232-C interface for computer and interface for barcode reader.
- Specification of equipment (test object) by keyboard or barcode reader for automatic test routines and unit identification in periodic testing.
- Entry functions via the keypad.
- Test stage chronology by LED indication.
- Indication of measurement and limit values in display.
- Error indication via additional red LED when limit value is exceeded.
- Limit values stored in memory alterable for measurements.
- Accessories on demand: Software *BENNING PC-Win 700* for recording, analysing and storing the values measured.
- Accessories on demand: Barcode reader, barcode labels (1 set/320 labels), test badges (1 set/300 labels) and adapter lead for three phase current 16 A/32 A.

### BENNING PC-Win 700 Software

(MS-Windows® from version '98)

Professional software for the documentation, analysis and recording of the measured values. The software *BENNING 700 PC-WIN* is equally suitable for performing the test according to standards DIN VDE 701/702 as service, as well as for the internal device administration to put the advantage of a modern test-data management into practice.

### Barcode reader/barcode label

(helpful accessories for periodic testing)

The application of a barcode reader and the use of barcode labels enables an easy identification of the test object by periodic testing. The barcode reader and labels are particularly suitable for handling rational a data bank with a higher quantity of test objects.



BENNING 700  
item no. 050305S

### BENNING 700 Set

- Portable appliance tester *BENNING 700* incl. service bag **item no. 050305**
- Software *BENNING PC-Win 700* on CD-ROM **item no. 047000**
- Barcode reader **item no. 009368**
- Barcode labels (1 set/320 labels) **item no. 756061**
- Test badges (1 set/300 labels) **item no. 756175**

### Technical data

#### General:

display:	5 digit LC display (99999 pixels) 20 mm high
interface:	RS-232-C interface interface for barcode reader
internal memory:	stores up to 199 test objects including the measured values of $R_{PE}$ , $R_{ISD}$ and $I_{PE}$
protective system:	IP 40
dimensions (h x w x d):	110 mm x 260 mm x 210 mm
weight:	2.7 kg (without accessories)
mains connection:	230 V $\pm$ 10 %, 50 up to 60 Hz

#### Protective-conductor resistance ( $R_{PE}$ ):

measuring range:	0 ... 65.535 $\Omega$
test current:	$\pm$ 200 mA DC and 10 A AC

#### Insulation resistance ( $R_{ISD}$ ):

measuring range:	0 ... 65.535 $\Omega$
test voltage:	500 V DC

#### Measurement of protective conductor, contact current and earth leakage current ( $I_{\Delta}$ ):

measuring range:	0 ... 65.535 mA
measurement of differential current	

#### Test of voltage absence by measuring differential current ( $I_{\Delta}$ ):

measuring range:	0 ... 65.535 mA
------------------	-----------------

#### Function test after safety test passed:

measuring range:	
voltage:	200 - 260 V
current:	0 - 16 A

#### Delivery includes:

Portable appliance tester *BENNING 700*, high-grade service bag made of nylon, safety test lead with 4 mm safety socket, 1 m connecting cable with 4 mm safety plug, instruction manual **item no. 050305**

#### Accessories on demand:

Software *BENNING PC-Win 700* on CD-ROM incl. 9-poles RS 232 cable **item no. 047000**

Software up date (for registered users only) *BENNING PC-Win 700* on CD-ROM **item no. 545961**

Barcode reader **item no. 009368**

Barcode labels (1 set/320 labels) **item no. 756061**

Test badges for marking the next test date  $\emptyset$  30 mm, auto-adhesive, laminated (1 set/300 labels) **item no. 756175**

Adapter lead for three phase current 16 A CEE-clutch 16 A, 5-pole with earthing type plug 16 A, 2-pole,  $I = 1$  m **item no. 044122**

Adapter lead for three phase current 32 A CEE-clutch 32 A, 5-pole with earthing type plug 16 A, 2-pole,  $I = 1$  m **item no. 044123**



## Insulation and resistance tester **BENNING IT 100** to avoid property and personal damages

**Insulation and resistance tester *BENNING IT 100***  
for low voltage distribution systems up to 1000 V  
according to standards EN 61557 part 1, 2 and 4  
(DIN VDE 0413 part 1, 2 and 4)

### Functions

- Insulation resistance measurement with test voltages 250 V, 500 V and 1000 V
- Low resistance measurement with a test current of 200 mA
- Voltage measurements up to 1000 V
- Resistance measurements and acoustical continuity test
- Battery test function under simulated load

### Relevant Instructions

The *BENNING IT 100* makes it possible to measure insulation resistance and low resistance in accordance with standard IEC/EN 61557 in electrical units and low voltage distributions systems.

The tests should prove that the necessary safety measure against personal and property damage are kept.

In addition the standard EN 50110 describes the continued tests for fixed installed units and mobile equipment.

### Advantages of the *BENNING IT 100*

The insulation and resistance tester *BENNING IT 100* combines the measuring of the insulation resistance test up to 2000 M $\Omega$  and low resistance measurement in a compact unit.

The test voltage of 250 V, 500 V and 1000 V makes it possible for the unit to be used in several test fields such as insulation test for electrical units, switch boards, electrical machines, motors and generators.

Additional functions include direct and alternating voltage measurement up to 1000 V, resistance measurement with acoustic continuity test and the measurement of remaining battery capacity with the use of a load.

### *BENNING IT 100* Button functions at a glance

- button: buzzer for acoustic continuity test - on/off
- button: for continuous insulation and low resistance measurements
- button: zero compensation for the test leads for exact low resistance measurements
- button: background light for LC display
- button: activates the insulation and low resistance measurement

DIN VDE 0100 0105	1000 V AC/DC
R <sub>ISO</sub> 250-500 1000 V	LOW $\Omega$
LCD	CAT III 600 V

service case  
with belt  
(see fig. on p. 41)  
enclosed in delivery

*BENNING IT 100*  
item no. 044032



# BENNING IT 100

## Tracing the insulation fault

### Important Safety Functions

The *BENNING IT 100* has an automatic external voltage identification for the insulation and resistance measurement.

In the event of an external power source, the *BENNING IT 100* blocks the incoming source and displays voltage and an additional warning symbol “⚡”.

Dangerous static voltages that appear after the insulation measurement test are completely discharged by the *BENNING IT 100*.

Further features are the remarkable user friendly design, a big LC display as well as an automatic switch off facility after 10 minutes.

The insulation and resistance tester *BENNING IT 100* meets the standard EN 61010-1 and offers a maximum of safety (CAT III 600 V resp. CAT II 1000 V).

A service case with belt is included in the delivery.



### Technical Data

#### General:

display: 2 x 3 1/2 digit, 2000 digit, 11 mm + 8 mm high, inclusive 63 segment bar graph and backlight

#### standards:

EN 61557 part 1, 2 and 4 (DIN VDE 0413 part 1, 2 and 4)  
EN 61010 part 1 (DIN VDE 0411 part 1)

fuse: 0.5 A, 1000 V, 10 kA, fast

protection: IP 40

over voltage category: CAT III 600 V, CAT II 1000 V

operating temperature: 0 °C up to + 50 °C

dimensions: 235 mm x 100 mm x 55 mm (l x w x h)

weight: 450 g/590 g (without/with batteries)

battery type: 6 Mignon-batteries 1.5 V IEC LR 6 AA

#### Insulation resistance:

range	resolutions	accuracy	overload protection
2 MΩ	0.01 MΩ	2 % + 2 digit	1000 V AC/DC
20 MΩ	0.1 MΩ	2 % + 2 digit	1000 V AC/DC
200 MΩ	1 MΩ	2 % + 2 digit	1000 V AC/DC
2000 MΩ	10 MΩ	6 % + 2 digit	1000 V AC/DC

analogue bar graph: 0 - 1 GΩ and infinity

test voltages: 250 V, range: 0.25 MΩ - 1000 MΩ  
500 V, range: 0.5 MΩ - 2000 MΩ  
1000 V, range: 1 MΩ - 2000 MΩ

test current: 1 mA

Number of measurements per standard EN 61557-2:  
approx. 6000 (250 V), 5000 (500 V), 3500 (1000 V)

#### Low resistance:

range	resolutions	accuracy	overload protection
20 Ω	0.01 Ω	2 % + 2 digit	1000 V effective

analogue bar graph: 0 - 100 Ω and infinity

test current: ≥ 200 mA, 0 - 2 Ω

open circuit voltage: 6 V DC

Number of measurements per standard EN 61557-2: approx. 4000  
test leads zero up to 10 Ω

input protection: 0.5 A (1000 V)-fuse, fast

#### Resistance and acoustic continuity test:

range	resolutions	accuracy	overload protection
2000 Ω	1 Ω	2 % + 2 digit	1000 V effective

analogue bar graph: 0 - 10 kΩ and infinity

accuracy: 10 %

acoustic continuity test: R ≤ 30 Ω

test current: 1 mA

input protection: 0.5 A (1000 V)-fuse, fast acting

#### AC/DC Voltage:

range	resolutions	accuracy	overload protection
1000 V	1 V	2 % + 5 digit	1000 V effective

frequency range: up to 400 Hz

analogue bar graph display: 0 - 1000 V

accuracy: 10 %

A flashing high voltage symbols warns the user if a voltage is more than 30 V AC or DC.

#### Measurement of battery capacity:

The measurement of the remaining battery capacity is performed by connecting a simulated load. The remaining battery capacity is displayed as a percentage of 0 - 100 %.

#### Delivery includes:

Insulation and resistance tester *BENNING IT 100*, 4 mm safety test leads (red, black), 4 mm safety crocodile clips (red, black), service case with belt, 6 Mignon batteries 1.5 V

further accessories of your choice: see page 42



fig.: service case with belt



## Accessories for **BENNING** measuring instruments... safe-practical-indispensable



### **BENNING TA 1** item no. 044124

Ø 4 mm safety crocodile clips, 2-piece, red, black, professional design, 1000 V CAT III, 32 A, consisting of:  
2 x Ø 4 mm fully insulated safety crocodile clips with toothed jaws and fine wire surface



### **BENNING TA 2** item no. 044125

Ø 4 mm safety measuring lead set, silicone, 6-piece, red, black, professional design, CAT III 1000 V, consisting of:  
2 x Ø 4 mm safety measuring leads, silicone, L = 100 cm, 19 A  
2 x fully insulated crocodile clips with toothed jaws and fine wire surface, 32 A  
2 x Ø 4 mm safety test probes, 20 A



### **BENNING TA 3** item no. 044126

Ø 4 mm safety measuring lead set, silicone, 8-piece, red, black, professional design, CAT III 1000 V, consisting of:  
2 x Ø 4 mm safety measuring leads, silicone, L = 100 cm, 19 A  
2 x fully insulated crocodile clips with toothed jaws and fine wire surface, 32 A  
2 x safety test probes with slight tip made of stainless steel, 1 A  
2 x safety claw gripper with strong claws, 16 A



### **BENNING TA 4** item no. 044120

Magnetic holder for Multimeter, 3-piece, consisting of: strong magnetic holder, adaptor and strap

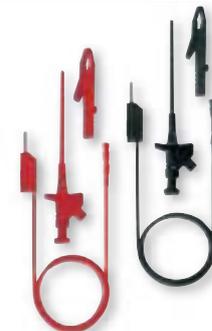
suitable for all BENNING Multimeters with protective rubber frame for safe attachment of the Multimeter to switching cabinets, distribution cabinets, tubes, walls, parts of machines or systems (see fig. right)



### **Test leads for DIGIPOL**

item no. 044759

Professional design, 6-piece, red, black, consisting of:  
2 x measuring leads with connecting jack and Ø 4 mm bunch plug, L = 75 cm  
2 x fully insulated safety crocodile clips  
2 x clamp test prob



### **Safety test leads for BENNING MM 4**

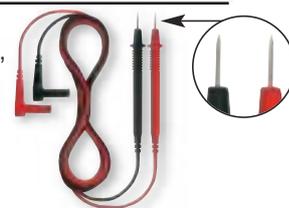
item no. 044119

Consisting of:  
1 x Ø 2 mm safety measuring lead, L = 140 cm, black, 1000 V CAT III, 10 A  
1 x crocodile clip, black  
2 x Ø 2 mm measuring probes

### **2 mm safety test leads**

item no. 044117

CAT III 1000 V, 10 A consisting of:  
2 x Ø 2 mm safety measuring lead, L = 140 cm, red, black



### **Temperature probe, K-type**

item no. 044121

Temperature probe made of V4A tube suitable for Digital multimeters **BENNING MM 7** and **MM 11**

application: insertion probe for soft-plastic materials, liquids, gas and air

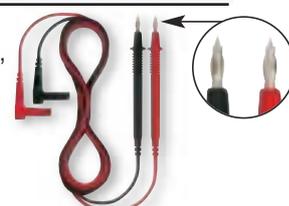
measuring range: -196 °C - 800 °C

dimensions: length = 210 mm, tube length = 12 mm, tube diameter = 3 mm, V4A

### **4 mm safety test leads**

item no. 044118

CAT III 1000 V, 10 A consisting of:  
2 x Ø 4 mm safety measuring lead, L = 140 cm, red, black



# Pictograph explanations at a glance

## Testing Devices: voltage, continuity, load testers and phase-sequence indicator

- |   |  |   |  |
|---|--|---|--|
|  | load connection by actuating the push buttons in order to<br>- suppress capacitive and inductive "reactive voltages"<br>- trigger a 30 mA FI safety switch |  | vibrating alarm for safe voltage detection                 |
|  | acoustic and optical continuity test up to 90 kΩ (buzzer and LED)  |  | precise illumination of the measuring point (pocket lamp)  |
|  | optical continuity test up to 600 kΩ (LC display)  |  | LC display with background lighting                        |
|  | testing the phase-sequence of three-phase mains  |  | storage of the testing result                              |
|  | single-pole phase test: "R" symbol for AC voltage  |  | integrated power supply means of solar cell and round cell |
|  | protection class IP 64 (dustproof and splash-proof housing)  |  | protected against external voltage up to 400 V             |

## Measuring devices: Digital Multimeters and Digital current clamp multimeters

- |   |   |   |  |
|---|---|---|--|
|  | AC voltage measuring up to 750 V AC/<br>DC voltage measuring up to 1000 V DC  |  | TRUE RMS measuring method for non-sinusoidal signal behavior         |
|  | AC current measuring up to 1000 A AC/<br>AC current measuring up to 1000 A DC |  | overvoltage category CAT IV 600 V AC against earth                   |
|  | resistance measuring up to 20 MΩ  |  | TRUE RMS measuring method for RS 232 interface                       |
|  | frequency measuring   |  | protocol and analysis software on CD-ROM                             |
|  | capacity measuring  |  | measuring value memory for the acquisition of 40000 measuring values |
|  | temperature measuring in °C und °F  |  | LC display with background lighting                                  |

## Safety Devices: appliance tester, insulation and resistance measuring instrument

- |   |  |   |   |
|---|--|---|---|
|  | Safety and repetitive tests on electrical equipment                                  |  | AC voltage measuring up to 1000 V AC/<br>DC voltage measuring up to 1000 V DC |
|  | safety tests on electrical systems and equipment                                     |  | TRUE RMS measuring method for RS 232 interface                                |
|  | regulation for the prevention of accidents BGV A2 "Electrical systems and equipment" |  | protocol and analysis software on CD-ROM                                      |
|  | Insulation resistance measuring with testing voltage 250 V, 500 V and 1000 V         |  | measuring value memory (storage capacity: 199 measuring values)               |
|  | low-impedance measuring with testing current of 200 mA                               |  | test sample identification by means of barcode reader and barcode label       |



## Testing and measuring device sets

### Practically proven basic equipment

#### **BENNING Testing and measuring device sets**

The selection of functional testing and measuring device sets depends on the professional requirements and on the experience of the user. Furthermore, the testing and measuring devices shall guarantee safety and reliability over many years.

BENNING testing and measuring devices meet these requirements in every aspect and guarantee maximum testing safety and measuring quality for decades.

The four BENNING testing and measuring device sets are adjusted to the Professional requirements of apprentices, craftsmen, master craftsmen as well as to those of service technicians and foremen.

Decide on a BENNING testing and measuring devices set at a special price!

#### **Order pays off!**

The practical and large testing/measuring device bag for professional storage made of hard-wearing polyester fabric (black), with handle and detachable shoulder belt.



protective bag

item no. 711019

Design and color subject to change.

#### **Starter set**

- 1 x DUSPOL® master, item no. 050252
- 1 x DUTEST®, item no. 050155
- 1 x BENNING MM 2, item no. 044028
- 1 x protective bag, item no. 711019

Starter set

item no. 050401



#### **Electrician set**

- 1 x DUSPOL® expert, item no. 050253
- 1 x BENNING MM 3, item no. 044029
- 1 x BENNING CC 1, item no. 044037
- 1 x protective bag, item no. 711019

Electrician set

item no. 050402



#### **Master set**

- 1 x DUSPOL® expert, item no. 050253
- 1 x BENNING MM 10, item no. 044079  
incl. CD-ROM software BENNING PC-Win MM 10
- 1 x BENNING CM 5, item no. 044057
- 1 x protective bag, item no. 711019

Master set

item no. 050403



#### **Industry set**

- 1 x DUSPOL® digital plus, item no. 050255
- 1 x BENNING MM 11, item no. 044080  
incl. CD-ROM software BENNING PC-Win MM 11
- 1 x BENNING CM 7, item no. 044059
- 1 x BENNING IT 100, item no. 044032
- 1 x protective bag, item no. 711019

Industry set

item no. 050404



# Sales display stand and showcase Free for specialized trade\*

## For sales promotion and product presentation: BENNING Sales display stand and showcase

For sales promotion and product presentation, a sales display stand as well as a stand showcase are available for the specialized trade.

When purchasing one of the indicated product arrangement variants, the respective sales display stand/showcase will be given to the specialized trade free of charge.\*

BENNING would like to submit your personal offer to you under:

Tel.: **++49 (0) 28 71/93 -420**  
 Fax: **++49 (0) 28 71/93 -429**  
 Email: **duspol@benning.de**

Free for special-  
ized trade\*



fig.: sales display stand with product arrangement\*

Free for special-  
ized trade\*



fig.: stand showcase with product arrangement\*

### Sales display stand

sales display stand made of metal including hole-wall hooks, wall hooks and catalogue box (filled with leaflets)

installation: suitable for standing position as well as for wall attachment

Dimensions (w x l x h): 500 x 300 x 800 mm

qty.	item no.	contents
2 x	050255	DUSPOL digital plus
2 x	050256	DUSPOL analog
2 x	050253	DUSPOL expert
2 x	050252	DUSPOL master
2 x	050254	DUSPOL combi
2 x	020022	PROFIPOD
2 x	050155	DUTEST
2 x	020050	TRITEST control
2 x	044028	BENNING MM 2
2 x	044035	BENNING CM 2

### Stand showcase

glass showcases with revolving door incl. safety lock, 3 tiers, bottom and top cover made of bright decorative beech wood, 1 set device identification plates and writing strip

installation: sales area

Dimensions (w x l x h): 430 x 370 x 1620 mm

qty.	item no.	contents
5 x	050255	DUSPOL digital plus
5 x	050256	DUSPOL analog
5 x	050253	DUSPOL expert
5 x	050252	DUSPOL master
5 x	050254	DUSPOL combi
5 x	050251	DUSPOL compact
5 x	050155	DUTEST
5 x	020050	TRITEST control
2 x	044027	BENNING MM 1
2 x	044028	BENNING MM 2
2 x	044076	BENNING MM 7
2 x	044079	BENNING MM 10
2 x	044034	BENNING CM 1
2 x	044035	BENNING CM 2
2 x	044057	BENNING CM 5

(\*) The delivery of a free sales display stand/showcase is only possible in connection with the purchase of the respective product sample variant.



## Product overview concerning testing and measuring functions

### Testing Devices



#### Voltage and Continuity Tester

	<b>DUSPOL® digital plus</b>	<b>DUSPOL® analog</b>	<b>DUSPOL® expert</b>	<b>DUSPOL® master</b>	<b>DUSPOL® combi</b>	<b>DUSPOL® compact</b>
<b>indication</b>	LCD digital	plunger system/LED	LED/LCD	LED/LCD	LED/LCD	LED
<b>indicating steps</b>	1.5 - 750 V	12 - 750 V	12 - 750 V	12 - 750 V	12 - 750 V	12 - 750 V
<b>continuity test</b>	-	-	buzzer + LED 90 kΩ	-	LCD 600 kΩ	-
<b>phase-sequence test</b>	yes/LCD	yes/LCD	yes/LCD	yes/LCD	-	-
<b>single-pole</b>	yes	yes	yes	yes	yes	-
<b>phase test</b>	LCD	LCD	LCD	LCD	LCD	-
<b>polarity test</b>	yes/LCD	yes/LED	yes/LED	yes/LED	yes/LED	yes/LED
<b>load connection via push buttons</b>	yes I <sub>S</sub> = 200 mA	plunger system I <sub>S</sub> = 32 mA	yes I <sub>S</sub> = 200 mA			
<b>vibrating alarm</b>	yes	-	yes	yes	yes	-
<b>measuring point illumination</b>	yes LED	-	yes LED	-	-	-
<b>protection class</b>	IP 64	IP 64	IP 64	IP 64	IP 64	IP 64
<b>item no.</b>	050255	050256	050253	050252	050254	050251

#### Voltage Tester, Continuity Tester, Phase-Sequence Indicator and Load Tester

	<b>PROFIPOL®</b>	<b>DUTEST® Continuity Tester</b>	<b>TRITEST® control</b>	<b>Z-TESTER load tester</b>
<b>indication</b>	LED	LED	LED	LED
<b>AC voltage</b>	6 - 400 V	-	400 - 690 V	230/400 V
<b>DC voltage</b>	6 - 400 V	-	-	-
<b>continuity test</b>	-	buzzer + LED 900 Ω/90 kΩ	-	-
<b>Phase-sequence test</b>	-	-	yes/LED	-
<b>Phase voltage indication</b>	-	-	yes/LED	-
<b>Pocket lamp function</b>	-	yes/bulb	yes/white LED	-
<b>polarity test</b>	yes/LED	-	-	-
<b>load connection via push button</b>	-	-	-	50 W/100 W I <sub>S</sub> = 270/470 mA
<b>protection class</b>	IP 65	IP 30	IP 30	IP 20
<b>item no.</b>	020022	050155	020050	050190

### Measuring Devices



#### Digital Multimeter

	<b>DIGIPOL</b>	<b>BENNING MM 1</b>	<b>BENNING MM 2</b>	<b>BENNING MM 3</b>	<b>BENNING MM 4</b>	<b>BENNING MM 5</b>
<b>indicating range</b>	3200	3200	1999	1999	4200	3400
<b>basic accuracy</b>	0.5 %	0.5 %	0.5 %	0.5 %	0.5 %	0.25 %
<b>AC voltage</b>	0.1 mV - 1000 V	1 mV - 600 V	0.1 mV - 750 V	0.1 mV - 600 V	1 mV - 600 V	1 mV - 750 V
<b>DC voltage</b>	0.1 mV - 1000 V	0.1 mV - 600 V	0.1 mV - 1000 V	0.1 mV - 600 V	1 mV - 600 V	0.1 mV - 1000 V
<b>AC current</b>	-	-	0.1 μA - 20 A	0.1 μA - 20 A	0.1 A - 300 A	10 μA - 10 A
<b>DC current</b>	-	0.1 μA - 3.2 mA	0.1 μA - 20 A	0.1 μA - 20 A	-	10 μA - 10 A
<b>resistance</b>	0.1 Ω - 32 MΩ	0.1 Ω - 32 MΩ	0.1 Ω - 20 MΩ	0.1 Ω - 20 MΩ	0.1 Ω - 42 MΩ	0.1 Ω - 30 MΩ
<b>continuity/diode</b>	-	yes	yes	yes	yes	yes
<b>frequency</b>	-	-	-	1 Hz - 200 kHz	-	1 Hz - 30 MHz
<b>capacity</b>	-	-	-	1 pF - 200 μF	-	-
<b>temperature</b>	-	-	-	-	-	-
<b>interface</b>	-	-	-	-	-	-
<b>software</b>	-	-	-	-	-	-
<b>memory/ data log function</b>	HOLD	HOLD	-	-	HOLD	HOLD
<b>measuring method</b>	RMS	RMS	RMS	RMS	RMS	RMS
<b>measuring category</b>	CAT II 1000 V	CAT III 600 V	CAT III 600 V	CAT II 600 V	CAT II 600 V	CAT III 600 V
<b>item no.</b>	050174	044027	044028	044029	044073	044074

## Product overview concerning testing and measuring functions

### Measuring Devices



#### Digital Multimeter

	BENNING MM 6	BENNING MM 7	BENNING MM 8	BENNING MM 9	BENNING MM 10	BENNING MM 11
indicating range	4000	4000	6000	6000	6000	20000
basic accuracy	0.25 %	0.25 %	0.5 %	0.5 %	0.5 %	0.06 %
AC voltage	0.1 mV - 750 V	0.1 mV - 750 V	0.1 mV - 750 V	0.1 mV - 750 V	0.1 mV - 750 V	1 µV - 750 V
DC voltage	0.1 mV - 1000 V	0.1 mV - 1000 V	0.1 mV - 1000 V	0.1 mV - 1000 V	0.1 mV - 1000 V	1 µV - 1000 V
AC current	10 µA - 10 A	10 µA - 10 A	–	1 mA - 10 A	1 mA - 10 A	1 µA - 10 A
DC current	10 µA - 10 A	10 µA - 10 A	0.1 µA - 6 mA	0.1 µA - 10 A	0.1 µA - 10 A	1 µA - 10 A
resistance	0.1 Ω - 40 MΩ	0.1 Ω - 40 MΩ	0.1 Ω - 60 MΩ	0.1 Ω - 60 MΩ	0.1 Ω - 60 MΩ	10 mΩ - 2 GΩ
continuity/diode	yes	yes	yes	yes	yes	yes
frequency	1 Hz - 40 MHz	1 Hz - 40 MHz	1 Hz - 60 MHz	1 Hz - 60 MHz	1 Hz - 60 MHz	0.01 Hz - 1 MHz
capacity	1 pF - 40 mF	1 pF - 40 mF	1 pF - 6 mF	1 pF - 6 mF	1 pF - 6 mF	1 pF - 40 mF
temperature	–	-20 °C up to + 800 °C	–	–	–	-200 °C up to +1200 °C
interface	–	–	–	–	RS 232, optical	RS 232, optical
software	–	–	–	–	PC-Win MM 10	PC-Win MM 11
memory/ data log function	HOLD	HOLD	HOLD	HOLD	HOLD	1000 memory locations 40000 memory locations
measuring method	TRUE RMS	TRUE RMS	RMS	TRUE RMS	TRUE RMS	TRUE RMS
measuring category	CAT III 600 V	CAT III 600 V	CAT IV 600 V	CAT IV 600 V	CAT IV 600 V	CAT III 600 V
item no.	044075	044076	044077	044078	044079	044080



#### Digital Current Clamp Meter/Current Clamp Adapter

	BENNING CM 1	BENNING CM 2	BENNING CM 3	BENNING CM 4	BENNING CM 5	BENNING CM 6	BENNING CM 7	Adapter CC 1
indicating range	1999	3999	1999	4000	4000	4000	4000	–
basic accuracy	1 %	0.5 %	1.9 %	0.7 %	0.7 %	0.7 %	0.7 %	1.9 %
AC voltage	1 V - 600 V	0.1 mV - 600 V	–	0.1 V - 600 V	0.1 V - 600 V	0.1 V - 750 V	0.1 V - 750 V	–
DC voltage	1 V - 600 V	0.1 mV - 600 V	–	0.1 V - 600 V	0.1 V - 600 V	0.1 V - 1000 V	0.1 V - 1000 V	–
AC current	0.1 A - 200 A	10 mA - 300 A	0.1 A - 600 A	0.1 A - 600 A	0.1 A - 600 A	0.1 A - 1000 A	0.1 A - 1000 A	1 A - 400 A
DC current	–	10 mA - 300 A	0.1 A - 600 A	–	0.1 A - 600 A	–	0.1 A - 1000 A	–
resistance	1 Ω - 2000 Ω	100 mΩ - 40 MΩ	–	0.1 Ω - 400 Ω	0.1 Ω - 400 Ω	0.1 Ω - 400 Ω	0.1 Ω - 400 Ω	–
continuity	yes	yes	–	yes	yes	yes	yes	–
frequency	–	–	–	1 Hz - 400 Hz	1 Hz - 400 Hz	1 Hz - 400 Hz	1 Hz - 400 Hz	–
memory MIN/MAX/ZERO function	–	MAX ZERO	–	MIN/MAX	MIN/MAX ZERO	MIN/MAX	MIN/MAX ZERO	–
measuring value/ peak value memory	HOLD	HOLD	HOLD	HOLD	HOLD	HOLD	HOLD	–
measuring method	RMS	RMS	RMS	RMS	TRUE RMS	RMS	TRUE RMS	RMS
max. clamp opening	12.5 mm	25 mm	38 mm	37 mm	45 mm	53 mm	53 mm	30 mm
measuring category	CAT III 600 V	CAT II 600 V	CAT II 600 V	CAT III 600 V	CAT III 600 V	CAT IV 600 V	CAT IV 600 V	CAT II 600 V
item no.	044034	044035	044031	044056	044057	044058	044059	044037



#### Appliance tester VDE 0701/0702

	BENNING 700
measuring according to DIN VDE 0701/0702, UVV BGV A2	protective conductor resistance, insulating resistance, protective conductor current, contact current, compensating leakage current, voltage neutrality test
indicating range	99999 digits
functional test	260 V/16 A
measuring value memory	199 test units
interface	RS 232 + barcode reader
optional accessories	software BENNING PC-Win 700, barcode reader/barcode labels, test badges, 16 A/32 A three-phase measuring adapter
item no.	050305

further accessories of your choice: see page 42

#### Insulation/Resistance measuring device VDE 0100

	BENNING IT 100
measuring according to DIN VDE 0100/0105	insulation, low-impedance resistance
indicating range	2000 digits (illumination)
AC/DC voltage	1 V - 1000 V
insulating resistance	0.01 MΩ - 2000 MΩ
low-impedance resistance	0.01 Ω - 20 Ω
resistance	1 Ω - 2000 Ω
continuity test	buzzer/30 Ω
internal battery capacity	0 - 100 %
measuring category	CAT III 600 V
item no.	044032

### Safety Devices



### 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 55 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.

Further fields of activity of the BENNING Company are the manufacturing of traction chargers for battery-driven vehicles, power supply systems for industry, medical engineering, IT and telecommunications as well as repair and maintenance of electrical machines. First-class quality and high reliability have given a good reputation worldwide to BENNING products. These factors as well as the committed and fair cooperation of all BENNING employees are the principles of the company's success.

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### *DUSPOL*® – a trademark goes around the world

The trademarked product *DUSPOL*® is patented by a series of international patents and stands for absolutely safe Voltage Testers which are manufactured according to highest quality requirements.

The international standard IEC/EN 61243-3 (DIN VDE 0682-401) ensures uniform testing criteria worldwide which guarantee product safety on the highest level.

The compliance with the relevant standards of all *DUSPOL*®-Voltage Testers has been tested by the independent VDE Test and Certification Institute and has been confirmed by being granted the VDE/GS mark of conformity.

### BENNING measuring devices – always top quality

The comprehensive BENNING range of measuring devices offers optimum solutions for all fields of application in industry, craft and service. The product range consists of devices with the common RMS measuring method and of devices which indicate the true RMS value (TRUE RMS measuring method). BENNING measuring instruments distinguish by precise measuring results and guarantee safety up to the highest measuring category CAT IV.

The Digital Multimeters *BENNING MM 10* and *MM 11* are equipped with an optical RS 232 interface as well as with a memory and a data logging function. A protocol and analysis software is enclosed in the delivery.

The internationally valid standard IEC/EN 61010-1 (DIN VDE 0411-1) ensures uniform testing criteria worldwide which guarantee product safety on the highest level.

The compliance with the relevant standards of all Multimeters and Current clamps has been tested by the independent VDE Test and Certification Institute and has been confirmed by being granted the VDE/GS mark of conformity.

### BENNING – the specialist for electrical safety

For rational safety tests of electrical equipment and systems according to the standards DIN VDE 0701/702 and DIN VDE 0413, the practically proven devices *BENNING 700* and *BENNING IT 100* are available.

# BENNING

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