

Demonstration Case

BENNING DB 1

part no. 044132

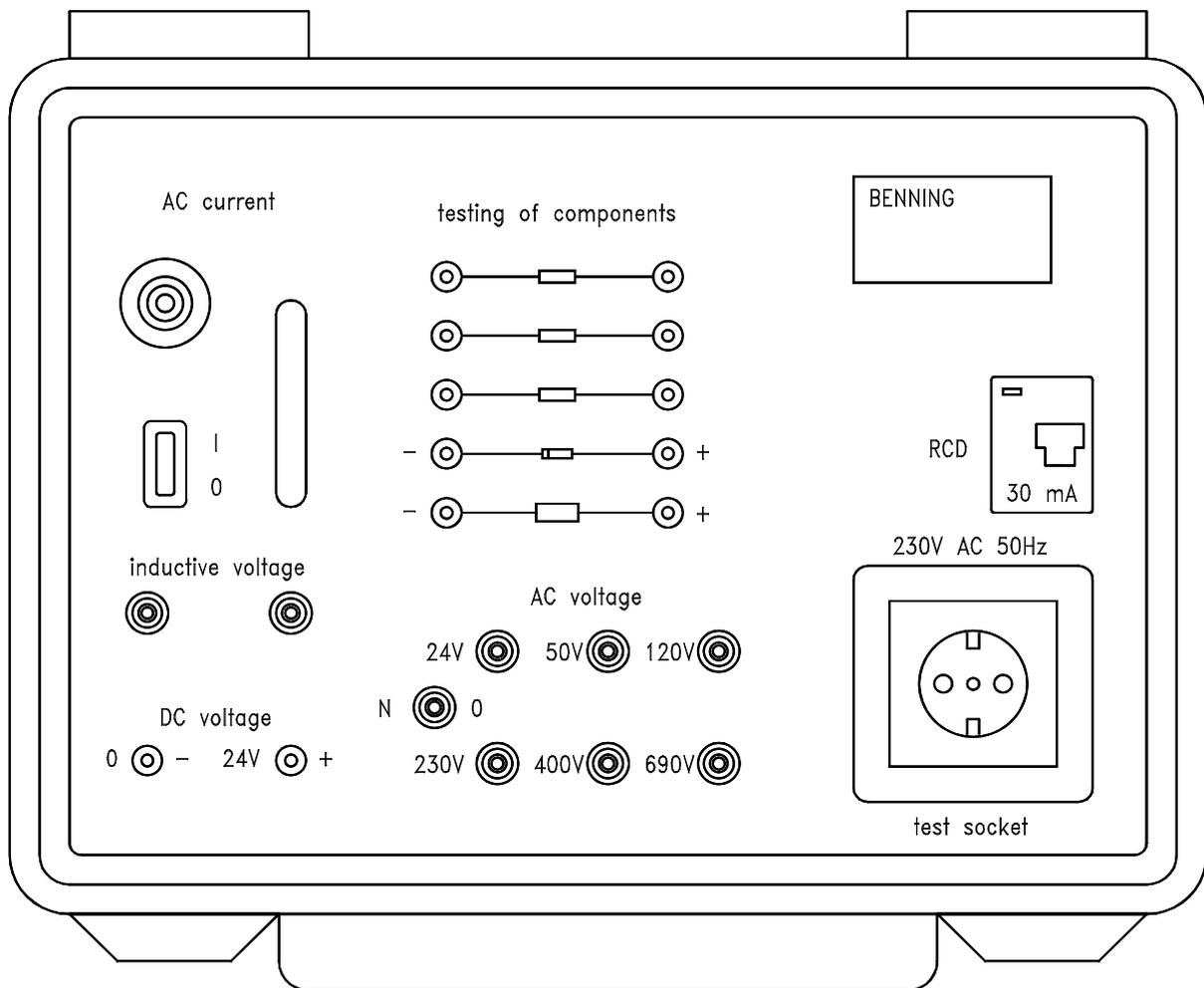


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1 Introduction

The demonstration case BENNING DB1 has been designed in order to be able to present measuring instruments, current clamps and voltage testers as quickly as possible.

This operating manual contains information that is necessary for proper operation of the device. Please read this operating manual thoroughly in order to ensure proper and safe operation of the device. All instructions contained in this operating manual have to be observed!

Thus, the following can be ensured:

- prevention of dangers during operation
- prevention of dangers for the user
- prevention of downtimes
- increased reliability and lifetime of the device.

Please keep this operating manual for later use!

After-sales service

Please contact the expert personnel of the supplier or manufacturer for further information.

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2 Safety instructions

The device has been built and tested in accordance with the applicable regulations (see chapter 3) and has left the factory in perfectly safe technical condition.

To preserve this condition and to ensure safe operation of the device, the user must observe the instructions and warnings given in this operating manual at all times.

The device complies with category I. It must be connected to a single-phase mains with 230 V, 50Hz, pre-fuse 16A only.



Please observe that working on live parts and electrical components of all kinds is dangerous! Even low voltages of 30 V AC and 60 V DC may be dangerous to human life!

This device must be operated by qualified electricians, "electrotechnically trained persons" or under responsibility of a qualified electrician only.

Please observe the corresponding operating manuals of the devices to be tested / to be connected (multimeters, voltage testers)!

The device must be used in dry rooms only. The device outputs are not intended for permanent operation, but only for short-time tests!



Before starting the device, always check the device as well as all cables for damages.

If it can be assumed that safe operation is no longer possible, switch the device off immediately and secure it against unintended operation.

Safe operation can be assumed to be no longer possible, if

- the device exhibits visible damage,
- the device no longer works,
- the device has been stored under unfavourable conditions for a longer period of time,
- the device was exposed to extraordinary stress during transport.



Do not connect any external voltage to the "test socket" and the measuring jacks. Otherwise, the device might be damaged!

3 Applicable regulations

Measurements / tests

BetrSichV
BGV A3 (German Health and Safety at Work Regulation)

Demonstration case (testers and measuring instruments)

DIN EN 60529 (VDE 0470 Part 1) (IP)
DIN EN 61010-1 (VDE 0411 Part 1) (device)
DIN EN 61326 –1 (VDE 0843 Part 20-1) (EMC)

4 Device description

For its active output voltages, the BENNING demonstration case requires a mains voltage of 230 V 50 Hz. The device (demonstration case) must be connected to a protected shock-proof socket 230 V by means of the enclosed mains cable.

The different output voltages are generated by an isolating transformer. All output voltages, except for the DC 24 V voltage, have the same potential and refer to the blue jack "N" (0).

The test socket, but with interconnected 30 mA FI safety switch, is paralleled to the measuring jacks (0 - 230V).

In order also to be able to perform phase measurements (only possible with grounded mains!), the "N" connection (blue jack, 0) is connected to the mains protective conductor with a current-limiting safety capacitor (max. 0.5 mA).

Capacitive and inductive reactive voltages in idle lines only occur, if they pass active (current-carrying) lines (possibly the same cable bundle). In this case, it is hardly possible to determine the absence of voltage by means of a high-impedance measuring instrument or a voltage tester.

The "reactive voltage" (green measuring jacks) is simulated by means of a multiplier resistor at the 230 V output voltage.

A separate, galvanically isolated coil with rectification, smoothing and subsequent stabilization is used to test a DC voltage (24 V, black and red jack).

AC current clamps can be put into operation at the semicircular current loop. For this purpose, the adjacent switch must be set to position I.

The passive components – 3 resistors, 1 diode and 1 capacitor - are connected to separate jacks in a potential-free way.

4.1 Measuring / testing

Connect the device to the mains. The IEC connector with two fuses and a mains switch is situated at the rear. Connect it to the enclosed mains cable and a shock-proof socket (230 V). The device is immediately ready for operation.

AC current measurement

AC current measurements are carried out by means of a current clamp. Set the switch to position I (the lamp lights) and enclose the semicircular current loop by means of the current clamp. The measured value is displayed (approx. 2.4A).

AC voltage measurement

Set the multimeter to AC voltage. The DUSPOL voltage tester automatically displays AC/DC voltage. Connect the COM measuring line (black) or the DUSPOL probe handle to the blue jack "N" (0) and the red measuring line or the DUSPOL display handle to the desired voltage measuring jack (24 / 50 / 120 V - yellow; 230 / 400 / 690 V - red) and read the displayed value.

AC phase test

AC phase tests are carried out by means of the DUSPOL voltage tester (equipped for single-pole phase tests). Bring the display handle of the voltage tester in contact with the measuring jacks=> 230 V or with the right jack (L) of the test socket. The phase will be displayed.

DC voltage measurement

Set the multimeter to DC voltage. The DUSPOL voltage tester automatically displays AC/DC voltage. Connect the COM measuring line (black) or the DUSPOL probe handle to the black jack (0 V - 24 V) and the red measuring line or the DUSPOL display handle to the red jack (+ 24 V) and read the displayed value.

Reactive voltage measurement (simulation)

Reactive voltage measurements are carried out by means of the DUSPOL voltage tester (with load connection!). Connect the voltage tester to the green jacks (reactive voltage). Voltage signaling approx. 50 - 150 V. Activate both push-buttons (load connection; voltage signaling approx. 6 V).

Voltage indication with a high-impedance multimeter is approx. 215 V AC. Therefore, it is hardly appropriate for testing the absence of voltage!

FI safety switch release 30 mA

This test is carried out by means of the DUSPOL voltage tester (with load connection!). Connect the voltage tester to the test socket, the right jack (L) and a "protective conductor spring". Voltage signaling 230 V. Activate both push-buttons (load connection), FI will be triggered!

Component test

The component test is carried out by means of a corresponding multimeter or a DUSPOL voltage tester with continuity test.

Resistance test,

Set the function of the multimeter to position resistance / ohms and connect the measuring lines (or the DUSPOL tester with continuity test) to the measuring jacks for resistance. Read the measured value or observe the maximum measured value of the DUSPOL voltage tester respectively! The multimeter displays the resistance values in ohms (22 / 1k / 470 k).

Diode test

Set the function of the multimeter to position diode / . Connect the COM measuring line (black) to the black diode jack (-) and the red measuring line to the red diode jack (+). Then, read the displayed value. The display shows the forward voltage of the diode (approx. 0.55 V).

Capacitor test

Set the function of the multimeter to position capacitor / . Connect the COM measuring line (black) to the black capacitor jack (-) and the red measuring line to the red capacitor jack (+). Then, read the displayed value. The display shows the capacity (approx. 10 μ F) of the capacitor.

4.2 Operating elements and connections

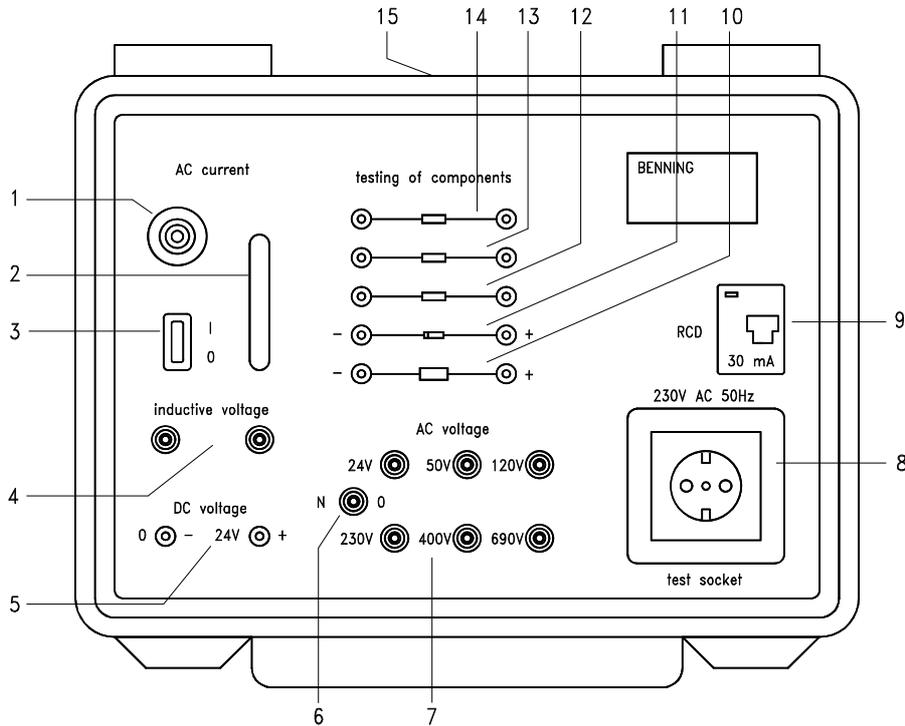


Fig. 1 demonstration case without cover

Caption for fig. 1:

- 1 lamp for AC load
- 2 AC current line
- 3 AC switch 0 - I
- 4 pair of jacks, green, reactive voltage
- 5 pair of jacks, black 0 (-) and red (+) 24 V DC
- 6 jack, blue, "N" (0) for AC voltages, 24 690 V
- 7 jacks, yellow for AC 24 / 50 / 120 V; red for AC 230 / 400 / 690 V
- 8 test socket 230 V AC 50 Hz, with FI safety switch
- 9 FI safety switch 230 V 50 Hz, 30 mA
- 10 component, capacitor, 10µF
- 11 component, diode, forward voltage approx. 0.55 V
- 12 component, resistor, 470 kohms
- 13 component, resistor, 1 kohm
- 14 component, resistor, 22 ohms
- 15 IEC connector with two fuses, mains switch and lamp "ON"

4.3 Technical data

Mains connection:	230 V \pm 10 %, 50 - 60 Hz
Current consumption:	approx. 0.6 A
Max. pre-fuse:	16 A
Built-in microfuse (F1, F2):	T 1 A (250 V, 5x20)
Current load of the voltage measuring jacks and the test socket	max. 0.2 A – for short-time operation only!
Temperature fuse (in the transformer)	80 °C
AC current measurement (7 windings) (halogen lamp 12 V 5 W)	display, approx. 2.4 A
FI safety switch (for release test)	230 V, 30 mA
Protection class:	I
Protection category:	IP 30 with the cover being open IP 50 with the cover being closed
Overvoltage category:	II
Contamination level:	2
Ambient conditions:	height up to 2000 m NN
- temperature range:	0 to 35 °C (operating temperature) -20 to 60 °C (storage temperature)
- max. relative humidity:	80 % up to 30 °C linearly decreasing 60 % up to 40 °C
Temperature range for tolerances:	18 to 28 °C
Housing:	carrying case, shock-resistant
Device regulations:	see chapter 3
Dimensions (max.):	height x width x depth 170 x 410 x 350 mm
Weight:	approx. 5 kg

5 Maintenance

On the mains side, the device is protected by means of two microfuses. For fuse replacement, it is absolutely important to disconnect the mains cable and thus to make sure that the device is free of voltage!

The microfuse holder is situated at the rear of the device.

Use fuses of the same type and characteristic only!

In case of longer overload or load, the thermal fuse integrated in the transformer will be triggered (all output voltages are switched off).

After an appropriate pause and cooling down of the device (transformer), the thermal fuse is reset!

Please check the built-in FI safety switch for correct functioning in certain intervals!

Clean the device by means of a slightly moistened cloth and a mild detergent. Do not use any solvents or abrasives!



Environmental protection!

At the end of product life, dispose of the unserviceable device via appropriate return or collecting facilities provided in your community.

6 Calibration

The device does not require any calibration.

7 Scope of delivery

- BENNING demonstration case (plastics carrying case)
- mains cable with shock-proof plug and IEC socket
- brief operating manual (glued in the device cover)
- operating manual
- spare fuse (enclosed under the housing cover)