

- D** Bedienungsanleitung
- GB** Operating manual
- F** Mode d'emploi
- E** Manuel de instrucciones
- BG** Инструкция за експлоатация
- CZ** Návod k použití zkoušečky
- FIN** Käyttöohje
- GR** Οδηγίες χρήσεως
- H** Használati utasítás
- I** Istruzioni per l'uso
- LT** Naudojimosi instrukcija
- N** Bruksanvisning
- NL** Gebruiksaanwijzing
- PL** Instrukcja obsługi
- RUS** Инструкция по эксплуатации индикатора напряжения
- S** Bruksanvisning
- TR** Kullanma Talimatı
- YU** Priručnik za upotrebu

## Operating manual DUSPOL® expert

Before using the voltage tester DUSPOL® expert: Please read the operating manual carefully and always observe the safety instructions!

### List of contents:

1. Safety instructions
2. Functional description of the voltage tester
3. Functional test of the voltage tester
4. How to test AC voltages
- 4.1 How to test the phase at AC voltage
5. How to test DC voltages
- 5.1 How to test the polarity at DC voltage
6. How to test the phase sequence of a three-phase mains
7. How to test an electrically conductive connection (continuity check)
8. Battery replacement
9. Technical data
10. General maintenance
11. Environmental notice

### 1. Safety instructions:

- Hold the voltage tester only by the insulated handles **A** and **B** and do not touch the contact electrodes (probe tips) **1**!
- Immediately before use: Check the voltage tester for correct operation! (see chapter 3). The voltage tester must not be used if one or several display functions fail or if the voltage tester is not ready to operate (IEC 61243-3)!
- At operating sites with a high noise level, it has to be checked before use if the test signal can be perceived.
- The voltage tester must be used only within the nominal voltage range of 12 V up to AC 690 V/ DC 750 V!
- Do not operate the voltage tester with the battery compartment being open!
- The voltage tester complies with protection class IP 64 and therefore can also be used under wet conditions (designed for outdoor use).
- For testing, firmly grasp the voltage tester by the handles **A** and **B**.
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- The voltage tester only operates correctly within the temperature range of -10 °C up to +55 °C at relative air humidity of 20 % up to 96 %.
- Do not dismantle the voltage tester!
- Please protect the housing of the voltage tester against contamination and damages!
- Please store the voltage tester under dry conditions.
- To prevent injuries and discharge of the battery, provide the contact electrodes (probe tips) with the enclosed cover after using the voltage tester!

### Attention:

After maximum load (i.e. after a measurement of 30 seconds at AC 690 V/ DC 750 V), the voltage tester must not be used for a duration of 240 seconds! The voltage tester is marked with international electric symbols and symbols for indication and operation with the following meaning:

symbol	meaning
	Device or equipment for working under voltage
	Push button
	Alternating current (AC)
	Direct current (DC)
	Direct and alternating current (DC and AC)
	Push button (manually actuated); indicates that respective indications only occur when both push buttons are actuated
	Phase-sequence clockwise
	Phase-sequence indication; the phase sequence can only be indicated at 50 or 60 Hz and in a earthed mains

	This symbol shows the correct alignment of the batteries to ensure correct polarity
	Signal lamp, optical signal for continuity check
	Buzzer, acoustic signal for continuity check
<b>R</b>	Symbol for phase and phase-sequence indication (phase-sequence clockwise)

### 2. Functional description

The DUSPOL® expert is a two-pole voltage tester according to IEC 61243-3 with visual display. As a supplementary device, the voltage tester is equipped with a phase indication, phase-sequence indication, measuring point illumination and a continuity check function. The supplementary functions – except the phase indication – are supplied via two replaceable micro batteries (LR 03/ AAA). The signalling of the continuity check is done optically and acoustically. The voltage tester is designed for DC and AC voltage tests within the voltage range of 12 V up to AC 690 V/ DC 750 V. It can be used to perform polarity tests in DC and phase tests in AC. The voltage tester indicates the phase-sequence provided that the neutral is earthed. The voltage tester consists of the test probes L1 **A** and L2 **B** and a connecting cable **3**. The test probe L1 **A** is equipped with a display **2**. Both test probes are provided with push buttons **4**. Without pressing both push buttons, the following voltage steps (AC or DC) can be indicated: 24 V+, 24 V-, 50 V, 120 V, 230 V, 400 V, AC 690 V/ DC 750 V. By pressing both push buttons, the voltage tester switches to a lower internal resistance (suppression of inductive and capacitive voltages). Thus, also the indication of 12 V+ and 12 V- is activated. Furthermore, a vibrating motor (motor with a flyweight) is put under voltage. From approximately 200 V this motor is set in rotation. With the voltage increasing, the motor's speed and vibration increases as well so that additionally by means of the handle of test probe L2 **B** the voltage value can be estimated roughly (e.g. 230/ 400 V). The duration of the test with a lower internal resistance of the device (load test) depends on the value of the voltage to be measured. To prevent excessive warming of the voltage tester, it is equipped with a thermal protection (reverse control). With this reverse control, the speed of the vibrating motor decreases as well. The measuring point illumination can be activated by pressing the push button **5** of test probe L1 **A**. For the voltage measurement with ripple (two-pole measurement), the illumination is activated with reduced brightness. The activation of the continuity check can be introduced by bringing together the two contact electrodes **1**.

### Display field

The display system consists of high-contrast light-emitting diodes (LED) **4** indicating DC and AC voltages in steps of 12; 24; 50; 120; 230; 400; AC 690 V/ DC 750 V. The indicated voltages are nominal voltages. With DC voltage, the LEDs also indicate the polarity for 12 V and 24 V (see chapter 5). The 12 V LED can only be activated by pressing both push buttons.

### LC display

The LC display **5** serves for the phase test with alternating current (AC) and indicates the phase-sequence of a three-phase mains.

### 3. Functional check

- The voltage tester must be used only within the nominal voltage range of 12 V up to AC 690 V/ DC 750 V!
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- Check the voltage tester for correct function immediately before use!
- Test all functions by means of known voltage sources.
  - For DC voltage tests use e.g. a car battery.
  - For AC voltage tests use e.g. a 230 V socket.
  - Connect both contact electrodes **1** to test the continuity check for correct function.
  - Check the battery status for the phase-sequence indication by activating the measuring point illumination. Replace the batteries, if necessary.

Do not use the voltage tester unless all functions are operating correctly! Check the function of the LC display **5** by single-pole connection of the contact electrode **1** of the test probe L1 **A** to an external conductor (phase).

### 4. How to test the phase at AC voltage

- The voltage tester must be used only within the nominal voltage range of 12 V up to AC 690 V!
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- Firmly grasp the insulated handles **A** and **B** of the test probes L1 and L2.
- Place the contact electrodes **1** of the test probes L1 **A** and L2 **B** against the relevant points of the unit under test.
- For AC voltages from 24 V onwards and when pressing both push buttons (load test) from 12 V onwards, the LEDs "plus" and "minus" **6** and **7** light up. Furthermore, all LEDs light until the step value of the applied voltage is reached.
- When pressing both push buttons **4** and from an applied voltage of approx. 200 V onwards, a vibrating motor is put in rotation inside the test probe L2 **B**. With the voltage increasing, the speed of this motor is increasing as well.

Please make sure that you touch the voltage tester at the insulated handles of test probes L1 **A** and L2 **B** only! Do not cover the display and do not touch the contact electrodes **1**!

#### 4.1 How to test the phase at AC voltage

- The voltage tester must be used only within the nominal voltage range of 12 V up to AC 690 V!
- The phase test is possible in the earthed mains from 230 V onwards!
- Firmly grasp the handle of test probe L1 **A**.
- Place the contact electrode **1** of test probe L1 **A** against the relevant point of the unit under test.
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- If the "R" symbol appears on the LC display **5**, the tester is in contact with the live phase of an AC voltage on this point of the unit under test.

Never touch the contact electrode of test probe L2 **B** during the single-pole test (phase test)!

### Note:

The reading of the LC display **5** might be impaired due to unfavorable light conditions, protective clothing or in insulated locations.

### Attention:

The absence of voltage can be detected by means of a bipolar test only.

### 5. How to test DC voltages

- The voltage tester must be used only within the nominal voltage range of 12 V up to DC 750 V!
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- Firmly grasp the insulated handles **A** and **B** of the test probes L1 and L2.
- Place the contact electrodes **1** of the test probes L1 **A** and L2 **B** against the relevant points of the unit under test.
- For AC voltages from 24 V onwards and when pressing both push buttons (load test) from 12 V onwards, the LEDs "plus" and "minus" **6** and **7** light up. Furthermore, all LEDs light until the step value of the applied voltage is reached.
- When pressing both push buttons **4** and from an applied voltage of approx. 200 V onwards, a vibrating motor is put in rotation inside the test probe L2 **B**. With the voltage increasing, the speed of this motor is increasing as well.

Please make sure that you touch the voltage tester at the insulated handles of test probes L1 **A** and L2 **B** only! Do not cover the display and do not touch the contact electrodes **1**!

#### 5.1 How to test the polarity at DC voltage

- The voltage tester must be used only within the nominal voltage range of 12 V up to DC 750 V!
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- Firmly grasp the insulated handles **A** and **B** of the test probes L1 and L2.
- Place the contact electrodes **1** of the test probes L1 **A** and L2 **B** against the relevant points of the unit under test.
- If LED **6** lights up, the "positive pole" of the unit under test is at test probe **A**.
- If LED **7** lights up, the "negative pole" of the unit under test is at test probe **A**.

Please make sure that you touch the voltage tester at the insulated handles of test probes L1 **A** and L2 **B** only! Do not cover the display and do not touch the contact electrodes **1**!

### 6. How to test the phase sequence of a three-phase mains

- The required auxiliary voltage is provided by the power supply (2 x 1.5 V batteries) integrated into test probe L1 **A**. Check the functional status of the batteries before measuring by activating the measuring point illumination.
- The voltage tester must be used only within the nominal voltage range of 12 V up to AC 690 V!
- The phase-sequence test is possible from 230 V AC voltage (phase against phase) onwards in a earthed three-phase mains.
- Firmly grasp the insulated handles **A** and **B** of the test probes L1 and L2.
- Place the contact electrodes **1** of the test probes L1 **A** and L2 **B** against the relevant points of the unit under test.
- The LEDs have to indicate the external conductor voltage.
- Never connect the voltage tester to voltage for longer than 30 seconds (maximum permissible operating time = 30 s)!
- When contacting the two contact electrodes **1** with two phases of a three-phase mains connected in clockwise rotation, the LC display **5** indicates the "R" symbol. If for two phases the rotation is anti-clockwise, no symbol appears on the LC display.

The phase-sequence test always requires a counter-test! If the LC display **5** indicates clockwise rotation for two phases of a three-phase mains, those two phases must be contacted again with reversed contact electrodes **1** during the counter-test. There must be no symbol indicated on the LC display during the counter-test. If in both cases the LC display indicates the "R" symbol, the earthing is too weak or the batteries are empty.

### Attention!

In case of empty batteries, „R“ indication for clockwise and anti-clockwise rotation!

### Note:

The reading of the LC display **5** might be impaired due to unfavorable light conditions, protective clothing or in insulated locations.

### 7. How to test an electrically conductive connection (continuity check)

- The continuity check must be performed on the relevant points of a "dead" (not being under voltage) unit under test. If necessary, the capacitors must be discharged.
- The necessary test voltage is supplied by means of the power supply (2 x 1.5 V batteries) integrated in the test probe L1 **A**.
- The test is possible within the range of 0 - 108 kΩ.
- Firmly grasp the handles L1 **A** and L2 **B**.
- Place the test probes L1 **A** and L2 **B** with the contact electrodes **1** against the relevant points of the unit under test.
- When contacting an electrically conductive connection with the contact electrodes **1**, the voltage tester gives an acoustic signal and the signaling LED **8** lights up.

### 8. Battery replacement

Do not set the voltage tester under voltage with the battery compartment being open! The energy supply for the phase-sequence indication, illumination and continuity check of the DUSPOL® expert is done by means of two built-in micro batteries (LR03/ AAA). Battery replacement is necessary as soon as illumination does not work anymore. In this case, the battery voltage is below 2.2 V.

#### How to replace the batteries:

Take a screw driver and open the battery compartment (next to the cable outlet) by a ¼-turn in direction of the arrow (counter-clockwise). The slot is now vertical and the battery compartment with the batteries can be removed. Remove the discharged batteries from the battery compartment. Insert the new batteries with correct polarity (see marking) into the battery compartment. Put the battery compartment with the batteries back onto the handle and lock it by ¼-turn in clockwise direction (slot must be horizontal and the marking points are opposite!). Make sure not to damage the O ring. If necessary, it has to be replaced.

#### Battery disposal:

Do not dispose of batteries with the household garbage. You as a consumer are legally obliged to return used batteries. You can return used batteries to public collection facilities in your community area or return them to any retail outlet selling similar batteries. Avoid using batteries containing dangerous substances!

### 9. Technical data:

- Guideline for two-pole voltage testers: IEC 61243-3
- Protection class: IP 64, IEC 60529 (DIN 40050)
- IP 64 means: Protection against access to dangerous parts and protection against solid impurities, dustproof, (6 - first index). Splash proof, (4 - second index). Can also be used in case of precipitation.
- Nominal voltage range: 12 V to AC 690 V/ DC 750 V
- Internal resistance, measuring circuit: 220 kΩ, parallel 3.9 nF (1.95 nF)
- Internal resistance, load circuit – both push buttons actuated!: approx. 3.7 kΩ... (150 kΩ)
- Current consumption, measuring circuit: max. I<sub>n</sub> 3.5 mA (690 V) AC/ 3.4 mA (750 V) DC
- Current consumption, load circuit – both push buttons actuated!: I<sub>0</sub> 0.2 A (750 V)
- Polarity indication: LED +; LED - (indicating handle = positive polarity)
- Indicating steps LED: 12 V+, 12 V-, 24 V+, 24 V-, 50 V, 120 V, 230 V, 400 V and 690 V (\*: only with both push buttons actuated)
- max. indicating errors: U<sub>n</sub> ± 15 %, ELV U<sub>n</sub> - 15 %
- Nominal frequency range f: 0 to 60 Hz
- Phase and phase-sequence indication 50/ 60 Hz
- Phase and phase-sequence indication: ≥ U<sub>n</sub> 230 V
- Vibrating motor, starting: ≥ U<sub>n</sub> 230 V
- max. permissible operating time: ED = 30 s (max. 30 seconds), 240 s pause
- Test current, continuity check: max. 2 μA
- Testing range, conducting resistance: 0 - 108 kΩ,
- Sound level acoustic signal: 55 dB
- Measuring point illumination (in 30 cm): 10 Lux
- Current consumption measuring point illumination: 46 mA
- Current consumption continuity check: 83 mA
- Current consumption automatic switch-on illumination: 23 mA
- Battery: 2 x Micro, LR03/ AAA
- Weight: approx. 200 g
- Connecting cable length: approx. 900 mm
- Operating and storing temperature range: -10 °C to +55 °C (climate category N)
- Relative air humidity: 20 % to 96 % (climate category N)
- Reverse control times (thermal protection):

voltage	time
230 V	30 s
400 V	9 s
750 V	2 s

### Attention!

The phase-sequence indication, measuring point illumination and continuity check do not work anymore, if the batteries are empty! Remove the batteries if not using the voltage tester for a longer period of time!

### 10. General maintenance:

Clean the exterior of the housing with a clean dry cloth (exception: special cleansing cloths). Do not use solvents and/ or abrasives to clean the voltage tester. Make sure not to contaminate the battery compartment and the battery contacts with leaking battery electrolyte. Should such electrolyte contamination or white deposits occur near the battery or the battery housing, these must also be removed with a dry cloth. In case of wear or damaging of the O ring of the battery compartment, the voltage tester does not comply with the indicated protection class anymore (protection against dust and water). In this case, the O ring must be replaced. The O ring can be ordered under the BENNING piece number 772897. Moisten a new O ring with glyzerin or talcum so that the battery compartment can be locked and unlocked easily.

### 11. Environmental notice

At the end of the product's useful life, please dispose of it at appropriate collection points provided in your country.

