GOSSEN METRAWATT

3-349-592-02
Operating Instructions 7/11.18

METRAVOLT 12D+L

Voltage-Continuity Tester

1 Test electrodes
2 Red ⚠-LED for hazardous voltages ≥ 50 V AC / 120 V DC
3 Green LED „Ω“ for continuity 0 ... 1999 kΩ (acoustic signal signalizes continuity)
4 RED LEDs for rotating field left/right
5 Display (LCD)
6 Button (HOLD): function to recording values
7 Button (Ω/V): change-over switch for resistance and voltage measurements and zero balancing of the kΩ range
8 Button (⏻): switch on/off (manual) and function test
9 Handgear
10 Connecting line

Symbols on the instrument

⚠ Attention! Observe user instructions!

CE Indicates EC conformity

TR_{on} On-time at highest nominal voltage

RT_{off} Recovery time after tests with highest nominal voltage

Device for live working

This devices may not be disposed with the domestic waste (WEEE 2012/19/EU).

1. Application
The METRAVOLT 12D+L is a two-pole voltage tester with digital display. It complies with DIN EN 61243-3 (VDE 0682 part 401) and is provided with continuity and phase tester, polarity tester and phase sequence indicator. With this device you can determine the existence and the strength of AC and DC voltages within a range of 24 V to 1000 V at frequencies up to 4 kHz.
With the integrated continuity tester you can also measure resistances within a range of 0 to1999 kΩ. Voltage and resistance values appear in digital format on the display. Additionally, three LEDs indicate voltage and rotating field as well as one LED and one sound generator continuity. Due to its high protection category IP 65 the METRAVOLT 12D+L can be used in precipitation.

1.1 Intended use
This device is intended for use in applications as described in the operating instructions only. Thus, it is imperative to observe the notes on safety and the technical data in conjunction with the ambient conditions.
Any other form of usage is not permitted and can lead to accidents or destruction of the unit.
Any misuse will result in the expiry of all guarantee and warrantly claims.

2. Safety Precautions
You have selected an instrument which provides you with a high level of safety. When used for its intended purpose, safety of the operator, as well as that of the instrument, is assured.
In order to maintain flawless technical safety conditions, and to assure safe use, it is imperative that you read these operating instructions thoroughly and carefully before placing your instrument into service, and that you follow all instructions contained therein.

The instrument provides a high level of safety by means of two series resistors immediately behind the test electrodes as well as two absolutely independently working test systems.
- LV-indication of existent voltage indicated by one LED, even without battery.
- digital indicator for exact test values.

Please observe the following safety precautions:

- The voltages indicated on the METRAVOLT 12D+L are rated voltages. The voltage tester may only be used in systems working within this rated voltage range.
- Faultless indication of display values is only guaranteed between -15°C ... +45°C.
- Hold the instrument by its handgears only, to avoid covering the display or touching the test elecrodes.
- The maximum on-period of the METRAVOLT 12D+L is 2 minutes.
- Only qualified persons may carry out work with these device. The user needs to be farmiliar with the risks for measuring voltage and compliance with safety regulations and the proper use of the voltage detector.
- Workings may only be performed with appropriate personal protective equipment.
  Observe the minimum object distance to other plant components that are energized or earthed and use personal protective equipment as specified by national accident prevention regulations (in Germany: DGUV 3 or VDE 0105-100).
- The function of the voltage tester must be checked briefly before and whenever possible after the use. Carry out the function test and check the instrument at a known voltage source (AC and DC). If the indication of one or several systems fails in the course of checking, the instrument must not be used again.
- The red ⚠-LED only serves as a indication for hazardous voltage and not as measurement value.
- This voltage detector may not permit to clearly indicate the absence of operating voltage in case of interference voltage because of its relatively high internal impedance.
  When the indication "voltage present" appears on a part that is expected to be disconnected of the installation, it is recommended confirming by an other means that there is no operating voltage on the part to be tested.
- With determination of phase conductors and phase sequence the perceptibility of the display may be impaired, e.g. when using insulating protective gears, in unfavourable locations, for example on wooden ladders or insulating floor coverings, as well as with unfavourable lighting conditions and in an improperly earthed AC voltage system.
- Before use, the battery compartment must be closed.
- The voltage tester may only be dismantled by authorised personnal.
- Before using the device check the housing and connecting line for visible damage. If damages are visible the voltage tester may not be placed into operation. In case of strong dirt contamination, the tester must be cleaned before use.
- The tester has to be stored in a clean and dry environment.

3. Putting into operation

3.1 Battery

Your instrument is already supplied with a 9 V block battery in accordance with IEC 6 LR 61.
The battery status is indicated by a battery symbol on the display (see section 6).

3.2 Testing correct display and function (self-test)

In accordance with EN 50110-1 voltage testers must be checked if they function correctly, briefly before and whenever possible after the use, for determining absence of voltage.

Step 1 – Test of the display

Press and hold button ⏻. All display segments light up on the display, additionally, the "Ω" LED and rotating field LEDs light up as well as a buzzer sound can be heard.
Release button ⏻, the value "0.00 ... 0.02 V" is indicated on the display.

Step 2 – Checking the line / function

Afterwards, actuate button Ω/↯. "OL" and "MΩ" appear on the display. Hold the test electrodes together. The value "000 ... 1999 kΩ" appears on the display. Through this, the measuring electronic and line have been tested.

Note

The red ⚠-LED is not checked by this self-test.
A daily check is not neccessary due to the highly reliable function.
When a voltage (≥ 50 V AC / 120 V DC) is indicated on the LCD the LED must light up.

Attention!

If one of the displays fails during the self-test – even if only partial failure occurs – or if the instrument does not indicate a function standby or the red ⚠-LED at voltage > ELV (e.g. 230 V~)does not light up, the voltage tester may not be placed into operation!

4. Measuring and testing

4.1 General information

The voltage tester switches on automatically when a voltage of at least 24 V is applied. If the function continuity testing had been activated, the device switches automatically to voltage testing. The instrument automatically selects the measuring range that corresponds to the applied voltage (see section 5.). In order to extend battery life the instrument switches off automatically approximately 30 seconds after the last measurement.

Note:

It is possible that the voltage tester switches-on automatically when only one test electrode is connected to voltage or to a statically charged object. This has no significance.

"Hold" test results (HOLD)

The maximum voltage value can be stored on the display when keeping pressed button (HOLD).
The value is recorded for approx. 30 seconds or until you press button (HOLD) again. The Hold-function is stopped when again a voltage is impressed.

Note:

When the measured value does not vary for 2 seconds, the maximum value is recorded.

4.2 Testing voltage an polarity

Securely contact the test electrodes with the test points. Voltage is indicated on the display.

Attention!

When a hazardous voltage (≥ 50 V AC / 120 V DC) is present, the red LED ⚠ lights up. If it does not light up, the voltage tester may not be placed into operation!
The maximum allowable on-time for voltage testing is 2 minutes.

Note:

The display of the LV indication (LED) remains in working order even when the battery is not available.

Direct and alternating voltage, polarity

The type of voltage is indicated by the symbols "~" for AC and "-" for DC. When minus is connected to the test electrode with display part designated with "+", then the "-" leading sign appears. When plus is connected, then no leading sign appears left to the displayed value.

Note:

Voltages with frequency of more than 2 kHz are indicated by the flashing Hz symbol.

Voltages < 24 V
For voltages of less than 24 V the device must be switched on or over by actuating the push-button ⏻.

Voltages 24 ... 1000 V AC / 1500 V DC
(Nominal voltage range in accordance with IEC 61243-3). The device automatically indicates the type of voltage (AC / DC) and voltage in „V" on the display.

Voltages 1000 V AC ... 1200 V AC
(Exceeds the limit values in accordance with IEC 61243-3). With the METRAVOLT 12D+L you can perform secure tests above the nominal voltage range up to 1200 V AC. The measurment value is indicated by flashing in the display.

Voltages > 1200 V AC / > 1500 V DC
"OL" in the display and an acoustic alarm warn against voltages exceeding 1200 V AC and exceeding 1500 V DC. In this case, the test procedure must be stopped immediately!

4.3 Testing phase and phase sequence
The METRAVOLT 12D+L is equipped with 2 triangular LEDs for the indication of phase sequence tests.
Attention!
These tests can be performed at a nominal voltage of at least 165 V (50 Hz) against earth.
When performing these tests, the device must be hold closely at the handgear of the display part (see picture below).
Note: You may wear insulating gloves when performing the tests.
Tests can be impaired by unfavourable locations, for example on wooden ladders or insulating floor coverings, as well as in improperly earthed AC voltage systems.

4.3.1 Phase test
Determination of the outer conductor occurs by applying the test electrode +L1 to the conductor. When "POL" appears on the display, the conductor is live.

4.3.2 Testing phase sequence
To determine the phase sequence between two phases in the phase network apply both test electrodes, clasp the handle of the display part and proceed as follows:
- Search for the phase conductors using one pole (see phase test).
- Apply both test electrodes to the two phase conductors (display 400 V).
- When phase L1 is applied to the test electrode marked (+L1) and L2 to the other test electrode „➔ R" appears at the display for rotation is clockwise. If „L➔" is indicated direction of rotation is counter-clockwise.
- The test result has to be checked by exchanging the two test electrodes. The opposite direction of rotation must be displayed.

If 230 V is displayed instead of 400 V, the neutral conductor may have been contacted with one of the test electrodes.

4.4. Testing resistance and continuity
When the instrument is switched on, press button Ω/V. "OL" and "MΩ" appear on the display.
Securely contact the measuring points with the test electrodes.
Resistance values 0 ...10 kΩ the measured value is indicated on the display in "kΩ". The green LED "Ω" lights up at the same time and an acoustic signal is generated.
Resistance values 10 kΩ ...1,999 MΩ the measured value is indicated on the display in "kΩ" or in "MΩ". The LED "Ω" lights up at the same time and no acoustic signal is generated.
Resistance values > 2 MΩ the display passes to overflow and "OL" and "MΩ" appear on the display. The LED does not light up and no acoustic signal is generated.
Function to "hold" measured values (HOLD)
As long as you keep pressed button HOLD you can record the latest measured resistance value on the display.
Zero balancing
The zero point in the resistance measuring range can be recalibrated if necessary:
Hold the test electrodes together and press and hold button Ω/V until "CAL" appears on the display and the green LED "Ω" flashes.
When "000" is indicated and the LED "Ω" lights up continuously, then calibration has been carried out sucessfully. During this process an acoustic signal is generated.
Note:
During continuity tests, the plus pole of the measuring voltage is located at the test electrode designated with +L1. The measuring current has a constant value of 5 µA for values of 0 ... 10 kΩ; 1 µA for 10 ... 1999 kΩ. If in this operating mode a voltage of 24 V or more is impressed, the device switches automatically to voltage testing.

5. Technical data METRAVOLT 12D+L

Measure-ment	Measuring ranges (auto-ranging)	Resolution	Frequency range/ measuring	Intrinsic error
U-	0,10 V ... 8,99 V 9,0 V ... 99,9 V 100 V ... 1500 V	0,01 V 0,1 V 1 V	–	±1,5 % +3 digits
U~ TRMS	1,0 V ... 99,9 V 100 V ... 1200 V	0,1 V 1 V	15 Hz ... 1,8 kHz	±1,5 % +3 digits
U~[1])	15 V ... 99,9 V 100 V ... 499 V		›1,8 Hz ... ... 10 kHz	±15 % +3 digits
	500 V ... 1200 V		›1,8 Hz ... ... 4 kHz	
R	0 ... 49 kΩ 50 ... 1999 kΩ	1 kΩ	5 µA 1 µA	±5 % +3digits

[1]) effective value; sinus

Nominal voltage range: 24* ... 1000 V AC/1500 V DC
*Auto on from 24 V

Overvoltage range
(exceeds the limit values in accordance with IEC 61243-3):
> 1000 V AC ... 1200 V AC

Nominal frequency range: 0 ... 500 Hz

Extended frequency range
(exceeds the limit values in accordance with IEC 61243-3):
15 Hz ... 10 kHz < 500 V,
15 Hz ... 4 kHz > 500 V

Input resistance: approx. 320 kΩ AC
approx. 710 kΩ DC

Current (Peak value I_s): 3,2 mA at 1000 V AC
1,4 mA at 1000 V DC

On-period: 2 minutes

Display: 4 LEDs for voltage, continuity, and phase sequence
LCD digital display 7-segment-figure, 2 lines
0 ... 1999 digit backlight
3 measurments/s

Power supply: 9 V block battery IEC 6LR61 (alkali-manganese) or corre-sponding accumulator, multi-stage display of battery status

Measurement category: CAT IV 600 V
CAT III 1000 V

Impulse withstand voltage: >12 kV (1,2/50 µs)

Test voltage: 6 kV

EMV-requirements: DIN-EN 61326

Operating temperature: -15…+45°C

Casing: impact-resistant, dustproof plastic casing with unbreakable display cover

Protection category:	IP 65
Connecting line:	PUR hose cable 1000 V, 1m
Dimensions:	test electrode with display part 240 x 62 x 39 mm
Weigth:	270 g (incl. battery)

6. Battery

6.1. Battery indication

The latest battery status is symbolised by a three-stage battery indicator.

 = battery filled

 = battery semi-filled
(still many measurements possible)

 = battery empty
The screen backlighting switches-off automatically. Depending on type of battery, you still can perform at least 30-100 measurments.

Attention!

When the empty battery symbol flashes, then no more measurements can be performed and the battery has to be replaced immediately.
The device requires a 9 V block battery IEC 6 LR61 (alkali-manganese).

6.2 Replacing the battery

Loosen the screw at the back of the instrument which secures the battery compartment lid, remove the lid.
Let the battery drop out of the battery compartment with its CAT IV protection cover and exchange it. Therefore, snap the battery contacts onto the 9 V block battery and insert the battery together with the CAT IV protection cover into the battery compartment. Put the lid back on the battery compartment and screw it tight.
Regularly make sure that the battery of your device does not leak. In case it does, you have to replace the electrolyte completely and to insert a new battery.
In case of a long storage period, remove the battery from the device.

Note:

Included in the scope of delivery is one battery. These battery is not to be re-charged. Attempting to recharge it may cause risk to personal safety and damage to the equipment. The battery may not to be opened. Depleted batteries must not be disposed with the domestic waste. Please, return batteries at a local retailer or municipal recycling depot. Return is free of charge and required by law.

7. Maintenance

7.1 General information

The METRAVOLT 12D+L is absolutely mainteinance-free. Nevertheless, observe the following information in order to maintain safe operation:
Always keep the voltage tester dry and clean. The housing can be cleaned with a cloth dampened with isopropyl (alcohol) or soapy water.

7.2 Repeated inspection

According to EN 61243-3 it is recommended to carry out repeated examinations.
It should not exceed the time-limit of 6 years.
Depending on operation conditions and frequency, a previous inspection may be recommendable.
The serial number with the date of manufacturing (WWYYNN=**W**eek **Y**ear **N**umber) is imprinted on the backside of the device. Repeated inspections are offered by the manufacturer and indicated by the inspection plate.

7.3 Device Return and Environmentally Compatible Disposal

The instrument is a category 9 product (monitoring and control instrument) in accordance with ElektroG (German Electrical and Electronic Device Law).
This device is subject to the RoHS directive.
We identify our electrical and electronic devices in accordance with WEEE 2012/19/EU and ElektroG with the symbol shown to the right per DIN EN 50419 .
These devices may not be disposed of with the trash. Please contact our service department regarding the return of old devices (address see chapter 8).