

Appliance Tester TG omni 1

User manual



Texts, drawings and technical information were prepared with great care. However, errors may still be present. The author and the manufacturer assume no direct or indirect liability for any incorrect or incomplete descriptions or any damages that may occur.

The user manual should be read carefully and completely before using the tester.

Warning markings in the manual and on the clamp are meant to warn of risks or dangers.

Warning markings in the manual on the tester and on the accessories have to be adhered to and describe the following:



General warning, warning of a danger!
See user manual!



Warning of hazardous electrical voltage!



Warning when exchanging fuses!



Warning of the risk of fire, e. g. when using improper fuses!

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1 General safety and warning instructions

The appliance tester "TG omni 1" was according to the following safety regulations built and tested:

DIN EN 61010-1 (VDE 0411 Part 1),

"Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (IEC 61010-1:2010 + Cor.: 2011)"

DIN VDE 0404 Part 1 und Part 2,

„Testing and measuring equipment for checking the electric safety of electric devices - Part 1 and 2: General requirements"

Immunity to standard DIN EN 61326,

„Electrical equipment for measurement, control and laboratory use - EMC requirement"

To maintain this safety and to ensure safe operation, the user must observe the following warnings:



All tests may only be carried out by a qualified electrician or by a person trained in electrical engineering under his direction and supervision. The user (examiner) must be instructed by a qualified electrician in the execution and assessment of the test!



The tester may only be used as intended to ensure the safety of the tester, tester and test object.
The warnings on the test device and the mains adapter cables must be observed!



The device may only be operated on a 115-230 V AC mains with a max. 16 A secured! It is not suitable for electrical installations!



No measurements may be taken on unsecured measuring circuits!



Repair work as well as changes to the test equipment may only be carried out by the manufacturer or only by specialists authorized by the manufacturer! Repair work on mains adapter cables may only be carried out by qualified personnel.



Only original spare parts specified by the manufacturer may be used and used!



The fuses must only be replaced by the manufacturer's original fuses!



If a safe operation is no longer possible, for example:

- Visible damage,
- improper storage,
- improper transport,
- Failure of a phase control lamp,
- Failure of measuring functions, etc.,

the tester may not be operated any further! The test device must be put out of operation immediately and secured against unintentional start-up! Only the manufacturer or the specialists authorized by the manufacturer may repair the tester!



Protective conductor resistance and leakage current measurements in electrical installations are only possible under certain conditions and using the appropriate hazard warnings permissible!



It should be noted that high voltages are present on test objects can occur, for example: charged capacitive circuits!



First connect the test specimen to one of the power sockets, if the power connection is in safety order



ATENCION! When connecting the device under test to a mains socket, contact-dangerous voltages may be present at a defective test object or at touchable conductive parts which are not connected to the protective conductor!

2 Application

The appliance tester "TG omni 1" is a device for electrical safety testing!

3 Scope of delivery and accessories

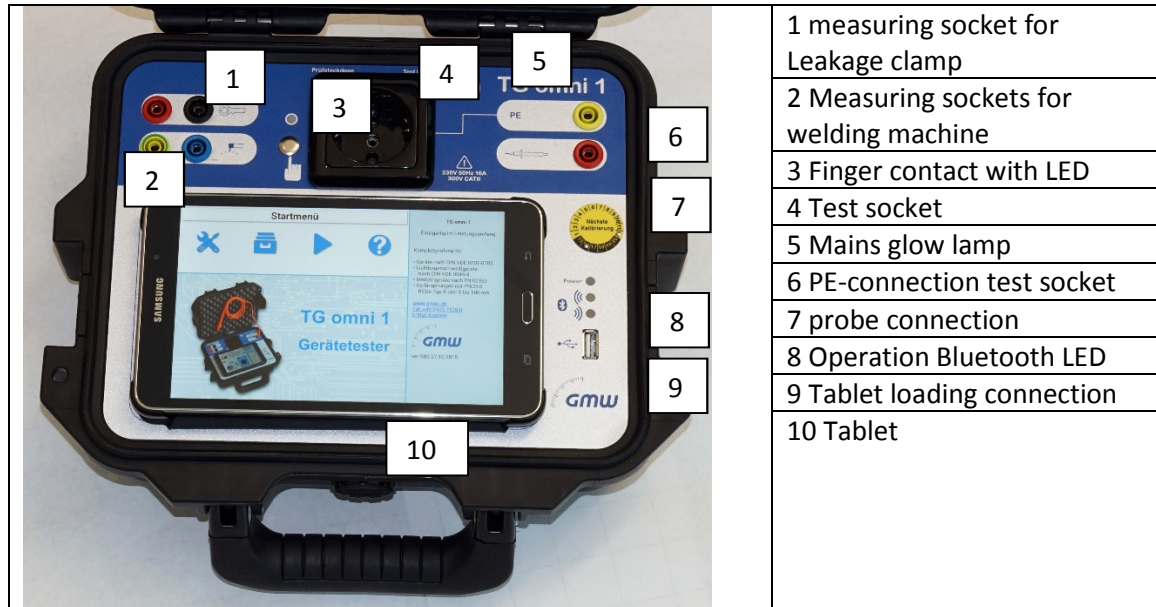
3.1 *Delivery (Standard):*

- 1 Power cord 1,5 m (Item No.: 7920019240)
- 1 Test probe red + Test clip red (Item No.: 7920019020)
- 1 Connecting cable 0,75 m (Item No.: 600000027/5)

3.2 *Accessories (optional):*

Accessories	Item number
Tablet 7" incl. protective cover	7920019001
Leakage clamp / current clamp TGSZ 40	7920019010
Brush probe 4 mm black	7910086049
Test probe set with top 4 mm blue/yellow (for ARC)	7920019210
Test probe with top red 4 mm length 3 m	7920019270
Three-phase adapter set CEE 16A	7920019160
Three-phase adapter set CEE 32A	7920019170
Three-phase adapter set CEE 16/32A with TGSZ 40	7920019200
Bluetooth barcode scanner	7920019310
Barcode printer USB/Wi-Fi	7920019100
RFID Transponder Scanner 125 kHz + 13,56 MHz	7920019220
Accessory bag	7920019230

4 Connections, Display and Keyboard (Figure 2)



4.1 Connection (Figure 2)

Before connecting the tester to mains voltage, the relevant warnings in chapter 1 "General safety and warning notices", the warnings on the mains adapter cables and if applicable also those on the accessories must be observed! Only if used properly is the safety of the user, device and test object guaranteed! The test of the protective conductor potential must be carried out via the finger contact after connection of the test instrument.

4.2 Mains power connection 115-230V AC 16A on the back

The tester may only be connected to a 115-230 V AC
40 - 60 Hz mains, which can be operated with max. 16 A secured!

4.3 Extension cable connection with three-pin IEC connector at the side

Extensions and RCDs are tested on the lateral extension connection.

4.4 Measuring socket „GND“ (Figure 2/1 Black socket)

Connection for the measuring line and test terminal for the negative pole for temperature, voltage and clamp current measurements.

4.5 Measuring socket „Probe“ (Figure 2/7)

Connection test probe for protective conductor resistance, voltage and touch current measurement.

4.6 Measuring socket „PE mains socket“ (Figure 2/6)

This measuring socket is parallel to PE from the mains socket.

4.7 Tablet loading connection (Figure 2/9)

5V voltage to loading Tablet or Smartphone

4.8 Operation and Bluetooth LED'S (Figure 2/8)

The operation LED indicates that the device is ready for use. The Bluetooth LED's flash during interface traffic between the tablet and the device.

4.9 Power on LED (Figure 2/5)

This LED indicates that the test socket is turned on with 115-230V.

4.10 Test socket (Figure 2/5)

Test socket, 115-230V with max. 16 A secured.

The protective conductor is connected only before the power is turn on.

ATTENTION!!!

When connecting the device to the test socket, a dangerous contact voltage may be applied to a defective test object or to a touchable conductive part, which is not connected to the protective conductor!

5 Testing the Mains Connection

The person responsible for the electrical installation is responsible for the safety of the power system to which the tester is connected.

The test of the installation is not part of the appliance test. However, it is important to know before testing if the electrical installation is safe.

The tester does not perform a complete test as required by DIN VDE 0100.

Nevertheless a few important measurements are made giving an indication of the mains connection, as for example:

- Testing of the protective earth potential using the finger contact
- Mains PE against N voltage < 30V.
- Check if the N conductor is open circuit (the display does not light up).
- Display of the orange phase check glow lamp if mains is on (yellow light)
- Voltage measurement phase against N (range 1 to 260V AC)

Note:

- Through touching the finger contact, it is possible to determine whether the protective conductor is connected. This is not the case, if after touching the finger contact the red LED lights up.
- If the mains connection is faulty a message "PE>30V!!" is displayed on the display. Further, the tester makes a loud beep sound. Further tests may only be performed after the power system has been repaired.
- If N/PE are exchanged the RCD of the installation switches off
- If no display appears PE may be hazardous live. Test this using the finger contact. Disconnect tester from the mains and check on another mains socket. If the tester now works, get a specialist to check the faulty mains socket.
- Around an IT-network, the protective conductor is not on PE potential. If "PE>30V" appears. If the tester is connected through an isolation transformer, the PE is missing. "PE>30V" appears.

6 Connection

After connecting the device, the operating LED appears. After starting the Test-Master app and after successful connection via Bluetooth, the Bluetooth transmit and receive LEDs flash during a measurement.

7 Menu structure

The tablet displays the pioneering user guidance, the display of measuring functions, limit values and measured values. The menu structure is in a separate document of the app.

8 Testing Electrical Appliances

The tests required by the standards have been realised by the internal testing sequences. Before starting a test, the appliance has to be classified in the profile menu.

After repair, modification and after repetitive testing electrical appliances have to provide a degree of safety to the user which is comparable of that of brand-new appliances. Whether the safety is given can be tested according to the applicable standard. The following tests are to be performed in the given order. Each test step must have been passed before proceeding to the following step:

- Visual inspection
- Earth bond test
- For class I appliances test of the insulation resistance and or the earth leakage current or the substitute leakage current.
- For class II equipment as well as for accessible conductive parts not connected to PE of class I equipment, the insulation resistance and the touch current or the substitute leakage current.
- Functional Test

Note:

Before performing a leakage test on class I appliances the earth bond test has to be passed. Before performing a leakage current test on class II or III (except for IT appliances) an insulation resistance test of 500 V DC has to be passed. Accessible connections and generated SELV voltages have to be checked according to the SELV specifications.

8.1 Qualification

High requirements are set to the qualification of the skilled electrician. All tests have to be performed by a skilled electrician or under his supervision. The skilled electrician must follow the rules and standards required for his work. Also, it is not allowed to omit any steps which would ensure a correct and safe use of the appliance. The liability of the skilled person responsible for testing is especially important if no complete test is possible (e. g. due to permanently installed equipment). If a complete test is impossible the responsible electrician assumes the liability and has to document this on the test report.

8.2 Mains connection

According to law the person responsible for the installation of the power system is responsible for the mains connection, not the manufacturer of the equipment to be connected.

The required tests on permanently installed equipment are often not possible due to technical reasons or due to the local conditions. If the equipment is not accessible the mains

connections (L1, L2, L3, N and PE) have to be disconnected from mains. Therefore, the connection should be refitted to a plug and socket connection according to IEC 60309-1 or a coupling should be inserted according to IEC 60309-1. The installation costs can be amortized due to a faster safety test.

Note:

Electrical appliances with a nominal current above 16A must be connected to all pole circuit breakers according to IEC 60947. These should be mounted at a height of approx. 1,7 m. Plugs and sockets of equipment rated above 16A may not be connected or disconnected under load. Always open the circuit breaker first.

Equipment rated below 16A does not require a separate circuit breaker.

8.3 Visual inspection

The appliances are checked for externally visible damages, and, if possible, the suitability of the surrounding for their use e. g.:

- Damages to the housing
- Suitable place of installation
- Damages to the power cord
- Deficiencies on the strain relief
- Indications of overload or improper use
- Inappropriate alterations
- Missing protective covers
- Dirt and corrosion affecting safety
- Presence of required ventilators
- Open air vents
- Tightness
- Legibility of markings

Note:

Visible damages which might impel the mechanical or electrical safe use or which might lead to fire must be repaired immediately.

8.4 Measurements

See menu system

8.5 Functional test

After performing the electrical test, a functional test is required. A short test may be sufficient.

8.6 Checking the Markings

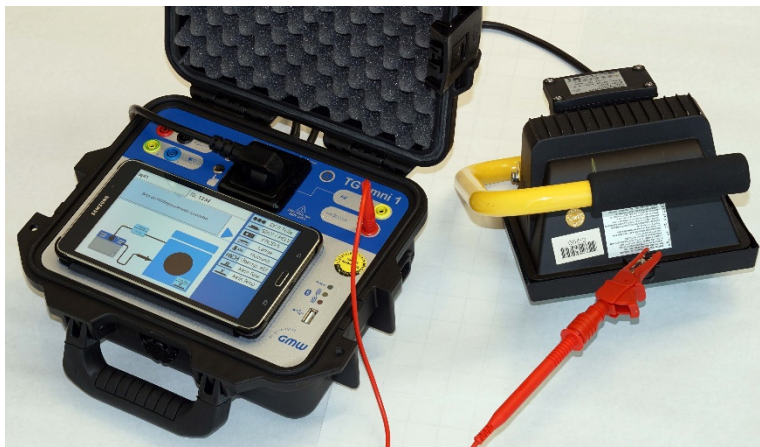
The presence of safety required markings must be checked and if necessary renewed or completed.

8.7 Documentation of the test

The passed test has to be documented. If an appliance is unsafe, this must be marked clearly on the appliance and the responsible body to be notified in writing. The measurement values and alterations performed are to be documented. The appliance should be marked by a sticker that for example states the following: "Tested according to VDE 0701-0702 and DGUV Standards 3", "Tested according to IEC 60974-4" and "Tested according to IEC 62363".

9 Connections, Pictures, Examples

9.1 *Earth bond test of AC appliances*



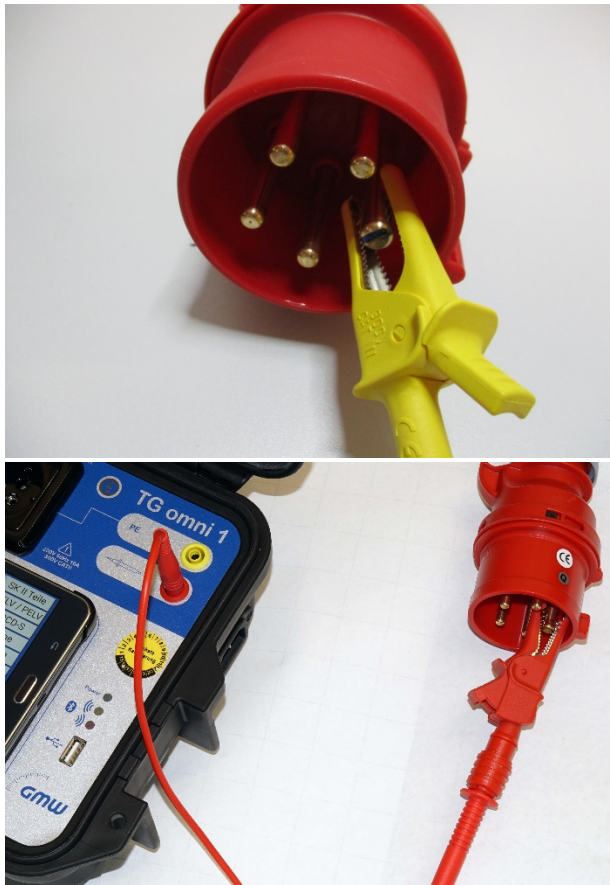
Protective conductor: Use the protective conductor probe to scan the housing parts and move the connection cord.

9.2 *Earth bond test of three phase equipment using a test lead*

Earth bond test: Use the probe to test all conductive parts connected to PE. Move the power cord.

Permanently connected equipment: Use the profile "Fixed equipment". Connect the tester to mains. Probe all conductive parts connected to PE. The earth bonding is tested via the PE connection of the tester, the installation and the connection of the unit under test. Therefore, the limit value is higher than the normal limit value.

9.3 ***Earth bond test of three phase equipment without using the extension lead adapter***



Testing sequence: „CI with Clamp“. Connect the test lead to the yellow connection on the tester and the large earth pin on the CEE connector. Probe all earthed parts of the appliance under test.

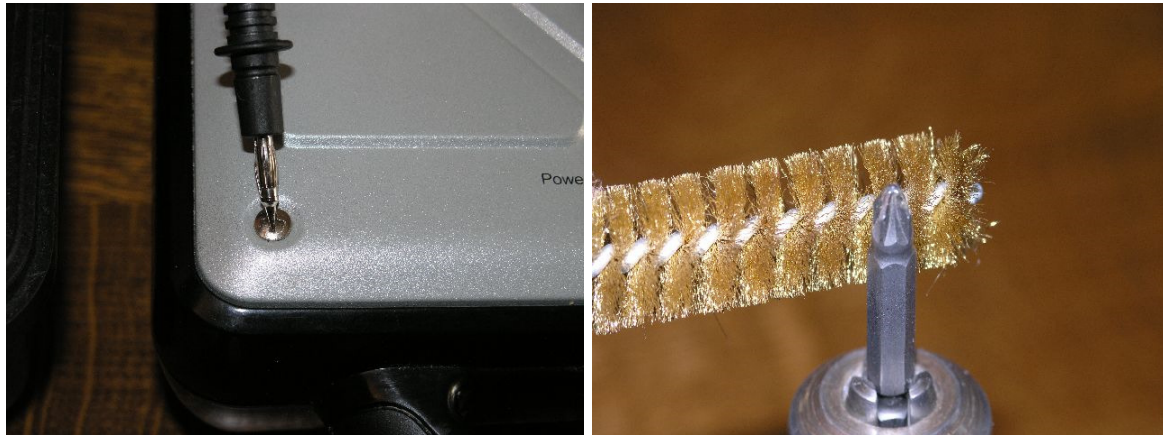
9.4 ***Earth bond test of three phase equipment using the extension lead adapter***



Testing sequence: „CI with clamp“. Connect the test lead to the yellow connection on the tester and the large earth pin on the CEE connector. Probe all earthed parts of the appliance under test.

9.5 ***Exposed insulated conductive parts***

Testing conductive parts not connected to PE: Use the probe to test these parts. If there are rotating or moving parts test these in motion. The best way is to use the optional brass brush probe. Use protective glasses.



Insulation resistance test LN-PE, Substitute leakage test: Connect appliance to test socket. Switch on the appliance. The test is done without applying mains.

9.6 ***Insulation resistance test LN-PE of three phase equipment using the extension lead adapter***



Testing sequence: „CI with Ins. test“. Connect the extension lead adapter to the tester and plug the appliance into the CEE socket. Turn on the appliance under test.

9.7 ***Differential current measurement on test objects with Schuko plug*** **Differential current measurement, function test:**

Insert the test object into the test socket. The test object is supplied with power via the test device.

9.8 *Earth leakage test on three phase equipment using the three-phase adapter*



Connect the adapter to a CEE socket of the installation. Connect the appliance to the socket of the adapter. Use the current clamp to encompass L1, L2, L3 and N without PE. Connect the current clamp to the tester.

Measurement in menu "CI I with Clamp" or "Fixed Connection".

9.9 *Extension cable testing*



As an option several extensions lead sets are available for single and three phase equipment. Three phase adapters:

Connect the AC plug into the tester. Connect the extension lead between the adapters. Connect the probe to the banana socket of the extension lead adapter plug. Start the extension lead test. The following tests are performed:

- earth bond continuity of the extension lead
- insulation between L1, L2, L3, N and earth
- continuity and phase rotation of the extension lead.

9.10 *Extension cable testing with PRCD-S, PRCD-K, RCD Type A, AC, B and B+*

During the PRCD-S test, the Schuko plug is inserted into the test socket of the tester. The other side of the extension cord is inserted into the panel plug on the right-hand side of the tester or an adapter as shown in the figure above. Start extension lead test. Choose PRCD-S and adjust tripping current before starting

9.11 *Testing Welding appliances*

During the testing of welding equipment, both electrodes, as shown in the figure, are attached to the tester. The power cord of the welding equipment is attached to the power socket of the tester. Select "VDE 0544-4" in the menu, set it to the open-circuit voltage and start the test. Follow the testing procedures.

10 Error messages, Removing Faults

10.1 *The display remains dark*

Note: Possibly there is no N connection on the mains socket. Possibly one of the fuses of the tester has blown.

10.2 *Touch current display is 0,000 mA*

This is no error but the safe condition.

10.3 *Contact current measurement larger than 0,5 mA*

Note! Do not touch the appliance under test; there is a hazardous voltage on the accessible parts!!!

Disconnect the appliance from mains!!!

Perform an insulation resistance measurement between the accessible conductive parts and mains of the unit under test. While performing the insulation resistance measurement all switches and contactors have to be closed or bridged in order to test all parts of the isolation. The measurement value should exceed 2 MΩ. After the insulation resistance measurement perform a substitute leakage measurement. Then do a touch current measurement. The current must be less than 0,5 mA.

10.4 *Leakage current measurement shows "F" as a result*

The tester regards the heating power when performing the test. A value of 1 mA/kW is established as the limit. Check the measurement value to the allowed limits.

If it exceeds the value, disconnect the unit under test from mains.

Do an insulation resistance measurement LN-PE.

All switches have to be closed; internal contactors bridged.

Also measure the capacitance between LN and PE.

Check the mains voltages with a Multimeter.

If the tester display is incorrect send it in for servicing.

11 Spare Parts

Attention!!!

Observe the warnings of chapter 1!

Use only spare parts supplied by the manufacturer, see chapter 1!

The tester may be serviced only by the manufacturer or by a service shop authorised by the manufacturer.

12 Technical Data

Mains connection: AC 115-230V +/- 10%.

Switching current: Mains Integrated relay 16A.

Temperature: 0°C – 40°C.

Measurements (Error max. 1% of +5% of measured value):

PE conductivity: 0,000 Ohm ... 4,000 Ohm. OC voltage 6V, Current 200mA DC.

Insulation resistance measurement: 0,00MOhm...20,00MOhm

Open circuit voltages 500V, 1000V, Short circuit current 1,5 mA.

Equivalent leakage current: 0,00mA ... 20,00 mA, Open circuit voltage approx. ca. 230V.

Differential current: 0,00mA...20,00mA. Filter characteristic according to DIN VDE 0404 for correct evaluation of the harmonic currents.

Contact current: 0,000mA ... 4,000mA

Phase voltage: 0,0V...440,0V

Phase current: 0,00A ... 20,00 A

Power: 0W ... 4 kW. Evaluation up to the 15th harmonic.

Power standby (option): 0,000W...9,999W, Current max. 50 mA

PE monitor: Voltage N-PE > 30V.

Integrated leakage current power off: Differential current > approx. 20 mA.

Clamp measurement:

Ratio 2000:1

Differential current 0,00 ... 20,00 mA

Line current: 0...40,00 A

RCD (optional): 10 mA, 30 mA tripping current and time

Open circuit voltage Welding current circuit with electronic potentiometer: 0 ... 150V

Test sequences:

Standard EN 62638/EN 62353

- Class I active / passive (Powered / without mains)
- Class II
- Class III
- Fixed connection
- Extension lead
- Single measurements
- 400V with three phase adapter and leakage clamp

Standard IEC 60974-4

- Class I active (Powered)
- Class II active (Powered)
- 400V with three phase adapter and leakage clamp

Interface:

USB Type A for power supply 5 V DC 1 A

Memory, Real time clock in the Android tablet or Android smartphone:

approx. 100000 measurement sequences with time and date.

13 Disposal

The disposal of a decommissioned tester must be carried out by the customer according to the national regulations.

14 Guarantee

The tester "TG Omni1" is subject to a strict quality assurance system.

A calibration certificate with the documentation of the test results is delivered together with the tester.

This certificate should always be available.

The guarantee period is for 12 months after delivery. Manufacturing defects and material defects are covered by the guarantee.

Transport costs to the manufacturer are born by the sender. For normal transports within Germany to the customer the manufacturer pays. Special transport costs, e. g. express delivery have to be borne by the customer.

Transport and costs for use of substitute equipment must be carried by the customer.

Damages due to dropping or improper use are exempted from the guarantee as well as parts underlying wear and tear like sockets, plugs, fuses, batteries, mechanical parts.

If defects occur after the guarantee period, the service department will repair the articles quickly.

15 Contact details

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