VOLTCRAFT

GB Operating Instructions

Device tester GT-6000 v2

Item No. 2362387 **Page 2 - 34**

CE

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GB

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1. Introduction

Dear customer,

Thank you for purchasing this product.

This product complies with the statutory national and European requirements.

To maintain this status and to ensure safe operation, you as the user must observe these operating instructions!



These operating instructions are part of this product. They contain important notes on commissioning and handling. Also consider this if you pass on the product to any third party. Therefore, retain these operating instructions for reference!

If there are any technical questions, please contact: www.conrad.com/contact

2. Explanation of symbols



The lightning symbol is used if there is a danger to your health, e.g. from electric shock.



The exclamation mark in a triangle indicates important notes in these operating instructions that must be observed strictly.



The “arrow” symbol indicates that special advice and notes on operation are provided.



Conformity symbol, the instrument complies with the valid directives. It complies with the EMC Directive (2014/30/EU), Standards EN 61326-1 is fulfilled. It also complies with the Low Voltage Directive (2014/35/EU), Standard EN 61010-1 is fulfilled.



This symbol indicates that device is intended for use in dry indoor areas only.



Protection class 1 (earthing contact)



Protection class 2 (double or reinforced insulation, protective insulation)

CAT I for measurements of circuits not directly connected to the mains. i.e. battery powered instruments.

CAT II for measurements performed on circuits directly connected to the low voltage installation (main voltage) such as household appliances, portable tools and similar equipment.

CAT III for measurements performed in the building installation, i.e. distribution boards, circuit breakers, wiring, including cables, bus-bars, junction-boxes, switches, socket-outlet in the fixed installation, and equipment for industrial use and some other equipment, for example, stationary motors with permanent connection to the fixed installation.

CAT IV This category is for measurements performed at the service entrance i.e. at the source of the low voltage installation (mains distribution, electricity transfer points to homes, electricity meters) or on power lines (overhead or buried). This includes measurements before the service equipment overcurrent device.

3. Intended use

The device tester GT-6000 v2 is developed for electrical safety testing of portable appliances.

It is used for:

- Portable appliances testing in accordance with DIN VDE 0701-0702 EN 50699, DGUV Regulation 3, ÖVE/ÖNORM E 8701, NEN 3140
- Tripping time measurement of permanently installed (RCCB/RCD) and portable (RCCB/PRCD) circuit breakers
- Three-phase electrical devices testing (with the help of optional measurement adapters)
- Voltage test on grounded sockets
- Cables, extension cables, cable distributions and IEC power cables testing

Tester GT-6000 v2 is characterized by the following features:

- Test results of GT-6000 v2 are compared with preset values of limits and based on that pass/fail information is given to user. Preset values of limits and more information regarding test can be found in last versions of standards.
- Default value of voltage for insulation resistance test is 500 V/DC (standard). If there is a need for lower voltage (500 V/DC too high for DUT or voltage protection / surge arresters built-in), test voltage can be set to lower value – 250 V/DC.
- The differential current/direct measurement method is applied when GT-6000 v2 is supplied with 230 V/AC mains voltage via the socket (the protective conductor current/contact current measurement is automatically provided).
- The alternative leakage current measurement method is applied when battery set inside GT-6000 v2 is used for tests regarding the protective conductor current and contact current measurement.
- Approx. 2500 device tests can be performed by GT-6000 v2, with fully charged batteries.

4. Delivery contents

- Device tester GT-6000 v2
- 1 mains cable (IEC 60320 C19)
- 1 test lead with alligator clip
- 1 IEC power cable (IEC adapter cable IEC 60320 C13)
- 1 USB-C connection cable (USB-A connector to USB-C socket)
- 6 AA batteries,1.5 V (type AA/LR6)
- 1 lithium button battery (CR2032)
- 1 pouch
- Operating instructions

Operating Instructions for download

Use the link www.conrad.com/downloads (alternatively scan the QR code) to download the complete operating instructions (or new/current versions if available). Follow the instructions on the web page.

5. Optional accessories

Passive measurement adapter:

Single and three-phase loads adapter are intended for RPE, RISO and IEA measurements (without mains voltage-dependent switching device). Commercially available measurement adapters with the following connections can be used:

16 A CEE connector (5-pin, L1, L2, L3 are bridged) --> earthing contact connector.

Active measurement adapter:

Three-phase loads adapter for RPE and IPE measurements (direct measurement, with mains voltage-dependent switching device) under operating conditions:

16 A CEE adapter (5-pin), active

The active measurement adapter can be obtained using item no. 2267357.

6. Transport and storage

- Please keep the original packaging for later transport, e.g. for calibration. Any transport damage due to faulty packaging will be excluded from warranty claims.
- In order to avoid instrument damage, it is advised to remove batteries when not using the instrument over a certain time period. However, should the instrument be contaminated by leaking battery cells, you are kindly requested to return it to the factory for cleaning and inspection.
- Instruments must be stored in dry and closed areas. In the case of an instrument being transported in extreme temperatures, a recovery time of minimum 2 hours is required prior to instrument operation.

7. Safety instructions





Before using the instrument, instructions must be read and followed, particularly first time.

The respective accident prevention regulations established by the professional associations for electrical systems and equipment must be strictly always met.

The respective accident prevention regulations established by the professional associations are to be strictly always enforced regarding body protection in the event of danger of burns.

In order to avoid electrical shock, the valid safety and VDE regulations regarding excessive contact voltages must receive utmost attention, when working with voltages exceeding 120V (60V) DC or 50V (25V) rms AC. The values in brackets are valid for limited ranges (as for example medicine and agriculture).

Measurements in dangerous proximity of electrical systems are only to be carried out in compliance with the instructions of a responsible electronics technician, and never alone.

If the operator's safety is no longer ensured, the instrument is to be put out of service and protected against use. The safety is no longer insured if the instrument:

- shows obvious damage,
- does not carry out the desired measurements,
- has been stored for too long under unfavorable conditions,
- has been subjected to mechanical stress during transport.





If the instrument is changed or modified, the safety is no longer ensured.

The instrument may only be used within the operating ranges as specified in the technical data section.

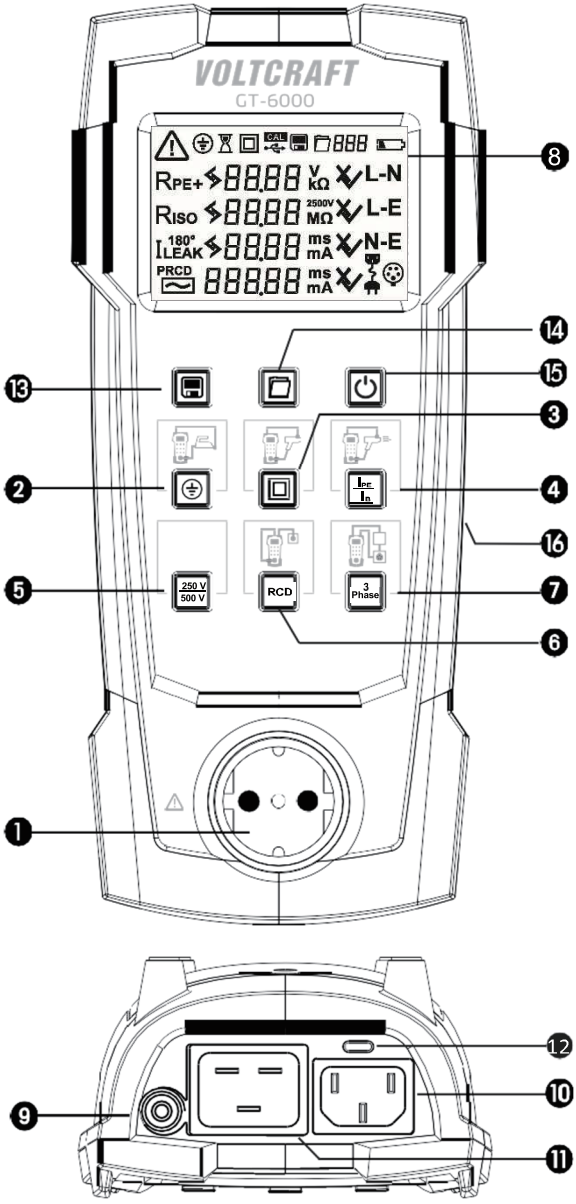
Avoid any heating up of the instrument by direct sunlight to ensure perfect functioning and long instrument life.

The opening of the instrument for fuse replacement, for example, may only be carried out by professionals. Prior to opening, the instrument must be switched off and disconnected from any current circuit. During operating instrument and measurements, battery compartment must be closed. Test leads or accessories must be original. During measurements, touching of measuring points and measuring probes (tips), outside of the marked handling area, is forbidden.

The instrument may only be used under those conditions and for those purposes for which it was conceived. For this reason, in particular the safety references, the technical data including environmental conditions and the usage in dry environments must be followed (no measurements when strong magnetic or electromagnetic fields are applied, moisture, high humidity/moisture exist).

Only originally specified batteries (6x1.5V AA/LR06) must be used (not rechargeable batteries).

8. Operation elements and connections



1 Schuko test socket for connecting DUT

2 Pushbutton for testing class 1 (protection) devices (protective conductor and touchable conductive parts connected)

3 Pushbutton for testing class 2 type devices (devices without protective conductor and with accessible conductive parts) and for testing of class 3 type devices (safety low voltage)

4 Pushbutton for testing the protective conductor current (using differential measurement) or the contact current (using direct measurement) when DUT is supplied with 230 V AC

5 Insulation resistance measurement: pushbutton for setting the test voltage (250 V DC or 500 V DC)

6 Pushbutton for testing RCCB/RCD breakers

7 Pushbutton for testing 3-phase devices with (optional) 3-phase adapter

8 Display

9 4 mm test socket (to be used with test lead with alligator clip)

10 IEC 60320 C14 connector for connecting the IEC low-power cable (C13) or for connecting optional measurement 3-phase adapter (16 A CEE adapter)

11 IEC 60320 C20 connector for connecting mains voltage (230 V, 50 Hz) or for voltage measurement at external earthed sockets

12 USB-C connector (memory operations)

13 Pushbutton for recording last measurement results

14 Pushbutton for reading saved measurement results

15 Power & Backlight On/Off pushbutton

LCD Symbols	
	Warning, potentially dangerous voltage!
	Class I Test
	Class II Test
	Indication that long version of test is selected (protective conductor resistance, differential and touch leakage current measurements)
	Calibration mode (only available in service center)
	USB connection
	STORE (saving record in PAT memory)
	OPEN (recall saved record from PAT memory)
	Battery is low (battery replacement is required)
	Battery is empty (PAT will soon Turn Off)

RPE	Protective conductor resistance - R_{PE} Test
RISO	Insulation resistance – R_{ISO} Test
ILEAK	Differential or Touch Leakage Current – I_{DIFF}/I_{DIR} Test
I EA	Substitute Leakage Current – I_{ALT} Test
RCD ~	RCD Test
PRCD ~	Portable RCD Test
180°	RCD Test - 180° initial polarity
0°	RCD Test - 0° initial polarity
V	Volt - Voltage measurement
Ω	Ω - R_{PE} Test
MΩ	Mega Ω - R_{ISO} Test
500V	RISO Test Voltage – 500V
250 V	RISO Test Voltage – 250V

mA	Mili Ampere - Leakage Current Test
ms	Mili Second - RCD Test
✗	FAIL
✓	PASS
L-N	Voltage measurement - LINE to NEUTRAL
L-E	Voltage measurement - LINE to EARTH
N-E	Voltage measurement - NEUTRAL to EARTH
	IEC Power Cable Test
	3- Phase 16A CEE Adapter

Note:

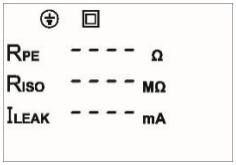
Backlight function (white-LEDs) is activated/deactivated by short press to the pushbutton (15). If not deactivated by the user, backlight will turn off automatically after approx. 1 minute.

Additionally, if the test result is **PASS** it will be indicated by turning on the green-LEDs backlight. Otherwise, when test result is **FAIL**, the red-LEDs backlight is turned on.

9. Carrying out Measurements

General Information to carry out measurements:

- **Measurements in dangerous proximity of electrical systems are only to be carried out in compliance with the instructions of a responsible electronics technician, and never alone.**
- **Test leads and test probes may only be touched at handle surfaces provided.**
- **Absolutely avoid the direct contact of the test probes. Prior to switching to a new measurement range or a new type of measurement, remove all connections from DUT.**
- **Measurements have to be carried out by respecting the standards.**



a) Testing a mains power outlet

- Press the red pushbutton (15) to switch on the GT-6000 v2.
- To switch the device on or off, press and hold the button for approx. 1 second. The device will turn on or off with a beep.

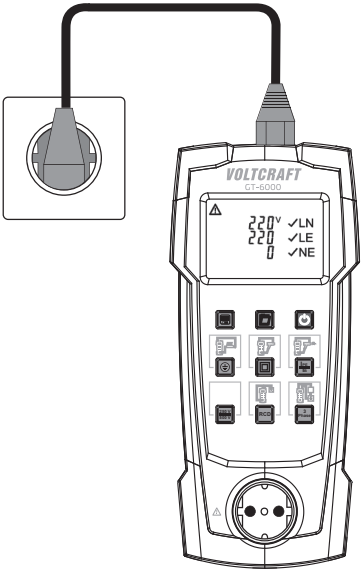
To avoid electrical shock, the valid safety measures and VDE directives strictly must be met concerning excessive contact voltage when working with voltages exceeding 120 V (60 V) DC or 50 V (25 V) rms AC. The values in brackets are valid for limited areas (such as e.g. medicine, agriculture).

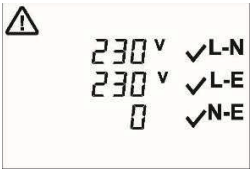
- Connect the mains cable (IEC 60320 C19) to the mains inlet socket (11) and to the power outlet.
- The voltage measurement will start automatically.
- Each time when voltage (mains) is detected, L-N, L-PE and N-PE are displayed for approx. 3 seconds.
- If the voltage potentials are within the following limit values, a tick symbol appears next to the symbols “LN”, “LE” and “NE”:

LN	195 V - 253V
LE	195 V - 253V
NI	<30 V

or

LN	195 V - 253V
LE	<30 V
NI	195 V - 253V



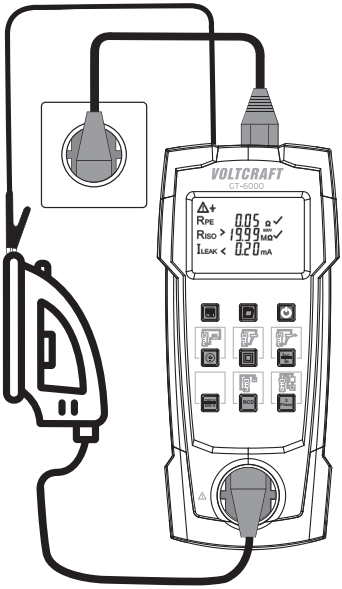




Note:

Check results – tick symbols do not guarantee good installation and proper value of voltage (high potential) on PE!

b) Testing devices of protection class 1

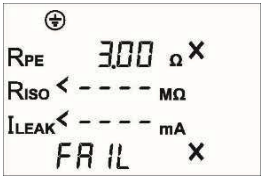


This function is used to test devices with protective conductor and accessible conductive parts that are connected to PE.

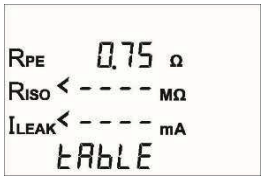
- Plug the DUT (Device Under Test) into the test socket (1) of the GT-6000 v2.
- Use the test lead with alligator clip to connect between the 4 mm test socket (9) and a touchable metal part of the DUT.
- In mains mode (differential current measurement method is executed and tests the device under test during operation), connect the mains cable with the built-in connector (11) on the GT-6000 v2 and the safety plug to an earthed socket (230 V, 50 Hz, 16 A).
- Switch on the DUT (Device Under Test).
- Start the automatic test by (short) pressing pushbutton (2).
- First test is the measurement of **the protective conductor resistance R_{PE} – Earth continuity**.

  Note: Extended version of this test is started by (long) press to the pushbutton (2).

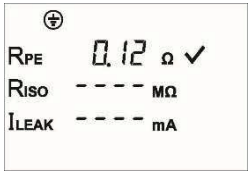
→ The preset value of the test voltage for the RISO measurement is 500V. This voltage can be reduced to 250 V DC with the button (5), if needed. The selected test voltage appears briefly on the display then. By pressing the button (5) again, test voltage will be set back to 500 V DC.



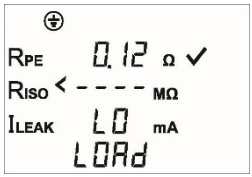
- If R_{PE} >1 Ω, the result for R_{PE} is shown on the display and an X symbol appears next to the RPE value. “FAIL” is shown on the display to indicate that the test has been aborted.
- If R_{PE} is higher than the permissible limit (≤ 0.3 Ω up to a length of 5 m) but < 1 Ω, there is no rating displayed behind the measured value. The “tAble” symbol is displayed, and the test sequence stops.
- Is displayed measured value is acceptable (according to limit values and the length of the DUT lead) must be decided by test person.



- Press the button (2) to accept the measured value. A tick symbol appears next to the R_{PE} value.
- Press the button (3) to reject the measured value. An X symbol appears behind the R_{PE} value. If the test has was aborted, “FAIL” is shown on the display.



- If R_{PE} ≤ 0.3 Ω, the measured value for R_{PE} is displayed and a tick symbol appears behind the R_{PE} value. The R_{PE} measurement will be performed again, with reverse polarity. The higher value of both measurements is shown.
- The **insulation resistance** test is started after R_{PE} test passed successfully.
- If “LO LOAD” appears on the display, should be checked if DUT is switched on.
- If the DUT is on but the load R_{L-N} > 6 kΩ, press the button (2) to proceed with the test sequence.
- Very high load (R_{L-N} < 14 Ω, ILOAD > 16 A) from the DUT is presented by “HIGH LOAD” on the display. In such a case, there is a risk of a short-circuit or earth fault. Check for a short-circuit between the external conductor (L) and the neutral conductor (N) on the device under test.

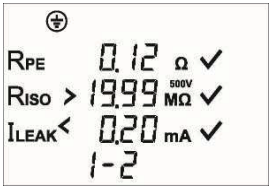


- If there is no short-circuit, press button (2) to proceed with the test sequence.
- Beside the R_{ISO} value will be shown a tick symbol (f the R_{ISO} is higher than the permissible minimum value).

Protective conductor current (differential current measurement method) – Differential Leakage Current

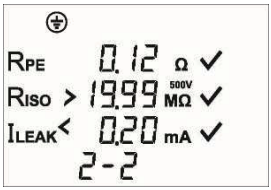
- After the R_{ISO} measurement GT-6000 v2 stops the test sequence and prompts the user to switch the mains voltage from 230 V to the test socket (“I_{LEAK}” symbol flashes).

- The protective conductor current measurement (Differential Leakage Current) starts by (short) pressing pushbutton (4) if the mains voltage is correct. **Note:** ⌛ Extended version of this test is started by (long) press to the pushbutton (4).
- During testing, DUT should be switched on and active.



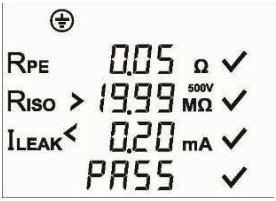
Step 1 (of 2):

- After a measurement time of 5 seconds, the polarity (mains) is reversed after 5 sec. and the protective conductor current is measured with the reverse mains voltage ("L/N" - "N/L"). The higher value of both measurements is shown.



Step 2 (of 2):

- Tick symbol will be displayed beside the I_{LEAK} value if the leakage I_{LEAK} is less than limit.
- "PASS" will be shown on the display if whole test is successfully finished.



Option: **Substitute Leakage Current (Battery operation, without mains supply):**

- Appliance is connected to the GT-6000 v2 like previously described (above), but without connecting the mains voltage.
- If measured I_{EA} (using equivalent leakage current measurement method) is lower than the permissible limit value, a tick symbol will be displayed beside I_{EA} value.
- "PASS" will be shown on the display if whole test is successfully finished.

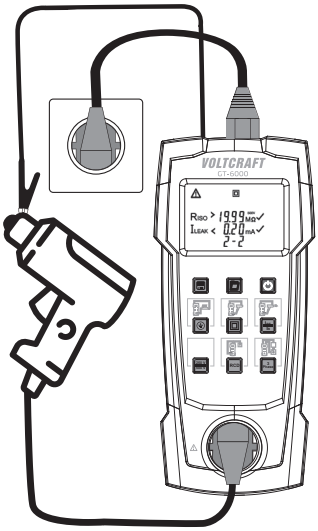
Note for measuring the contact current (Touch Leakage Current)!

⟶ When measuring **contact current using the direct measurement method (Touch Leakage Current)**, GT-6000 v2 should be connected to mains voltage (230 V AC). Appliance must be placed on insulated surface. If that is not the case, possible leakage currents to earth will disrupt the measurement and accuracy.

c) Testing devices of protection class 2 (insulated) and devices of protection class 3 (safety low voltage)

This function is used to test devices without protective conductor and with touchable conductive parts.

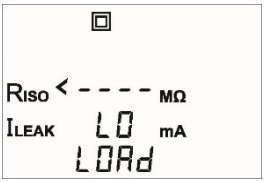
- Plug the DUT (Device Under Test) into the test socket (1) of the GT-6000 v2.
- Use the test lead with alligator clip to connect between the 4 mm test socket (9) and a touchable metal part of the DUT.
- In mains mode (**Touch Leakage Current - contact current - direct measurement method**), connect the mains cable with the built-in connector (11) on the GT-6000 v2 and the safety plug to an earthed socket (230 V, 50 Hz, 16 A).



→ The preset value of the test voltage for the R_{ISO} measurement is 500V. This voltage can be reduced to 250 V DC with the button (5), if needed. The selected test voltage appears briefly on the display then. By pressing the button (5) again, test voltage will be set back to 500 V DC.



- Switch on the DUT.
- Start the automatic test by pressing button (3).
- If "LO LOAD" appears on the display, should be checked if DUT is switched on.
- If the DUT is on but the load R_{L-N} > 6 kΩ, press the button (3) to proceed with the test sequence.
- Very high load (R_{L-N} < 14 Ω, ILOAD > 16 A) from the DUT is presented by "HIGH LOAD" on the display. In such a case, there is a risk of short-circuit. Should be checked connection between L) and N of DUT.

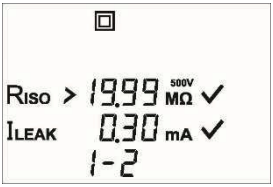


- If there is no short-circuit, press button (3) to proceed with the test sequence.
- Beside the R_{ISO} value will be shown a tick symbol (f the R_{ISO} is higher than the permissible minimum value).

Contact current measuring using the direct measurement method (Touch Leakage Current)

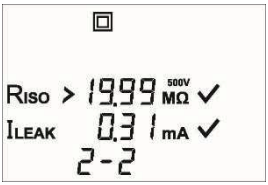
- After the R_{ISO} measurement GT-6000 v2 stops the test sequence and prompts the user to switch the mains voltage from 230 V to the test socket ("I_{LEAK}" symbol flashes).
- Contact current measuring using the direct measurement method (Touch Leakage Current) starts by (short) pressing pushbutton (4) if the mains voltage is correct.

  Note: ⌛ Extended version of this test is started by (long) press to the pushbutton (4).
- During testing, DUT should be switched on and active.



Step 1 (of 2):

- After a measurement time of 5 seconds, the polarity (mains) is reversed after 5 sec. and the protective conductor current is measured with the reverse mains voltage ("L/N" - "N/L"). The higher value of both measurements is shown.



Step 2 (of 2):

- Tick symbol will be displayed beside the I_{LEAK} value if the leakage I_{LEAK} is less than limit.
- "PASS" will be shown on the display if whole test is successfully finished.

⟶ **Note for measuring the contact current (Touch Leakage Current)!**

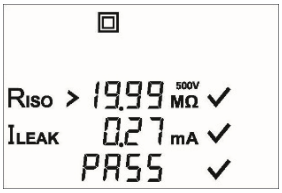
Appliance must be placed on insulated surface. If that is not the case, possible leakage currents to earth will disrupt the measurement and accuracy.

⟶ **Note for measuring the insulation resistance for test objects of protection class 3:**

In the case that measured R_{ISO} value is between 2 MΩ (limit for protection class 2 objects) and 0.25 MΩ (protection class 3 objects), marked with X symbol beside Riso value, test person must decide about result.

Option: **Substitute Leakage Current (Battery operation, without mains supply):**

- Appliance is connected to the GT-6000 v2 like previously described (above), but without connecting the mains voltage.
- If measured I_{EA} (using equivalent leakage current measurement method) is lower than the permissible limit value, a tick symbol will be displayed beside I_{EA} value.
- "PASS" will be shown on the display if whole test is successfully finished.

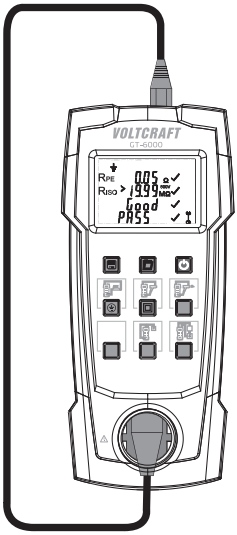


d) Lead test - testing of power / extensions cables, cable reels and multi-plugs

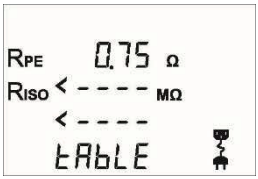
Lead test can be used for testing of power / extensions cables, cable reels and multi-plugs.

Testing IEC power cables

- Connect the IEC power cable, IEC 60320 C13, to the IEC low - power connector, IEC 60320 C14, (10).
- By pressing the button (2) automatic test (protection class 1) will start, R_{PE} will be first measured.
- If value of R_{PE} is below the limit, a tick symbol is displayed next to the R_{PE} value.



- **R_{PE} depends on the length and cross-section of the tested cable!**
- If R_{PE} is higher than limit value (≤0.3 Ω up to a length of 5 m), but lower than 1 Ω, the measured value is displayed without rating. The “tAble” symbol is displayed, and the test sequence stops. Main test person needs to decide about correctness of result.



- In the table below, typical cable resistances can be found:

Lead length	Conductor cross section		
	1.0 mm²	15 mm²	2.5 mm²
5 m	0.1 Ω	0.06 Ω	0.04 Ω
10 m	0.2 Ω	0.12 Ω	0.08 Ω
25 m	0.5 Ω	0.3 Ω	0.2 Ω
50 m	1.0 Ω	0.6 Ω	0.4 Ω

- If main test person decides to R_{PE} value rate like a good (below limit), need to press the button (2). In that case, a tick symbol will be displayed beside the R_{PE} value and the test can continue.
- If main test person decides to R_{PE} value rate like not good (above limit), need to press the button (3). “FAIL” will be displayed and test is stopped.
- After R_{PE} test is passed, the R_{ISO} is measured automatically.
- Tick symbol is displayed next to the R_{ISO} symbol if value is above limit.
- After R_{ISO} test is passed, L) and N are tested (open and short-circuit); tick symbol is displayed next to the cable symbol is passed.
- “PASS” will be shown on the display if whole test is successfully finished.



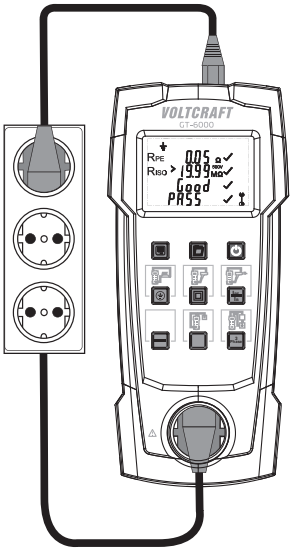
- If the open / short-circuit test fail, instead of display message “Good” message below will be shown:
  - “OPEn” symbol: open circuit in L lead or in N lead, or,
  - “SHOr” symbol: short-circuit between L) and N.

Testing extension cables, cable reels and multi-plugs

- Connect the IEC power cable (from GT-6000 v2 kit), to the IEC low - power connector, IEC 60320 C14, (10).
- Connect extension cable to the test socket (1) and to the safety plug on the IEC low-power cable.
- By pressing the button (2) automatic test (protection class 1) will start, R_{PE} will be first measured.
- The rest of testing is the same as described above for testing of IEC power cable.

Testing three-phase cable

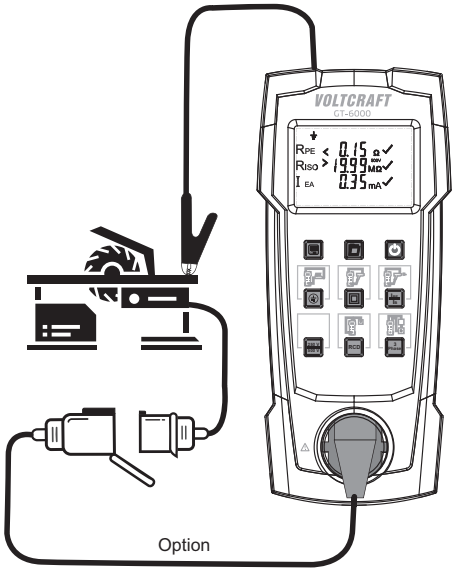
- Connect the three-phase cable to the test socket (1), using the optional passive measurement adapter.
- Insert the 4 mm safety connector of the test lead with alligator clip into the 4 mm safety socket (9) and connection to the PE on CEE connector of the tested 3-phase cable.
- By pressing the button (2) automatic test (R_{PE}, R_{ISO} and I_{EA}) will start.



e) Testing (passive and active) of three-phase devices

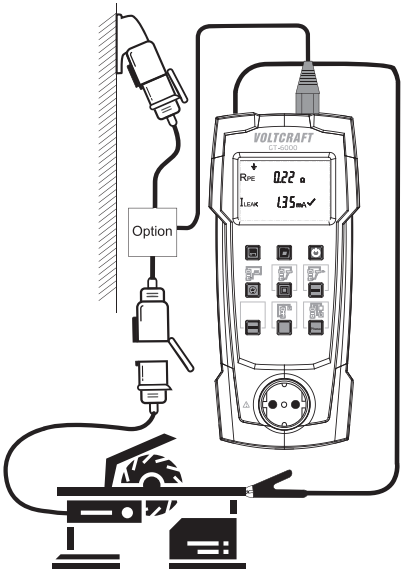
Passive testing

- For passive testing, L1, L2 and L3 of the 5-pin CEE connector should be bridged, by some available, standard adapter.
- For testing protective conductor and contact current, Substitute Leakage Current method (equivalent leakage current measurement method) is used.
- The test is performed on the same way as described in “b) Testing devices of protection class 1 (Substitute Leakage Current (Battery operation, without mains supply)”.



Active testing

- For active testing, adapter 16 A CEE, 5-pin (option in GT-6000 v2 kit), is necessary.
- Adapter is active (electronics inside).
- Connect the CEE connector on the device under test to the CEE connector on the measurement adapter and then connect the CEE connector on the measurement adapter to a protected mains supply (3x 400 V, N, PE, 50 Hz, 16A).
- The measurement signal cable (IEC) of the 16 A CEE adapter, need to be connected to the IEC socket (10).
- Use the test lead with alligator clip to connect between the 4 mm test socket (9) and a touchable metal part of the DUT.
- The appliance should be switched off. Otherwise, there is a risk of failures and for test person.



- By pressing the button (7) the automatic test will start.

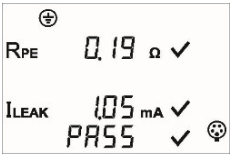
- The measurement is stopped if a contact voltage is present on the metal part of the test object. The warning can be seen on picture on right side.



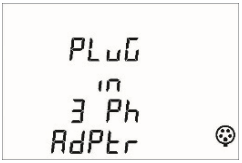
- If contact voltage is not present (below limit), RPE measurement is started. Polarity reversal is automatically applied, and the highest measured value (of both measurements) will be taken as final value.
- Next test, after successful R_{PE} test, is about protective conductor current I_{LEAK} – it is performed as a continuous measurement (30 sec, max.). By pressing the button (7), measurement can be stopped anytime.



- If measured value is lower than the limit, beside the "I_{LEAK}" symbol will be displayed a tick symbol.
- "PASS" will be shown on the display if whole test is successfully finished.



- If the button (7) is pressed without connecting the If 16 A CEE adapter is not connected to the GT-6000 v2, and button (7) is pressed, the following warning is displayed is warning which can be seen on picture on the right side.



DUT must be placed on insulated surface. If that is not the case, possible leakage currents to earth will disrupt the measurement and accuracy.

f) Testing of RCDs

30 mA residual current circuit breakers RCCBs/RCDs

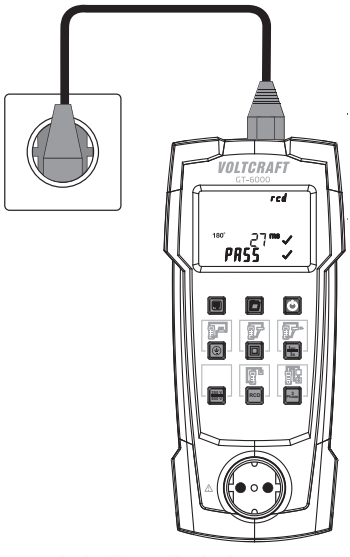
- The GT-6000 v2 supports tripping time measurement of permanently installed RCCBs/RCDs and portable RCCBs/PRCDs with a rated residual current of 30 mA. The tripping time is measured with 2 different current settings in the automatic test sequence: the single rated fault current (initial polarity 0°/180°) and the five-fold rated fault current (initial polarity 0°/180°).
- Maximum contact voltage is always compared with limit value of 50 ; If value of Contact voltage is above limit, displayed is the symbol "UB > 50 V" and the test will be stopped.

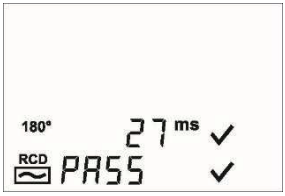
⟶ **On next should be put attention:**

- Possible leakage currents (after RCCB/RCD)
- Presence of the other earthing equipment
- Some devices (placed after RCCB/RCD) can cause a longer tripping time, e.g., rotating machines, capacitors etc.

Testing of permanently installed RCCBs/RCDs

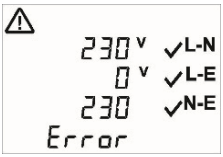
- Connect the IEC low-power cable to the IEC connection (10).
- Connect the plug to an mains (earthed) socket (this socket is associated with RCCB/ RCD which are under the test and should be switched on).
- By pressing the button (6) of the RCCB/RCD will start.
- The plug in the mains socket should be rotated by 180° if “IEC Volt Error” is displayed on LCD. The button (6) should be pressed to re-start the test.
- Every time when the symbol “rESEt” appears on the display, RCCB/ RCD should be switched on.
- The RCCB/RCD is tripped by fault current of 30mA generated by GT-6000 v2 (with both 0° and 180° polarity). The tripping times are measured.
- Tick symbol is displayed next to the tripping time value if the tripping time is less than the limit (200 ms).
- If tripping time caused by the single rated fault current is inside limit, GT-6000 v2 will generate 150 mA fault current with 0° or 180° initial polarity. The RCCB/RCD is tripped, and the tripping times caused by this five-fold rated fault current will be measured.
- Tick symbol is displayed next to the tripping time value if tripping time is less than the limit (40 ms).
- “PASS” will be shown on the display if whole test is successfully finished.

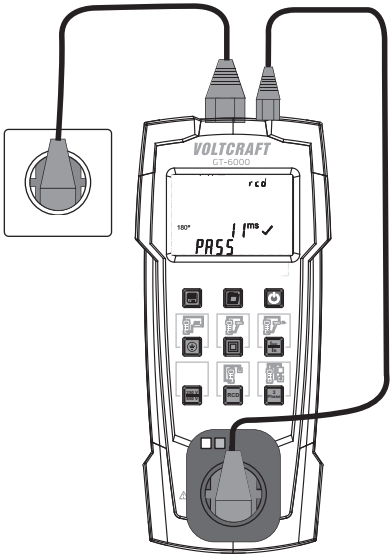




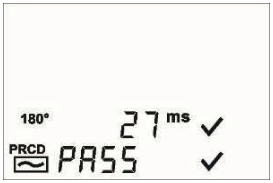
Testing portable RCCBs/PRCDs

- Connect the connector on the mains cable to the low-power connection (11).
- Connect the plug to a 230 V mains (earthed) socket. The voltage measurement will be applied automatically.
- Error message is displayed for approx. 2 seconds if L wire of mains socket is not correct.





- The portable RCCB/PRCD should be put into the test socket (1).
- Connect the supplied IEC low-power cable to the IEC connector (10) on the GT-6000 v2.
- Put the safety plug into the socket of the portable RCCB/ PRCD. The plug must be oriented as shown on picture on the right side.
- By pressing the button (6) the mains voltage is applied to the test socket. The symbols “rCd” and “rESEt” are displayed.
- Switch on the portable RCCB/PRCD.
- Two errors may occur:
  - If “rESET” warning is displayed continuously and the symbols “LN” and “LE” are flashing, should be checked if RCCB/ PRCD is switched on.
  - If RCCB/ PRCD is switched on and the message “IEC Volt Error” is displayed on the display, safety plug in the socket of the RCCB/PRCD need to be rotated by 180°.
- By pressing the button (6) the test will be restarted.
- RCCB/PRCD should be switched back on, each time when “rESEt” symbol is displayed.
- The portable RCCB/PRCD is tripped by fault current of 30 mA with 0° or 180° initial polarity. The tripping times caused by such single rated fault current are measured.
- Tick symbol is displayed next to the tripping time value if the tripping time is less than the limit (200 ms).
- If tripping time caused by the single rated fault current is inside limit, GT-6000 v2 will generate 150 mA fault current with 0° or 180° initial polarity. The RCCB/RCD is tripped, and the tripping times caused by this five-fold rated fault current will be measured.
- Tick symbol is displayed next to the tripping time value if the tripping time is less than the limit (40 ms).
- “PASS” will be shown on the display if whole test is successfully finished.



⟶ In some cases, the portable RCCB/ PRCD need to be plugged into a mains socket (which is not protected by any other RCCBs) – test should be done like for permanently installed RCCBs/RCDs.

10. Memory function

The GT-6000 v2 can store measured values of 999 tested appliances.

a) Saving measurement data

- Once the test sequence is complete and the test result is available, press the save button (13). The displayed measured values are saved in the first free memory space.
- Saving is confirmed by the “STORE” symbol and the memory space number appearing on the display.
- The save button (13) is locked until another test is performed to prevent duplicates being saved.
- The memory space number is automatically increased by one each time a value is saved. “FULL” appears on the display when all 999 memory spaces have been used.



b) Retrieving measurements

- Press the folder button (14) to retrieve the saved measured values with the corresponding memory space number. The “RECALL” symbol appears on the display.
- The folder button (14) switches to the next memory space, the save button (13) switches back to the previous memory space.

c) Measurement data deleting

- Press the folder button (14) to retrieve the saved measured values with the corresponding memory space number. The “RECALL” symbol appears on the display.
- To clear the entire measurement memory, press and hold the save button (13) and the folder button (14) at the same time until the counter value is reset to zero. The display shows “no dAtA” when the memory is empty. Individual memory spaces cannot be cleared.

d) Transferring measurements data

- The measured values can be downloaded from the GT-6000 v2 to a Windows®-compatible computer using a download program. The data are transferred via the USB interface. When the USB interface is activated, automatic shutoffs cannot occur. Auto power-off is thus deactivated.

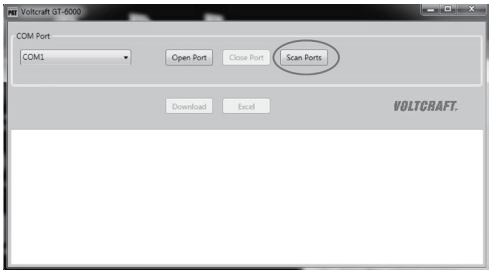
Remove all connection cables and test objects from the GT-6000 v2. Only the interface cable may be connected.

- The driver and the download program must be installed on the computer before the GT-6000 v2 can be connected via the USB interface.

e) Software and driver installation

⟶ You can also obtain the latest version of the driver and software via the link for the current operating instructions (see “Introduction” chapter).

- Please download the “setupVoltcraftPAT” setup program to your computer and install the application.
- Run the “setupVoltcraftPAT” setup program by double clicking. This will install the driver for the GT-6000 v2 and the download program. Follow the on-screen instructions. After successful installation, it may be necessary to restart the computer in order to load the drivers correctly. A “Voltcraft PAT software” shortcut will be placed on the desktop.
- Connect the USB-C data cable to the USB-C connection (12) on the GT-6000 v2. Connect the USB-A connector to an unused USB interface on your computer.
- Switch the GT-6000 v2 off. To activate the USB interface, press and hold the save button (13) and the On/Off button (15) at the same time. The device switches on and activates the interface. The USB plug symbol and “USB Conn” appear on the display.
- The computer detects the device and displays a brief notification.



- Start the “Voltcraft PAT software” program by double clicking on the program icon on the desktop. The program starts.
- Select “Scan Ports”, which will detect all available serial interfaces.



- Then, select the COM port to which your GT-6000 v2 is connected.
- In the example, this is COM5.
- Press “Open Port”.

- The saved data can now be loaded into the program via the “Download” button.
- The downloaded data are displayed chronologically in the lower area.
- The data can now be saved in a data format for spreadsheet programs (.xls) using the “Excel” button. The file name and the storage location can be freely selected.
- Follow the on-screen instructions.



f) Setting the RTC (Real Time Clock)

To set the date and time, proceed as follows:

- Switch the GT-6000 v2 off.
- To activate the date and time setting, press and hold the folder button (14) and the On/Off button (15) at the same time. The device switches on and activates the setting.
- The date/time format is displayed as follows:

  DD.MM = Day (1-31). Month (1-12)

  YYYY = Year

  HH.mm = Hours (0-23). minutes (0-59)

  SS = Seconds (0-59), not adjustable
- Press the button (2) to select a date/time field. Pressing the button moves one field ahead each time.
- When the field flashes, the value for this field can be set.
- Press the save button (13) to decrease the value or the folder button (14) to increase the value.
- Each time the hours and minutes are changed, the seconds field resets to zero.
- To save the setting, press and hold the button (2) for approx. 2 seconds. The display switches back to standard mode.
- RTC has its own independent power supply (an integrated lithium button battery CR2032).

11. Maintenance

- When using the instrument in compliance with the instruction manual, no special maintenance is required. Should operational problems occur during daily use, consulting service will be at your disposal, free of charge. If functional errors occur after expiration of warranty, our sales service will repair your instrument without delay.

a) Cleaning

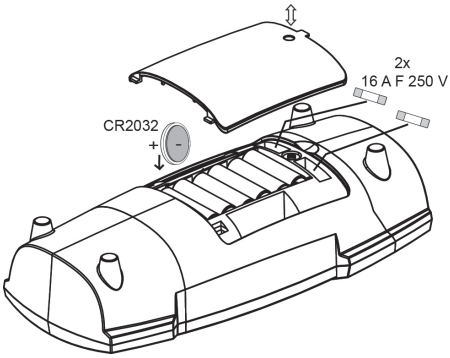
- Use a clean, damp, lint-free and antistatic cloth to clean the device, display and test leads. Allow the device to dry completely before using it again.
- If the instrument is dirty after daily usage, it is advised to clean it by using a humid cloth and a mild household detergent. Never use acid detergents or dissolvent for cleaning. Before using again, instrument need to be dry.
- Prior to cleaning, ensure that instrument is switched off and disconnected from external voltage supply and any other instruments connected (such as UUT, control instruments, cables, etc.).

b) Calibration Interval

The instrument has to be periodically calibrated by our service department in order to ensure the specified accuracy of measurement results. We recommend a calibration interval of one year.

c) Battery Replacement and Disposal

- Prior to battery replacement, disconnect the instrument from any connected test leads. Only use batteries as described in the technical data section!
  - Switch off instrument. Disconnect test leads.
  - Loosen the screws on the instrument rear (not to be completely removed). Lift the case cover.
  - Remove discharged batteries.
  - Insert six new batteries 1,5 V AA (LR6).
  - Insert new lithium button battery of type CR2032 (last approx. 2 years). Those batteries are responsible for the date and time settings. Check polarity!
  - Replace the case cover and retighten the screws.
- Please consider your environment when you dispose of your one-way batteries or accumulators. They belong in a rubbish dump for hazardous waste. In most cases, the batteries can be returned to their point of sale.
- Please, comply with the respective valid regulation regarding the return, recycling and disposal of used batteries and accumulators.
- Batteries must not be placed in household waste.
- Batteries must not be short-circuited.
- If an instrument is not used over an extended time period, the accumulators or batteries must be removed. Should the instrument be contaminated by leaking battery cells, the instrument needs to be returned, for cleaning and inspection, to the factory.



d) Fuse Replacement / Product Disposal

- Prior to fuse replacement, ensure that device is disconnected from external voltage supply and the other connected instruments (such as UUT, control instruments, etc.)
- Only use fuses as described in the technical data section!
- Using auxiliary fuses, in particular short-circuiting fuse holders is prohibited and can cause instrument destruction or serious bodily injury of operator.
- Switch off the instrument. Disconnect test leads.
  - Loosen the screws on the instrument rear.
  - Lift the case cover.
  - Remove the defect fuse.
  - Insert new fuse.
  - Replace the case cover and retighten the screws.
  - Ceramic fuse F1/F2 : 16A, 250V, fast-blow (5x 20 mm), breaking capacity ≥500A
- General warning: if the battery/fuse compartment is open, device must not be used!

Product Disposal

- This product must not be disposed of in household waste.
- Batteries must be removed and disposed separately from the product.

12. Technical data

Display	Liquid crystal display (LCD)
Battery status display	Battery Symbol appears (< 2,4V)
Measurement category	CAT II 300 V
Pollution degree	2
Protection class	IP40
Power supply	6 AA or LR06 batteries, 1.5 V
Mains voltage	230 V AC, 50 Hz
Dimensions (L x W x H)	277 x 124 x 68 mm
Weight	approx. 1030 g
Ambient conditions	
Operation Temperature	0 to +30 °C (0 - 80% rel. humidity)
Operation Temperature	+31 °C to +40 °C (0 - 75% rel. humidity)
Storage Temperature	-25 °C to +65 °C (0 - 80% rel. humidity)
Overload Protection	
Fuse F1/F2	F 16 A / 250 V, Ceramic, 5x 20 mm
Auto Power Off function	1 minute
Battery life	approx. 2500 tests with full batteries
Technical Data refer to	23°C ± 5°C at < 80% rel. humidity

Safety standards

EN 61010-1

EN 61010-2-030

EN 61557-1, -2, -4, -10 and -16

Earth Continuity - Protective conductor resistance

Measurement range	Resolution	Accuracy
0.05 Ω - 19.99 Ω	0.01 Ω	±(5% + 2)
Test current: >200 mA into 2 Ω Open circuit voltage: <5 V Factory Set Pass/Fail Preset limit: ≤0.3 Ω (up to 5 m length)		

Insulation resistance

Measurement range	Resolution	Accuracy
0.1 MΩ - 19.99 MΩ	0.1 MΩ	±(5% + 2)
Test voltages: 250 V/DC or 500 V/DC (+20%, -0%) Measuring current: >1 mA, <2 mA at 2 kΩ Factory Set Pass/Fail Preset limits: 1 MΩ (protection class 1), 2 MΩ (protection class 2)		

Substitute Leakage Current - Protective conductor and contact current (equivalent leakage current measurement method)

Measurement range	Resolution	Accuracy
0.25 mA - 19.99 mA	0.01 mA	±(5% + 2)
Test voltage: 40 V/AC, 50 Hz Test current: <10 mA into 2 kΩ Factory Set Pass/Fail Preset limits: 3.5 mA (protection class 1), 0.5 mA (protection class 2)		

Differential Leakage Current- Protective conductor current (differential current measurement method)

Measurement range	Resolution	Accuracy
0.25 mA - 19.99 mA	0.01 mA	±(5% + 2)
Test voltage: 230 V ±10% Rated current: 16 A Max. breaking capacity: 3000 VA Max. lamp load: 1000 W Max. measurement time: 30 seconds Factory Set Pass/Fail Preset limit: 3.5 mA (protection class 1) Protected against external voltages: Max. 276 V For non-sinusoidal power supply, an additional error must be taken into account: Crest factor of >1.4 to 2.0, additional error +0.4%.		

Touch Leakage Current - Contact current (direct measurement method)

Measurement range	Resolution	Accuracy
0.1 mA - 1.99 mA	0.01 mA	±(5% + 2)
Test voltage: 230 V ±10% Rated current: 16 A Max. measurement time: 30 seconds Factory Set Pass/Fail Preset limit: 0.5 mA (protection class 2) Protected against external voltages: Max. 276 V For non-sinusoidal power supply, an additional error must be taken into account: Crest factor of >1.4 to 2.0, additional error +3.1%		

Testing of power / extensions cables, cable reels and multi-plugs

Protective conductor resistance measurement (for data, see above)
Insulation resistance measurement (for data, see above)
Lead break test of the external conductor (L) and the neutral conductor (N)
Short-circuit test of external conductor (L) and neutral conductor (N)

RCD test - Tripping time of RCCB/RCD

Measurement range	Resolution	Accuracy
10 ms - 500 ms	1 ms	±(5% + 2)
Testing of current/polarity: 30 mA sinusoidal/0° and 180°, 150 mA sinusoidal /0° and 180° Factory Set Pass/Fail Preset limit: 200 ms (30 mA), 40 ms (150 mA)		

Leakage Current measurement with 3-phase adapter - Protective conductor current (direct measurement method with optional measurement adapters)

Measurement range	Resolution	Accuracy
0.25 mA - 9.99 mA	0.01 mA	±(5% + 2)
Test voltage: 3x 400 V ±10% Rated current: 16 A Factory Set Pass/Fail Preset limit: 3.5 mA		

Voltage measurement - Voltage measurement at external earthed socket

Measurement range	Resolution	Accuracy
5 V - 270 V/AC	1 V	±(5% + 2)
Measured and display: Voltage between L and N, L and PE, N and PE		

Note: all Factory Set Pass/Fail limits are preset according to DIN VDE 0701-0702 EN 50699 and ÖVE/ÖNORM E 8701-1

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