

Manual

SAFETYTEST 1PM



Texts, illustrations and technical information have been carefully compiled. Nevertheless, errors cannot be completely excluded. The author and the manufacturer of the test device cannot accept any legal responsibility or liability for incorrect information and their consequences!

These operating instructions must be read carefully and completely before using the test device!

Warning notices and warning signs are intended to specifically warn of risk or danger!

Warnings and warning signs in the manual, on the test device as well as on the accessories must be particularly observed and mean e.g.:



General warning of a danger point!
Observe the operating instructions!



Danger high voltage!

Revision: 002
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Additional Information:

Wiki Technical documentation:

Data sheet, menu structure, quick reference guide

<https://safetytest.atlassian.net/wiki/spaces/TD/overview>



Wiki Test-Master App

<https://safetytest.atlassian.net/wiki/spaces/TMA/overview>



Wiki Remote-Master App

<https://safetytest.atlassian.net/wiki/spaces/RMA/overview>



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1 General safety instructions and warnings

The SAFETYTEST 1LT V2/1LT V2 RCD test device was built and tested according to the following safety regulations:

Directive / Richtlinie	2014/30/EU Elektromagnetische Verträglichkeit (EMV-Richtlinie)
Directive / Richtlinie	2014/35/EU Low Voltage directive / Elektronische Betriebsmittel (Niederspannungsrichtlinie)
Directive / Richtlinie	Restriction of certain hazardous substance / RoHS-Richtlinie EN 63000:2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (IEC 63000:2016) / Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe (IEC 63000:2018)
Standard / Norm	EN 61010-1:2020 Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements / Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 1: Allgemeine Anforderungen
	EN 61010-2-030:2012 Particular requirements for testing and measuring circuits / Besondere Bestimmungen für Prüf- und Messstromkreise
Standard / Norm	Electro-magnetic compatibility (EMC) EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements (IEC 61326-1:2012) / Elektrische Mess-, Steuer-, Regel- und Laborgeräte – EMV-Anforderungen – Teil 1: Allgemeine Anforderungen (IEC 61326-1:2012)
Standard / Norm	EN 300328:2019-10 Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques (EN 300 328 V2.2.2) / Breitband-Übertragungssysteme - Datenübertragungsgeräte zum Betrieb im 2,4-GHz-Band – Harmonisierte Norm zur Nutzung von Funkfrequenzen
Standard / Norm	EN 301489-1:2020-06 Electromagnetic compatibility and Radio spectrum Matters (ERM); EMC standard for radio equipment and services; Part 1: Common technical requirements (EN 301 489-1 V2.2.3) / Elektromagnetische Verträglichkeit für Funkeinrichtungen und -dienste – Teil 1: Gemeinsame technische Anforderungen
Standard / Norm	EN 301489-17:2021-03 Electromagnetic compatibility and Radio spectrum Matters (ERM); EMC standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems (EN 301 489-17 V3.2.4) / Elektromagnetische Verträglichkeit für Funkeinrichtungen und -dienste – Teil 17: Spezifische Bedingungen für Breitband-Datenübertragungssysteme

In order to maintain this safety and to ensure safe operation, users must observe the following warnings:



All tests may only be carried out by a qualified electrician or by a person who has been instructed in electrical engineering under his direction and supervision. The user (testing person) must be instructed by a qualified electrician in carrying out and assessing the test!



The test device may only be used as intended to ensure the safety of the testing person, test device and test object.

The warning notices on the test device and the mains adapter cables must be observed!



The device may only be operated on a 230 V AC network that is secured with a maximum of 16 A! It is not suitable for electrical systems!



No measurements may be carried out on unsecured measuring circuits!



Repair work and changes to the test device may only be carried out by the manufacturer himself or by specialists authorized by the manufacturer! Repair work on mains adapter cables may only be carried out by specialists.



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

If safe operation is no longer possible, e.g. by:

- visible damage,
- improper storage,
- improper transport,
- failure of a phase control lamp,
- failure of measurement functions, etc.,



the test device must not be operated further! The test device must be shut down immediately and secured against unintentional start-up! The test device may only be repaired by the manufacturer or by specialists authorized by the manufacturer!



PE resistance and touch current measurements in electrical systems are only permitted under certain conditions and using the corresponding hazard warnings!



It should be noted that high voltages can occur on test objects, e.g. by charged capacitive circuits!



Do not connect the test object to the test socket until the mains connection is safe from a safety point of view!



DANGER! When connecting the test object to a test socket, dangerous contact voltages can be present on a defective test object or on touchable conductive parts that are not connected to the protective conductor!

2 Application

The **SAFETYTEST 1PM** tester is used for testing after repair and for repeat testing of electrical work equipment with a connected load of up to 4 kW and, via adapters, for testing three-phase consumers and extensions.

The optional test sequences are performed via an Android app on the tablet PC or smartphone, coupled with the test instrument via a Bluetooth connection. The test sequence is menu-driven with simple, graphical profile selection and animated images to illustrate the measurement principle. Parallel to the test, photos can be taken of the master data or the test by the tablet's camera. Barcodes for test item identification are also scanned by the tablet camera or by a separate barcode reader coupled to the tablet via Bluetooth. To accommodate different user groups, the user profiles "Expert" and "Standard" can be set.

Separate processes for extension leads and permanently connected devices are available. The measured values are automatically stored in a database, which can optionally be synchronized with the PC or with several Android devices via the cloud, so that all inspectors in a work group can access the same data. A PDF protocol with preselectable company logo is automatically generated at the end of a test sequence.

The special features of the **SAFETYTEST 1PM** are the standby power measurement according to EU regulation 1275/2008 and a lightning-fast pole reversal.

Technical highlights of the SAFETYTEST 1PM:

- Testing according to DGUV regulation 3, DIN EN 50678 (DIN VDE 0701) and DIN EN 50699 (DIN VDE 0702)
- Fast selection of the individual measurements via direct selection buttons
- Automatic limit value adjustment (protective conductor, insulation)
- Two-pole measurement (low resistance, insulation, equivalent leakage current, voltage)
- Testing of permanently connected devices possible
- Plain text operation with block diagrams and green/red LED for OK/error
- Large high-contrast display
- Checking the mains connection for PE connection and automatic switch-off in the event of a dangerous residual current from the test object
- Bluetooth and USB interface
- Fast execution of all active tests including function test with real-effective performance display in just one step
- Optional operation via Android app **Test-Master** with SQLite3 database fully activated in the first year
- fast polarity reversal
- Individual test sequences with a unique operating concept via **Remote-Master App** (Android/iOS) for efficient testing and quick documentation

3 Scope of delivery and accessories

3.1 Scope of delivery (standard)

- 1 SAFETYTEST 1PM test device
- 1 measuring line red and black (2 m)
- 1 quick reference guide
- 1 factory calibration certificate

3.2 Optional accessories

ACCESSORIES	ITEM NO.
Test probe 2-pole 5 m	0002840
Test probe 2-pole 10 m	0014460
Residual current clamp/current clamp DI40, current measurement up to 40 A AC	6733040
Residual current clamp/current clamp DI80, current measurement up to 10 A AC	0036509
Brush probe 4 mm black for effective PE resistances	0001001
Brush probe 4 mm red	6462270
Test clip black	0001002
Test clamp red	6462250
Barcode scanner RS232/USB	0001190
Transponder scanner RS232/USB	0018510
Transport bag for accessories	0017890
Transponder disc ø 30 mm perforated (100 pieces)	upon request
Transponder glass 3.15x13.3 mm (100 pieces)	upon request
barcode printer	0002620
USB cable	861094

3.3 Software options

3.3.1 Remote-Master App

The **Remote Master App** is a test sequence and documentation software. The app is suitable for iOS and Android operating systems.

With the newly developed software, plants, devices, machines and work equipment can be tested and documented very efficiently and easily. Individual test sequences with a unique operating concept ensure efficient testing and fast documentation.

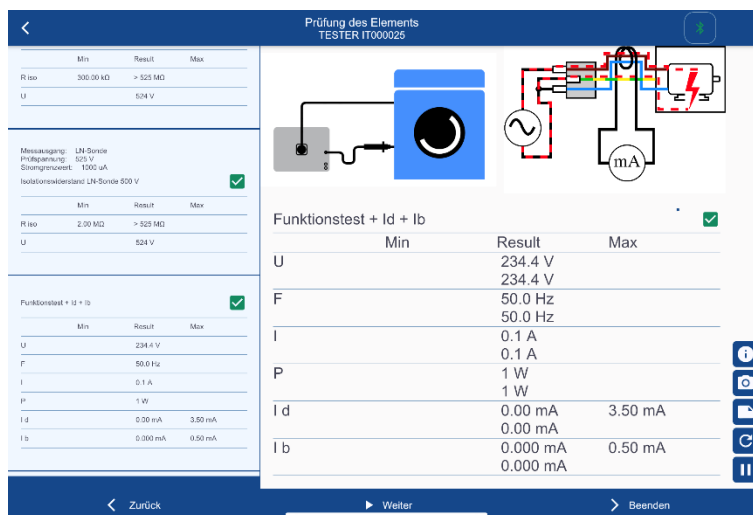
The **Cloud-Master App (server solution)** offers central access and an overview of all test data, customers and orders, as well as simple monitoring of the distribution of rights and roles. For customers, specific access to their test data can be enabled and thus the documentation can be transferred.

Asset trees, device lists or objects can be created both locally in the app and centrally via the cloud. By swiping with drag & drop in the new menu, assets, equipment and resources can be duplicated quickly and easily.

VERSIONS	ITEM NO.
Basic Remote - Master App	0042690
Pro Remote-Master App	0042691
Comfort Remote -Master App	0042692
Cloud Remote-Master App	0043900

For more information, see

<https://safetytest.atlassian.net/wiki/spaces/RMA/overview>



3.3.2 Test-Master App

The **Test-Master App** is ideal for controlling test equipment for VDE testing with simple logging and work equipment management.

The app controls the test device via a Bluetooth interface in the Android tablet or smartphone. The data is stored in a SQLITE3 database in the tablet/smartphone. Test reports are automatically generated in PDF format and stored or sent by e-mail. The camera integrated in the tablet/smartphone can be used for barcode/QR code entry and photo documentation of the test specimens or the tests. Photos are printed together with the test protocols, stored in a separate folder and always exported and/or imported together with the database.

The Test-Master App supports four different hardware licences, which correspond to the different requirements of the customer. The functional scope of the app depends on the hardware licence on your test device.

VERSIONS	ITEM NO.
Basic Test-Master App	0039360
Pro Test-Master app	0039361
Comfort Test-Master App	0039362
EUP Test -Master App	0039363

For more information, see

<https://safetytest.atlas-sian.net/wiki/spaces/TMA/overview>



3.3.3 Database software Safety -Remote

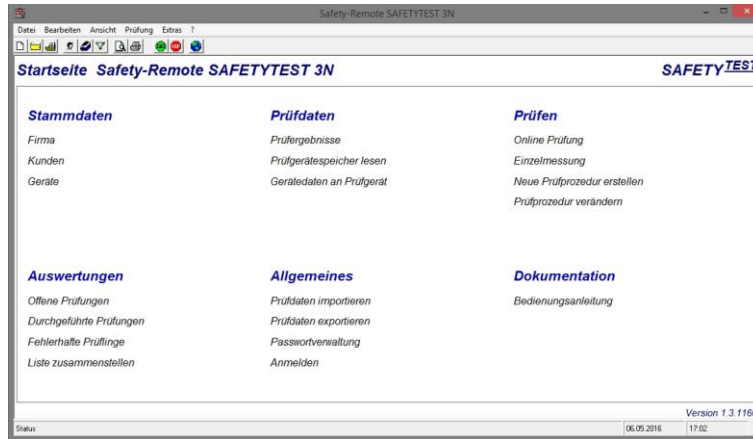
The **Safety-Remote Software** is used to manage the test data of various devices in a database and to directly control the test device. The display and adaptation of the master and test data as well as the test procedures are made possible by the clear tabular form.

With remote operation via PC, individually created test procedures can be carried out. Communication with the test instrument takes place via USB and/or Bluetooth interface.

The software supports the import and export of various database formats (SQLite, ACCESS) and the direct synchronisation of the measurement data on other PCs, e.g. via an SQL server or via cloud connection (TestAndSmile/Syfit).

For more information, see

<https://safetytest.atlas-sian.net/wiki/spaces/SAR/overview>



3.3.4 Management software SafetyDoc Pro/Free

The **SafetyDoc software** is an easy-to-use management software in Microsoft Excel. The software can be used to read test devices and create test reports.

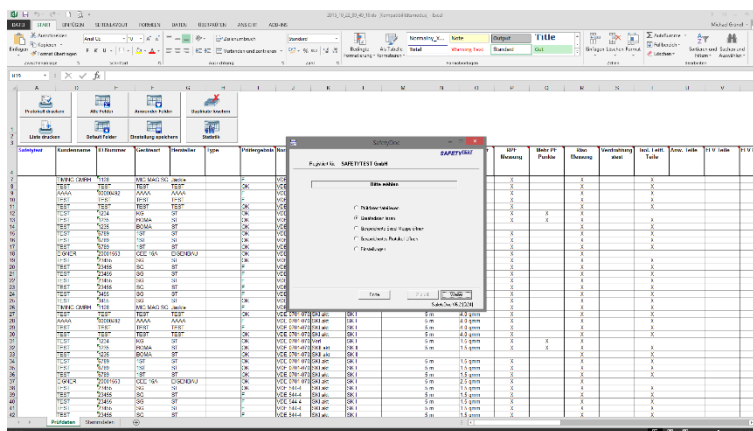
The report templates can be customized under Microsoft Word, including the logo. Further evaluations of the test results can be carried out using Excel or an existing Word template with error rate analysis.

With the full version of SafetyDoc PRO, filtered or complete master data, e.g. be transferred to the test device for a repeat test. The software also offers the option of carrying out a risk assessment with test time adjustment. This can be assigned to each filtered test object or to all test objects.

SafetyDoc FREE can be converted at any time into the full version SafetyDoc PRO with a license key.

For more information, see

<https://safetytest.atlas-sian.net/wiki/spaces/SD/overview>



4 Connections, operating and display elements

4.1 Front panel with connections, sockets, test sockets



Before connecting the test device to the mains voltage, the corresponding warnings in Chapter 1 "General safety and warnings", the warnings on the mains adapter cables and, if available, also on the accessories must be observed!

The safety of the user, the device and the test item can only be guaranteed if it is used as intended!

- 1 In the selection level: Back
In the measurement level: Send measured value
- 2 Connection for test leads red/black
- 3 GOOD LED
- 4 ERROR LED
- 5 LCD display
Adjustment buttons:
 - 6 - Arrow keys to move the cursor
 - 7 - Enter button to enter and confirm the menu
- 8 Control panel for the individual measurements
- 9 test socket
- 10 power switch
- 11 USB Type C for communication with a Windows PC
- 12 fuse

4.1.1 connections

Before connecting the test device to the mains voltage, the corresponding warnings in Chapter 1 "General safety and warnings", the warnings on the mains adapter cables and, if available, also on the accessories must be observed! The safety of the user, the device and the test item is only guaranteed if it is used as intended!

4.1.2 Mains connection (not shown)

The mains connection of the test device is located on the back of the device. The test device may only be operated on a 230 V AC 40 - 60 Hz network that is protected with a maximum of 16 A!

4.1.3 Measuring socket black "GND"

Connection of the measuring line for the negative pole when measuring the PE resistance, contact current, voltage and insulation resistance

4.1.4 Measuring socket red "probe"

Connection of the measuring line for the positive pole when measuring the PE resistance, insulation resistance. Measuring input for voltage, substitute leakage current and touch current measurement.

4.1.5 Interface USB type C

Connection of a USB C plug for control via a virtual COM interface from the PC. The drivers from the company FTDI must be installed. This is done during the installation of the software on the PC.

4.1.6 test socket

Schuko socket up to 16 A.

The protective conductor is only connected before the mains is switched on.



When connecting the test object to a test socket, a dangerous contact voltage can be present on a defective test object or on a touchable conductive part that is not connected to the protective conductor!

4.1.7 Operating and display elements

All measurements can be operated easily and conveniently using the operating elements and can be read using the display elements.

4.1.8 Screen

The display has a resolution of 320x240 pixels and is backlit. All information (user prompts, help texts) and measurement results (measurement functions, limit values, measured values and units) are displayed in plain text.

5 functional description

5.1 Power supply

The device is powered by the mains voltage (230 V ±10%). The measuring electronics are supplied via an internal fuse.

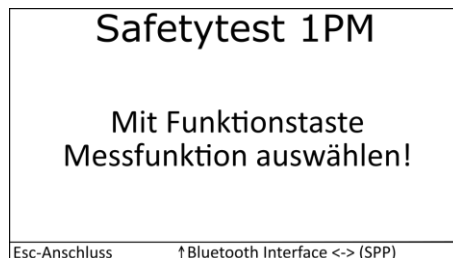
5.2 Internal memory

The measured values can only be saved using software or an app on a smartphone, tablet or PC. More information on software solutions can be found in Software options.

The SAFETYTEST 1PM test device has no internal memory.

5.3 Bluetooth interface

In the main menu, the Bluetooth communication type can be selected using the "↑" arrow key. Depending on the hardware version, you can switch between SPP ↔ HID and SPP ↔ BLE.



Switching between SPP and HID:

- **SPP:** Serial data transmission, please select when using Android software (Testmaster) or Windows software (Safety -Remote) devices.
- **HID :** USB protocol based communication

Switching between SPP and Bluetooth Low Energy (BLE) (**new hardware version**):

- **SPP:** Serial data transmission, please select when using Android software (Testmaster) or Windows software (Safety -Remote) devices.
- **BLE (Bluetooth Low Energy):** radio technology with low power consumption and good reception quality. Use for the Remote-Master App in an iOS operating system

5.4 Interface USB -C

- **USB:** The PC is connected via a standard USB type A/C cable.
- The FTDI driver is installed with the PC software.
- The transfer rate is 19,200 baud. The interface is isolated.
- The firmware can be updated quickly and conveniently with a PC via the USB-C interface of the "SAFETYTEST 1LT V2 RCD". The menu, measuring functions, limit values and national language can be updated or expanded by updating the firmware

6 Testing of electrical devices

The tests required by the standards are implemented using the integrated test sequences. Before the test is completed, the test item must be classified in the profile menu.

Even after repair, modification and repeat testing, electrical devices must offer their users protection against the dangers of electricity that is comparable to the protection offered by new devices. Whether the necessary security is available can be determined by tests according to the relevant standards. The tests listed below must be carried out in the order given. Each of the exams must be passed before starting the next exam:

- visual inspection
- Checking the protective conductor
- On devices of protection class I, a measurement of the insulation resistance and the leakage current or the insulation resistance as well as a substitute measurement using the substitute leakage current method, insofar as this is permitted for the test object.
- On devices of protection class II and for all accessible conductive parts of devices of protection class I that are not connected to the protective conductor, a measurement of the insulation resistance, the contact current or the insulation resistance as well as a substitute measurement using the substitute leakage current method, provided this is permitted for the test object.
- functional test



Before a protective conductor current measurement is carried out on devices of protection class I, the PE resistance measurement must have been carried out successfully!



a contact current measurement is carried out on devices of protection class II or III (except IT devices), the insulation resistance measurement with 500 V DC should have been carried out successfully!



External connection points of protective extra-low voltages generated in the device must be checked for compliance with the limit values for protective extra-low voltage!

6.1 Specialist responsibility

Particularly high demands are placed on the professional qualification of an electrician. For example, the DGUV regulation 3 and the VDE regulations, which are also stipulated as electrotechnical rules, are legally binding and therefore mandatory for the use of the responsible electrician.

Specialist responsibility includes the obligation to do the right thing. The corresponding rules of technology (electrotechnical rules, VDE regulations, etc.) must therefore be observed. The qualified electrician must also not omit anything that should have been done to avoid damage. The specialist responsibility becomes particularly clear when, for whatever reason, a full examination cannot be carried out.

If one of the test procedures specified in the corresponding standard cannot be carried out for technical reasons or due to the local conditions or due to the effort involved, the electrician must decide whether or not safety can be confirmed despite this waiver. This decision must be justified and documented and the specialist must take responsibility for it!

6.2 Electrical connection check

The test of the electrical connection is not part of the test specifications for the change, test and repeat test on electrical devices. Nonetheless, before testing electrical equipment, it is important to know that the “*grid conditions*” are OK.

Tests on devices with a permanent connection are often not always possible for technical reasons, local conditions or the effort involved. If the connection of the device is difficult to access, its connections (L1, L2, L3, N, PE) to the supply network may also have to be checked at another point, e.g. Mains connection terminal of the device, junction box, distributor, etc. can be solved in a complex manner.

The test device does not check the electrical connection according to the specifications of DIN VDE 0100. Nevertheless, important and meaningful measurements are carried out with regard to the electrical connection, such as e.g.:

- Mains protective conductor potential PE < 30 V
- Checking the N conductor for a break (display remains off)
- Phase control lamp display when the relay is switched on
- Voltage measurements phase against N (display up to 260 V AC)



Electrical devices with a rated current of more than 16 A must be connected directly to an all-pole mains disconnection device (load switch, isolating switch or circuit breaker) in accordance with IEC 60947. So that the mains disconnection device can be operated easily, it should be installed in the immediate vicinity and at a height of approx. 1.7 m above the access level where it is easily accessible.

Plugs and sockets or device connection devices with a rated current of more than 16 A must not be connected or disconnected under load (always switch off beforehand!).

The mains disconnect device is not required for plugs and sockets or device connection devices for devices with a rated current of no more than 16 A.



If N/PE are mixed up, the on-site residual current circuit breaker switches off



When used in an IT network or when the test device is connected via an isolating transformer, the PE connection is missing: The following message appears on the display: " PE > 30 V!!".

6.3 visual inspection

The test devices are inspected for externally visible defects and, as far as possible, also for suitability for the place of use, e.g.:

- damage to the housing
- external defects in the connecting cables
- Deficiencies in bending protection and strain relief of the connecting cables
- Signs of overload and improper use
- unauthorized interventions and changes
- proper condition of the protective covers
- contamination and corrosion that affect safety
- Presence of required air filters
- free cooling openings
- tightness

- Flawless legibility of inscriptions that serve to ensure safety, e.g. Warning symbols, protection class, ratings of the fuse, switch positions on circuit breakers, etc.

The presence of inscriptions intended for safety, e.g. Information on the direction of rotation must be checked and, if necessary, renewed or supplemented in a suitable form.



Externally recognizable defects that lead to a mechanical hazard or fire hazard should result in immediate repair.

6.4 Commissioning of the test device

6.4.1 Carry out a visual check on the test device

- Observe the safety instructions in Chapter 1!
- Carry out a visual inspection of the mains connection, test device and measuring accessories!
- Observe the warnings on the test device, mains adapter cable and measuring accessories!
- Observe the operating instructions!

6.4.2 Connection of the test device

The test device is connected directly to the assembly.

6.5 Start exam

The individual tests can be selected using the direct selection buttons.

Optionally, tests can be controlled and documented via Bluetooth connection or USB connection:

- Remote-Master App
- Test-Master App
- Safety-Remote Software

6.6 Measurements

The following measurements can be selected depending on the test object and the potential electrical hazard it poses.

6.6.1 PE resistance measurement RPE

RPE = low-impedance measurement with 200 mA DC test current

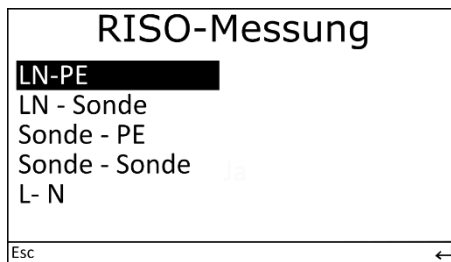
RPE-Messung	
Stecker	
Festanschluss	
Sonde - Sonde	
Verlängerung	
Abgleich Rsl	
Esc	↵

Plug	Low-resistance measurement via the Schuko socket and the red probe connection
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permanent connection	Low-resistance measurement via the mains connection cable (blue powerCON)/via the system installation and the red probe connection
probe - probe	Low-resistance measurement between the red probe connection and the black probe connection
extension	Low-resistance measurement via the Schuko socket and the IEC connector C13
adjustment	Low-resistance measurement for calibrating measuring line resistances

6.6.2 Insulation resistance measurement RISO

RISO / **R_{INS}** = **insulation test** with a test voltage of 250 VDC or 500 VDC (max. 1 mA)



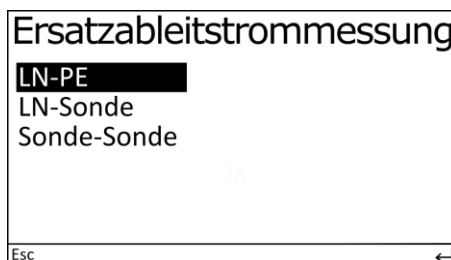
LN-PE	Insulation test between active conductors (bridged) and protective conductor
LN - probe	Insulation test between active conductors and probe connection red
probe - PE	Insulation test between the red probe connection and the protective conductor contact on the Schuko test socket
probe - probe	Insulation test between red probe connection and black probe connection
L - N	Insulation test between active conductors L and N



The test voltage of 500 VDC can destroy the test objects.

6.6.3 Substitute leakage current measurement IEA

IEA / **I_{SL}** = **Substitute leakage current measurement** with an open circuit voltage of approx. 95 V AC (max. 2.5 mA)

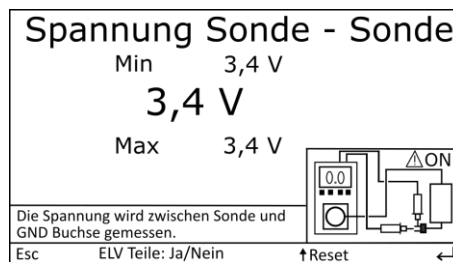


LN-PE	Measurement of substitute leakage currents when applying an AC voltage between the active conductor and the protective conductor
-------	--

LN - probe	Measurement of equivalent leakage currents when an AC voltage is applied between the active conductor and the red probe connection
probe - probe	Measurement of substitute leakage currents when applying an AC voltage between the red and black probe connection

6.6.4 Voltage measurement U

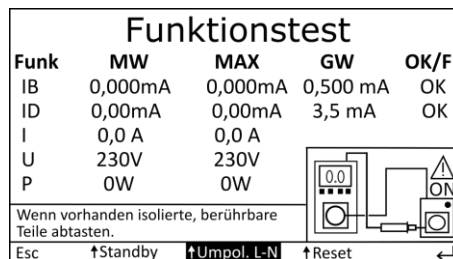
U = **voltage measurement** via the probe connection red and black.



Here, the mains voltage is switched on at the Schuko test socket !

6.6.5 Functiontest Ftest

F_{TST} = **Functiontest** with differential, touch current measurement, phase current, voltage, active power and stand-by power measurement in one measurement step.



Plug	<p>The mains voltage is switched on at the Schuko test socket.</p> <p>Touch currents on all conductive parts can be scanned with the red probe, and residual current, voltage, phase current and effective power measurements are carried out in parallel.</p> <p>Additional functions can be activated with the arrow keys, such as "standby" power measurement and polarity reversal of phase and neutral conductor.</p>
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6.7 Functional test

After completion of the electrical test, a functional test of the device must be carried out. A partial examination may be sufficient.

6.8 Documentation of the exam

The passed test must be recorded. If a device proves to be unsafe, this must be clearly marked on the device and the operator must be informed in writing (test report/list of defects). The measured values and any changes must be logged. Affixing a test seal to the device is recommended after the safety test has been passed.

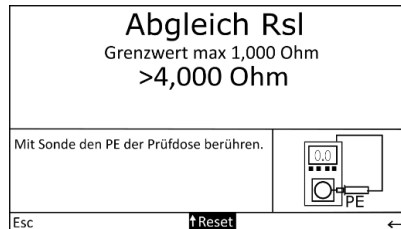
7 Connection options (examples)

7.1 PE resistance measurement

7.1.1 Adjustment

to carry out a probe adjustment after every change of probe or switching off.

Select the PE resistance measurement "Rsl adjustment" via the display.

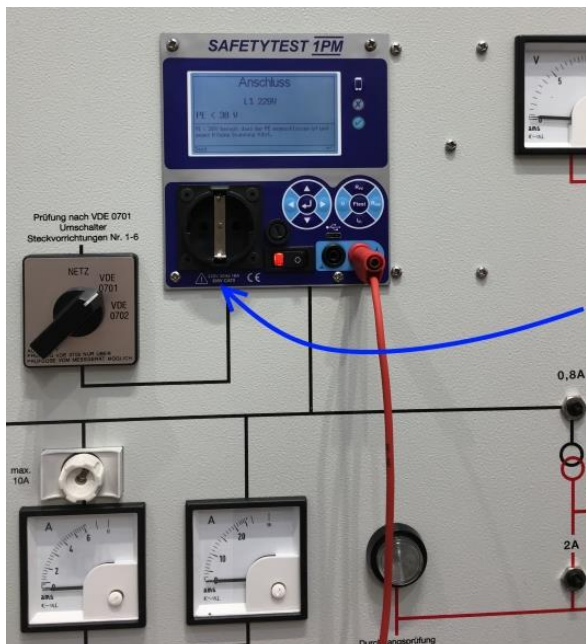


Use the probe (red) to contact a protective earth contact in the Schuko test socket, wait for a stable value and complete with the "Enter" key. The measured value is saved until the next restart.

7.1.2 Alternating current test samples

Select PE resistance measurement "Plug" via display.

PE resistance: Use the protective conductor probe to scan the housing parts of the test item and move the connection cable.



7.1.3 Cold device cables and extensions using a VLS adapter



Plug the extension cable/cold device cable into the test device. Connect the test specimen to the extension adapter VLS Adapter with the extension/cold device cable and the red probe.

7.1.4 Three-phase test objects with two measuring lines

Select PE resistance measurement "probe-probe" via display.

Or automatic test sequence via **Test-Master Select app**, **Remote-Master app** and **safety remote software** "SKI with insulation measurement".

Plug the measuring line into the black socket of the test device and connect it to the protective conductor connection of the test item.

Scan the grounded metal parts of the test object with the red measuring line (probe).

7.1.5 Three-phase current test objects with the extension cable adapter VLCEE 16/32/63

Select PE resistance measurement "Plug" via display.

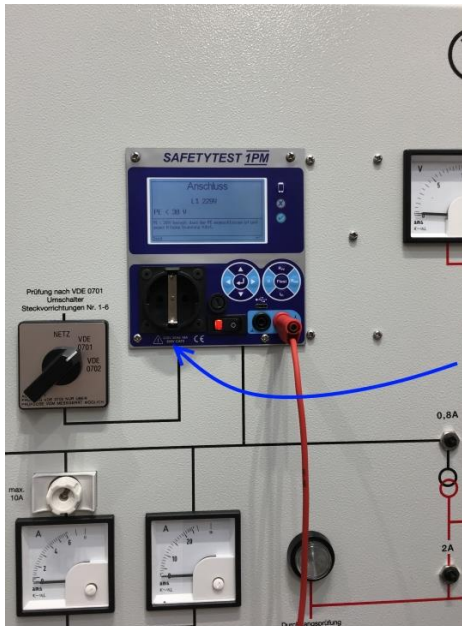
Or automatic test sequence via **Test-Master Select app**, **Remote-Master app** and **safety remote software** "SKI with insulation measurement".

Plug the extension cord adapter into the tester. Connect the test item to the extension adapter and scan the PE housing parts.

7.1.6 Accessible, isolated, conductive parts

Measurement on touchable parts that are not connected to PE: Scan these parts with the probe. In the case of moving parts, such as in a drill, scan the drill chuck while it is in operation, ideally with the **optional brush probe**.

Observe privacy protection!



7.2 Insulation resistance measurement

7.2.1 LN against PE

Insulation resistance measurement LN-PE, substitute leakage current measurement:
the device into the test socket. The measurement is carried out in the de-energized state.



7.2.2 Three-phase test objects with the extension cable adapter VLCEE16/32/63



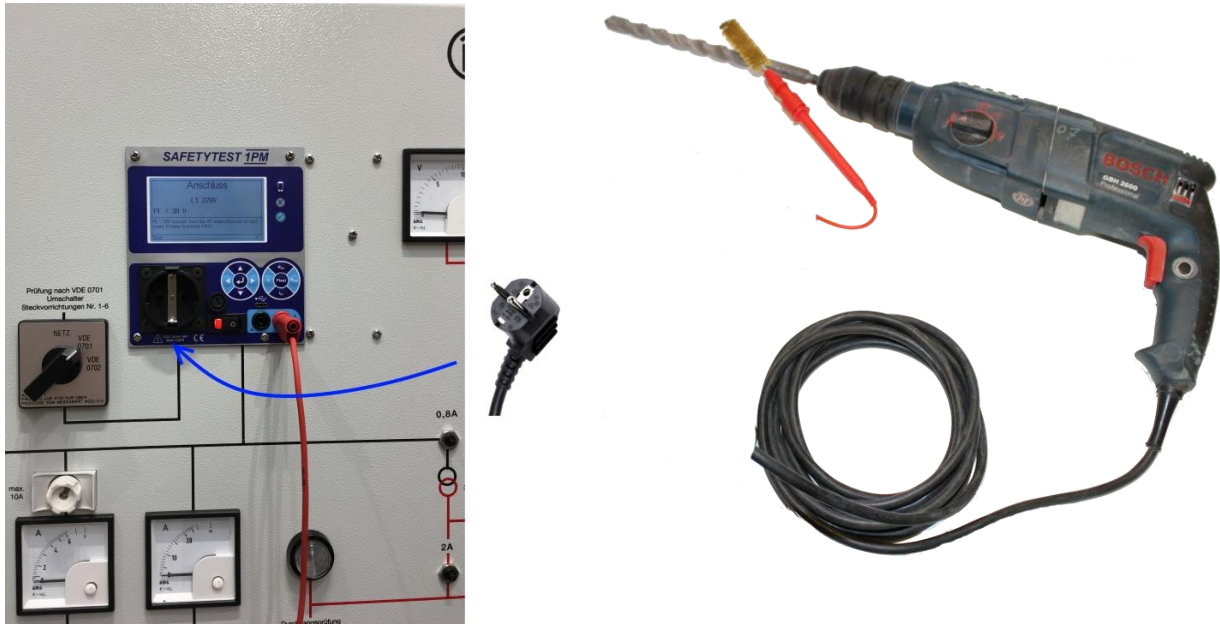
Plug the extension cord adapter into the tester.

Connect the DUT to the extension adapter. Turn on the DUT.

7.3 Functional test

7.3.1 Touch current measurement

Scan these parts with the probe. In the case of moving parts, such as in a drill, scan the drill chuck while it is in operation, ideally with the **optional brush probe**.



7.3.2 Residual current measurement on test objects with Schuko plug

Residual current measurement, functiontest: Plug the test item into the test socket.

The test object is supplied with power via the test device.

Funktionstest				
Funk	MW	MAX	GW	OK/F
IB	0,000mA	0,000mA	0,500 mA	OK
ID	0,00mA	0,00mA	3,5 mA	OK
I	0,0 A	0,0 A		
U	230V	230V		
P	0W	0W		

Wenn vorhanden isolierte, berührbare Teile abtasten.

Esc ↑Standby ↑Umpol. N-L ↑Reset

8 Update firmware



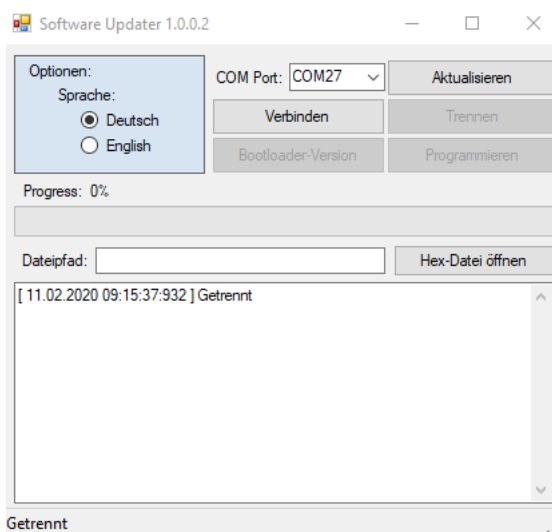
An error or non-observance of the instructions can lead to damage to the test device! In this case, the test device must be sent in!



power supply must be guaranteed during the entire update process !

8.1 Firmware update via USB connection

- 1 Supply the test device with voltage
- 2 Connect the test device to the USB interface of the PC.



- 3 Start the "ST1_UPDATE_SOFTWARE.exe" program with sufficient rights for interface access.
- 4 Select the interface of the test device under "COM port". If there are several entries in the selection in the Windows device manager, look for the corresponding COM number.
- 5 Select and open the firmware file under "Open hex file".
- 6 Turn off device
- 7 Press the "Connect" button, →the green bar is slowly being filled completely (Status: "Connected")
- 8 Switch on the device again →the green bar is completely filled
- 9 Press the "Program" button, the programming process then starts. (Status: "Programming started...")

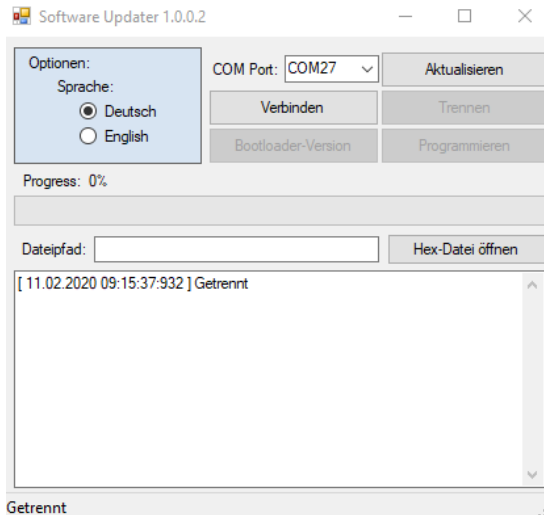


The programming process takes several minutes! Do not disconnect the device from the mains or interrupt the interface connection!

- 10 After completing the programming process (status: "Programming finished!"), press the "Disconnect" button. (Status: "Disconnected")
- 11 Disconnect the tester from the mains and reconnect

8.2 Firmware update via Bluetooth interface

- 1 Supply the test device with voltage
- 2 Connect the test device to the PC via Bluetooth and check the Com port of the device in the "Device Manager".
- 3 Start the "ST1_UPDATE_SOFTWARE.exe" program with sufficient rights for interface access.



- 4 the interface of the test device under " COM Port ". If there are several entries in the selection in the Windows device manager, look for the corresponding COM number.
- 5 Select and open the firmware file under "Open hex file".
- 6 Turn off device
- 7 Press the "Connect" button, →the green bar is slowly being filled completely (Status: "Connected")
- 8 Switch on the device again →the green bar is completely filled
- 9 Press the "Program" button, the programming process then starts. (Status: "Programming started...")



The programming process takes several minutes! Do not disconnect the device from the mains or interrupt the interface connection!

- 10 After completing the programming process (status: "Programming finished!"), press the "Disconnect" button. (Status: "Disconnected")
- 11 Disconnect the tester from the mains and reconnect

9 Error message, error correction

Help? Contact us:

<https://ssp.safetytest.eu>



10 Technical specifications

10.1 Measurements

Measurements (usage error 5% v.M.+ 1% v.B.)	
PE resistance	0.000Ω ... 4.000Ω Test current 200 mA DC/open circuit voltage 10 V
insulation resistance	0.00MΩ ... 20.00MΩ, Open circuit voltages: <ul style="list-style-type: none">• 500 V (operational error 5% v.M. + 1% v.B.)• 250 V (operational error 10% v.M. + 2% v.B.) Short circuit current: 1.2mA max
Integrated Residual Current Shut-down	Residual current > approx. 20 mA
substitute leakage current	0.00mA ... 20.00mA, No-load voltage approx. 110 V AC (max. 2.5 mA), (internal resistance 2 kΩ)
Residual current according to DIN EN 61557-14 for the correct evaluation of the harmonics	0.00mA ... 20.00mA AC
touch current	0.000mA ... 4.000mA
Mains voltage measurement	85V ... 250V AC
touch current	0.000mA ... 4.000mA
current measurement	0.00A ... 16.00A
performance measurement	0 W ... 4,000 W standby 0.000 W ... 9.999 W (current max. 50 mA)
interfaces	<ul style="list-style-type: none">• USB type C for control with Windows PC or Android tablet• Bluetooth for wireless control with Windows PC or Android tablet
memory, clock	<ul style="list-style-type: none">• Database and timestamp in app or software

10.2 Technical characteristics

- Mains connection: AC 230 V ± 10%,
- Operating ambient temperature: 5 °C ... 40 °C

10.3 Product standard

- DIN EN 61557-16/EN 61010
- EN 61326
- CAT II 300V

10.4 Height, Weight

- Size 150mm x 135mm x 40mm
- Weight approx. 0.75 kg

11 Service and Calibration

SAFETYTEST recommends a calibration after 12 months.

The test devices receive a factory calibration including factory calibration certificate for 12 months, adjustment and label "next calibration".

Chapter 16 describes our warranty conditions.

For a calibration or a service case, use our service form. You will also find our service price list here.

Service form

<https://service.safetytest.eu/support/index.php>



12 Spare Parts



Observe the safety instructions and warnings from Chapter 1!

Only original spare parts from the manufacturer may be used, see Chapter 1!

The test device and accessories may only be checked and, if necessary, repaired by the manufacturer or by a service authorized by the manufacturer!

13 Disposal

The end user is responsible for the correct disposal according to the valid guidelines.

14 Warranty and Guarantee

The SAFETYTEST 1LT V2/1LT V2 RCD test device is subject to strict quality control. A corresponding test report with all calibration data is enclosed with each test device.

§1 Warranty period for own products of the SAFETYTEST brand

The warranty period for our products is 1 year from delivery at SAFETYTEST, unless otherwise stated in the sales agreements or product descriptions. Any warranty services do not extend the warranty period and no new warranty period begins. It is possible, by purchasing a special warranty extension, to extend the warranty period by the specified period from the warranty extension invoice date. Special conditions apply for this, see "Scope of warranty" and "Additional warranty extension". The statutory warranty claims are not affected by the warranty provisions.

§1.1 Basically applies:

The guarantee is a voluntary service and should not be confused with the statutory guarantee.

§2 Scope of guarantee of own products of the brand SAFETYTEST

The guarantee extends to proven material or manufacturing defects. Excluded are fuses, batteries, rechargeable batteries and mechanical parts that are subject to normal wear and tear. Also not covered by the guarantee are damages or failures that are due to improper use, negligence, tampering, accidents or force majeure as well as operation outside of the operating conditions. The warranty is void if the device is used outside of the permitted specification or if the device is opened. Follow-up costs of all kinds are also not covered.

§3 Additional warranty extension for own products of the SAFETYTEST brand

A warranty extension can only be granted if the full functionality and safety of the products has been ensured by a corresponding check by our employees (e.g. with the help of a factory calibration). Defective devices can therefore only receive a warranty extension if all errors have been completely rectified and the condition has been checked as described. We reserve the right to refuse an extended warranty for an unsuitable product.

§4 Warranty of third-party products

The statutory warranty of 1 year applies to merchandise such as mobile phones or tablets from third-party manufacturers.

§5 Guarantee of third-party products

For commodities such as mobile phones or tablets from third-party manufacturers, any warranty claims must be processed directly with the manufacturer. The warranty period can vary depending on the manufacturer.

Please contact:

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service

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Germany

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