GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP

# CONDENSED OPERATING INSTRUCTIONS

2/9.24

3-447-033-03


# SECULIFE ST PRO/ SECULIFE ST PRIME

## TEST INSTRUMENTS FOR TESTING THE ELECTRICAL SAFETY OF ELECTRIC MEDICAL DEVICES

Read the complete operating instructions (available at www.gossenmetrawatt.com). The condensed operating instructions do not replace the complete operating instructions!

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# 1 SAFETY INSTRUCTIONS

Read and follow these instructions carefully and completely in order to ensure safe and proper use.

The instructions must be made available to all persons who use the instrument.

Keep for future reference.

- Observe this documentation, in particular all included safety information, in order to protect yourself and others from injury, and to prevent damage to the test instrument.
- Carefully and completely read and adhere to these condensed operating instructions, as well as the test instrument's operating instructions.
  The documents can be found at http://www.gossenmetrawatt.com. Retain these documents for future reference.
- Tests/measurements may only be performed by a qualified electrician, or under the supervision and direction of a qualified electrician in the commercial sector. The user must be instructed by a qualified electrician concerning performance and evaluation of tests and/or measurements.
- Observe and comply with all safety regulations which are applicable for your work environment.
- Wear suitable and appropriate personal protective equipment (PPE) whenever working with the test instrument.
  Be aware that PPE may be required for the device under test and wear it if necessary.
- The functioning of active medical devices (for example pacemakers, defibrillators) and passive medical devices may be affected by voltages, currents and electromagnetic fields generated by the test instrument and the health of their users may be impaired. Implement corresponding protective measures in consultation with the manufacturer of the medical device and your physician. If any potential risk cannot be ruled out, do not use the test instrument.
- Use only the specified accessories (included in the scope of delivery or listed as options) with the test instrument.
- Carefully and completely read and adhere to the product documentation for optional accessories. Retain these documents for future reference.
- Use the test instrument in undamaged condition only.
  Inspect the test instrument before use. Pay particular attention to damage, interrupted insulation or kinked cables.
  Damaged components must be replaced immediately.
- Accessories and cables may only be used as long as they're fully intact.
  Inspect accessories and all cables before use. Pay particular attention to damage, interrupted insulation or kinked cables.
- Avoid plugging in or unplugging accessories (e.g. probes) while measurements are in progress.
- If the test instrument or its accessories don't function flawlessly, permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- If the test instrument or accessories are damaged during use, for example if they're dropped, permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- If there are any signs of interior damage to the instrument or accessories (e.g. loose parts in the housing), permanently remove the instrument/accessories from operation and secure them against inadvertent use.
- Do not use the test instrument and its accessories after long periods of storage under unfavorable conditions (e.g. humidity, dust or temperature).
- Do not use the test instrument and its accessories after extraordinary stressing due to transport.
- Only use the test instrument and its accessories within the limits of the specified technical data and conditions (ambient conditions, IP protection code, measuring category etc.).
- The test instrument and the accessories may only be used for the tests/measurements described in the documentation for the test instrument.

- The test instrument may only be connected to TN, TT or IT electrical systems with a maximum of 264 V (nominal voltage) which comply with applicable safety regulations (e.g. IEC 60346, VDE 0100) and are protected with a fuse or circuit breaker with a maximum rating of 16 A.
- Ensure compliant functionality of this test instrument within the scope of operational equipment testing through the use of a suitable calibrator.
- The test instrument is equipped with fuses. The test instrument may only be used as long as the fuses are in flawless condition. Defective fuses must be replaced.
- Do not perform any measurements in electrical systems with the test instrument. It has been neither designed nor approved for this purpose.
- Plugging in the measurement cables must not necessitate any undue force.
- Never touch conductive ends (of test probes, for example).
- Fully unroll all measurement cables before starting a test/measurement. Never perform a test/measurement with the measurement cable rolled up.
- Avoid short circuits due to incorrectly connected measurement cables.
- Conduct a probe check after completing each test.
- The test instrument must be operated within the same electrical system as the DUT.
- Unexpected voltages may occur at DUTs (for example, capacitors can be dangerously charged). Take appropriate precautions.
  In particular during high-voltage tests, be aware that dangerous residual voltage may be present at the HV test pistol and/or the device under test. Do not touch the device under test for any reason during high-voltage testing.
- The fuses may only be replaced when the test instrument is voltage-free, i.e., it must be disconnected from mains supply power and may not be connected to a measuring circuit.
  The fuse type must comply with the specifications in the technical data or the labeling on the test instrument.
- Test instruments with feature M01: The test instrument is equipped with a Bluetooth® module. Determine whether or not use of the implemented frequency band of 2400 to 2483.5 MHz is permissible in your country.
- Always create a backup copy of your measurement data. Please refer to the operating instructions for further information (see section 3, “Documentation”).
- Observe and comply with respectively applicable national data protection regulations. Use the corresponding functions provided by the test instrument such as password protection, as well as other appropriate measures.
- Test reports must be checked for correctness and signed by the testing person.

# 2 APPLICATIONS

Please read this important information!

## 2.1 INTENDED USE / USE FOR INTENDED PURPOSE

The SECULIFE ST PRO and the SECULIFE ST PRIME are test instruments for testing the electrical protective measures of medical electrical devices, electrical devices and arc welding equipment.
All test instruments include measuring and test functions for checking the effectiveness of the protective measures required in accordance with the respective test standards for the particular field of technology. Single measurements and test sequences can be executed.
Test sequences (semi-automatic test procedures) can be used in an integrated, i.e. preconfigured form, or defined individually by the user.
The integrated test sequences consist of a preconfigured series of individual tests with subsequent documentation, as stipulated in the respective standard. They can thus be used to repeatedly and efficiently perform standards-compliant tests. Their progress is interrupted by safety-related pauses, as well as associated warnings and instructions. As a result, the level of protection provided to the user is greater than demanded by sections 4.1.6 and 4.1.7 of standard “IEC / 61557-16 / DIN EN 61557-16 / VDE 0413-16” with regard to “automated test sequences”.
The integrated test sequences can be used to comply with the following standards:

- IEC 62353 / EN 62353 / VDE 0751-1
  Medical electrical equipment – Recurrent test and test after repair of medical electrical equipment
- IEC 60601-1 VDE 0750-1
  Medical electrical equipment –
  Part 1: General requirements for basic safety and essential performance
- EN 50678 / VDE 0701
  General Procedure for Verifying the Effectiveness of the Protective Measures of Electrical Equipment After Repair
- EN 50699 / VDE 0702
  Recurrent Test of Electrical Equipment
- VDE 0701-0702 (withdrawn) / ÖVE E 8701 / SNR 462638
  Inspection after repair, modification of electrical appliances – Periodic inspection on electrical appliances
- IEC 60974-4 / EN 60974-4 / VDE 0544-4
  Arc welding equipment– Part 4: Periodic inspection and testing
- NEN 3140
  Bedrijfsvoering van elektrische installaties – Laagspanning
- IEC 62368 / EN 62368 / VDE 0868-1
  Audio/video, information and communication technology equipment
- IEC 62911 / EN 62911 / VDE 0868-911
  Audio, video and information technology equipment – Routine electrical safety testing in production

**Note**

The integrated, preconfigured test sequences do not include all of the tests stipulated by the product standard which are required for type testing! They’re restricted to the tests which are required as a rule after repair or during maintenance work and for occupational health and safety measures, as well as for quality assurance in production.

**Note**

Availability of the individual integrated test sequences depends on the test instrument type (SECUTEST ST... or SECULIFE ST...), the selected features (order features) and the enabled extensions (activations).
Refer to your order, test instrument and data sheet for details.

Suitable, database-driven test software is available, namely IZYTRONIQ. This software facilitates test organization and the management of test data from a broad range of test instruments. It also provides extended functions such as remote control in connection with the respective test instrument – support for extended functions depends on the test instrument and its order features or enabled extensions (activations). The software itself is included with test equipment sets, or can be purchased separately.
The test instrument housing is compact, impact resistant and includes an integrated rubber protector for mobile use, e.g. in factories, on construction sites and in industrial environments.
The front panels and housings of the test instruments are also furnished with antimicrobial properties, which make it possible to use them in hygienically sensitive areas.
Safety of the user, as well as that of the instrument, is only assured when it's used for its intended purpose.

| | Reason for Testing | | |
|---|---|---|---|
| **DUTs** | **Repair** | **Periodic Testing (occupational safety, DGUV)** | **Routine Testing in Production** |
| Electric devices<br>(as a rule with mains power cable)<br><br>including extension cords and multiple outlet strips | EN 50678 / VDE 0701<br><br>VDE 0701-0702 (withdrawn) / ÖVE E 8701 / SNR 462638<br><br>NEN 3140 | EN 50699 / VDE 0702<br><br>VDE 0701-0702 (withdrawn) / ÖVE E 8701 / SNR 462638<br><br>NEN 3140 | |
| IT equipment | Not defined<br><br>To a given extent:<br><br>IEC 62368 / EN 62368 / VDE 0868-1<br><br>IEC 62911 / EN 62911 / VDE 0868-911<br><br>VDE 0701-0702 (withdrawn) / ÖVE E 8701 / SNR 462638 | EN 50699 / VDE 0702<br><br>VDE 0701-0702 (withdrawn) / ÖVE E 8701 / SNR 462638<br><br>NEN 3140 | IEC 62911 / EN 62911 / VDE 0868-911 |
| Medical electrical equipment | IEC 62353 / EN 62353 / VDE 0751-1 | IEC 62353 / EN 62353 / VDE 0751-1 | IEC 62353 / EN 62353 / VDE 0751-1<br><br>To a given extent:<br><br>IEC 60601-1 / EN 60601-1 / VDE 0750-1 |
| Arc welding equipment | IEC 60974-4 / EN 60974-4 / VDE 0544-4 | IEC 60974-4 / EN 60974-4 / VDE 0544-4 | |

*Tab. 1: Standards – by Device and Reason for Testing*

| | EN 50678 / VDE 0701<br><br>EN 50699 / VDE 0702<br><br>VDE 0701-0702 (withdrawn)/ ÖVE E 8701 / SNR 462638 | IEC 60974-4 / EN 60974-4 / VDE 0544-4 | IEC 62353 / EN 62353 / VDE 0751-1 | IEC 60601-1 / EN 60601-1 / VDE 0750-1 | IEC 62368 / EN 62368 / VDE 0868-1<br><br>IEC 62911 / EN 62911 / VDE 0868-911 |
|---|---|---|---|---|---|
| **Single Measurements** | | | | | |
| Protective conductor resistance | • | • | • | • | • |
| Insulation resistance | • | • | • | • | • |
| Protective conductor current | • | • | • | | • |
| Earth leakage current | | | | • | |
| Primary leakage current | | • | | | |
| Device leakage current | | | • | | |
| Touch current | • | • | • | • | • |
| Current from welding circuit | | • | | | |
| Patient leakage current | | | | • | |
| Leakage current from applied part | | | • | | |
| **Measuring Method** | | | | | |
| Alternative (equivalent [device] leakage current) | • | | • | | |
| Differential current | • | • | • | | |
| Direct | • | • | • | • | • |

*Tab. 2: Standard Designations for Available Tests*

## 2.2 USE FOR OTHER THAN INTENDED PURPOSE

Using the instrument for any purposes other than those described in the instrument's operating instructions or these condensed operating instructions is contrary to use for intended purpose. Use for purposes other than those intended may result in unforeseeable damage!

## 2.3 LIABILITY AND GUARANTEE

Liability and guarantee granted by Gossen Metrawatt GmbH comply with the applicable contractual and mandatory legal regulations.

## 2.4 OPENING THE INSTRUMENT / REPAIRS

In order to ensure flawless, safe operation and to assure that the guarantee isn't rendered null and void, the test instrument may only be opened by authorized, trained personnel. Even original replacement parts may only be installed by authorized, trained personnel.
Unauthorized modification of the test instrument is prohibited.
If it can be ascertained that the test instrument has been opened by unauthorized personnel, no guarantee claims can be honored by the manufacturer with regard to personal safety, measuring accuracy, compliance with applicable safety measures or any consequential damages.
If the guarantee seal is damaged or removed, all guarantee claims are rendered null and void.

# 3 DOCUMENTATION

## 3.1 INFORMATION CONCERNING THESE INSTRUCTIONS

The condensed operating instructions do not replace the complete operating instructions!
Read the complete operating instructions (available at www.gossenmetrawatt.com).
Read these instructions attentively and carefully. They contain all necessary information for safe use of the instrument. Comply with them in order to protect yourself and others from injury, and to avoid damaging the instrument.
The latest version of these instructions is available on our website:

https://www.gmc-instruments.de/en/services/download-center/

**Trademark Law**

Product designations used in this document may be subject to trademark and patent law. They are the property of their respective owners.

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**Firmware Version**

These condensed operating instructions describe a test instrument with software/firmware version FW 3.5.3. Refer to the operating instructions with regard to updates.

## 3.2 IDENTIFICATION OF WARNINGS

Instructions for your safety and for the protection of the instrument and its environment are provided as warnings and notes at certain points within these instructions.
They're laid out as shown below and are graded in terms of the severity of the respective hazard. They also describe the nature and cause of the hazard, the consequences of non-observance and what must be done to avoid it.

**DANGER**

Death or serious injury is almost certain.

**WARNING**

Death or serious injury is possible.

**CAUTION**

Minor or moderate injury is possible.

**ATTENTION**

Damage to the product or the environment

**Note**

Important information

**Tip**

Useful additional information or application tip

## 3.3 IDENTIFIERS

The following identifiers are used in this documentation:

| Identifier | Meaning |
|---|---|
| **Control element** | Keys, buttons, menus and other controls |
| ✓ Prerequisite | A condition etc. which must be fulfilled before a given action can be taken |
| ▶ **Procedure** | Beginning of a procedural instruction |
| 1. Procedural step | Steps of a procedure which must be completed in the specified order |
| ↳ Result | Result of a procedural step |
| ■ Enumeration<br>■ Enumeration | Bullet lists |
| *Fig. 2: Caption* | Description of the content of a figure |
| *Tab. 3: Table 1* | Description of the content of a table |
| Footnote | Comment |

*Tab. 4: Identifiers in this Document*

## 3.4 ICONS IN THE DOCUMENTATION

The following icons are used in this documentation:

| Icon | Meaning |
|---|---|
|  | Read and adhere to the product documentation. |
|  | General warning symbol |
|  | Warning regarding electrical voltage |

*Tab. 5: Icons used in this document*

## 3.5 DEFINITION OF TERMS

| Term | Definition |
|---|---|
| Test instrument | SECULIFE ST... |
| Device under test (DUT) | Electrical device, medical electrical equipment or electric welding equipment to be tested |
| Test object | Electronic representation of a specific DUT in the internal test instrument database<br>(unequivocal allocation to a real DUT by means of an ID) |
| Test sequence | Series of semi-automatic tests or test steps |
| Integrated test sequence | A test sequence (see above) that is available upon delivery or after enabling in the instrument. Cannot be changed (test parameters are configurable). |
| User-defined test sequence | A test sequence (see above) which is created individually by the user |

*Tab. 6: Definition of Terms*

# 4 GETTING STARTED

This chapter provides an overview of the initial steps for working with the device.

1. Read and adhere to the product documentation. In particular, observe all safety information in the documentation, on the device and on the packaging.
   - ⇨ "Safety Instructions" 🗎4
   - ⇨ "Applications" 🗎6
   - ⇨ "Documentation" 🗎9
2. Familiarize yourself with the device.
   - ⇨ "The Instrument" 🗎13
3. Start up the device.
   - ⇨ "Initial Startup" 🗎23
4. Familiarize yourself with instrument operation.
   - ⇨ "Configuration/Operation" 🗎26
5. Prepare the test instrument for use.
   - ⇨ "Test Instrument Settings" 🗎29
   - ⇨ "Testing Person Management" 🗎33
   - ⇨ "Internal Database" 🗎34
6. Perform measurements.
   - ⇨ "Important Basic Information on Tests and Measurements" 🗎35
   - ⇨ "Single Measurements" 🗎39
   - ⇨ "Test Sequences (automatic test sequences)" 🗎64
7. Generate a report if required.
   - ⇨ "Reports" 🗎72
8. Transfer measurement data to IZYTRONIQ software if required.
   - ⇨ "Test Data Management – IZYTRONIQ Software" 🗎72

# 5 THE INSTRUMENT

## 5.1 SCOPE OF DELIVERY

The scope of delivery varies depending on which test instrument variant has been ordered, and is country-specific. Information concerning the scope of delivery can be found in your order and in the data sheet, in which all order information is listed.
Please check the scope of delivery for completeness and intactness.

## 5.2 FEATURES

The test instruments are available with various features. These can be selected when placing an order.
The basic test instruments include the following features:

| | Features | SECULIFE ST PRO | SECULIFE ST PRIME |
|---|---|---|---|
| Touchscreen / keyboard | E01 | • | • |
| HV DC test | F01 | | • |
| HV DC test with optional connection for HV test pistol (2-probe measurement) | F02 | | o |
| 10 A RPE test current | G01 | • | o |
| 25 A RPE test current | G02 | o | • |
| 2. Test probe (connection for 2nd test probe) | H01 | • | o |
| Voltage measuring input[1)] | I01 | • | • |
| Integrated test sequences for EN 50678 / VDE 0701, EN 50699 / VDE 0702, IEC 62368 / EN 62368 / VDE 868-1, IEC 62911 / EN62911/ VDE 868-911 | KE | • | • |
| Additional test sequence for IEC 60601 | KA01 | • | • |
| Additional sequences for IEC 61010 / IEC 60335 (in preparation) | KA03 | | o |
| SECUTEST DB+ | KB01 | • | • |
| SECUTEST DB COMFORT | KD01 | • | • |
| Bluetooth® | M01 | o | • |
| Antimicrobial housing | — | • | • |

[1)] For voltage measurement, or for connecting a current clip sensor for current measurement or an AT3-adapter, and for temperature measurement via a Pt100 or Pt1000 temperature sensor

Key • In the scope of delivery, o optional

*Table 7: Basic Test Instrument Features*

## 5.3 INSTRUMENT OVERVIEW

### 5.3.1 FRONT

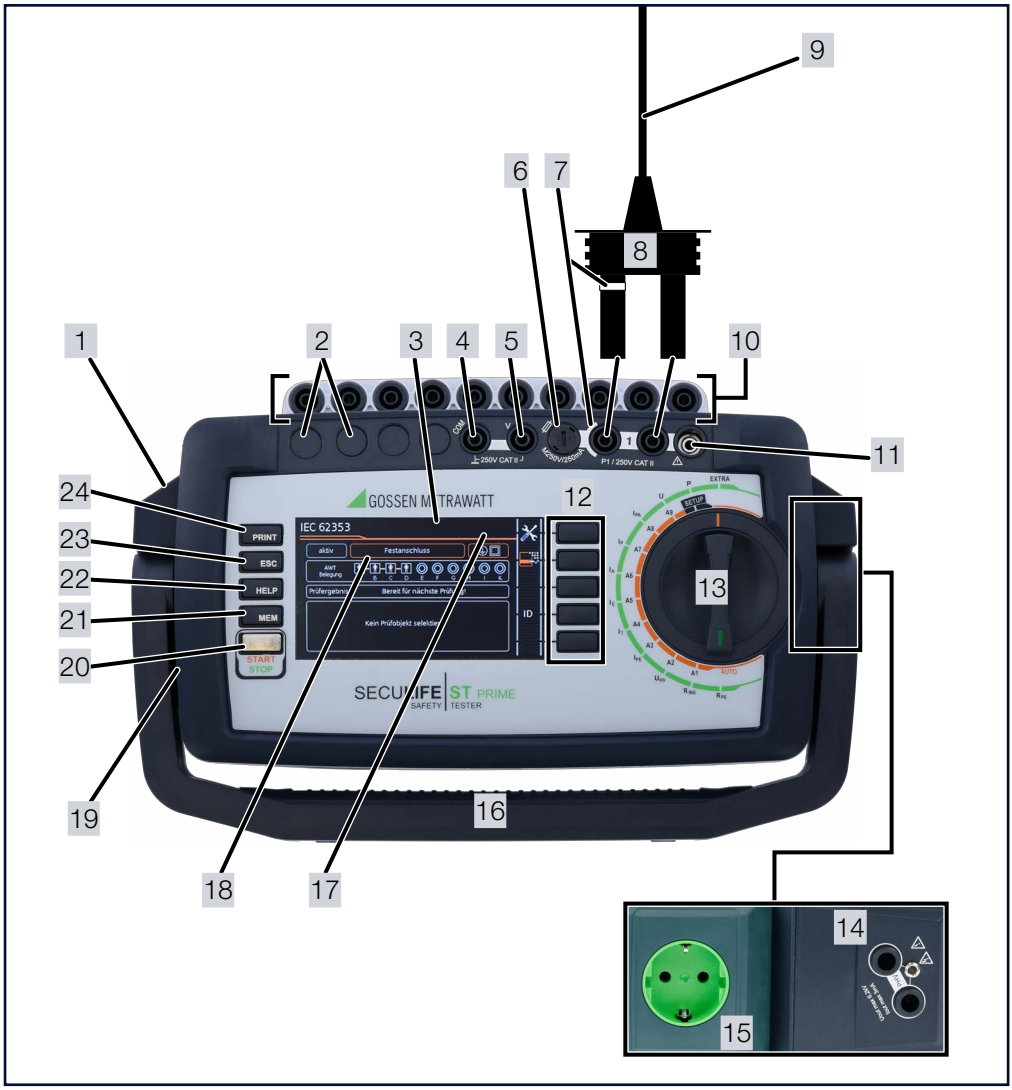



*Fig. 9: Front Panel*

| | | |
|---|---|---|
| 1 | 2 USB masters | – For keyboard |
| | | – For scanner |
| | | – For printer |
| | | – For USB flash drive |
| | 1 USB slave | – For PC |
| 2 | 2 connector sockets | Test probe (P2 for 2-pole measurement)[1)] |

| | | |
|---|---|---|
| 3 | Displayed icons for devices connected to the USB master port | |
| | Display of special icons: | IT – Measurement at IT system active |
| | | OFF SET – Offset for RPE active |
| 4 | Voltage measuring inputs [1] | |
| 5 | | |
| 6 | Fuse compartment (fuse link for probe input P1) | |
| 7 | White/silver color-coded, fused high-current path | |
| 8 | Test probe (P1) | |
| 9 | Reinforcing sleeve: | Black: max. 16 A<br>Green: max. 25 A |
| 10 | Applied part sockets AP A ... K | |
| 11 | Supply power connection for SECUTEST CLIP (Z745H) [2] | |
| 12 | Softkeys | |
| 13 | Rotary function selector switch | Orange rotary switch level<br>Test sequences A1 to A9<br>(test sequences according to standard or user-defined test sequence) |
| | | Green rotary switch level<br>Single measurements |
| 14 | HV test pistol connector socket (only SECULIFE ST PRIME with feature F02) | |
| 15 | Test socket (country-specific) for connecting DUTs<br>⚠ **Attention!**<br>Depending on the measuring task, the test socket may be charged with line voltage. | |
| 16 | Carrying handle and tilt stand | |
| 17 | Mains to test socket. SFC: Normal cond. |  |
| | Mains to test socket. SFC: N interrup. |  |
| | High-voltage is present<br>(with feature F01/F02) |  |
| 18 | LCD panel | |
| 19 | Socket for mains power via inlet plug (country-specific) | |
| 20 | START STOP | Start/stop<br>– Single measurement<br>– Test sequence<br>**Finger contact** |
| 21 | MEM function key | Database |
| 22 | HELP function key | Context-sensitive help (in some cases) |
| 23 | ESC function key | Go back |
| 24 | PRINT function key | Print via USB |

[1] (only test instruments with feature H01)

[2] See also operating instructions for the device.

**Note**

Features such as touchscreen, Bluetooth® etc. can be found in your order, on the instrument and in the data sheet.

### 5.3.2 SYMBOLS ON THE INSTRUMENT AND THE INCLUDED ACCESSORIES

| Symbol | Meaning | Icon | Meaning |
|---|---|---|---|
|  | Warning concerning a point of danger (attention, observe documentation!) |  | If the guarantee seal is damaged or removed, all guarantee claims are rendered null and void. |
| 250 V CAT II | Maximum permissible voltage and measuring category between connections P1 (test probe), the test socket and ground |  | The instrument may not be disposed of with household trash ⇨ "Disposal and Environmental Protection" 🗎75. |
| CE | European conformity marking |  | Warning regarding dangerous electrical voltage |

*Table 8: Symbols on the Instrument and the Included Accessories*

## 5.4 INCLUDED FEATURES

Single measurements and test sequences can be executed with the test instruments.

**Single Measurements**

Switch Positions at **Green** Rotary Switch Level

| **Switch Position**<br>Description as of | **Measuring Functions**<br>Test Current/Voltage | |
|---|---|---|
| **Single measurements,** *rotary switch level: green* | | |
| **Measurements at voltage-free objects** | | |
| **RPE**<br>⇨ 41 | $R_{PE}$ | Protective conductor resistance |
| | $I_{Te}$ | Test current: 200 mA<br>Test current: 10 A [1] (feature G01)<br>Test current: 25 A [1] (feature G02) |
| **RINS**<br>⇨ 42 | $R_{INS}$ | Insulation resistance |
| | $U_{ISO}$ | Test voltage |
| **UHV** [2]<br>⇨ 44 | | High-Voltage Test |
| | $U_{min}$ | Determined minimum voltage value during the set test time |
| | $U_{Gen}$ | Test voltage |
| **Measurements at DUTs with line voltage** | | |
| **IPE**<br>⇨ 45 | $I_{PE\simeq}$ | Protective conductor current, TRMS value |
| | $I_{PE\sim}$ | AC component |
| | $I_{PE=}$ | DC component |
| | $U_{LPE}$ | Line voltage |
| | $U_{Gen}$ | Test voltage (alternative method) |
| **IT**<br>⇨ 46 | $I_{T\simeq}$ | Touch current, TRMS value |
| | $I_{T\sim}$ | AC component |
| | $I_{T=}$ | DC component |
| | $U_{LPE}$ | Line voltage |
| | $U_{Gen}$ | Test voltage (alternative method) |
| **IE**<br>⇨ 48 | $I_{E\simeq}$ | Device leakage current, TRMS value |
| | $I_{E\sim}$ | AC component |
| | $I_{E=}$ | DC component |
| | $U_{LPE}$ | Line voltage |
| | $U_{Gen}$ | Test voltage (alternative method) |
| **IA**<br>⇨ 49 | $I_{A\simeq}$ | Leakage current from the applied part, TRMS value |
| | $U_{LPE}$ | Line voltage |
| | $U_{Gen}$ | Test voltage |
| **IP**<br>⇨ 52 | $I_{P\simeq}$ | Patient leakage current, TRMS value |
| | $I_{P\sim}$ | AC component |
| | $I_{P=}$ | DC component |
| | $U_{LPE}$ | Line voltage |
| **IPA**<br>⇨ 50 | $I_{PA\simeq}$ | Patient auxiliary current, TRMS value |
| | $I_{PA\sim}$ | AC component |
| | $I_{PA=}$ | DC component |
| | $U_{LPE}$ | Line voltage |
| **U**<br>⇨ 53 | $U_{\simeq}$ | Measuring voltage, TRMS value |
| | $U_{\sim}$ | Alternating voltage component |
| | $U_{=}$ | Direct voltage component |

| Switch Position<br>Description as of | Measuring Functions<br>Test Current/Voltage | |
|---|---|---|
| **P**<br>⇨ 55 | **Function test at the test socket** | |
| | I | Current between L and N |
| | U | Voltage between L and N |
| | f | Frequency |
| | P | Active power |
| | S | Apparent power |
| | PF | Power factor |
| **Special measuring functions** | | |
| **EL1**<br>3)<br>⇨ 56 | Function test for extension cords<br>Continuity, short-circuit, polarity (wire reversal 4)) | |
| **EXTRA**<br>⇨ 58 | Reserved for expansion within the framework of software updates | |
| | °C temperature measurement5) with Pt100/Pt1000 | |
| | IZ current clip measurement with current clip sensor | |
| | Relay continuity check | |
| | $t_{PRCD}$ | $t_A$ PRCD time to trip for 10/30 mA PRCD<br>$U_{LN}$ Line voltage at the test socket |

1) 10/25 A RPE measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.
2) Only SECULIFE ST PRIME.
3) With SECULIFE ST PRIME in EXTRA switch position.
4) No checking for reversed wires when the EL1 adapter is used.
5) Voltage measurement inputs with test instruments with feature I01 only

### Integrated Test Sequences

The test instrument is equipped with preconfigured, integrated test sequences which are selected via the switch positions at the **orange** rotary switch level.

**Note**

Availability of the individual integrated test sequences depends on the test instrument type , the selected features (order features) and the enabled extensions (activations).
Refer to your order, test instrument and data sheet for details.

The integrated test sequences are freely assignable, i.e. they can be individually assigned to the rotary switch positions (because there are more integrated test sequences than rotary switch positions). But the test instrument is preconfigured upon delivery.
Which integrated test sequences are assigned to the rotary switch positions on your test instrument upon delivery depends on several factors: Test instrument type, selected features and enabled extensions.
Due to the great variety of possible combinations, a list of all delivery statuses would go beyond the scope of this documentation.
In order to provide you with an impression, the delivery status of a standard test instrument is listed below as an example.

| **Integrated Test Sequences** *Switch Positions at Orange Rotary Switch Level* | | | | | |
|---|---|---|---|---|---|
| **Rotary Switch Position** | **Standard / Test Sequence** | **Measurement Mode** | **Connection** | **Type** | **Protection Class** |
| A1 | VDE 0750-1 2nd | Active | Auto | BF/CF | I |
| A2 | VDE 0750-1 3rd | Active | Auto | BF/CF | I |
| A3 | VDE 0750-1 3rd TLC | Active | Auto | BF/CF | I |
| A4 | VDE 0750-1 3rd TLC | Active | Auto | - | I |
| A5 | IEC 62353 | Passive | Test socket | BF | I |
| A6 | IEC 62353 | Passive | Test socket | BF/CF | II |
| A7 | IEC 62353 | Passive | Test socket | BF | II |
| A8 | IEC 62353 | Active | Auto | BF | I |
| A9 | IEC 62353 | Active | Auto | BF/CF | II |

Auto = automatic detection
TLC = **t**otal **p**atient **l**eakage **c**urrent

**Note**

If you want to use the automatic detection of the measurement mode, check for each DUT whether it is suitable for passive testing; if in doubt, carry out an active test.

Details concerning test sequences can be found in the operating instructions.

## 5.5 RELEVANT STANDARDS

The device has been manufactured and tested in accordance with the following safety regulations:

| | |
|---|---|
| EN 61010-1 | Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements |
| EN 60529 | Test instruments and test procedures<br>Degrees of protection provided by enclosures (IP code) |
| EN 61326-1 | Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements |
| EN 61326-2 | Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-2: Particular requirements – Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications |
| EN 61557-16 | Electrical safety in low voltage distribution systems up to 1000 V AC and 1500 V DC – Equipment for testing, measuring or monitoring of protective measures –<br>Part 16: Devices for testing the effectiveness of protective measures of electrical devices and/or electrical medical devices |

*Table 9: Relevant Standards*

## 5.6 TECHNICAL DATA

| | | | |
|---|---|---|---|
| **Reference Ranges** | Line voltage | 230 V AC ±0.2% | |
| | Line frequency | 50 Hz ±2 Hz | |
| | Waveform | Sine (deviation between effective and rectified value < 0.5%) | |
| | Ambient temperature | +23 °C ±2 K | |
| | Relative humidity | 40 to 60% | |
| | Load resistors | Linear | |
| **Nominal Ranges of Use** | Nominal line voltage | 90 V … 264 V AC | |
| | Nominal line frequency | 50 Hz … 400 Hz | |
| | Line voltage waveform | Sinusoidal | |
| | Temperature | 0 … +40 °C | |
| **Power Supply** | Supply network | TN, TT or IT | |
| | Line voltage | 90 V … 264 V AC | |
| | Line frequency | 50 Hz … 400 Hz | |
| | Power consumption | 200 mA DUT:<br>10 A DUT:<br>25 A DUT: | Approx. 32 VA<br>Approx. 105 VA<br>Approx. 280 VA |
| | Mains to test socket (e.g. for function test) | Continuous max. 3600 VA, power is conducted through the instrument only<br>Switching capacity ≤ 16 A, ohmic load, the AT3-IIS32 (Z745X) adapter (for example) can be used for current > 16 A AC | |
| **Ambient Conditions** | Operating temperatures: | +0 ... +40 °C | |
| | Storage temperatures: | -20 ... +60 °C | |
| | Relative atmospheric humidity: | Max. 75%, no condensation allowed | |
| | Elevation: | Max. 2000 m | |
| | Place of use | Indoors, except within specified ambient conditions | |
| | | In order to avoid deviation due to excessive temperature fluctuation, e.g. after transport in low outdoor temperatures and subsequent operation in a warm indoor environment, it's advisable to wait until the test instrument has acclimatized before starting any measurements.<br>If the test instrument is colder than the ambient air, condensation may occur at high humidity, i.e. condensate may accumulate on components. This could result in the occurrence of parasitic capacitances and resistances which affect the measuring circuit and measuring accuracy. | |

| | | | |
|---|---|---|---|
| **Electrical Safety** | Measuring category: | Designed for 300 V CAT II<br>(but reduced to 250 V CAT II through the use of fuses for increased user safety. The user-friendly fuses are replaceable, and replacements are easily obtainable.) | |
| | Pollution degree: | 2 | |
| | Protection class: | I per EN 61140 | |
| | Nominal voltage: | 230 V | |
| | Test voltage | 2.3 kV AC 50 Hz or 3.3 kV DC<br>(mains circuit / test socket to mains PE terminal, USB, finger contact, test probe(s), test socket, AP sockets) | |
| | Safety Shutdown | At DUT differential current of > 10 mA,<br>shutdown time: < 500 ms,<br>can also be set to > 30 mA<br>in the event of probe current (electronic fuse) during:<br>– Leakage current measurement: > 30 mA~ / < 500 ms [1)]<br>– Protective conductor resistance measurement: > 250 mA~/ < 1 ms in case of continuous current I > 16.5 A | |
| | Fuse links | Mains fuses: 2 × 500V/16A T<br>Probe fuse: M 250V/250mA<br>10 A RPE test current<br>(feature G01) only: 1 ea. FF 500V/16A<br>Applied parts: 2 ea. M 250 V / 250 mA | |
| **Electromagnetic Compatibility (EMC)** | Interference emission: | EN 55011, class A<br>EN 55032, class A<br>EN IEC 61000-3-2<br>EN IEC 61000-3-3 | |
| | Interference immunity: | DIN EN 61326-1<br>DIN EN 61326-2-2 | |
| **Mechanical Design** | Protection: | Housing: IP 40<br>(protection against ingress of solid foreign objects: ≥ 1.0 mm diameter, protection against ingress of water: not protected)<br>Test socket: IP 20<br>(protection against ingress of solid foreign objects: ≥ 12.0 mm diameter, protection against ingress of water: not protected)<br>Applied part: IP 20<br>(protection against ingress of solid foreign objects: ≥ 12 mm diameter, protection against ingress of water: not protected)<br>per DIN EN 60529 / IEC 60529<br>Housing with antimicrobial effectiveness in accordance with JIS standard Z 2801 | |
| | Housing (W × H × D): | Approx. 295 ×145 × 150 mm<br>SECULIFE ST PRIME:<br>W × H × D: 295 × 145 ×240 mm | |
| | Height with handle: | 170 mm | |
| | Weight: | Feature G00/G01:<br>Feature G02:<br>(depending on test instrument version)<br>SECULIFE ST PRIME: | Approx. 2.5 kg<br>Approx. 4.0 kg<br><br>Approx. 6.0 kg |
| | Display: | 4.3" multi-display<br>(9.7 × 5.5 cm), backlit,<br>480 × 272 pixels with 24 bit color depth (true color) | |

| | | | |
|---|---|---|---|
| **Data Interfaces** | Bluetooth® 2.1 + EDR<br>(test instruments with feature M01 only) | Frequency range:<br>Transmission intensity: | 2400 … 2483.5 MHz<br>Max. 2.5 mW (class II) |
| | USB: | – USB slave for PC connection / remote control<br>– 2 ea. USB master<br>for data entry devices[1] with HID boot interface,<br>for USB flash drive for data backup,<br>for USB flash drive for saving reports<br>as HTML files for printers[1] | |
| **Database** | Number of data records | 50,000<br>1 data record = 1 DUT or location node or customer or individual measurement | |

[1] See operating instructions for compatible test instruments.

*Table 10: Technical Data*

# 6 INITIAL STARTUP

Initial startup of the test instrument is conducted by connecting it to the power supply. The following sections describe operation, as well as how to select various basic settings.

## 6.1 CONNECTING THE TEST INSTRUMENT TO THE MAINS

- See chapter 5.6 for nominal mains values (nominal ranges of use).
- Connect the mains cable to the test instrument via its inlet plug and insert the mains plug into an electrical outlet. Any rotary switch position can be selected.
  If a mains outlet (earthing contact outlet) isn't available, or if only a 3-phase outlet is available, the adapter socket can be used to connect the phase conductor, the neutral conductor and the protective conductor. The adapter socket has three permanently attached cables and is included with the KS13 cable set.

**DANGER**

**Electric Shock! Risk of Consequential Accidents!**

Incorrectly connected power supply cables or connecting the instrument while energized may result in injury due to electrical voltage.

If connection isn't possible via an earthing contact outlet: Shut down mains power first.
Then connect the cables from the coupling socket to the mains terminals using pick-off clips and finally activate the electrical circuit.

**Measurements in IT Systems**

The **IT System** setting can be activated in the **SETUP** switch position (Setup 1/3) in the **All Measurements** submenu: with **"Meas. at IT Mains" set to Yes:** active leakage current measurements (or all measurements with reference to PE at the mains connection side) are disabled. Test sequences which include measurements of this sort are also disabled.

## 6.2 AUTOMATIC RECOGNITION OF MAINS CONNECTION ERRORS

The device automatically recognizes mains connection errors if the conditions in the following table have been fulfilled. The user is informed of the type of error, and all measuring functions are disabled in the event of danger.

| Type of Mains Connection Error | Message | Condition | Measurements |
|---|---|---|---|
| Voltage at protective conductor PE to finger contact (**START/STOP** key) | Display | Press **START/STOP** key:<br>U > 25 V<br>Key → PE:<br>< 1 MΩ [1)] | All measurements disabled |
| Phase conductor L and protective conductor PE reversed and/or interrupted neutral conductor N | | Voltage at PE<br>> 100 V | Not possible (no supply power) |
| Line voltage < 180 V / < 90 V (depending on mains) | | $U_{L-N}$ < 180 V<br>$U_{L-N}$ < 90 V | Possible under certain circumstances [2)] |
| Test for IT/TN system | Display | Connection<br>N → PE > 20 kΩ | Possible under certain circumstances |

[1)] If the location impedance of the tester is very high, the following error message may appear: "Interference voltage at mains connection PE"

[2)] 10/25 A $R_{PE}$ measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.

**DANGER**

**Electric Shock! Risk of Consequential Accidents!**

Voltage from the protective conductor is also applied to the test socket's exposed protective contacts and can cause life-threatening injury if touched.

If, while testing protective conductor potential, you determine that the mains protective conductor is conducting voltage (in accordance with the first two cases shown in the table above), no measurements may be performed with the test instrument at this mains connection.
Disconnect the test instrument from the mains connection.
Arrange for rectification of the fault at the mains outlet / installation.

**WARNING**

**Electric Shock! Risk of Consequential Accidents!**

Voltage at the electrical system's protective conductor PE may result in distorted measurement values during testing for the absence of voltage or during leakage voltage measurements. For example, DUTs can falsely pass the test and pose a safety risk when used.

Make sure that the mains connection is correct. If necessary, change the mains outlet.

**Note**

Voltage at the electrical system's protective conductor PE may result in distorted measurement values during testing for the absence of voltage, or during leakage voltage measurements.

**Note**

**Finger Contact**

During this test for correct mains connection, a voltage measurement is performed between the finger contact and PE at the test instrument's mains connection, and its reference potential is acquired via the user's body resistance to the conductive start key. In order to obtain reliable measurement results, this resistance value must be less than 1 MΩ. If the user is wearing insulating shoes or gloves, or is standing on an insulating floor covering, erroneous measurements and display of the "Interference voltage at mains connection PE" message may result. Try to reduce resistance in this case, for example by touching ground potential with the other hand (e.g. a radiator, but not an insulating wall etc.).

## 6.3 CONNECTING TEST PROBE P1 OR P2

Insert the double plug of test probe P1 or P2 into sockets 1 or 2 so that the side of the plug with the white ring is aligned with the silver-colored circle segment printed on the housing.
The white ring identifies the terminal for the high current conductor which is safeguarded by the neighboring fuse link.

**CAUTION**

**Risk of Puncture When Using Test Probes with Coil-Cable (SK2W)!**

Tensioning at the coil-cable may cause the test probe to snap back resulting in possible injury.

Grasp the test probe firmly, for example if it has been inserted into a jack socket.

**Note**

**Probe Check**

Check probe P1 after each test – checking probe P1 also checks whether the probe fuse is still OK when the probe is plugged in.
Tests that use the P1 probe may lead to erroneously good or overly low measured values when insulation resistance values or touch currents are evaluated.
If a probe check fails after a test, make sure that the test of the previously tested DUT is repeated after the probe fuse has been replaced.

**Tip**

**Difficultly in Contacting Exposed Conductive Parts when Using the Standard Probe with Test Tip**

In order to assure good contact, surface coatings must be removed from devices under test with special tools at a suitable location.
The tip of test probe P1 isn't suitable for scratching away paint, because this may impair its coating and/or mechanical strength. Brush probe Z745G may be more suitable than the test probe in certain individual cases.

## 6.4 INTERNATIONAL USE

The test instrument can be used internationally. Refer to the operating instructions in this regard.

# 7 CONFIGURATION/OPERATION

## 7.1 BASIC TEST INSTRUMENT OPERATION

The test instrument is operated using the keys and the rotary switch on the test instrument, see chapter "Instrument Overview" ➪🗎14.

### Softkeys

The softkeys are assigned to different functions depending on the operating level, see chapter "User Interface Icons – Parameter and Softkey Icons" ➪🗎27.

### Function Keys

Fundamentally, these keys have a permanently assigned function:

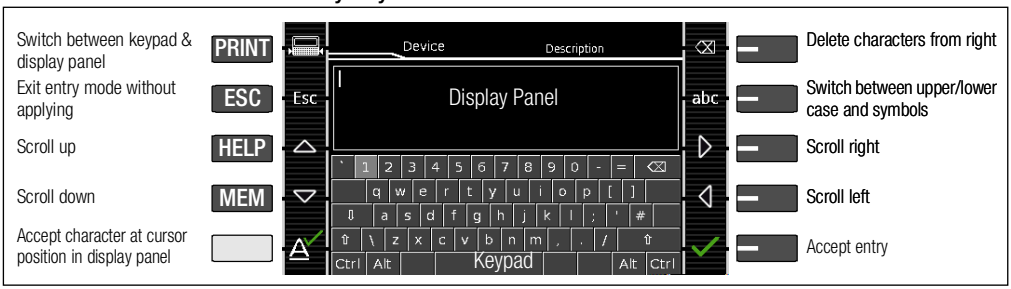
| | | | | | | |
|---|---|---|---|---|---|---|
| **PRINT** | Print via USB | | **MEM** | Database | **START**<br>**STOP** | Start/stop<br>– Single measurement<br>– Test sequence<br>***Finger contact*** |
| **ESC** | Go back | | **HELP** | Help images | | |

In some situations, for example when using the softkey keyboard (see below), an alternative function appears at the display.

## 7.2 ENTERING TEXT AND NUMBERS

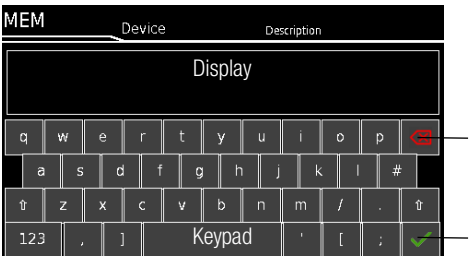
A softkey keyboard is displayed for entering text, numbers and characters (e.g. for entering an offset, a test object ID number, type designations, comments etc.), which is operated by means of the softkeys. In the case of test instruments with touchscreen (feature E01), entry is more convenient via the touchscreen keyboard. Alternatively, entries can also be made via a connected USB or Bluetooth® keyboard (only with feature M01).

### Overview of Entries via the Softkey Keyboard




### Overview of Entries via the Touchscreen Keyboard (feature E01)

- Briefly pressing the shift key once causes the next character to appear in uppercase.
- Pressing the shift key for a longer period of time causes all following characters to appear in uppercase.
- The cursor can be positioned as desired by pressing the display panel at the respective point in the existing text.




* Also via assigned softkey

## 7.3 USER INTERFACE ICONS – PARAMETER AND SOFTKEY ICONS

| Icon | Setup Page | Parameters and Their Significance<br>Complete overviews of all icons are included in the full operating instructions. |
|---|---|---|
|  | 1/3 | **All measurements:** Ref. voltage: Voltage at which measured leakage current values are standardized; residual current protection: value for ground fault sense (10/30 mA) |
|  | 1/3 | **Autom. measurem.**: Set parameters for test sequences: auto meas. point (yes/no); Autom. power off (yes/no); Into operat. msg (yes/no); AutoStore (off/on); AutoPrint (off/on); At end of testing (Result list / Memory screen); Limit mode (normal/expert); At limit viol. (retry/continue/abort); Incl. oper. uncert. (operating measurement uncertainty) (yes/no); Steps skippable (off/on); Skipped steps (store / don't store); Std. interv. (mon.); Home appearance (Show details/Location tree/Customer tree);<br>Preselection of the available integrated test sequences; restart may be necessary!<br>**Caution**: Assignments for switch positions A1 - A9 are lost in this case! |
|  | 1/3 | **Database**:  Delete,  Statistics,<br>**with inserted USB stick**  **:** database  Backup,  Restore,  Export .secu/IZY USB,  Import .secu/IZY USB |
|  | 1/3 | **System**: set general device parameters:<br>  culture (language, keyboard layout),  date/time,  Features,<br>  factory settings,  brightness,  volume,<br>  touch calibr. (only with feature E01),  self-test |
|  | 2/3 | **System information**: query software and hardware version, serial number, build number, calibration data and memory occupancy |
|  | 2/3 | **Testing Person**: Select test. person;  Edit test. person (define testing person role (only feature KD01), etc.);  Create new testing person |
|  | 2/3 | **Printer**: Printer selection for USB master interface:<br>  connected,  disconnected |
|  | 2/3 | **Test reports**: select memory mode and information to be contained in the test report |
|  | 3/3 | **User sequences**:  manage sequences,  load from file |
|  | 3/3 | **Barcode scanner**: barcode scanner configuration |
| | — | **Functions and Their Significance** |
|  | | Set classification parameters for the respective test sequence<br>(test sequences at switch positions A1 through A9) |
|  | | Accept parameters, acknowledge message |
|  | | Cancel single measurement or test sequence |
|  | | Evaluate measurement or visual inspection with **OK** or **not OK** (toggle key) |
|  | | Continue test, next test step in the test sequence |
|  |  | Left icon: Direct selection key for measuring type (connection type ...) or measuring method (direct ...)<br>Right icon: Selection between two statuses (no submenu) |

| Icon | Setup Page | Parameters and Their Significance<br>Complete overviews of all icons are included in the full operating instructions. |
|---|---|---|
|  | | Start evaluation – record measured value. Each time this softkey is pressed, an additional measured value is saved and the number is increased by one. |
|  |  | Left icon: Repeat measured value recording<br>Right icon: Repeat test step |
|  |  | Left icon: Delete measured value<br>Right icon: Skip individual tests in a test sequence |
|  | | Display measured values from performed measurements and test sequences |
|  |  | **Magnifying glass icon:** show (+) or hide (–) details regarding database objects or selected measurements |
|  | | Enter a new ID for a test object either before or after a test, and in case the ID has not yet been entered to the structure |
|  |  | Save measurement data / save measurement data as (with display of directory path / ID or new entry of an ID other than the preselected one) |

# 8 TEST INSTRUMENT SETTINGS

**SETUP**

After initial startup (see chapter 6), basic system parameters must first be configured. Then you'll need to decide which standard designations will be used for the integrated, preconfigured test sequences and, if necessary, change the assignment of test sequences to rotary switch positions.

**Note**

The standard designation cannot be changed retroactively! Stored measurements retain the standard designation and it's used in the test report.
For this reason, select the standard designation carefully during initial startup.
As soon as the standard designation has been changed, the new designation is used in all future tests.

## 8.1 SYSTEM PARAMETERS

Basic system parameters must first be set:
Setup 1/3 > System 1/2 > Culture > **Language**
Setup 1/3 > System 1/2 > Culture > **Keyboard Layout**
Setup 1/3 > System 1/2 > **Date/Time** (for report generation)
Setup 1/3 > System 2/2 > **Brightness** (display brightness as %)

## 8.2 TEST STANDARDS / CONFIGURATION OF INTEGRATED TEST SEQUENCES

Test sequences in accordance with the standards (also called measurement or test sequences) are preconfigured and integrated into the test instrument. They consist of a series of single tests with subsequent documentation, as stipulated in the respective standard. They can thus be used to repeatedly and efficiently perform standards-compliant tests. Additional information is available in Kapitel 13 „Test Sequences (automatic test sequences)".
In order to use the integrated test sequences, they have to be prepared during initial startup:
The integrated test sequences are identical in terms of content, but they have different national designations depending on the respective country (DIN, VDE, ÖNORM, SNR etc.). Furthermore, there are variants for each integrated test sequence, e.g. for testing PRCDs.
This is why a standard designation must first be selected in the test instrument for the integrated test sequences.

**Note**

Selection of the standard designation is mandatory and must be completed during initial startup.

Standards which are not needed can be deactivated in order to increase clarity.
The integrated test sequences are run in orange rotary switch positions A1 through A9. Integrated test sequences are preassigned to each rotary switch position at the factory, but these assignments can be changed. You can assign a different integrated test sequence to a rotary switch position if required, or leave the preselected, integrated test sequences as they are.

### 8.2.1 SELECTING THE STANDARD DESIGNATION AND DEACTIVATING STANDARDS

During initial startup, the desired national standard designation must be selected for each integrated test sequence.
The integrated test sequences are identified with this designation:

- For display at the test instrument (routine daily work)
- In the test results saved to the test instrument (and when these results are exported, e.g. to IZYTRONIQ test software) (data management)
- In reports (verification requirement)

**Note**

The standard designation cannot be changed retroactively! Stored measurements retain the standard designation and it's used in the test report.
For this reason, select the standard designation carefully during initial startup.
As soon as the standard designation has been changed, the new designation is used in all future tests.

Standards which are not needed can be deactivated in order to increase clarity.
The settings can be found under **SETUP** > **Autom. measurem.** Each standard for which a test sequence is integrated is displayed there.

1. **SETUP 1/3** > **Autom. measurem.**
2. Scroll through the menu pages until the individual standards appear.
3. Select the first standard via the softkey.
   ↳ All possible standard designations are displayed.
   (An overview of all available standard designations can be found on the following page).
4. Select the desired standard designation with the corresponding softkey.
   Alternatively, the standard (the test sequence) can be deactivated by selecting the **off** entry.
   ↳ The menu is returned to the standards display in **Autom. measurem.**
5. Repeat this procedure for all standards.
6. Finally, confirm with the green checkmark.
   ↳ The settings are saved.

### Overview of Integrated Standards

**Note**

Availability of the individual integrated test sequences depends on the test instrument type (SECUTEST ST... or SECULIFE ST...), the selected features (order features) and the enabled extensions (activations).
Refer to your order, test instrument and data sheet for details.

**SETUP > Autom. measurem.**

4/7 > VDE 0701-0702 >
based on
OVE E 8701
SNR 462638
VDE 0701-0702

5/7 > IEC 62353 >
based on
EN 62353
IEC 62353
VDE 0751-1

5/7 > IEC 60974-4 >
based on
EN 60974-4
IEC 60974-4
VDE 0544-4

5/7 > NEN 3140 >
based on
NEN 3140

6/7 > EN 50678 >
based on
EN 50678
VDE 0701

6/7 > EN 50699 >
based on
EN 50699
VDE 0702

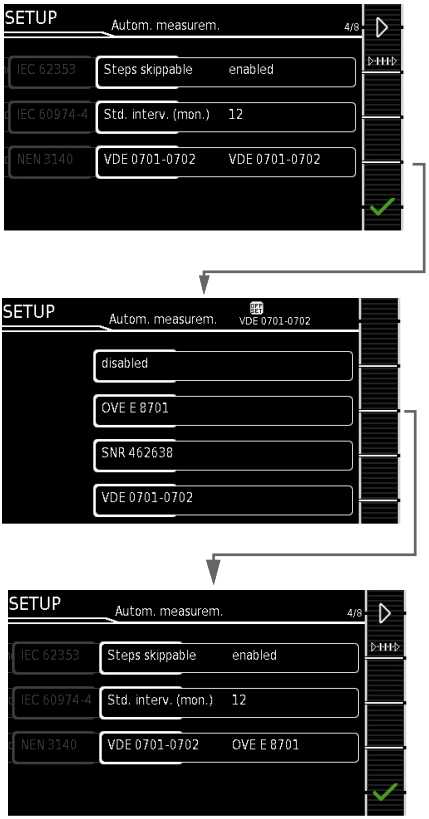
6/7 > IEC 62368 >
based on
EN 62368
IEC 62368
VDE 0868-1

7/7 > IEC 62911 >
based on
EN 62911
IEC 62911
VDE 0868-911

**Example**

Configure the standard designations in the SECUTEST ST PRO.

**SETUP 1/3 > Autom. measurem. 4/7 > VDE 0701-0702**




Save the setting with the green checkmark.
The “OVE E 8701” designation is then used in the test instrument.

### 8.2.2 CONFIGURING ROTARY SWITCH POSITIONS

We recommend assigning frequently used test sequences to A1 through A8 and reserving rotary switch position A9 for special sequences, for which parameters often need to be adjusted.

1. Select an orange rotary switch position (**A1**…**A9**), after which the start page for the respective test sequence is displayed (i.e. the integrated test sequence set at the factory).

2.Select classification parameters .

↳ The **Classification Parameters 1/2** page appears.

The standard which is currently assigned to the respective rotary switch position is displayed under **Standard/Test Sequence**.

3. Select **Standard/Test Sequence**.

↳ The **Standard/Test Sequence** page appears.

All standards available on the test instrument are displayed here according to the selected setting (off / national designation – see chap. 8.2.1).

4. Select the desired standard.

↳ The menu is returned to the **Classification Parameters 1/2** page.

5. Finally, confirm with the green checkmark.

↳ The settings are saved.

6. Repeat the above described procedure for each of the respective rotary switch positions.

# 9 TESTING PERSON MANAGEMENT

The test instrument is equipped with testing person management under **Setup 2/3** > **Testing Persons**. You can set up several testing persons and switch amongst them. However, only one testing person can be logged on at any given time. The testing person remains logged on even after a power failure.
The “active” (selected) testing person appears in completed tests as the “Testing Person”: tests are saved under the testing person’s name and can thus be allocated unequivocally to the testing person.
Upon delivery (default setting) the testing person is set up in the test instrument as “not defined”.

**Note**

Create new users and delete the “not defined” default user for security reasons.

**Note**

Test instrument settings are valid for all testing persons. Separate settings are ***not*** saved for the individual testing persons.

A complete description of testing person management is included in the full operating instructions.

### Adding a Testing Person

1. **Setup 2/3 > Test. person > New testing person**
2. See chapter 7.2 regarding data entry.
3. The testing person is added by pressing the green checkmark.
4. You can set a password for this testing person either now or later.

↳ A new testing person has been added.

### Setting a Password

1. Select the testing person to be edited from the list under **Setup 2/3 > Test. persons > Edit test. persons**
2. Confirm by pressing the softkey. A password can be assigned to the testing person using the “Create Password” option. See chapter 7.2 regarding data entry.
3. The password is assigned by pressing the green checkmark.

↳ The password is set.

### Selecting a Testing Person

1. Select the desired testing person from the list under **Setup 2/3 > Test. persons > Select test. pers.**
2. Use the softkey to select a testing person.
3. If necessary, enter the password for the testing person.

↳ The testing person is selected.

### Deleting a Testing Person

The currently selected testing person cannot be deleted.

1. First select a testing person that will not be deleted (⇨ "Selecting a Testing Person" 33).
2. Then select the testing person to be deleted from the list under **Setup 2/3 > Test. persons > Edit test. persons**
3. Press the **Delete Testing Person** softkey.
4. The testing person is deleted by pressing the green checkmark in the security prompt.

↳ The testing person is deleted.

# 10 INTERNAL DATABASE

## 10.1 CREATING TEST STRUCTURES

A complete test structure with data regarding customer properties, buildings, floors, rooms and test objects can be created in the test instrument.

**Note**

**Sensitive Data – Mandatory Data Protection!**
Customer data are confidential and must be protected.
Observe and comply with respectively applicable national data protection regulations.

This structure makes it possible to save the results of single measurements or test sequences to test objects belonging to various customers.
Up to 50,000 data records can be stored in the test instrument. The following applies in this regard: 1 data record = 1 DUT or location node or customer or individual measurement.
Structures can be created directly at the test instrument or at a PC (IZYTRONIQ software), and then transferred accordingly. They can also be saved to and restored from a USB flash drive.
The scope of functions provided by the database structure and the transfer options depend on the instrument variant and its features.
A complete description of database creation is included in the full operating instructions.

# 11 IMPORTANT BASIC INFORMATION ON TESTS AND MEASUREMENTS

## 11.1 IMPORTANT SAFETY INFORMATION

Observe and comply with the following safety information when performing individual measurements and test sequences.

### 11.1.1 SWITCHING LOADS – MAXIMUM STARTING CURRENT

The test instruments permit active testing of DUTs with a nominal current (load current) of up to 16 A.
The test socket on the respective test instrument is equipped with 16 A fuses to this end, and the switching capacity of the internal relays is also 16 A. Starting current of up to 30 A is permissible.

**ATTENTION**

**Fusing Together of Relay Contacts!**

Despite extensive protective measures targeted at preventing overloading, the relay contacts may be fused together if starting current exceeds 30 A.

Follow the procedure described below and observe information concerning defective relays.

**Procedure**

Be absolutely sure to adhere to the sequence specified below when switching the live device under test. This prevents excessive wear of the mains relays at the test instrument.

▶ **Before measurement:**

1. **DUT**: Turn the DUT off via its own switch.
2. **Test instrument**: Switch line voltage to the test socket.
3. **DUT**: Turn the DUT on via its own switch.
4. Perform the measurement.

▶ **After measurement:**

5. **DUT**: Turn the DUT off via its own switch.
6. **Test instrument**: Deactivate line voltage to the test socket.

**Safer Testing with Test Adapter**

In the case of DUTs for which a starting current of greater than 30 A can be expected, we urgently recommend the use of a test adapter for larger starting currents:
for example, test adapters from the AT3 series (AT3-IIIE, AT3-IIICH, AT3-IIS, AT3-IIS32, AT16DI or AT32DI).

**Alternative: Passive Test**

If necessary on the basis of the hazard assessment, testing can be conducted as a passive test (alternative method, formerly equivalent leakage current measuring method), i.e. without switching line voltage to the test socket.

## 11.2 MEASUREMENT WITH DUT CONNECTED TO LINE VOLTAGE

**WARNING**

**Dangerous Touch Voltage!**

Exposed parts may conduct dangerous touch voltage during testing.

Do not touch under any circumstances!
Use a special cover in order to avoid touch contact.

Mains power is disconnected by the test instrument if leakage current exceeds approximately 10 mA (can also be set to 30 mA) (see “Ground fault sense” in the operating instructions). However, this does not fulfill the requirements specified for a PRCD.

**DANGER**

**Electric Shock! Risk of Consequential Accidents!**

If the “PROCEED in case of limit violation” setting has been selected (see operating instructions), there is a risk of electric shock. For example, an additional fault can result in current flowing through the body.

Take the necessary precautions when testing; use an RCD 30 mA.
Wear personal protective equipment (PPE) and make sure that the workplace (mobile test station) is safe.

**WARNING**

**Mechanical Hazard due to DUT Start-Up!**

Unintentional start-up of a DUT or associated functions (such as rotating parts) can lead to serious injuries.

Do not perform function testing until the DUT has passed the safety test!

## 11.3 MEASUREMENT OF INSULATION RESISTANCE AND EQUIVALENT LEAKAGE CURRENT (ALTERNATIVE MEASURING METHODS FOR LEAKAGE CURRENT)

**DANGER**

**Electric Shock! Risk of Consequential Accidents!**

Testing is conducted with up to 500 V. If terminals L or N at the test socket or the test tip are touched, an electric shock may occur (despite the current being limited to I< 3 mA for the test).

Do not touch terminals L or N at the test socket or the test probe.

## 11.4 UHV HIGH-VOLTAGE TEST, DC (SECULIFE ST PRIME ONLY)

**DANGER**

**High voltage! Life endangering!**

Testing is conducted with up to 6000 V. Terminals L or N at the test socket, the test tip of probe P1 or the tip of the HV test pistol, along with all contacted parts (such as the test object), carry this voltage. Despite the current being limited to I < 3 mA, there is a risk of electric shock; due to capacitances in the DUT, for example – which lie outside the range of influence of the test instrument – the current may be even higher!

During testing, do not touch the L or N terminals at the test socket, the test tip of test probe P1, the test tip of the HV test pistol, parts of the DUT or the conductive surface.
Even after the test, make sure that all parts mentioned are discharged before touching the DUT.

**DANGER**

**High voltage! Life endangering!**

Residual voltages may still be present after releasing the button of the HV test pistol or after interrupting an ongoing measurement.

Do not touch the test probe contacts or connected parts (such as the DUT).
When using the probe or the test pistol, maintain the electrical connection to the DUT to enable the voltage to be dissipated.
Always wait until discharging has been completed (up to 9 seconds).

## 11.5 MEASURING PARAMETERS FOR SINGLE MEASUREMENTS AND TEST SEQUENCES

Measuring parameters which apply to individual measurements, as well as to test sequences, must be entered in the **SETUP** switch position.

**Setup 1/3 > All Measurements**

| Measuring Parameter | Meaning |
|---|---|
| **Meas. at IT System**<br><br>**(Yes/No)** | **Yes**: active leakage current measurements (or all measurements with reference to PE at the mains connection side) are disabled. Test sequences which include measurements of this sort are also disabled. |
| **Ref. Voltage L-PE** | Reference (line) voltage is the voltage to which the measured values for leakage current have been standardized.<br>It's used in the case of leakage current for mathematical adaptation of measured current values to the specified voltage.<br>**Measurements with line voltage at the test socket:**<br>The setting value has no influence on the voltage with which the DUT is supplied via the test instrument's test socket.<br>**Leakage current measurements with "Alternative" measurement mode:** The setpoint value of the synthetic test voltage is derived from the value specified here. |
| **Testingfreq Alt**<br><br>**(48 Hz … 400 Hz)** | Selectable frequency setpoint value for synthetic test voltage for all leakage current measurements of measurement mode "Alternative", affecting the following measurements and/or rotary selector switch positions:<br>Single measurements (rotary switch level: green)<br>Measurements in integrated test sequences<br>Measurements included in user-defined test sequences (only with SECUTEST DB+ – Z853R or feature KB01) |

| Measuring Parameter | Meaning |
|---|---|
| **Gnd fault sens.**<br><br>**(10 mA, 30 mA)** | Selectable residual current for safety shutdown. |
| **HV Acoustic Signal**<br><br>**(Yes/No)** | Yes: an acoustic signal is generated for the duration of the high voltage test. (The signal only sounds if the sound is not switched off under **Setup** > **System** > **Volume** > **Measurements**.) |

# 12 SINGLE MEASUREMENTS

## 12.1 GENERAL

- Any measuring duration is possible.
- The respective measurement is started and ended by pressing **START/STOP**.
- No limit values can be specified for single measurements, and thus there's no evaluation.
- Checking is performed before each measurement in order to assure a trouble-free process and to prevent any damage to the DUT.

## 12.2 MEASUREMENT PROCEDURE AND STORAGE

The measured value can be captured by pressing the save key or several measured values, i.e. a measurement series, can be acquired by repeatedly pressing the key. The save key indicates in each case whether one or several measured values have been acquired.
The measurements or measurement series can be saved after measurement has been completed.

**Note**

Measured values can only be added to intermediate buffer memory during a measurement.
If no measured values have been saved to buffer memory before the **STOP** key (interrupt/pause, end) is pressed, the last value is automatically saved so that no "empty" measurements or measurement series are saved.

The procedure for saving data depends on whether or not the DUT has already been created as a test object in the test instrument's database. Only the latter is described in this document. Refer to the operating instructions for saving data under test objects that have already been created.

1. Start the measurement by pressing the **START/STOP** key
   ↳ The icon shown at the right appears and indicates how many measurements have already been performed.

2. End the measurement by pressing the **START/STOP** key (unless a specified measuring time has been stipulated).
   The save icon (floppy disk with a number) appears and indicates that one or more valid measured values have been captured, which can now be saved.


3. Press the **save icon** (floppy disk).
   You're informed that you haven't selected a test object in the database.


4. Optional: If you want to view the measured values, press the **AΩV** key. Details concerning the individual measured value can be accessed via the **magnifying glass** icon.
   Use the green checkmark to return to the memory menu.

5. Optional: Enter a comment via the icon which depicts a sheet of paper and a pencil.

6. Press the **ID** key.
   You now have the option of entering a test object ID number. If you enter an ID here which is **not yet** included in the database, a prompt appears asking you if you want to enter a new test object.


**Note**

If you haven't yet set up a customer, you must do so now. Follow the instructions which appear in the dialog.

↳ The test object can then be created:

7. Select either device or (medical) ME device.
8. (De)activate the QEDIT function (quick edit – with SECUTEST DB COMFORT only – Z853S or feature KD01).
   If QEDIT is activated, you can fill in additional fields for the test object in the next step.

9. Confirm with the green checkmark.
10. If you activated the QEDIT function in the previous step, you can now fill in all the test object's fields.
11. Confirm with the green checkmark.
    ↳ An overview of the database appears along with the newly created test object.
12. Press the **save icon** (floppy disk) in order to store the measurement results.
    ↳ A message appears indicating that the data have been successfully saved and the display is switched to the measuring view.


**Note**

The storage process can be aborted by pressing the **ESC** key. The display is returned to the memory menu. All measured values can be deleted by once again pressing the **ESC** key.

**Note**

You can send the test results to a PC on which IZYTRONIQ software is running. This function is known as "push-print" and can be implemented via USB or Bluetooth®.
Database expansion SECUTEST DB COMFORT (Z853S or feature KD01) and, if applicable, feature M01 (Bluetooth®) are required to this end.
Complete information regarding push-print and a description of the application can be found in IZYTRONIQ online help.

## 12.3 RPE – PROTECTIVE CONDUCTOR RESISTANCE FOR PROTECTION CLASS I DUTS

### 1 Select measuring function

RPE

### 2 Select parameters


### 3 Set parameters

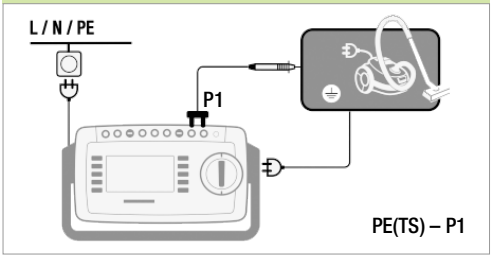
| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode Permissible Test Current ITe** | |
| Passive: PE(TS) – P1 @ ITE = 200 mA/10 A/25 A | Testing is conducted between the two protective conductor terminals: at the test socket[3)1)] and test probe P1. |
| Active: PE(TS)-P1 @ ITe = 200 mA | Same as PE(TS) – P1 but with line voltage to the test socket and alternating AC or DC test current (PRCDs) |
| PE(mains) – P1 Permanently connected DUTs @ ITE = 200 mA/10 A | Testing is conducted between the ground terminal at the mains and test probe P1. |
| PE(mains) - P1 clip | @ ITe = 10 A (see chapter 12.19) |
| P1 - P2 @ ITE = 200 mA/25 A | Only test instruments with feature H01: 2-pole measurement between test probes 1 and 2 (see chapter 12.18) |
| **ITE(set)** | **ITe** |
| 200 mA | Test current: 200 mA AC (+/–/± DC) |
| 10 A [2)] | 10 A test current (feature G01) |
| 25 A[2)] | 25 A test current (feature G02) |
| **f – only at 200 mA ~ (AC)** | |
| 50 … 200 Hz | Test frequency (adjustable in steps) |
| **Offset** | |
| > 0 … < 5 Ω [3)] | Zero balancing for a selected reference point. |

1) Connection also via EL1, VL2E, AT3-adapter, AT16DI/AT32DI.

2) 10/25 A RPE measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.

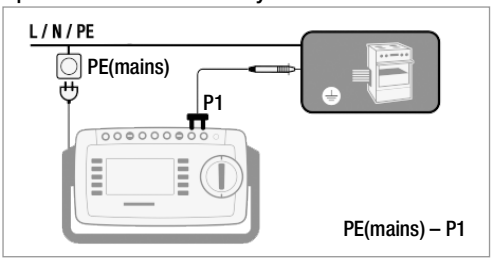
3) The selected offset value is permanently saved and used in measurements performed in switch positions A1 to A9.

### 4 Connect the DUT




- Connect the DUT to the test socket.
- Contact all conductive parts which are connected to the protective conductor with test probe P1.

**Special Case: Permanently Installed DUT**




- Contact the conductive parts of the housing with test probe P1.

### 5 Start test

START STOP

### 6 Acknowledge line voltage warning

**Only when active: PE(TS)-P1**

**6** Save measured values to buffer memory

**7** Stop test

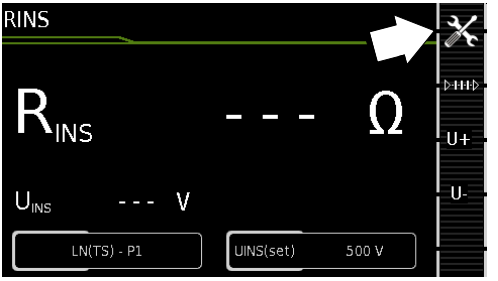
**8** Save measurements under ID no.

## 12.4 RINS – INSULATION RESISTANCE MEASUREMENT FOR PROTECTION CLASS DUTS

**1** Select measuring function

**RINS**

**2** Select parameters



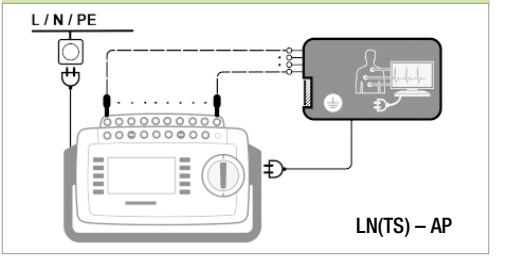

**U+/U–** = increase/decrease UINS(set)

**3** Set parameters

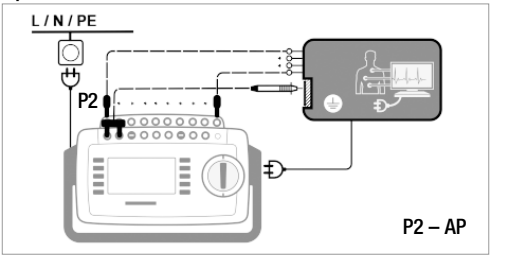
| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| **LN(TS) – PE(TS)** | Class I: Testing is conducted between short-circuited LN mains terminals at the test socket and the DUT's PE terminal. [1] |
| **LN(TS) – P1** | See chapter 12.5 |
| **P1 - P2** | Only test instruments with feature H01:<br>2-pole measurement between test probes P1 and P2 (see chapter 12.18) |
| **PE(mains) – P1**<br>**Permanently connected DUTs** | Testing is conducted between the ground terminal at the mains and test probe P1. |
| **PE(TS) – P1** | Testing is conducted between the PE terminal at the test socket and test probe P1. |
| **LN(TS) – P1//PE(TS)** | Testing is conducted between short-circuited LN mains terminals at the test socket and test probe P1, including PE at the test socket. |
| **LN(TS) – AP** | Testing is conducted between the specified measuring point (see above) and the selected applied part sockets. |
| **PE(mains) – AP** | |
| **PE(TS) – AP** | |
| **P1//PE(TS) – AP** | |
| **P2 – AP** | |
| **AP on/off** | |
| Selection: A / B / C / D / E / F / G / H / I / K | |
| **UINS(set)** | **U+/U–** |
| **> 50 … < 500 V** | Variable test voltage can be entered with the numeric keypad. |

[1] Connection also via EL1, VL2E, AT3-I I I E, AT3-I I S, AT3-I I S32, AT16DI/AT32DI or CEE adapter

**4** Connecting the DUT, APs




**Special case P2 – AP**



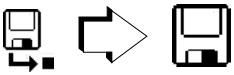

- Connect the DUT to the test socket and the APs to the AP sockets.
- P2-AP: Contact exposed conductive parts not connected to the protective conductor with test probe P2.

**5** Start test


**6** Save measured values to buffer memory 

**7** Stop test 

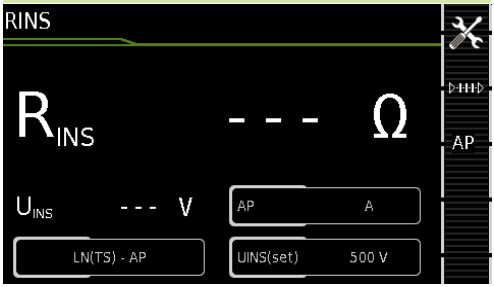

**8** Save measurements under ID no.



## 12.5 RINS – INSULATION RESISTANCE MEASUREMENT FOR PROTECTION CLASS II DUTS

**1** Select measuring function

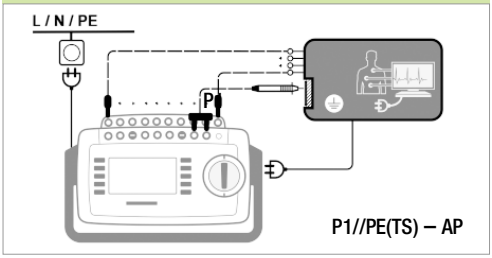

**2** Select parameters




**3** Set parameters

| Measuring Parameter | Meaning |
|---|---|
| Measurement Mode | |
| LN(TS) – P1 | Testing is conducted between short-circuited LN mains terminals at the test socket and test probe P1. (connection via test socket, VL2E, AT3-IIIE, AT3-IIS, AT3-II S32 or AT16DI/AT32DI adapter) |
| LN(TS) – AP | Testing is conducted between short-circuited LN mains terminals at the test socket and the applied part. |
| P2 – AP | Testing is conducted between test probe P2 and the applied part. |
| AP on/off | |
| Selection: A / B / C / D / E / F / G / H / I / K | |
| UINS(set) | U+/U– |
| > 50 … < 500 V | Variable test voltage can be entered with the numeric keypad. |

**4** Connect the DUT



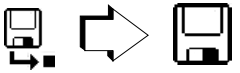

- Connect the DUT to the test socket and the applied parts to the AP sockets.
- Contact all exposed conductive parts with test probe P1.

**5** Start test


**6** Save measured values to buffer memory 

**7** Stop test

## 8 Save measurements under ID no.



## 12.6 UHV – HIGH-VOLTAGE TEST (SECULIFE ST PRIME ONLY)

**DANGER**

**High voltage! Life endangering!**

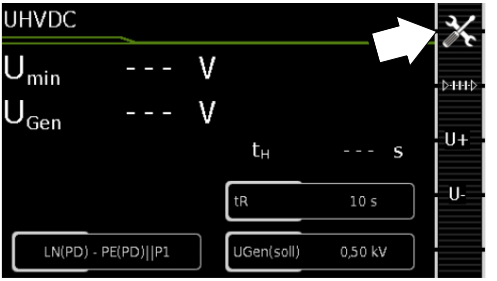
Testing is performed with up to 6000 V DC. If terminals L or N at the test socket or the test tips of the test probe or the HV test pistol are touched, electric shock may occur which could result in consequential accidents (despite current limiting for the test to I < 3 mA).

Do not touch the L or N terminals at the test socket, the test probe's test tip, the test tip of the HV test pistol or the potentially energized DUT.

## 1 Select measuring function

**UHV**

## 2 Select parameters



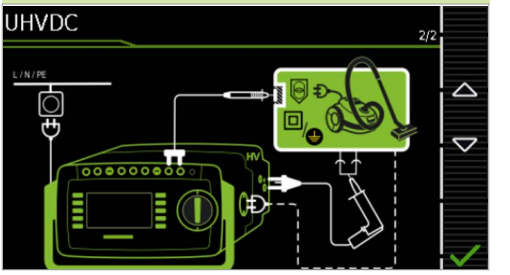

**U+/U–** = increase/decrease UGen(set)

## 3 Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| LN(TS) – PE(TS)\|\|P1 | Testing is conducted between short-circuited L and N mains terminals at the test socket and protective conductor PE at the test socket (while test probe P1 is parallel to the PE at the test socket). |
| LN(TS) – P1 | Testing is conducted between short-circuited LN mains terminals at the test socket and test probe P1 (connection via test socket). |
| PHV – P1[1)] | Testing is conducted between the HV test pistol (PHV) and test probe P1. |
| **UGen(set)** | **U+/U–** |
| ≥ 500 … ≤ 6000 V | Variable test voltage can be entered with the numeric keypad. |
| **tR** | |
| ≥ 1 … ≤ 999 s | Variable rise time can be entered with the numeric keypad |

[1)] Only with feature F02

## 4 Connect the DUT




## 5 Start test

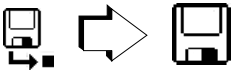

## 6 Save measured values to buffer memory (optional)

## 7 Stop test

START STOP

Each time the test is triggered, a corresponding measured value is automatically saved to buffer memory.

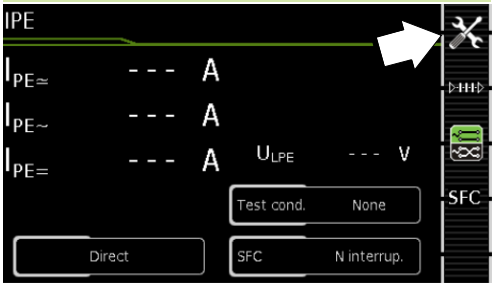
**8** Save measurements under ID no.



## 12.7 IPE – PROTECTIVE CONDUCTOR CURRENT

**1** Select measuring function


**2** Select parameters




**3** Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| **Direct** | Direct measuring method (via test socket, AT16DI/AT32DI (direct)) |
| **Differential** | Differential current method (via test socket) |
| **Alternative** | Alternative method (equivalent leakage current measuring method) (via test socket[1]) |
| **AT3-adapter** | Only test instruments with feature I01: measurement with AT3-Adapter: AT3-IIIE, AT3-IIS or AT3-II S32<br>See chapter 12.20. |
| **Clip** | Only test instruments with feature I01: See chapter 12.19. |
| **AT16/32DI diff.** | Differential measurement, AT16DI/AT32DI (if there's a toggle switch on the adapter, it must be set to differential) |
| **Testing conditions – only with direct measurement mode** | |
| **None / lay AP to PE** | |
| **Clip factor – only for clip measurement mode** | |
| **1 mV : 1 mA / 10 mV: 1 mA / 100 mV: 1 mA, 1 V: 1 mA** | |
| **Single fault (SFC) – only with direct measurement mode** | **SFC** |
| **Normal cond.** | Single fault simulation not active |
| **N interrup.** | Fault simulation – only phase and protective conductor are connected to the DUT.[2] |
| **Polarity[3] – only with measurement mode direct Differential, AT3-adapter[4] and AT 16/32DI diff[4]** | |
| **Normal** | Selection of polarity for mains voltage to the test socket |
| **Reversed** | |

[1] Connection also via VL2E, AT3-Adapter, AT16DI/AT32DI

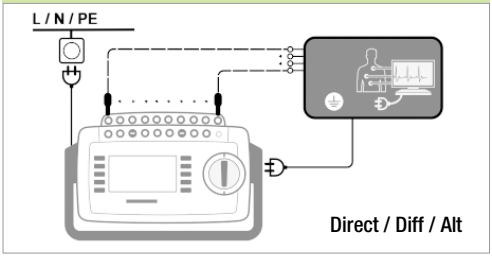
[2] Only suitable for connecting the DUT to the test socket. Not suitable for measurements with AT16DI or AT32DI adapter.

[3] Measurement must be performed with both mains polarities using the Direct and Differential measurement types (when connected with 3-phase adapters, the polarity selected on the test instrument is irrelevant). The largest value must be used for limit value assessment.

[4] The polarity parameter only affects the DUT when the DUT is connected directly to the test socket, not when using 3-phase adapters.

Before conducting any leakage current measurements, make sure that the "Ref. Voltage L-PE" and ". Testingfreq Alt" measurement parameters have been set correctly in SETUP; see chapter 11.5.

**4** Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.

**5 Start test**


**6 Acknowledge line voltage warning**

**Direct & Differential & AT3-Adapter:**

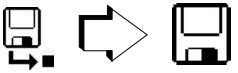
- Switch DUT on

**7 Save measured values to buffer memory**

- Switch DUT off

**8 Stop test**


**9 Save measurements under ID no.**



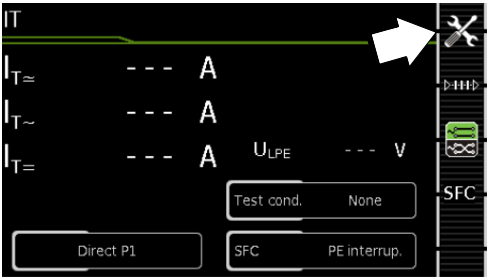
## 12.8 IT – TOUCH CURRENT

**Note**

When measuring touch current on multiphase DUTs with measurement types Direct P1, Differential P1 and Perman. Con. P1, it must be ensured that all non-conductively interconnected parts are also contacted and measured one after the other and that the worst value is ascertained/evaluated. Interconnecting all accessible parts for the measurement may result in the canceling out of leakage currents from different phases so that dangerous active parts go unnoticed!

**1 Select measuring function**


**2 Select parameters**




**3 Set parameters**

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| **Direct P1** | Direct measuring method (via test socket[1]) |
| **Differential P1** | Differential current method (via test socket) |
| **Alternative P1** | Equivalent leakage current method (via test socket[1] or VL2E) |
| **Perman. Con. P1** | Permanently installed DUT |

| Measuring Parameter | Meaning |
|---|---|
| **Alternative P1–P2** | Only test instruments with feature H01:<br>Equivalent leakage current measuring method:<br>2-pole measurement between test probes 1 and 2 (see chapter 12.18) |
| **Testing condition – for Direct and Differential Only** | |
| **None / lay AP to PE (all)** | |
| **Single fault (SFC) – only with direct measurement mode** | **SFC** |
| **Normal cond.** | Single fault simulation not active |
| **N interrup.** | Fault simulation – only phase and protective conductor are connected to the DUT.[2)] |
| **PE interrup.** | Fault simulation active – the protective conductor is disconnected from the DUT for the duration of the measurement. |
| **Polarity[3)] – only with measurement mode Direct, Differential and AT3-adapter** | |
| **Normal**<br>**Reversed** | Selection of polarity for mains voltage to the test socket |

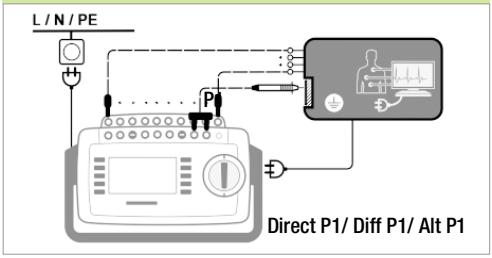
1) Connection also via AT3-IIIE, AT3-IIS, AT3-II S32, AT16DI/AT32DI

2) Only suitable for connecting the DUT to the test socket. Not suitable for measurements with AT16DI or AT32DI adapter.

3) Measurement must be performed with both mains polarities using the Direct and Differential measurement types (when connected with 3-phase adapters, the polarity selected on the test instrument is irrelevant). The largest value must be used for limit value assessment.

Before conducting any leakage current measurements, make sure that the “Ref. Voltage L-PE” and “Testingfreq Alt” measurement parameters have been set correctly in SETUP; see chapter 11.5.

### 4 Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.
- Contact additional, exposed conductive parts that are not connected to the protective conductor with test probe P1.

### 5 Start test

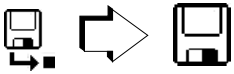

### 6 Acknowledge line voltage warning

**Direct & Differential:**

### 7 Save measured values to buffer memory

### 8 Stop test


### 9 Save measurements under ID no.



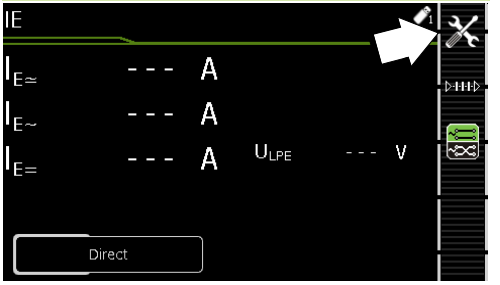
## 12.9 IE – DEVICE LEAKAGE CURRENT

**Note**

If device leakage current measurements are performed on multiphase DUTs, dangerous touch current components may be canceled out by leakage currents from other parts for all measurement types except alternative! For this reason, always perform an a touch current measurement as well. When measuring touch current, be sure to contact and measure each exposed conductive part, one after the other.

### 1 Select measuring function


### 2 Select parameters




### 3 Set parameters

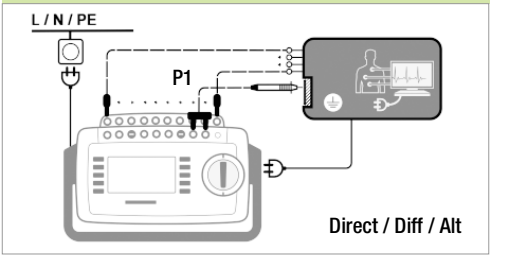
| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| **Direct** | Direct measuring method (via test socket), optional probe contact |
| **Differential** | Differential current method (via test socket) |
| **Alternative** | Equivalent leakage current measuring method with probe contact (via test socket, AT16DI/AT32DI) |
| **Perman. Con. (Permanent connection)** | Permanently installed DUT |
| **AT3-adapter** | Only test instruments with feature I01: Measurement with AT3-IIIE, AT3-IIS or AT3-II S32 adapter See chapter 12.20. |
| **Clip** | Only test instruments with feature I01: See chapter 12.19. |
| **AT16/32DI dir.** | Direct measuring method, AT16DI/AT32DI (if there's a toggle switch on the adapter, it must be set to direct) |
| **Polarity[1] – only with measurement mode Direct, Differential, AT3-adapter[2] and AT 16/32DI Dir[2]** | |
| **Normal** | Selection of polarity for mains voltage to the test socket |
| **Reversed** | |
| **Clip factor – only for clip measurement mode** | |
| **1 mV : 1 mA / 10 mV: 1 mA / 100 mV: 1 mA, 1 V: 1 mA** | |

1) Measurement must be performed with both mains polarities using the Direct and Differential measurement types (when connected with 3-phase adapters, the polarity selected on the test instrument is irrelevant). The largest value must be used for limit value assessment.

2) The polarity parameter only affects the DUT when the DUT is connected directly to the test socket, not when using 3-phase adapters.

Before conducting any leakage current measurements, make sure that the **Ref. Voltage L-PE** and **Testingfreq Alt** have been set correctly in SETUP; see chapter 11.5.

### 4 Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.

- Contact exposed conductive parts that are not connected to the protective conductor with test probe P1.
- For DUTs with applied parts: Additionally contact the short-circuited inputs for the applied parts with test probe P1.

**5 Start test** START STOP

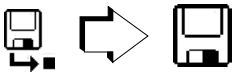
**6 Acknowledge line voltage warning**

Direct & Differential &
AT3-Adapter &
AT16/32DI diff.

**7 Save measured values to buffer memory**

**8 Stop test** START STOP

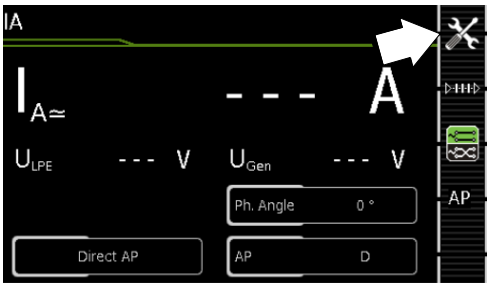
**9 Save measurements under ID no.**



## 12.10 IA – LEAKAGE CURRENT FROM THE APPLIED PART

**1 Select measuring function**


**2 Select parameters**



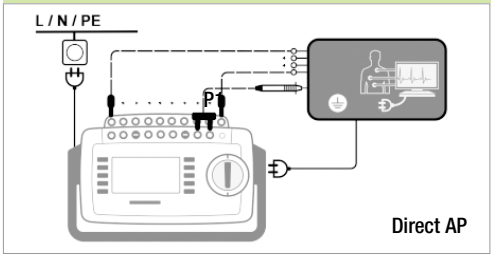

**3 Set parameters**

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| Direct P1 | Direct measuring method (via test socket) with test probe P1 |
| Direct AP | As above – here via the AP socket |
| Alternative P1 | Equivalent leakage current measuring method (via test socket) with test probe P1 |
| Alternative AP | As above – here via the AP socket |
| Perman. Con. P1 | Permanently installed DUT |
| Perman. Con. AP | As above – here via the AP socket |
| AP – P2[1)] | Test probe P2 to conductive parts without PE |
| **Phase angle – for Direct (P1), AP) & Perman. Con. (P1, AP) only** | |
| 0° or 180° | Selectable phasing for the internal generator relative to mains phasing |
| **Polarity[2)] –with Direct measurement mode only** | |
| Normal<br>Reversed | Selection of polarity for mains voltage to the test socket |

1) For ME equipment with its own power supply
2) The measurement must be performed in both mains polarities. The largest value must be used for limit value assessment.

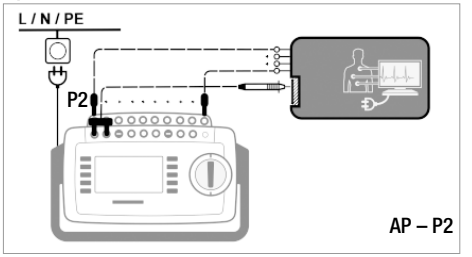
Before conducting any leakage current measurements, make sure that the “Ref. Voltage L-PE” and “Testingfreq Alt” measurement parameters have been set correctly in SETUP; see chapter 11.5.

## 4 Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.
- Contact the short-circuited inputs for the applied parts with test probe P1.

**Special case AP – P2**




- Contact exposed conductive parts not connected to the protective conductor with test probe P2.

## 5 Start test

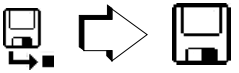

## 6 Acknowledge line voltage warning

**Direct:**

## 6 Save measured values to buffer memory

## 7 Stop test

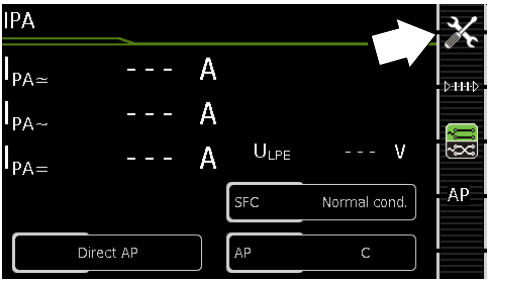

## 9 Save measurements under ID no.



# 12.11 IPA – PATIENT AUXILIARY CURRENT

## 1 Select measuring function


## 2 Select parameters

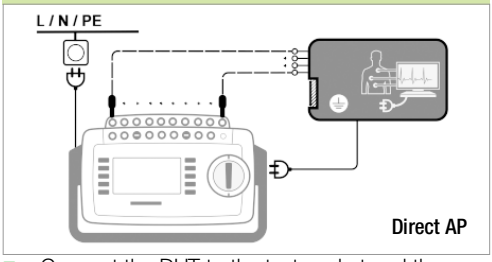


## 3 Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| Direct AP | Direct measurement from the selected applied part socket to all others |
| Perman. Con. AP | Direct measurement from the selected applied part socket to all others (no individual faults or polarity selectable) |
| **AP on/off** | |
| **Selection: A / B / C / D / E / F / G / H / I / K each against remaining applied parts** | |
| **Single fault (SFC) – only with direct measurement mode** | |
| Normal cond. | Single fault simulation not active |
| N interrup. | Fault simulation active – only phase and protective conductor are connected to the DUT. |
| PE interrup. | Fault simulation active – the protective conductor is disconnected from the DUT for the duration of the measurement. |
| **Polarity –with Direct measurement mode only** | |
| Normal<br>Reversed | Selection of polarity for mains voltage to the test socket |

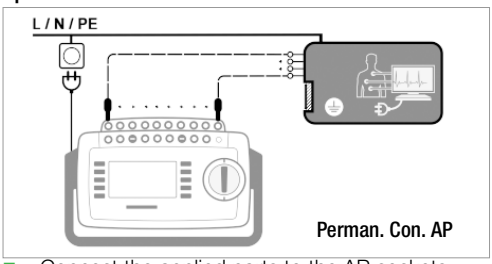
Before conducting any leakage current measurements, make sure that the “Ref. Voltage L-PE” and “Testingfreq Alt” measurement parameters have been set correctly in SETUP; see chapter 11.5.

## 4 Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.

### Special Case – Fixed Connection




- Connect the applied parts to the AP sockets.

## 5 Start test

START STOP

## 6 Acknowledge line voltage warning

Direct:

## 7 Save measured values to buffer memory

## 8 Stop test

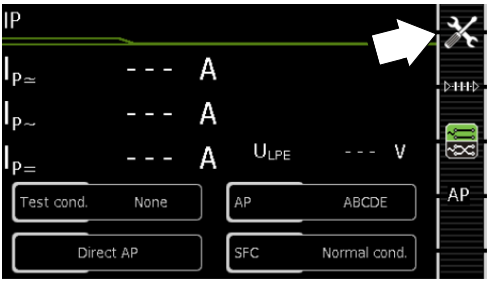
START STOP

## 9 Save measurements under ID no.

## 12.12 IP – PATIENT LEAKAGE CURRENT

### 1 Select measuring function


### 2 Select parameters



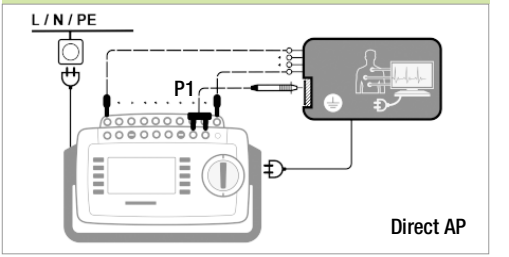

### 3 Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| **Direct P1** | Direct measuring method (via test socket) with test probe P1[1)] |
| **Direct AP** | As above – here via the AP socket |
| **Perman. Con. P1** | Permanently installed DUT |
| **Perman. connect AP** | As above – here via the AP socket |
| **Testing conditions – with AP measurement mode only** | |
| AP to PE / housing to PE / AP & housing to PE / none | |
| **AP on/off** | |
| **Selection: A / B / C / D / E / F / G / H / I / K** | |
| **Single fault (SFC) – depending on measurement mode** | |
| **Normal cond.** | Single fault simulation not active |
| **N interrup.[2)]** | Fault simulation active – only phase and protective conductor are connected to the DUT.[3)] |
| **PE interrup.[2)]** | Fault simulation active – the protective conductor is disconnected from the DUT for the duration of the measurement. |
| **MVoltage > AP** | Fault simulation active – low voltage to applied part |
| **Polarity[4)] –with Direct measurement mode only** | |
| **Normal** | Selection of polarity for mains voltage to the test socket |
| **Reversed** | |

1) Connection also via AT16DI, AT32DI, AT3-IIS, AT3-IIS32, AT3-IIIE
2) for Direct P1 and Direct AP measurement types only
3) Not suitable for measurements via test adapter.
4) The measurement must be performed in both mains polarities. The largest value must be used for limit value assessment.

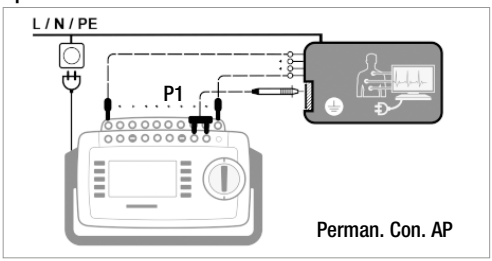
Before conducting any leakage current measurements, make sure that the “Ref. Voltage L-PE” and “Testingfreq Alt” measurement parameters have been set correctly in SETUP, see chapter 11.5.

### 4 Connect the DUT




- Connect the DUT to the test socket and the applied parts to the AP sockets.
- Contact exposed conductive parts that are not connected to the protective conductor with test probe P1.

Special Case – Fixed Connection




**5** Start test

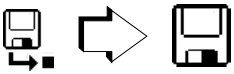

**6** Acknowledge line voltage warning

Direct: 

**7** Save measured values to buffer memory 

**8** Stop test

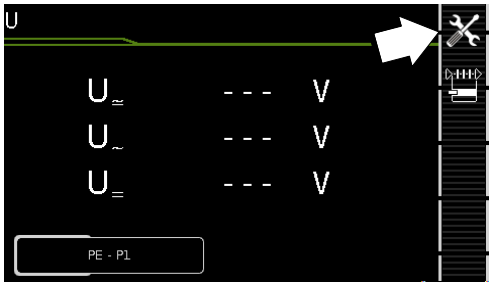

**9** Save measurements under ID no.



## 12.13 U – VOLTAGE MEASUREMENT (PROBE P1)

**1** Select measuring function

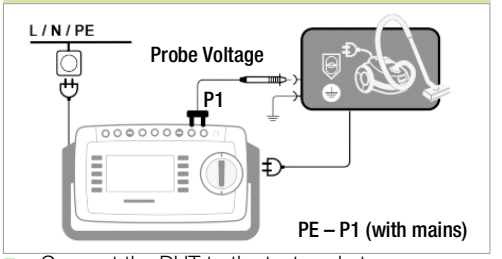

**2** Select parameters




**3** Set parameters 

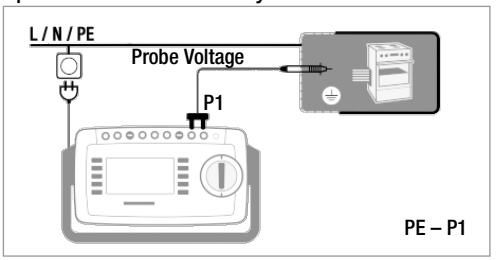
| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode**  | |
| **PE – P1** | Measurement of voltages with reference to PE, test socket remains voltage-free, for permanently connected DUTs |
| **PE – P1 (with mains)** | Measurement of voltages with reference to PE, line voltage is applied to the test socket |
| **Polarity**  | |
| **Normal / reversed** | Selection of mains voltage polarity at test socket (for PE-P1 measurement mode with mains only) |

### 4 Connect the DUT




- Connect the DUT to the test socket.
- Contact the ungrounded output for safety extra-low voltage with test probe P1.
- Select line voltage polarity.

**Special Case: Permanently Installed DUT**




- Contact all voltage conducting parts with test probe P1.

### 5 Start test

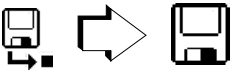

### 6 Acknowledge line voltage warning

For measurement mode only **(with mains)**

### 7 Save measured values to buffer memory

### 8 Stop test

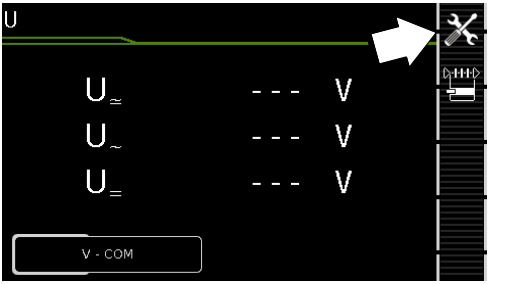

### 9 Save measurements under ID no.



## 12.14 U – VOLTAGE MEASUREMENT (MULTIMETER)

### 1 Select measuring function

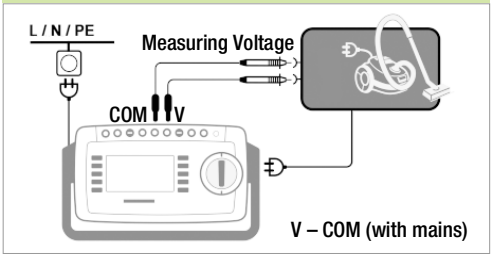

### 2 Select parameters




### 3 Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| V – COM | TRMS value + AC + DC for permanently connected DUTs |
| V – COM (with mains) | TRMS value + AC + DC, with mains to test socket |
| **Polarity** | |
| Normal / reversed | Selection of polarity for mains voltage to the test socket (only with V – COM (with mains)) |

### ❹ Connect the DUT



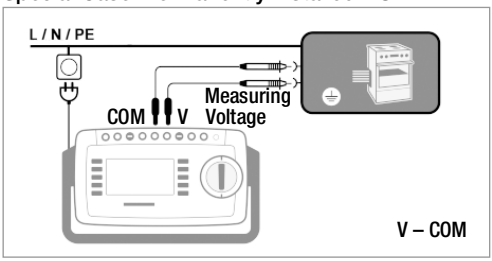

**WARNING**

**Electric Shock! Risk of Consequential Accidents!**

Risk of injury due to electric shock if unsuitable measurement cables are used.

Use only the included, contact-protected KS17-ONE measurement cables when measuring dangerous voltage.

**Special Case: Permanently Installed DUT**




- **When testing mains power packs or chargers:** Connect the DUT's mains plug to the test instrument's test socket.
- Connect the DUT's output, e.g. for measuring safety extra-low voltage, to the **V** and **COM** sockets.

### ❺ Start test

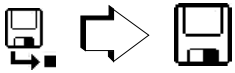

### ❻ Acknowledge line voltage warning

For measurement mode only **(with mains)**

### ❼ Save measured values to buffer memory

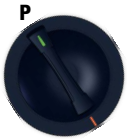
### ❽ Stop test


### ❾ Save measurements under ID no.

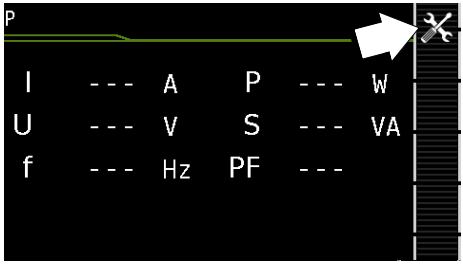


## 12.15 P – FUNCTION TEST

### ❶ Select measuring function




### ❷ Select parameters



### ❸ Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Polarity** | |
| Normal | Selection of polarity for mains voltage to the test socket |
| Reversed | |

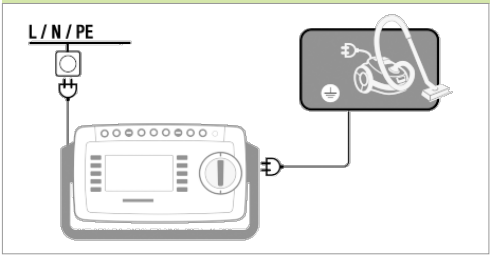
**The following connection types are possible:**

- Test socket
- CEE adapter (only for connection via single-phase CEE or “caravan socket”)
- AT3-adapter (AT3-IIIE, AT3-IIS, AT3-IIS32)
- AT16DI/AT32DI

**Note**

These or similar adapters can be used for the function test (initial startup of the DUT), but measurement of apparent and active power, power factor and current consumption is only possible when the DUT is directly connected to the test socket or via the CEE adapter (single-phase CEE socket only).

### ❹ Connect the DUT




- Connect the DUT to the test socket.

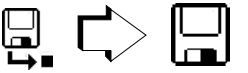
### ❺ Start test


### ❻ Acknowledge line voltage warning

### ❼ Save measured values to buffer memory

### ❽ Stop test


### ❾ Save measurements under ID no.



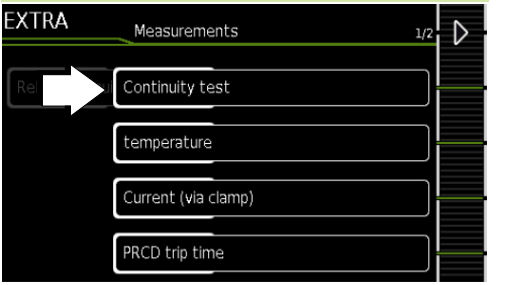
## 12.16 EL1 – FUNCTION TEST FOR EXTENSION CORDS

(with SECULIFE ST PRIME in Extra switch position)

### ❶ Select measuring function

**EL1**

**Select measuring function**



## ❷ Select parameters


## ❸ Set parameters

| Measuring Parameter | Testing for | | |
|---|---|---|---|
| **Measurement Mode** | Continuity L(1/2/3), N | Short-Circuit Between: L(1/2/3), N | Reversed Polarity / Clockwise Phase Sequence |
| **EL1 adapter** | X | X | —[1)] |
| **VL2E adapter** | X | X | X |
| **AT3-IIIE adapter** | X | X | X |

[1)] Testing for reversed polarity is only performed for Swiss outlets, and only in combination with feature B09.

**Note**

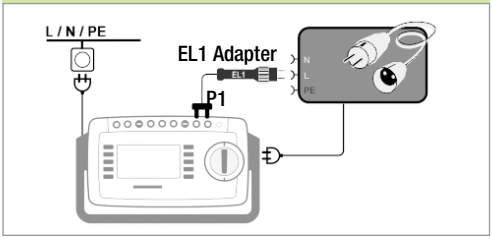
This function permits an evaluation of the continuity of the extension cord's active conductors L(1, 2, 3) and N. The PE conductor isn't tested in this case!

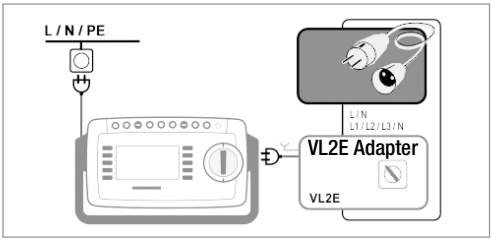
See corresponding single measurements for the testing of $R_{PE}$ and $R_{INS}$.

**Note**

see chapter "Test Sequences (automatic test sequences)" ➪ 64 with regard to testing extension cords according to EN 50678 / EN 50699, for which $R_{PE}$ and $R_{INS}$ are measured.

## ❹ Connect the DUT




**Connecting the EL1 Adapter**

- Connect the EL1 adapter to the special P1 sockets at the test instrument.
- Connect the plug at the end of the extension cord to the test socket.
- Connect the coupling socket at the other end of the extension cord to the plug at the EL1 adapter.

**Connecting Test Adapters VL2E and AT3-IIIE**

- Connection examples can be found in chapter 12.20.

## ❺ Start test

START STOP

Continuity test for L and N

## ❻ Save measured values to buffer memory

## ❼ Stop test

START STOP

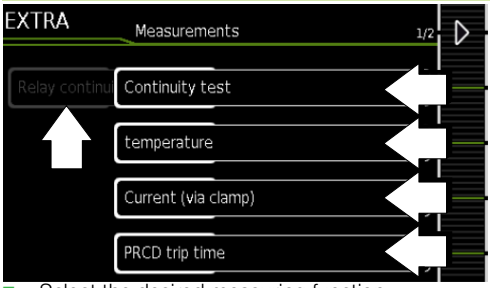
## ❽ Save measurements under ID no.

## 12.17 EXTRA – SPECIAL FUNCTIONS

**1** Select measuring function

**EXTRA**

**2** Select measuring function



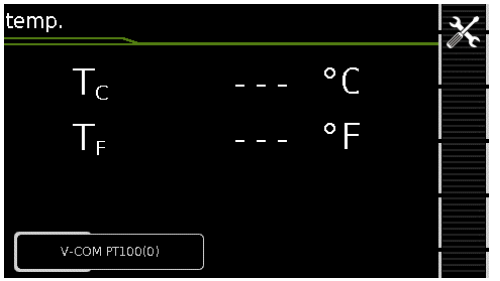

- Select the desired measuring function.

### 12.17.1 CONTINUITY TESTING

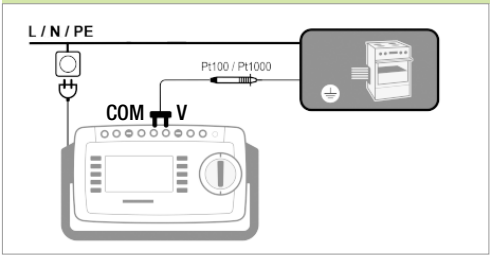
See chapter 12.16 on page 56.

### 12.17.2 TEMPERATURE MEASUREMENT

**3**




**4** Connect the DUT




Temperature measurement is conducted with either a Pt100 or a Pt1000 temperature sensor – the sensor type is automatically detected internally.

**5** Start test START STOP

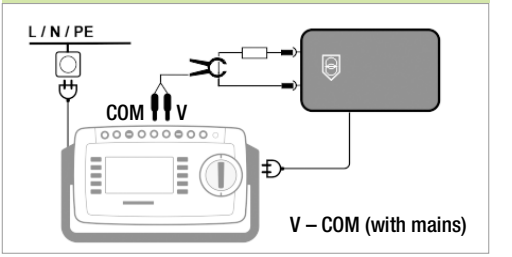
**6** Save measured values to buffer memory

**7** Stop test START STOP

### 12.17.3 $I_Z$ – CURRENT (VIA CLIP)

**3**


**4** Connect the DUT




**5** Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| V – COM | A AC for permanently connected DUTs |
| V – COM (with mains) | A AC, with mains to test socket |
| **Polarity – With mains to test socket only** | |

| Measuring Parameter | Meaning |
|---|---|
| Normal | Selection of polarity for mains voltage to the test socket |
| Reversed | |

- Set the clip factor (Za. factor):
  – At the current clip sensor
  – At the test instrument

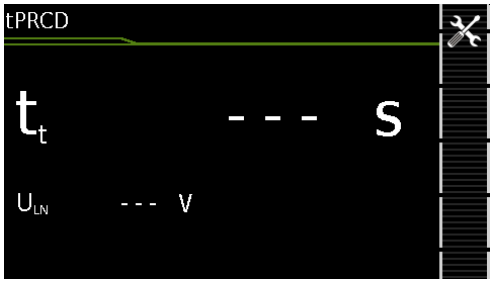
**6 Start test**

**7 Save measured values to buffer memory**

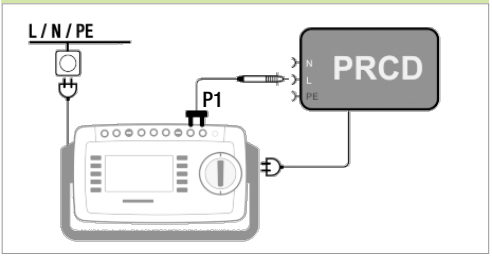
**8 Stop test**

### 12.17.4 TPRCD – MEASURING TIME TO TRIP OF PRCD-TYPE RESIDUAL CURRENT CIRCUIT BREAKERS

**3**




**4 Connect the DUT**




- Connect the PRCD to the test socket.

**5 Start test (test current: 30 mA)**

**6 Acknowledge line voltage warning**

**7 Execute test**

- Activate the PRCD.
- Contact neutral conductor L at the PRCD with test probe P1 (if necessary, ascertain by trial and error.)

The PRCD is tripped.

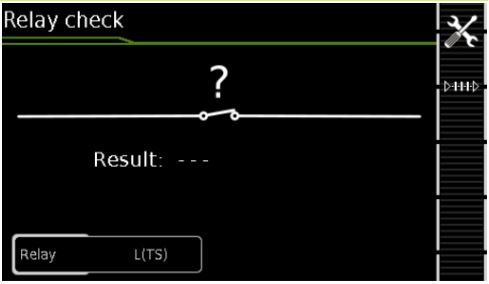
**8 Testing is stopped automatically.**

Ascertained time to trip is displayed.

**9 Save measurements under ID no.**

### 12.17.5 RELAY CONTINUITY CHECK (SECULIFE ST PRIME ONLY)

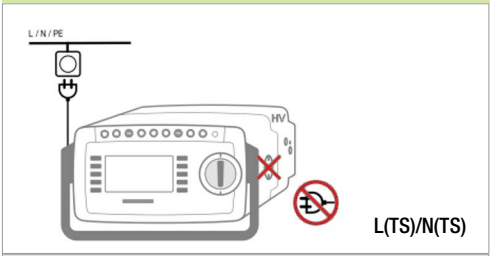
**3**



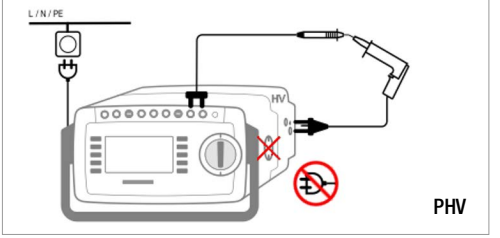

**Note**

The relay continuity check is a self-test function of the mains changeover relays in the high-voltage section. Perform this test regularly in your daily testing routine to ensure that your test results are correct.

## 4 Connect the DUT




L(TS)/N(TS)




PHV

## 5 Set parameters

| Measuring Parameter | Meaning |
|---|---|
| **Measurement Mode** | |
| L(TS) | Function test of the cut-off relay of the HV part's L-connection |
| N(TS) | Function test of the cut-off relay of the HV part's N-connection |
| PHV[1)] | Function test of the cut-off relay for the PHV high-voltage pistol |

1) Only with feature F02

- Before starting the test, pull the plug out of the test socket.
- During the PHV test, connect the test tip of probe P1 to the tip of the PHV test pistol.

## 6 Start test

START STOP

The measurement must have a **Passed** result.

## 8 Stop test

START STOP

## 12.18 2-POLE MEASUREMENTS WITH TEST PROBES P1 AND P2

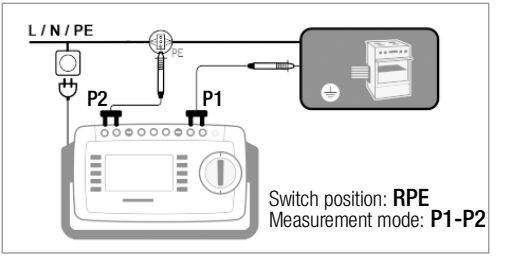
**Only for instruments with feature H01 (for example, SECULIFE ST PRO)**

If your DUT is not equipped with a country-specific mains plug that fits into the test socket at the test instrument, or if a permanently installed DUT is involved, the second test probe – in combination with the first test probe – permits 2-pole measurement (dual-lead-measurement) of RPE, RINS, IPE and IT (alternative method).

Measurements with test probe 1 to test probe 2 (P1 – P2) are electrically isolated from the mains. There's no voltage at the test socket.

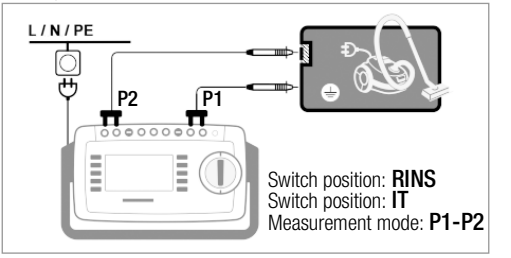
### Connection Example for Measuring RPE

Measuring protective conductor resistance RPE for permanently installed, protection class I DUTs




### Connection Example for Measuring RINS or IT

Measuring insulation resistance RINS or touch current IT for protection class I DUTs

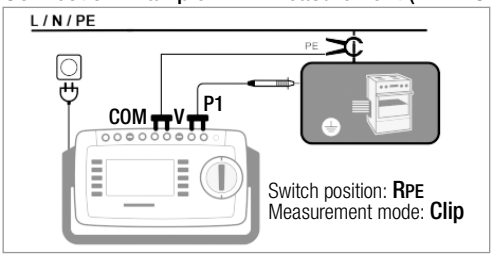


## 12.19 MEASUREMENT WITH CURRENT CLIP SENSOR FOR PERMANENTLY INSTALLED CLASS I DUTS

| Test Instrument | Clip | | Test Instrument |
|---|---|---|---|
| Parameters<br>Transformation Ratio | Transformation Ratio<br>(switch *) | Measuring Range | Display Range<br>with Clip |
| 1 mV : 1 mA | WZ12C | | |
| | 1 mV : 1 mA | 1 mA … 15 A | 0 mA … 300 A |

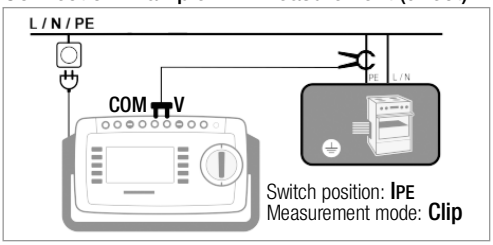
* Only with WZ12C

**Connection Example: RPE Measurement (WZ12C only)**



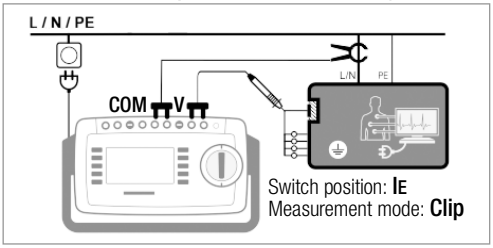

Measurement of test current by closing the clip around **PE** in the mains. This measurement mode can only be selected if test current is set to 10 A AC.

**Connection Example: IPE Measurement (direct)**




Measurement of test current by closing the clip around **PE** in the mains cable.

**Connection Example: IE Measurement (Differential)**




Measurement of device leakage current by closing the clip around the **L and N** conductors in the mains cable.

## 12.20 MEASUREMENTS WITH TEST ADAPTER

| Test with Adapter | EL1 | VL2E | AT3 | AT16DI AT32DI | CEE adapter (Z745A) |
|---|---|---|---|---|---|
| **Connectors for the DUT** | | | | | |
| Non-heating devices, 1P+N+PE 16 A | — | ✔ | ✔ [1] | — | — |
| Earthing contact, 1P+N+ PE 16 A | — | ✔ | ✔ [1] | — | — |
| CEE, 1P+N+PE 16 A | — | ✔ | — | — | ✔ |
| CEE, 3P+N+PE 16 A | — | ✔ | ✔ | ✔ / — | ✔ |
| CEE, 3P+N+PE 32 A | — | ✔ | ✔ | — / ✔ | ✔ |
| 5 x 4 mm sockets | — | — | — | — | ✔ |
| **Connectors for the Test Instrument** | | | | | |
| Earthing contact, 1P+N+ PE 16 A | — | — | ✔ | ✔ | — |
| Socket for test probe | — | ✔ | ✔ [1] | — | — |
| Plug for V–COM | — | — | ✔ | — | — |
| ***Active Test*** | | | | | |
| Protective conductor current **IPE** | | | | | |
| – Direct method | — | — | ✔ | ✔ | — |
| – Differential current | — | — | ✔ | ✔ | — |
| Device leakage current **IE** | | | | | |
| – Direct method | — | — | ✔ | ✔ | — |
| – Differential current | — | — | ✔ | — | — |
| Touch current **IT** | — | — | ✔ | ✔ | — |
| ***Passive Test*** | | | | | |
| Pro. con. resistance **RPE** | ✔ | ✔ | ✔ | ✔ | ✔ |
| Insulation resistance **RINS** | ✔ | ✔ | ✔ | ✔ | ✔ |
| High-voltage test **UHV** [2] (max. 2.25 kV) | — | — | ✔ | ✔ | ✔ |
| Protective conductor current **IPE** (equivalent leakage current method) | — | ✔ | ✔ | ✔ | ✔ |
| **Extension cords:** The following additional test steps are executed in switch position **EL1 (or EXTRA**) depending on the selected test type: | | | | | |
| Single-phase (3-pole) | ✔ | ✔ | ✔ [1] | — | — |
| 3-phase (5-pole) | — | ✔ | ✔ [1] | — | — |
| Wire short-circuit | ✔ | ✔ | ✔ [1] | — | — |
| Wire break | ✔ | ✔ | ✔ [1] | — | — |
| Reversed wires | — [3] | ✔ | ✔ [1] | — | — |

[1] AT3-IIIE/AT3-IIICH only

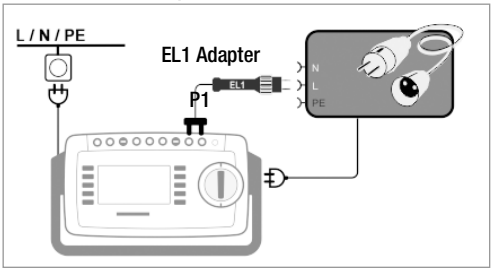
[2] Observe maximum test voltage ($U_{Gen}$); see operating instructions for the adapter.

[3] Wire reversal is only tested for devices with a Swiss test socket (CH).

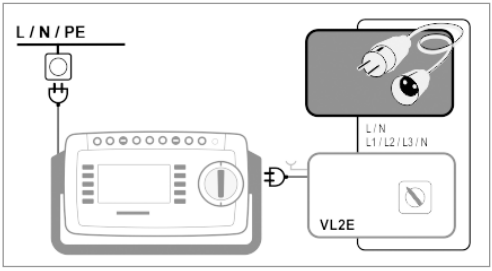
**Note**

Please read and observe the operating instructions for the test adapters regarding correct connection of the test adapter and the DUT, as well as peculiarities involved in the test procedure.

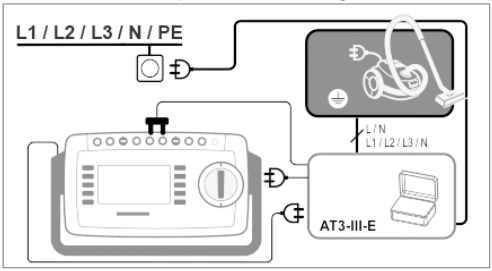
**Connection Example with EL1**



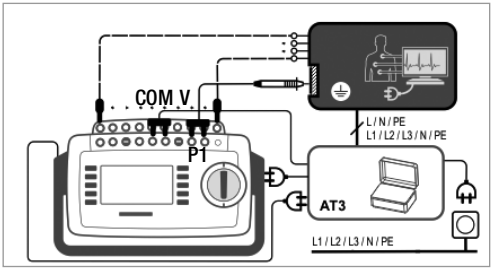

**Connection Example with VL2E**




**Connection Example for Measuring Protective Conductor Current $I_{PE}$ with AT3-IIIE**




**Connection Example for Measurement of Device Leakage Current $I_E$ (differential current method) with AT3**



# 13 TEST SEQUENCES (AUTOMATIC TEST SEQUENCES)

A test sequence is a series of semi-automatic tests or test steps. If the same sequence of individual tests will be run frequently (one after the other with subsequent report generation), for example as specified in the standards, it's advisable to make use of such test sequences.
The test instrument includes two types of test sequences:

- Integrated Test Sequences
  Available ex works or after enabling at the test instrument. Cannot be changed (test parameters are configurable).

**Note**

The integrated test sequences do not include all of the tests stipulated by the product standard which are required for type testing! They're restricted to the tests which are required as a rule after repair or during maintenance work and for occupational health and safety measures, as well as for quality assurance in production.

- User-Defined Test Sequences
  Created individually by the user with IZYTRONIQ software and transferred to the test instrument.
  (This function is available depending on test instrument model or features.)

**Note**

The user selects standard designations (national designations) for the integrated test sequences during initial configuration. If the designations need to be changed, follow the instructions in the operating instructions. Please note that designations cannot be changed retroactively (standard designations in previously saved tests cannot be changed).

**Note**

An insulation test can also be added to your instrument sequence as a control type test step in IZYTRONIQ. This type of step determines whether or not a DUT which is (directly) connected to the test socket is insulated. The DUT must be set up in an insulated manner in order to correctly determine protective conductor or device leakage current with the direct measurement mode. The test instrument automatically performs this type of test at the beginning of the sequence if test steps of this sort (protective conductor or device leakage current with the "Direct" measurement mode) are included in the user-defined sequence – in such cases, it's not necessary to add this test step to the sequence manually!

All test sequences are run in orange rotary switch positions A1 through A9. Each of the rotary switch positions is preconfigured at the factory with integrated test sequences, but they can be adapted to suit your needs, In other words, integrated and user-defined test sequences can be subsequently assigned to the various rotary switch positions as required.
The measurements included in the test sequences are evaluated – either automatically by the test instrument (in the case of limit values) or manually by the user (e.g. visual inspection). Automatic evaluation by the test instrument is based on the worst-case and, depending on settings, in consideration of measuring uncertainty.
Results:

- Green: the momentary measured value lies within the limits specified in the standard.
- Orange: further entries are required after the test step (e.g. cable length), which are decisive as to whether or not the test has been passed.

- Red: limit value violation. The measured value does not comply with the specifications stipulated in the standard.

**Note**

Even if the DUT fails just one single measurement, the test sequence is aborted and testing in accordance with the selected standard is failed.

**Note**

With the help of the SECUTEST DB COMFORT feature (Z853S or feature KD01), test sequences can be modified such that they're not interrupted in the event of a limit value violation. Amongst other things, this is helpful for troubleshooting during repair. Please refer to the operating instructions for further information.

## 13.1 MEASURING PROCEDURE AND STORAGE

1. Connect the DUT.
2. Select the desired test sequence with the rotary switch (**A1** … **A9**).
   ↳ The test instrument initializes connection type recognition.
3. Start the test sequence by pressing the **START/STOP** key


4. The measured value recording icon shown at the right appears.
   Each time this key is pressed, the measuring or evaluation procedure is restarted (see case B ⇨ 66).

5. Proceed to the next measurement by pressing the key shown at the right.

6. When the test sequence has been completed, "Sequence Finished" is displayed.
   At the end of the test sequence, a list of results can be generated for the individual test steps.
7. If you want to view details such as the settings for the individual test steps, select the desired measurement with the cursor and press the **+ magnifying glass key**.

8. The display is returned to the list of test steps by pressing the **magnifying glass –** key.

9. Save the results of a successful test sequence by pressing the **Save** key.
   The following message appears: "No test object selected!".

10. Press the **ID** key.
    You now have the option of entering a test object ID number. If you enter an ID here which is **not yet** included in the database, a prompt appears asking you if you want to enter a new test object.
    ↳ The test object can then be created:


11. Select either device or (medical) ME device.
12. (De)activate the QEDIT function (quick edit – with SECUTEST DB COMFORT only – Z853S or feature KD01).
    If QEDIT is activated, you can fill in additional fields for the test object in the next step.
13. Confirm with the green checkmark.
14. If you activated the QEDIT function in the previous step, you can now fill in all the test object's fields.
15. Confirm with the green checkmark.
    ↳ An overview of the database appears along with the newly created test object.
16. Press the **save icon** (floppy disk) in order to store the measurement results. A message appears indicating that the data have been successfully saved and the display is switched to the measuring view.

**Note**

The storage process can be aborted by pressing the **ESC** key. The display is returned to the memory menu. All measured values can be deleted by once again pressing the **ESC** key.

**Note**

You can send the test results to a PC on which IZYTRONIQ software is running. This function is known as “push-print” and can be implemented via USB or Bluetooth®.
Database expansion SECUTEST DB COMFORT (Z853S or feature KD01) and, if applicable, feature M01 (Bluetooth®) are required to this end.
Complete information regarding push-print and a description of the application can be found in IZYTRONIQ online help.

### Evaluation Procedure

During a measurement procedure, evaluation is performed automatically for some test steps within a test sequence, while for others it must be performed manually:

**Case A – automatic triggering of evaluation:**

Evaluation (with a duration of, for example, 5 seconds) is started automatically as soon as the measured value has stabilized. The worst value which occurs during this duration is saved, and automatic switching to the next test step ensues.

**Case B – manual triggering of evaluation:**

Evaluation is started after pressing the measurement value recording icon (display: 0). After a specified period of time has elapsed, the worst value is saved and displayed to the right of **wc:**


(worst case), and the number 1 is displayed in the measurement value recording icon indicating that the first measured value has been saved. Pressing the measured value recording icon again restarts the evaluation procedure. If the worst value is worse than the value obtained for the previous measurement, the new value is used. However, if this value is better than the previous worst value, the original value remains in the display.

Depending on whether you want to delete the last value saved to buffer memory or all values, press the icon an appropriate number of times.


Switching to the next test is accomplished with the help of the adjacent icon.

**ATTENTION**

**Danger of Electric Arcs and Damage to Surfaces**

(feature G01 or G02 only)
High test current is applied during test steps of sequence parameter RPE IP with 10 or 25 A test current. It’s activated as soon as the evaluation period starts and remains active until the evaluation period has ended.
Outside the evaluation period, the measured value for the current test current for probe contact with the PE is therefore < 300 mA as well.

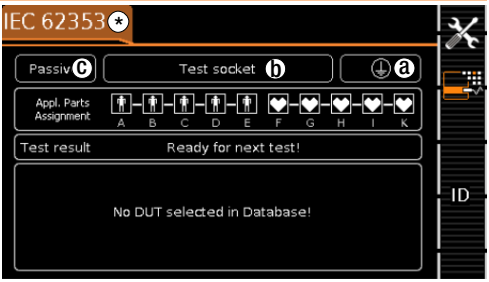
Maintain contact between the probe and the DUT for the entire duration of the evaluation!

## 13.2 EXAMPLE OF AN INTEGRATED TEST SEQUENCE

### ❶ Select test sequence

**A3**

### ❷ Initial page




* On devices with SECUTEST DB COMFORT and touchscreen, the test sequence can be changed immediately after tapping the area highlighted in color.

### ❸ Set sequence parameters

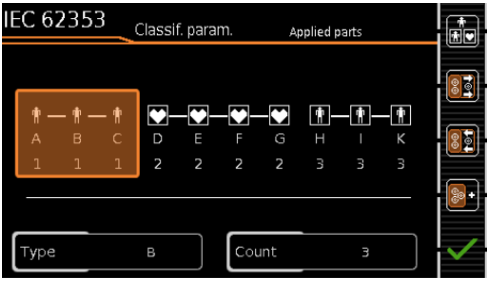
Individual test steps can be configured with the sequence parameters (see operating instructions).

### ❹ Set classification parameters

| Measuring Parameter | Meaning |
|---|---|
| **Standard / Test Sequence** | Select Test Standard (if necessary, select detailed parameter "VLTG; EDV; or PRCD") |
| **Protection class * ⓐ** | Class I / Class II / Class III |
| **Connection * ⓑ** | Test socket / permanent / adapter |
| **Meas. Mode (MA) * ⓒ** | Active or Passive Testing (passive for DUTs without an electronic switch; test actively if in doubt) |
| **Applied parts ⓓ (for IEC 62353 or IEC 60601)** | Applied parts: none, B, BF, CF or combinations<br>**Type B (body):** Devices of this type are suitable for both internal and external patient applications, except for use in direct proximity to the heart. The following protection classes are permissible: I, II, III or devices with internal electric power supply.<br>**Type BF (body float):** Same as type B, but with type F insulated applied parts<br>**Type CF (cardiac float):** Devices of this type are suitable for use directly at the heart. The insulated applied part may ungrounded. The following protection classes are permissible: I, II or devices with internal electric power supply. |
| **PRCD type (for PRCD variants of EN 50678, EN50699, VDE 0701-0702)** | PRCD (standard)<br>PRCD (SPE)<br>PRCD-S (SPE)<br>PRCD-K (SPE) |
| **Auto-detection** | Automatically detect and adopt classification parameters **based on** or combinations of<br>– **Connection (Conn.)** ⓑ<br>– **Measurement mode** (MM) ⓒ<br>– **Protection class** (PC) detection ⓐ |

* If the settings of the classification parameters are detected automatically, they're identified by an orange border (in this case ⓑ). However, they have to be entered manually if they're not automatically detected, or if they're detected incorrectly.

### Selection of Applied Parts (APs)




1. Press the "**Classification Parameter**" key.
2. Go to page 2/2.
3. Press the "**Applied Parts**" key. The screen shown above appears.
4. Select the desired applied part sockets with the "**Expand Group**" key. A red frame identifies the currently selected sockets, always

beginning with socket A. A socket is added each time the key is pressed. The current number of selected sockets appears in the field at the bottom right.

5. The number of selected sockets can be reduced by pressing the "**Reduce Group**" key.

6. After the sockets have been selected, assign the respective type using the "**AP Type**" key. The corresponding icons are allocated to the selected sockets and the type appears in the field at the bottom left.

After selecting the applied parts and assigning a type, further groups can be created by pressing the "**Next Group**" key. An already created group can be edited after selecting it with the help of the input frame.

**Note**

The creation of additional groups with the help of the "+" key is only possible if a type has been assigned to an already selected group.

7. Finish the selection process.

## 5 Connect the DUT

- Connect the DUT to the test instrument in accordance with the selected test sequence.
  – Test socket
  – Permanent connection
  – Adapter
- Connect the applied parts to the AP sockets.

Connection depends on the type of DUT.

For testing extension cords in accordance with standards: Connection to the test socket via the following adapter:

- **EL1:** for single-phase extension cords
- **VL2E/AT3-IIIE:** for single and 3-phase extension cords

## 6 Check connection and start test sequence

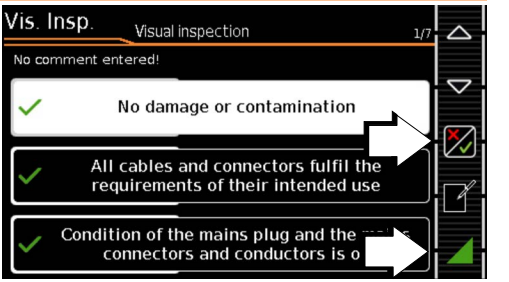
The following checks are run automatically before the test sequence is started:


- Probe check P1 (determines whether or not test probe P1 is connected and fuse link P1 is intact)
- Insulation test (whether or not the DUT is set up in a well-insulated fashion)
- Switch-on and short-circuit check.
  In order to be able to detect a short-circuit at the DUT, testing is conducted between L and N, as well as LN and PE.

If you've set the "**Detected classification**" parameter for the respective test sequence to "Always accept" and the "**Auto-detection of**" parameter to "Connection and PC" (before triggering **Start**), the following additional checks will be run before the test sequence is started:

- Protection class detection for DUTs with protective conductor
- Connection test: Checks whether the DUT is connected to the test socket. In the case of protection class I: whether or not the two protective conductor terminals are short-circuited.

## 7 Evaluate visual inspection manually




Visual inspection passed

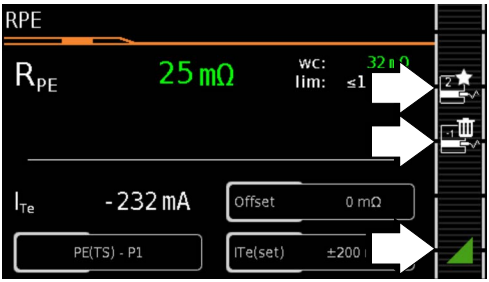
Visual inspection not passed (test sequence is ended, test failed)

Resume test sequence

**Note**

If the plug is pulled out of the test socket during the test sequence, the test sequence is aborted immediately.

## 8 Test step – start evaluation



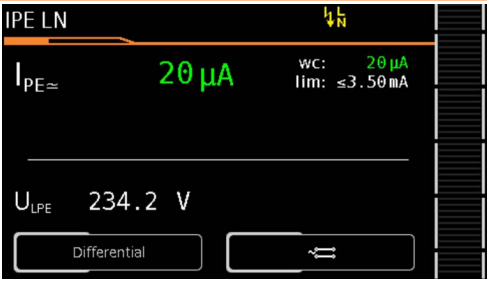

**Green measured value**: complies with standard ☑

Record measuring point

Delete last measuring point

Resume test sequence

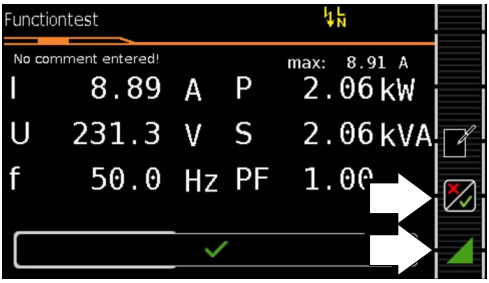
## 9 Test step – automatic evaluation




The measured value is ascertained automatically within a specified period of time. The test sequence is then automatically resumed.

**Green measured value**: complies with standard ☑

## 10 Evaluate function test manually



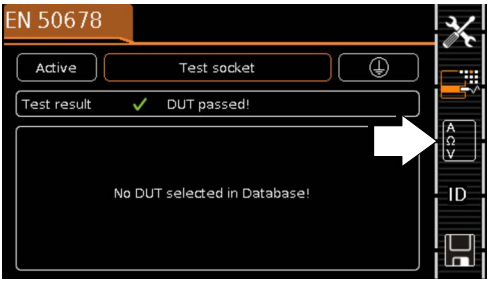

Function test passed

Function test not passed
(test sequence is ended, test failed)

Resume test sequence

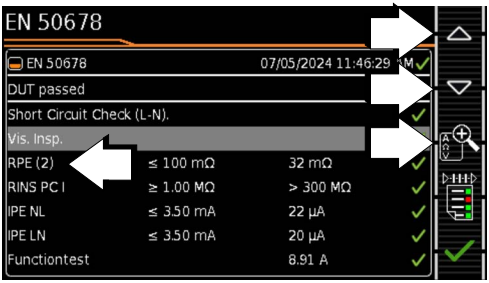
- Remove DUT from service (per instructions in the test sequence).

## 11 Optional: Display results



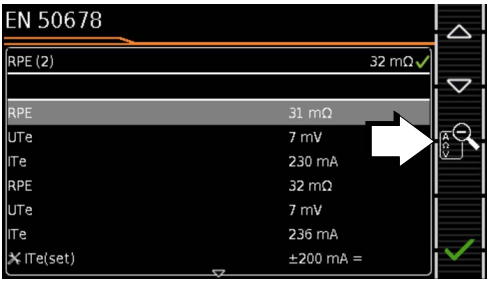

(Display of the memory screen depends on the parameter setting in the **SETUP** switch position: Setup 1/3 > Autom. measurem. > At End of Sequence > **Memory Screen**. When set to **Events list**, this is displayed immediately.)

Show details:



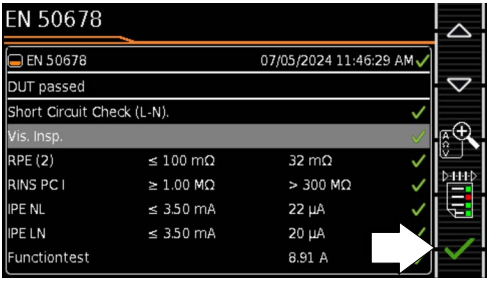

(Consideration of measuring error depends on the parameter setting in the **SETUP switch position: Setup 1/3 > Autom. measurem. > Incl. oper. uncert. > Yes**)

Hide details:



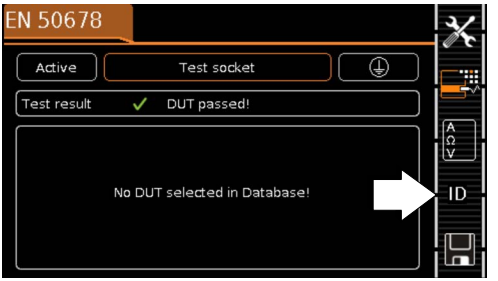

Return to the list of test steps

Confirm results:




Return to the memory screen.

## 13 Save results




- Press the **ID** key.
  You now have the option of entering a test object ID number. If you enter an ID here which is **not yet** included in the database, a prompt appears asking you if you want to enter a new test object.
  The ID dialog appears.

**Note**

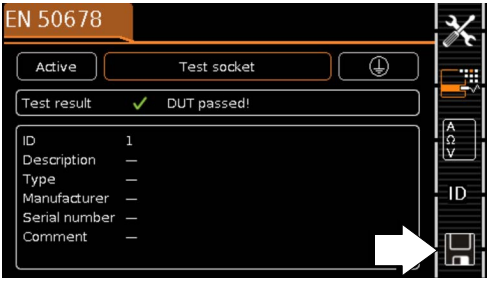
Since no test object is selected, a corresponding note is displayed when the save key is pressed.

- Enter an ID that hasn't yet been used and confirm your selection.
  The "Create test object" prompt appears:


QEDIT On/Off
(QuickEdit function, only with SECUTEST DB COMFORT – Z853S or feature KD01)
If QEDIT is activated, you can fill in all of the test object's fields as a further step. Refer to the operating instructions for further information.

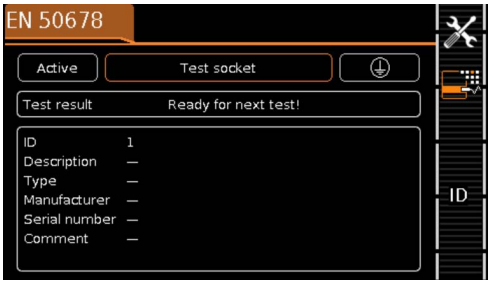
Toggle between device and medical device.

Return to results screen.




- Save the results by pressing the save key.

The measurement is saved and the test instrument is ready for the next measurement:




**Note**

1 You can send the test results to a PC on which IZYTRONIQ software is running. This function is known as “push-print” and can be implemented via USB or Bluetooth®. Database expansion SECUTEST DB COMFORT (Z853S or feature KD01) and, if applicable, feature M01 (Bluetooth®) are required to this end. Complete information regarding push-print and a description of the application can be found in IZYTRONIQ online help.

## 14 REPORTS

A report can be read out showing the results of individual measurements or test sequences stored to the internal database.
Various output formats can be selected:

- Print directly at the test instrument with a printer (thermal printer Z721S).
- Print as an HTML file to a USB flash drive connected to the test instrument
- By transferring the stored measurement data to IZYTRONIQ software on the PC and printing it out there as a report.

Please refer to the operating instructions for complete information.

## 15 TEST DATA MANAGEMENT – IZYTRONIQ SOFTWARE

IZYTRONIQ software facilitates test organization and the management of test data from a broad range of test equipment.
It also provides extended functions such as remote control in connection with the respective test instrument – support for extended functions depends on the test instrument and its order features or enabled extensions (activations).

**Note**

IZYTRONIQ test software may be included in the scope of delivery, for example with standard models and test instrument sets (see data sheet).
If this is not the case or if you would like to take advantage of a variant with a larger scope of functions, you can purchase IZYTRONIQ separately. Detailed information is available at:
https://www.izytron.com/

# 16 CONTACT, SUPPORT AND SERVICE

Gossen Metrawatt GmbH can be reached directly and conveniently – we have a single number for everything! Whether you require support or training, or have an individual inquiry, we can answer all of your questions here:

| | | |
|---|---|---|
| +49 911 8602-0 | Monday to Thursday:<br>Friday: | 08:00 am - 4:00 pm<br>08:00 am - 2:00 PM |
| Or contact us by e-mail at: | info@gossenmetrawatt.com | |

Do you prefer support by e-mail?

| | |
|---|---|
| Measuring and Test Technology: | support@gossenmetrawatt.com |
| Industrial Measuring Technology: | support.industrie@gossenmetrawatt.com |

Enquiries concerning training and seminars can also be submitted by e-mail and online:

training@gossenmetrawatt.com

https://www.gossenmetrawatt.de/en/knowledge/webinars

Please contact GMC-I Service GmbH for repairs, replacement parts and calibration[1]:

+49 911 817718-0

service@gossenmetrawatt.com

Beuthener Str. 41
90471 Nürnberg
Germany

www.gmci-service.com/en/

[1] DAkkS calibration laboratory per DIN EN ISO/IEC 17025
accredited by the Deutsche Akkreditierungsstelle GmbH under reference number D-K-15080-01-01

# 17 CERTIFICATIONS

## 17.1 CE DECLARATION

The instrument fulfills all requirements of applicable EU directives and national regulations. We confirm this with the CE mark.

| **Gossen Metrawatt GmbH** | **Begleitende Formulare zum PEP**<br>**EU-Konformitätserklärung / EU Declaration of Conformity** | **Form E0F34** |
|---|---|---|

| | |
|---|---|
| Hersteller / Manufacturer: | Gossen Metrawatt GmbH |
| Anschrift / Address: | Südwestpark 15, 90449 Nürnberg |
| Produktbezeichnung/ | Prüfgerät für elektrische Sicherheit (Gerätetester) |
| Product name: | Safety Tester (Device Tester) |
| Typ / Type: | SECUTEST ST \| BASE (10) \| PRO \| PRIME ,<br>SECULIFE ST \| BASE (25) \| PRO \| PRIME |
| Bestell-Nr / Order No: | M7050, M707A/B/C, M708B/C/E/D, M694C/D/H/I/U/K |
| Zubehör / Accessories: | Z219C, Z723A, Z745D/H/N/O/R/S/G/W, Z750A/B, Z751A/E , Z721E , Z747A |

Der oben beschriebene Gegenstand der Erklärung* erfüllt die einschlägigen Harmonisierungsvorschriften der Union: / The object of the declaration** described above is in conformity with the relevant Union harmonisation legislation:

| | | |
|---|---|---|
| 2014/53/EU | Funkanlagenrichtlinie | Radio Equipment Directive (RED) |

EN/Norm/Standard:

EN 301 489-1 V2.2.3 : 2019 , EN 301 489-17 V3.2.4 : 2020 , EN 300 328 V2.2.2 : 2019

Anforderungen an die Sicherheit gemäß 2014/35/EU (Niederspannungsrichtlinie) /
Safety requirements according to 2014/35/EU (Low Voltage Directive)

EN/Norm/Standard:

EN 61010-1 : 2010 + A1 : 2019 , EN IEC 61010-2-030 : 2021 + A11 : 2021, EN 61010-031 : 2015 ,

EN IEC 61010-2-032 : 2021 + A11 : 2021

Anforderungen an die elektromagnetische Verträglichkeit gemäß 2014/30/EU (EMV Richtlinie) /
Requirements for electromagnetic compatibility according to 2014/30/EU (EMC Directive)

EN/Norm/Standard:

EN IEC 61326-1 : 2021

| | | |
|---|---|---|
| 2011/65/EU | RoHS - Richtlinie | RoHS Directive |
| (EU) 2015/863 | Deligierte Richtlinie | Deligate Directive |

EN/Norm/Standard:

EN IEC 63000 : 2018

Nürnberg, 21.08.2024
Ort, Datum / Place, Date:

Joachim Czabanski, Geschäftsführer / Managing Director

*) Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Sie beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

**) This Declaration of Conformity is issued under the sole responsibility of the manufacturer but does not include a property assurance. The safety notes given in the product documentation which are part of the supply, must be observed.

| Datei: | Ausgabe: | Erstellt: | Freigabe: |
|---|---|---|---|
| 24-03-M7050-CE-Entwurf | 15.01.2021 | Eckl | Weiß |

# 18 DISPOSAL AND ENVIRONMENTAL PROTECTION

Proper disposal makes an important contribution to the protection of our environment and the conservation of natural resources.

**ATTENTION**

**Environmental Damage**

Improper disposal results in environmental damage.

- Follow the instructions concerning return and disposal included in this section.

The following comments refer specifically to the legal situation in the Federal Republic of Germany. Owners or end users who are subject to other regulations must comply with the respective local requirements and implement them correctly on site. Further information is available, such as from the responsible authorities or local distributors.

**Waste Electrical Equipment, Electrical or Electronic Accessories and Waste Batteries (including rechargeable batteries)**

Electrical equipment and batteries (including rechargeable batteries) contain valuable raw materials that can be recycled, as well as hazardous substances which can cause serious harm to human health and the environment, and they must be recycled and disposed of correctly.

The symbol at the left depicting a crossed-out garbage can on wheels refers to the legal obligation of the owner or end user (German electrical and electronic equipment act ElektroG and German battery act BattG) not to dispose of used electrical equipment and batteries with unsorted municipal waste (“household trash”). Waste batteries must be removed from the old device (where possible) without destroying them and the old device and the waste batteries must be disposed of separately. The battery type and its chemical composition are indicated on the battery’s labelling. If the abbreviations “Pb” for lead, “Cd” for cadmium or “Hg” for mercury are included, the battery exceeds the limit value for the respective metal.

Please observe the owner’s or end user’s responsibility with regard to deleting personal data, as well as any other sensitive data, from old devices before disposal.

Old devices, electrical or electronic accessories and waste batteries (including rechargeable batteries) used in Germany can be returned free of charge to Gossen Metrawatt GmbH or the service provider responsible for their disposal in compliance with applicable regulations, in particular laws concerning packaging and hazardous goods. Waste batteries must be returned in the discharged state or with appropriate precautions against short circuiting. Further information regarding returns can be found on our website.

**Packaging Materials**

We recommend retaining the respective packaging materials in case you might require servicing or calibration in the future.

**WARNING**

**Danger of Asphyxiation Resulting from Foils and Other Packaging Materials**

Children and other vulnerable persons may suffocate if they wrap themselves in packaging materials, or their components or foils, or if they pull them over their heads or swallow them.

- Keep packaging materials, as well as their components and foils, out of the reach of babies, children and other vulnerable persons.

In accordance with German packaging law (VerpackG), the user is obligated to correctly dispose of packaging and its components separately, and not together with unsorted municipal waste (“household trash”).

Packaging which is not subject to so-called system participation is returned to the appointed service provider. Further information regarding returns can be found on our website.

GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP



## YOUR CONTACT PARTNER

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