GOSSEN METRAWATT

SECULIFE ST PRO

Test Instrument for Measuring the Electrical Safety of Medical Devices per IEC 62353, IEC 60601 and VDE 0701-0702

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- Preconfigured test sequences for quickly testing operating equipment
- One universal, adjustable test sequence
- One test sequence executed with individual measurements
- Suitable for use by trained persons
- Extensive data management and storage concept for test results and individual measurements (up to 50,000 data records) – allocation of measurements/tests to devices and customers
- Quick access to measuring and test functions via the double rotary switch, direct selection keys and softkeys
- High-resolution, brilliant 4.3" TFT color display
- Unique multiple measurement permits convenient recording of several measuring points
- Automatic DUT connection and protection category detection
- Compact, impact resistant housing with integrated rubber protector
- Comprehensive, legally secure preparation of test reports
- Interfaces for data entry (two USB A) and data transmission (one USB B)
- Extensive setting options for international use (language, keyboard, character set, date, time)
- Testing of various PRCD types such as PRCD-S/PRCD-K (also with protective conductor resistance measurement for variants with switched PE) with integrated "VDE 0701-0702-PRCD" test sequence



Option

- **R_{PE} test** with 200 mA or 10 A test current (optional: 25 A)
- **Applied parts:** 10 configurable connections (4 mm sockets)
- Connections for 2nd test probe and voltage measurement
- **Test sequences per IEC 62353** and IEC 60601 (option KA01), and measurements via APP sockets
- **Single fault conditions** – adjustable, with and without mains and applied part
- **Test conditions** – adjustable, data entry via **touchscreen**
- **Database functions** permit the creation of a complete test structure with customer or device views

Including SECUTEST DB+ database expansions

- **Remote control** possible from PC (**IZYTRONIQ**)
- **Additional database elements:** property, building, floor and room – in order to better be able to structure comprehensive data – plus additional department and cost center fields
- Multi-print – **print-out of several/all test reports** (to a connected Z721S thermal printer) which are available for a device under test by pressing just one key
- Create user-defined **report templates** and manage them in the **SECULIFE ST PRO** – including company logo
- **Export** of all data (master data and measured values) as file to USB flash drive
- **Import** of all test object master data (no measured values) from **IZYTRONIQ** or from a USB flash drive to the **SECULIFE ST PRO**
- Create **user-defined test sequences** in **IZYTRONIQ** and upload them to the **SECULIFE ST PRO**

Including SECUTEST DB COMFORT database expansions

- New **"medical" database object** – device with extended entry options
- Searches started with the **"Search All" softkey** now search the new "UDI" field (unique device identification) at medical devices as well.
- **User-defined test sequences** – the number of user-defined sequences has been increased to 24.
- **Move** test objects – "moving" of (medical) devices within the tree can be initiated by pressing and holding the respective element in the tree display.
- **Touch-edit** – "editing" of a (medical) device can be started by pressing and holding the respective element of the detail display in the main window.
- **Auto-store** – the auto-store function can be activated in the setup menu so that the results of automatic testing are saved immediately under the selected test object.
- **Push-print** – a PC connected to the test instrument can cause the **SECULIFE ST PRO** to enter an operating mode in which data are transmitted directly to the connected PC instead of being stored at the tester.
- **Quick edit** – the quick edit option can be activated when entering a new test object so that all other fields can be filled out immediately after entering the ID number.
- New **test interval** database field (also for synchronization with **IZYTRONIQ**)

SECULIFE ST PRO

Test Instrument for Measuring the Electrical Safety of Medical Devices

Overview, Test Instrument's Scope of Functions

Switch Position		Measuring Functions Test Current/Voltage	Measurement Type Connection Type
Single measurements, *rotary switch level: green*			
RPE	R_{PE}	**Protective conductor resistance**	PE(TS) - P1 passive PE(TS) - P1 (TS to) PE(mains) - P1 [6] PE(mains) - P1 clamp [2, 6] P1–P2 [3]
	I_P	Test current 200 mA Test current 10 A [1] (feature G01) Test current 25 A [1] (feature G02)	
RINS	R_{ISO}	**Insulation resistance** (PC I/PC II)	LN(TS) - PE(TS) LN(TS) - P1 P1–P2 [3] PE(mains) - P1 PE(TS) - P1 LN(TS) - P1//PE(TS) LN(TS) - APP PE(mains) - APP PE(TS) - APP P1//PE(TS) - APP P2 - APP
	U_{INS}	Test voltage	
IPE	$I_{PE\sim}$	**Protective conductor current, TRMS**	Direct Differential Alternative AT3-Adapter [2] Clamp [2]
	$I_{PE\sim}$	AC component	
	$I_{PE=}$	DC component	
	U_{LPE}	Test voltage	
	U_{Gen}	Reference voltage (alternative)	
IT	$I_{T\sim}$	**Touch current, TRMS**	Direct P1 Differential P1 Alternative P1 Perm. conn. P1 Alternative P1–P2
	$I_{T\sim}$	AC component	
	$I_{T=}$	DC component	
	U_{LPE}	Test voltage	
	U_{Gen}	Reference voltage (alternative)	
IE	$I_{E\sim}$	**Device leakage current, RMS**	Direct Differential Alternative AT3-Adapter [2] Clamp [2]
	$I_{E\sim}$	AC component	
	$I_{E=}$	DC component	
	U_{LPE}	Test voltage	
	U_{Gen}	Reference voltage (alternative)	
IA	$I_{A\sim}$	**Leakage current from the applied part RMS**	Direct P1 Direct APP Alternative P1 Alternative APP Perm. conn. P1 Perm. con. APP APP - P2 [7]
	U_{LPE} U_{Gen}	Test voltage Voltage at applied part	
IP	$I_{P\sim}$	**Patient leakage current, RMS**	Direct P1 Direct APP Perm. conn. P1 Permanent connection APP
	$I_{P\sim}$	AC component	
	$I_{P=}$	DC component	
	U_{LPE}	Test voltage	
IPA	$I_{PA\sim}$	**Patient leakage current, TRMS**	Direct APP Permanent connection APP
	$I_{PA\sim}$	AC component	
	$I_{PA=}$	DC component	
	U_{LPE}	Test voltage	
U	$U_{\sim}$	**Probe voltage, RMS**	PE–P1 PE–P1 (PD to *) * Polarity parameter
	$U_{\sim}$	AC component	
	$U_{=}$	DC component	
	$U_{\sim}$	**Measuring voltage, RMS** [2]	V – COM V – COM (PD to)
	$U_{\sim}$	AC component [2]	
	$U_{=}$	DC component [2]	
P	**Function test at the test socket**		Polarity parameter
	I	Current between L and N	
	U	Voltage between L and N	
	f	Frequency	
	P	Active power	
	S	Apparent power	
	PF	Power factor	

Switch Position	Measuring Functions Test Current/Voltage		Measurement Type Connection Type
Probe measuring functions			
EL1	Extension cord test with adapter: continuity, short-circuit, polarity (wire reversal[5])		EL1 adapter AT3-IIIE adapter VL2E adapter
EXTRA	Reserved for expansion during the course of software updates		
	t_A [4]	PRCD time to trip for 30 mA PRCDs	
	°C	Temperature measurement [2] with Pt100/Pt1000	V – COM
	IZ	Current clamp measurement [2] with current clamp sensor	V – COM

1 10/25 A-R_{PE} measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.
2 Voltage measuring inputs
3 Connection of a 2nd test probe for 2-pole measurement
4 Measurement of time to trip is not possible in IT systems.
5 No checking for reversed polarity takes place when the EL1 adapter is used.
6 Type of connection not available with feature G02

Key

Alternative	= alternative measurement (equivalent leakage current measurement)
Differential	= differential current measurement
Direct	= direct measurement
APP	= applied part
LN(TS)	= short-circuited L and N conductors at test socket
P1	= measurement with test probe P1
P1-P2	= 2-pole measurement with test probes P1 and P2
PE-P1	= measurement between PE and test probe P1
PE(TS)	= protective conductor at the test socket
PE(mains)	= protective conductor at the mains connection

Switch Position	Standard	Measurement type, connection type (* feature KA01)
Automated test sequences, *rotary switch level: orange*		
Preconfigured (freely adjustable) test sequences – default settings		
A1	**IEC 62353**	Passive, test socket, 1 group of BF APPs A-K, PCI
A2	**IEC 62353**	Passive, test socket, 1 group of BF APPs A-K, PCII
A3	**IEC 62353**	Passive, test socket, 1 group of BF APPs A-K, PCI + II
A4	**IEC 62353**	Active, automatic detection, 1 group of BF APPs A-K, PCI
A5	**IEC 62353**	Active, automatic detection, 1 of group of BF APPs A-K, PCII
A6	**IEC 62353**	Active, automatic detection, 1 group of BF APPs A-K, PCI + II
A7 *	**IEC 60601 3. A.**	Active, automatic detection, 1 group BF APPs A-K, PCI
A8 *	**IEC 60601 3. A.**	Active, automatic detection, 1 of group of BF APPs A-K, PCII
A9 *	**IEC 60601 3rd edition**	Active, automatic detection, 1 group BF APPs A-E, PCI + II Active, automatic detection, 1 group CF APPs F-K, PCI + II

Antimicrobial Properties

The instrument has been equipped with antimicrobial properties. This is intended to impede the growth of germs, counteract microbial colonization and destroy microorganisms.

Display with Selectable Language

The display panel consists of a backlit, color multi-display at which menus, setting options, measurement results, instructions and error messages, as well schematic and wiring diagrams appear.

The display and user prompting can be set to the desired language depending on the country in which the test instrument is used.

Data Entry

Data can be entered, for example, via a barcode reader, an RFID scanner or a USB keyboard connected to the USB port, or via the softkey keyboard when it appears at the display. The touchscreen

permits convenient entry of data and comments, and menu-driven operation is still possible via the softkeys.

Creating a Database

A complete test structure with data regarding customer buildings, floors, rooms and test objects can be created in the test instrument. This structure makes it possible to assign single measurements or test sequences to devices under test belonging to various customers. Manual single measurements can be grouped together into a so-called “manual sequence”.
In the case of the test instrument with database expansion, a test structure can be created at the PC with the help of **IZYTRONIQ** software and subsequently transferred to the test instrument.

Data Interfaces

Structures set up in, and measurement data saved to the test instrument can be imported to **IZYTRONIQ** report generating software via the USB slave port. Data can then be archived at the PC, comments can be added with the software and reports can be generated.
The following input and output devices can be connected to the two integrated USB master ports:

- External keyboard as well as barcode or RFID reader
- USB flash drive for data backup, import, export and reports
- Printer

Software Updates

The test instrument can always be kept current thanks to firmware which can be updated via the USB slave port.

Report Generating Functions

All of the values required for approval reports or device logbooks for electrical devices (e.g. per ZVEH) can be measured with this test instrument. All measured data can be documented and archived thanks to the measurement and test report that can be printed with a thermal printer which has been connected to the USB port, or stored to a PC.

Automatic Detection of Measuring Point Changes

During protective conductor measurement, the test instrument recognizes whether or not the test probe is in contact with the protective conductor, which is indicated by means of two different acoustic signals. This function is very useful where several protective conductor connections need to be tested.

Mains Connection Analysis

Line voltage and frequency are measured and compared with the data specified in Setup. Momentary voltage or nominal voltage in accordance with the standard is required, for instance in order to calculate measured values for the leakage current measurement.

Automatic Detection 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 at the instrument	Press **START**/STOP key U > 25 V key → PE: < 1 MΩ [2]	All measurements disabled
Protective conductor PE and phase conductor L reversed and/or neutral conductor N interrupted		Voltage at PE > 100 V	Not possible (no supply power)
Line voltage < 180 V / < 90 V (depending on mains)		U_{L-N} < 180 V U_{L-N} < 90 V	Conditionally possible [1]
Test for IT/TN system	Display at the instrument	Connection N → PE > 20 kΩ	Possible under certain circumstances

[1] 10 A/25 A-R_{PE} measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.
[2] If the user of the test instrument is too well insulated, the following error message may appear: “Interference voltage to PE”

Analysis of Connection and Condition of the DUT

Depending on the measurement or how the DUT is connected, the following conditions are checked and displayed before measurement.

Test Function		Condition
Short-circuit test L–N	Short-circuit / DUT starting current	R ≤ 2.5 Ω [2]
	No short-circuit (AC test)	R > 2.5 Ω [2]
Open-circuit voltage U_0 4.3 V, short-circuit current I_K < 250 mA		
Short-circuit test LN–PE	Short-circuit	R ≤ 2 kΩ
	No short-circuit (AC test)	R > 2 kΩ
Open-circuit voltage U_0 230 V AC, short-circuit current I_K < 1.5 mA		
On test	On (DUT passive)	R < 250 kΩ
	Off (DUT active)	R > 300 kΩ
Open-circuit voltage U_0 230 V AC, short-circuit current I_K < 1.5 mA		
Special test	No probe	R > 2 MΩ
	Probe detected	R < 500 kΩ
Protection category detection (only with country-specific version [1])		
	Protective conductor found: PC I	R < 1 Ω
	No protective conductor: PC II	R > 10 Ω
Safety shutdown [1]		
Triggered at following residual current value (selectable)		> 10 mA / > 30 mA
Triggered at following probe current value During leakage current measurement		
	During protective conductor resistance measurement	> 250 mA
Connection test (only with country-specific version [1])		
Checks whether the DUT is connected to the test socket.		
	DUT power cable found	R < 1 Ω
	No DUT power cable	R > 10 Ω
Insulation test	DUT set up in a well-insulated fashion	R ≥ 500 kΩ
	DUT set up in a poorly insulated fashion	R < 500 kΩ
PE_{Mains} – PE_{Socket}: Open-circuit voltage U_0 50 V DC, I_K < 2 mA		
Overcurrent protection		
Shutdown in the event of a continuous flow of current via the test socket: Our **SECUTEST BASE10/PRO, SECULIFE ST BASE(25) and SECULIFE ST PRO** test instruments permit active testing of devices with 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. In the case of test objects 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.		I > 16.5 A

[1] Applies to M7050 with feature B00, B09

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Test Instrument for Measuring the Electrical Safety of Medical Devices

Applications

Regulations and standards in accordance with which the test instrument is manufactured and tested:

DIN EN 61010-1 **VDE 0411-1**	Safety requirements for electrical equipment for measurement, control and laboratory use – general requirements
DIN EN 62353 **DIN VDE 0751-1**	Medical electrical equipment – Recurrent test and test after repair of medical electrical equipment
DIN EN 60529/ **VDE 0470-1**	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)
DIN EN 61326-1 **VDE 0843-20-1**	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
DIN EN 61326-2-2 **VDE 0843-20-2-2**	Part 2-2: Particular requirements – Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems
IEC 61557-16 **DIN EN 61557-16** **VDE 0413-16**	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 – Part 16: Devices for testing the effectiveness of protective measures of electrical devices and/or electrical medical devices

Scope of Delivery

Standard Version (country-specific)

1 Test instrument
1 Mains power cable
1 Test probe, 2 m, not coiled
1 USB cable, USB A to USB B, 1.0 m long
1 Plug-on alligator clip
1 KS17-ONE cable set for voltage measuring inputs
1 Calibration certificate
1 Set of condensed operating instructions
1 Set of comprehensive operating instructions on the Internet for download from www.gossenmetrawatt.com
1 Card with registration key for **IZYTRONIQ BUSINESS Starter** software

IZYTRONIQ is newly developed test software with which the entire testing scenario can be visualized, managed and documented in an audit-proof, instrument-independent fashion. And thus for the first time ever, measurement and test data from various test instruments and multimeters can be combined into a single test and documented. Intuitive operation and a modern look assure quick access to all functions.

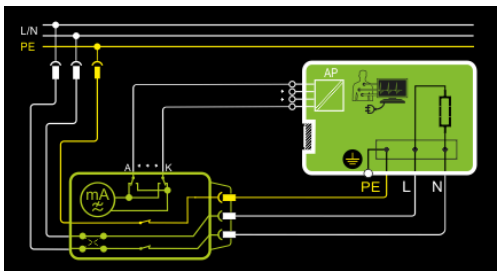
The software is available on different scales and in different versions for the commercial trades, for industry and for training applications.

Backlit Multi-Display Samples

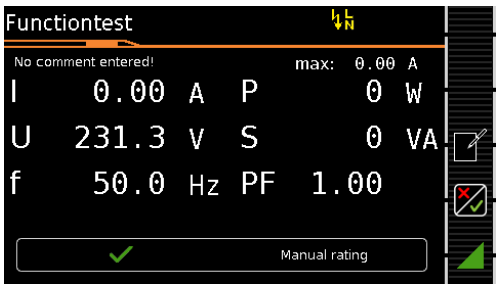
Single Test – Initial Screen with Parameters Display



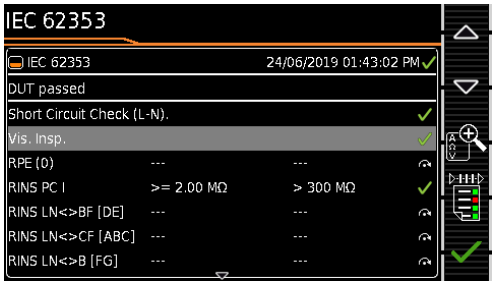
Help – Schematic and Wiring Diagram



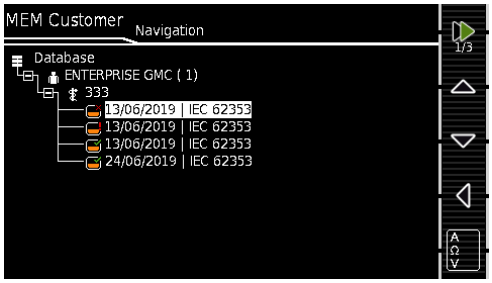
Test Function for Test Step in the Test Sequence



Results of a Test Sequence per IEC 62353



Database Structure – List of Test Results



Characteristic Values

Function	Measured Quantity	Display Range / Nominal Range of Use	Resolution	Nominal Voltage U_N	Open-Circuit Voltage U_0	Nominal Current I_N	Short-Circuit Current I_K	Internal Resistance R_I	Reference Resistance R_{REF}	Measuring Uncertainty	Intrinsic Error	Overload Capacity Value	Overload Capacity Time
Tests, 62638 (DIN VDE 0701-0702) / IEC 62353 (VDE 0751)	Protective conductor resistance [12] **RPE**	1 … 999 mΩ	1 mΩ	—	< 24 V AC or DC	—	> 200 mA AC / DC	—	—	±(15% rdg.+ 10 d) > 10 d > 10.0 Ω : ±(10% rdg.+ 10 d)	±(10% rdg.+ 10 d) > 10 d	264 V 250 mA / 16 A AC [5]	Cont.
		1.00 ... 9.99 Ω	10 mΩ										
		10.0 … 27.0 Ω	100 mΩ				> 35 A AC [11]					> 42 A AC [11]	15 s
	Insulation resistance [9] **RISO**	10 … 999 kΩ	1 kΩ	50 … 500 V DC	1.0 • U_N … 1.5 • U_N	> 1 mA	< 2 mA	—	—	±(5% rdg.+ 4 d) > 10 d ≥ 20 MΩ : ±(10% rdg.+ 8 d)	±(2.5% rdg.+2 d) > 10 d ≥ 20 MΩ : ±(5% rdg.+4 d)	264 V	Cont.
		1.00 … 9.99 MΩ	10 kΩ										
		10.0 … 99.9 MΩ	100 kΩ										
		100 … 300 MΩ	1 MΩ										
	Leakage current, alternative measurement [2] **IPE, IT, IE, IA**	0 ... 99 µA	1 µA	—	50 ... 250 V~ – 20/+10%	—	< 1.5 mA	> 150 kΩ	1 kΩ ±10 Ω	±(5% rdg.+ 4 d) > 10 d > 15 mA: ±(10% rdg.+ 8 d)	±(2% rdg.+2 d) > 10 d > 15 mA: ±(5% rdg.+ 4 d)	264 V	Cont.
		100 ... 999 µA	1 µA										
		1.00 ... 9.99 mA	10 µA										
		10.0 ... 30.0 mA	100 µA										
	Leakage current, direct measurement [3] **IPE, IT, IE, IA, IP, IPA**	only IP, IPA: 0.0 ... 99.9 µA	100 nA	—	—	—	—	1 kΩ ±10 Ω	1 kΩ	±(5% rdg.+ 10 d) > 10 d	±(2.5% rdg. + 5 d) > 10 d	264 V	Cont.
		0 ... 99 µA	1 µA							±(5% rdg.+ 4 d) > 10 d	±(2.5% rdg.+ 2 d) > 10 d		
		100 ... 999 µA	1 µA										
		1.00 ... 9.99 mA	10 µA										
		10.0 ... 30.0 mA	100 µA										
	Leakage current, differential current measurement [4] **IPE, IT, IE**	0 ... 99 µA	1 µA	—	—	—	—	—	—	±(5% rdg.+ 10 d) > 10 d	±(2.5% rdg.+2 d) > 10 d	264 V	Cont.
		100 ... 999 µA	1 µA							±(5% rdg.+ 4 d)			
		1.00 ... 9.99 mA	10 µA										
		10.0 ... 30.0 mA	100 µA										
Function test at test socket	Line voltage $U_{L–N}$ [10]	100.0 … 240.0 V~	0.1 V	—	—	—	—	—	—	—	±(2 % rdg.+2 d)	264 V	Cont.
	Load current I_L	0 ... 16.00 A_{RMS}	10 mA	—	—	—	—	—	—	—	±(2 % rdg.+2 d)	16 A	Cont.
	Active power P	0 ... 3700 W	1 W	—	—	—	—	—	—	—	±(5 % rdg.+10 d) > 20 d	264 V	Cont.
												20 A	10 min.
	Apparent power S	0 ... 4000 VA	1 VA	Calculated value, $U_{L–N}$ • I_V							±(5 % rdg.+10 d) > 20 d	264 V	Cont.
	Power factor PF with sinusoidal waveform: cosφ	0.00 ... 1.00	0.01	Calculated value, P / S, display > 10 W							±(10% rdg.+5 d)	264 V	Cont.
	Line frequency f	0 ... 420.0 Hz	0.1 Hz	—	—	—	—	—	—	—	±(2 % rdg.+2 d)	264 V	Cont.
t_A PRCD	Time to Trip	0.1 ... 999 ms	0.1 ms	—	—	30 mA	—	—	—	±5 ms	—	264 V	Cont.
Voltage measurement	Probe voltage (probe P1 to PE) ⎓, ∼ and ⎓∼	0.0 ... 99.9 V	100 mV	—	—	—	—	3 MΩ	—	—	±(2 % rdg.+2 d)	264 V	Cont.
		100 ... 264 V											
	Measuring voltage (V–COM sockets ⎓, ∼ and ⎓∼)	0.0 ... 99.9 V	100 mV					1 MΩ			±(2% rdg.+2 d) > 45 Hz ... 65 Hz ±(2% rdg.+5 d) > 65 Hz ... 10 kHz ±(5% rdg.+5 d) > 10 kHz ... 20 kHz	300 V ⎓, ∼ and ⎓∼	
		100 ... 300 V	1 V										
$I_{Leakage}$	Leakage current via AT3-IIIE adapter Z745S [8]	0.00 ... 0.99 mA ∼	0.01 mA	—	—	—	—	—	—	—	±(2% rdg.+2 d) > 10 d without adapter	253 V	Cont.
		1.0 ... 9.9 mA ∼	0.1 mA										
		10 ... 20 mA ∼	1 mA										
Temp	Temperature with Pt100 sensor	- 200.0 ... +850.0 °C	0.1 °C	—	< 20 V –		1.1 mA	—	—	—	±(2% rdg.+1 °C)	10 V	Cont.
	Temperature with Pt1000 sensor	- 150.0 ... +850.0 °C											

Function	Measured Quantity	Display Range / Nominal Range of Use	Resolution	Nominal Voltage U_N	Open-Circuit Voltage U_0	Nominal Current I_N	Short-Circuit Current I_K	Internal Resistance R_I	Reference Resistance R_{REF}	Measuring Uncertainty	Intrinsic Error	Overload Capacity	
												Value	Time
I_{Clamp}	Current via current clamp sensor [1 mV : 1 mA] (V–COM sockets [6, 7])	1 ... 99 mA ∼	1 mA (1 mV)	—	—	—	—	—	—	—	±(2% rdg.+2 d) > 10 d 20 Hz ... 20 kHz without clamp	253 V	Cont.
		0.1 ... 0.99 A ∼	0.01 A (10 mV)										
		1.0 ... 9.9 A ∼	0.1 A (100 mV)										
		10 ... 300 A ∼	1 A (1 V)										
	Current via current clamp sensor [10 mV : 1 mA] (V–COM sockets [6, 7])	0.1 ... 9.9 mA ∼	0.1 mA (1 mV)	—	—	—	—	—	—	—			
		10 ... 99 mA ∼	1 mA (10 mV)										
		0.10 ... 0.99 A ∼	0.01 A (100 mV)										
		1.0 ... 30.0 A ∼	0.1 A (1 V)										
	Current via current clamp sensor [100 mV : 1 mA] (V–COM sockets [6, 7])	0.01 ... 0.99 mA ∼	0.01 mA (1 mV)	—	—	—	—	—	—	—			
		1.0 ... 9.9 mA ∼	0.1 mA (10 mV)										
		10 ... 99 mA ∼	1 mA (100 mV)										
		0.10 ... 3.00 A ∼	0.01 A (1 V)										
	Current via current clamp sensor [1000 mV : 1 mA] (V–COM sockets [6, 7])	1 ... 99 µA ∼	1 µA (1 mV)	—	—	—	—	—	—	—			
		0.10 ... 0.99 mA ∼	0.01 mA (10 mV)										
		1.0 ... 9.9 mA ∼	0.1 mA (100 mV)										
		10 ... 300 mA ∼	1 mA (1 V)										

[2] Known as equivalent leakage current or equivalent patient leakage current from previous standards
[3] Protective conductor current, touch current, device leakage current, patient leakage current
[4] Protective conductor current, touch current, device leakage current
[5] Only with feature G01
[6] Only with feature I01
[7] Measurement types IPE_clamp and IG_clamp
[8] Measurement types IPE_AT3 adapter and IG_AT3 adapter
[9] The upper range limit depends on the selected test voltage.
[10] Voltage at the test socket may be lower than measured line voltage due to components which limit inrush current.
[11] Only with feature G02
[12] Specifications for measurement type PE(mains) – P1 after offset balancing

Key: rdg. = reading (measured value), d = digit(s)

Test Times, Automated Sequence

Test times ("measurement duration" parameter) can be set separately for each rotary switch position during configuration of the sequence parameters. Test times are neither tested nor calibrated.

Emergency Shutdown During Leakage Current Measurement

As of 10 mA of differential current (can also be set to 30 mA), automatic shutdown ensues within 500 ms. This shutdown does not take place during leakage current measurement with clamp meter or adapter.

Reference Ranges

Line voltage	230 V AC ±0.2%
Line frequency	50 Hz ±2 Hz
Waveform	
Sine (deviation between RMS and rectified value < 0.5%)	
Ambient temperature	+23 °C ±2 K
Relative humidity	40 … 60%
Load resistance	Linear

Nominal Ranges of Use

Nominal line voltage	100 V … 240 V AC
Nominal line frequency	50 Hz ... 400 Hz
Line voltage waveform	Sinusoidal
Temperature	0 °C … + 40 °C

Ambient Conditions

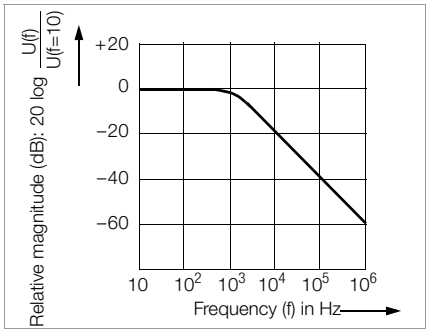
Storage temperature	- 20 °C … + 60 °C
Relative humidity	Max. 75%, no condensation allowed
Elevation	Max. 2000 m
Place of use	Indoors, except within specified ambient conditions

Test Instrument for Measuring the Electrical Safety of Medical Devices

Influencing Quantities and Influence Error

Short form designation	Influencing Quantity	RPE	RINS	IPE, IT, IE, IA Leakage Current, Alternative Measurement	IPE, IT, IE, IA, IP, IPA Leakage Current, Direct Measurement	IPE, IT, IE Leakage Current, Differential Current Measurement
A	Intrinsic Uncertainty	±(10% rdg. +10 d) > 10 d	±(2.5% rdg. +2 d) > 10 d ≥ 20 MΩ: ±(5% rdg. + 4 d)	±(2% rdg. + 2 d) > 10 d > 15 mA: ±(5% rdg. + 4 d)	±(2.5% rdg. +2 d) > 10 d	±(2.5% rdg. + 2 d) > 10 d
E1	Reference position ±90°	0%	0%	0%	0%	0%
E2	Supply voltage	2.5%	2.5%	2.5%	2.5%	2.5%
E3	Temperature 0 °C ... +40 °C	2.5%	2.5%	2.5%	2.5%	2.5%
E9	Mains harmonics				1%	1%
E11	Low frequency magnetic fields	2.5%	2.5%	2.5%	2.5%	2.5%
I12	Load current [A]					2.5%

Frequency response in accordance with the figure to the right is taken into consideration for all leakage current measurements (**IPE**, **IT**, **IE**, **IA, IP, IPA**) (direct, differential, alternative).



Power Supply

Supply network	TN, TT or IT
Line voltage	100 ... 240 V AC
Line frequency	50 ... 400 Hz
Power consumption	200 mA test: approx. 32 VA 10 A test: approx. 105 VA 25 A test: approx. 280 VA
Mains to test socket (e.g. for function test)	Continuous max. 3600 VA, power is conducted through the instrument only, switching capacity: ≤ 16 A, ohmic load, the AT3-IIS32 adapter (Z745X), for example, can be used for current > 16 A AC

USB Data Port

Type	USB slave for PC connection
Type	2 ea. USB master for data input devices * with HID boot interface for USB flash drive for data backup, for USB flash drive for saving reports as BMP files, for printer *

* See following page for compatible devices

In the remote operating mode, the test instrument can be controlled via the USB slave data interface.

Bluetooth® data interface 2.1 + EDR (feature M01)

Electrical Safety

Protection category	I per IEC 61010-1/EN 61010-1/ VDE 0411-1
Nominal voltage	230 V
Test voltage	2.3 kV AC 50 Hz or 3.3 kV DC (mains circuit / test socket to mains PE terminal, USB, finger contact, probe(s), APP sockets, test socket)
Measuring category	250 V CAT II
Pollution degree	2
Safety shutdown	At DUT differential current of > 10 mA, shutdown time: < 500 ms, can also be set to > 30 mA with following probe current during: – Leakage current measurement: > 10 mA~/< 500 ms – Protective conductor resistance measurement: > 250 mA~/< 1 ms with continuous flow of current I > 16.5 A
Fuse links	Mains fuses: 2 ea. FF 500V/16A Probe fuse: M 250V/250mA **Feature G01:** 10 A RPE test current: 1 ea. FF 500V/16A **Feature J01:** Applied parts: 2 ea. M 250V/250mA

Electromagnetic Compatibility

Product standard	DIN EN 61326-1:2013 DIN EN 61326 -2-2: 2013

Interference Emission		Class
EN 55011		B
IEC 61000-3-2		B
IEC 61000-3-3		B
Interference Immunity	**Test Value ***	**Evaluation Criterion**
EN 61000-4-2	Contact/atmos. – 4 kV/8 kV	B
EN 61000-4-3	10 V/m (80 MHz ... 1 GHz)	A
EN 61000-4-4	Mains connection – 2 kV	B
EN 61000-4-5	Mains connection – 1 kV (LN), 2 kV (LPE)	B
EN 61000-4-6	Mains connection – 3 V	A
EN 61000-4-8	30 A/m	A
EN 61000-4-11	0%: 1 period	B
	0%: 250/300 periods	C
	40%: 10/12 periods	C
	70%: 25/30 periods	C

Mechanical Design

Display	4.3" color display (9.7 x 5.5 cm) backlit, 480 x 272 pixels at 24-bit color depth (true color)
Touchscreen	Touch controlled user interface
Dimensions	W x H x D: 295 x 145 x 150 mm Height with handle: 170 mm
Weight	Feature G00/G01: approx. 2.5 kg Feature G02: approx. 4 kg
Protection	Housing: IP 40 Test socket: IP 20 Applied parts: IP 20 per DIN VDE 0470, part 1 / EN 60529 Housing with antimicrobial properties per JIS standard Z 2801:2000

Test Instrument for Measuring the Electrical Safety of Medical Devices

Accessories (not included)

Z751A Barcode Reader

For connection to the USB master port at the test instrument, and for reading in barcodes. This makes it possible to conveniently insert the ID numbers of DUTs into single measurements and test sequences.

This device is based on the concept of an instinctive scanning distance and provides best possible reading performance. Green Spot technology provides “good-read” projection directly on the code. The device is equipped with a USB port



Z721E Barcode Printer

For connection to the USB master port at the test instrument, and for printing out test reports.

Encoding: Code39, Code128, EAN13, Text, QR Code *, Micro QR Code, DataMatrix, Aztec

* QR Code is a registered trademark of DENSO WAVE INCORPORATED



Z721S Thermal Printer

For connection to the USB master port at the test instrument, and for printing out test reports.



SCANBASE RFID (Z751E) (RFID read/write)

Compact reading and writing device with a USB port for programming and reading 13.56 MHz transponders in accordance with ISO15693.

RFID tags can also be written directly from the test instrument with the program.



CEE Adapter for Testing Single and 3-Phase Electrical Devices (Z745A)

The Z745A CEE adapter allows for quick and efficient testing of devices equipped with a CEE plug. The adapter is equipped with the following CEE flush-type socket outlets: 5-pole 16 A, 5-pole 32 A and 3-pole 16 A. Furthermore, the adapter includes five 4 mm safety sockets to which 3-phase devices without permanently attached plug or conventional measurement cables can be connected, e.g. by means of quick clamp terminals (not included).

The following tests can be performed on devices with CEE plugs with the help of the CEE adapter:

- Testing of protective conductor continuity
- Insulation resistance, alternative leakage current (equivalent leakage current)
- Function test (3-pole CEE outlet only)

The Z745A CEE adapter may also be used as an adapter for connecting devices with 3-pole CEE plugs to common earthing contact outlets.

VL2 E (Z745W)

Test adapter with single and 3-phase plug connectors up to CEE 32A



AT16-DI 3-Phase 16 A Differential Current Adapter (Z750A)

Devices which are equipped with a 5-pole, 16 A / 6 h CEE plug can be quickly and efficiently tested with the AT16-DI CEE adapter.

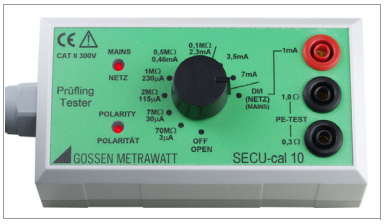
The following tests can be performed on devices with CEE plugs with the help of the AT16-DI CEE adapter:



- Testing of protective conductor continuity
- Insulation resistance, alternative leakage current (equivalent leakage current)
- Measurement of protective conductor resistance with the following methods: equivalent leakage current / differential current / direct
- Function test

This differential current adapter is also available in a variant with a 5-pole 32 A / 6 h CEE plug with the designation AT32-DI CEE adapter.

SECU-cal 10 Calibration Adapter (Z715A)



The calibration adapter is used for testing the measuring uncertainty of test instruments in accordance with DIN VDE 0701-0702 / IEC 62353 (VDE 0751). As a rule, these instruments must be tested once each year as set forth by DGUV Regulation 3 (accident prevention regulation, previously BGV A3), as well as for certification in accordance with the ISO 9000 quality standard.

All limit values for the required tests per DIN VDE, as well as protective conductor resistance, insulation resistance, equivalent leakage current, differential and/or touch as well as housing leakage current, must be tested.

EL1 Adapter for Testing Single-Phase Extension Cables (Z723A)



AT3-III-E Three-Phase Adapter (Z745S)



Test adapter for active and passive testing of single and 3-phase electric devices, as well as extension cords, in combination with SECUTEST.../SECULIFE test instruments.

Operation is simple and safe. The test adapter is connected to a 3-phase 16 A mains outlet, and to the respective test instrument. Testing is performed without reversing polarity at the device under test, either automatically or manually, and is controlled by the test sequence of the utilized test instrument. Safety shutdown occurs if the preset residual current value is exceeded.

SECULIFE ST PRO

Test Instrument for Measuring the Electrical Safety of Medical Devices

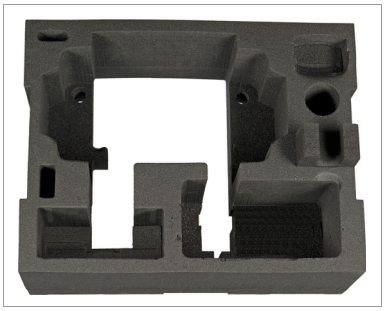
SORTIMO L-BOXX (Z503D)

Plastic system case, outside dimensions:
W x H x D
450 x 255 x 355 mm

Z701D foam insert for test instrument and accessories must be ordered separately, see below.



Foam Insert for SORTIMO L-BOXX (Z701D)



F2000 Universal Carrying Pouch (Z700D)



Outside dimensions:
W x H x D
380 x 310 x 200 mm
(without buckles, handle and carrying strap)

F2010 Universal Carrying Pouch (Z700G)



Outside dimensions:
W x H x D
380 x 230 x 270 mm
(without carrying strap)

F2020 Universal Carrying Pouch (Z700F)



Outside dimensions:
W x H x D
430 x 310 x 300 mm
(without buckles, handle and carrying strap)

Sample Content

List of Order Features

Device Variants			SECULIFE ST PRO (M7050 A01 AA13 E01 G01 H01 I01 J01 KB01 KD01 M00)
	Article Number, Basic Instrument		**M7050**
		Article Number / Feature	**AA13**
Connections – Country-Specific Mains Plug and Test Socket			
	Germany with detection of connection and protection category	**B00**	–.–
	UK	**B01**	–.–
	FR/CZ/PL	**B03**	–.–
	China	**B04**	–.–
	USA	**B05**	–.–
	Off	**B06**	–.–
	DK	**B07**	–.–
	IT	**B08**	–.–
	CH with detection of connection and protection category	**B09**	–.–
User interface language (can be subsequently changed to any of the other languages listed below)			
	German	**C00**	–.–
	English	**C01**	–.–
	French	**C02**	–.–
	Italian	**C03**	–.–
	Spanish	**C04**	–.–
	Czech	**C05**	–.–
	Dutch	**C06**	–.–
	Polish	**C07**	–.–
Data entry via touchscreen			
	None	**E00**	
	Included	**E01**	✔
R-PE test current for protective conductor measurement			
	200 mA	**G00**	
	200 mA and 10 A [1] (not in combination with G02)	**G01**	✔
	200 mA and 25 A	**G02**	
Connection of a 2nd test probe			
	None	**H00**	
	Included	**H01**	✔
DVM function (digital voltmeter) with 2 additional measurement inputs, COM–V			
	None	**I00**	
	Included	**I01**	✔
Connection for applied parts			
	None	**J00**	
	Included	**J01**	✔
Additional test sequences			
	None	**KA00**	
	IEC 60601	**KA01**	✔
Database expansion	None	**KB00**	
	Included (corresponds to Z853R – SECUTEST DB+)	**KB01**	✔
Database Comfort	None	**KD00**	
	Included (corresponds to Z853S – SECUTEST DB COMFORT)	**KD01**	✔
Bluetooth	None	**M00**	✔
	Included	**M01**	
DAkkS calibration certificate (language combinations)			
	In D/GB/F	**P00**	
	In D/GB/PL	**P01**	
	In D/GB/IT	**P02**	
DAkkS calibration certificate (recalibration)			
		Key: ✔ preset	

[1] 10 A/25 A-R_{PE} measurements are only possible with line voltages of 115/230 V and line frequencies of 50/60 Hz.

Sample order SECULIFE ST PRO with English user interface:
M7050 AA13 C01 **E01** (Highlighted features the table – in this case in boldface with gray background in – belong to the fixed basic equipment of the **SECULIFE ST PRO**, and other features can be selected as desired.)

AA13: device variant **SECULIFE ST PRO**, C01: user interface, keyboard layout and test sequences in English, G01: R-PE test current for protective conductor measurement: 200 mA and 10 A

SECULIFE ST PRO

Test Instrument for Measuring the Electrical Safety of Medical Devices

Order Information for Accessories

Designation	Type	Article No.
Mains cable		
Cable set for connecting test instruments to the mains without using a an earthing contact outlet, and for connecting DUTs. Consists of coupling socket with 3 permanently connected cables, 3 measurement cables, 3 plug-on pick-off clips and 2 plug-on test probes	KS13	GTY3624065P01
Adapter for testing 3-phase current consumers		
Adapter for connecting DUTs: 3-pole 16 A, 5-pole 16 A + 32 A, 5 ea. 4 mm socket – For all tests without mains voltage for single and 3-phase electrical devices – For leakage current measurement per direct or differential current method	CEE adapter	Z745A
3-phase 16 A/32 A adapter (test case) – For all tests without mains voltage for single and 3-phase electrical devices – For tests at single and 3-phase extension cords – For leakage current measurements with direct method – For leakage current measurements with differential current method	AT3-III-E [D]	Z745S
Test adapter for testing devices with CEE16 and CEE32 connectors (max. 20 A load capacity)	AT3-IIS [D]	Z745T
Same as AT3-II-S but with 32 A load capacity	AT3-II S32 [D]	Z745X
3-phase 16 A differential current adapter	AT16-DI	Z750A
3-phase 32 A differential current adapter	AT32-DI	Z750B
Test adapter with single and 3-phase plug connectors up to CEE 32A – For all tests without mains voltage for single and 3-phase electrical devices – For tests at single and 3-phase extension cords	VL2E	Z745W
Adapter cable, red CEE 5-pole 16 A plug to red CEE 5-pole 32 A coupling, 0.5 m, 5 x 1.5 sq. mm	CEE16/CEE32 adapter cable	Z750F
Adapter for testing single-phase extension cords		
Adapter for testing single-phase extension cords including earth contact and inlet plug inserts	EL1	Z723A
Plug insert for using the EL1 adapter in Switzerland	PRO-CH	GTZ3225000R0001
Calibration adapter		
Calibration adapter for test instruments per DIN VDE 0701-0702/IEC 62353 (VDE 0751) (max. 200 mA) **cannot be used for 10 A protective conductor test current**	SECU-cal 10	Z715A
Probe cables		
Probe cable with test probe and 2 m probe cable (not coiled), 300 V CAT II 16 A	PC2	Z745D
Probe cable with test probe and 2 m probe cable (coiled), 300 V CAT III 16 A	SK2W	Z745N
5 m probe cable for protective conductor measurement, 300 V CAT II 16 A	PC5	Z745O
Brush probe	Z745G	Z745G
Distributor for connecting five 4 mm and five 2 mm test probes for measuring multiple, accessible housing parts or applied parts	SV5	Z745J
Cable set (1 pair of measurement cables) 1.2 m, with VDE-GS mark, 600 V CAT IV 1 A [1], 1000 V CAT III 1 A [1] 1000 V CAT II 16 A [2] [1] With plugged-on safety caps [2] Without plugged-on safety caps	KS17-2	GTY3620034P0002
2 pieces in a plastic bag, diameter: 4 mm, length: 1.0 m, 1000 V CAT III, 19 A, blue	Measuring cable set, blue	Z746A
2 pieces in a plastic bag, diameter: 4 mm, length: 1.0 m, 1000 V CAT III, 19 A, black/red	Measuring cable set, black/red	Z746B
Current clamp sensors		
Leakage current clamp meter (current clamp sensor) for **SECUTEST PRO** and **SECULIFE ST PRO** 0.1 mA ... 25 mA AC, frequency range: 50 Hz …1 MHz, transformation ratio: 100 mV/mA, clamp opening: max. 40 mm cable dia.	SECUTEST CLIP	Z745H
Switchable current clamp sensor, 1 mA … 15 A and 1 A … 150 A, frequency range: 45...65 …500 Hz, transformation ratio: 1 mV/mA and 1 mV/A, clamp opening: max. 15 mm cable dia.	WZ12C [D]	Z219C
Leakage current clamp meter, 0.1 mA ... 25 mA, 100 mV/mA	SECUTEST CLIP [D]	Z745H
Temperature sensors		
Pt100 temperature sensor, -40 ... +500 °C for surface and immersion measurements	Z3409	GTZ3409000R0001
Pt1000 temperature sensor, class B for measurement in gases and liquids, -50 ... +220 °C	TF220	Z102A
Pt100 oven sensor, -50 ... +550 °C	TF550	GTZ3408000R0001
Dip-stick oil temperature sensor, Pt1000, class B, -50 to +500 °C, sensor: 3 mm dia. x 810 mm long	TF400CAR	Z102C
Pouches and cases		
Carrying pouch for **SECULIFE ST PRO**	F2000 [D]	Z700D
Large carrying pouch for test instrument sets	F2020	Z700F
Universal carrying pouch with flexible compartments and display protection for **SECULIFE ST PRO**	F2010	Z700G
Plastic system case	SORTIMO L-BOXX	Z503D
Foam insert for SORTIMO L-BOXX with compartment for **SECULIFE ST PRO**	Foam SORTIMO L-BOXX Secutest4	Z701D
Foam insert for SORTIMO L-BOXX GM with compartment for adapter	Foam SORTIMO L-BOXX adapter	Z701E

Designation	Type	Article No.
Report generating accessories		
RFID system		
RFID read/write for USB port (frequency: 13.56 MHz)	SCANBASE RFID	Z751E
RFID tags per ISO 15693, dia. approx. 22 mm, self-adhesive, 500 pcs.	Z751R	Z751R
RFID tag per ISO 15693, dia. approx. 30 mm, 2 mm thick with 3 mm hole, 500 pcs.	Z751S	Z751S
RFID tag per ISO 15693, pigeon ring, dia. approx. 7.5 mm, 250 pcs.	Z751T	Z751T
Barcode scanners		
Barcode scanner for USB connection	Z751A	Z751A
Barcode printer		
Barcode and label printer including software, with USB port for PC or test instrument Encoding: Code39, Code128, EAN13, Text, QR Code, Micro QR Code, DataMatrix, Aztec	Z721E	Z721E
Label set for Z721D barcode and label printer (qty. x width: 3 x 24 / 1 x 18 / 1 x 9 mm, 8 m long)	Z722D	Z722D
Label set for Z721D barcode and label printer (qty. x width: 5 x 18 mm, 8 m long)	Z722E	Z722E
Thermal printer		
Thermal printer for printing test reports, including user's manual on CD-ROM, lithium battery, power pack and mains cable, USB cable, 1 roll of thermal paper	Z721S	Z721S
Thermal paper for Z721S, 10 rolls of thermal paper, 12/50 mm dia., 30 m x 112 mm, outside coating	Z722S [D]	Z722S
See also separate data sheet for ID systems regarding RFID scanners, barcode readers and printers.		

[D] Data sheet available

For additional information regarding accessories please refer to:

- Measuring Instruments and Testers catalog
- www.gossenmetrawatt.com

SECU**LIFE** ST PRO

Test Instrument for Measuring the Electrical Safety of Medical Devices