GOSSEN METRAWATT

PRO*Fi*TEST®*C*
Test Instrument per DIN VDE 0100

3-349-075-03
16/6.12

QUALITY MANAGEMENT SYSTEM
DQS certified per
DIN EN ISO 9001

CE

Testing of Residual-Current Devices (RCDs)

- Measures contact voltage without tripping the RCCB. Contact voltage relative to nominal residual current is measured with $^1/_3$ nominal residual current.
- Trip test with nominal residual current and measurement of time to trip

Special Testing for Systems and RCCBs

- Testing for systems and RCCBs with rising residual, tripping current is displayed
- Testing for RCCBs (10, 30 mA and 100 mA) with 5 • $I_{\Delta N}$
- Tests RCCBs with half-waves in order to determine contact voltage and tripping current

Testing for Special RCCBs

- Selective S, type G

Measurement of line voltage and frequency, phase angle and sequence

Measurement of loop and earthing resistance

Special Features

- **Allowable fuse types are displayed for the system under test.**
- **Internal measurement value memory with 32 kB capacity stores up to 255 electrical circuits and up to 2000 measurement values.**
- **Data interface for the transmission of measurement values and for software updates**

Voltage and Frequency Ranges

The measuring device allows for use of the test instrument in all alternating and three phase current systems with voltages ranging from 170 to 253 V, and frequencies from 15 to 70 Hz.

Loop Impedance Measurement

Loop impedance measurement can be performed within a range of 170 to 253 V. Subsequent calculation of short-circuit current is based upon the respective line voltage, assuming that the measured line voltage is within the specified range. If line voltage is not within the specified range, short-circuit current is calculated based upon actual line voltage and measured impedance. RCCB tripping can be suppressed for the measurement of loop impedance with the PRO*Fi*TEST®DC-II accessory device.

Display

The LCD window consists of a backlit dot matrix which is used to display menus, configuration options and measurement results, as well as online help. Various user interface languages can be selected, depending upon the country in which the test instrument is used.

Operation

The instrument is very easy to operate. A multifunction key allows for one-handed operation when selecting menus and starting measurements. Basic functions and sub-functions are selected with the help of four softkeys. For systems with earthing contact outlets, the instrument is simply connected to the mains outlet with the test plug.

Phase Tester

Protective conductor potential is tested when the finger contact surface is touched. The PE signal lamp lights up if a potential difference of greater than 150 V is detected between the contact surface and the earthing contact at the test plug.

Battery Charge Level Indicator and Device Self-Test

A battery symbol in the main menu with 5 segments ranging from depleted to fully charged keeps the user continuously informed concerning battery charge level.
Test patterns can be queried one after the other in the self-test mode, and display LEDs and relays can be tested. The test instrument is switched off automatically if the batteries are depleted, and it includes a charge control circuit for safe charging of commercially available rechargeable NiMH or NiCd batteries.

Sturdy Housing for Rugged Use

Soft plastic jacketing protects the instrument against impacts, or if it is inadvertently dropped.

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Signal Lamps

The device recognizes errors in the electrical system automatically, which are indicated with four lamps, (see following table).

Lamp	Status	Meas. Function	Function
PE	lights up red	all	**Device on** and potential difference ≥ 100 V between finger contact and PE (earthing contact), frequency: f > 45 Hz
NETZ/ MAINS	lights up green	I_Δ / R_E / Z_{Loop}	3-pole connection: line voltage approx. 170 V to 253 V, measurement enabled
NETZ/ MAINS	blinks green	I_Δ / R_E / Z_{Loop}	2-pole connection (e.g. N conductor not connected): line voltage approx. 170 V to 253 V, measurement enabled
NETZ/ MAINS	blinks red	I_Δ / R_E / Z_{Loop}	Line voltage < approx. 170 V or > 253 V, measurement disabled
U_L	lights up red	I_Δ	– Contact voltage $U_{I\Delta N}$ or $U_{I\Delta}$ > 25 V or > 50 V – Safety shutdown has occurred.^
		R_E	– Limit value for R_E exceeded
RCD/FI	lights up red	I_Δ	The RCCB was not tripped, or was tripped too late during the trip test.

Data Interface

Measurement data can be read out to a printer or a PC via the integrated IRDA interface, providing the user with 3 advantages.

- Transmission of stored data to a PC for processing and archiving, or for the generation of official reports
- Immediate print-out of all measurement data (via adapter)

Software Updates

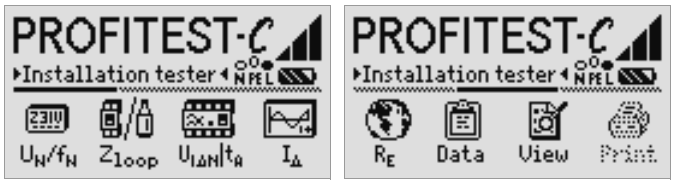
The test instrument will never become obsolete thanks to software updates which can be installed via the IRDA interface. Updates can be performed by our service department as part of our re-calibration service, or by the user himself.

Applicable regulations and Standards

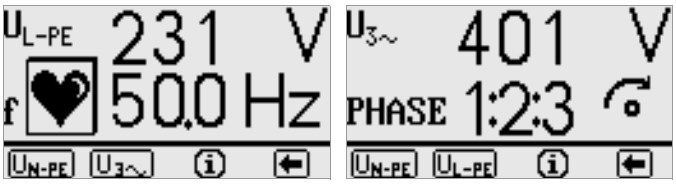
IEC 61010-1/EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use
IEC 61557/ EN 61557/ VDE 0413	Part 1: General requirements Part 3: Loop resistance measuring instruments Part 6: Devices for testing residual current devices (RCDs) for correct functioning, and for testing the effectiveness of protective safety measures in TT and NT systems Part 7: Phase sequence indicators
VDE 0106-1	Protection against electric shock, classification of electric and electronic equipment
DIN EN 60529 VDE 0470-1	Test instruments and test procedures, 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

Sample Displays

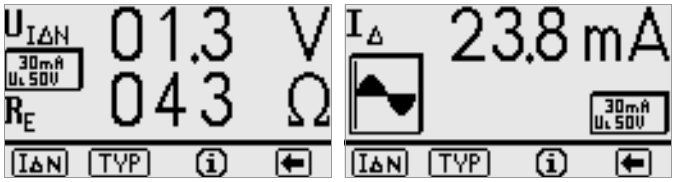
Main Menus

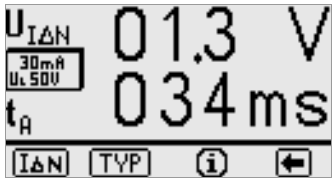


Voltage Measurement

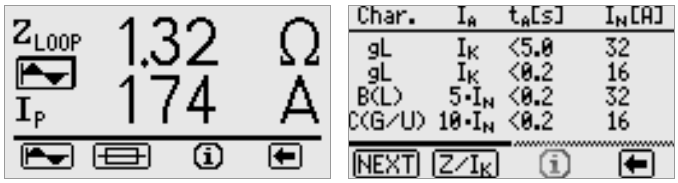


Testing Residual Current Circuit Breakers (RCCBs)

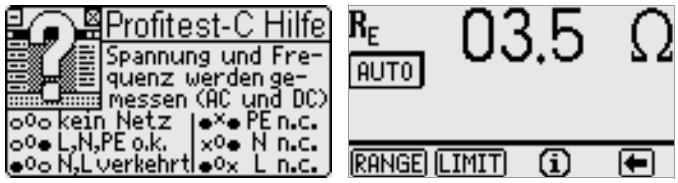




Loop Impedance Measurement and Fuse Characteristics



Online Help and Earthing Resistance Measurement



Characteristic Values

Function	Measured Quantity	Measuring Range (display range)	Resolution	Input Impedance/ Test Current	Nominal Values	Intrinsic Uncertainty	Nominal Range of Use	Measuring Uncertainty
U_{L-PE} U_{N-PE}	U_{L-PE} U_{N-PE} / U_{L-N}	0 ... 99.9 V 100 ... 300 V (0 ... 600 V)	0.1 V 1 V	500 kΩ	—	±(2% rdg. + 2 d)	108 ... 253 V	±(4% rdg. + 3 d)
	f	15.0 ... 99.9 Hz (15.0 ... 650 Hz)	0.1 Hz	500 kΩ	—	±(0.1% rdg. + 1 d)	15 ... 70 Hz	±(0.2% rdg. + 1 d)
$U_{3\sim}$	$U_{3\sim}$	0 ... 99.9 V 100 ... 500 V (0 ... 600 V)	0.1 V 1 V	500 kΩ	—	±(2% rdg. + 2 d)	108 ... 440 V	±(4% rdg. + 3 d)
I_Δ	$U_{I\Delta N}$	0 ... 99.9 V	0.1 V	0.3 · $I_{\Delta N}$	U_N = 120 V U_N = 230 V f_N = 50 Hz U_L = 25/50 V $I_{\Delta N}$ = 10/30/100/ 300/500 mA	+(12.5% rdg. + 2 d) +(2.5% rdg. – 2 d)	5 ... 70 V	+15% rdg. + 2 d +0% rdg. – 0 d
	R_E / $I_{\Delta N}$ = 10 mA	10 Ω ... 9.99 kΩ	10 Ω	0.3 ... 1.3 · $I_{\Delta N}$		—	calculated value	—
	R_E / $I_{\Delta N}$ = 30 mA	3 Ω ... 999 Ω 1 kΩ ... 6.40 kΩ	3 Ω 10 Ω					
	R_E / $I_{\Delta N}$ = 100 mA	1Ω ... 999 Ω	1Ω					
	R_E / $I_{\Delta N}$ = 300 mA	0.3 Ω ... 99.9 Ω 100 Ω ... 640 Ω	0.3 Ω 1 Ω					
	R_E / $I_{\Delta N}$ = 500 mA	0.2 Ω ... 99.9 Ω 100 Ω ... 380 Ω	0.2 Ω 1 Ω					
	I_Δ / $I_{\Delta N}$ = 10 mA	3.0 ... 13.0 mA	0.1 mA	3.0 ... 13.0 mA		±(5% rdg. + 2 d)	3.0 ... 13.0 mA	±(8% rdg. +2 d)
	I_Δ / $I_{\Delta N}$ = 30 mA	9.0 ... 39.0 mA		9.0 ... 39.0 mA			9.0 ... 39.0 mA	
	I_Δ / $I_{\Delta N}$ = 100 mA	30 ... 130 mA	0.1 mA 1 mA	30 ... 130 mA			30 ... 130 mA	
	I_Δ / $I_{\Delta N}$ = 300 mA	90 ... 390 mA		90 ... 390 mA			90 ... 390 mA	
	I_Δ / $I_{\Delta N}$ = 500 mA	150 ... 650 mA	1 mA	150 ... 650 mA			150 ... 650 mA	
	$U_{I\Delta}$ / U_L = 25 V	0 ... 25.0 V	0.1 V	same as I_Δ		+(12.5% rdg. + 2 d) +(2.5% rdg. – 2 d)	0 ... 25.0 V	+15% rdg. +2 d +0% rdg. – 0 d
	$U_{I\Delta}$ / U_L = 50 V	0 ... 50.0 V					0 ... 50.0 V	
	t_A ($I_{\Delta N}$/5 · $I_{\Delta N}$)	0 ... 99.9 ms 100 ... 999 ms	0.1 ms 1 ms	1.05 · $I_{\Delta N}$ / 5 · $I_{\Delta N}$		±3 ms	0 ... 1000 ms	±4 ms
Z_{loop}	Z_{loop}	0 ... 0.49 Ω 0.5 ... 9.99 Ω 10.0 ... 30.0 Ω	10 mΩ 10 mΩ 100 mΩ	740 mA	U_N = 120 V U_N = 230 V f_N = 50 Hz	±5 d ±(6% rdg. + 3 d) ±(6% rdg. + 3 d)	0.25 ... 0.49 Ω 0.50 ... 9.99 Ω 10.0 ... 30.0 Ω	±(15% rdg. + 5 d) ±(10% rdg. + 5 d) ±(10% rdg. + 5 d)
	Z_{loop} 15 mA	0 ... 99.9 Ω 100 ... 250 Ω	100 mΩ 1 Ω	15 mA		±(6% rdg. + 5 d) ±(6% rdg. + 3 d)	0.50 ... 99.9 Ω 100 ... 250 Ω	±(15% rdg. + 10 d) ±(10% rdg. + 10 d)
R_E	R_E	0 ... 0.49 Ω 0.5 ... 9.99 Ω 10.0 ... 99.9 Ω 100 ... 999 Ω 1.00 k ... 9.99 kΩ	10 mΩ 10 mΩ 10 mΩ 100 mΩ 1 Ω	740 mA 740 mA 400 mA 40 mA 4 mA		±5 d ±(6% rdg. + 3 d) ±(4% rdg. + 3 d) ±(4% rdg. + 3 d) ±(4% rdg. + 3 d)	0.25 Ω ... 0.49 Ω 0.50 Ω ... 9.99 Ω 10.0 Ω ... 99.9 Ω 100 Ω ...999 Ω 1 kΩ ...9.990 kΩ	±(15% rdg. + 5 d) ±(10% rdg. + 5 d) ±(8% rdg. + 5 d) ±(8% rdg. + 5 d) ±(8% rdg. + 5 d)

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

Reference Conditions

Line Voltage	230 V ± 0.1%
Line Frequency	50 Hz ±0.2 Hz
Measured Quantity Waveshape	sine (deviation between effective and rectified values < 1%)
System Impedance Angle	cos φ = 1
Battery Voltage	5.5 V ± 1%
Ambient Temperature	+ 23 °C ± 2 K
Relative Humidity	40 ... 60%
Finger Contact	for testing potential difference to earth potential

Nominal Ranges of Use

Voltage U_N	230 V	(108 ... 253 V)
Frequency f_N	$16^2/_3$ Hz	(15.4 ... 18 Hz)
	50 Hz	(49.5 ... 50.5 Hz)
	60 Hz	(59.4 ... 60.6 Hz)
Overall Frequency Range	15 ... 70 Hz	
Waveshape	sine	
Temperature Range	0 °C ... + 40 °C	
Battery Voltage	4.6 ... 6.5 V	

System Impedance Angle	corresponds to cosφ = 1 ... 0.95

Power Supply

Batteries	4 ea.1.5 V baby cell (4 x C size) (alkaline-manganese per IEC LR14) or 4 rechargeable NiCd/NiMH batteries
Batter Test	Symbolic display
Battery Saving Circuit	Display illumination can be deactivated. The test instrument is switched off automatically 10 to 60 seconds after the last key operation. ON-time can be selected by the user.
Safety Shutdown	The instrument is switched off if supply voltage drops to below the specified level, or it cannot be switched on.
Charging Socket	Rechargeable batteries can be recharged inside the instrument by connecting the NA102 (Z501N) charger to the charging socket.

PRO*Fi*TEST®*C*
Test Instrument per DIN VDE 0100

Overload Capacity

U_{L-PE}, U_{L-N}	600 V continuous
Fi, R_E, Z_{Loop}	300 V (limited to the number of measurements and the off period, a thermostatic switch prevents execution of the function if overload occurs)
Fine-Wire Fuse Protection	1 A 10 s, > 2 A – fuses blow

Electrical Safety

Safety Class	II per IEC 61010-1/EN 61010-1/ VDE 0411-1
Operating Voltage	300 V
Test Voltage	3.7 kV 50 Hz
Measuring Category	III
Contamination Level	2
Electromagnetic Compatibility EMC	IEC 61326/EN 61326
Fuses Terminals L and N	1 cartridge fuse link each, F1H250V 5 mm x 20 mm

Ambient Conditions

Operation	–10 ... + 50 °C
Storage	–20 ... + 60 °C (without batteries)
Relative Humidity	max. 75%, no condensation allowed
Altitude	max. 2000 m
Deployment	indoors, outdoors only within the specified ambient conditions

Mechanical Design

Display	multiple dot matrix display, 128 x 64 pixels (65 mm x 38 mm), illuminated
Dimensions	275 mm x 140 mm x 65 mm
Weight	approx. 1.2 kg with batteries
Protection	housing: IP 52 per DIN VDE 0470 part 1/EN 60529 with pressure compensating diaphragm of microporous ePTFE, non-ageing, 8 mm dia. in battery compartment lid

Extract from table on the meaning of IP codes

IP XY (1st digit X)	Protection against foreign object entry	IP XY (2nd digit Y)	Protection against the penetration of water
2	≥ 12.5 mm dia.	2	vertically falling drops with enclosure tilted 15°
3	≥ 2.5 mm dia.	3	spraying water
4	≥ 1.0 mm dia.	4	splashing water
5	dust protected	5	water jets

Data Interface

Type	infrared interface (SIR/IrDa) bidirectional, half-duplex
Format	9600 baud, 1 start bit, 1 stop bit, 8 data bits, no parity, no handshake
Range	max. 10 cm recommended distance: < 4 cm

Standard Equipment

1 PRO*Fi*TEST®*C* test instrument
1 carrying strap
1 set batteries
1 factory calibration certificate
1 operating instructions

The free PC starter software WinProfi is used for communication with your PRO*Fi*TEST®*C* test instrument. WinProfi is available on our homepage with the following content and functions:
(Please refer to section Order Information for the web address)

- up-to-date test instrument software
  – for loading another language
  – for loading software version updates,
- Exchange of measured data between test instrument and PC

PROFiTEST®C Accessories

Variable Plug Adapter Set

Three self-retaining, contact protected test probes for the connection of measurement cables with 4 mm banana plugs, or with contact protected plugs for sockets with an opening of 3.5 mm to 12 mm, e.g. CEE and Perilex sockets etc. The test probes also fit the square PE jacks on Perilex sockets. Maximum allowable operating voltage: 600 V per IEC 61010.

Three-Phase Current Adapters

A3-16, A3-32 and A3-63 three-phase current adapters allow for trouble-free connection of testers to 5-pole CEE sockets. The three models have different sized plugs which correspond to 5-pole CEE sockets with 16 A, 32 A and 63 A nominal current. Phase sequence is indicated with signal lamps. Testing for the effectiveness of protective measures is conducted with five, 4 mm contact protected sockets.

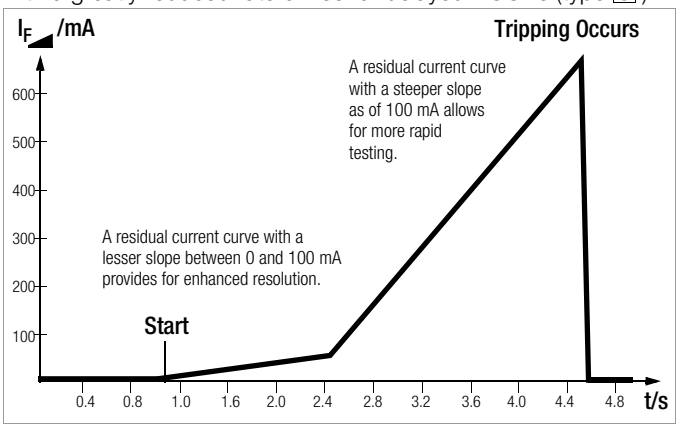
PROFiTEST®DC-II

Applications

- Tripping test for direct current components of AC-DC sensitive RCCBs
  - For measurement of tripping current
  - For measurement of time to trip
  - For testing delayed and undelayed S RCCBs
- Loop impedance measurement with the PROFiTEST®C with suppression of RCCB triggering

Tripping Test for AC-DC Sensitive RCCBs with Rising DC Residual Current and Measurement of Tripping Current

A slowly rising direct current is applied to N and PE with the selector switch in the I_F position. The measured current value is displayed continuously. When the RCCB is tripped, the last measured current value is displayed. Measuring is conducted with a greatly reduced rate of rise for delayed RCCBs (type S).

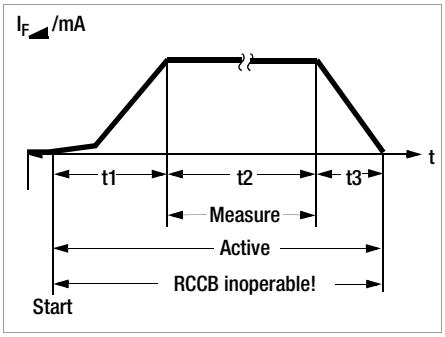


Tripping Test for AC-DC Sensitive RCCBs with Constant DC Residual Current and Measurement of Time to Trip

With the selector switch set to the respective nominal residual current, twice the nominal current is applied to N and PE. Time to trip is measured and displayed for the RCCB.

Loop Impedance Measurement with the PROFiTEST®C with Suppression of RCCB Triggering

The PROFiTEST®DC-II allows for the measurement of loop impedance in TN systems with RCCBs (10, 30, 100, 300, 500 mA nominal residual current).



The test instrument generates a DC residual current which saturates the magnetic circuit of the RCCB. The PROFiTEST®C superimposes a measuring current which demonstrates only half-waves of like polarity. The RCCB cannot detect this measuring current and can thus no longer be tripped during measurement.

PROFiTEST®C
Test Instrument per DIN VDE 0100

Order Information

Designation	Type	Article Number
Basic Instruments		
Universal instrument for testing protective safety measures per DIN VDE 0100 in accordance with DIN VDE 0413, parts 1, 3, 6 and 7	*PROFiTEST®C-GB int.*	M521D
Set consisting of PROFiTEST®C, METRISO®C, 3-pole adapter, IrDa 0100 adapter cable and measurement cables KS17-4 in carrying case HC 40	Set PROFiTEST®C/ METRISO®C	M508A
Expansions		
Test instrument as described on page 5 including connector cable and operating instructions	PROFiTEST®DC-II [D)]	M523A
IR interface adapter for connection to an USB PC port for transmission of data between the PC and the PROFiTEST®C, e.g. for software updates at the test instrument or for visualization of measured values at the PC	IrDa-USB Converter	Z501J
Plug Inserts and Adapters		
3-phase measuring adapter	3-Pole Adapter	Z521A
5-pole 3-phase adapter for 16 A CEE outlets	A3-16	GTZ3602000R0001
5-pole 3-phase adapter for 32 A CEE outlets	A3-32	GTZ 3603000R0001
5-pole 3-phase adapter for 63 A CEE outlets	A3-63	GTZ 3604000R0001
Variable Plug Adapter Set	Z500A	Z500A
Adapter for PROFiTEST®DC-II for use in systems without earthing contact outlets	3-Pole Adapter f. DC-II	Z523A

Designation	Type	Article Number
Accessories		
Charger for recharging batteries while inside the PROFiTEST®C	NA102	Z501N
Hard case for 1 test instrument (PROFiTEST®C, METRISO®C or GEOHM®C) and accessories	HC30-C	Z541C
Hard case for 2 test instruments (PROFiTEST®C, METRISO®C or GEOHM®C) and accessories	HC40	Z541 D
PC Analysis Software		
http://www.gossenmetrawatt.com (→ Products → Electrical Testing → Testing of Electr. Installations ... → PROFITEST C) *or* http://www.gossenmetrawatt.com (→ Products → Software → Software for Testers)		

D) Data sheet available

For additional information on accessories, please refer to
- *our Measuring Instruments and Testers Catalog*
- *our website www.gossenmetrawatt.com*

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