

PROFITEST | MASTER Series
PROFITEST | MBASE MTECH
Test Instruments per IEC 60364-6/DIN VDE 0100

 3-349-471-03
 11/6.11

Testing of Residual-Current Protective Devices (RCDs)

- Measurement of contact voltage without tripping the RCCB
Contact voltage with reference to nominal residual current is measured with 1/3 of nominal residual current.
- Testing for N-PE reversal
- Trip test with nominal residual current, measurement of time to trip
- Testing of systems and RCDs
with rising residual current and display of trip current, as well as contact voltage
- Testing of RCDs with $\frac{1}{2} \cdot I_{\Delta N}$, $1 \cdot I_{\Delta N}$, $2 \cdot I_{\Delta N}$, $5 \cdot I_{\Delta N}$
($5 \cdot I_{\Delta N}$ bis 100 mA residual current)

Testing of Special RCDs

- selective **S**, SRCDs, PRCDs (Schukomat, Sidos etc.), type G/R, type AC, type A; type B and B+ (**PROFITEST MTECH** only)
- Testing of RCDs, which are suitable for pulsating, DC and AC fault currents, testing is conducted with positive or negative half-waves

New!

**Intelligent data transfer
Bidirectional interface
to DDS-CAD electronic engineering**
DESIGN PLUS

 powered by: **light+building**

DKD
 DKD-Calibration Certificate
 included

QUALITÄTSMANAGEMENTSYSTEM


 DQS-zertifiziert nach
 DIN EN ISO 9001:2000
 Reg.-Nr. 1262

Large Voltage and Frequency Range

An extended-range measuring system allows for use of the test instrument for all AC and three-phase systems with voltages ranging from 65 to 500 V, and frequencies from 16 to 400 Hz.

Loop and System Impedance Measurement

Measurement of loop and system impedance can be performed within a range of 65 to 550 V. Conversion to short-circuit current is based upon the respective line voltage, as long as the measured line voltage is within the prescribed range. Additionally, the measuring error of **PROFITEST MASTER** is taken into account for conversion. Short-circuit current is calculated on the basis of the present line voltage and measured impedance outside of this range.

**Insulation Resistance Measurement
with Nominal Voltage and Variable or Rising Test Voltage**

Insulation resistance is usually measured with the nominal voltages 500 V, 250 V or 100 V. For measurements at sensitive components, as well as within systems with voltage limiting devices, test voltages ranging from 50 to 1,000 V can be selected which deviate from nominal voltage.

Measurements can be performed with continuously rising test voltage for the detection of weak points in insulation, as well as for the determination of response voltages for voltage limiting components.

Voltage at the device under test, any detected response or break-down voltage appear at the instrument's display.

Low-Resistance Measurements

Bonding conductor resistance and protective conductor resistance can be measured with a measuring current of ≥ 200 mA DC, automatic measuring voltage polarity reversal and selectable conduction direction. An LED indicates when an (adjustable) limit value is exceeded.

Earth Resistance Measurement

In addition to earth resistance measurement, a selective earth resistance measurement is possible with the **PROFITEST MTECH** in combination with accessory current clamps.

Standing-Surface Insulation Measurement

Measurement of standing-surface insulation is performed with actual line frequency and line voltage.

Universal Connector System

The interchangeable plug inserts and the plug-on 2-pole adapter (can be expanded to a 3-pole adapter for phase sequence measurements) allow for use of the test instrument all over the world.

Special Features

- Display of allowable fuse types for electrical systems
- Start-up testing for energy consumption meters
- Measurement of biasing, leakage and circulating current up to 1 A, as well as working current to 1,000 A with current sensor clamp (accessory)
- Phase sequence measurement (phase sequence, highest line-to-line voltage)

Test Instruments per IEC 60364-6/DIN VDE 0100

Display – Selectable Language

The LCD field consists of a backlit dot matrix at which menus, possible settings, measurement results, tables, tips and error messages, as well as wiring diagrams are displayed.

An appropriate language can be selected for the country in which the test instrument is used.

Operation

The basic functions are directly selected with a rotary switch. Softkeys allow for easy selection of sub-functions and for parameters setting. Functions and/or parameters which are not available are automatically suppressed.

The start and RCD trip functions at the test instrument are functionally identical to the two keys at the test plug in order to allow for trouble-free measurement even in locations with restricted access. Connection diagrams, measuring ranges and help texts for all basic and sub-functions can be shown on the display.

Phase Tester

Protective conductor potential is tested by contacting the contact surface with the contact finger. If a potential difference of greater than 25 V is detected between the contact surface and the protective contact at the earthing contact plug, the PE signal lamp lights up.

Fault Signals

- **Faults in connecting** the test instrument to the system are recognized automatically by the instrument, and are indicated in a connection icon.
- **Faults within the system** (missing line and/or conductor voltage, tripped RCD) are indicated by 3 LEDs and Pop Ups in the top section.

Battery or Rechargeable Battery Test and Self-Test

The battery test is performed under load. The results are displayed both numerically and with a symbol. Test patterns can be queried one after the other during the self-test, and LEDs can be tested as well. The instrument is shut down automatically if the batteries are depleted. The instrument includes a microprocessor-controlled charge control circuit for safe charging of NiMH or NiCd batteries.

Data Entry

Data can be read in by means of a barcode scanner connected via the RS232 port and comments can be entered via softkeys. Data entry via RFID scanner or barcode scanner .

PC User Software ETC

ETC provides a great variety of supplementary options for data acquisition and management.

- The software acquires all important data for generating reports per DIN VDE 0100 part 600
- Test reports (ZVEH) can be generated automatically
- Distributor structures with circuit/RCD data can be defined individually
- Created structures can be saved to memory and loaded into the test instrument via USB connection as required
- Data can be exported to EXCEL, CSV and XML
- The device selection lists can be edited

Data Interface

Measurement data are transmitted to a PC via the integrated USB interface, where they can be printed in the form of reports or filed.

Software Updates

The test instrument will always be up to date, because its firmware can be updated via the USB interface. Software updates are performed within the framework of instrument re-calibration by our service department or directly by the customer.

Scope of Performance of PROFITESTMASTER Variants

PROFITEST ...	MBASE	MTECH
Article Number	M520M	M5200
RCD measurements		
U_B measurement without tripping the RCD	✓	✓
Time-to-trip measurement	✓	✓
Trip current measurement I_F	✓	✓
selective, SRCDS, PRCDs, type G/R	✓	✓
AC-DC sensitive RCDs type B	—	✓
Testing for N-PE reversal	✓	✓
Loop impedance measurements Z_{L-PE} / Z_{L-N}		
fuse table for mains without RCDs	✓	✓
without tripping the RCD, fuse table	—	✓
with 15 mA test current* without tripping the RCD	✓	✓
Earth resistance R_E I/U measuring methods, mains-operated		
Selective earth resistance R_E (mains-operated) with probe, earth electrode and current transformer	✓	✓
Low resistance R_{LO} automatic polarity reversal		
✓	✓	✓
Insulation resistance R_{INS} Test voltage variable or rising		
✓	✓	✓
Voltage $U_{L-N} / U_{L-PE} / U_{N-PE} / f$		
✓	✓	✓
Special measurements		
Leakage current (clamp measurement) I_L, I_{AMP}	✓	✓
Meter start-up	✓	✓
Phase sequence	✓	✓
Standing-surface insulation Z_{ST}	✓	✓
Ground leakage resistance $R_{E(ISO)}$	✓	✓
Features		
Selectable user interface language	✓	✓
Memory (database max. 50,000 test objects)	✓	✓
Interface for RS232 scanner	✓	✓
Interface for USB data transfer	✓	✓
PC user software ETC	✓	✓
Measuring category CAT III 600 V / CAT IV 300 V	✓	✓
DKD calibration	✓	✓

* The so-called live measurement is only advisable if there is no biasing current within the system.

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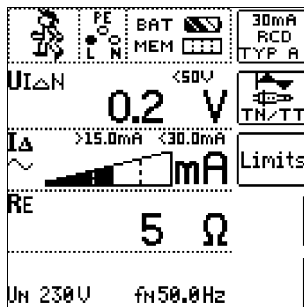
Test Instruments per IEC 60364-6/DIN VDE 0100

Sample Displays

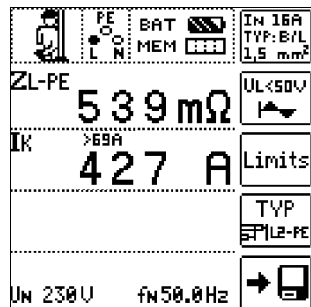
PROFITESTMASTER Test Instruments

Softkeys enable the user to select sub-functions and parameters conveniently. Those sub-functions and parameters which are not available are automatically suppressed.

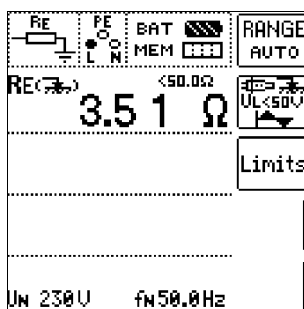
RCD Measurement Display



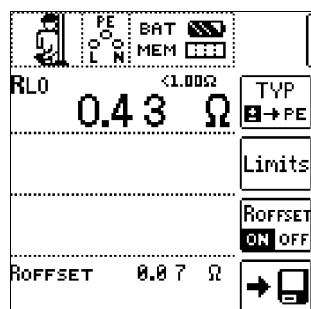
Loop resistance measurement Display



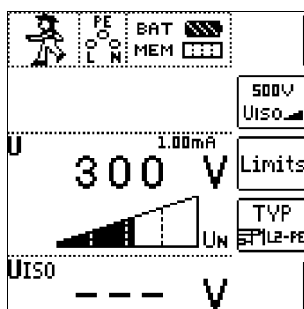
Earth resistance measurement Display



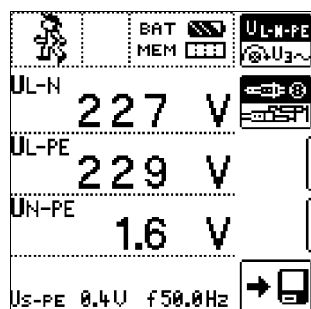
Low resistance measurement Display



Insulation measurement Display



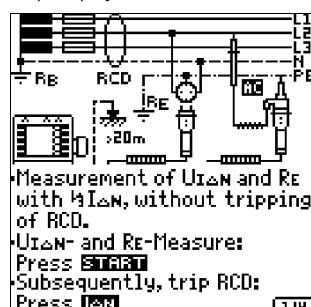
Voltage measurement Display



Basic configuration Display



Help Display



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 2: Insulation resistance measuring instruments Part 3: Loop resistance measuring instruments Part 4: Instruments for the measurement or resistance at earth conductors, protective conductors and bonding conductors Part 5: Earth resistance measuring instruments Part 6: Instruments for testing for correct functioning of residual-current protective devices (RCDs) and the effectiveness of protective measures in TT and TN systems Part 7: Phase sequence indicators Part 10: Combined measuring instruments
EN 60529 VDE 0470 Part 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
IEC 60364-6-61 VDE 0100 Teil 600	Low voltage electrical installations –Part 6: Verification
IEC 60364-6-62 EN 50110-1 VDE 0105 Teil 100	Operation of electrical installations – Part 100: General requirements
IEC 60364-7-710 VDE 0100 Teil 710	Erection of low-voltage installations – Requirements for special installations or locations – Part 710: Medical locations

Nominal Ranges of Use

Voltage U_N	120 V	(108 ... 132 V)
	230 V	(196 ... 253 V)
	400 V	(340 ... 440 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)
	200 Hz	(190 ... 210 Hz)
	400 Hz	(380 ... 420 Hz)
Overall voltage range	65 ... 550 V	
Overall frequency range	15.4 ... 420 Hz	
Waveshape	sine	
Temperature range	0 °C ... + 40 °C	
Battery voltage	8 ... 12 V	
Line impedance angle	corresponds to $\cos\varphi = 1 \dots 0.95$	
Probe resistance	< 50 kΩ	

Test Instruments per IEC 60364-6/DIN VDE 0100

Function	Measured Quantity	Display Range	Resolution	Input Impedance/ Test Current	Measuring Range	Nominal Values	Measuring Uncertainty	Intrinsic Uncertainty	Connections						
									Plug Insert ¹⁾	2-Pole Adapter	3-Pole Adapter	Probe	Clamps WZ12C Z3512A	MFLEX P300	
U	U _{L-PE} U _{N-PE}	0 ... 99.9 V 100 ... 600 V	0.1 V 1 V	5 MΩ	90 ... 600 V ¹⁾	U _N = 120/230/ 400/500 V f _N = 16 ² /3/50/ 60/200/400 Hz	±(2% rdg.+5d) ±(2% rdg.+1d)	±(1% rdg.+5d) ±(1% rdg.+1d)	●	●	●				
	f	15.0 ... 99.9 Hz 100 ... 999 Hz	0.1 Hz 1 Hz		15.4 ... 420 Hz		±(0.2% rdg.+1d)	±(0.1% rdg.+1d)							
	U _{3~}	0 ... 99.9 V 100 ... 600 V	0.1 V 1 V		90 ... 600 V		±(3% rdg.+5d) ±(3% rdg.+1d)	±(2% rdg.+5d) ±(2% rdg.+1d)		●					
	U _{PROBE}	0 ... 99.9 V 100 ... 600 V	0.1 V 1 V		0 ... 600 V		±(2% rdg.+5d) ±(2% rdg.+1d)	±(1% rdg.+5d) ±(1% rdg.+1d)			●				
	U _{L-N}	0 ... 99.9 V 100 ... 600 V	0.1 V 1 V		90 ... 600 V ¹⁾		±(3% rdg.+5d) ±(3% rdg.+1d)	±(2% rdg.+5d) ±(2% rdg.+1d)	●		●				
I _{ΔN} I _F	U _{IΔN}	0 ... 70.0 V	0.1 V	0.3 · I _{ΔN}	5 ... 70 V	U _N = 120/230 V f _N = 50/60 Hz U _L = 25/50 V I _{ΔN} = 10/30/ 100/300/500 mA U _N ¹⁾²⁾ = 400 V I _{ΔN} = 10/30 mA	+10% rdg.+1d	+1% rdg.-1d ... +9% rdg.+1d							
	R _E / I _{ΔN} = 10 mA	10 Ω ... 6.51 kΩ	10 Ω		calculated value from U _{IΔN} / I _{ΔN}										
	R _E / I _{ΔN} = 30 mA	3 Ω ... 999 Ω 1 kΩ ... 2.17 kΩ	3 Ω 10 Ω												
	R _E / I _{ΔN} = 100 mA	1 Ω ... 651 Ω	1 Ω												
	R _E / I _{ΔN} = 300 mA	0.3 Ω ... 99.9 Ω 100 Ω ... 217 Ω	0.3 Ω 1 Ω												
	R _E / I _{ΔN} = 500 mA	0.2 Ω ... 9.99 Ω 100 Ω ... 130 Ω	0.2 Ω 1 Ω								●	●			optional
	I _Δ / I _{ΔN} = 10 mA	3.0 ... 13.0 mA	0.1 mA	3.0 ... 13.0 mA	3.0 ... 13.0 mA										
	I _Δ / I _{ΔN} = 30 mA	9.0 ... 39.0 mA		9.0 ... 39.0 mA	9.0 ... 39.0 mA										
	I _Δ / I _{ΔN} = 100 mA	30 ... 130 mA	1 mA	30 ... 130 mA	30 ... 130 mA			±(5% rdg.+1d)	±(3.5% rdg.+2d)						
	I _Δ / I _{ΔN} = 300 mA	90 ... 390 mA	1 mA	90 ... 390 mA	90 ... 390 mA										
	I _Δ / I _{ΔN} = 500 mA	150 ... 650 mA	1 mA	150 ... 650 mA	150 ... 650 mA										
	U _{IΔ} / U _L = 25 V	0 ... 25.0 V	0.1 V	wie I _Δ	0 ... 25.0 V			+10% rdg.+1d	+1% rdg.-1d ... +9% rdg.+1d						
U _{IΔ} / U _L = 50 V	0 ... 50.0 V	0 ... 50.0 V													
t _A / I _{ΔN}	0 ... 1000 ms	1 ms	1.05 · I _{ΔN}	0 ... 1000 ms		±4 ms	±3 ms								
t _A / 5 · I _{ΔN}	0 ... 40 ms	1 ms	5 · I _{ΔN}	0 ... 40 ms											
Z _{L-PE} Z _{L-N}	Z _{L-PE} (full waves) Z _{L-N}	0 ... 999 mΩ 1.00 ... 9.99 Ω	1 mΩ 0.01 Ω	0.65 ... 4.0 A	0.15 ... 0.49 Ω 0.50 ... 0.99 Ω 1.00 ... 9.99 Ω	U _N = 120/230 V	±(10% rdg.+30d) ±(10% rdg.+30d) ±(5% rdg.+3d)	±(5% rdg.+30d) ±(4% rdg.+30d) ±(3% rdg.+3d)							
	Z _{L-PE} DC+				0.25 ... 0.99 Ω 1.00 ... 9.99 Ω	U _N = 400 V ¹⁾ / 500 V at Z _{L-PE}	±(18% rdg.+30d) ±(10% rdg.+3d)	±(6% rdg.+50d) ±(4% rdg.+3d)	●	●	Z _{L-PE}				
	I _k	0 A ... 999 A 1.00 kA ... 9.99 kA 10.0 kA ... 50.0 kA	1 A 10 A 100 A			120 (108 ... 132) V 230 (196 ... 253) V 400 (340 ... 440) V	f _N = 50/60 Hz	calculated value from Z _{L-PE}							
	Z _{L-PE} (15 mA)	0.5 ... 9.99 Ω 10.0 ... 99.9 Ω 100 ... 999 Ω	0.01 Ω 0.1 Ω 1 Ω		15 mA	10 ... 100 Ω 100 ... 1000 Ω	U _N = 120/230 V f _N = 50/60 Hz	±(10% v.M.+10D) ±(8% v.M.+2D)	±(2% v.M.+2D) ±(1% v.M.+1D)						
	I _k (15 mA)	100 ... 999 mA 0.00 ... 9.99 A 10.0 ... 99.9 A	1 mA 0.01 A 0.1 A			calcul. value depends on U _N and Z _{L-PE} : I _k = U _N / Z _{L-PE} (15 mA)			calculated value from Z _{L-PE} (15 mA): I _k = U _N / Z _{L-PE} (15 mA)						
R _E	R _E (with probe)	0 ... 999 mΩ 1.00 ... 9.99 Ω	1 mΩ 0.01 Ω	0.65 ... 3.4 A 0.65 ... 3.4 A	0.15 Ω ... 0.49 Ω 0.50 Ω ... 0.99 Ω	U _N = 120/230 V U _N = 400 V ¹⁾	±(10% rdg.+30d) ±(10% rdg.+30d)	±(5% rdg.+30d) ±(4% rdg.+30d)							
	[R _E (without probe) values as Z _{L-PE}]	10.0 ... 99.9 Ω 100 ... 999 Ω 1 kΩ ... 9.99 kΩ	0.1 Ω 1 Ω 0.01 kΩ	400 mA 40 mA 4 mA	1.0 Ω ... 9.99 Ω 10 Ω ... 99.9 Ω 100 Ω ... 999 Ω 1 kΩ ... 9.99 kΩ	f _N = 50/60 Hz	±(5% rdg.+3d) ±(3% rdg.+3d) ±(10% rdg.+3d) ±(10% rdg.+3d)	±(3% rdg.+3d) ±(3% rdg.+3d) ±(3% rdg.+3d)	●	●					
	R _E DC+	0 ... 999 mΩ 1.00 ... 9.99 Ω	1 mΩ 0.01 Ω	0.65 ... 3.4 A + 1.25 A DC	0.25 ... 0.99 Ω 1.00 ... 9.99 Ω	U _N = 120/230 V f _N = 50/60 Hz	±(18% rdg.+30d) ±(10% rdg.+3d)	±(6% rdg.+50D) ±(4% v.M.+3D)							
U _E	0 ... 253 V	1 V	—	calculated value											
R _E Sel clip	R _E	0 ... 999 Ω	1 mΩ ... 1 Ω	0.65 ... 3.4 A	0.25 ... 300 Ω ⁵⁾	see R _E	±(20% rdg.+20 D)	±(15% rdg.+20 d)					●		
	R _E DC+	0 ... 999 Ω	1 mΩ ... 1 Ω		0.25 ... 300 Ω ⁵⁾	U _N = 120/230 V f _N = 50/60 Hz	±(22% v.M.+20 D)	±(15% rdg.+20 d)					●		
EX- TRA	Z _{ST}	0 ... 30 MΩ	1 kΩ	2.3 mA at 230 V	10 kΩ ... 199 kΩ 200 kΩ ... 30 MΩ	U ₀ = U _{L-N}	±(20% rdg.+2d) ±(10% rdg.+2d)	±(10% rdg.+3d) ±(5% rdg.+3d)							
R _{INS}	R _{INS} · R _{EINS}	1 ... 999 kΩ 1.00 ... 9.99 MΩ 10.0 ... 49.9 MΩ	1 kΩ 10 kΩ 100 kΩ	I _k = 1.5 mA	50 kΩ ... 500 MΩ	U _N = 50 V I _N = 1 mA	kΩ range ±(5% rdg.+10d) MΩ range ±(5% rdg.+1d)	kΩ range ±(3% rdg.+10d) MΩ range ±(3% rdg.+1d)							
		1 ... 999 kΩ 1.00 ... 9.99 MΩ 10.0 ... 99.9 MΩ	1 kΩ 10 kΩ 100 kΩ			U _N = 100 V I _N = 1 mA									
		1 ... 999 kΩ 1.00 ... 9.99 MΩ 10.0 ... 99.9 MΩ 100 ... 200 MΩ	1 kΩ 10 kΩ 100 kΩ 1 MΩ			U _N = 250 V I _N = 1 mA									
		1 ... 999 kΩ 1.00 ... 9.99 MΩ 10.0 ... 99.9 MΩ 100 ... 500 MΩ	1 kΩ 10 kΩ 100 kΩ 1 MΩ			U _N = 500 V/ 1000 V I _N = 1 mA									
		U	25 ... 1200 V			1 V				25 ... 1200 V		±(3% rdg.+1d)	±(1.5% rdg.+1d)		
R _{LO}	R _{LO}	0.01 Ω ... 9.99 Ω 10.0 Ω ... 99.9 Ω	10 mΩ 100 mΩ	I _m ≥ 200 mA	0.1 Ω ... 6 Ω	U ₀ = 4.5 V	±(4% rdg.+2d)	±(2% rdg.+2d)		●					

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Test Instruments per IEC 60364-6/DIN VDE 0100

Function	Measured Quantity	Display Range	Resolution	Input Impedance/ Test Current	Measuring Range	Nominal Values	Measuring Uncertainty	Intrinsic Uncertainty	Connections									
									Plug Insert 1)	2-Pole Adapter	3-Pole Adapter	Probe	Clamps					
												WZ12C	Z3512A	MFLEX P300				
SENSOR	I _{L/Amp}	0 ... 99.9 mA	0.1 mA		5 ... 1000 mA ³⁾		±(10% rdg.+8d)	±(4% rdg.+7d)										
		100 ... 999 mA	1 mA				±(10% rdg.+3d)	±(4% rdg.+2d)										
		0 ... 99.9 A	0.1 A				5 ... 150 A ³⁾	±(8% rdg.+2d)	±(3% rdg.+2d)									
		100 ... 150 A	1 A					±(8% rdg.+1d)	±(3% rdg.+1d)									
		0 ... 99.9 mA	0.1 mA	5 ... 1000 mA ⁴⁾ 0.05 ... 10 A ⁴⁾ 0.5 ... 100 A ⁴⁾ 5 ... 1000 A ⁴⁾		±(7% rdg.+8d)	±(4% rdg.+7d)											
		100 ... 999 mA	1 mA			±(5% rdg.+3d)	±(2% rdg.+2d)											
		1.0 ... 9.99 A	0.01 A			±(4% rdg.+2d)	±(2% rdg.+2d)											
		10.0 ... 99.9 A	0.1 A			±(4% rdg.+2d)	±(2% rdg.+2d)											
		100 ... 999 A	1 A			±(4% rdg.+1d)	±(2% rdg.+1d)											
		1.00 ... 1.02 kA	0.01 kA			±(4% rdg.+1d)	±(2% rdg.+1d)											
		0 ... 99.9 mA	0.1 mA			1 V/A	30 ... 1000 mA ⁴⁾	±(7% rdg.+100d)	±(4% rdg.+100d)									
		100 ... 999 mA	1 mA					±(6% rdg.+12d)	±(3% rdg.+12d)									
		1.0 ... 9.99 A	0.01 A	±(6% rdg.+12d)	±(3% rdg.+12d)													
		10.0 ... 99.9 A	0.1 A	±(5% rdg.+11d)	±(2% rdg.+11d)													

1) U > 253 V only with 2-pole resp. 3-pole adapter

2) I_{AN} = 500 mA, max. U_N = 250 V

3) The measuring range respectively the transformation factor selected at the clamp (I_L=In: 1 mA...15 A/Out:1 mV/mA or lamp = 1...150 A/1 mV/A) must be set in the "TYPE" menu with the selector switch in the SENSOR position.

4) The measuring range respectively the transformation factor selected at the clamp (x 1, x 10, x 100, x 1000 mV/A) must be set in the "TYPE" menu with the selector switch in the SENSOR position.

5) for R_{Eselective}/R_{Etotal} < 100


Reference Conditions

Line voltage	230 V ± 0.1%
Line frequency	50 Hz ± 0.1%
Meas. qty. frequency	45 Hz ... 65 Hz
Meas. qty. waveshape	sine (deviation between RMS and rectified value ≤ 0.1%)
Line impedance angle	cos φ = 1
Probe resistance	≤ 10 Ω
Supply voltage	12 V ± 0.5 V
Ambient temperature	+ 23 °C ± 2 K
Relative humidity	45% ... 55%
Finger contact	potential difference test at earth potential
Standing surface insulation	purely ohmic

Overload Capacity

R _{INS}	1200 V continuous
U _{L-PE} , U _{L-N}	600 V continuous
RCD, R _E , R _F	440 V continuous
Z _{L-PE} , Z _{L-N}	550 V (limits the number of measurements and pause duration, a thermal protector switches the instrument off if overload should occur.)
R _{LO}	Electronic protection prevents the instrument from being switched on if interference voltage is present.
Fine-wire fuse protection	FF 3.15 A 10 s, > 5 A – fuse blows

Power Supply

Rechargeable batteries	8 ea. 1.5 V AA size batteries, we recommend rechargeable batteries type enloop AA HR6, 2000 mAh (Article no. Z502H)
Number of measurements with PROFITEST MTECH (standard setup with display illumination)	
– for R _{INS}	1 measurement – 25 s pause about 1100 measurements
– for R _{LO}	automatic polarity reversal/1 Ω (1 measuring cycle) – 25 s pause: about 1000 measurements
Battery test	Battery voltage displayed with symbol BAT 
Battery saving circuit	Display illumination can be deactivated. The instrument switches itself off automatically after last key operation. ON-time can be selected by the user.
Safety shutdown	The instrument is switched off, or cannot be switched on, if the supply voltage drops to below a given level.
Charging socket	Rechargeable batteries can be directly charged within the instrument by connecting the Z502P mains power battery charger to the charging socket.

Electrical Safety

Protection class	II per IEC 61010-1/EN 61010-1/VDE 0411-1
Nominal voltage	230/400 V (300/500 V)
Test voltage	3,7 kV 50 Hz
Measuring category	CAT III 600 V or CAT IV 300 V
Pollution degree	2
Fuses	
Terminals L and N	1 ea. G fuse link FF 3.15/500G 6.3 mm x 32 mm

Electromagnetic Compatibility (EMC)

Product standard EN 61326-1:2006

Interference Emission		Class
EN 55022		A
Interference Immunity	Test value	Performance feature
EN 61000-4-2	Contact/air - 4 kV/8 kV	
EN 61000-4-3	10 V/m	
EN 61000-4-4	Mains connection - 2 kV	
EN 61000-4-5	Mains connection - 1 kV	
EN 61000-4-6	Mains connection - 3 V	
EN 61000-4-11	0.5 period / 100%	

Ambient Conditions

Accuracy	0 ... + 40 °C
Operation	-5 ... + 50 °C
Storage	-20 ... + 60 °C (without batteries)
Relative humidity	max. 75%, no condensation
Elevation	max. 2000 m above sea level

Mechanical Design

Display	multiple display with dot matrix 128 x 128 pixels
Dimensions	WxLxD = 260 mm x 330 mm x 90 mm
Weight	approx. 2.3 kg with batteries
Protection	housing: IP 40, test probe: IP 40 per EN 60529/DIN VDE 0470 part 1

Extract from table on the meaning of IP codes

IP XY (1 st digit X)	Protection against foreign object entry	IP XY (2 nd digit Y)	Protection against the penetration of water
4	≥ 1.0 mm Ø	0	not protected

Data Interface

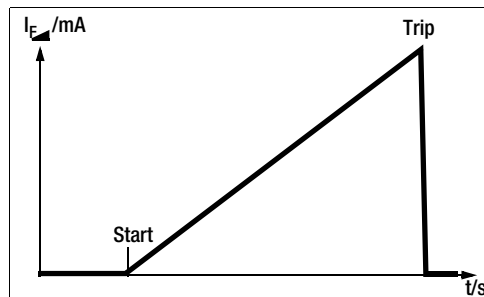
Type	USB slave for PC connection
Type	RS232 for barcode and RFID scanner

Standard Equipment

- 1 Test instrument
- 1 Earthing contact plug insert (country-specific)
- 1 2-pole measuring adapter and
1 cable for extension to 3-pole adapter (PRO-A3-II)
- 2 Alligator clips
- 1 Carrying strap
- 1 Set of rechargeable batteries (Z502H)
- 1 Battery charger (Z502P)
- 1 Condensed operating instructions
- 1 Operating instructions (on CD-ROM)
- 1 DKD calibration certificate
- 1 PC program ETC (see page 7)
- 1 USB interface cable

Special Functions with PROFITEST MTECH

Trip test for AC-DC sensitive RCDs (type B)  
with rising DC residual current and measurement of trip current




In selector switch position $I_{F\Delta}$, a slowly rising direct current flows via N and PE. The measurement value for current is continuously displayed. When the RCD is tripped, the last

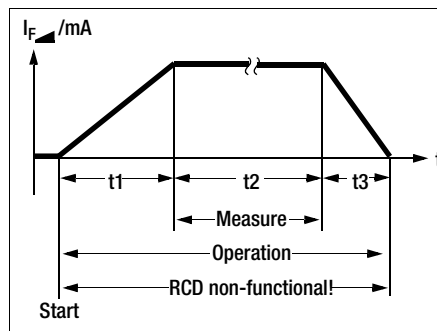
measured current value appears. Measurement is performed for delayed RCDs (type **S**) with a greatly reduced rate of rise.

Trip test for AC-DC sensitive RCDs (type B)  
with constant DC residual current and measurement of trip time

In the selector switch position for the respective nominal residual current, twice the nominal current flows via N and PE. Time required until RCD tripping occurs is measured and displayed.

Loop impedance measurement by means of suppressing RCD tripping

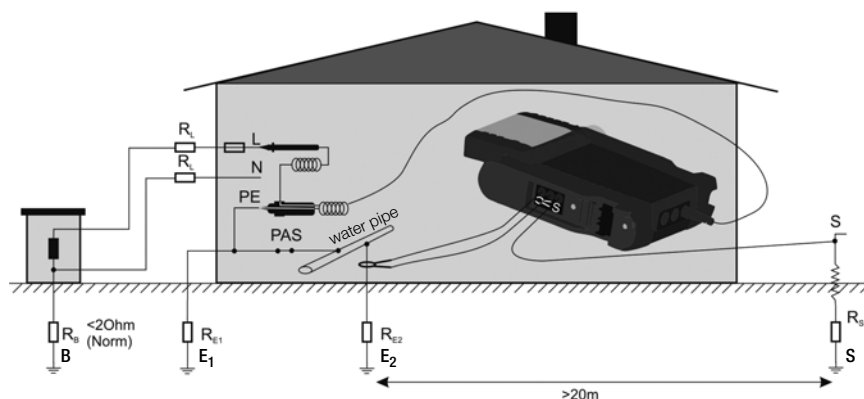
The test instruments allow for the measurement of loop impedance in TN systems with RCDs, type A and AC  (10/30/100/300/500 mA nominal residual current).



The respective test instrument generates a DC residual current which saturates the RCD's magnetic circuit. A measuring current is superimposed by the test instrument, which demonstrates half-waves only of like polarity. The RCD can no longer

detect the measuring current in this case and is not tripped during testing.

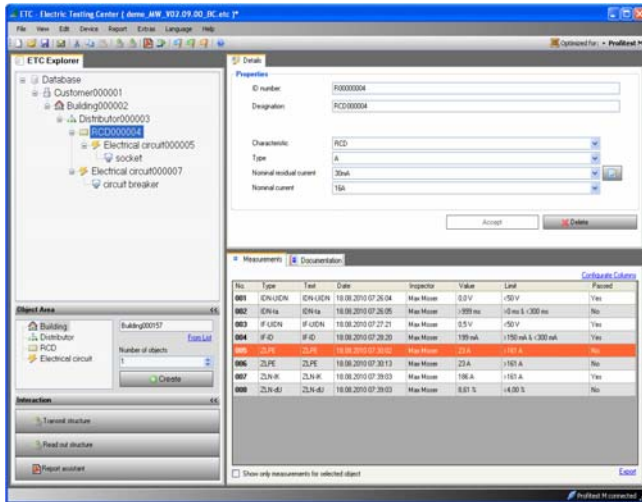
Selective earth resistance measurement



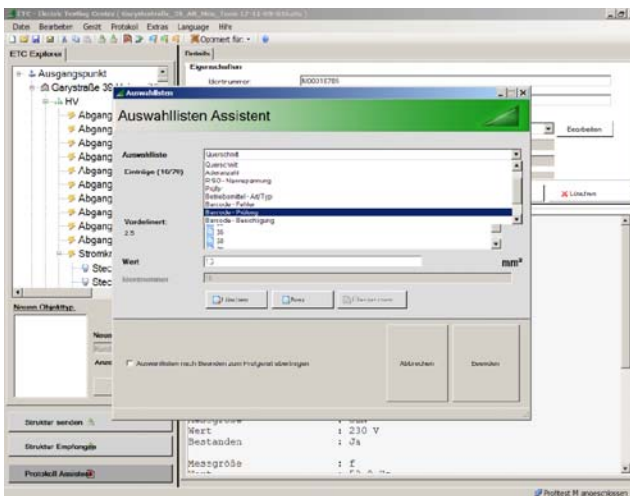
PROFITEST | MBASE MTECH Test Instruments per IEC 60364-6/DIN VDE 0100

PC User Software ETC (Standard Equipment)

Creation of individual test structures at the PC and transmission to the test instrument.



Editing of selection lists



Report generation



Accessories for Test Instruments of the PROFITESTMASTER Series

PROTOKOLLmanager Professional

Report generation software for the documentation of electrical tests per BGV A3, VDE 0100, VDE 0701-0702, with unlimited customer management.

ELEKTROmanager

Software for measurement and documentation of electrical devices and systems. ELEKTROmanager represents a new generation of software for data logging and data management, as well as for controlling test sequences used by electricians concerned with effectiveness, technical competence and legal security. Use is easy to learn and self-explanatory to a great extent. All common measuring instruments supplied by other manufacturers can be interconnected, i.e. after purchasing a new GMC-I Messtechnik GmbH instrument the customer can continue using the old instrument from another manufacturer.

PS3 Intelligent Modular Software for Test Instruments (in preparation)

Measurement data acquired with test instruments is transferred to PS3 and are then automatically assigned to activities such as testing, maintenance or inspection. Ready-to-sign test and work reports can thus be prepared with a minimum of effort.

The basic module and the device module are sufficient for standard requirements such as reading in measurement data and report printing.

Additional requirements such as following up on deadlines, test data history, data selection and list generation, right on up to complete object management (devices and buildings) with inventory management, errors indication, work orders and repairs are handled with the expansion module and with add-on modules.

It is possible to export the data from PS3 to the test instrument.

An overview of all of the features included with this software is given on our website.

Generation of Reports and Lists with PC.doc-WORD™/EXCEL™

Prerequisite: Microsoft®WORD™ or Microsoft®EXCEL™

PC.doc-WORD™/EXCEL™ inserts test results and data entered at the test instrument input module into test or list forms. These can then be supplemented and printed out with Microsoft®WORD™ or Microsoft®EXCEL™.

Test Data Management with PC.doc-ACCESS™

Prerequisite: Microsoft®ACCESS™

PC.doc-ACCESS™ manages device, machine, equipment, master and test data, Available test instrument data are automatically entered to master data and test data list which are assigned to individual customers.

Data are represented in accordance with the respective test standard. Data are displayed as lists or in data sheet format, and can be sorted and filtered in a variety of different ways. Complete test data management is thus made possible. Reports and deadline list can be printed out for selectable ID number ranges.

PROFITEST | MBASE MTECH

Test Instruments per IEC 60364-6/DIN VDE 0100

PROFISCAN ETC (Barcodes) – Z502G Barcode Scanner for RS232 Connection to the Test Instrument – Z502F



Barcode and Label Printer for USB Connection to a PC – Z721D

Barcode and label printer for connection to a PC to produce self-adhesive, smudge-proof barcode labels to identify devices and system components. The barcodes can be recorded from our test instruments by means of the barcode scanner and the measured values can be assigned.



RFID Scanner SCANBASE RFID for RS232 Connection with the Test Instrument – Z751G



The RFID scanner Z751G is preprogrammed for reading the following RFID tags.

Order no.	Frequency	Standard	Layout	Package Quantity
Z751R	13.56 MHz	ISO 15693	dia. approx. 22 mm self-adhesive	500 pieces
Z751S	13.56 MHz	ISO 15693	dia. approx. 30 x 2 mm with 3 mm hole	500 pieces
Z751T	13.56 MHz	ISO 15693	Pigeon ring, dia. approx. 10 mm	250 pieces

Regarding barcode scanner, printer and RFID scanner see also separate datasheet „ID systems“.

ISO Calibrator 1

Calibration adapter for quick and efficient testing of the accuracy of test instruments for insulation resistance and low-value resistors.



3-Phase Current Adapters



The A3-16, A3-32 and A3-63 three-phase current adapters are used for the convenient connection of test instruments to 5-pole CEE outlets. The three different versions have different sized plugs which correspond to 5-pole CEE outlets with current ratings of 16 A, 32 A and 63 A. Phase sequence is indicated with lamps.

Testing for the effectiveness of protective devices is accomplished via five 4 mm, contact protected jacks.

Variable Plug Set



Three contact protected, self-retaining test probes for connection to measurement cables with 4 mm banana plugs, or with contact protected plugs for connection to sockets with openings ranging from 3.5 to 12 mm, e.g. CEE or Perilex outlets etc.

The test probes also fit into, for example, the square PE jack at Perilex

outlets. Maximum allowable operating voltage: 600 V per IEC 61010.

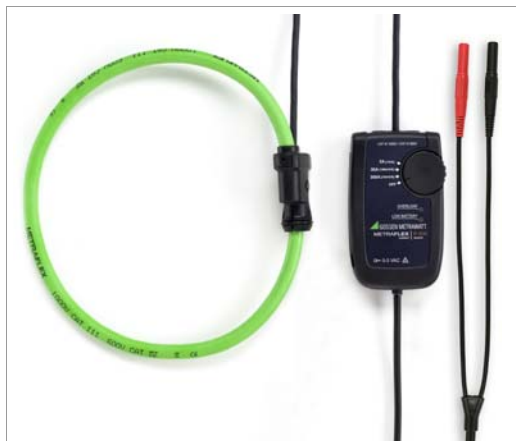
KS24 Cable Set



The KS 24 cable set consists of a 4 m extension cable with permanently attached test probe at one end, and a contact protected jack at the other end, as well as two alligator clips which can be plugged onto the test probe.

METRAFLEX P300

Flexible current clamp sensor for selective earth resistance measurement.



PROFITEST | MBASE MTECH

Test Instruments per IEC 60364-6/DIN VDE 0100



WZ12C
Current sensor clamp
for leakage current



Z3512A
AC current
sensor clamp

Floor Probe



The 1081 floor probe allows for the measurement of resistance at insulating floor coverings in accordance with DIN VDE 0100 part 600 and EN 1081.

Measurement Cable Drum TR50



50 m measurement cable, wound onto a metal drum. Connection to one end of the cable is accomplished with a jack which is integrated into the drum. The other end is equipped with a banana plug. The drum axle with handle can be removed for space saving storage. Cable resistance can be compensated for in selector switch position R_{LO} .

Various Accessories



Clockwise:
TR25 reel,
SP350 earth drill,
Telearn 1
telescoping rod,
PRO-UNI-II and PRO-
RLO-II plug inserts.

Charger Master Z502P



Battery Pack Master Z502H



Carrying Pouch F2000



The test instrument, the PSI module, plug inserts, measuring adapter, replacement batteries, recording chart paper etc., can all be conveniently stored and transported with the F2000 carrying pouch.

(Outer dimensions:
380 x 310 x 200 mm)

Large Universal Carrying Pouch F2020



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

Master Case



Stackable case with
inserts for test instru-
ment and accessories

Dimensions:
W x H x D
395 x 320 x 295 mm

Order Information

Designation	Type	Article Number
PROFITESTMASTER Variants		
Universal, protective measures test instrument for DIN VDE 0100 per EN 61557, part 1+2+3+4+5+6+7 with integrated memory and insulation measurement up to 1000 V, see page 6 for standard equipment	PROFITESTMBASE	M520M
same as PROFITESTMBASE , plus trip test operating mode for AC-DC sensitive RCDs and loop impedance measurement	PROFITESTMTECH	M5200
Plug Inserts and Adapters		
Plug Insert Schuko: D, A, NL, F	PRO-Schuko	GTZ3228000R0001
Plug Insert corresponding SEV: CH	PRO-CH	GTZ3225000R0001
Plug Insert corresponding BS: UK	PRO-GB	GTZ3226000R0001
Plug Insert for South Africa	PRO-RSA	Z501A
Measuring adapter for three-phase current and phase sequence systems 300 V/16 A CAT IV	PRO-A3-II	Z5010
With 10 m cable for PE and similar measurements 300 V/16 A CAT IV	PRO-RLO-II	Z501P
With 3 connector cables for any standard 300 V/16 A CAT IV	PRO-UNI-II	Z501R
5-pole three-phase current adapter for 16 A CEE outlets	A3-16	GTZ3602000R0001
5-pole three-phase current adapter for 32 A CEE outlets	A3-32	GTZ3603000R0001
5-pole three-phase current adapter for 63 A CEE outlets	A3-63	GTZ3604000R0001
Variable plug set	Z500A	Z500A
Calibration adapter for testing the accuracy of instruments for the measurement of insulation resistance and low-value resistors	ISO-Kalibrator 1	M662A
Accessories		
Barcode scanner, printer and RFID scanner see separate datasheet „ID systems“		
4 m extension cable	KS24	GTZ3201000R0001
Telescoping rod for PE measurement	Telearm 1	GTZ3232000R0001
Reel with 25 m measurement cable	TR25 Reel	GTZ3303000R0001
Drum with 50 m measurement cable	TR50 Drum	GTY1040014E34
35 cm earth drill for earth measurement	SP350 Earth Drill	GTZ3304000R0001
Triang. probe for floor measurement per EN 1081 and DIN VDE 0100	1081 Probe	GTZ3196000R0001
Current sensor clamp for leakage current, switchable, 1 mA ... 15 A, 3% and 1 A ... 150 A, 2%	WZ12C ^{D)}	Z219C
Current sensor clamp, convertible measuring ranges 0 ... 1/100/1000 A~ AV~ ± (0.7% ... 0.2%)	Z3512A ^{D)}	Z225A
Flexible AC current sensor 3/30/300 A, 1 V/100 mV/10 mV/A, with batteries, probe length 45 cm	METRAFLEX P300	Z502E
8 LSD-NiMH AA size rechargeable low self discharge batteries (eneloop/Sanyo) 2000 mAh with heat-sealed cells	Akku-Pack Master	Z502H

Designation	Type	Article Number
Mains power battery charger for charging the batteries inserted in PROFITESTMASTER Broad range charger (only suited for mains operation) input: 100 ... 240 V AC; output: 16.5 V DC	Charger „Master“	Z502P
Stackable case empty with inserts for PROFITESTMASTER and accessories	Master case „Device“	Z502A
Stackable case with inserts and accessories for earth resistance measurement and 2 clamps	Master case „Earth“	Z502B
Universal carrying pouch	F2000 ^{D)}	Z700D
Universal carrying pouch big	F2020	Z700F
PC Analysis Software		
For further details on software, please refer to our website		
http://www.gossenmetrawatt.com (→ Products → Electrical Testing → Testing of electr. Installations → PROFITEST ...)		
or		
http://www.gossenmetrawatt.com (→ Products → Software → Software for testers)		
Starter packages		
Consisting of: PROFITESTMBASE , Variable plug adapter set and universal carrying pouch F2000	BASE Starter Package	M500M
Consisting of: PROFITESTMTECH , Variable plug adapter set and universal carrying pouch F2000	TECH Starter Package	M500N
Consisting of: PROFITESTMTECH , variable plug adapter set, earth drill Sp350, metal drum TR50, adapter PRO-RLO II and Master case „Device“ (Z502A)	TECH Master Package	M500P
Consisting of: PROFITESTMBASE , universal carrying pouch F2000 and METRAFLEX P300	PRO-Package E	M500R
Consisting of: PROFITESTMTECH , universal carrying pouch F2000 and METRAFLEX P300	XTRA-Package E	M500S
Consisting of: PROFITESTMTECH , METRAFLEX P300, Variable plug adapter set, earth drill SP350, metal drum TR50, adapter PRO-RLO II and Master case „Device“ (Z502A)	XTRA-Package XL	M500T

^{D)} Data sheet available

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