

COMBI519

Advanced multifunction installation tester for verification of electric safety of private and industrial electric systems



Functions

AUTO test (Non-trip ground resistance, RCD, Insulation) in sequence

Insulation with voltage 50, 100, 250, 500, 1000VDC

Measurement of polarization index P.I.

Measurement of dielectric absorption ratio D.A.R.

Continuity of protective circuit with 200mA

Tripping time and current of RCDs type A, AC Standard, Selective

Non-trip earth resistance

Loop/Line impedance Phase-Phase, Phase-Neutral, Phase-PE with high resolution (0.1mΩ)

Loop/Line impedance, Phase-Phase, Phase-Neutral, Phase-PE

Percentage voltage drop on the line

Contact voltage

Phase sequence

Help on line on the display

Internal memory for measured data saving

Optical/USB serial port for PC connection

Protection rating

Power supply

Protection category

Weight in grams (batteries included)

Size (LxWx H) (mm)

B type up to 300mA

With optional accessory IMP57

CAT IV 300V

1200

222x162x57



1. TECHNICAL SPECIFICATIONS

Accuracy is calculated as: $\pm[\% \text{reading} + (\text{no. of digits}) * \text{resolution}]$ at 23°C, <80%RH

AC TRMS VOLTAGE

Range (V)	Resolution (V)	Accuracy
15 ÷ 460	1	$\pm(3.0\% \text{ rdg} + 2\text{dgt})$

FREQUENCY

Range (Hz)	Resolution (Hz)	Accuracy
47.50 ÷ 52.50 / 57.00 ÷ 63.00	1	$\pm(0.1\% \text{ rdg} + 1\text{dgt})$

CONTINUITY OF PROTECTION CONDUCTORS WITH 200mA

Range (Ω)	Resolution (Ω)	Accuracy
0.00 ÷ 9.99	0.01	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

Test current: >200mA DC up to 5 Ω (test leads included)
 Test current generated: 1mA resolution, range 0 ÷ 250mA
 Open-circuit voltage: $4 < V_0 < 24\text{VDC}$
 Safety protection: error message for input voltage >10V

INSULATION RESISTANCE

DC test voltage (V)	Range (M Ω)	Resolution (M Ω)	Accuracy
50	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 49.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
	50.0 ÷ 99.9		
100	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 99.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
	100 ÷ 199	1	
250	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 99.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
	100 ÷ 249		
500	250 ÷ 499	1	
	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
200 ÷ 499	1		
1000	500 ÷ 999	1	
	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
200 ÷ 999	1		
	1000 ÷ 1999	1	

Open-circuit voltage: rated test voltage -0% +10%
 Rated measuring current: >1mA with 1k Ω x Vnom (50V, 100V, 250V, 1000V), >2.2mA with 230k Ω @ 500V
 Short-circuit current: <6.0mA for each test voltage
 Safety protection: error message for input voltage >10V




LINE/LOOP IMPEDANCE P-P, P-N, P-PE – TT/TN SYSTEMS

Range (Ω)	Resolution (Ω) (*)	Accuracy
0.01 ÷ 19.99	0.01	$\pm(5.0\% \text{ rdg} + 3\text{dgt})$
20.0 ÷ 199.9	0.1	

(*) 0.1m Ω in range 0.1 ÷ 199.9 m Ω (by using the optional accessory IMP57)

Maximum test current: 3.31A (at 265V); 5.71A (at 457V)
 P-N/P-P Test voltage: (100V \pm 265V) / (100V \pm 460V); 50/60Hz \pm 5%
 Protection types: MCB (B, C, D, K), Fuse (aM, gG, BS882-2, BS88-3, BS3036, BS1362)

TEST ON RCD PROTECTION (MOLDED-CASE TYPE)

Differential protection type (RCD):	AC () , A () , General (G), Selective (S) and B ()
Voltage range P-PE, P-N:	100V ÷265V RCD type A, A and B ($I_{\Delta N} \leq 100\text{mA}$), 190V ÷265V RCD type B ($I_{\Delta N} = 300\text{mA}$)
Voltage range N-PE:	<10V
Rated tripping currents ($I_{\Delta N}$):	6mA, 10mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA
Frequency:	50/60Hz \pm 5%

RCD tripping current (for General RCDs only)

Type RCD	$I_{\Delta N}$	Range $I_{\Delta N}$ (mA)	Resolution (mA)	Accuracy
A, AC, B	6mA, 10mA	$(0.2 \div 1.1) I_{\Delta N}$	0.1 $I_{\Delta N}$	- 0%, +10% $I_{\Delta N}$
A, AC, B	$30\text{mA} \leq I_{\Delta N} \leq 300\text{mA}$			- 0%, +5% $I_{\Delta N}$
AC, A	$500\text{mA} \leq I_{\Delta N} \leq 650\text{mA}$			

Measurement RCD tripping time – TT/TN systems



	x 1/2		x 1		x 5		AUTO				AUTO+ 		
	\	G	S	G	S	G	S	G	S	G	S	G	S
6mA	AC	999	999	999	999	50	150	✓	✓	310		✓	
	A	999	999	999	999	50	150	✓	✓	310		✓	
	B	999	999	999	999					310			
10mA	AC	999	999	999	999	50	150	✓	✓	310		✓	
	A	999	999	999	999	50	150	✓	✓	310		✓	
	B	999	999	999	999					310			
30mA	AC	999	999	999	999	50	150	✓	✓	310		✓	
	A	999	999	999	999	50	150	✓	✓	310		✓	
	B	999	999	999	999					310			
100mA	AC	999	999	999	999	50	150	✓	✓	310			
	A	999	999	999	999	50	150	✓	✓	310			
	B	999	999	999	999					310			
300mA	AC	999	999	999	999	50	150	✓	✓	310			
	A	999	999	999	999	50	150	✓	✓	310			
	B	999	999	999	999					310			
500mA 650mA	AC	999	999	999	999	50	150	✓	✓	310			
	A	999	999	999	999					310			
	B												
1000mA	AC	999	999	999	999								
	A	999	999	999	999								
	B												

Table with duration of tripping time measurement [ms] - Resolution: 1ms, Accuracy: $\pm(2.0\% \text{reading} + 2 \text{digits})$

Measurement RCD tripping time – IT systems



	x 1/2		x 1		x 5		AUTO				AUTO+ 		
	\	G	S	G	S	G	S	G	S	G	S	G	S
6mA 10mA 30mA	AC	999	999	999	999	50	150	✓	✓	310		✓	
	A	999	999	999	999	50	150	✓	✓	310		✓	
	B	999	999	999	999					310			
100mA 300mA	AC	999	999	999	999	50	150	✓	✓	310			
	A	999	999	999	999	50	150	✓	✓	310			
	B	999	999	999	999					310			
500mA 650mA	AC	999	999	999	999	50	150	✓		310			
	A	999	999	999	999			✓		310			
	B												
1000mA	AC	999	999	999	999								
	A	999	999	999	999								
	B												

Table with duration of tripping time measurement [ms] - Resolution: 1ms, Accuracy: $\pm(2.0\% \text{reading} + 2 \text{digits})$

FIRST FAULT CURRENT – IT SYSTEMS

Range (mA)	Resolution (mA)	Accuracy
0.1 ÷ 0.9	0.1	±(5.0% rdg + 1dgt)
1 ÷ 999	1	±(5.0% rdg + 3dgt)

Limit contact voltage (ULIM) : 25V, 50V

OVERALL EARTH RESISTANCE WITHOUT RCD TRIPPING

Voltage range P-PE, P-N:	100V ÷ 265V
Voltage range N-PE:	<10V
Frequency:	50/60Hz ± 5%

Overall earth resistance in systems with Neutral (3-wire) – (30mA or higher RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 8dgt)
10.0 ÷ 199.9	0.1	

Overall earth resistance in systems with Neutral (3-wire) – (6mA and 10mA RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 30dgt)
10.0 ÷ 199.9	0.1	

Overall earth resistance in systems without Neutral (2-wire) – (30mA or higher RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 8dgt)
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

Overall earth resistance in systems without Neutral (2-wire) – (6mA and 10mA RCD)

Range (Ω)	Resolution (Ω)	Accuracy
0.05 ÷ 9.99	0.01	± (5.0% rdg + 30dgt)
10.0 ÷ 99.9	0.1	
100 ÷ 1999	1	

Contact voltage

Range [V]	Resolution [V]	Accuracy
0 ÷ Ut LIM	0.1	-0%, +(5.0%rdg + 3V)

PHASE ROTATION WITH 1 TEST LEAD

Voltage range P-N, P-PE[V]	Frequency range
100 ÷ 265	50Hz/60Hz ± 5%

Measurement is only carried out by direct contact with metal live parts (not on insulation sheath)

2. GENERAL SPECIFICATIONS

MECHANICAL CHARACTERISTICS

Dimensions (L x W x H):	225 x 165 x 75mm (9 x 6 x 3in)
Weight (batteries included):	1.2kg (42 ounces)
Mechanical protection:	IP40

MEMORY AND PC CONNECTIONS

Memory:	999 locations, 3 mark levels
PC connection:	optical/USB port

DISPLAY

Characteristics:	COG Black/white graphic LCD, 320x240pxl
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POWER SUPPLY

Battery type:	6x1.5V alkaline batteries type AA IEC LR06 or 6 x1.2V rechargeable NiMH type AA
Battery life:	> 500 tests for each function
Auto Power OFF:	after 5 minutes' idling (if activated)

ENVIRONMENTAL CONDITIONS FOR USE

Reference temperature:	23°C ± 5°C (73°F ± 41°F)
Operating temperature:	0°C ÷ 40°C (32°F ÷ 104°F)
Allowable relative humidity:	<80%RH
Storage temperature:	-10°C ÷ 60°C (14°F ÷ 140°F)
Storage humidity:	<80%RH
Max. operating altitude:	2000m (6562ft)

REFERENCE GUIDELINES

Safety:	IEC/EN61010-1, IEC/EN61010-2-030, IEC/EN61010-2-033 IEC/EN61010-2-034, IEC/EN61557-1
EMC :	IEC/EN61326-1
Technical documentation:	IEC/EN61187
Safety of accessories:	IEC/EN61010-031
Insulation:	double insulation
Pollution level:	2
Measurement category:	CAT IV 300V to earth, maximum 415V between inputs
RPE:	IEC/EN61557-4, BS7671 17th ed., AS/NZS3000/3017
MΩ:	IEC/EN61557-2, BS7671 17th ed., AS/NZS3000/3017
RCD:	IEC/EN61557-6 (only on Phase-Neutral-Earth systems)
LOOP P-P, P-N, P-PE:	IEC/EN61557-3, BS7671 17th ed., AS/NZS3000/3017
Multifunction:	IEC/EN61557-10, BS7671 17th ed., AS/NZS3000/3017
Short-circuit current:	EN60909-0

This instrument satisfies the requirements of Low Voltage Directive 2014/35/EU (LVD) and of EMC Directive 2014/35/EU

This instrument satisfies the requirements of European Directive 2011/65/EU (RoHS) and 2012/19/EU (WEEE)