

COMBI519	Rel. 1.01 of 06/09/22
Multifunctional instrument for safety measurements	Pag 1 di 5

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	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		
1000	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	
	200 ÷ 999	1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$
1000	0.01 ÷ 9.99	0.01	$\pm(2.0\% \text{ rdg} + 2\text{dgt})$
	10.0 ÷ 199.9	0.1	
	200 ÷ 999	1	$\pm(5.0\% \text{ rdg} + 2\text{dgt})$

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 >30V

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 ÷ 265V) / (100V ÷ 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/F(✓), B/B+(✓), CCID(✓ - USA country), General (G), Selective (S)

Single -phase systems (L-N-PE)

 Voltage range L-PE, L-N: 100V ÷265V RCD type AC, A/F, B/B+ and CCID ($I_{\Delta N} \leq 100\text{mA}$)
 190V ÷265V RCD type B/B+ ($I_{\Delta N} = 300\text{mA}$)

Voltage range N-PE: <10V

Split-phase systems (phase delay VL1-PE, VL2-PE = 180° or phase delay VL1-PE, VL2-PE = 120°)

 Voltage range L1-PE, L1-L2: 100V ÷265V RCD type AC, A/F, B/B+ and CCID ($I_{\Delta N} \leq 100\text{mA}$)

Voltage range L2-PE:

 0V÷265V RCD type AC, A/F
 0V÷min[(VL1-PE-100V) and (VL1-L2-100V)], RCD type B/B+ ($I_{\Delta N} \leq 100\text{mA}$)

 Rated tripping currents ($I_{\Delta N}$):

5mA, 6mA, 10mA, 20mA, 30mA, 100mA, 300mA, 500mA, 650mA, 1000mA

Frequency:

50/60Hz ± 5%

RCD tripping current (for General RCDs only)

Type RCD	$I_{\Delta N}$	Range $I_{\Delta N}$ (mA)	Resolution (mA)	Accuracy
CCID	5mA, 20mA	$(0.2 \div 1.3) I_{\Delta N}$	0.1 $I_{\Delta N}$	- 0%, +10% $I_{\Delta N}$
AC, A/F, B/B+	6mA, 10mA			
AC, A/F, B/B+	$30\text{mA} \leq I_{\Delta N} \leq 300\text{mA}$	$(0.2 \div 1.1) I_{\Delta N}$		- 0%, +5% $I_{\Delta N}$
AC, A/F	$500\text{mA} \leq I_{\Delta N} \leq 650\text{mA}$			

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
5mA	AC									
	A/F									
	B/B+									
	CCID		999						310	
6mA	AC	999	999	999	999	999	✓	✓	310	✓
	A/F	999	999	999	999	999	✓	✓	310	✓
	B/B+	999	999	999	999				310	
	CCID									
10mA	AC	999	999	999	999	999	✓	✓	310	✓
	A/F	999	999	999	999	999	✓	✓	310	✓
	B/B+	999	999	999	999				310	
	CCID									
20mA	AC									
	A/F									
	B/B+									
	CCID			999					310	
30mA	AC	999	999	999	999	999	✓	✓	310	✓
	A/F	999	999	999	999	999	✓	✓	310	✓
	B/B+	999	999	999	999				310	
	CCID									
100mA	AC	999	999	999	999	999	✓	✓	310	
	A/F	999	999	999	999	999	✓	✓	310	
	B/B+	999	999	999	999				310	
	CCID									
300mA	AC	999	999	999	999	999	✓	✓	310	
	A/F	999	999	999	999	999	✓	✓	310	
	B/B+	999	999	999	999				310	
	CCID									
500mA 650mA	AC	999	999	999	999	999	✓	✓	310	
	A/F	999	999	999	999				310	
	B/B+									
	CCID									
1000mA	AC	999	999	999						
	A/F	999	999	999						
	B/B+									
	CCID									

Table with duration of tripping time measurement [ms] - Resolution: 1ms, Accuracy: ±(2.0%reading + 2digits)

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	AC	999	999	999	999	50	150	✓	✓	310		✓	
10mA	A/F	999	999	999	999	50	150	✓	✓	310		✓	
30mA	B/B+	999	999	999	999					310			
100mA 300mA	AC	999	999	999	999	50	150	✓	✓	310			
	A/F	999	999	999	999	50	150	✓	✓	310			
	B/B+	999	999	999	999					310			
500mA 650mA	AC	999	999	999	999	50	150	✓		310			
	A/F	999	999	999	999			✓		310			
	B/B+												
1000mA	AC	999	999	999	999								
	A/F	999	999	999	999								
	B/B+												

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

TEST ON RCD TYPE DD PROTECTION

Differential protection type (RCD):	DD type (compliance with IEC62955 guideline), General (G)
Single -phase systems (L-N-PE)	
Voltage range L-PE, L-N:	100V \div 265V
Voltage range N-PE:	<10V
Split-phase systems (phase delay VL1-PE, VL2-PE = 180° or phase delay VL1-PE, VL2-PE = 120°)	
Voltage range L1-PE, L1-L2:	100V \div 265V
Voltage range L2-PE:	0V \div min[(VL1-PE-100V) and (VL1-L2-100V)]
Rated tripping currents (I Δ N):	6mA
Frequency:	50/60Hz \pm 5%

Tripping current – (RCD DD type General)

RCD type	I Δ N	Range (mA)	Resolution (mA)	Accuracy
DD	6mA	(0.2 \div 1.1) I Δ N	$\leq 0.1 I_{\Delta N}$	- 0%, +10% I Δ N

Tripping time – (RCD DD type General)

RCD type	I Δ N	Range (ms)	Resolution (ms)	Accuracy
DD	6mA	10000	1	$\pm(2.0\% \text{rdg} + 2 \text{dgt})$

FIRST FAULT CURRENT – IT SYSTEMS

Range (mA)	Resolution (mA)	Accuracy
0.1 \div 0.9	0.1	$\pm(5.0\% \text{rdg} + 1 \text{dgt})$
1 \div 999	1	$\pm(5.0\% \text{rdg} + 3 \text{dgt})$

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

OVERALL EARTH RESISTANCE WITHOUT RCD TRIPPING

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

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

Range (Ω)	Resolution (Ω)	Accuracy
0.05 \div 9.99	0.01	$\pm (5.0\% \text{rdg} + 8 \text{dgt})$
10.0 \div 199.9	0.1	

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

Range (Ω)	Resolution (Ω)	Accuracy
0.05 \div 9.99	0.01	$\pm (5.0\% \text{rdg} + 30 \text{dgt})$
10.0 \div 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)

VOLTAGE DROP ON LINES ($\Delta V\%$)

Range [%]	Resolution [%]	Accuracy
0.0 ÷ 100.0	0.1	±(10.0%rdg + 4dgt)

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)
RCD-DD:	IEC62955
RCD CCID:	UL2231-2
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 2014/30/EU

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