



VR2250

INSTALLATION ANALYSER

MULTIFUNCTION TEST INSTRUMENT

SPECIFICATION

TECHNICAL SPECIFICATIONS

TECHNICAL FEATURES

Accuracy is indicated as [% of reading + number of digits]. It refers to the following atmospheric conditions: a temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ with a relative humidity $< 60\%$.

Martindale Electric Ltd reserves the right to change specification without notice, and without incurring any obligation.

Safety Test functions

● LOW Ω : 200mA CONTINUITY TEST (AUTO, RT+, RT- MODE)

Range [Ω]	Resolution [Ω]	Accuracy(*)
0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$
10.0 - 99.9	0.1	

(*) After Test leads calibration

Test Current > 200mA DC per $R \leq 5\Omega$ (Test leads included)
 Resolution for Test current: 1mA
 Open Circuit Voltage $V_0 \geq 4V \leq 24V$

● M Ω : INSULATION TEST

Test Voltage [V]	Range [M Ω]	Resolution [M Ω]	Accuracy
50	0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$ if $V/R > 1\mu\text{A}$
	10.0 - 49.9	0.1	
	50.0 - 99.9	0.1	$\pm(5\% \text{ Reading} + 2 \text{ digits})$ if $V/R \leq 1\mu\text{A}$
100	0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$ if $V/R > 1\mu\text{A}$
	10.0 - 99.9	0.1	
	100.0 - 199.9	0.1	$\pm(5\% \text{ Reading} + 2 \text{ digits})$ if $V/R \leq 1\mu\text{A}$
250	0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$ if $V/R > 1\mu\text{A}$
	10.0 - 199.9	0.1	
	200 - 249	1	$\pm(5\% \text{ Reading} + 2 \text{ digits})$ if $V/R \leq 1\mu\text{A}$
	250 - 499	1	
500	0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$ if $V/R > 1\mu\text{A}$
	10.0 - 199.9	0.1	
	200 - 499	1	$\pm(5\% \text{ Reading} + 2 \text{ digits})$ if $V/R \leq 1\mu\text{A}$
	500 - 999	1	
1000	0.01 - 9.99	0.01	$\pm(2\% \text{ Reading} + 2 \text{ digits})$ if $V/R > 1\mu\text{A}$
	10.0 - 199.9	0.1	
	200 - 999	1	$\pm(5\% \text{ Reading} + 2 \text{ digits})$ if $V/R \leq 1\mu\text{A}$
	1000 - 1999	1	

Open circuit Test Voltage < 1.3 x Nominal Test Voltage
 Short Circuit Current < 6.0mA with 500V Test Voltage
 Nominal Test Current 500V > 2.2mA with 230k Ω
 other > 1mA with 1k Ω *Vnom

● RCD: TEST ON RCD DEVICES

Nominal Test Current ($I_{\Delta N}$) 10mA, 30mA, 100mA, 300mA, 500mA
 RCD type AC, A General and Selective
 Phase to Earth Test Voltage 100V - 250V 50 Hz
 Frequency 50Hz $\pm 0.5\text{Hz}$

- Tripping Time Measurement t_N

Range [ms]	Resolution [ms]	Accuracy
$\frac{1}{2} I_{\Delta N}, I_{\Delta N}$ 1 - 999	1	$\pm(2\% \text{ Reading} + 2 \text{ digits})$
$2 I_{\Delta N}$ 1 - 200 general		
1 - 250 selective		
$5 I_{\Delta N}$ RCD 1 - 50 general		
1 - 160 selective		

- Contact Voltage U_t

Range [V]	Resolution [V]	Accuracy
0 - $2U_{t \text{ lim}}$	0.1	- 0%, +(5% Reading + 3 digits)

U_t LIM (UL): 25V or 50V

- Global Earth Resistance Measurement (avoiding RCD tripping)

Range [Ω]	Resolution [Ω]	Accuracy $I_{\Delta N}$
1 - 1999	1	- 0%, +(5% Reading + 3 digits)

Test Current 0.5 $I_{\Delta N}$ set

- Tripping Current Measurement

$I_{\Delta N}$	RCD Type	Range $I_{\Delta N}$ [mA]	Resolution [mA]	Accuracy $I_{\Delta N}$
$I_{\Delta N} \leq 10\text{mA}$	AC	$(0.5 - 1.4) I_{\Delta N}$	0.1 $I_{\Delta N}$	- 0%, +5% $I_{\Delta N}$
	A	$(0.5 - 2.4) I_{\Delta N}$		
$I_{\Delta N} > 10\text{mA}$	AC	$(0.5 - 1.4) I_{\Delta N}$		
	A	$(0.5 - 2) I_{\Delta N}$		

● **FREQUENCY MEASUREMENT**

Range [Hz]	Resolution [Hz]	Accuracy
47.0 - 63.6	0.1	$\pm(0.1\% \text{Reading} + 1 \text{ digit})$

RCD and LOOP function are active only for 50Hz \pm 0,5Hz frequency

● **VOLTAGE MEASUREMENT (RCD, LOOP, PHASE ROTATION)**

Range [V]	Resolution [V]	Accuracy
0 - 460V	1	$\pm(3\% \text{Reading} + 2 \text{ digits})$

● **LOOP P-P, P-N: LINE IMPEDANCE MEASUREMENT (Phase - Phase, Phase - Neutral)**

Range [Ω]	Resolution [Ω]*	Accuracy
0.01 - 9.99	0.01	$\pm(5\% \text{ Reading} + 3 \text{ digits})$
10.0 - 199.9	0.1	

(*) 0.1 m Ω on range 0.0 - 199.9 m Ω (with IMP57)

Peak value of the Test current

127V	3.65A
230V	6.64A
400V	11.5A

Voltage Range (Phase - Phase, Phase - Neutral) 100 - 250/ 100 - 440V

Frequency 50Hz \pm 0.5Hz

● **LOOP P-PE: FAULT LOOP IMPEDANCE MEASUREMENT (Phase - Earth)**

Range [Ω]	Resolution [Ω]*	Accuracy
0.01 - 19.99	0.01	$\pm(5\% \text{ Reading} + 3 \text{ digits})$
20.0 - 199.9	0.1	
200 - 1999	1	

(*) 0.1 m Ω on range 0.0 - 199.9 m Ω (with IMP57)

Peak value of the Test current:

127V	3.65A
230V	6.64A

Voltage Range (Phase - Earth)

100 - 250V

Frequency

50Hz \pm 0.5Hz

● **LOOP R_a 15mA: FAULT LOOP IMPEDANCE MEASUREMENT without RCD Tripping (Phase - Earth)**

Range [Ω]	Resolution [Ω]	Accuracy
1 - 1999	1	- 0%, + (5% Reading + 3 digits)

Test Current

15mA

Voltage Range (Phase - Earth)

100 - 250V 50Hz

● **EARTH: GROUND RESISTANCE MEASUREMENT WITH EARTH RODS**

Range RE [Ω]	Resolution [Ω]	Accuracy
0.01 - 19.99	0.01	$\pm(5\% \text{ Reading} + 3 \text{ digits})$
20.0 - 199.9	0.1	
200 - 1999	1	

Test Current

<10mA - 77.5Hz

Open circuit Test Voltage

<20V RMS

● **RESISTIVITY MEASUREMENT**

Range ρ	Resolution	Accuracy
0.60 - 19.99 Ω m	0.01 Ω m	$\pm(5\% \text{ Reading} + 3 \text{ digits})$
20.0 - 199.9 Ω m	0.1 Ω m	
200 - 1999 Ω m	1 Ω m	
2.00 - 99.99 k Ω m	0.01 k Ω m	
100.0 - 125.6 k Ω m(*)	0.1 k Ω m	

(*) setting distance = 10m

Test Current

<10mA - 77.5Hz

Open circuit Test Voltage

<20V RMS

ANALYZER and AUX functions

● VOLTAGE MEASUREMENT – SINGLE PHASE SYSTEM (AUTORANGE)

Range [V]	Resolution [V]	Accuracy	Input Impedance
15 - 310V	0.2V	±(0.5% Reading+2digits)	300kΩ (Phase - Neutral) 300kΩ (Phase - Phase)
310 - 600V	0.4V		

● VOLTAGE SAG AND SURGE DETECTION – SINGLE PHASE SYSTEM (MANUAL RANGE)

Range [V]	Resolution (Voltage)	Resolution (Time)	Accuracy (Voltage)	Accuracy (rif. 50Hz) (Time)	Input Impedance
15 - 310V	0.2V	10ms (½ period)	±(1.0% Reading+2digits)	± 10ms (½ period)	300kΩ (Phase - Neutral) 300kΩ (Phase - Phase)
310 - 600V	0.4V				

● CURRENT MEASUREMENT – SINGLE PHASE SYSTEM (AUTORANGE)

Range [V]	Resolution [mV]	Accuracy	Input Impedance	Overload Protection
0.005 - 0.26V	0.1	±(0.5% Reading+2digits)	200kΩ	5V
0.26 - 1V	0.4			

(*): Example: with a 1000A/1V full scale clamp , the instrument detect only current higher than 5A

● POWER MEASUREMENT – SINGLE PHASE SYSTEM (AUTORANGE)

Quantity	Range	Resolution	Accuracy
ACTIVE POWER	0 - 999.9W	0.1W	±(1.0% Reading + 2 digits)
	1 - 999.9kW	0.1kW	
	1 - 999.9MW	0.1MW	
	1000 - 9999MW	1MW	
REACTIVE POWER	0 - 999.9VAR	0.1VAR	
	1 - 999.9kVAR	0.1kVAR	
	1 - 999.9MVAR	0.1MVAR	
	1000 - 9999MVAR	1MVAR	
APPARENT POWER	0 - 999.9VA,	0.1VA	
	1 - 999.9kVA,	0.1kVA	
	1 - 999.9MVA	0.1MVA	
	1000 - 9999MVA	1MVA	
ACTIVE ENERGY (Class 2 EN61036)	0 - 999.9Wh,	0.1Wh	
	1 - 999.9kWh,	0.1kWh	
	1 - 999.9MWh	0.1MWh	
	1000 - 9999MWh	1MWh	
REACTIVE ENERGY (Class 3 IEC1268)	0 - 999.9VARh,	0.1VARh	
	1 - 999.9kVARh,	0.1kVARh	
	1 - 999.9MVARh	0.1MVARh	
	1000 - 9999MVARh	1MVARh	

● Cos φ MEASUREMENT – SINGLE PHASE SYSTEM

Cos φ	Resolution	Accuracy [°]
0.20	0.01	0.6
0.50		0.7
0.80		1.0

● VOLTAGE AND CURRENT HARMONICS MEASUREMENT – SINGLE PHASE SYSTEM

Range	Resolution	Accuracy
DC – 25H	0.1V / 0.1A	±(5% + 2 digits)
26H – 33H		±(10% + 2 digits)
34H – 49H		±(15% + 2 digits)

Harmonics values are null under fixed threshold:

- DC: its values are null if it is < 2% of Fundamental or is < 2% of Full Scale clamp
- 1st Current Harmonic: its values are null if it is < 0.2% Full Scale clamp
- 2nd - 49th: its values are null if it is < 2% of fundamental or is < 2% of Full Scale clamp

● LEAKAGE CURRENT MEASUREMENT

Range (*)	Resolution [mA]	Accuracy	Input Impedance	Overload Protection
0.5 - 999.9mA	0.1mA	±(5% Reading + 2digits)	200kΩ	5V

(*): During a recording the instrument will detect only Current > 5mA with Resolution 1mA

STANDARDS**General**

Safety	EN 61010-1 + A2 (1997)
Protection classification	Class 2 - Double Insulation
Pollution degree	2
Degree of Protection:	IP50
Over-Voltage Category	CAT II 600V~ / 350V~ (phase –earth) CAT III 600V~ / 300V~ (phase –earth)
Usage:	Indoor; max height 2000m
EMC	EN61326-1 (1997) + A1 (1998)

The instrument complies with European Guidelines for CE mark

Safety Test

LOW Ω (200mA):	IEC 61557-4
M Ω :	IEC 61557-2
RCD:	IEC 61557-6
LOOP P-P, P-N, P-PE:	IEC 61557-3
PHASE SEQUENCE:	IEC 61557-7
EARTH:	IEC 61557-5

ANALYZER

Voltage Sag and Surge	EN50160
Alternating Current Static Watt-hour meters for Active Energy	EN61036 (CLASS 2)
Alternating Current Static VAR-hour meters for Reactive Energy	IEC1268 (CLASS 3)

GENERAL SPECIFICATIONS

Mechanical Data

Dimensions	225 (L) x165 (W) x 105 (H) mm
Weight	1295g approx (including batteries) 1150g approx (excluding batteries)

Power supply

Batteries	6 x 1.5-LR6-AA-AM3-MN 1500
Battery Life:	LOW Ω : approx: 800 tests M Ω : approx: 500 tests RCD AC and A Type: approx: 1000 tests LOOP P-P, P-N, P-PE approx: 1000 tests Ra \perp : approx: 1000 tests EARTH: approx: 1000 tests PHASE SEQUENCE: approx: 1000 tests AUX (recording): approx: 20 Hours ANALYZER (recording): approx: 20 Hours Code MARVR2250PSU (for ANALYZER and AUX) functions
External Power Supply Adapter (optional)	

Display

Display Type	Graphic with backlight
Resolution	128 x128
Visible Area	73mm x 73mm

Memory

Safety Test Memory	999 measurements
ANALYZER:	2MByte (with 63 channels selected and Integration Period = 15min), more than 30 days).

ENVIRONMENT

Reference Temperature	23° ± 5°C
Working Temperature Range	0° - 40°C
Working Humidity	< 80%
Storage Humidity Range	-10° - + 60°C
Storage Humidity	< 80%