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- Proving units
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- Test Leads
- Voltage Indicators
- Specialist Metrohm testers (4 & 5kV)
- Specialist Drummond testers

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QUICK START



VERITEST 2240 ALL-IN-ONE

MARTINDALE
● ● ● ELECTRIC

Trusted by professionals

USER NOTES

CONTENTS

THIS IS DESIGNED TO BE USED AS A QUICKSTART GUIDE ONLY.
COMPREHENSIVE INSTRUCTIONS ARE AVAILABLE FOR DOWNLOAD AT
www.martindale-electric.co.uk/instruct.htm

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**ALL TESTING TO BE CARRIED OUT IN ACCORDANCE WITH
WIRING REGULATIONS IEE 16TH EDITION, BS 7671-2001**

SAFETY INFORMATION: Always read before proceeding.

WARNING

These instructions contain information and warnings that are necessary for safe operation and maintenance of the Veritest. It is recommended that you read the instructions carefully and ensure the contents are understood. Failure to understand the instructions and comply with warnings and instructions herein can result in serious injury, damage or even death.








In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding 30V AC rms, 42V AC peak or 60V DC. Never exceed the maximum allowable input level for each function and range. Refer to the specifications for maximum inputs. Never touch exposed wiring, connections or live circuits.

The Veritest must only be used in conditions and for the purpose which it has been constructed. Attention should be paid to safety instructions, technical specifications and use of the Veritest in dry surroundings.

Always inspect your meter, test leads and accessories for any sign of damage before use. If any abnormal conditions exist (e.g: broken test leads, cracked case, display not reading, etc.), do not attempt to use it. Do not expose it to direct sunlight, excessive temperature or moisture.

Keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk

SYMBOLS:

-  Equipment complies with relevant EU Directives
-  AC (Alternating Current)
-  Ground
-  Direct Current
-  Equipment protected by Double Insulation (Class II)
-  Caution - refer to accompanying documents
-  Caution - risk of electric shock

10. OPTIONAL ACCESSORIES

Infra red data lead	<i>VRTL1</i>
Download software	<i>VRSOFT1</i>
Mini printer	<i>VRPRINT1</i>
Data Lead VRPRINT1 to VR2240	<i>TL130</i>
Test lead (GB 13A plug)	<i>TL206</i>
Fused test lead set	<i>TL54</i>

11. MAINTENANCE

Cleaning

Maintenance consists of periodic cleaning.

The exterior of the instrument can be cleaned with a dry clean cloth to remove any oil, grease or grime. Never use liquid solvents or detergents.

Repairs or servicing not covered in this manual should only be performed by qualified personnel.

Calibration

The recommended calibration interval is 12 months.

Martindale Electric will carry out routine calibration (on a chargeable basis) if the instrument is returned, carriage paid, to the address on the final page of this document. Alternatively, a chargeable collection and return service is available.

Repair & Service

There are no user serviceable parts in this unit. Return to Martindale Electric if faulty. Our service department will promptly quote to repair any faults that occur outside the warranty period.

Storage Conditions

The Veritest should be kept in warm, dry conditions away from direct sources of heat or sunlight and in such a manner as to preserve the working life of the instrument.

Warranty

Faults in manufacture and materials are fully guaranteed for 24 months from date of invoice and will be rectified by us free of charge, provided the unit has not been tampered with and is returned to us with its housing unopened. Damage due to dropping, abuse or misuse is not covered by the guarantee. Nothing in these instructions reduces your statutory rights.

NON TRIP EARTH LOOP TEST: (R_{A15MA})

Measuring	Resolution	Accuracy
1-1999Ω PFC 1-999 Amps, 1.0-20.0KA Test current 15mA	1Ω Res	±(5%rdg+2dgt)

Battery type: 6x1.5V LR6-AA-AM3-MN1500

Low battery indication: Yes

Battery life: About 40 hrs in stand-by or 500 Continuity tests or

250 Insulation tests 500V/500k or

1000 LOOP/RCD/PHASE SEQUENCE TESTS

Weight: (batteries included) 1000gm

Dimensions: 222mm(L) x 162mm(W) x 57mm(D)

Phase Rotation Test: graphic display of phase sequence

Memory Slots For Saved Tests: 350

Display Features: LCD custom

Interface optical: RS232 to print or to download the tests

Please refer to the accessories section for test leads.

SAFETY STANDARDS

The instrument complies with: EN 61010-1 + A2 (1997), EN61557, EN61326-1 (1997) + A1 (1998).

Insulation: Class 2, double insulation

Pollution degree: 2

Inside use: max altitude - 2000m

Overvoltage category: CAT III 460V~P-N-E / 265V~ to earth

ENVIRONMENT

Environmental working conditions

Reference temperature: 23° ± 5°C

Working temperature: -10°C – 50 °C

Relative humidity allowed: <80%

Storage temperature: -20 – 60 °C

Storage humidity: <80%

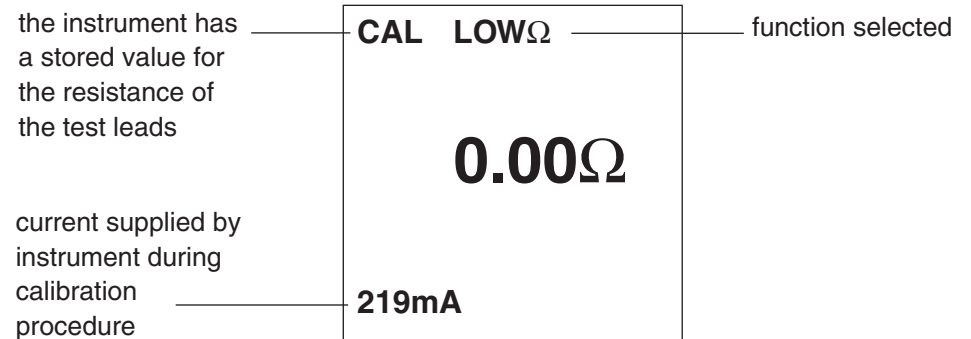
1. CALIBRATION OF TEST LEADS

- 1) Connect red & black test leads to P + N terminals respectively.
- 2) Turn dial to low Ω (continuity setting). Display shows 'LOW Ω' at top left.
- 3) Press **FUNC** key repeatedly until 'CAL' is shown on display.
- 4) Connect/Short circuit test leads together so good contact is made.
- 5) Press yellow **GO** key. 'MEASURING' briefly appears on the display - Calibration is being carried out. The test lead resistance is shown briefly, before the screen zeros.
- 6) When calibration is complete, 2 beeps are heard and 'MEASURING' is **not** displayed.

NB: To remove test lead compensation, repeat procedure above, but with test leads open circuit.

This function enables the instrument to measure the resistance of the test leads and commits the measurement to memory. Once this has been carried out, the test lead resistance is automatically subtracted from any continuity measurement, thus giving more accurate results.

This compensation value is retained when the instrument is powered down and when batteries are removed for replacement.



2. LOW Ω CONTINUITY TEST

- 1) Connect red & black test leads to P + N terminals respectively.
- 2) Turn dial to low Ω (continuity setting). Display shows 'LOW Ω ' at top left.
- 3) Select: 'Auto', 'R+', 'R-', 'R+TIMER', 'R-TIMER'. By repeated pressing of the **FUNC** key. See below for details of individual tests.

If using the timer function, set time using **S ▲** + **U_L ▼** keys

- 4) Connect the test leads to the conductors on which the continuity test is to be carried out.
- 5) Press yellow **GO** key – The instrument performs the test

Auto: The instrument carries out 2 measurements. 1x positive polarity and 1 x negative polarity. The instrument displays an average reading of the two measurements performed.

R+: The instrument carries out 1 measurement with a positive polarity. I.E. Red test lead positive.

R-: The instrument carries out 1 measurement with a negative polarity. I.E. Black test lead positive

R+TIMER: The instrument carries out 1 measurement with a positive polarity and an adjustable duration of test. Min 3 seconds, Max 15 seconds. Use **S ▲** + **U_L ▼** to set test duration.

R-TIMER: The instrument carries out 1 measurement with a negative polarity and an adjustable duration of test. Minimum of 3 seconds, Maximum of 15 seconds. Use **S ▲** + **U_L ▼** to adjust time up and down respectively.

At the end of the test, if the resistance value is lower than 5 Ω , the instrument beeps twice, indicating low resistance. The resistance value is displayed on the screen.

NB Cal & Low Ω is displayed in the top left of the screen if a lead compensation value is stored; this value will be applied to any measurement made.

AC VOLTAGE:

Electrical Syst Range (V)	Resolution (V)	Accuracy
Single-phase 0 - 265	1	$\pm(2\% \text{ rdg} + 2 \text{ dgt})$
2 or 3 - phase 0 - 460	1	$\pm(5\% \text{ rdg} + 2 \text{ dgt})$

FREQUENCY:

Range (V)	Resolution HZ	Accuracy
15.3 - 99.9 Hz	0.1 HZ	$\pm(0.1\% \text{ rdg} + 1 \text{ dgt})$

LINE IMPEDANCE

(LOOP Z_S/I_K PHASE TO PHASE OR PHASE TO NEUTRAL)

Test mode	Range	Resolution	Accuracy
(P-P & P-N)	0.03-19.99 Ω 20.0-199.9 Ω	(0.01 Ω Res) (0.1 Ω Res)	$\pm(5\% \text{ rdg} + 2 \text{ dgt})$ $\pm(5\% \text{ rdg} + 2 \text{ dgt})$
PSC	1-999A 1.0-20.0KA		

Test voltage: V_{PN} 100V - 265V 50Hz + 0.5 Hz
 V_{PP} 100V - 460V 50Hz + 0.5 Hz

Max peak test current: 100V 3.17A test duration: 80ms
230V 6.64A test duration: 40ms
400V 11.5A test duration: 40ms

Accuracy current measurement: $\pm 10\% I_{\max} \text{ Pk}$

PHASE EARTH IMPEDANCE (LOOP Z_S/I_K)

Range	Resolution	Accuracy
0.03-19.99 Ω	(0.01 Ω Res)	$\pm(5\% \text{ rdg} + 2 \text{ dgt})$
20.0-199.9 Ω	(0.1 Ω Res)	$\pm(5\% \text{ rdg} + 2 \text{ dgt})$
200-1999 Ω	(1 Ω Res)	$\pm(5\% \text{ rdg} + 2 \text{ dgt})$
PFC		
	1-999A, 1.0-20.0KA	

Max peak test current: 100V 3.17A test duration: 80ms
230V 6.64A test duration: 40ms

Accuracy current measurement: $\pm 10\% I_{\max} \text{ Pk}$

Test frequency: V_{PE} 100V - 265V 50Hz +0.5 Hz

Open circuit voltage: Rated voltage test -0% +10%

Short circuit current: <3,0mA @ 500V

<2,0mA @ 50V, 100V, 250V, 1000V

Test current on load: >1mA @ V_{Test} across $R_{load} = (1000 \times V_{Test}) \Omega$

If the instrument measures a voltage higher than 30V, the instrument does not perform the test

RCD

Type of RCD: AC, A

Range of phase to earth voltage: (100 - 265) V

Rated Tripping Current ($I_{\Delta N}$): 10mA, 30mA, 100mA, 300mA, 500mA

Test frequency: 50Hz \pm 0.5 Hz

TRIPPING TIMES

Test	Range	Resolution	Accuracy
$\frac{1}{2} I_{\Delta N}, I_{\Delta N}$	0-999ms	1ms	$\pm(2\%rdg+2dgt)$
2 $I_{\Delta N}$	0-200ms general	1ms	$\pm(2\%rdg+2dgt)$
	0-250ms selective	1ms	$\pm(2\%rdg+2dgt)$
5 $I_{\Delta N}$ RCD(*)	0-50ms general	1ms	$\pm(2\%rdg+2dgt)$
	0-160ms selective	1ms	$\pm(2\%rdg+2dgt)$

(*) For RCD type A 500mA, the MAN x5 and AUTO tests are not available.

The Ramp test measures tripping current

CONTACT VOLTAGE

Measuring range(V)	Resolution(V)	Accuracy
0 - 2 U_t Lim	0.1	-0%,+(10%rdg+2dgt)
U_t Lim (U_L): 25V or 50V		

TRIPPING CURRENT FOR RCD TYPE A AND AC

RCD with $I_{\Delta N} \leq 10mA$

Type RCD	Range $I_{\Delta N}$ (mA)	Resolution(mA)	Accuracy $I_{\Delta N}$
AC	(0.5 - 1.4) $I_{\Delta N}$	0.1 $I_{\Delta N}$	-0%, +10% $I_{\Delta N}$
A	(0.5 - 2.4) $I_{\Delta N}$		

RCD with $I_{\Delta N} \geq 10mA$

Type RCD	Range $I_{\Delta N}$ (mA)	Resolution(mA)	Accuracy $I_{\Delta N}$
AC	(0.5 - 1.4) $I_{\Delta N}$	0.1 $I_{\Delta N}$	-0%, +10% $I_{\Delta N}$
A	(0.5 - 2) $I_{\Delta N}$		

3. M Ω INSULATION TEST

- 1) Connect the red and black test leads to P + N terminals respectively
- 2) Turn dial to M Ω (insulation resistance). Display shows 'Riso' at top left.
- 3) Select '**MAN**', '**AUTO**' or '**TIMER**' mode by repeatedly pressing the **FUNC** key. See below for details of individual tests.
- 4) Press **U_v/I Δ n** repeatedly to select the voltage suitable for the test being carried out. 50V, 100V, 250V, 500V, 1000V.
- 5) Connect the test leads to the conductor on which the insulation test is to be carried out.
- 6) Press yellow **GO** key. The instrument performs the test as stated below.

At the end of the test, the instrument beeps twice indicating a successful measurement. The resistance is displayed on the screen.

If the insulation is very low value the tester emits a long single beep to indicate that the test voltage fell below the set rated voltage and the measurement was unsuccessful. See technical specification.













MAN: Minimum test time of 5 or 10 seconds depending on test voltage and insulation resistance. See table below. If "Go" is pressed and held for longer than 10 seconds, the instrument continues to measure until the "Go" key is released.

AUTO: The test ends when the measured value becomes stable.

TIMER: Test duration can be adjusted from 10-999 seconds. Adjust values using **S ▲** or **U_L ▼**. This test can be used if a minimum measuring time is required.

	100V	250V	500V	1000V
Low resistance	5 seconds	10 seconds	10 seconds	10 seconds
High resistance	5 seconds	5 seconds	5 seconds	5 seconds

4. RCD TEST

- 1) Connect the red, black and green test leads, or the plug top lead to P,N +E terminals respectively.
- 2) Turn the dial to RCD  for RCD type A.C. sensitive to sine leakage current, (general) or RCD  for RCD'S type A sensitive to pulsating leakage current (DC sensitive). Display shows RCD  or RCD  at top centre.
- 3) Select: **MAN x ½, MAN x1, MAN x 2, MAN x 5, AUTO, RAMP,  Ut** by repeatedly pressing the function key  See further description on next page.
- 4) Select the rated tripping current of the RCD by repeatedly pressing the  key. (10mA, 30mA, 100mA, 300mA, 500mA) until the desired level is reached.
- 5) If the test is to be carried out on a 'selective' time delayed RCD, the symbol  must be displayed. This function is controlled via the  key and is not available in ramp or Ut mode.
- 6) Select the limit for contact voltage (50V by default) by pressing  button.
(This cycles between 50V & 25V).
- 7) Connect either the mains plug to a 230V 50HZ socket outlet, or the croc clips to the appropriate conductors on which the test is to be carried out.
- 8) A. Press the yellow  key once. The instrument injects a current in phase with positive half wave of the voltage. (indicated on display by 0°).
B. Press the yellow  key twice. The instrument injects a current in phase with negative half wave of the voltage (indicated on display by 180°).

9. SPECIFICATION

Accuracy is indicated as [% of reading + number of digits]. It refers to the atmospheric conditions listed previously.

CONTINUITY:

Test mode	Range	Resolution	Accuracy
AUTO, R+, R-	0.01-19.99 Ω	0.01 Ω	$\pm(2\%rdg+2dgt)$
	20.0-99.9 Ω	0.1 Ω	$\pm(2\%rdg+2dgt)$
Timer Mode	0.01-9.99 Ω	0.01 Ω	$\pm(2\%rdg+2dgt)$

Test current: >200mA DC up to 16 Ω (include the resistance of the calibration)
40mA DC from 16 Ω to 99.9 Ω

Resolution: 1mA

Open circuit Test Voltage: 9V

Live Circuit Warning: Yes

Timer: test duration 10-999 seconds

INSULATION TESTS

Rated Test Voltage	Measurable Range M Ω at Rated Test Voltage	Resolution	Accuracy
50V	0.05-19.99 M Ω	0.01M Ω	$\pm(2\%rdg+2dgt)$
	20.0-49.9 M Ω	0.1M Ω	$\pm(2\%rdg+2dgt)$
	50.0-99.9 M Ω	0.1M Ω	$\pm(5\%rdg+2dgt)$
100V	0.10-19.99 M Ω	0.01M Ω	$\pm(2\%rdg+2dgt)$
	20.0-99.9 M Ω	0.1M Ω	$\pm(2\%rdg+2dgt)$
	100.0-199.9 M Ω	0.1M Ω	$\pm(5\%rdg+2dgt)$
250V	0.23-19.99 M Ω	0.01M Ω	$\pm(2\%rdg+2dgt)$
	20.0-199.9 M Ω	0.1M Ω	$\pm(2\%rdg+2dgt)$
	200-249 M Ω	1M Ω	$\pm(2\%rdg+2dgt)$
	250-499 M Ω	1M Ω	$\pm(5\%rdg+2dgt)$
500V	0.25-19.99 M Ω	0.01M Ω	$\pm(2\%rdg+2dgt)$
	20.0-199.9 M Ω	0.1M Ω	$\pm(2\%rdg+2dgt)$
	200-499 M Ω	1M Ω	$\pm(2\%rdg+2dgt)$
	500-999 M Ω	1M Ω	$\pm(5\%rdg+2dgt)$
1000V	0.90-19.99 M Ω	0.01M Ω	$\pm(2\%rdg+2dgt)$
	20.0-199.9 M Ω	0.1M Ω	$\pm(2\%rdg+2dgt)$
	200-999 M Ω	1M Ω	$\pm(2\%rdg+2dgt)$
	1000-1999 M Ω	1M Ω	$\pm(5\%rdg+2dgt)$

Automatic selection of the measuring range

8. INSTRUMENT CONNECTION TO PC OR A PRINTER

The connection from the **VR2240** to a PC is made using the optional infra red data lead **VRTL1** connected to the PC serial port. The optional software package **VRSOFT1** provides the facility to download and print results onto a form (All items sold separately).

Before connecting the **VR2240** to a PC, it is necessary to select and configure the COM port on the PC used for data transfer. To set this, start the software and refer to the help provided with the **VRSOFT1** download application.

The selected port should **NOT** be shared by other devices or applications (eg. mouse, modem, etc.).

The connection from the **VR2240** to the printer **VRPRINT1** is made using the infra red data lead **VRTL1**, in conjunction with printer adaptor cable **TL130** (all items sold separately).

To transfer the stored data from the instrument to the PC or printer, follow the directions below.



1. Turn the rotary switch to the **RS232** position.

FUNC

2. Using the FUNC key, select the modes "Prn ALL" or "Prn n1 n2", to display the following screens respectively:

Press **GO** to start printing all of the stored test results.

Press **ESC** to stop printing immediately.

indicates the total number of results stored in memory.

Prn
All 125

Press **GO** to start printing the test results from memory locations n1 to memory locations n2 inclusive. Note that the printing order is that of the increasing value of the parameter P, **NOT memory location order**. Ensure the range n1 to n2 covers all the results you need.

Press **ESC** to stop printing immediately.

indicates the memory cell which will be printed as the last one.

Prn
13
25

Note Transmission speed on the PC or printer is set to **4800 baud** to match the output from **VR2240**.

MAN x ½

the instrument performs the test with a leakage current at ½x the value of the rated current indicated, with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage.

MAN x 1

the instrument performs the test with a leakage current at 1x the value of the rated current indicated, with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage.

MAN x 2

the instrument performs the test with a leakage current at 2x the value of the rated current indicated, with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage.

MAN x 5

the instrument performs the test with a leakage current at 5x the value of the rated current indicated, with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage

AUTO

the instrument performs the test automatically with a leakage current at ½x, 1x, 5x the value of the rated current indicated with the leakage current in phase with the voltage and then phase shifted by 180° with respect to the voltage. Recommended test.

RAMP Mode

the instrument performs the test with a steadily increasing leakage current, with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage. Use this test to measure the tripping current.

U_t Mode

the instrument performs the test with a leakage current equal to ½ the value of the rated current indicated and calculates the contact voltage as well as the Ra earth resistance with the leakage current in phase with the voltage or phase shifted by 180° with respect to the voltage. Readings below 1Ω are displayed as 1Ω.

PLEASE NOTE:

MAN x5 and auto test modes are not available for RCD type A, 500mA

Test results:

MAN x ½: If the RCD does not trip, the instrument beeps twice indicating a successful outcome. (see screen on unit)

MAN x1, x2, x5: If the RCD trips within limits, the instrument beeps twice suggesting a successful outcome. (see screen on unit). Please note that the internal values apply for RCDs manufactured to comply with BSEN61008. RCDs which are manufactured to comply with BS4293 are required to operate in 0.2s at $1X I_{\Delta N}$. It is important that the user of this instrument is aware of the applicable tripping time(s) for the RCD being tested.

Please refer to the full user manual for tripping times.

AUTO: The instrument carries out the following 6 tests with different values of rated current.

½ x $I_{\Delta n}$ @ 0° - The RCD should not trip

½ x $I_{\Delta n}$ @ 180° - The RCD should not trip

1 x $I_{\Delta n}$ @ 0° - The RCD trips (blinking RCD) - Switch RCD on again

1 x $I_{\Delta n}$ @ 180° - The RCD trips (blinking RCD) - Switch RCD on again

5 x $I_{\Delta n}$ @ 0° - The RCD trips (blinking RCD) - Switch RCD on again

5 x $I_{\Delta n}$ @ 180° - The RCD trips (blinking RCD) - Switch RCD on again

'OK' displayed - test passed.

Please refer to the full user manual for tripping times.

Press **DISP** to scroll through the test results

RAMP: The instrument generates a leakage current growing step by step in a given time interval. At the end of the test, if the RCD tripping current is $< I_{\Delta n}$ (type AC) or $1.4xI_{\Delta n}$ (type A with $I_{\Delta n}>10mA$) the instrument beeps twice indicating a positive outcome of the test.

If the parameters set on the instrument are consistent with the RCD under test, the ramp test will cause RCD tripping with a current lower than or equal to the selected rated differential current.

U: Press yellow **GO** key once. The instrument carries out the test. If the RCD does not trip, the instrument beeps twice indicating a successful outcome of the test.

CLEARING TEST RESULTS

To clear results, proceed as follows:

- 1) Press the **RCL** key
- 2) Navigate to the desired test using **S ▲** and **UL ▼** keys.
- 3) Press the **DISP** key to display the selected test result.
- 4) Press **CLR** once. **CLR** flashes in the display.

To cancel deletion press **ESC**

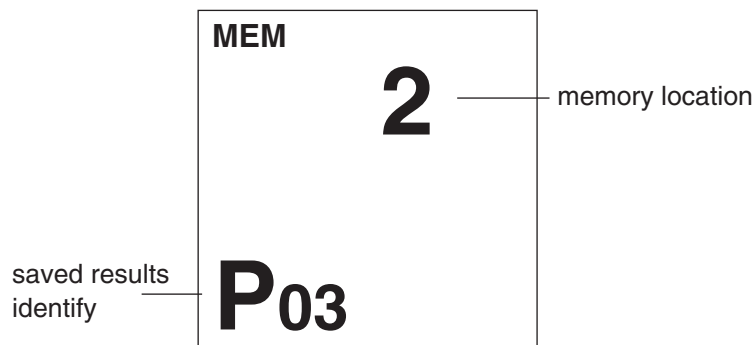
- 5) Press **CLR** again to permanently delete the test result, from the one selected to the last one saved

WARNING The instrument will delete the all results stored from the memory location selected to the last full one.

SAVING TEST RESULTS

If test results are to be stored, proceed as follows:

- a. After carrying out any successful test, press the **SAVE** key once.
- b. Press either **S ▲** or **UL ▼** to adjust the 'P' number up or down. This is used to identify the test within a number of tests. When the desired number is shown. Press save again to commit the test to memory.



The instrument beeps twice confirming that the test results have been stored.

- c. Press **ESC** to return to test mode.

RECALLING TEST RESULTS

If the test results are to be recalled, proceed as follows.

- 1) Press the **RCL** key
- 2) Navigate to the desired test number using the **S ▲** and **UL ▼** keys.
- 3) Press the **DISP** button to display test result.
- 4) You can navigate to other test results by pressing **S ▲** and **UL ▼** again.
- 5) Press **ESC** to return to test mode.

5. LOOP - ZS / IK

PHASE TO NEUTRAL TESTING (PN)

- 1) Connect the red, black and green leads, or plug top lead, to P,N + E terminals respectively.
- 2) Turn the dial to loop Zs/Ik. Display shows 'LOOP' at the top centre.
- 3) Press **FUNC** key repeatedly to select **P-N**. 'P-N' is shown.
- 4) Connect the mains plug to a 230V 50Hz socket outlet, or the croc clips to appropriate conductors on which the test is to be carried out.
- 5) Press the yellow **GO** key to start the test.
- 6) At the end of the test, the instrument beeps twice indicating a positive outcome of the test with the relevant results displayed.

PHASE TO PHASE TESTING (P.P.)

- 1) Connect the red, black and green leads to P,N + E terminals respectively.
- 2) Turn the dial to loop Zs/Ik. Display shows 'LOOP' at the top centre.
- 3) Press **FUNC** key repeatedly to select **P-P**. 'P-P' is shown.
- 4) Connect green test lead to the earth (PLE) conductor. Connect the red and black test leads to each pair of phase conductors in turn, P1 & P2, P2 & P3, P3 & P1, and press the **GO** key for each pair.
- 6) At the end of the test, the instrument beeps twice indicating a successful outcome of the test with the relevant results displayed.

PHASE TO PROTECTIVE EARTH (P-PE)

- 1) Connect the red, black and green cables to P,N + E terminals respectively.
- 2) Turn the dial to loop Zs/Ik. Display shows 'LOOP' at the top centre.
- 3) Connect the mains plug to a 230V 50HZ socket outlet or to the appropriate conductor by means of the croc clips
- 4) Press **FUNC** key repeatedly to select **P-PE**. 'P-PE' is shown.
- 5) Press the yellow **GO** key **once**. The instrument carries out the test injecting a current in phase with **positive** half wave of the voltage indicated on display by 0°

OR

Press the yellow **GO** key **twice**. The instrument carries out the test injecting a current in phase with **negative** half wave of the voltage indicated on display by 180°.

At the end of the test, the instrument beeps twice, indicating a positive outcome of the test. The relevant results are displayed.

