

Figure 1 9083P Front View

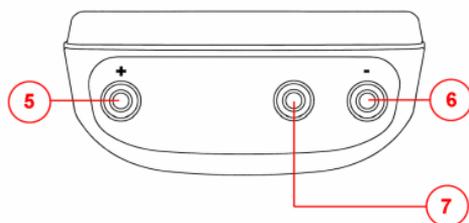


Figure 2 9083P End View

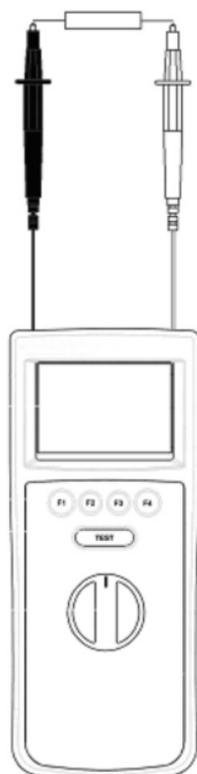


Figure 3 Earth Continuity/Insulation Measurement



Figure 4 Earth Continuity/Insulation Measurement using Cordless probe



Figure 5 Voltage Measurement using test probes



Figure 6 Earth Loop Impedance/Line Impedance/ RCD/ Mains Voltage Measurement

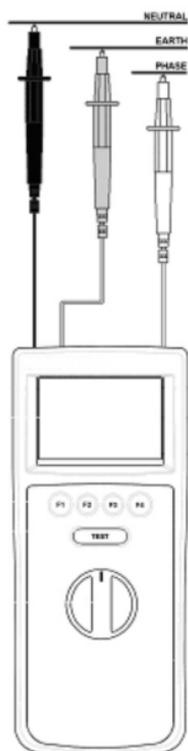


Figure 7 Earth Loop Impedance/Line Impedance

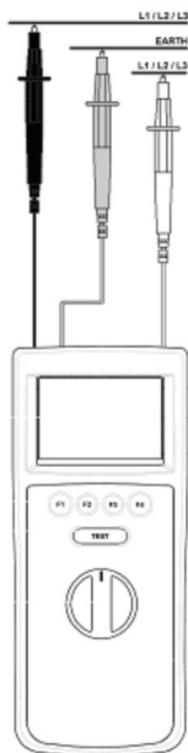


Figure 8 Line Impedance between phases

Limited Warranty & Limitation of Liability

DI-LOG Test Equipment guarantees this product to be free from defects in material and workmanship under normal use and service for a period of 2 year. The period of warranty will be effective at the day of delivery.

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Due to a policy of continuous development DI-LOG reserves the right to alter the equipment specification and description outlined in this publication without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract.

Table of Contents

Limited Warranty & Limitation of Liability	6
Table of Contents	7
CERTIFICATE OF CONFORMITY.....	8
Introduction.....	9
1 Important Information	9
2 Safety Information	10
3 Accessories	11
3.1 Standard Accessories.....	11
3.2 Optional Accessories.....	11
4 Unit Description.....	12
4.1 Identifying parts of the unit.....	12
4.2 LCD display.....	13
5 Using the 9083P	15
5.1 Power On	15
5.2 Battery Health Check.....	15
5.3 Continuity Tests.....	15
5.4 Insulation Resistance Tests.....	17
5.5 Voltage Measurement.....	18
5.6 Earth Loop Impedance / Line Impedance	18
5.7 Auto RCD Test Sequence.....	19
5.8 RCD Trip Time Tests.....	21
5.9 RCD trip current (Ramp) Tests.....	23
6 Electrical Specifications.....	25
6.1 Earth Continuity.....	25
6.2 Insulation Resistance.....	25
6.3 Earth Loop Impedance	25
6.4 Line Impedance.....	26
6.5 RCD	26
6.6 Voltage/Frequency Measurement	26
7 Environmental Conditions	27
8 Maintenance.....	28
8.1 Preparing to work on the 9083P.....	28
8.2 Securing the 9083P	28
8.3 Cleaning	29
8.4 Battery Replacement	29
8.5 Replacing the Fuse.....	30
8.6 Service and Calibration.....	30
8.7 Spare Parts.....	31

CERTIFICATE OF CONFORMITY

As the supplier of the apparatus listed, declare under our sole responsibility that the product:

9083P Multifunction Tester

To which this declaration relates are in conformity with the relevant clauses of the following standard:

BS EN 61010-1:2001

Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.

BS EN 61557-1,2,3,4,6,10:1997

Electrical safety in low voltage distribution systems up to 1000V a.c. and 1500V d.c. – Equipment for testing, measuring and monitoring of protective measures

BS EN 61326:1998

Electrical equipment for measurement, control and laboratory user-EMC Requirements

Performance: The instrument operates within specification when used under the conditions in the above standards EMC and Safety Standards.

The product identified above conforms to the requirements of Council Directive 89/336/EEC and 73/23 EEC.

Introduction

The 9083P is a hand held, battery powered, multi-function electrical installation test instrument capable of performing a comprehensive range of tests, including:

Earth Continuity @ 200mA

Insulation Resistance at 100V, 250V and 500V

Voltage

Frequency

Auto RCD trip time sequence

RCD Trip Time at $\frac{1}{2}I_{\Delta n}$, $I_{\Delta n}$ and $5xI_{\Delta n}$

RCD Trip current

Earth Loop Impedance

Prospective Fault Current

Mains Impedance

Prospective Short-circuit Current

Power socket wiring polarity

1 Important Information

These operating instructions are intended for the use of adequately trained personnel.

The following symbols are used in these operating instructions and on the 9083P.



Caution, risk of electric shock.

Instructions must be followed to avoid risk of electric shock.



Caution, risk of danger. This symbol indicates that the operating instructions must be adhered to in order to avoid danger.

2 Safety Information

This 9083P is fully compliant with the requirements of:

BS EN 61010-1: 2001.

BS EN 61557 part 1, 2, 3, 4, 6 and 10.

In order to ensure safe operation of this instrument, all notes and warnings must be observed at all times.



The 9083P has been designed to make measurements in a dry environment. Do not operate the 9083P in an explosive gas or dust environment.



The 9083P may be used to test circuits with a maximum over-voltage Category III, 300 V AC/DC with reference to earth.



Always hold test probes above the hand guards.



The 9083P and all associated cables and leads must be checked for signs of damage before equipment is operated.



Prior to any resistance measurement, always ensure that the circuit under test is electrically isolated.

Where safe operation of the 9083P is no longer possible it should be immediately shut down and secured to prevent accidental operation.

It must be assumed that safe operation is no longer possible:

- if the instrument or leads show visible signs of damage or
- the instrument does not function or
- after long periods of storage under adverse environmental conditions.



If the 9083P is used in a manner not specified by this document then the protection provided by the equipment may be impaired.

3 Accessories

3.1 Standard Accessories

The 9083P is supplied with the following items:

- 1 off 9083P unit
- 1 off professional carry case
- 1 off Di-LOG mains test lead
- 1 off 1.2 M black test lead
- 1 off 1.2 M red test lead
- 1 off 1.2 M green test lead
- 1 off Operating Instruction Manual
- 1 off Leadless probe
- 1 off black crocodile clip
- 1 off red crocodile clip
- 1 off green crocodile clip

3.2 Optional Accessories

3.15A T 500V Fuse



Do not open unit, no other serviceable parts.

4 Unit Description

The 9083P is a hand held, multi-function electrical installation test instrument, capable of performing all of the required electrical tests. Tests are selected using the colour coded rotary switch.

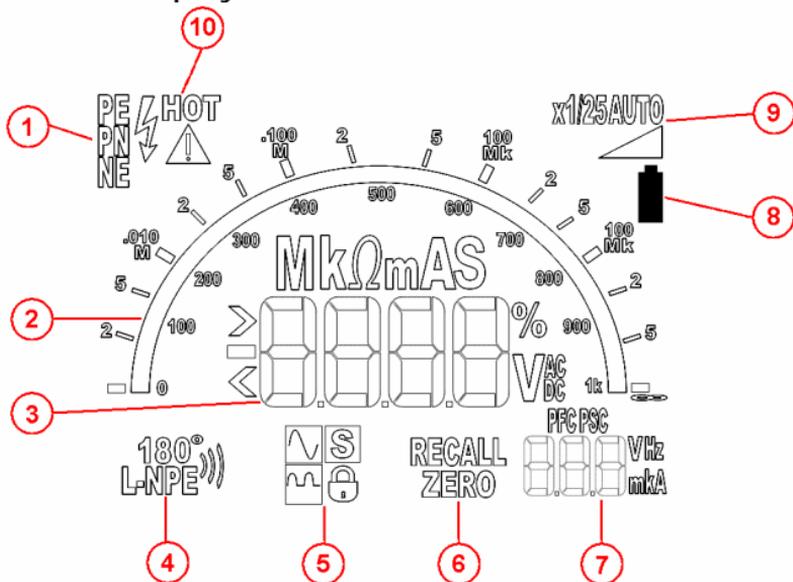
4.1 Identifying parts of the unit

The numbering below refers to figure 1 and figure 2.

1. LCD Display
2. Function keys F1, F2, F3 and F4
3. TEST key
4. Rotary Switch
 - a. Voltage/frequency
 - b. Insulation resistance @ 100V
 - c. Insulation resistance @ 250V
 - d. Insulation resistance @ 500V
 - e. Continuity @ 200mA
 - f. Off
 - g. Earth Loop / Mains Impedance
 - h. Auto RCD
 - i. RCD trip time @ $\frac{1}{2} I_{\Delta N}$
 - j. RCD trip time @ $I_{\Delta N}$
 - k. RCD trip time @ $5I_{\Delta N}$
 - l. RCD trip time (ramp test)
5. Test lead input (RED)
6. Test lead input (BLACK)
7. Test lead input (GREEN)

Note: The function performed by keys F1 – F4 depends upon the rotary switch position. For each rotary switch position, the lower part of the LCD display indicates the function of the key above.

4.2 LCD display



1. Mains supply status icons

These icons indicate the status of the mains supply between phase-earth (PE), phase-neutral (PN) and phase-earth (PE) during RCD and Loop tests.

Note: Testing is inhibited if the mains supply is incorrect.

2. Analog bargraph

The analogue bargraph provides an analogue representation of the measurement shown by the primary digital display.

3. Primary digital display

The primary digital display is used to indicate the test measurement for the active test type.

4. Icons for function key F1.

These icons are used to display the available options for the selected test. Repeatedly pressing function key F1 cycles through the available options.

5. Icons for function key F2.

These icons are used to display the available options for the selected test. Repeatedly pressing function key F2 cycles through the available options.

6. Icons for function key F3.

These icons are used to display the available options for the selected test. Repeatedly pressing function key F3 cycles through the available options.

7. Secondary display for function key F4.

The secondary display is used to show the measured output voltage during insulation resistance

measurements, PFC/PSC calculations during earth loop / line impedance measurements and rated residual operating current for RCD tests.

8. Battery status icon.

This icon displays the status of the battery voltage.

9. RCD test icons.

These icons display the selected RCD test function.

10. Warning Icons.

These icons are used to inform the user of the potential of any hazard or warning which may restrict the operation of the 9083P.

Note: The 9083P is equipped with a thermal cut-out to protect against damage from excessive internal temperature. If the thermal cut-out is activated the HOT icon is illuminated and all RCD and Loop tests are inhibited until the unit cools and the thermal cut-out self-resets.

5 Using the 9083P

5.1 Power On

To turn the 9083P on simply rotate the rotary switch to the required test type.

5.2 Battery Health Check

The 9083P will automatically perform battery health checks periodically or when a new test type is selected.

Note: When the battery symbol is flashing all tests will be inhibited and the batteries should be replaced as described in section 8.4.

5.3 Continuity Tests



Always ensure that the circuit under test is electrically isolated before performing continuity tests.



If the test probes are connected across a voltage of >30V then the 9083P will automatically display the voltage between the probes, the warning buzzer will sound and the TEST key is inhibited.

Rotate the rotary switch until the W test is selected.

When the continuity test is selected, the 9083P will display the available test options for 1 second; Buzzer, Test Lock, Lead Zero. If the Buzzer was previously enabled then the icon will remain highlighted. The Test Lock and Lead Zero must be enabled each time the Continuity test is selected.

Functions keys F1-F4 have are used to select the options below:

F1	F2	F3	F4
Buzzer	Test Lock	ZERO	Not used

Buzzer (F1)

When enabled, the Buzzer will sound when the continuity measurement is less than 20 ohms.

Test Lock (F2)

The Test Lock is used to 'lock' the instrument in a continuous measurement mode, with a single press of the TEST key. When Test Lock is enabled the LCD shows the padlock icon. When Test Lock is active the TEST key is locked until the option is disabled or the rotary switch is moved to another position.

To enable the Test Lock mode test press the TEST key and F2 simultaneously.

To disable Test Lock, press F2 or turn the rotary switch to another position.

ZERO (F3)

The instrument can automatically compensate for the resistance of the test leads as follows:

Connect the two test probes firmly together, then press and hold the ZERO key. The measured resistance of the test leads is shown in the primary display until a beep is heard and the ZERO icon is illuminated. All subsequent measurements will take into account the test lead resistance compensation until the function is disabled by pressing function key F3.

Note: A maximum test lead resistance of 10 ohms can be nulled out. If the test lead resistance is great than 10 ohms an error beep will indicate that the Lead Zero function has failed.

Note: For ease of use, the 9083P will store the lead compensation when the instrument is switched off and recall this value when next switched on. The stored value is only applicable to the test leads used when the compensation measurement was made. If the test leads are replaced the ZERO function should be repeated using the replacement test leads.

To make a continuity measurement, press and hold the TEST key. The resistance between the test probes is displayed until the TEST key is released. Alternatively, use the Test Lock function to allow measurements to be started or stopped with single press of the TEST key. During a measurement, the measured value is shown in the primary display and on the analogue bargraph.

5.4 Insulation Resistance Tests



Always ensure that the circuit under test is electrically isolated.



If the test probes are connected across a voltage of $>30V$ then the 9083P will automatically display the voltage between the probes, the warning buzzer will sound and the TEST key is inhibited.

Use the rotary switch to select either the 100V, 250V or 500V M \square test.

The 9083P will display the Test Lock and battery symbol for 1 second. If the Test Lock feature is required, it should be activated as described below.

Functions keys F1-F4 have are used to select the options below:

F1	F2	F3	F4
Not used	Test Lock	Not used	Not used

Test Lock (F2)

The Test Lock is used to 'lock' the instrument in a continuous measurement mode, with a single press of the TEST key. When Test Lock is enabled the LCD shows the padlock icon. When Test Lock is active the TEST key is locked until the option is disabled or the rotary switch is moved to another position.

To enable the Test Lock mode test press the TEST key and F2 simultaneously.

To disable Test Lock, press F2 or turn the rotary switch to another position.

To make an insulation resistance measurement, press and hold the TEST key. The resistance between the test probes is displayed until the TEST key is released. Alternatively, use the Test Lock function to allow measurements to be started or stopped with single press of the TEST key. During a measurement, the measured value is shown in the primary display and analogue bargraph and the measured test voltage is shown in the secondary display.

5.5 Voltage Measurement

Rotate the rotary switch until the VOLTS test is selected. The 9083P will start measuring voltage immediately and use of the TEST key is not required.

The function keys do not perform any operations while in Voltage mode.

For AC voltage measurements, the frequency of the measured voltage is shown in the secondary display.

5.6 Earth Loop Impedance / Line Impedance



The 9083P will only allow the Earth Loop Impedance test to be performed if the correct voltages are detected between phase-neutral (PN illuminated), phase-earth (PE illuminated) and neutral-earth (NE not illuminated).

Rotate the rotary switch until the Zs test is selected. Press the function key F1 to select either the Earth Loop Impedance test (L-PE) or the Line Impedance test (L-N).

F1	F2	F3	F4
Line Impedance	Not used	Not used	Not used

The secondary display will automatically show the appropriate icon: PFC when L-PE is selected and PSC when L-N is selected.

Note: When the Zs switch position is selected, the 9083P will default to the last used setting, even if it has been switched off.

To begin the test, press and release the TEST key.

Note: The 9083P will determine the fault voltage that may appear on the protective conductor during the test. If the fault voltage is greater than 25V the 9083P will indicate >25V on the LCD, but the user may proceed with the test. If the fault voltage is great than 50V, this is indicated on the LCD and the test is inhibited.

During the test, progress is shown by the analogue bargraph. When the test is complete, the Earth Loop Impedance measurement is shown in the primary display and the calculated Prospective Fault Current (PFC) is shown in the secondary display.

Note: A Line Impedance measurement is automatically made as part of the Earth Loop Impedance test. The Line Impedance measurement (L-N) and Prospective Short-circuit Current (PSC) can be viewed by simply pressing function key F1, without the need to repeat the test.

5.7 Auto RCD Test Sequence



The 9083P will only allow the Earth Loop Impedance test to be performed if the correct voltages are detected between phase-neutral (PN illuminated), phase-earth (PE illuminated) and neutral-earth (NE not illuminated).



Leakage currents or voltage on the protective conductor may influence the measurement.

The Auto RCD test is used to automatically perform a sequence of 6 RCD trip time tests with a single press of the TEST key. Each time the RCD trips, the sequence will automatically continue once the RCD is reset. The sequence comprises of test at:

$\frac{1}{2}I_{\Delta n} / 0^{\circ}$

$\frac{1}{2}I_{\Delta n} / 180^{\circ}$

$I_{\Delta n} / 0^{\circ}$

$I_{\Delta n} / 180^{\circ}$

$5I_{\Delta n} / 0^{\circ}$

$5I_{\Delta n} / 180^{\circ}$

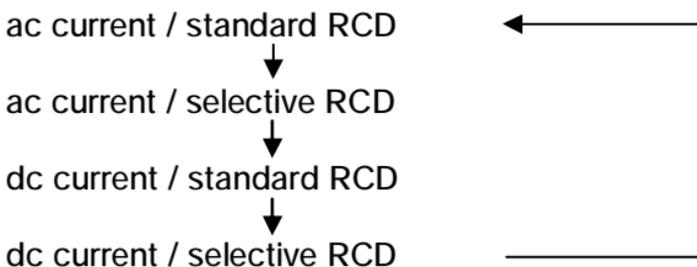
Functions keys F1-F4 have are used to select the options below:

F1	F2	F3	F4
Not used	AC/DC/ Selective	RCL	$I_{\Delta n}$

AC/DC/Selective (F2)

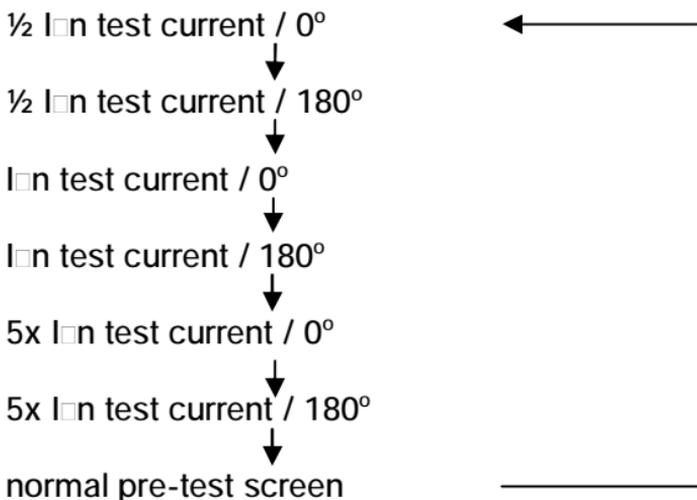
Function key F2 is used to select the required RCD type: AC or DC sensitive combined with standard or selective RCD types. Each time the F2 key is pressed the next option is selected

During selective tests the 9083P will display a delay timer which counts down from 30s to 0s. Pressing the Test key or turning the rotary switch while the 9083P is counting will terminate the count.



RCL (F3)

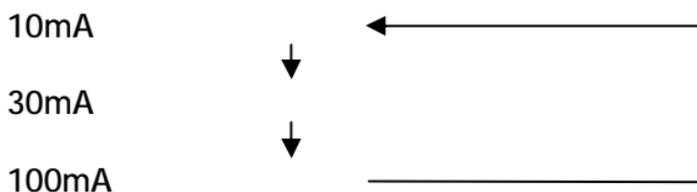
The RCL (Recall) key is used to recall the results of the last automatic RCD test performed by the 9083P. The LCD will update to show all of the relevant parameters for the result displayed. Continue to press the F3 key to rotate through the results.



Pressing any key while displaying a recalled measurement will return the 9083P to the normal pre-test screen.

Rated residual operating current I_{Dn} (F4)

The rated residual operating current is selected by pressing the F4 key.



When the required settings have been selected, press the TEST key to begin the sequence.

Note: The 9083P will determine the fault voltage that may appear on the protective conductor during the test. If the fault voltage is greater than 25V the 9083P will indicate >25V on the LCD, but the user may proceed with the test. If the fault voltage is great than 50V, this is indicated on the LCD and the test is inhibited.

If the fault voltage is less than 50V the test sequence will proceed and the trip times are shown in the primary display.

When the sequence is completed, the RCL key (F3) is used to recall the measurements.

5.8 RCD Trip Time Tests



The 9083P will only allow the Earth Loop Impedance test to be performed if the correct voltages are detected between phase-neutral (PN illuminated), phase-earth (PE illuminated) and neutral-earth (NE not illuminated).



Leakage currents or voltage on the protective conductor may influence the measurement.

Note: The 9083P will determine the fault voltage that may appear on the protective conductor during the test. If the fault voltage is greater than 25V the 9083P will indicate >25V on the LCD, but the user may proceed with the test. If the fault voltage is great than 50V, this is indicated on the LCD and the test is inhibited.

Use the rotary switch to select the $\frac{1}{2} I_{\Delta n}$, $I_{\Delta n}$ or $5 I_{\Delta n}$ test position.

The $\frac{1}{2} I_{\Delta n}$ test will perform the RCD test with a current of 50% of that indicated on the LCD.

The $I_{\Delta n}$ test will perform the RCD with the test current indicated on the LCD.

The $5 I_{\Delta n}$ test will perform the RCD with 500% that which is indicated on the LCD.

F1	F2	F3	F4
0° / 180°	AC/DC/Selective	Not used	$I_{\Delta n}$

0° / 180°

Use the F1 key to alternate between the starting angle of the current. All RCD tests will start on zero crossing.

AC/DC/Selective

Function key F2 is used to select the required RCD type: AC or DC sensitive combined with standard or selective RCD types. Each time the F2 key is pressed the next option is selected

During selective tests the 9083P will display a delay timer which counts down from 30s to 0s. Pressing the Test key or turning the rotary switch while the 9083P is counting will terminate the count.

ac current / standard RCD



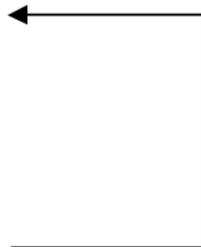
ac current / selective RCD



dc current / standard RCD

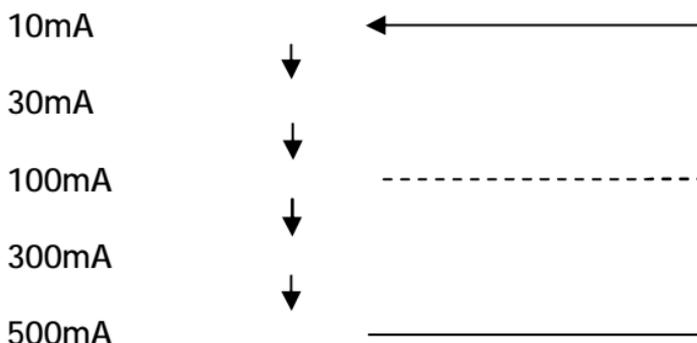


dc current / selective RCD



Rated residual operating current $I_{\Delta n}$ (F4)

The rated residual operating current is selected by pressing the F4 key.



Note: The available settings for rated residual operating current are restricted for the 5IDn test as shown below.

	10mA	30mA	100mA	300mA	500mA
½ I _N	a	a	a	a	a
1 I _N	a	a	a	a	a
5 I _N	a	a	a		

5.9 RCD trip current (Ramp) Tests



The 9083P will only allow the Earth Loop Impedance test to be performed if the correct voltages are detected between phase-neutral (PN illuminated), phase-earth (PE illuminated) and neutral-earth (NE not illuminated).



Leakage currents or voltage on the protective conductor may influence the measurement.

Note: The 9083P will first perform a short pre-test to determine the fault voltage that may appear on the protective conductor during the test. If the fault voltage is greater than 50V then the 9083P will indicate >50V on the LCD, the test will be disabled.

F1	F2	F3	F4
0°/180°	AC/DC/Selective	Not used	Test current

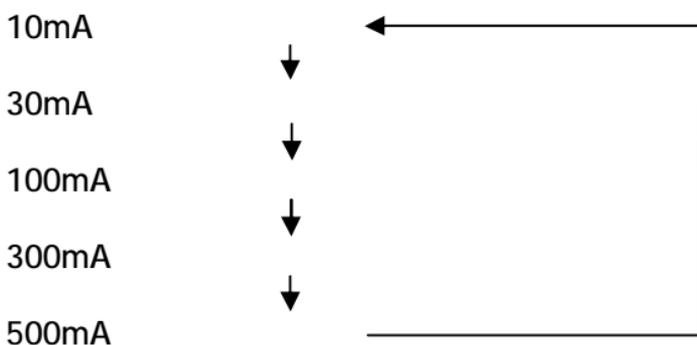
AC/DC/Selective

Function key F2 is used to select the required RCD type: AC or DC sensitive combined with standard or selective RCD types. Each time the F2 key is pressed the next option is selected

During selective tests the 9083P will display a delay timer which counts down from 30s to 0s. Pressing the Test key or turning the rotary switch while the 9083P is counting will terminate the count.

Rated residual operating current IDn (F4)

The rated residual operating current is selected by pressing the F4 key.



0° / 180° (F1)

Use the F1 key to alternate between the starting angle of the current. All RCD tests will start on zero crossing.

6 Electrical Specifications

6.1 Earth Continuity

Test Voltage Open Circuit	>4V
Test Current	>200mA into 2Ω
Display Range	0.00Ω - 199Ω
Measuring Range	0.01Ω – 1.99Ω 2.0Ω – 19.9Ω 20Ω – 199Ω
Resolution	0.01Ω maximum
Accuracy	±2% ±5 digits
Number of repeat tests	Approx 3000

6.2 Insulation Resistance

Test Voltage Accuracy	-0% +20% (open circuit)
Test current	>1mA into $U_N \times (1000\Omega/V)$
Test Current Short Circuit	<2mA
Display Range	0.05MΩ – 199MΩ
Measuring Range	0.05MΩ – 1.99MΩ 2.0MΩ – 19.9MΩ 20MΩ – 100MΩ
Resolution	0.01MΩ maximum
Accuracy	±5% ±5 digits
Voltage Indication	±5%
Accuracy	
Number of repeat tests	Approx 3000

6.3 Earth Loop Impedance

Supply Voltage	195V – 253V, 45Hz – 65Hz
Nominal Test Current	15mA
Display Range	0.01Ω - 2000Ω
Measuring Range	1.00Ω - 1.99Ω 2.0Ω – 19.9Ω 20Ω - 2000 Ω
Resolution	0.01Ω maximum
Accuracy	±5%±12d (1.00Ω - 1.99Ω) ±5%±5d (2.0Ω - 19.9Ω)
PFC Range	0kA – 26kA

6.4 Line Impedance

Supply Voltage	195V – 440V, 45Hz – 65Hz
Nominal Test Current	15mA
Display Range	0.01Ω - 2000Ω
Measuring Range	0.05Ω - 1.99Ω 2.0Ω – 19.9Ω 20Ω - 2000Ω
Resolution	0.01Ω maximum
Accuracy	±5% ±2 digits
PFC Range	0kA – 26kA

6.5 RCD

Supply Voltage	195V – 253V, 45Hz – 65Hz
Nominal Test Currents	10mA, 30mA, 100mA, 300mA, 500mA
Test Current Accuracy	-0% +10% at $I_{\Delta n}$ and $5I_{\Delta n}$ -10% +0% at $\frac{1}{2} I_{\Delta n}$
Trip Time Ranges	0ms – 2000ms, $\frac{1}{2} I_{\Delta n}$ 0ms – 300ms, $I_{\Delta n}$ General 0ms – 500ms, $I_{\Delta n}$ Selective 0ms – 40ms, $5I_{\Delta n}$
Trip Time Accuracy	±5% ±2 digits
Ramp Current Range	$\frac{1}{2} I_{\Delta n}$ to $1.1 I_{\Delta n}$
Trip Current	10%
Measurement Accuracy	

6.6 Voltage/Frequency Measurement

Display Range	0V – 440V
Voltage Measuring Range	0V – 440V
Resolution	1V
Accuracy	±5% ±2 digits
Frequency Range	45Hz – 65Hz
Frequency Accuracy	Indication only

7 Environmental Conditions

The 9083P has been designed to perform tests and measurements in a dry environment.

Maximum barometric elevation for making measurements is 2000M.

Overvoltage category IEC 60664/IEC 61010, 300V Category III.

Pollution degree 2 according to IEC 61010-1.

Protective system IP40 according to IEC 60529.

Electromagnetic compatibility (EMC). Interference immunity and emitted interference conforming to IEC 61326-1.

Operating temperature range of 0°C to 40°C, without moisture condensation.

The 9083P can be stored at any temperature in the range -25°C to +65°C (relative humidity up to 90%). The batteries should be taken out of the instrument for storage.

Operating Altitude 0 to 2000 meters

8 Maintenance



Before opening the 9083P ensure that it is disconnected from all voltage! Electric shock danger!

8.1 Preparing to work on the 9083P.

Ensure that the 9083P is voltage free as follows, before opening the instrument;

Power the unit off using the rotary switch by selecting the Off position on the rotary switch.

Disconnect all of the test leads from the unit

8.2 Securing the 9083P

Under certain conditions safe operation of the 9083P can no longer be assumed:

Visible damage of the instrument case.

Incorrect measurement results.

Recognisable abuse to the instrument due to prolonged storage under improper conditions.

Recognisable abuse to the instrument due to extraordinary transportation stress.

Check the battery compartment for signs of battery electrolyte leakage.

In these cases, the 9083P should be immediately switched off, disconnected from any test or measurement function and secured to prevent any further use.

8.3 Cleaning

Clean the external case of the 9083P with a clean dry cloth.

Avoid using solvents and abrasive scouring agents to clean the external case of the 9083P.

Check the battery contacts and compartment are free of electrolytic contamination.

Any contamination of the battery contacts or compartment should be cleaned with a dry cloth.

8.4 Battery Replacement



Before removing the battery cover, ensure that the 9083P is electrically isolated from any potential voltage source.

Power the unit off by selecting the Off position on the rotary switch.

Disconnect all the test leads from the unit

Position the 9083P face down and release the captive screw in the battery compartment cover.

Remove the battery compartment cover.

Remove the discharged batteries from the compartment.

Fit a new set of alkaline batteries.

Relocate the battery cover over the battery compartment and fasten in position with the battery cover captive screw.

8.5 Replacing the Fuse.



Before removing the battery cover, ensure that the 9083P is electrically isolated from any potential voltage source.



All replacement fuse types are specified for ratings and size on the battery compartment cover on the rear of the 9083P.

Power the unit off by selecting the Off position on the rotary switch.

Disconnect all the test leads from the unit.

Position the 9083P face down and release the captive screw in the battery compartment cover.

Remove the battery compartment cover.

Lift one end of the fuse out of the fuse holder with the help of a flat bladed screwdriver.

Lift the defective fuse completely out of the fuse holder.

Insert a new fuse of the correct type as described and specified by the text on the battery compartment cover.

Ensure that the new fuse is seated and centred in the fuse holder.

Relocate the battery cover over the battery compartment and fasten in position with the battery cover captive screw.

8.6 Service and Calibration.

To maintain the specified accuracy of the measurement results, the instrument must be recalibrated at regular intervals by either the manufacturer or an authorised Di-LOG Service Agent. We recommend a recalibration period of one year.

8.7 Spare Parts.

	Part No.
Red, Black and Green lead set (includes crocodile clips)	44B151
Mains test lead	44B152
Cordless Probe	43B721
Carrying Case	328A953
3.15A T 500V 1¼"	27B083

For help or advice on Service and Calibration contact:

Service Department
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