



## **MEGGER® LCB2000/2500 SERIES**

- Fully compatible with the requirements of BS7671, HD384, IEC364 and EN61557
- High current loop tests
- Non tripping loop tests to 0.01Ω
- PSSC and Contact Voltage Indication
- Phase Rotation Indication

# Premium Loop & Circuit Breaker Testers

## **DESCRIPTION**

The new Megger LCB 2000/2500 series of Loop and Circuit Breaker testers utilise advanced microprocessor technology to provide a host of new features not normally associated with standard testers.

The instruments utilise a large custom LCD display with a power saving LED backlight. The display is close mounted behind a highly resilient polycarbonate window where it provides outstanding clarity and viewing angle.

Both the LCB 2000 and the LCB 2500 are designed to perform all the live system tests required for an electrical installation meet in full the requirements of the 16th Edition Wiring Regulations, (BS 7671). By providing a range of both basic and advanced features, all of which are simple to use, the MEGGER LCB 2000/2500 are designed for maximum user convenience and time saving. As an example the auto-sequence RCD test enables the instrument to perform and record all the necessary tests on an RCD in sequence whilst the user stays at the distribution board to reset the trip. In the event that the installed system has a fault or does not test as expected a host of diagnostic features such as ramp RCD tests are on hand to pinpoint the problem.

The LCB 2500 provides the ultimate in technology offering the ideal mix of features for the busy electrical contractor combined with speed of operation and efficiency provided by the downloading of data. When combined with software certification the system provides a highly professional image for the contractor combined with the ever increasing requirement for tracability of test results.

The LCB 2500 offers comprehensive data storage options with individual test results being quickly stored with relevant connection details against user selectable distribution board and circuit references. Data storage is contained within non-volatile memory, (NVM), ensuring that test results are not lost in the event of battery failure or removal.

Once stored, results may be recalled to the display, printed to an external serial printer or downloaded to suitable software. AVO Download Manager™ for Windows is included enabling the simple download of stored data from the instrument into files on a PC. These files can be maintained as a record, used for manually completing certificates or exported to other applications such as spreadsheets and word processor documents. Instrument setups and printer language may also be changed. Where creation of

certificates of test is required both instruments are fully compatible with AVO PowerSuite for Windows and AVO NICEone (for the creation of N.I.C.E.I.C. Certification alone).

## **APPLICATIONS**

### **Electrical Contractors Features and Applications**

The LCB 2000/2500 are designed to provide the electrical contractor with highly professional tools for testing and commissioning fixed installations to both the British and International Wiring Regulations. The LCB2000 provides a comprehensive set of features to cater for almost all Loop and RCD testing needs. The LCB 2500 adds to these the ability to store and print results on site. The on-board storage facilities enable each test result to be assigned to particular distribution board and circuit references. Data may be later recalled to the display for manual completion of certificates of test or for maximum performance downloaded to certification software such as AVO PowerSuite for Windows or NICEone to create a seamless recording system with the tracability necessary for safety critical applications. Some of the key features of the LCB 2000/2500 are:

- **Intelligent Power saving backlight**

The inclusion of an intelligent backlight ensures that the display can be clearly seen even where the distribution board is located in a dark cupboard but without ruining battery life.

- **A choice of Non Tripping loop tests**

A three wire 15mA non tripping loop test provides a fast response with  $0,01\Omega$  A two wire 15mA non-tripping loop test is also included and provides  $0.1\Omega$  resolution. Both tests guarantee not to trip RCD's rated at 15mA or more.

- **No neutral needed for line - earth Testing**

This useful feature enables tests to be performed on lighting and three phase delta configurations where no neutral is available.

- **Automatic Test Start**

When using probes to make the connections both hands are needed making it almost impossible to press the test button. The LCB 2000/2500 include a "Test start on voltage detection" feature. Once armed the instrument will wait until the probes are connected or voltage is turned on then automatically start a test .

- **Three Phase Test Capability**

Phase-Phase measurements (up to 440V), Phase-Neutral and Phase-Earth tests are all possible.

- **A variety of Test leads Supplied as standard**

LCB 2000/2500 are supplied with a pre-wired plug for making connections via the standard socket outlets and a three wire leadset with probes and clips. This enables connection to be made easily to a wide variety of systems.

- **Selectable RCD Types**

The LCB2000/2500 may be easily set to test General purpose, Selective or dc sensitive RCD's.

- **Tests Programmable RCD's**

The MEGGER LCB2000/2500 cater for programmable RCD's by allowing the test current to be precisely defined up to 1000mA. This advanced feature enables the instruments to be used in a wide range of specialist installations, (e.g. medical), or where a programmable device is encountered.

- **Contact Voltage Indication**

MEGGER LCB2000/2500 indicate the Contact Voltage, (potential that bonded metalwork would actually rise to in the event of a fault) and the loop impedance during and RCD test.

- **Auto-Sequence RCD tests**

RCD testing requires a number of tests to be performed sequentially, many of which will trip the RCD which then has to be reset each time. In many cases the tester is some distance away from the RCD requiring the operator to make repeated journeys to reset the trip. LCB 2500 includes an unique Auto-Sequence RCD enabling the operator to remain with the RCD in order to reset it whilst the instrument automatically cycles through the necessary tests and records the results ready for when the operator returns.

- **RCD Ramp Test - Indicates actual tripping current of RCD**

There are numerous situations when it is useful to know the current at which a particular RCD actually trips. For instance in cases of nuisance tripping it is necessary to establish whether the RCD is over sensitive. MEGGER LCB2000/2500 include a Ramp Test feature which automatically increases the test current until the RCD trips. At this point the actual tripping current is displayed.

- **Phase Rotation Display**

MEGGER LCB2000/2500 include a special phase rotation symbol within the LCD display. When connected to a three phase supply the symbol automatically indicates the phase rotational sequence.

- **Warranty**

In addition to the electrical features above the rugged design of the LCB 2000/2500 range ensures that they can withstand the everyday handling, transportation and storage with other tools in the contractor's toolbag. Both products are supplied with a three year manufacturer's warranty.

## SPECIFICATION

### SUPPLY VOLTAGE

Instruments are designed to work on supplies of 110 - 440V, 50/60Hz over-voltage Category III with a maximum voltage to Earth of 300V

### SUPPLY VOLTAGE MEASUREMENT

25 - 500 V

Intrinsic accuracy  $\pm 2\% \pm 2$  digits

### SUPPLY FREQUENCY MEASUREMENT

16 - 460 Hz

Intrinsic accuracy  $\pm 0,1\% \pm 1$  digit

### LINE-EARTH LOOP RESISTANCE MEASUREMENT (to EN 61557-3)

**Displayed Range:**

0,01  $\Omega$  to 3,00 k $\Omega$

**Supply Range**

100-280V

**Nominal Supply:**

230 V, 50 Hz

**EN61557 Operating Range:**

0,25  $\Omega$  to 3,00 k $\Omega$

**Intrinsic accuracy:**

0,01  $\Omega$  - 9,99  $\Omega$   $\pm 4\% \pm 0,03\Omega$

10,0  $\Omega$  - 89,9  $\Omega$   $\pm 5\% \pm 0,5\Omega$

90  $\Omega$  - 899  $\Omega$   $\pm 5\% \pm 5\Omega$

900  $\Omega$  - 3,00 k $\Omega$   $\pm 5\% \pm 20\Omega$

### LINE - LINE (Phase/Phase) LOOP RESISTANCE MEASUREMENT (to EN 61557-3)

**Displayed Range:**

0,01  $\Omega$  to 19,99  $\Omega$

**Supply Range** 100-440V Phase to Phase

**Nominal Supply:** 230 V, 50 Hz

**EN61557 Operating Range:**

0,25  $\Omega$  to 19,99  $\Omega$

**Intrinsic accuracy:**  $\pm 5\% \pm 0,03 \Omega$

### PROSPECTIVE FAULT CURRENT

Prospective fault current =

Nominal voltage

Loop resistance

Prospective Fault Current is calculated from the respective loop resistance. Ranges and accuracy's are therefore derived from the previous section.

### LINE - EARTH LOOP RESISTANCE MEASUREMENT AT15 mA (to EN 61557-2)

**Loop L-PE 0.1 $\Omega$**

**Displayed Range:**

0,1  $\Omega$  to 2,00 k $\Omega$

**Nominal Supply:**

230 V 50 Hz

**EN61557 Operating Range:**

5,0  $\Omega$  to 2,00 k $\Omega$

**Intrinsic accuracy:**

up to 200  $\Omega$   $\pm 3\% \pm 0,3 \Omega$

over 200  $\Omega$   $\pm 5\% \pm 5 \Omega$

**Noise Immunity:**

1 $\Omega$  of reading within 0,3  $\Omega$  on a normal domestic supply.

**LOOP L-PE 0.01 $\Omega$**

**Displayed Range:** 0,01  $\Omega$  to 10,00  $\Omega$

**EN61557 Operating Range:**

0.5 $\Omega$  to 10,00  $\Omega$

**Nominal Supply:** 230 V 50 Hz

**Intrinsic accuracy:**  $\pm 5\% \pm 0,05 \Omega$

**Noise Immunity:** 1  $\Omega$  of reading within 0,05  $\Omega$  on a normal domestic supply

**RCD TESTING (to EN61557-6 up to 500 mA)**

**Selectable Ranges**

30, 100, 300, 500, 1000 mA

**Variable Range**

10 mA to 1000 mA

**Test Facilities:**

Contact voltage tests at 1  $\frac{1}{2}$  I  $\Delta$ n

Loop resistance tests at  $\frac{1}{2}$  I  $\Delta$ n

No Trip tests at  $\frac{1}{2}$  I  $\Delta$ n

Trip tests at I  $\Delta$ n, 5I  $\Delta$ n

Fast Trip test at 150 mA

Ramp tests

**RCD Types:**

General purpose, delayed (Selective) and d.c. Sensitive

**Nominal Supply:** 230 V, 50 Hz

**Supply Range:**

100 - 280 V, 45 - 65 Hz

$\frac{1}{2}$  I  $\Delta$ n TEST

CONTACT VOLTAGE

Displayed range: 0 V to 90 V

Measurement range: 5 V to 90 V

**LOOP RESISTANCE**

(measured at  $\frac{1}{2}$  I  $\Delta$ n )

I $\Delta$ n	RESOLUTION
10	0,5 k $\Omega$ to 9 k $\Omega$
30	170 $\Omega$ to 3 k $\Omega$
100	50 $\Omega$ to 900 $\Omega$
300	17 $\Omega$ to 300 $\Omega$
500	10 $\Omega$ to 180 $\Omega$
1000	5 $\Omega$ to 90 $\Omega$

**2 SECOND NO TRIP TEST**

at  $\frac{1}{2}$  I  $\Delta$ n (optional)

Test current duration 2 seconds.

**Intrinsic Test Current accuracy:**

-8% to -2%

**TRIP TESTS**

I  $\Delta$ n Trip Test Automatic  $\frac{1}{2}$  I  $\Delta$ n test, followed by a 30 second delay (Selective type only) then a Trip test.

**General purpose Test**

$\Omega$ n test for up to 300 ms

**Selective Test**

$\Delta$ n test for up to 2000 ms

**D.C. Sensitive Trip (For RCDs up to 300 mA)**

As the I  $\Delta$ n Trip Test above, but test current is a half wave rectified a.c.with an r.m.s. value of  $\sqrt{2}$   $\Delta$ n.

**5I  $\Delta$ n Trip Test (for RCDs up to 100 mA)**

Test follows the same sequence of  $\frac{1}{2}$  I  $\Delta$ n test, 30 second delay (Selective type only) as the I  $\Delta$ n test.

**General purpose test**

5I  $\Delta$ n test for up to 40 ms

**Selective test**

5I  $\Delta$ n test for up to 150 ms

**TIMED TRIP TESTS**

Trip time displayed Range  
0,1 ms to test time limit

**Intrinsic Trip time accuracy**

$\pm 1\% \pm 1$  ms

**Intrinsic Test Current accuracy**

+2% to +8%

**Ramp Test**

(Trip current measurement)

Automatic 1/2 I  $\Delta$ n test followed by a 30 second delay (Selective type RCD only) then an incremental ramp test.

**Intrinsic Ramp Test**

**Current accuracy**  $\pm 3\%$

I $\Delta$ n	RAMP RANGE	INCREMENT
10	5 - 15 mA	1 mA
30	15 - 50 mA	1 mA
100	50 - 150 mA	2 mA
300	150 - 300 mA	6 mA
500	250 - 500 mA	10 mA
1000	500 - 1020 mA	52 mA

**150 mA 40 ms Trip Test**

Stand alone test at 150 mA for 40 ms

**Displayed Range**

0,1 ms to 40 ms

**POWER SUPPLY**

6 x 1,5 V Alkaline cells type LR6 or 1,5V nickel cadmium rechargeable cells.

**FUSES**Non replaceable  
2 x 7A (SIBA 70-065-63)**TEMPERATURE RANGE****Operating**

-5°C to +40°C up to 90% RH

**Storage**

-25°C to +65°C up to 90% RH

**IEC 61557 / EN 61557**

Complies with the following parts of EN 61557, Electrical safety in low voltage systems up to 1000 V a.c. and 1500 V d.c. -Equipment for testing, measuring or monitoring of protective measures:-

Part1 - General requirements

Part 2 - Loop resistance

Part 3 - Residual current devices (RCDs)

Part 10 - Combined Measuring Equipment.

**Safety**

The LCB 2000/2500 comply with the latest international directives concerning safety and electromagnetic compatibility.

The instruments meet the requirements for double insulation to IEC 61010-1 (1995), EN 61010-1 (1995) Safety Requirements for electrical equipment for measurement, control, and laboratory use. Category III\*\*, 300 Volts phase to earth (ground) and 440 Volts phase to phase, without the need for separately fused test leads. If required, fused test leads are available as an optional accessory.

\*\* Relates to the transient over-voltages likely to be met in fixed wiring installations.

**Electromagnetic Compatibility**

The LCB 2000/2500 series comply with IEC 61326-1

**Environmental Conditions****Operating range**

to +40 °C

**Operating humidity**

90% RH at 40 °C max.

**Storage temperature range**

-25 to +65 °C

**Calibration Temperature +20 °C****Maximum altitude** 2000 m**Dust and water protection IP54****Physical Specifications****Dimensions****Height:** 230mm (9.1 inches)**Width:** 114mm (4.5 inches)**Depth:** 62mm (2.4 inches)**Weight**

920g (2.0lbs) (including batteries)

**Cleaning** Wipe with a clean cloth damped with soapy water or Isopropyl Alcohol(IPA)**ORDERING INFORMATION**

Item (Qty)	Order Code	Optional Accessories	
Premium Loop/Circuit Breaker Tester	LCB2000	UK Mains Plug Test Lead	6231-633
Premium Loop/Circuit Breaket Tester	LCB2500	Euro Mains Plug Test Lead	6231-634
With download, printing and storage		2-Wire Test Lead Set With Prods and Clips (not for 0.01Ω non-trip loop tests)	6231-631
<b>Included Accessories</b>		2 Wire Test Lead 5m long (not for 0.01Ω non-trip loop tests)	6231-637
User Guide	Depends on variant	Lead Set (Earth Bond) (5 Pin)	6231-634
		Switched Probe SP2	6231-636
		Fused Probe and Clip Set	6180-405
3-Wire Test Lead Set, 2Prods, 3 clips	6231-632	Computer Serial Lead (LCB 2500 only)	25955-025
Mains Plug Test Lead	Depends on variant	Printer Serial lead (LCB 2500 only)	25955-026
		Probes (Pair)	6220-502
Test and Carry Case	6420-122	<b>Optional Software</b>	
Download Manager Software on CD	6111-442	AVO PowerSuite for Windows	See supplier
		(Comprehensive Electrical Testing Software)	
		AVO NICEone	6111-403
		(Certification software for producing NICEIC certificates)	
		<b>Publications:</b>	
		Testing Electrical Installations (Book)	6172-129
		'A Stitch in Time' (Video)	AVTM21-P8
		'Getting Down To Earth' (Book)	AVTB25-TA
		A practical manual on earth resistance testing	