

# BM80/2 Series

## Multi-Voltage Analogue/Digital Insulation and Continuity Testers



- Fully complies with the requirements of BS 7671, HD 384 and IEC 364
- Multiple insulation test voltages from 50 V to 1000 V d.c. (according to model)
- Remote control switched probe option
- Optional RS232 port
- Optional current clamp accessory
- Waterproof and dustproof to IP54

### DESCRIPTION

The Megger® BM80/2 Series are multi-voltage insulation and continuity testers offering advanced performance, specification and features, and simplicity of use. They have insulation test voltages from 50 V to 1000 V d.c., (500 V max. on BM81/2.) The comprehensive specification is achieved using the latest electronic design and technology.

The analogue/digital LCD incorporates the benefits of electronic arc analogue indication with unambiguous digital readings. The analogue scale helps to make rapid identification of insulation condition, and to monitor variable readings, and is complemented by the precision and simplicity of a digital display. All 3 instruments in the range are identical except that the BM81/2 has a maximum test voltage of 500 V and the BM82/2 has no continuity range.

In compliance with BS 7671, IEC 364, HD 384 and VDE 0413 Part 1 and 4, the 250 V, 500 V and 1000 V insulation ranges have a 1 mA test current at the minimum pass values specified. The BM80/2 and BM81/2 continuity ranges have a short circuit test current of approximately 205 mA in order to comply with the requirements of these documents. Also on the continuity ranges, is the facility to null the resistance of the test leads.

This enables direct readings of low resistance to be taken. A continuity buzzer is included on the second continuity range.

In addition to the insulation and continuity ranges, the BM80/2 series has a resistance range which measures up to 100 kΩ on the digital scale and up to 10 MΩ on the

analogue scale. Due to the low test voltage and current of this range, it can be used to test circuits with sensitive equipment connected, without causing damage.

Two voltage ranges measure up to 50,0 V and 600 V a.c. or d.c. respectively, and indicate the presence of negative d.c. A voltage warning is provided in these models, alerting the user to the presence of external voltage greater than 25 V, by displaying the voltage level, even when measuring on insulation and continuity ranges. The voltage range will indicate if capacitive charge remains after a test, and will monitor the automatic discharge.

On all models testing is inhibited if 55 V is detected.

Hands free operation is offered as standard on all ranges except the insulation ranges. Locking and non-locking test buttons are provided with each instrument for user selection. Use of the non-locking button is recommended to prevent accidental mis-use and injury, and in cases where continuous operation of an insulation test is required the locking button can be fitted. Alternatively the optional accessory Switched Test Probe SP1 can be used enabling remote operation of the test button from the negative test probe.

The BM80/2 series is rugged, and therefore suited to tool bag treatment, as well as having an IP54 environmental protection rating which ensures product reliability in wet and dusty conditions. Exceptional battery life is provided by six cells housed in separate battery compartment. The instruments are designed to IEC 1010-1, VDE0411 and BS4743 safety standards.

**Model Selection Chart**

	Insulation Test Voltage					Cont Range
	50	100	250	500	1000	
BM80/2	✓	✓	✓	✓	✓	✓
BM81/2	✓	✓	✓	✓	✗	✓
BM82/2	✓	✓	✓	✓	✓	✗

**ELECTRICAL CONTRACTORS**

The BM80/2 series, designed for flexibility and versatility, has a wide variety of applications and is ideal for testing electrical installations to the British and International Wiring Regulations. Each instrument in the series conforms to the requirements of Table 71 A in BS 7671, and to VDE 0413 parts 1 and 4, HD384 and IEC364.

The BM80/2 series can be used in both the domestic and industrial contracting environments. Test voltages of 250 V, 500 V and 1000 V d.c. are available. A 250 V insulation test voltage is necessary to test low voltage circuits supplied by an isolating transformer. 500 V d.c. is the most commonly required voltage, since it is used to test all circuits except low voltage circuits with a nominal voltage up to and including 500 V. The 1000 V d.c. test voltage is used on circuits with a nominal voltage greater than 500 V and less than 1000 V.

The continuity ranges can be used to test the continuity of protective and ring final circuit conductors, and the polarity of the conductors.

The BM80/2 series instruments can also be used for insulation and continuity tests on transformers, motors, generators, domestic appliances, power tools, such as electric drills, and many other pieces of electrical equipment.

On high energy systems it is recommended that test leads with fused prods are used when measuring voltage. These are available as an optional accessory.

**SERVICE ORGANISATIONS**

The BM80/2 series is ideal for use by Service Organisations due to the wide range of parameters which can be measured with the instrument and its associated optional accessories.

The insulation test ranges are available for establishing the integrity of the insulation of internal parts such as motors and transformers, as well as other equipment, and the continuity ranges can be used for circuit tracing and operational checking of switches, etc.

With the resistance range measuring up to 100 kΩ on the digital display, and 10 MΩ on the analogue scale, basic components such as resistors, capacitors and diodes can be tested for functionality.

Two voltage ranges (1-50,0 V and 0-600 V a.c./d.c.) enable internal mains voltages and power supply rail levels to be measured, and with the addition of the MCC10 optional Current Clamp, appliance current consumptions can be measured and compared to the rating plate.

These unique features offer measurement ranges and facilities not normally found in an Insulation Tester and could therefore reduce the number of test instruments required by the Service Engineer.

**ADVANCED APPLICATIONS**

The addition of the DLB1 RS232 communication base will enable the BM80/2 family to produce a continuous output of information corresponding to the value which is shown on the instrument display. The DLB1 is supplied complete with DATA software which will enable the test information to be transferred to an IBM compatible computer.

This opens up applications for continuous monitoring of insulation resistance for the advanced user who may wish to use the results for calculating Dielectric Absorption Ratios including Polarisation Index. The Polarisation Index Ratio is defined as the ratio between insulation resistance values measured after 1 minute and 10 minutes; it is useful for determining insulation quality without the need for temperature compensation or necessary referral to historical test information.

The DLB1 when used in conjunction with the SP1 can also facilitate limited remote operation of the BM80/2 series for applications where the product may need to be permanently installed in or near a piece of equipment.

**TELECOMMUNICATIONS APPLICATIONS**

In addition to the Installation Testing capabilities of the 1000 V, 500 V and 250 V insulation test ranges the BM80/2 series incorporates 100 V and 50 V testing facilities. These low voltage insulation tests enable the instrument to be used for checking delicate components and equipment which would otherwise be damaged by higher voltages.

The instruments are designed to perform insulation tests on systems with up to 55 V of electrical interference, or

cross-talk, without the accuracy or reliability of results being effected and with no damage to the instrument.

A wide resistance measuring capability across the ranges enables a degree of cable fault pre-location to be performed by using resistance to fault methods, and the wide voltage measuring capability allow accurate measurement of line and battery voltages.

**SPECIFICATIONS**

**INSULATION RANGES**

**Nominal Test Voltage (d.c.):**

50 V, 100 V, 250 V, 500 V and 1000 V

(1000 V not available on BM81/2.)

**Measuring Range**

50 V range:	0–10 GΩ
100 V range:	0–20 GΩ
250 V range:	0–50 GΩ
500 V range:	0–100 GΩ
1000 V range:	0–200 GΩ

**Resolution:** 0,01 MΩ

**Terminal Voltage on Open Circuit (d.c.):** +15% maximum

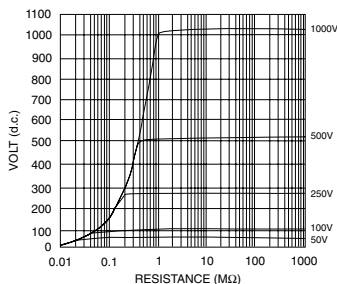
**Test Current**

1 mA minimum at the minimum pass values of insulation specified in BS 7671 (formerly the 16th Edition IEE Wiring Regulations) on the 250V, 500 V and 1000 V ranges.

50 V range:	0,2 mA at 250 kΩ
100 V range:	0,4 mA at 250 kΩ

**Accuracy (at 20°C)**

50 V range:	±2% ±2 digits ±4% per GΩ
100 V range:	±2% ±2 digits ±2% per GΩ
250 V range:	±2% ±2 digits ±0,8% per GΩ
500 V range:	±2% ±2 digits ±0,4% per GΩ
1000 V range:	±2% ±2 digits ±0,4% per GΩ



Typical Terminal Voltage Characteristics:

**CONTINUITY RANGES (not BM82/2)**

**Measuring Range:** 0,01 - 99,9 Ω  
(0-50 Ω on analogue scale)

**Open Circuit Voltage:** 5 V, ±1 V

**Short Circuit Current:** 205 mA, ±5 mA

**Accuracy (at 20° C)** ±2%, ±2 digits

**Zero Offset Adjust:** 0 - 9,99 Ω

**Continuity Buzzer** Operates at less than 5 Ω approx.

**RESISTANCE RANGE (can be used for diode testing)**

**Measuring Range:** 0,1 - 100 kΩ (0 - 10 MΩ on analogue scale)

**Open Circuit Voltage:** 5 V, ±1 V

**Short Circuit Current:** 20 μA, ±5 μA Accuracy (at 20°C): ±3%, ±2 digits

**VOLTAGE RANGE**

**Measuring Range**

- (i) 0 - 600 V a.c./d.c.
- (ii) 1,0 - 50,0 V a.c./d.c.

**Accuracy (at 20° C)**

0-600 V Range <450 V a.c. (50/60 Hz) and d.c. ±1%, ±2 digits

>450 V a.c. (50/60 Hz) and d.c. ±2%, ±2 digits

<450 V a.c. 400 Hz: ±5%, ±2 digits

1,0 - 50,0 V Range a.c./d.c. ±2%, ±3 digits

**TEMPERATURE COEFFICIENT**

<0,1% per °C on all ranges.

**DEFAULT VOLTMETER**

The default voltmeter operates when an external voltage >25 V a.c. or d.c. is detected on any range except OFF and . If this voltage exceeds 55 V then insulation testing will be inhibited. Reverse polarity d.c. will cause 'd.c.' to appear on the DISPLAY.

**BATTERY CONDITION TEST**

If the batteries are low during a test, the symbol will appear automatically. The batteries can also be checked by selecting the battery condition test position. This will indicate the result as volts and as a bar.

**AUTO SHUT-OFF**

The instrument auto shut off operates 5 minutes after the start of a test, on all ranges, except the insulation ranges where it operates after 12 minutes. This can be adjusted to 60 minutes for the voltage, continuity and KΩ ranges. Selecting an insulation range or off will revert the shut-off to 5 minutes.

**GENERAL SPECIFICATION**

**Operating Range** -20 - +40°C

**Operating Humidity** 90% R.H. at 40°C max.

**Storage Range** -25 - +65°C

**Environmental Protection** IP54

**Fuse Type**

500 mA (F) 440 V, 32 x 6 mm Ceramic HBC 10 kA minimum. Glass fuses must not be fitted.

Indication of a ruptured fuse is provided by the symbol .

**Safety**

The instruments meet the requirements for double insulation to IEC 1010-1 (1995), EN61010-1 (1995) to Category III, 300 V phase to earth (ground) and 440 V phase to phase. Over voltage measuring facilities exist to indicate capacitive discharges.

**FUSE PROTECTED TO 440 V.**

**INSTALLATION CATEGORIES**

Category III: Fixed wiring and installations within a building.

**AUTOMATIC DISCHARGE**

When the test button is released after an insulation test the item under test will be discharged automatically. Any voltage present will be indicated on the display so that the discharge can be monitored.

#### POWER SUPPLY

<b>Battery Type</b>	6 x 1,5 V cells IEC LR6 type only.
<b>Battery Life</b>	3000, 5 second operations, at 1 kV worst case
<b>Weight</b>	625g (1,377 lbs approx.)
<b>Dimensions</b>	220 x 92 x 55 mm (5,5 in x 2,33 x 2,16 in approx.)

#### EMC

In Accordance with IEC61326 including Amendment No.1



#### SP1

The SP1 switched probe is available as an optional accessory. By simply plugging the standard red positive lead into the instrument, and with the switched test probe inserted into a unique socket on the top of the insulation tester, tests can be made by pressing the remote switch on the probe.

This remote operation significantly increases the ease of use of the product and reduces the time taken to perform a test.

#### SPECIFICATION

**Operating Temperature Range:** -20°C to +40°C

**Operating Humidity:** 90% RH @ 40°C max.

**Storage Temperature Range:** -25°C to +65°C

**Protection:** IP54

#### Safety

Meets the safety requirements for double insulation to IEC1010-2-31 (1995) EN61010-2-31 (1995) IEC1010-1 (1995) EN61010-1 (1995) Category III, 300 V phase to earth and 500 V phase to phase.

**Weight:** 155 g

#### MCC1

The MCC10 Current Clamp will connect to the instrument test leads and enable direct indication of a.c. current to be displayed on the 50,0 V measuring range. Measurement in the range of 1,0 A to 10,0 A a.c. can be made, with overload up to 16 A at marginally reduced accuracy, and the clamp will span a conductor of 15 mm. This current measuring feature, not normally associated with insulation testers, greatly enhances the product versatility and further increases the applications for Electrical Contractors, Utilities and Service Organisations.

#### SPECIFICATION

**Current Range:** 1,0 A to 10 A a.c. R.M.S

**Output Voltage:** 1 V a.c. per 1 A a.c.

<b>Accuracy:</b>	±2%
<b>Operating Temperature:</b>	-10°C to +50°C <75% RH
<b>Storage Temperature:</b>	-20°C to +75°C
<b>Type of Sensing:</b>	Induction coil for a.c. current
<b>Max. Output Impedance:</b>	75Ω
<b>EMC</b>	In accordance with IEC61326 including Amendment No.1
<b>Max. Conductor Size:</b>	15 mm dia. cable, or a 15 mm x 17 mm busbar.
<b>Size (without leads):-</b>	43 mm x 23 mm x 94 mm
<b>Weight:</b>	105 g

#### DLB1

The DLB1 optional accessory communication interface provides an RS232 serial data output simultaneous to the displayed readings.

When used in conjunction with the DATA software provided and an IBM-compatible PC, long-term insulation monitoring and data storage are possible.

DATA also enables test data to be presented in tabular form and facilitates the printing of certificates.

#### SPECIFICATION

<b>Baud Rate:</b>	9600
<b>Operating Range:</b>	-20°C to +40°C
<b>Operating Humidity:</b>	90% RH @ 40°C max.
<b>Storage Temperature Range:</b>	-25°C to +65°C

#### Safety:

Meets the safety requirements for double insulation to IEC1010-1(1995) EN61010-1(1995) to Cat. III, 300 V phase to earth (ground) and 500 V phase to phase.

#### E.M.C.

In accordance with IEC61326 including Amendment No.1

<b>Dimensions:</b>	94 mm x 46 mm x 42 mm
<b>Weight:</b>	80 g

#### ORDERING INFORMATION

Item (Qty)	Order Code
Multivoltage Insulation & Continuity Testers	BM80/2
(no 1000 V range)	BM81/2
(no continuity range)	BM82/2
<b>Included Accessories</b>	
Test lead set	6220-437
Test & carry case	6420-112
User Guide	6171-188
<b>Optional Accessories</b>	
Fused lead set FPK8	6111-218
SP1	6220-606
MCC10	6111-290
DLB2	6220-602
Test record card (Pack of 20)	6111-216

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Registered to ISO 14001 Reg no. EMS 61597

**BM80\_2\_DS\_en\_V10**  
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