



## **MEGGER® BMM Series Multi-MEGGERS®**

- Insulation measurement to 200 GΩ
- Complete multimeter capability
  - Voltage measurement
  - Current measurement
  - Frequency measurement
  - Low-resistance measurement
  - mV transducer input
- 200 mA Continuity Range
- Backlight
- Selectable locking test button
- Data storage and downloading

# Premium Hand-held Insulation Testers

## **DESCRIPTION**

The Megger BMM Series Multi-MEGGERS are a versatile new range of hand-held insulation testers designed to extend the capability of insulation testers beyond anything available on the market today.

In addition to extremely high-sensitivity insulation resistance measurements (200 GΩ), these instruments offer complete multimeter testing capability and the ability to view the insulation measurement in terms of leakage current (μA). The top-of-the-range models also include data storage and download capability. The end user can now carry a single instrument to the test site rather than multiple instruments.

The specific models of the BMM Series Multi-MEGGERS are:

**BMM2000:** Advanced feature contractor/service technician insulation tester and multimeter. Offers voltage ranges of 250, 500, and 1000 V.

**BMM2500:** Top of the range contractor/service technician insulation tester and multimeter featuring result storage, printing, and downloading. Offers the same voltage ranges as the BMM2000.

**BMM80:** High spec low voltage/specialty application insulation tester and multimeter. Features 50, 100, 250, 500, and 1000 V insulation ranges.

**BMM2080:** Advanced feature low voltage/specialty application insulation tester and multimeter. Like the BMM80, it offers voltage ranges of 50, 100, 250, 500, and 1000 V.

**BMM2580:** Top of the range low voltage/specialty application insulation tester and multimeter. Features include result storage, printing, and downloading. Voltage ranges of 50, 100, 250, 500, and 1000 are also available in this model.

Additionally, all units are supplied with the SP1 Remote Switch Probe as a standard accessory (at no additional cost) for hands-free operation.

The BMM Series Multi-MEGGERS are rugged and easy to use. The instruments have a designer crafted ABS case with integral handgrips and a custom designed LCD with wide viewing angle featuring Megger's patented analog arc and digital displays. Elastomeric softkeys and an easy-to-grip rotary control provide simple range selection. A power saving backlight ensures good visibility in dimly lit areas. All models are designed to meet the requirements of IP54 for protection against ingress of dust and water.

A specially designed test and carry case is provided and facilitates multiple modes of use from belt clip to around-the-neck operation. A clear flexible membrane covers the instruments' front surface allowing easy operation of the controls while keeping the unit clean. Test leads may remain attached to the instrument at all times and be secured to the back of the case. The case has a removable accessory storage pouch and a hanging strap for convenience in all situations.

Depending on the model chosen, the BMM Series Multi-MEGGERS can include most or all of the following capabilities:

- Patented analog/digital display
- Backlight
- Digital insulation resistance measurement to 200 GΩ
- Analog insulation resistance measurement to 100 GΩ
- Leakage current measurement (μA)
- kΩ Range
- Lead resistance zeroing
- Voltage, current, frequency, and low resistance measurements
- mV transducer range for measuring other parameters such as temperature
- Capacitance measurement

- Result storage
- Data recall to display
- Direct result printout
- Download to a PC  
(download software included)
- Data logging capability
- 200 mA continuity range
- Remote control switch probe capability
- Live circuit warning

### **BMM2000 Series**

The insulation and continuity ranges are augmented by a number of features only to be found on a dedicated multimeter. The BMM2000 and BMM2080 include autoranging voltage measurement up to 500 V ac/dc, resistance measurement from as low as 10 mΩ up to 10 MΩ and current measurement from 10 mA to 500 mA. Higher currents still may be measured using an external mV output current clamp.

By incorporating all the above features into a single unit the BMM2000 removes the need to carry a separate multimeter.

Both instruments in this series feature mV ranges enabling connection of a wide variety of optional transducers. Such devices extend the range of possible measurements almost endlessly including such items as temperature probes, airspeed indicators and high current clampmeters thus extending the scope of the instruments into the HVAC and Servicing industries.

The BMM2080 includes two low-voltage ranges (50 V and 100 V) and capacitance measurement capability for telecom and specialty applications.

### **BMM80**

The BMM80 offers all the features and specifications of AVO's popular Model BM80/2, plus a lot more! A Millivolt Transducer input accommodates a wide range of probes to allow measurement of additional parameters, such as temperature, current, humidity, pressure, and microwave leakage. Five insulation test voltages, which include 50 V and 100 V tests, combine with capacitance measurement to make the BMM80 fully suited to telecom applications. A power-saving backlight illuminates the display without serious depletion of the battery. The tester comes complete with a switch test probe to facilitate hands-free operation in tight quarters.



### **BMM2500 Series**

The BMM2500 and BMM2580 include all the capabilities of the BMM2000 Series, and offer comprehensive data storage options with individual test results being stored against user selectable distribution board and circuit references. Alternatively data logging may be selected and up to 300 consecutive measurements of any chosen parameter may be made at a selectable time interval. Data storage is contained within nonvolatile 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 language changes to be performed, along with the simple download of stored data from the instrument. These files can be maintained as a record, used for manually completing certificates or exported to applications such as spreadsheets and word processor documents.

The BMM2580 includes two low-voltage ranges (50 V and 100 V) and capacitance measurement capability for telecom and specialty applications.

### **FEATURES AND BENEFITS**

- Live Circuit Warning alerts user of connection to circuits above 25 V regardless of range selected.
- Zero offset adjustment on continuity range provides automatic removal of lead resistance from measurement for increased accuracy.
- Continuity Buzzer sounds continuously below 5 ohms allowing user to concentrate on making the connection.
- Voltage, current, frequency and low resistance measurements with one instrument, eliminating the need to carry multimeters.
- Power saving backlight enables clearly-seen display and easy-to-see test results.
- Download Manager Software is included on CD for quickly saving data and including it with other reports.
- Millivolt transducer input allows measurement of parameters such as temperature and high currents by connecting the appropriate device.
- Result, test configuration, circuit and distribution board reference storage reduces testing time and increased profitability (models BMM2500 and BMM2580).

- Nonvolatile memory (BMM2500 and BMM2580 models) stores data and protects it in the event of battery removal or failure.
- Continuous data logging facility monitors slowly-changing parameters and permits additional test such as Polarization Index (models BMM2500 and BMM2580).
- The included accessory, SP1 switch probe, allows measurements be made when both hands are needed to hold the probe.
- Capacitance measurement range (BMM80, BMM2080, and BMM2580) addresses a critical telecom testing need.
- Extremely sensitive insulation resistance measurement (up to 200 G $\Omega$ ) can detect changes at high levels that may indicate future problems in the insulation.
- Insulation measurement result can be expressed in terms of leakage current for end users needing this information.

## APPLICATIONS

### Electrical Contractors

The BMM Series multi-MEGGERS are ideal for testing electrical installations. The BMM2500 and BMM2580 provide the electrical contractor with the ultimate tool for testing/commissioning fixed installations.

The on-board storage capability of the BMM2500 series 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 a printer or PC. The inclusion of a backlight ensures that the display can be clearly seen even where the distribution board is located in a dark cupboard without ruining battery life.

Up to five insulation test voltages (depending on model) between 50 and 1000 V are provided to ensure that the correct test voltage for the installation under test is available. The 500 V range is suitable for the majority of testing on circuits with a nominal voltage up to 500 V. The 250 V or below insulation ranges are necessary where low voltage circuits supplied by an isolating transformer are tested, while the 1000 V range is used for circuits with a nominal voltage exceeding 500 V and below 1000 V. An additional leakage facility (not available on the BMM80) allows any insulation measurement to be dis-

played in terms of microampere ( $\mu$ A) leakage currents.

The instruments have a 200 mA continuity range which is ideal for testing the continuity of ring final circuit conductors, primary bonding of services and of supplementary bonding conductors. The zero offset adjustment allows the resistance of the test leads to be ignored so the measurement shown is due to the conductors under test only.

The feature set of the BMM2000 and BMM2500 Series extends to include measurement ranges for voltage, current, resistance, and frequency enabling one instrument to be used where normally a separate multimeter would be required.

### Servicing and HVAC

The BMM2000 and BMM2500 Series offer features addressing the requirements of the service engineer in a single unit, including the testing of domestic appliances. The combination of multiple voltage insulation test, continuity, and mV transducer inputs cater for the testing of motors, timers, earth bonding, solenoids and relays, valves, and PCB components.

The insulation ranges are useful for establishing the integrity of the internal parts such as motors, timers and transformers, while the continuity range can verify the correct earth bonding of the case metalwork and check the operation of switches, etc.

The option of attaching any mV output temperature measuring transducer extends the measurement range of the BMMs to measurement of water, air, pipe, and surface temperatures making the instruments ideally suited for the servicing of ovens, washing machines, and HVAC systems. The unique mV transducer input ranges enable the BMM Series to interface to transducers for measurement of the various parameters necessary during servicing and in the commissioning and verification of HVAC systems.

The multimeter functions of voltage, current, resistance, and frequency find a number of uses in the measurement of component parts within appliances such as the verification of correct power supplies, timer switching characteristics, and component level measurement on control PCBs.

### Telecommunications

In addition to the standard installation testing functions, the BMM2080 and BMM2580 include additional 50 V and 100 V insulation testing facilities and a

10  $\mu$ F capacitance range. The low voltage insulation tests are necessary for the testing of delicate components and equipment found in telecom systems that would be damaged by higher voltages.

The instruments are designed to perform tests on systems with up to 25 V of electrical interference or crosstalk without the accuracy or reliability of results being affected and with no damage to the instrument.

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

### Data Logging (BMM2500 Series Only)

The advanced data logging facilities of the BMM2500 and BMM2580 enable a log of measured values at regular presettable intervals for any of the measured parameters (i.e. voltage, capacitance, insulation resistance). In the case of insulation resistance, the logging facility enables calculations of Dielectric Absorption Ratios and Polarization Index (PI). The PI is defined as the ratio between the insulation resistance values after 1 minute and 10 minutes. This calculation is useful for determining insulation quality without the need for temperature compensation or necessary referral to historic test data.

## SPECIFICATIONS

All quoted accuracies are at 68°F (20°C)

### Insulation Ranges

#### Measuring Range

**BMM2000 and BMM2500:**

0.01 M $\Omega$  to 20 G $\Omega$

(0 - 100 G $\Omega$  on analog scale)

**BMM80, BMM2080 & BMM2580:**

0.01 M $\Omega$  to 200 G $\Omega$

(0 - 100 G $\Omega$  on analog scale)

#### EN61157 Operating Range

0.10  $\Omega$  to 99.9 M $\Omega$

#### Test Voltage Accuracy

+15% maximum on open circuit

#### Short circuit current

< 2 mA

#### Test Current on Load

1 mA at min. pass value of insulation specified in BS7671, HD384 and IEC 364, 2 mA max.

#### Accuracy

$\pm 2\% \pm 2$  digits

Product Features at a Glance	BMM80	BMM2000	BMM2080	BMM2500	BMM2580
Digital LCD	✓	✓	✓	✓	✓
Patented analog arc	✓	✓	✓	✓	✓
Backlight	✓	✓	✓	✓	✓
1000 V insulation	✓	✓	✓	✓	✓
500 V insulation	✓	✓	✓	✓	✓
250 V insulation	✓	✓	✓	✓	✓
100 V insulation	✓		✓		✓
50 V insulation	✓		✓		✓
Auto discharge	✓	✓	✓	✓	✓
Live circuit warning	✓	✓	✓	✓	✓
Locking test button	✓	✓	✓	✓	✓
Max insulation range — digital	200 GΩ	20 GΩ	200 GΩ	20 GΩ	200 GΩ
Max insulation range — analog	100 GΩ	100 GΩ	100 GΩ	100 GΩ	100 GΩ
Leakage current (μA)		✓	✓	✓	✓
200 mA continuity	✓	✓	✓	✓	✓
Lead resistance zeroing	✓	✓	✓	✓	✓
Continuity buzzer	✓	✓	✓	✓	✓
Voltage range	✓	✓	✓	✓	✓
Frequency measurement		✓	✓	✓	✓
Current measurement (mA)		✓	✓	✓	✓
mV transducer range	✓	✓	✓	✓	✓
Kilohms measurement to 9.99 MΩ	✓	✓	✓	✓	✓
Capacitance measurement (μF)	✓		✓		✓
Result Storage				✓	✓
Data Recall to display				✓	✓
Direct result printout				✓	✓
Download to PC				✓	✓
Download software included				✓	✓
Data logging				✓	✓
Auto shutdown	✓	✓	✓	✓	✓
Selectable auto shutdown	✓	✓	✓	✓	✓
Switch probe facility	✓	✓	✓	✓	✓
IEC61010	✓	✓	✓	✓	✓
IP54 rated	✓	✓	✓	✓	✓



**Auto-Discharge Facility**

Safely discharges the connected circuit after a test

**Live Circuit Warning**

Provides automatic warning when connected to live circuits. Threshold 25 V

**Continuity Ranges****Measuring Range**

0.01  $\Omega$  to 99.9  $\Omega$   
(0 to 10  $\Omega$  on analog scale)

**EN61577 Operating Range**

0.10  $\Omega$  to 99.9  $\Omega$

**Accuracy**

$\pm 2\%$   $\pm 2$  digits

**Open Circuit Voltage**

5 V  $\pm 1$  V

**Test current**

210 mA  $\pm 10$  mA (0 to 2  $\Omega$ )

**Zero offset at probe tips**

0.10  $\Omega$  typical

**Lead resistance zeroing**

Up to 9.99  $\Omega$

**Buzzer**

Operates continuously at less than 5  $\Omega$

**Resistance Range****Measuring Range**

0.01 k $\Omega$  to 9.99 M $\Omega$   
(0 to 100 M $\Omega$  on analog scale with Auto Ranging or Range Lock Facility)

**Accuracy**

$\pm 3\%$   $\pm 2$  digits

**Open circuit voltage**

5 V  $\pm 1$  V

**Short circuit current**

25  $\mu$ A  $\pm 5$   $\mu$ A

**Voltage Range****Measuring Range**

$\pm 1$  V to  $\pm 500$  V  
(0 to 1000 V on analog scale)

**Accuracy**

0 to 500 V dc or ac (50/60 Hz)  
 $\pm 2\%$   $\pm 3$  digits  
0 to 500 V 400 Hz ac  $\pm 5\%$   $\pm 3$  digits

**Millivolts****Measuring Range**

$\pm 0.1$  mV to  $\pm 1999$  mV  
(0 to 1000 mV on analog scale)

**Accuracy**

10 mV to 1999 mV dc or ac  
(50/60 Hz)  $\pm 2\%$   $\pm 3$  digit

0.1 mV to 10 mV dc or ac  
(50/60 Hz)  $\pm 2\%$   $\pm 5$  digits

10 mV to 1999 mV ac  
(16 to 460 Hz)  $\pm 5\%$   $\pm 3$  digits

0.1 mV to 10 mV ac  
(16 to 460 Hz)  $\pm 5\%$   $\pm 5$  digits

**dc Millivolts Zeroing**

Up to 9.9 mV

**Transducer Compatibility**

A variety of transducers may be connected to facilitate measurements of other parameters such as temperature and high currents. Kits containing a useful selection of such transducers for both the HVAC and the service industry are available

**Capacitance****(BMM80, BMM2080 and BMM2580)****Measuring Range**

0.1 nF to 9.99  $\mu$ F

**Accuracy**

3%  $\pm 2$ nF  $\pm 2$  digits

 **$\mu$ F Zeroing**

Up to 10 nF

**Milliamps (BMM2000 and BMM2500 Series)****Measuring Range**

0.1 mA to 500 mA  
(0 to 1000 mA on analog scale)

**Accuracy**

0.1 mA to 10 mA dc or ac  
(50/60 Hz)  $\pm 2\%$   $\pm 5$  digits

10 mA to 500 mA dc or ac  
(50/60 Hz)  $\pm 2\%$   $\pm 3$  digits

0.1 mA to 10 mA ac  
(16 to 460 Hz)  $\pm 5\%$   $\pm 7$  digits

10 mA to 500 mA ac  
(16 to 460 Hz)  $\pm 5\%$   $\pm 5$  digits

**Frequency (BMM2000 and BMM2500 Series)****Measuring range**

16 Hz to 460 Hz

**Accuracy**

$\pm 1\%$   $\pm 1$  digit

**Backlight**

User selectable LCD backlight with auto turn off to save battery life

**Power Supply****Battery Type**

6 x 1.5 V Alkaline cells IEC LR6

**Battery Life**

Typically 3000, 5 second 1-kV tests

**Auto Shut Off**

Turns the instrument off after approximately 5 minutes, (12 minutes for insulation ranges), to conserve battery life

**Test Result Storage (BM2500 Series)**

Up to 99 distribution board references each with up to 99 circuit references may be specified. Test results may be stored against any circuit and distribution board combination.

Data may be recalled to the display, printed, or downloaded to a printer or pc.

**Communications (BM2500 Series)**

RS232 9 pin male D connector

Baud rate 9600

**Printer Output (BM2500 Series)**

Prints test results, distribution board and circuit details to external serial printer.

**Two selectable language options (BMM2500 Series)**

Language may be changed using AVO Download Manager Software supplied.

**Data Logging (BM2500 Series)**

The instruments may be set to continuously record any one of the measurable parameters e.g. voltage, insulation resistance etc. The logging interval may also be adjusted to suit the application.

**Logging Interval**

10 s to 1990 s in 10 s increments

**Number of samples**

Approximately 300

**Accuracy**

As above for each parameter

**SAFETY**

Complies with the latest international directives concerning safety and electromagnetic compatibility.

The instruments meet the requirements for double insulation to IEC 1010-1 (1995), EN 61010-1 (1995) Safety Requirements for electrical equipment for measurement, control, and laboratory use. Category III\*\*, 300 V phase to ground, and 440 V 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 overvoltages likely to be met in fixed wiring installations.*

Complies with the following parts of EN 61557, Electrical safety in low voltage systems up to 1000 V ac and 1500 V dc equipment for testing, measuring or monitoring of protective measures:

- Part 1 - General requirements
- Part 2 - Insulation resistance
- Part 4 - Resistance of earth connection and equipotential bonding

**Fuse**

500 mA (F) 500 V, 32 x 6 mm Ceramic HBC 10 kA minimum.

**Electromagnetic Compatibility****RF Susceptibility**

Complies with IEC 61326

**RF Emission**

Complies with IEC 61326 FCC Part 15 Class B

**Environmental Conditions****Operating Range**

23° to 104° F (-5° to +40° C)

**Operating humidity**

90% RH at 104° F (40° C) max.

**Storage Temperature Range**

-13° to +149° F (-25 to +65° C)

**Calibration Temperature**

68° F (20° C)

**Maximum Altitude**

6562 ft. (2000 m)

**Dust and Water Protection**

IP54

**Temperature coefficient**

<0.1% per °C

**Physical Specifications****Dimensions**

1.77 H x 8.66 W x 4.33 D in.  
(45 H x 220 W x 110 D mm)

**Weight (including batteries)**

1.63 lbs (742g)

**Cleaning**

Wipe with a clean cloth dampened with soapy water or Isopropyl Alcohol (IPA).

**ORDERING INFORMATION**

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
MEGGER® Insulation Multimeter		<b>Optional Accessories:</b>	
50/100/250/500/1000 V .....	BMM80	Fused lead set, FPK8 .....	EV6111-218
250/500/1000 V .....	BMM2000	Test record cards (20/pack) .....	EV6111-216
50/100/250/500/1000 V .....	BMM2080	Probes .....	EV6220-502
250/500/1000 V .....	BMM2500	MCC10 10-A current clamp .....	EV6111-290
50/100/250/500/1000 V .....	BMM2580	Computer serial lead (BMM2500 Series) .....	EV25955-025
<b>Included Accessories:</b>		Printer .....	33841-1
Test lead set .....	EV6220-437	Printer serial lead (BMM2500 Series) .....	33841-2
Test and carry case .....	EV6420-123	Rechargeable battery for printer .....	33841-4
Switch test probe, SP1 .....	EV6220-606		
Download manager software (BMM2500 Series) ....	EV6111-442		