

Megger

BM11, BM11D, BM21 and BM25 5 kV Analogue/Digital Insulation Testers



- **Spot tests and diagnostic insulation tests**
- **Simplicity and Ease of Use**
- **User safety features**
- **Unique rugged casing**
- **Analogue and Analogue/Digital Displays**
- **Wide range of test voltages**

DESCRIPTION

The Megger® BM11 series of 5 kV Insulation Testers provides a choice of features to suit all applications and budgets.

The traditional BM11 instrument became the industry-standard 5 kV tester. It is battery-powered, housed in a rugged case and has a large, simple white-on-black scale.

The series has been extended with three analogue/digital instruments; the BM11D, BM21 and BM25. These instruments show results and test options on a large, clear analogue/digital scale for both practicality and precision. A built-in timer makes both spot tests and PI testing easier to carry out.

They are powered by a built-in rechargeable lead-acid battery which can be charged directly from any supply from 95 V to 265 V. All testers incorporate a guard terminal to allow surface leakage to be removed.

Pre-set standard test voltages at 500 V, 1000 V, 2500 V and 5000 V are supplemented on the BM21 and BM25 units with a variable test voltage in 25 V steps. These top of the range units also allow measurement of resistance to 5 TΩ, leakage current to 0,01 nA and can display capacitance at the end of a test to 10 μF.

The BM25 extends the diagnostic testing capability of the range by performing automatic Polarisation Index, Step Voltage and Dielectric Discharge tests as well as providing an optically isolated RS232 port for downloading results during a test.

APPLICATIONS

The BM11 series is designed for testing the insulation of high voltage electrical equipment and the wide voltage range also allows it to be applied to low voltage equipment.

Generators, motors, transformers, cables and switchgear all require effective maintenance and the test techniques on the Megger range give valuable diagnostic information.

‘Spot’ Insulation tests that are the most widely used, check on the general condition of electrical insulation, called up in most standards covering equipment design, testing, installation and maintenance.

Insulation suffers from gradual steady decline, as well as occasional sudden damage; the effects of dirt, grease, moisture, vibration and chemical attack can be tracked through the recording of Polarisation Index tests which remove the temperature dependence of raw Insulation Resistance measurements.

For finding more localised insulation problems, the BM25 includes both Step Voltage and Dielectric Discharge tests. Step Voltage identifies local weak spots because they respond differently as the electrical stress is increased, while the Dielectric Discharge test can show up a single bad layer in multilayer insulation.

The key to Predictive Maintenance is the trending of diagnostic tests and this is facilitated on the BM25 by the ability to use a PC to store results over time for trend analysis.

FEATURES AND BENEFITS

All BM11 Series

- Choice of test voltages
- Direct reading display
- Unique rugged case
- Guard terminal
- Designed for user safety

BM11

Features

- Large direct reading analogue scale
- Guard terminal
- Rugged case design
- 123 mm scale length

Note: Not for sale in E.U.

Test voltages (d.c.)	500, 1000, 2500, 5000 V	500, 1000, 2500, 5000 V
Accuracy (20°C)	±5% on open circuit	±5% on 100 MΩ load
Insulation Resistance Range	100 kΩ to 100 GΩ; at all test voltages	Digital 10 kΩ to 50 GΩ @ 500 V 10 kΩ to 100 GΩ @ 1000 V 10 kΩ to 250 GΩ @ 2500 V 10 kΩ to 500 GΩ @ 5 kV Analogue 100 kΩ to 1 TΩ @ all voltages
Basic Accuracy	±1,5% of arc length	±5% of reading 10 MΩ to 100 GΩ @ 5 kV
Short Circuit Current	1 mA nominal, 2 mA max.	1,8 mA nominal, 2 mA max.
Voltage Range	50 to 1000 V d.c. or a.c.	50 to 1000 V d.c. or a.c.
Accuracy (20°C)	±5% ±10 V	±2% ±1 V
Display	Analogue	Analogue/digital (3 digits)
Interference Rejection	2 mA a.c. (50/60 Hz) on 5 kV range	1 mA r.m.s. per kV to a maximum 2 mA
Capacitor Discharge Time	<1 s per μF to discharge from 5000 V to 50 V	<2 s per μF to discharge from 5000 V to 50 V
Leakage current measurement	None	None
Capacitance measurement	None	None
Timer	None	Automatic; 0 to 60 minutes
Temperature Range	Operating -15 to +55°C (5 to +131°F) Storage -40 to +65 °C (-40 to +149°F)	Operating -20to +50°C (-4 to 122°F) Storage -25 to +65 °C (-13 to +149°F)
Temperature Coefficient	< 0,04% of arc length per °C (0.2%/°F) 0,2% per °C (0.1%/°F) for test currents >100 nA	(Applies over range 0 to 30°C) (32 to 86°F) 0,1% per °C to test voltage (0.05% per °F)
Humidity Range	90% RH @ 40°C max. (104°F)	90% RH @ 40°C max. (104°F)
Safety	IEC348	IEC1010-1 (1995), EN61010 (1995) to installation category III, 300 V, phase to earth, 500 V phase to phase

BM11D

- Large, custom Analogue/Digital LCD
- Built-in timer
- Locking test leads for safety
- Battery indicator
- Automatic discharge of capacitance
- Voltage measurement and warning
- Tests to 500 GΩ
- Weather proof to IP54

BM11D

- Large Analogue/digital display
- Built-in timer
- Locking test leads for safety
- Battery indicator
- Weatherproof to IP54
- Voltage measurement and warning

BM21: as BM11D plus;

- Variable test voltage in 25 V steps
- Breakdown or 'Burn' modes allow choice of diagnostic approach
- Shows capacitance at end of test
- Timer sets test duration for easier test control
- Tests to 5,000 GΩ
- Leakage current mode

BM21

All BM11D features plus:

- Variable test duration controlled by timer
- Variable test voltage in 25 V steps to 5000 V
- Leakage current and capacitance measurement
- Breakdown or Burn modes
- Tests to 5,000 GΩ

Test voltages (d.c.) 500, 1000, 2500, 5000 V; plus 25 to 5000 V in 25 V steps

BM25: as BM21 plus;

- Automated testing for increased productivity
- Polarisation Index and Step Voltage tests
- Dielectric Discharge test for multilayer insulation
- Optically isolated RS232 port for real-time download

BM25

All BM21 features plus:

- RS232 real time download
- Dielectric Discharge Test
- Automatic Polarisation Index Tests
- Automatic Step Voltage Tests

500, 1000, 2500, 5000 V; plus 25 equal steps to 5000 V in 25 V steps

Accuracy (20°C)	±5% on 100 MΩ load ±25V for test voltages <500V	±5% on 100 MΩ load ±25 V for test voltages <500 V
Insulation Resistance Range	Digital 10 kΩ to 500 GΩ @ 500 V 10 kΩ to 1 TΩ @ 1000 V 10 kΩ to 2,5 TΩ @ 2500 V 10 kΩ to 5 TΩ @ 5 kV Analogue 100 kΩ to 1TΩ @ all voltages	Digital 10 kΩ to 500 GΩ @ 500 V 10 kΩ to 1 TΩ @ 1000 V 10 kΩ to 2,5 TΩ @ 2500 V 10 kΩ to 5 TΩ @ 5 kV Digital Analogue 100 kΩ to 1TΩ @ all voltages
Basic Accuracy	±5% of reading 1MΩ to 1 TΩ @ 5 kV (0 to 30°C) (32 to 86°F)	±5% of reading 1 MΩ to 1 TΩ @ 5 kV (0 to 30°C) (32 to 86°F)
Short Circuit Current	1,8 mA nominal, 2 mA max.	1,8 mA nominal, 2 mA max.
Voltage Range	50 to 1000 V d.c. or a.c. (0 to 5000 V d.c. when testing)	50 to 1000 V d.c. or a.c. (0-5000 V d.c. when testing)
Accuracy (20°C)	Accuracy ±2%, ±1 V	Accuracy ±2%, ±1 V
Display	Analogue/digital (3 digits)	Analogue/digital (3 digits)
Interference Rejection	1 mA r.m.s. per kV to a maximum 2 mA	1 mA r.m.s. per kV to a maximum 2 mA
Capacitor Discharge Time	< 2 s per μF to discharge from 5000 V to 50 V	<2 s per μF to discharge from 5000 V to 50 V
Leakage current measurement	0,01 nA to 999 μA Accuracy ±5% ±0,2 nA	0,01 nA to 999 μA Accuracy ±5% ±0,2 nA
Capacitance measurement	0,01 - 10,0 μF (displayed at end of test) Accuracy ±15% ±0,03 μF	0,01 to 10,0 μF (displayed at end of test) Accuracy ±15% ±0,03 μF
Timer	User selectable 0 to 90 minutes Test is terminated at end of preset time	User selectable 0 to 90 minutes Test is terminated at end of preset time
Temperature Range	Operating -20to +50°C (-4 to 122°F) Storage -25°C to +65°C (-13 to 149°F)	Operating -20°C to +50°C (-4 to 122°F) Storage -25°C to +65°C (-13 to 149°F)
Temperature Coefficient	(Applies over range 0 to 30°C) 0,2% per °C for test currents >100 nA (0.1%/°F) 0,1% per °C for test voltage (0.05%/°F)	(Applies over range 0 to 30°C) 0,2% per °C for test currents >100 nA (0.1%/°F) 0,1% per °C for test voltage (0.05%/°F)
Humidity Range	90% RH @ 40°C max. (104°F)	90% RH at 40°C max. (104°F)
Safety	EC1010-1 (1995), EN61010 (1995) to installation category III, 300 V, phase to earth, 500 V phase to phase	IEC1010-1 (1995), EN61010 (1995) to installation category III, 300 V, phase to earth, 500 V phase to phase

SPECIFICATIONS

See Specifications Table.

BM11

Power Supply

NiCd battery pack of 2 Ah capacity. Battery life: typically 8 hrs continuous (varying between 2 h and 20 h depending upon load conditions). Battery charging: built-in-charging unit, operating from 100 V to 250 V a.c. supply, 50 Hz or 60 Hz, charging time: 16 hrs.

Low battery voltage indication: small oscillations of the pointer occur with an approx. 80% exhausted battery, large pointer oscillations occur when the battery must be recharged.

Dimensions

344 mm x 245 mm x 158 mm (13½ in x 9⅝ in approx.)

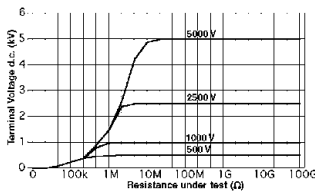
Weight

4,8 kg (10½ lb approx.)

BM11D, BM21 & BM25

Power Supply

Rechargeable sealed lead-acid batteries (12 V, 4 Ah). Battery life typically 8 hrs continuous testing. Built in charger operates from 95 V to 265 V a.c., recharge time: 8 hrs to 90%, 16 hrs to 100% d.c. emergency charge socket from 12 V d.c. Comprehensive battery state indicator on display.



Typical Terminal Voltage Characteristics

Dimensions

344 mm x 245 mm x 158 mm (13½ in x 9⅝ in approx.)

Weight

5,6 kg (12½ lb approx.)

EMC

In accordance with IEC61326 including amendment No.1

Altitude to 2000 m to retain full accuracy

CB101 CALIBRATION BOX

Nominal resistance values:
10 MΩ, 100 MΩ, 1 GΩ and 10 GΩ.

High quality resistors, rated to high voltage, suitable for calibration checks on insulation testers up to 5 kV d.c. Voltage coefficient is less than 1 part per million per volt.

A calibration certificate is provided with each CB101 showing the actual value of each resistance check-point.

CB101 SPECIFICATION

Calibration accuracy

1%

Voltage coefficient

1 ppm/V

Calibration temperature

20°C

Temperature coefficient

250 ppm/°C (139 ppm/°F)

Shelf stability, typically

0,5% per year

Environmental specification

Operating temperature

+5 to +40°C (41 to 104°F)

Storage temperature

-20°C to +60°C (-4°F to 140°F)

Operating humidity

60% RH max.

Safety

Meets the requirements of EC1010-1 (1992), EN61010 (1993) to installation category III, 300 V, phase to phase

EMC

In accordance with IEC61326 including Amendment No. 1.

ORDERING INFORMATION

Item (Qty)	Order No.
Analogue Insulation Tester	BM11
Analogue/Digital Insulation Tester	BM11D
Analogue/Digital Insulation Tester	BM21
Automated 5 kV Insulation Tester	BM25
Included Accessories BM11	
3 x 3m HV leads	8101-181
Mains Supply lead for charging	25424-860
Accessory pouch, leather	6430-193
User Guide	6172-922
Included Accessories BM11D/BM21/BM25	
High Voltage test lead, 3 m long (set of 3)	6121-291
Mains supply lead for charging	25424-860
Accessory pouch	6420-096
PC connector lead, 1,8 m long (BM25 only) (9 way D female to 9 way D female)	25955-025
BM25 Download 3½" disk (BM25 only)	6139-085
Test Record Cards (5)	6172-112
User Guide	
Optional Accessories BM11	
High Voltage test lead, 8 m long	6220-318
Optional Accessories BM11D/21/25	
3 x 8m HV leads	8101-182
3 x 15m HV leads	8101-183
Shielded test leads 15 m long	TBA
Charging lead, 12 V d.c. with automotive cigarette lighter plug 3 m long	6231-584
CB101 Calibration Box	6311-077
Test Record Cards (pack of 20)	6111-217
Publications	
'A Stitch in Time'	AVTM21-P8B
'The Lowdown on High Voltage d.c. Testing'	AVTM22P-1
Optional Accessories	
Test leads with fused prods, FPK4 — unsuitable for continuity measurements: comply with Health and Safety Executive Guidance Note GS 38 (1 set)	6111-287