BM12, MJ10
Mutlivoltage Analogue Insulation and Continuity Testers

- **Standard d.c. test voltages 100 V, 250 V, 500 V and 1000 V**
- **Guard terminal**
- **Continuity range with polarity reversal**
- **Automatic capacitive circuit discharge facility**
- **Voltage range for indicating an energized circuit and monitoring discharge**

DESCRIPTION

The Major Megger® insulation and continuity testers MJ10 and BM12 are modern, portable, self-contained instruments designed to give rapid and accurate measurements. They have four d.c. insulation testing voltages 100 V, 250 V, 500 V and 1000 V, and a single insulation resistance range of up to 2000 MΩ. Similarly, continuity is measured, with either polarity, on a single 0-4 Ω range.

Power for the MJ10 instrument is derived from a low voltage, hand-cranked generator which has been designed to be easy to turn even under full load conditions. The low voltage generator is connected to an electronic inverter to provide a very stable test voltage. Accuracy of measurement is unaffected by variations in the generator cranking speed and the test voltage is maintained at its rated value to as low as 1 MΩ at 1000 V or 0,5 MΩ at 500 V. The BM12 has a similar specification and circuitry to the MJ10 but it is powered by internal, replaceable batteries.

As a safety feature, the a.c. voltage range becomes effective as soon as the instrument is connected to the circuit under test. Thus, a warning is given that the circuit is not de-energized before the instrument is operated. Though calibrated for a.c. voltage, this range also acts as a monitor for the automatic discharge facility, so that after equipment having capacitance, e.g. a cable, has been tested, an indication can be given that the voltage has discharged to a level which is safe for removing the test leads.

Every instrument has a guard terminal which may be used to prevent the effects of surface leakage from influencing the readings. This is achieved by diverting the leakage current through the guard terminal and away from the instrument's measuring circuit. The continuity measuring function has the facility for reversing the polarity of the test current, without altering the test leads. The operator may then eliminate the effects of standing e.m.fs. etc. by averaging the measurements made with both polarities.

Each instrument is robust, lightweight and built into a strong, polycarbonate case. All readings are given directly on an analogue meter with a white on black scale, an orange 'dayglow' pointer. The ranges are selected by a rotary switch and a 'Test' push-button is pressed to execute a test. On the MJ10 the button is pressed and the generator handle turned simultaneously. Batteries for the BM12 fit into a compartment accessible from the bottom of the case and a check of the battery condition can be made by operating a second push-button.

The test leads supplied have right angled connectors and, when fitted to the instrument's recessed terminals, the carrying handle folds down over them. These features help to ensure that the leads are not accidentally pulled out of the terminals during a test.

APPLICATIONS

The MJ10 and BM12 have been designed for convenience and ease-of-use when testing complex or larger electrical installations, and commissioning, servicing or maintaining

electrical equipment. They are designed for the safe testing of motors, generators, cables, switchgear, trans-formers, distribution networks, industrial and domestic installations, components and appliances.

The range of insulation test voltages available allows one instrument to be used for a variety of applications. For example, installations and equipment can be tested at 1000 V d.c. when this requirement is specified, also aircraft and telecommunications equipment can be tested at the relatively low 100 V d.c. and 110 V to 120 V a.c. systems can be tested using 250 V d.c.

Test leads with fused prods are available and it is recommended that these be used when checking that equipment has been isolated from the supply (by performing a voltage test), especially in high energy situations.

SPECIFICATION

Insulation Range

Insulation Resistance: 0–2000 MΩ and ∞ (at all test voltages)

Nominal Test Voltages d.c.
(min. terminal voltage at 1 mA load):
100 V 250 V 500 V 1000 V

Terminal Voltage on Open Circuit:
Nominal voltage + 40%. –0%

Terminal Current on Short Circuit:
1,9 mA

Accuracy: Within the marked 50% of scale ±2,5 mm from any position. ±1,5% of f.s.d. over remainder of scale

Voltage Stability:

MJ10 <±1% between 180 rev/min and 240 rev/min

Continuity Range

Resistance: 0–4 Ω

Terminal Voltage on Open Circuit:

MJ10 8 V ± 5%
BM12 5 V ± 5%
Terminal Current on Short Circuit:

MJ10 240 mA ± 10%
BM12 230 mA ± 10%
Accuracy:

Within the marked 50% of scale, ±2,5 mm from any position, ± 1,5% of f.s.d. over remainder of scale

Voltage Range

Range: 0–600 V a.c. (effective with push-button not pressed)

Accuracy: ± 2,5% of f.s.d.

General

Overload Rating:

1200 V a.c. or d.c. for 10 s on 1 kV test voltage range, 600 V a.c. or d.c. on remaining ranges

Temperature Range

Operating: –10 °C to +50 °C
Storage: –20 °C to +70 °C

Humidity Range

Operating: 50% R.H. max. at 40 °C (70% R.H. at 20 °C)
Storage: 95% R.H. max. at 35 °C

Flash Test: 6 kV a.c. r.m.s.

Power Supply

MJ10
Low voltage brushless a.c. generator

BM12
Six 1,5 V cells IEC LR6 type
Battery life:– no. of tests insulation or continuity ranges 1300 minimum

Fuse

–500 mA FF 660 V Ceramic 50 kA H.B.C. 32 mm x 6 mm Ferraz type D86483 or similar.
–7 A (F) H.B.C. 10 kA

Safety

The instrument(s) meet the requirements for double insulation to IEC 1010-1 (1992), EN 61010-1-2001 i.e. 300 V Category II, 500 V Phase to Phase and 1 kV d.c.

E.M.C.

The instrument meets IEC/EN 61326:1

Dimensions

MJ10
210 mm x 128 mm x 125 mm (including generator handle)
(81/4 in x 5 in x 5 in approx.)

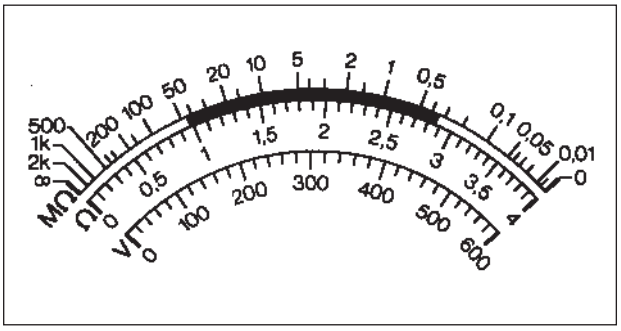
BM12
180 mm x 128 mm x 125 mm (7 in x 5 in x 5 in approx.)

Weight

MJ10
1 kg (21/4 lb)

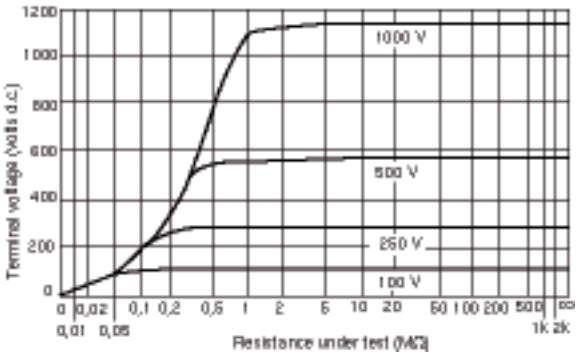
BM12
1 kg (21/4 lb)

Illustration of Typical Scale

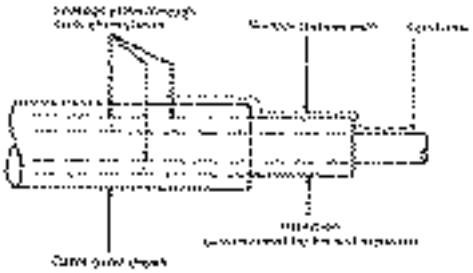


MJ10 scale is shown. BM12 scale is the same but has a battery condition indication mark added.

Typical Terminal Voltage Characteristics



(MJ10 and BM12) Footnote:– U.K. Safety Authorities recommend the use of fused test leads when measuring voltage on high energy systems.



Current Leakage Paths in a Cable

Use of the Guard Terminal

Surface leakage is essentially a low resistance path in parallel with the main resistance path through the body of the insulation. The guard terminal on the MJ10 and BM12 can be used to stop the effects of the surface leakage from influencing the measurement of resistance through the insulation. In the example of a cable, shown in the diagram above, connecting the instrument's guard terminal to the surface of the insulation will divert surface leakage currents away from the measuring circuit.

ORDERING INFORMATION

Item (Qty)	Order No.
Multivoltage Analogue Insulation & Continuity Tester	MJ10/BM12
Included Accessories	
Test lead set comprising 2 black test leads and 1 red test lead, with appropriate crocodile clips (MJ/K)	6220-436
Operating instruction book	6171-140
Optional Accessories	
Leather carrying case	6420-043
4 mm right angled adaptors (enabling use of leads with straight connectors)	
black	6320-176
red	6320-177
Set of test leads with fused prods – unsuitable for continuity measurements. (Comply with Health and Safety Executive Guidance Note GS 38)	6110-920

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ISO STATEMENT
Registered to ISO 9001:2000 Reg no. Q 09290
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