913 300 066 065

Battery MEGGER® Testers BM100/2, BM101/2, BM102/2

Précision ±2,5% pleine longueur d'échelle

Operating Instructions

300A

MEGGER®

SAFETY WARNING

- ★ *The circuit must be de-energized and isolated BEFORE connections are made for any test, (except a voltage measurement with the BM100/2).*
- ★ *Do not touch the circuit during an insulation test.*
- ★ *After insulation tests, capacitive circuits MUST be allowed to discharge BEFORE disconnecting the test leads.*
- ★ *Test leads, including prods and crocodile clips, must be in good order; clean and having no broken or cracked insulation.*
- ★ *Replacement fuses MUST be of the correct type and rating.*
- ★ *When making voltage measurements on high energy systems with the BM100/2, it is essential that test leads with fused prods are used.*
- ★ *When using the BM100/2 to make a voltage test DO NOT press the 'Test' button.*

Refer also to page 9 for further explanations and other precautions.
The warnings and precautions must be read and understood before the instrument is used. They must be observed during use.

NOTE

This instrument is only to be used by a suitably trained and competent person.

WARNING

and isolated BEFORE connections are
ge measurement with the BM100/2).

n insulation test.

circuits MUST be allowed to discharge
eads.

rocodile clips, must be in good order;
acked insulation.

he correct type and rating.

ents on high energy systems with the
eads with fused prods are used.

a voltage test DO NOT press the

nations and other precautions.
be read and understood before the
served during use.

OTE
by a suitably trained and competent

CONTENTS

Illustrations

Acknowledgement

The manufacturer would like to express thanks to the Institution of Electrical Engineers for permission to quote extracts from the 15th. Edition of their Wiring Regulations.

GENERAL DESCRIPTION

The BM100/2, BM101/2 and BM102/2 are hand-held insulation testers incorporating resistance and continuity ranges. The BM100/2 can also indicate a.c. voltage up to 600 V.

The BM100/2 and BM101/2 test insulation at 500 V d.c. (nominal), the BM102/2 tests insulation at 250 V d.c. (nominal).

Each tester has a 250 μA moving coil meter with a black scale plate, white calibrations and an orange pointer. The test leads connect to fully shrouded terminal sockets at the top of the case. The test lead set includes prods and clips. The insulation, resistance or continuity functions are selected by a single switch and a test is initiated by pressing the 'Test' push-button. The condition of the internal battery can also be checked. The BM100/2 acts as a voltmeter with the switch in any position and the 'Test' push-button **not** pressed. Therefore an immediate indication can be given of whether a circuit is energized or not as soon as the test leads are connected. Capacitive circuits are automatically discharged after insulation tests.

The case is fitted with a fold-away support stand and non-slip rubber feet.

The instructions given in this book are common to all the testers except where stated.

Note:— (i) Each tester is protected against 250 V a.c. on all resistance ranges.

(ii) The cover of this instrument has been given an antistatic treatment which should be effective for many months. If in the course of time the cover is found to retain electrostatic charges, it should be re-treated with a suitable antistatic solution.

The case is fitted with a fold-away support stand and non-slip rubber feet.

The instructions given in this book are common to all the testers except where stated.

Note:— (i) Each tester is protected against 250 V a.c. on all resistance ranges.

(ii) The cover of this instrument has been given an antistatic treatment which should be effective for many months. If in the course of time the cover is found to retain electrostatic charges, it should be re-treated with a suitable antistatic solution.

APPLICATIONS

These insulation testers are intended for installation and maintenance work on domestic and industrial wiring systems, transformers, motor windings, electrical appliances etc.

The BM100/2 and BM101/2 are suitable for testing up to 500 V a.c. systems in relation to the British IEE Wiring Regulations. The BM102/2 is suitable for low voltage equipment and 110 V to 120 V wiring installations.

Circuit and earth continuity measurements may be made and the BM100/2 will also measure a.c. voltage up to 600 V.

Test leads with fused prods are available for use with the BM100/2. It is recommended that these are used when making voltage measurements, especially in high energy situations.

ACCESSORIES

SUPPLIED WITH THE INSTRUMENT

A test lead set including prods and clips — Part no. 6220-434

An operating instruction book

AVAILABLE AS AN OPTIONAL EXTRA

Synthetic test-and-carry case — Part no. 6420-030

4 mm right angled adaptors (enabling use of leads with straight connectors) black Part no. 6320-176
red Part no. 6320-177

Set of test leads with fused prods — unsuitable for continuity measurements. (Comply with Health and Safety Executive Guidance Note GS 38) Part no. 6110-872

SPECIFICATION

Model:—		**BM100/2**	**BM101/2**	**BM102/2**
Insulation Test Voltage		500 V d.c.	500 V d.c.	250 V d.c.
Ranges	Insulation resistance	0—200 MΩ	0—200 MΩ	0—100 MΩ
	Resistance	—	0—1 MΩ	0—500 kΩ
	Continuity (i)	0—200 Ω	0—200 Ω	0—200 Ω
	(ii)	0—2 Ω	0—2 Ω	0—2 Ω
	Voltage	0—600 V a.c.	—	—
Terminal Voltage d.c. (nominal on o/c)				
	Insulation resistance range	<550 V (500 V ±2% at 1 MΩ)	<550 V (500 V ±2% at 1 MΩ	<300 V (250 V ±2% at 500 kΩ)
	Resistance range	—	53 V	27 V
	Continuity ranges (i)	0,76 V	0,76 V	0,76 V
	(ii)	1,6 V	1,6 V	1,6 V
Terminal Current (nominal on s/c)				
	Insulation resistance range	920 μA	920 μA	920 μA
	Resistance range	—	325 μA	327 μA
	Continuity ranges (i)	12,3 mA	12,3 mA	12,3 mA
	(ii)	26 mA	26 mA	26 mA

All Models:—

Accuracy (at 20 °C) ±2,5% of scale length on all ranges (i.e. ±1,9 mm (0,075 in) on insulation resistance range).

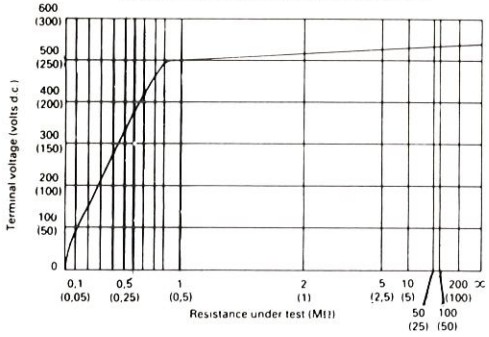
Movement 250 μA f.s.d.

	BM101/2	BM102/2
	500 V d.c.	250 V d.c.
	0—200 MΩ	0—100 MΩ
	0—1 MΩ	0—500 kΩ
	0—200 Ω	0—200 Ω
	0—2 Ω	0—2 Ω
	—	—
	<550 V	<300 V
MΩ)	(500 V ±2% at 1 MΩ	(250 V ±2% at 500 kΩ)
	53 V	27 V
	0,76 V	0,76 V
	1,6 V	1,6 V
	920 μA	920 μA
	325 μA	327 μA
	12,3 mA	12,3 mA
	26 mA	26 mA

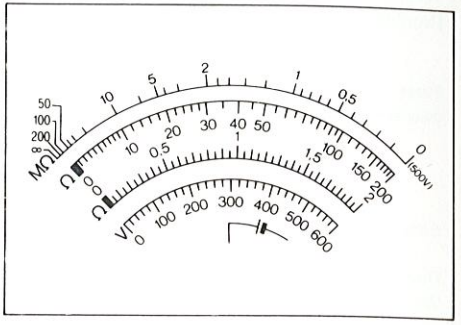
length on all ranges (i.e. ±1,9 mm (0,075 in) on insulation
e).

Discharge		Automatic discharge of capacitive circuits via a 470 kΩ ± 10% resistor (320 kΩ ± 10% for BM100/2) when 'Test' push-button is released following an insulation test.
Voltmeter Input Impedance		Equals discharge lead resistance (BM100/2 only)
Temperature Range	operation	−5 °C to +40 °C
Temperature Coefficient		±0,1%/°C
Humidity	operation	90% R.H. max. at 20 °C 80% R.H. max. at 35 °C
	storage	95% R.H. max. at 35 °C
Fuse		500 mA 250 V ceramic HBC type F, 20 mm x 5 mm, IEC 127/1
Power Supply		Single 9 V battery IEC 6-F22 type e.g. Ever-Ready PP3B Current consumption 55 mA max. on insulation range — BM100/2 and BM101/2 17 mA max. on insulation range — BM102/2 40 mA max. on resistance and continuity ranges.
Safety		The instruments will in general meet the requirements of the BS 4743 and IEC 348 safety specifications. Safety Class II. Flash test to 4 kV.
Dimensions		175 mm x 95 mm x 57 mm (6⅞ in x 3¾ in x 2¼ in approx.)
Weight		485 g (1 lb 1 oz) approx.

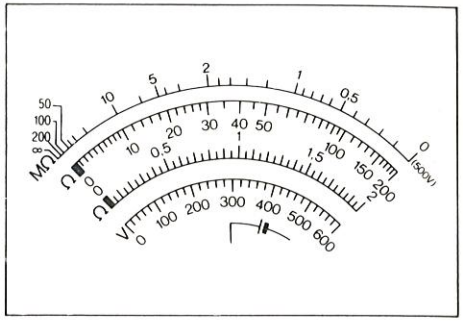
Typical Terminal Voltage Characteristic
BM100/2, BM101/2 and BM102/2
(figures in brackets apply to BM102/2)



Typical BM100/2 Scale
(BM101/2 and BM102/2 are similar)



Typical BM100/2 Scale
(BM101/2 and BM102/2 are similar)



OPERATION

WARNING

1. **THE CIRCUIT UNDER TEST MUST BE SWITCHED OFF, DE-ENERGIZED AND ISOLATED BEFORE INSULATION, RESISTANCE OR CONTINUITY TESTS ARE MADE.**
   Switch the circuit off and check that it is so by making a voltage test. The BM100/2 will automatically indicate any a.c. voltage present as soon as the test leads are connected. If this does happen, do not press the 'Test' button. When testing wiring installations according to the I.E.E. Wiring Regulations, the circuit under test must be isolated.
2. **Voltage measurements may be made with the BM100/2 tester. Take great care when the system voltage is greater than 50 V. The use of test leads with fused prods is recommended.**
3. **Where capacitive circuits have been tested allow a suitable time to elapse before disconnecting the test leads in order for the circuit to discharge.**
4. **The 2 Ω and 200 Ω continuity ranges are protected by a fuse. Replacement fuses MUST be of the correct type and rating, (see the specification).**

PRECAUTIONS

1. Instruments used in dusty environments should be stripped and cleaned periodically.
2. Do not leave the meter exposed to direct heat from the sun for long periods.

PRELIMINARY PROCEDURE

(a) Fitting a battery or fuse
Ensure that the instrument is not connected to any external circuit. Remove the battery and fuse compartment cover from the rear of the case by releasing the cross-head screw in the centre and levering upwards. The battery and fuse compartment will be exposed. Observe the correct polarity as shown on the holder when replacing the battery. Replace the cover.

(b) Checking battery condition
Set the selector switch to ' ⊣⊢ ' and press the 'Test' push-button. The meter pointer should deflect to within the 'battery check' arc on the scale. (⊣⊢).

Note:— It is advisable to remove the battery if the tester is not to be used for any length of time. Never leave discharged batteries in the tester because of the possibility of causing damage by leaking electrolyte.

(c) Setting the meter mechanical zero

With the tester horizontal set the meter pointer to zero (∞ on insulation range) if necessary, using the mechanical adjuster located centrally on the front panel.

(d) Connecting and checking the test leads

Connect the red and black test leads, terminated with the appropriate prods, or clips, to the '+' and '−' terminal sockets respectively.

Inspect the test leads to see that they have good, unbroken insulation. Connect the test lead prods or clips together and set the selector switch to '2 Ω'. Press the 'Test' push-button and check that the meter reads 0. If a high resistance reading is obtained or one greater than full scale, check the connections. If the reading is still high suspect that the test leads may be at fault.

INSULATION TESTS

The red test lead is connected to earth, frame of the equipment or cable sheath etc. and the black test lead is connected to the circuit under test or cable core.

With the selector switch set to '200 MΩ' ('100 MΩ' on the BM102/2) and the 'Test' push-button pressed, the insulation resistance can be read from the top meter scale after the pointer has become steady.

Capacitive circuits automatically discharge through the tester when the 'Test' push-button is released. Therefore, wait a few moments before disconnecting the test leads to allow this to happen. The suggested time to allow for discharge of capacitance is 1,5 seconds per microfarad. The BM100/2 will automatically monitor the discharge on its voltage range, thus showing when it is safe to remove the test leads. Be aware that dielectric absorption may take place during an insulation test on a capacitive item.

RESISTANCE AND CONTINUITY TESTS

The test leads are connected across the circuit under test and the selector switch set to the required resistance or continuity range.

When the 'Test' push-button is pressed the resistance is indicated on the appropriate meter scale. There is a separate scale for each range so the readings are direct.

Release the push-button and remove the test leads.

on the BM102/2) and the 'Test' push-button pressed, the insulation resistance can be read from the top meter scale after the pointer has become steady.

Capacitive circuits automatically discharge through the tester when the 'Test' push-button is released. Therefore, wait a few moments before disconnecting the test leads to allow this to happen. The suggested time to allow for discharge of capacitance is 1,5 seconds per microfarad. The BM100/2 will automatically monitor the discharge on its voltage range, thus showing when it is safe to remove the test leads. Be aware that dielectric absorption may take place during an insulation test on a capacitive item.

RESISTANCE AND CONTINUITY TESTS

The test leads are connected across the circuit under test and the selector switch set to the required resistance or continuity range.

When the 'Test' push-button is pressed the resistance is indicated on the appropriate meter scale. There is a separate scale for each range so the readings are direct.

Release the push-button and remove the test leads.

A.C. VOLTAGE MEASUREMENTS (BM100/2 only)

The voltage range is automatically selected when the switch is in any position and the 'Test' push-button **not** pressed. Connect the test leads across the circuit under test. The tester will indicate if the circuit is energized, and the level of the voltage present (up to 600 V a.c.) will be shown on the inner scale. Test leads with fused prods are recommended for this measurement.

FUSE CHECK

With the test leads open circuit, switch to the 200 Ω range and press the 'Test' push-button. A reading of <200 Ω indicates a fuse rupture.

Note:— The fuse is located in clips in the battery and fuse compartment at the rear of the case.

DESIRABILITY OF INSULATION TESTING

The safety of electrical installations and apparatus depends on the condition of the insulation. It is essential that this is thoroughly checked when new equipment is installed, whilst being subjected to a voltage high enough to break through any mechanical flaws arising from manufacture or installation.

It is also desirable, in order to avoid interruptions or breakdowns, that tests on the condition of the installation and equipment are made from time to time to ensure that deterioration is not occurring because of the accumulation of dirt or damp, or caused by mechanical factors of wear or breakage.

In every case the insulation resistance can be measured very simply by using the MEGGER® Tester.

PREVENTIVE MAINTENANCE

It is good practice to make regular tests of the insulation resistance of all larger machinery and thus detect any incipient faults. When the tests are entered in the logbook a considerable variation between test results will be noted.

It is therefore important to test under similar conditions each time and to note the current weather status.

Damp weather – or damp conditions of use or storage – can cause large reductions in insulation resistance. Drying out by heat or by running for a period, should give a more consistent and appropriate insulation resistance value.

A counter effect to that above occurs because the insulation resistance of the varnishes used in the construction of machine windings becomes lower when hot than when cold. Thus for constant comparisons the temperature of the machine under test should also be noted.

The best plan is regularly to make the time for testing a machine as soon as possible after it has been shut down. The insulation resistance is then likely to be at its lowest operational value. This then would become the figure which would show any continuing mechanical depreciation or potential insulation breakdown.

If the machine stands idle in humid conditions a worse picture might well apply but this would normally be assumed to be safe during the running up to temperature, provided that the resistance at working temperature remained unchanged.

For fractional horse-power generators and motors, the British Standard Specification No. 170 states that the insulation resistance should not be less than 1 MΩ when tested at 500 V.

TESTING MOTORS AND GENERATORS

1. Disconnect the equipment from the supply by opening the main switch and removing the main fuses.
2. Join together BOTH terminals on the motor side of the double pole main switch.
3. With a contactor operated starter where all the lines to the motor are disconnected at 'off' it is necessary to make tests to earth on both the incoming and outgoing terminals of the starter.
4. Connect the red test lead to earth using the frame of the motor.
5. Using the black test lead measure the resistance of each part of the circuit in the usual way. If the value is unsatisfactory then separate tests in starter, motor and cables must be carried out to locate the defect.

assumed to be safe during the running up to temperature, provided that the resistance at working temperature remained unchanged.

For fractional horse-power generators and motors, the British Standard Specification No. 170 states that the insulation resistance should not be less than 1 MΩ when tested at 500 V.

TESTING MOTORS AND GENERATORS

1. Disconnect the equipment from the supply by opening the main switch and removing the main fuses.
2. Join together BOTH terminals on the motor side of the double pole main switch.
3. With a contactor operated starter where all the lines to the motor are disconnected at 'off' it is necessary to make tests to earth on both the incoming and outgoing terminals of the starter.
4. Connect the red test lead to earth using the frame of the motor.
5. Using the black test lead measure the resistance of each part of the circuit in the usual way. If the value is unsatisfactory then separate tests in starter, motor and cables must be carried out to locate the defect.
6. If the motor itself is suspect, disconnect its supply cables and with one lead connected to the frame carry out the following tests:
7. Test with the armature and field windings connected together.
8. Test with the brushes lifted from contact with the commutator.
9. Test on the armature only, section by section.
10. If all resistances are low the fault can usually be remedied by complete and careful cleaning of the machine. Equipment that has been in service for a period can accumulate metallic, or other conducting, dust especially when mixed with oil from bearings etc. The leakage paths from such deposits are eliminated by thorough cleaning.

TESTING WIRING INSTALLATIONS IN BUILDINGS

IEE Wiring Regulations

Extracts from the British IEE Regulations for Electrical Installations in Buildings (15th. Edition), where they appertain to Insulation and Continuity tests, are given below.

Continuity of ring final circuit conductors

Regulation 613-2. A test shall be made to verify the continuity of all conductors (including the protective conductor) of every ring final circuit (see Item 2 of Appendix 15).

Continuity of protective conductors

Regulation 613-3. Every protective conductor shall be separately tested to verify that it is electrically sound and correctly connected. This test shall include all conductors and any extraneous conductive parts used for equipotential bonding (see Item 3 of Appendix 15).

Appendix 15 Item 2.
Continuity of ring final circuit conductors

Method 1

The continuity of each conductor of the ring circuit, including the protective conductor, is measured between the two ends of the conductor before completion of the ring. The resistance values are noted.

After connection of the two ends of each conductor to complete the ring, the resistance is measured between the corresponding distribution board terminal and the appropriate terminal or contact at the outlet nearest to the midpoint of the ring, using a suitable test lead. The resistance value is noted and the resistance value of the test lead is deducted from this. The resulting value should be approximately one quarter of the corresponding value obtained before completion of the ring.

Method 2

The continuity of each conductor of the ring circuit, including the protective conductor, is measured between the two ends of the conductor before completion of the ring. The resistance values are noted.

After completion of the ring, the various conductors of the circuit are all bridged together at the point nearest to the midpoint of the ring. The resistance is then measured between the phase and neutral terminal at the origin of the circuit in the distribution board, when the value obtained should be approximately one half of the value for either the phase or the neutral conductor before completion of the ring.

Where the protective conductor is in the form of a ring, the resistance is then measured between the phase and earth terminals at the origin of the circuit. The value obtained should be the sum of one quarter of the value originally obtained for the phase conductor and one quarter of the value originally obtained for the protective conductor.

Appendix 15 Item 3.
Continuity of protective conductors and equipotential bonding

The initial tests to be applied to protective conductors are intended to verify that the conductors are electrically sound and correctly connected, before the installation is energized and before any other tests involving these conductors are made. The test is

After completion of the ring, the various conductors of the circuit are all bridged together at the point nearest to the midpoint of the ring. The resistance is then measured between the phase and neutral terminal at the origin of the circuit in the distribution board, when the value obtained should be approximately one half of the value for either the phase or the neutral conductor before completion of the ring.

Where the protective conductor is in the form of a ring, the resistance is then measured between the phase and earth terminals at the origin of the circuit. The value obtained should be the sum of one quarter of the value originally obtained for the phase conductor and one quarter of the value originally obtained for the protective conductor.

Appendix 15 Item 3.
Continuity of protective conductors and equipotential bonding

The initial tests to be applied to protective conductors are intended to verify that the conductors are electrically sound and correctly connected, before the installation is energized and before any other tests involving these conductors are made. The test is made with a voltage not exceeding 50 V a.c. or d.c. and at a current approaching 1,5 times the design current of the circuit under test, except that the current need not exceed 25 A. For a.c. the current shall be at the frequency of the supply. If a d.c. test is used, it is to be verified by inspection throughout the length of the protective conductor that no inductor is incorporated. Where the protective conductor is not steel conduit or other steel enclosure the requirement concerning the test current does not apply and a d.c. ohmmeter may be used. It is often more convenient if a hand generator or other portable device is used rather than a transformer fed from the supply, as in this event the live conductors of the various circuits, whilst disconnected from the supply, may be connected for purpose of test to the consumer's earthing terminal and the test can then be made between the phase conductor and the protective conductor at each individual point, such as a socket outlet.

Insulation resistance

Regulation 613-5. The tests described in Regulations 613-6 to 613-8 shall be made before the installation is permanently connected to the supply. For these tests large installations may be divided into groups of outlets, each containing not less than 50 outlets. For the purpose of this regulation the term 'outlet' includes every point and every switch except that a socket outlet, appliance or luminaire incorporating a switch is regarded as one outlet. A d.c. voltage not less than twice the normal voltage of the circuit concerned (r.m.s. value for an a.c. supply) shall be applied for the measurement of insulation resistance, provided that the test voltage need not exceed 500 V d.c. for installations rated up to 500 V, or 1000 V d.c. for installations rated above 500 V up to 1000 V.

Regulation 613-6. When measured with all fuse links in place, all switches (including, if practicable, the main switch) closed and, except for TN-C systems, all poles or phases of the wiring electrically connected together, the insulation resistance to Earth shall be not less than 1 megohm.

Regulation 613-7. When measured between all the conductors connected to any one phase or pole of the supply and, in turn, all conductors connected to each other phase or pole, the insulation resistance shall be not less than 1 megohm. Wherever practicable, so that all parts of the wiring may be tested, all lamps shall be removed and all current-using equipment shall be disconnected and all local switches controlling lamps or other equipment shall be closed. Where the removal of lamps and/or the disconnection of current-using equipment is impracticable, the local switches controlling such lamps and/or equipment shall be open. Particular attention shall be given to the presence of electronic devices connected in the installation and such devices shall be isolated so that they are not damaged by the test voltage.

Regulation 613-8. Where equipment is disconnected for the tests prescribed in Regulations 613-6 and 613-7, and the equipment has exposed conductive parts required by these Regulations to be connected to protective conductors, the insulation resistance between the exposed conductive parts and all live parts of the equipment shall be measured separately and shall comply with the requirements of the appropriate British Standard for the equipment. If there is no appropriate British Standard the insulation resistance shall be not less than 0,5 megohm.

Note:— Earth continuity conductors are also subject to earth fault loop impedance tests — Regulation 613-15.
The operation of residual current circuit breakers must be tested – Regulation 613-16.
Earth electrodes included in installations are subject to tests — Regulation 613-4.
Recommended MEGGER® testers for these purposes are LT5, CBT2 and DET3.

and shall comply with the requirements of the appropriate British Standard for the equipment. If there is no appropriate British Standard the insulation resistance shall be not less than 0,5 megohm.

Note:— Earth continuity conductors are also subject to earth fault loop impedance tests — Regulation 613-15.
The operation of residual current circuit breakers must be tested – Regulation 613-16.
Earth electrodes included in installations are subject to tests — Regulation 613-4.
Recommended MEGGER® testers for these purposes are LT5, CBT2 and DET3.

MODE D'EMPLOI

AVERTISSEMENT

1. **Le circuit à vérifier DOIT être mis hors tension et isolé avant toutes mesures d'isolement ou de continuité.**
   Couper l'alimentation et vérifier le résultat de cette action en effectuant une mesure de tension.
   Le BM100/2 indique toute tension alternative présente dès que les cordons sont branchés.
   Dans ce cas, ne pas enfoncer le bouton 'Test'.
2. **Le BM100/2 peut mesurer que des tensions.**
   Prendre toutes les précautions nécessaires lors de mesures de tensions supérieures à 50 V.
   Dans ce cas, il est conseillé d'utiliser des cordons avec pointes de touche munies de fusibles.
3. **Après essai sur circuits capacitifs, ne débrancher les cordons qu'après décharge complète du circuit.**
4. **Les gammes de continuité 2 Ω et 200 Ω sont protégées par un fusible. Les fusibles de remplacement DOIVENT être de même type et calibre.**

PRECAUTIONS

1. Démonter et nettoyer périodiquement l'appareil (ou nous le retourner) s'il est utilisé en milieu poussiéreux.
2. Une exposition prolongée à la chaleur solaire est contre indiquée.

PRELIMINAIRES

1. Remplacement d'une pile ou d'un fusible.
   S'assurer que l'appareil n'est raccordé a aucun circuit externe. Après dévissage de la tête cruciforme, ôter en le soulevant, le couvercle du compartiment pile/fusible (voir à l'arrière du boitier).
   — Bien respecter la polarité indiquée sur le connecteur lors du remplacement de la pile.
2. Contrôle de la pile:
   Positionner le sélecteur sur ⊣⊢ et presser sur le poussoir "test". L'aiguille de l'indicateur doit atteindre le secteur de l'échelle destinée à "vérification pile". (⊣⊢)
   N.B.: Il est recommandé d'ôter la pile si l'appareil doit rester inutilisé pendant un certain temps.
   D'autre part, ne jamais laisser dans l'appareil de pile déchargée afin d'éviter des dégâts consécutifs aux fuites d'électrolyte.
3. Zéro mécanique de l'indicateur:
   Placer l'appareil horizontalement et amener

l'aiguille de l'indicateur à zéro (∞ de l'échelle isolement) en utilisant, si nécessaire, la mise à zéro au centre du boitier supérieur.

4. Branchement et vérification des cordons d'essai. Brancher respectivement les cordons rouge et noir, équipés de leurs pointes ou pinces crocodile, sur les fiches "+" et "−".
   Après s'être assuré que leur gaine isolante est en bon état, court-circuiter l'extrémité des cordons d'essai et mettre le sélecteur en position "2 Ω". Presser sur le poussoir "Test". L'aiguille doit indiquer 0. Si l'aiguille indique une valeur de résistance élevée ou qui dépasse l'échelle, vérifier les connexions. Si la valeur de résistance indiquée reste élevée, soit les cordons sont défectueux.

ESSAI D'ISOLEMENT

Le cordon d'essai rouge est branché à la terre, sur le châssis de l'équipement ou le blindage du câble etc ... le cordon noir est branché au circuit soumis à l'essai ou sur l'âme du câble.

Mettre le sélecteur de gammes sur la position 200 MΩ (ou 100 MΩ dans le cas du BM102/2).

Presser sur le poussoir "Test" et la valeur de la résistance d'isolement est indiquée sur l'échelle supérieure de l'appareil, après l'aiguille s'arrête.

Les circuits capacitifs sont automatiquement déchargés à l'intérieur de l'appareil dès que l'on cesse de presser sur le poussoir de mise en circuit. Ceci permet, après un certain temps, de débrancher les cordons sans danger (le temps de décharge suggéré est de 1,5 secondes par microfarad); il est à noter que sur le BM100/2 la décharge est indiquée sur la gamme de tension. Tenir compte du temps de charge sur une structure capacitive.

ESSAIS DE FAIBLES ISOLEMENT ET CONTINUITE

Brancher les cordons au circuit à essayer. Positionner le sélecteur sur la gamme de résistance ou de continuité requise. La valeur de résistance mesurée est indiquée sur l'échelle appropriée de l'indicateur. L'appareil, doté d'une échelle individuelle pour chaque gamme, offre l'avantage d'une lecture directe.

Relâcher ensuite le bouton "Test" et débrancher les cordons de mesure.

Presser sur le poussoir "Test" et la valeur de la résistance d'isolement est indiquée sur l'échelle supérieure de l'appareil, après l'aiguille s'arrête.

Les circuits capacitifs sont automatiquement déchargés à l'intérieur de l'appareil dès que l'on cesse de presser sur le poussoir de mise en circuit. Ceci permet, après un certain temps, de débrancher les cordons sans danger (le temps de décharge suggéré est de 1,5 secondes par microfarad); il est à noter que sur le BM100/2 la décharge est indiquée sur la gamme de tension. Tenir compte du temps de charge sur une structure capacitive.

ESSAIS DE FAIBLES ISOLEMENT ET CONTINUITE

Brancher les cordons au circuit à essayer. Positionner le sélecteur sur la gamme de résistance ou de continuité requise. La valeur de résistance mesurée est indiquée sur l'échelle appropriée de l'indicateur. L'appareil, doté d'une échelle individuelle pour chaque gamme, offre l'avantage d'une lecture directe.

Relâcher ensuite le bouton "Test" et débrancher les cordons de mesure.

MESURE DE TENSION EN COURANT ALTERNATIF (BM100/2 SEULEMENT)

La gamme de tension est automatiquement en circuit pour n'importe quelle position du sélecteur à et quand le bouton "Test" n'est pas enfoncé. Connecter les cordons d'essai aux bornes du circuit à vérifier et le mettre sous tension. L'appareil indiquera la présence de tension et sa valeur jusqu'á 600 V en alternatif, sur l'échelle inférieure. Il est recommandé d'utiliser des cordons avec pointes de touche munies de fusibles pour cette mesure.

VERIFICATION DU FUSIBLE

Les cordons de mesure étant en circuit ouvert, mettre sur la position 200 Ω et appuyer sur le bouton 'TEST'. Une valeur indiquée <200 Ω signifie un claquage du fusible.

Remarque:
Le fusible se trouve dans un porte-fusible, dans le compartiment à pile et à fusible, à l'arrière du boîtier.

WARNUNG:

1. **Der zu prüfende Stromkreis MUß vor Isolierungs-Widerstands- oder Durchgangsprüfungen entladen und ausgeschaltet sein.**
   Den Stromkreis ausschalten und durch Spannungsmessung sicherstellen, daß dies der Fall ist.
   Falls eine Wechselspannung vorhanden ist, wird diese von dem BM100/2 automatisch angezeigt, sobald die Prüfleitungen angeschlossen sind. Sollte eine Spannung festgestellt werden, darf die Prüftaste "Test" nicht gedrückt werden.
2. **Das BM100/2 darf zum Messen von Spannungen benutzt werden. Falls die Spannung höher ist als 50 Volt, ist Sorgfalt geboten. In diesem Fall sind Meßleitungen mit abgesicherten Prüfspitzen empfehlenswert.**
3. **Nach dem Prüfen von kapazitiven Stromkreisen, eine entsprechende Zeit verstreichen lassen, bevor man die Prüfleitungen löst, damit sich der Stromkreis entladen kann.**
4. **Der 200 Ω und 2 Ω Durchgangsmeßbereich ist durch eine Sicherung geschützt.**

Ersatzsicherungen MÜSSEN unbedingt der gleichen Bauart und Größe entsprechen.

VORSICHTSMASSREGELN

1. In staubiger Umgebung verwendete Instrumente sind regelmäßig zu zerlegen und zu reinigen.
2. Das Instrument darf während langer Zeitspannen unmittelbarer Sonnenwärme nicht ausgesetzt sein.

VORBEREITUNG

a) Einsetzen einer Batterie oder Sicherung
Sicherstellen, daß des Instrument mit keinem externen stromkreis verbunden ist. Die Abdeckung der Batterie – und Sicherheitsmulde von der Rückseite des Gehäuses entfernen; zu diesem Zweck ist die in der Mitte befindliche Kreuzschlitzschraube zu lösen und die Abdeckung hochzupressen. Die Batterie – und Sicherungsmulde ist nun offen. Die Batterie mit der richtigen Polarität einsetzen; diese ist an dem Halter ersichtlich. Die Abdeckung wieder anbringen.

b) Prüfen des Batteriezustands
Den Wählschalter auf ⊣⊢ einstellen und auf die

Ersatzsicherungen MÜSSEN unbedingt der gleichen Bauart und Größe entsprechen.

VORSICHTSMASSREGELN

1. In staubiger Umgebung verwendete Instrumente sind regelmäßig zu zerlegen und zu reinigen.
2. Das Instrument darf während langer Zeitspannen unmittelbarer Sonnenwärme nicht ausgesetzt sein.

VORBEREITUNG

a) Einsetzen einer Batterie oder Sicherung
Sicherstellen, daß des Instrument mit keinem externen stromkreis verbunden ist. Die Abdeckung der Batterie – und Sicherheitsmulde von der Rückseite des Gehäuses entfernen; zu diesem Zweck ist die in der Mitte befindliche Kreuzschlitzschraube zu lösen und die Abdeckung hochzupressen. Die Batterie – und Sicherungsmulde ist nun offen. Die Batterie mit der richtigen Polarität einsetzen; diese ist an dem Halter ersichtlich. Die Abdeckung wieder anbringen.

b) Prüfen des Batteriezustands
Den Wählschalter auf ⊣⊢ einstellen und auf die Drucktaste "Test" drücken. Der Zeiger des Instruments sollte sich nun in den Batterieprüfungsbereich der Skala (⊣⊢) bewegen. Achtung: Es ist ratsam, die Batterie aus dem Instrument zu nehmen, wenn dieses längere Zeit außer Gebrauch steht Erschöpft Batterien dürfen niemals in dem Instrument gelassen werden, da die Gefahr besteht, daß das auslaufen der des Batterie Schaden verursacht.

c) Mechanisches Nullen des Instruments
Das Instrument waagerecht legen und den Zeiger falls erforderlich auf Null (∞ im Isolierungsbereich) stellen; dazu ist von der in der Mitte der Frontplatte befindlichen Einstellvorrichtung Gebrauch zu machen.

d) Anschließen und Prüfen der Prüfleitungen
Die roten und schwarzen Prüfleitungen, an deren Enden sich entsprechende Prüfspitzen oder Krokodilklemmen befinden, an die + bzw. – Anschlußbuchsen anschließen.
Die Prüfleitungen testen, um sicherzustellen, daß die Isolierung einwandfrei und unverletzt ist. Die Prüfspitzen bzw. Krokodilklemmen der Prüfleitungen miteinander verbinden und den Wählschalter auf 2 Ω stellen. Auf die Drucktaste "Test" drücken, um sicherzustellen, daß das Instrument 0 anzeigt. Wird ein hoher Widerstand angezeigt oder wenn die Widerstandsanzeige über die volle Skala hinausgeht, die Anschlüsse prüfen. Ist die Anzeige nach wie vor hoch, so kann dies darauf zurückzuführen sein, daß die Prüfleitungen schadhaft sind.

ISOLIERUNGSPRÜFUNGEN

Die rote Prüfleitung an die Erdung, den Gerätrahmen oder den Kabelmantel usw und die schwarze Prüfleitung an den zu prüfenden Stromkreis oder die Kabelseele anschließen. Wird der Wählschalter auf 200 MΩ, (bei dem BM102/2 100 MΩ), geschaltet und auf die Drucktaste "Test" gedrückt, so kann der Isolierungswiderstand von der oberen Skala des Instruments abgelesen werden, nachdem der Zeiger stillsteht.

Bei Freigabe der Drucktaste "Test" entladen sich kapazitive Stromkreise automatisch. Man wartet daher einige Sekunden vor dem Lösen der Prüfleitungen, damit dies geschehen kann. Die für die Kapazitätsentladung empfohlene Wartezeit beträgt 1,5 Sekunden je Mikrofarad. Der BM100/2 überwacht die Entladung in seinem Spannungsbereich

automatisch, so daß ersichtlich ist, wann die Prüfleitungen ohne Gefahr gelöst werden können. Beachten sie, daß eine dielektrische Äbsorption während eines Isolationstests an kapazitiven Bauteilen stafffinden kann.

WIDERSTANDS – UND DURCHGANGSPRÜFUNGEN

Die Prüfleitungen an den zu prüfenden Stromkreis anschließen und den Wählschalter auf den gewünschten Widerstands — bzw. Durchgangsbereich einstellen.

Beim Betätigen der Drucktaste "Test" wird der Widerstand an der entsprechenden Skala angezeigt. Es ist für jeden Bereich eine getrennte Skala vorgesehen, und die Meßwerte können daher unmittelbar abgelesen werden. Den Finger von der Drucktaste nehmen und die Prüfleitungen lösen.

WECHSELSPANNUNGSMESSUNGEN

(nur BM100/2)

Wenn der Schalter in irgendeïner funktionsbezogenen Position ist, OHNE daß auf die Drucktaste "Test" gedrückt wird, wird automatisch auf den Spannungsbereich geschaltet. Die Prüfleitungen an den zu prüfenden Stromkreis anschließen und einschalten. Das Instrument zeigt an, ob der Stromkreis eingeschaltet ist, und die betreffende Spannung (bis 600 V Wechselspannung) wird auf der Innenskala angezeigt. Meßleitungen mit abgesicherten Prüfspitzen sind für diese Messung empfehlenswert.

ÜBERPRÜFUNG DER SICHERUNG

Bei offenem Prüfkabelstromkreis auf den 200 Ω Bereich schalten und die Drucktaste "Test" betätigen. Wird ein Wert von <200 Ω angezeigt, ist die Sicherung durchgeschlagen.

Anmerkung
Die Sicherung wird auf der Rückseite des Gehäuses im Batterie-und Sicherungsteil auf den dortigen Klammern eingesetzt.

bereich geschaltet. Die Prüfleitungen an den zu prüfenden Stromkreis anschließen und einschalten. Das Instrument zeigt an, ob der Stromkreis eingeschaltet ist, und die betreffende Spannung (bis 600 V Wechselspannung) wird auf der Innenskala angezeigt. Meßleitungen mit abgesicherten Prüfspitzen sind für diese Messung empfehlenswert.

ÜBERPRÜFUNG DER SICHERUNG

Bei offenem Prüfkabelstromkreis auf den 200 Ω Bereich schalten und die Drucktaste "Test" betätigen. Wird ein Wert von <200 Ω angezeigt, ist die Sicherung durchgeschlagen.

Anmerkung
Die Sicherung wird auf der Rückseite des Gehäuses im Batterie-und Sicherungsteil auf den dortigen Klammern eingesetzt.

INSTRUCCIONES DE USO

ADVERTENCIAS

1. **El circuito bajo prueba DEBE desconectarse de la red antes de hacer pruebas de aislamiento, resistencia o continuidad. Comprobar que no hay tensión una vez desconectado el circuito. El BM100/2 indicará automáticamente al conectar los cables de prueba si hay tensión alterna. Si esto ocurre, no presionar el botón de prueba.**
2. **Con los medidores BM100/2 pueden hacerse medidas de tensión. Tenga cuidado cuando las tensiones sean superiores a 50 V. En este caso se recomienda el uso de cables de prueba con fusible incorporado.**
3. **En los casos en que se han comprobado circuitos capacitivos, dejar que transcurra un periodo apropiado antes de desconectar los conductores de prueba, para permitir descargar el circuito.**
4. **Los rangos de continuidad de 200 Ω y 2 Ω están protegidos con un fusible. Los fusibles de repuesto DEBEN ser del mismo tipo y rango.**

PRECAUCIONES

1. Los instrumentos usados en medios ambientales polvorientos deben desarmarse y limpiarse periodicamente.
2. No debe dejarse el instrumento expuesto a la luz directa del sol durante largos períodos de tiempo.

PROCEDIMIENTO PRELIMINAR

a) Instalación de pilas o fusibles.
Asegurarse de que el instrumento no esté conectado a ningún circuito externo. Retirar la tapa del compartimiento de pilas y fusible desde la parte posterior de la caja, aflojondo el tornillo de cabeza en cruz situado en el centro, y apalancando hacia arriba. La pila y el fusible quedarán al descubierto. Cuando se recambian las pilas, debe observarse la polaridad correcta según se muestra en el porta-pilas. Volver a colocar la tapa.

b) Comprobación del estado de la pila.
Situar el conmutador selector en " ⊣⊢ " y oprimir el botón pulsador "Test" (prueba). La aguja del medidor deberá desviarse en la escala dentro del arco de "comprobación de pila" (⊣⊢).
Nota: Se aconseja sacar la pila si el instrumento no va a utilizarse durante cierto período de tiempo. Nunca debe dejarse pilas descargadas en el instrumento, debido a la posibilidad de desperfectos causados por fugas del electrólito.

c) Ajuste del cero mecánico del medidor.
Con el instrumento en posición horizontal, situar la aguja del medidor en cero (∞ en la escala de aislamiento) si es necesario, utilizando el ajustador mecánico situado en el centro del panel frontal.

d) Conexión y comprobación de los conductores de prueba.
Conectar los conductores de prueba rojo y negro, rematados con las puntas de contacto o clips apropiados, en las tomas terminales "+" y "−" respectivamente.
Inspeccionar los conductores de prueba para cerciorarse que el aislamiento está en buen estado y sin roturas. Conectar las puntas de contacto o clips conjuntamente y situar el interruptor selector en "2 Ω". Oprimir el botón pulsador de "Test" (prueba) y comprobar que el medidor registre 0 de lectura. Si se obtiene una lectura de resistencia alta, o una mayor que las escala máxima, comprobar las conexiones. Si las lectura es todavia alta, debe sospecharse que estén defectuosos los conductores.

COMPROBACIONES DE AISLAMIENTO

El conductor de pruebas rojo se conecta a tierra, al bastidor del equipo, vaina del cable, etc., y el conductor de pruebas negro se conecta al circuito bajo pruebas o al núcleo del cable. Con el conmutador selector situado en "200 MΩ" ("100 MΩ" en el BM102/2), y el botón pulsador "Test" (prueba) oprimido, la resistencia del aislamiento podrá leerse en la escala superior del medidor, después la aguja indicadora se haya parado.

Los circuitos capacitivos se descargan automáticamente a través del instrumento cuando se suelta el botón pulsador "Test" (prueba). Por lo tanto, han de esperarse unos momentos antes de conectar los conductores de pruebas para dejar que esto ocurra. El tiempo sugerido para que se produzca la descarga de la capacidad es de 1,5 segundos, por microfaradio. El BM100/2 vigilará automáticamente la descarga en su escala de tensiones, indicando así cuando pueden quitarse con seguridad los conductores de pruebas. Estar atentos a la carga de los dispositivos capacitivos cuando se haga una prueba de aislamiento.

COMPROBACIONES DE RESISTENCIA Y CONTINUIDAD

Los conductores de prueba se conectan a través del circuito bajo prueba y el conmutador selector se sitúa

conductor de pruebas negro se conecta al circuito bajo pruebas o al núcleo del cable. Con el conmutador selector situado en "200 MΩ" ("100 MΩ" en el BM102/2), y el botón pulsador "Test" (prueba) oprimido, la resistencia del aislamiento podrá leerse en la escala superior del medidor, después la aguja indicadora se haya parado.

Los circuitos capacitivos se descargan automáticamente a través del instrumento cuando se suelta el botón pulsador "Test" (prueba). Por lo tanto, han de esperarse unos momentos antes de conectar los conductores de pruebas para dejar que esto ocurra. El tiempo sugerido para que se produzca la descarga de la capacidad es de 1,5 segundos, por microfaradio. El BM100/2 vigilará automáticamente la descarga en su escala de tensiones, indicando así cuando pueden quitarse con seguridad los conductores de pruebas. Estar atentos a la carga de los dispositivos capacitivos cuando se haga una prueba de aislamiento.

COMPROBACIONES DE RESISTENCIA Y CONTINUIDAD

Los conductores de prueba se conectan a través del circuito bajo prueba y el conmutador selector se sitúa en la escala de resistencia o continuidad requerida.

Cuando se oprime el botón pulsador "Test" (prueba), la resistencia se verá indicada en la escala apropieada del medidor. Hay una escala separada para cada gama, de modo que las lecturas son directas.

MEDIDAS DE TENSIÓN C.A. (BM100/2 solamente)

La gama de tensiones es seleccionada automáticamente cuando el conmutador está en cualquier posición y NO está oprimido el botón pulsador de "Test" (prueba). Conectar los conductores de prueba a través del circuito que está probándose y conectar el circuito. El probador indicará si el circuito está energizado, y el nivel de tensión presente (hasta 600 V c.a.) será indicado en la escala interior. Los cables de prueba con fusible incorporado son recomendables para estas medidas.

COMPROBACION DEL FUSIBLE

Con los conductores de prueba en circuito abierto, conmutar a la gama de 200 ohmios y oprimir el botón pulsador "Test" (prueba). Una lectura de <200 Ω indicará que está quemado el fusible.

Nota: El fusible está sujeto mediante clips en el compartimiento de la batería y del fusible situado en la parte posterior de la caja.

CIRCUIT DESCRIPTION

INSULATION TEST RANGES (200 MΩ or 100 MΩ)

An inverter provides a stable 500 V test voltage in the case of the 200 MΩ instruments (BM100/2, BM101/2) and 250 V in the case of the BM102/2. The circuit is arranged so that the pointer gives a slight 'kick' before settling back to a steady reading. This is noticeable only above about 100 MΩ and is included to show that the instrument is functioning correctly when measuring resistances corresponding to small deflections of the pointer. A 470 kΩ (320 kΩ effectively for BM100/2) resistor is connected automatically between the positive and negative test terminals on releasing the 'Test' button, to allow for capacitive circuits to discharge.

VOLTAGE RANGE (BM100/2 only)

On any position with the 'Test' button **not** pressed, the instrument acts as a voltmeter, reading 0—600 V a.c.

CONTINUITY RANGES (2 Ω and 200 Ω)

The nominal test voltage on these ranges is 1,6 V for the 2 Ω range and 0,76 V for the 200 Ω range. Overload protection is provided by a 500 mA 250 V ceramic fuse type F. Changing the fuse will have no effect on the calibration of the ranges.

RESISTANCE RANGES (1 MΩ and 500 kΩ)

The nominal test voltage is 53 V in the case of the 1 MΩ range (BM101/2) and 27 V in the case of the 500 kΩ range (BM102/2). Protection against overload is provided by a positive temperature coefficient (PTC) thermistor.

BATTERY CHECK

In the battery check position the instrument functions as a voltmeter of approx. 12 V f.s.d. (6 V mid-scale). The battery is rejected if its voltage is less than 6 V. During this test the battery is drawing approx. 50 mA, so the 'Test' button should not be pressed longer than necessary to make the check.

CONTINUITY RANGES (2 Ω and 200 Ω)

The nominal test voltage on these ranges is 1,6 V for the 2 Ω range and 0,76 V for the 200 Ω range. Overload protection is provided by a 500 mA 250 V ceramic fuse type F. Changing the fuse will have no effect on the calibration of the ranges.

RESISTANCE RANGES (1 MΩ and 500 kΩ)

The nominal test voltage is 53 V in the case of the 1 MΩ range (BM101/2) and 27 V in the case of the 500 kΩ range (BM102/2). Protection against overload is provided by a positive temperature coefficient (PTC) thermistor.

BATTERY CHECK

In the battery check position the instrument functions as a voltmeter of approx. 12 V f.s.d. (6 V mid-scale). The battery is rejected if its voltage is less than 6 V. During this test the battery is drawing approx. 50 mA, so the 'Test' button should not be pressed longer than necessary to make the check.

SERVICE AND MAINTENANCE

In order for any servicing and maintenance work to be carried out on the instrument it must be opened up. NOTE: THIS WILL AUTOMATICALLY INVALIDATE ANY WARRANTY COVERING THE INSTRUMENT.

It is important that any servicing or repair work is carried out by a suitably qualified instrument technician who is aware that high voltage is present at various points on the p.c.b. when the circuit is energized.

Caution:— The instrument circuit contains static sensitive devices. If the instrument casing is opened for any reason, care must be exercised in handling the printed circuit board. This should be done in accordance with DEF STAN 59-98 and BS 5783, specifications for handling electrostatic sensitive devices.

OPENING THE TESTER

The tester should not be connected to any external circuit and the test leads should be removed. All parts should be stored carefully ready for re-assembly.

1) Lay the tester face down on the work bench.
2) Remove the test prods from their storage slots.
3) Remove the battery and fuse compartment cover plate. Release the cross-head screw in the centre and then lift up and towards the top of the tester until the cover is completely free. Do not lose the spare fuse which is attached to the inside of the cover.
   Note:— The tester stand is not fixed in place once the cover has been removed. Be careful that it is not lost.
4) Remove the battery.
5) Release the four cross-head screws, one in each corner of the rear cover.
6) Lift the rear cover assembly vertically off the tester.
7) The printed circuit board and components are now exposed so that test measurements and settings can be made.

REMOVING THE PRINTED CIRCUIT BOARD

If it is necessary to unsolder components, service the selector switch or push-button or remove the movement, the printed circuit board must be taken out.

1) Unclip the red and black wires connecting the meter to the board, at the board end.
2) The push-button prevents the board from being

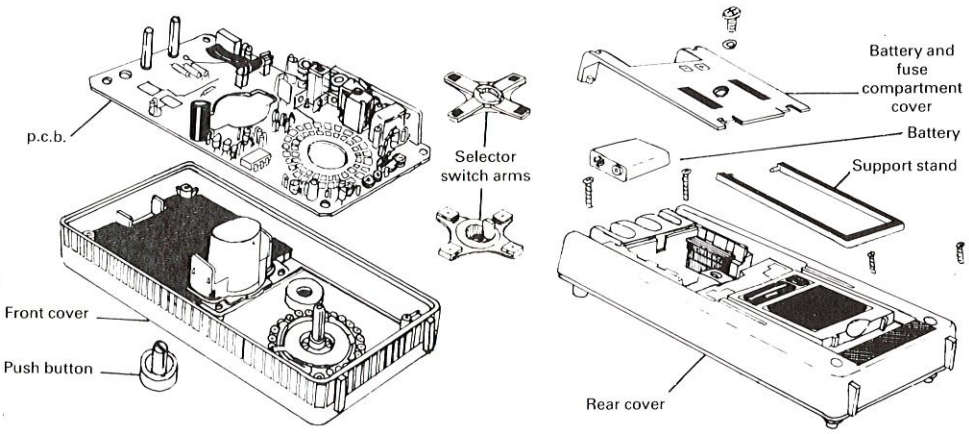
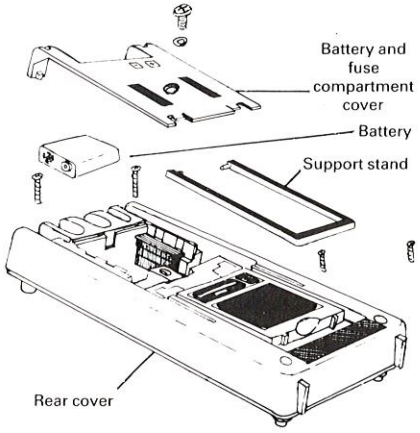


Fig. 1 The tester dis-assembled

ector
h arms



lifted straight out. Therefore hold the front cover assembly in one hand and grip the push-button S2 with the other. Pull firmly until the button is released from the switch, (take care that it is not lost), then continue to lift until the selector switch mechanism separates from its knob.

3) The removal of the selector switch arms from the board should not normally be necessary. However, to achieve this, hold the rear switch arm moulding still and rotate the front one until they spring apart. (The two sections are identical and interchangeable).

Note:— The contacts are retained and will not drop out. To replace the selector switch arms, position them either side of the board and line up the spiggot on one with the recess on the other. Push together and turn anti-clockwise until locked.

RE-ASSEMBLY

The tester is re-assembled by performing the dismantling operations in the reverse order.
When replacing the p.c.b. in the front cover assembly, ensure that the slots in the selector switch mouldings line up with the 'keys' on the knob spiggot.

Ensure that the parts are properly in place before securing the screws. The battery must be fitted properly, therefore observe the correct polarity as indicated in the battery compartment.

CALIBRATION

Refer to the circuit diagram and to fig. 2 to find the positions of the adjustment potentiometers.

There is no adjustment of the battery check function nor of the BM100/2 a.c. voltage range.

Open up the tester as described in 'Opening the Tester' and connect a 9 V battery (IEC 6-F22 type) to the circuit. This may be done using short leads with crocodile clips, for convenience. The positive being connected to the leg of R18 and the negative to the pin from which a lead connects to the push-button switch.

Setting the 2 Ω range

1) Set potentiometers R7 and R19 to their mid-positions.
2) Connect the test leads to the instrument terminals and join their ends together.
3) Press the push-button and adjust R19 to give a reading of zero.

4) Connect the test leads to a known 2 Ω ± 0,5% resistor.
5) Press the push-button and adjust R7 to give a reading of 2 Ω on the '2 Ω scale'.
6) Because the adjustments of R7 and R19 could be interactive the setting procedure may need to be repeated until the required accuracy is obtained.

Note:— It is necessary to ensure a good connection between the test lead clips and the resistor terminals in order to keep contact resistance as low as possible.

Setting the 200 Ω range

1) Connect the test leads to a known 200 Ω ± 0,3% resistor.
2) Press the push-button and adjust R8 to give a reading of 200 Ω on the '200 Ω scale'.

Setting the 1 MΩ range (BM101/2) **or 500 kΩ range** (BM102/2)

1) Connect the test leads to a known 1 MΩ ± 0,3% resistor for BM101/2 or 500 kΩ ± 0,3% resistor for BM102/2.
2) Press the push-button and adjust R28 to give a reading of 1 MΩ or 500 kΩ on the '1 MΩ scale' or '500 kΩ scale' as appropriate.

Setting the insulation resistance range
(200 MΩ range BM100/2, BM101/2, 100 MΩ range BM102/2)

1) Set R25 fully anticlockwise and connect the test leads to a 1 MΩ ± 0,3% resistor (BM100/2 and BM101/2) or to a 500 kΩ ± 0,3% resistor (BM102/2).
2) Press the push-button and adjust R26 for 503 V ± 3 V (BM100/2 and BM101/2) or 250 V ± 5 V (BM102/2).
3) With the push-button pressed adjust R20 to give a reading of 1 MΩ (BM100/2 and BM101/2) or 0,5 MΩ (BM102/2).
4) Short the test leads together, press the push-button and adjust R15 to give a reading of zero.
5) Connect the test leads to a 0,75 MΩ ± 0,3% resistor (BM100/2 and BM101/2) or to a 0,25 MΩ ± 0,3% resistor (BM102/2).
6) Adjust R25 to give a reading of 0,75 MΩ (BM100/2 and BM101/2) or 0,25 MΩ (BM102/2).
7) Check that the voltage at 100 MΩ is <600 V (BM100/2 and BM101/2) or <300 V (BM102/2).

reading of 1 MΩ or 500 kΩ on the '1 MΩ scale' or '500 kΩ scale' as appropriate.

Setting the insulation resistance range
(200 MΩ range BM100/2, BM101/2, 100 MΩ range BM102/2)

1) Set R25 fully anticlockwise and connect the test leads to a 1 MΩ ± 0,3% resistor (BM100/2 and BM101/2) or to a 500 kΩ ± 0,3% resistor (BM102/2).
2) Press the push-button and adjust R26 for 503 V ± 3 V (BM100/2 and BM101/2) or 250 V ± 5 V (BM102/2).
3) With the push-button pressed adjust R20 to give a reading of 1 MΩ (BM100/2 and BM101/2) or 0,5 MΩ (BM102/2).
4) Short the test leads together, press the push-button and adjust R15 to give a reading of zero.
5) Connect the test leads to a 0,75 MΩ ± 0,3% resistor (BM100/2 and BM101/2) or to a 0,25 MΩ ± 0,3% resistor (BM102/2).
6) Adjust R25 to give a reading of 0,75 MΩ (BM100/2 and BM101/2) or 0,25 MΩ (BM102/2).
7) Check that the voltage at 100 MΩ is <600 V (BM100/2 and BM101/2) or <300 V (BM102/2).

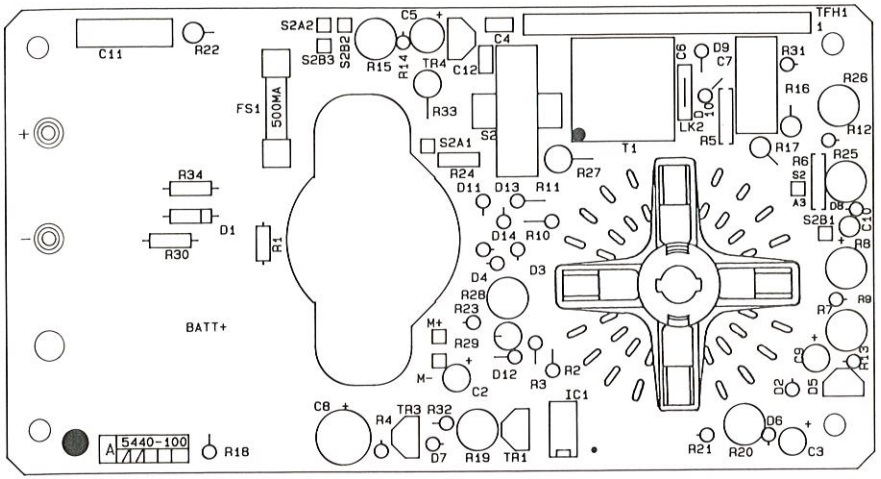


Fig. 2 The printed circuit board

8) Check that the short circuit current is 920 μA $\pm$ 60 μA.
9) Because the adjustments of R15, R20, R25 and R26 could be interactive the setting procedure may need to be repeated until the required accuracy is obtained.

Note:— All the resistors used must be able to withstand the voltage applied to them.

Having set all the potentiometers the calibration of all the scale points may be checked against the specification using appropriate value resistors or resistance boxes. Following the setting-up and calibration checks, the potentiometers should be locked in place using a suitable varnish, and the tester re-assembled.

CLEANING THE TESTER

A mild solution of detergent in water is recommended for cleaning the instrument case. Wipe the exterior surface with a moistened cloth taking particular care not to scratch the meter cover. This has been given an antistatic treatment.

CARE OF THE BATTERY

If the tester is not in regular use, the condition of the battery should be checked periodically. For preference the battery should be removed and stored separately, to avoid possible damage caused by leaking electrolyte.

Notes referring to fig. 2 page 30:—
R24 — on BM100/2 only
R27 — on BM101/2 and BM102/2 only
R28 — on BM101/2 and BM102/2 only
R29 — on BM101/2 and BM102/2 only
C6 — on BM100/2 and BM101/2 only (replaced by link LK2 on BM102/2)
C12 — not used
D9 — on BM100/2 and BM101/2 only
D11 — on BM100/2 only
D13 — on BM100/2 only
TR2 — not used

CARE OF THE BATTERY

If the tester is not in regular use, the condition of the battery should be checked periodically. For preference the battery should be removed and stored separately, to avoid possible damage caused by leaking electrolyte.

Notes referring to fig. 2 page 30:—
R24 — on BM100/2 only
R27 — on BM101/2 and BM102/2 only
R28 — on BM101/2 and BM102/2 only
R29 — on BM101/2 and BM102/2 only
C6 — on BM100/2 and BM101/2 only
(replaced by link LK2 on BM102/2)
C12 — not used
D9 — on BM100/2 and BM101/2 only
D11 — on BM100/2 only
D13 — on BM100/2 only
TR2 — not used

INSTRUMENT REPAIRS AND SPARE PARTS

The manufacturer's service and spare parts organisation for MEGGER® instruments:—

MEGGER INSTRUMENTS LTD,
Archcliffe Road,
Dover,
Kent CT17 9EN,
England.
Tel: Dover (0304) 202620
Telefax: Dover (0304) 207342
Telex: 96283 Avomeg G

Approved Repair Companies

A number of independent instrument repair companies in the U.K. have been approved for repair work on most MEGGER® instruments, using genuine MEGGER® spare parts. Their names and addresses are listed in the Warranty Card, supplied with each new instrument.

Overseas

Instrument owners outside Great Britain should consult the Appointed Distributor/Agent for their country regarding spare parts and repair facilities. The Distributor/Agent will advise on the best course of action to take.

If returning an instrument to Britain for repair, it should be sent, freight pre-paid to the address shown opposite. A copy of the Invoice and of the Packing Note should be sent simultaneously by airmail to expedite clearance through the U.K. Customs.

A repair estimate showing return freight and other charges will be submitted to the sender, if required, before work on the instrument commences.

NEW MEGGER® INSTRUMENTS ARE GUARANTEED FOR 12 MONTHS FROM THE DATE OF PURCHASE BY THE USER.

COMPONENTS LIST

(Components are common to all instruments except where stated)

R1	Resistor	91 Ω±1%	½ W	
R2	Resistor	100 Ω±1%	¼ W	
R3	Resistor	47 Ω±5%	¼ W	
R4	Resistor	3,65 kΩ±1%	¼ W	
R5	Posistor	10 kΩ		
R6	Posistor	10 kΩ		
R7	Potentiometer	200 Ω±20%	½ W	
R8	Potentiometer	1 kΩ±20%	½ W	
R9	Resistor	1,5 kΩ±1%	¼ W	
R10	Resistor	47 kΩ±1%	¼ W	
R11	Resistor	121 Ω±1%	¼ W	BM100/2 and BM101/2
		221 Ω±1%	¼ W	BM102/2
R12	Resistor	2 kΩ±1%	¼ W	
R13	Resistor	82,5 kΩ±1%	½ W	
R14	Resistor	2,15 kΩ±1%	¼ W	
R15	Potentiometer	1 kΩ±20%	½ W	
R16	Resistor	18 MΩ±5%	½ W	BM100/2 and BM101/2
		9,1 MΩ±5%	½ W	BM102/2
R17	Resistor	20 MΩ±5%	½ W	BM100/2 and BM101/2
		10 MΩ±5%	½ W	BM102/2
R18	Resistor	3,32 kΩ±1%	¼ W	
R19	Potentiometer	5 kΩ±20%	½ W	
R20	Potentiometer	10 kΩ±20%	½ W	
R21	Resistor	15 kΩ±1%	¼ W	
R22	Resistor	100 kΩ±20%	½ W	
R23	Resistor	4,3 kΩ±1%	¼ W	
R24	Resistor	1,08 MΩ±1%	½ W	BM100/2 only
R25	Potentiometer	50 kΩ±20%	½ W	
R26	Potentiometer	1 MΩ±20%	½ W	
R27	Resistor	1 MΩ±5%	½ W	BM101/2 only
		470 kΩ±10%	1 W	BM102/2 only
R28	Potentiometer	1 MΩ±20%	½ W	BM101/2 and BM102/2 only

R16 Resistor	18 MΩ±5%	½ W	BM100/2 and BM101/2
	9,1 MΩ±5%	½ W	BM102/2
R17 Resistor	20 MΩ±5%	½ W	BM100/2 and BM101/2
	10 MΩ±5%	½ W	BM102/2
R18 Resistor	3,32 kΩ±1%	¼ W	
R19 Potentiometer	5 kΩ±20%	½ W	
R20 Potentiometer	10 kΩ±20%	½ W	
R21 Resistor	15 kΩ±1%	¼ W	
R22 Resistor	100 kΩ±20%	½ W	
R23 Resistor	4,3 kΩ±1%	¼ W	
R24 Resistor	1,08 MΩ±1%	½ W	BM100/2 only
R25 Potentiometer	50 kΩ±20%	½ W	
R26 Potentiometer	1 MΩ±20%	½ W	
R27 Resistor	1 MΩ±5%	½ W	BM101/2 only
	470 kΩ±10%	1 W	BM102/2 only
R28 Potentiometer	1 MΩ±20%	½ W	BM101/2 and BM102/2 only

R29 Resistor	180 kΩ±5%	1 W	BM101/2 only
	91 kΩ±2%	1 W	BM102/2 only
R30 Resistor	0,68 Ω±10%	½ W	
R31 Resistor	100 kΩ±1%	¼ W	
R32 Resistor	4,32 kΩ±5%	¼ W	
R33 Resistor	470 kΩ±10%	1 W	
R34 Resistor	62 Ω±2%	½ W	
C2 Capacitor	10 µF	35 V	electrolytic
C3 Capacitor	10 µF	35 V	electrolytic
C4 Capacitor	330 pF±2%	63 V	
C5 Capacitor	47 µF	25 V	electrolytic
C6 Capacitor	4,7 nF	630 V	BM100/2 and BM101/2
	link LK2		BM102/2
C7 Capacitor	68 nF	630 V	
C8 Capacitor	470 µF	16 V	electrolytic
C9 Capacitor	10 µF	35 V	electrolytic
C10 Capacitor	4,7 µF	25 V	tantalum
C11 Capacitor	15 nF	1000 V	
C12 Capacitor	150 pF±20%	63 V	

D1 Zener diode	1N5337B	
D2 Zener diode	BZX79C15	
D3 Diode	1N4148	
D4 Diode	BZV46C2V0	
D5 Band gap diode	ICL8069DCZR	
D6 Diode	1N4148	
D7 Zener diode	BZV46C2V0	
D8 Zener diode	BZX79C30	
D9 Diode	BA159	BM100/2 and BM101/2 only
D10 Diode	BA159	
D11 Diode	1N4148	BM100/2 only
D12 Diode	1N4148	
D13 Diode	1N4148	BM100/2 only
IC1 Integrated circuit	TLC271ACP	
TR1 Transistor	BC183	
TR3 Transistor	BC213	
TR4 Transistor	VN10KM	

COMPONENTS LIST

TFH1	Thick film hybrid	part no. 6180-203
T1	Transformer assembly	part no. 6131-398
FS1	Fuse	500 mA ceramic
SW2	Switch	part no. 6180-219
LK2	Wire link	part no. 5160-265 BM102/2 only (replaces C6)

Movement

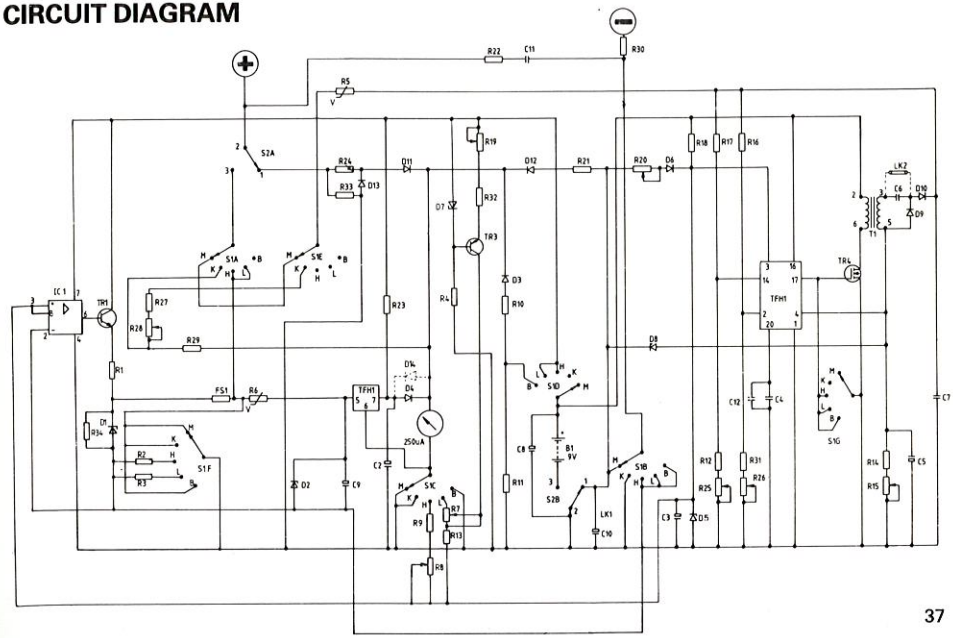
BM100/2	6480-024
BM101/2	6480-025
BM102/2	6480-026

RECOMMENDED SPARES LIST (BM100/2 series only)

		part no.
Front cover assembly		6331-514
Rear cover assembly		6231-084
Switch assembly		6231-093
Printed circuit board assembly	BM100/2	6331-491
	BM101/2	6331-506
	BM102/2	6331-510

Movement	BM100/2	6480-024
	BM101/2	6480-025
	BM102/2	6480-026

CIRCUIT DIAGRAM



MEGGER INSTRUMENTS LIMITED

Archcliffe Road Dover Kent CT17 9EN England Tel: 0304 202620 Fax: 0304 207342 Telex: 96283 Avomeg G

This instrument is manufactured in the United Kingdom.
The company reserves the right to change the specification or design without prior notice.
MEGGER is the registered Trade Mark of MEGGER INSTRUMENTS LIMITED.
This data uses the comma as the decimal marker to align with general European usage.

Part No 6171-293 Edition 7 Printed in England SL/2,4k/10V

An AVO INTERNATIONAL company

MEGGER