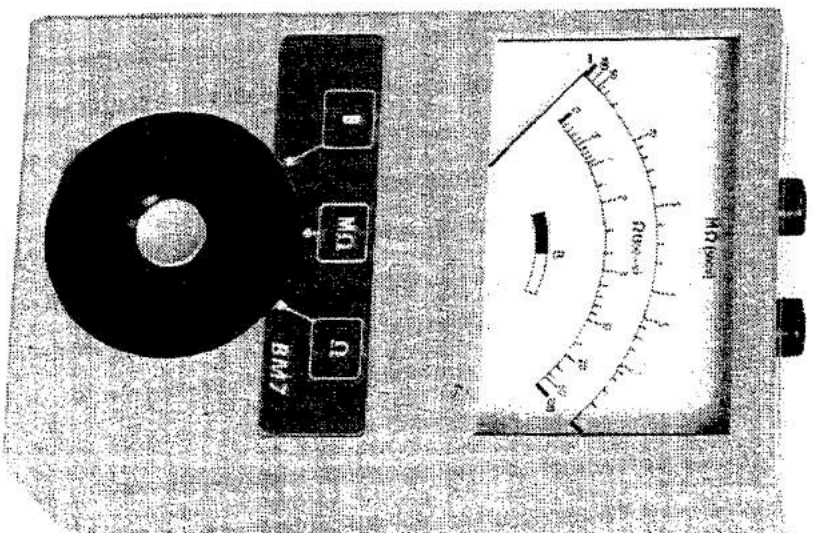


BM7

Battery MEGGER Tester



MEGGER

Operating Instructions

MEGGER BATTERY MEGGER TESTER BM7 OPERATING INSTRUCTIONS

SAFETY IN THE USE OF ELECTRICAL EQUIPMENT

It should be understood that any use of electricity inherently involves some degree of safety hazard.

Various safety regulations and recommendations are in existence and new ones are being formulated in an attempt to reduce the extent of such hazard. This is achieved principally by defining, as far as possible, the levels of voltage and current above which there is significant hazard; by establishing certain principles in the design of equipment and by recommending specific visual warnings of any residual hazard, to be placed on the equipment.

We, in common with other responsible manufacturers, take all reasonable steps to ensure that our products comply with relevant approved

safety standards. However, it must be emphasised that certain types of electrical testing essentially involve the use of voltages and currents above the limits defined as 'safe' values. For example, insulation testing and flash testing generally require the use of high voltages well above the safe limit and it may not always be possible to restrict the currents available from the test equipment to within the defined safe values.

It is recommended that the user of electrical equipment of any sort should always ensure that he understands, in detail, the equipment's characteristics so that he is aware of the degree of safety hazard which may be involved.

SAFETY IN THE USE OF ELECTRICAL EQUIPMENT

Whilst every effort is made by responsible manufacturers to reduce the hazards and to warn of any hazard remaining, it still rests with the user to play his part in ensuring his own safety.

The best way to achieve this is:—

Understand the equipment you are proposing to use, and its ratings.

Understand the application to which the equipment is to be put.

Ensure that all reasonable safety procedures are followed.

Take no chances, nor short cuts in safety procedures.

The equipment described in this booklet has been examined, both in design and manufacture, to ensure that safety hazards are minimised.

Any known remaining hazards are explained in the paragraph headed "WARNING" on page 9.

If, for some specific application, it is found that the information provided is not adequate, then please contact the manufacturer for further details and assistance.

INDEX

Safety in the use of Electrical Equipment	2	House Wiring Insulation Tests	10
General Description	5	IEE Wiring Regulations Summary	10
Applications	6	IEE Continuity Tests	11
Preliminary Checks	7	Specifications	12
Fuse Replacement	8	Accessories	13
OPERATION		Instrument Repairs and Spare Parts	15
Insulation Resistance Testing	9	Components List	16
Continuity Testing	9	Circuit Diagram BM7/250	17
		Components List	18
		Circuit Diagram BM7/500	19

GENERAL DESCRIPTION

The BM7/500 and BM7/250 MEGGER Testers are dual purpose battery powered instruments designed for insulation and continuity testing, giving direct resistance readings with maximum portability and accuracy, and requiring no setting up operations.

Their usage covers most of the needs of installation and maintenance in domestic and industrial wiring layouts, transformer and motor windings, and electric appliances.

An internal electronic voltage generator produces a 500V d.c. nominal output from which the BM7/500 covers the British IEE requirements for test on 240V a.c. installations and equipment. Model BM7/250 tests insulation at a nominal 250V and is therefore suitable for testing 110-120V installations.

The easily operated button permits one-hand operation and the built-in battery tester shows if the batteries need replacing. Releasing the button after a test automatically discharges the capacitance of the circuit under test.

Ranges and scales are specially chosen for convenience of use. The large selector knob makes function selection extremely simple.

The instrument employs a robust, specially designed taut-band moving coil movement with safety fuse protection.

Instrument ranges:

BM7/500

Insulation 0-100M Ω at 500V d.c. nominal
Continuity 0-100 Ω at 300mV approx.

BM7/250

Insulation 0-50M Ω at 250V d.c. nominal
Continuity 0-100 Ω at 300mV approx.

APPLICATIONS

INSULATION RESISTANCE

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, while subjected to a voltage high enough to break through any mechanical flaws arising from manufacture or installation. The 500V MEGGER models are suitable for testing 240V a.c. systems, complying with IEE Wiring Regulations.

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

In every case the insulation resistance can be measured very simply by the MEGGER tester which will give an instant and direct reading of resistance in megohms.

CONTINUITY TESTING

By setting the range switch to Ω the instrument will give direct readings for circuit and earth continuity. Readings are given directly in ohms and any unsatisfactory joints or contacts can be measured, traced and dealt with.

PRELIMINARY CHECKS

(1) INSERT BATTERIES

Place the instrument face downwards and remove battery cover by inserting a coin under the slot and levering off. Fit six batteries (Ever Ready HP7 or similar) into the spring clips ensuring that the polarity indicated is followed exactly. Replace cover.

(2) CHECK BATTERY POWER

Battery condition should always be checked before circuit testing is commenced. Turn the range selector knob to 'B' and then press the button in the centre.

The meter pointer should move to the scale mark B or beyond. If the pointer does not move or fails to pass the black section the batteries should immediately be replaced.

Never leave discharged batteries in the instrument because of the possibility of leakage and consequent corrosion and damage.

(3) CHECK TEST LEADS

Always check that the instrument leads have, first, no break in the conductor and, second, no break in the insulation:

- (a) Insert leads into tester without separating or opening them out from their coil. Ensure that the outer ends are not touching anything. Set the range switch to ' $M\Omega$ '. Press the test button. The pointer should move to the infinity mark. If it does not then the leads may be faulty and should be inspected for damage.

- (b) Connect the two leads together at the outer ends with the crocodile clips. Press the test button. The meter should read zero. If it reads infinity then the leads may be open circuit and should be checked again.

If either of these test results fail then the leads may have been damaged and should be inspected and replaced if necessary.

PRELIMINARY CHECKS

(4) CHECK FUSE

To check fuse, switch to Ω , insert leads with clips joined, and press test button. Reading should be zero.

If readings beyond full scale are obtained on the continuity range the fuse should be replaced. The fuse is located inside the battery compartment.

Fuse protection is provided on the two resistance ranges. The fuse rating is 800 milliamps and size is 20 x 5mm.

OPERATION

WARNING

The circuit under test must be isolated. Check before testing that circuit is 'dead'.

INSULATION RESISTANCE TESTS

- (1) Insert red lead into red socket, black lead into black socket.
- (2) Carry out battery condition and test lead checks (as on page 7)
- (3) Turn range selector to ' $M\Omega$ ' position.
- (4) Connect red lead to equipment frame or earth.
- (5) Connect black lead to circuit under test.
- (6) Press test button and read resistance in megohms on outer scale.
- (7) Capacitive circuits are automatically discharged through the tester when the test button is released.

CONTINUITY TESTS

- (1) Insert leads in instrument following colour coding.
- (2) Carry out battery and test lead checks (as on page 7).
- (3) Turn range selector to Ω position.
- (4) Connect leads to circuit being tested.
- (5) Press test button and read resistance in ohms on centre scale.

OPERATION

TESTING HOUSE WIRING

IEE WIRING REGULATIONS

The British IEE Regulations for the Electrical Equipment of Buildings covering the specific fields of insulation and continuity are briefly summarised in the following paragraphs.

Regulation E8

The insulation resistance between conductors shall not be less than 1 megohm when:

All conductors are connected to one phase (or pole) of the supply and, in turn, all conductors are connected to each of the other phases (or poles).

Regulation E9

Apparatus disconnected for tests E7 and E8 shall be measured separately, and the insulation resistance between the case or framework and all live parts shall comply with the requirements given in the appropriate British Standard for the apparatus. If there is no British Standard for the apparatus, the insulation resistance shall not be less than 0,5 megohms.

IEE Insulation Tests

Regulation E6

In large installations, the compulsory tests E7 to E9 may be divided into groups of outlets each containing not less than 50 outlets. For 240V (RMS) a.c. circuits the test voltage need not exceed 500V d.c.

Regulation E7

The insulation resistance to earth shall not be less than 1 megohm when:

All fuse links are in place,

All switches are closed, and

All poles or phases of the wiring (except earthed concentric wiring) are electrically connected together.

OPERATION

IEE Continuity Conductor Tests

Regulation E3

In general (provided no choke or inductor is incorporated) it is normally satisfactory if test results are as follows:

With steel conduit earth continuity conductor, the resistance must not exceed 0,5 ohm.

With entirely copper, copper alloy or aluminium earth conductor, the resistance must not exceed 1 ohm.

All above earth continuity conductor tests are subject to the IEE requirements for total earth loop tests. (Regulation E4).

SPECIFICATIONS

MODEL NUMBER	BM7/250	BM7/500
Test Voltage		
Megohm range	250V d.c. nominal	500V d.c. nominal
Resistance Ranges		
Megohm range	0-50M Ω and ∞	0-100M Ω and ∞
Ohm range	0-100 Ω	0-100 Ω
Terminal Voltage		
Megohm range	270V d.c. max. on open circuit 210V d.c. $\pm 10\%$ at 1M Ω	600V d.c. max. on open circuit 500V d.c. $\pm 10\%$ at 1M Ω
Ohm range	300mV d.c. approx. on open circuit	300mV d.c. approx. on open circuit
Terminal Current		
Megohm range	2,5mA approx. on short circuit	4mA max. on short circuit
Ohm range	50mA approx. on short circuit	60mA approx. on short circuit
BOTH MODELS		
Accuracy	$\pm 1,63\text{mm}$ (0,065in) from any marked position on scale.	
Movement	Taut band suspension moving coil type giving added robustness.	
Discharge	Capacitive circuits are automatically discharged when the test button is released, permitting safe removal of test leads.	

SPECIFICATIONS

BOTH MODELS

Fuses

Fuse protection is provided on continuity and $M\Omega$ range. 800mA rating international cartridge type, size 20 x 5mm. Standard Fuse Co. C19/0,8. Part No. 25413-290.

Batteries

Type

Six Dry cells of 1,5V each.

IEC type R6, or equivalent e.g. HP7, 280, 815.

Built in check

Indication on dial gives battery condition under load with selector switch at 'B' and push-button pressed.

Current drain

150mA max. on Megohm range

120mA max. on Ohm range.

Dimensions

Both instruments

153 x 59 x 95mm
(6 x 2 $\frac{1}{8}$ x 3 $\frac{3}{4}$ in.)

Weight

Both instruments

570g (20 oz)
Case & Instrument 900g (2lb) (incl. leads)

ACCESSORIES

SUPPLIED WITH INSTRUMENT

BM7 MEGGER Testers are supplied complete with test leads and interchangeable clips and prods,

Red lead with clip and prod

Catalogue No. 6320-058

Black lead with clip and prod

Catalogue No. 6320-059

AVAILABLE AT EXTRA COST

Carrying Cases

Leather

Catalogue No. 40090

Imitation Leather

Catalogue No. 40091

Companion Case

Catalogue No. 63355.

For two instruments, carries BM7 with LT3½. Line—Earth Loop tester and all leads. Leather Covered.

INSTRUMENT REPAIRS AND SPARE PARTS

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

THORN EMI Instruments Limited, Parts and Service Centre,

Archcliffe Road,
Dover,
Kent CT17 9EN,
England.
Tel: Dover (0304) 202620
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 Booklet, 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. Names and addresses of Overseas Distributors/Agents are given in the Warranty Booklet supplied with each new instrument.

If returning an instrument to Britain for repair, it should be sent, freight pre-paid to the Parts and Service Centre at 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.**

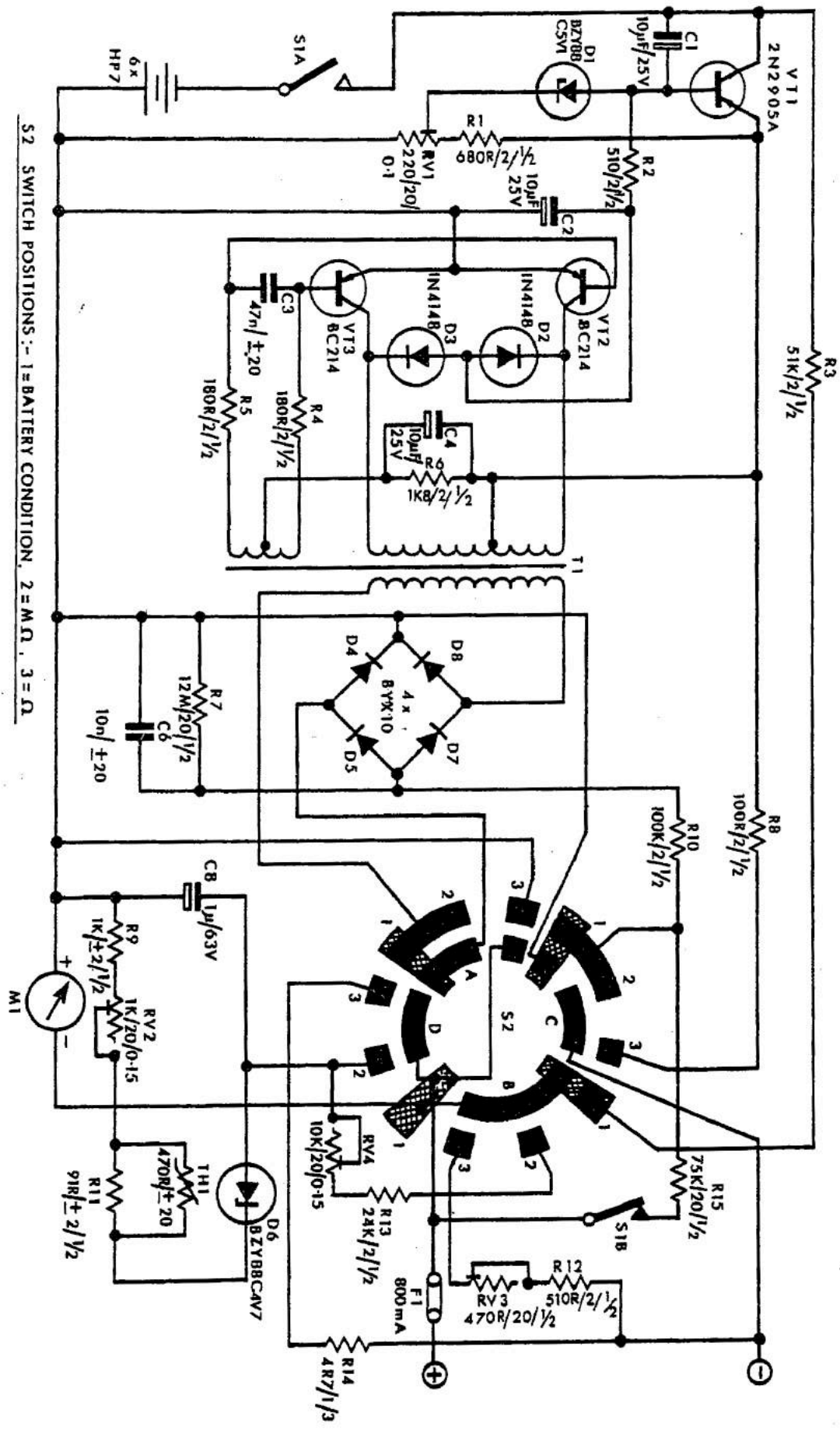
COMPONENTS LIST

BM7/250

R1	680Ω ±2%	½W	C1	10µF 25V	D1	MULLARD BZY88 C5V1
R2	510Ω ±2%	½W	C2	10µF 25V	D2	1N4148
R3	51kΩ ±2%	½W	C4	10µF 25V	D3	1N4148
R4	180Ω ±2%	½W	C3	0,047µF ± 20% 250V	D4	BYX10
R5	180Ω ±2%	½W	C6	0,01µF ± 20% 500V	D5	BYX10
R6	1,8kΩ ±2%	½W	C8	1µF 63V	D6	BZY88 C4V7
R7	12MΩ ±20%	½W			D7	BYX10
R8	100Ω ±2%	½W			D8	BYX10
R9	1kΩ ±2%	½W	VT1	2N2905A		
R10	100kΩ ±2%	½W	VT2	BC214		
R11	91Ω ±2%	½W	VT3	BC214		
R12	510Ω ±2%	½W	Plug-in transformer assembly 6130-889			
R13	24kΩ ±2%	½W	Alternative to above:			
R14	4,7Ω ±1%	3W	Transformer Assy. 6230-394			
R15	75kΩ ±20%	½W	M3 Nylon Hex Nut 21810-604			
TH1	470Ω ±20%	KR4 71C	M3 Pan Hd Screw 6mm 21816-525			
RV1	220Ω ±20%	0,1W	Microswitch 25475-556			
RV2	1kΩ ±20%	0,15W				
RV3	470Ω ±20%	0,1W				
RV4	10kΩ ±20%	0,15W				

CIRCUIT DIAGRAM

BM7/250



S2 SWITCH POSITIONS:- 1=BATTERY CONDITION, 2=M.Ω, 3=Ω

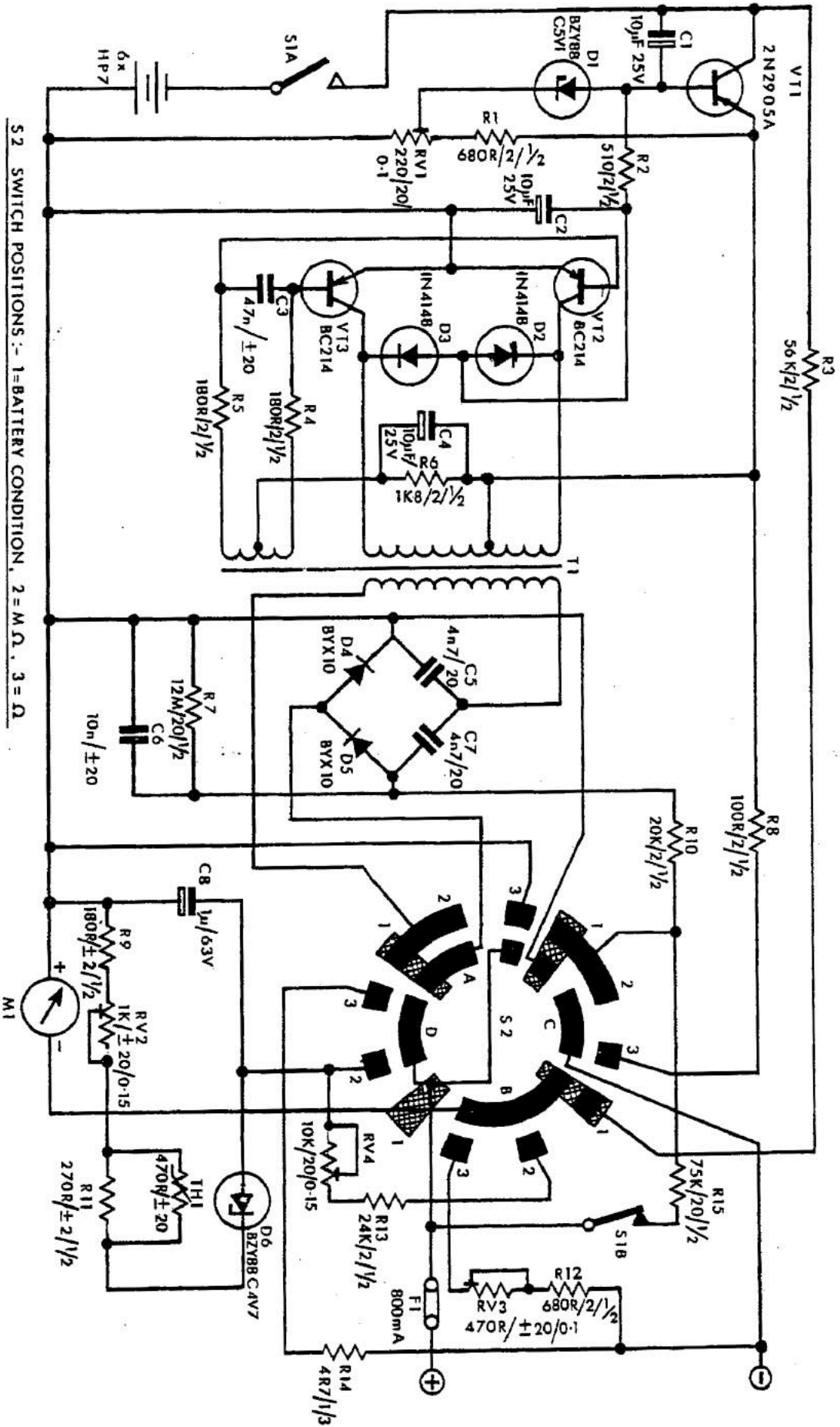
COMPONENTS LIST

BM7/500

R1	680Ω ±2%	1/2W					
R2	510Ω ±2%	1/2W	C1	10μF 25V		D1	BZY88 C5V1
R3	51kΩ ±2%	1/2W	C2	10μF 25V		D2	1N4148
R4	180Ω ±2%	1/2W	C4	10μF 25V		D3	1N4148
R5	180Ω ±2%	1/2W	C3	0,047μF ± 20% 250V		D4	BYX10
R6	1,8kΩ ±2%	1/2W	C5	0,0047μF ± 20% 500V		D5	BYX10
R7	12MΩ ±20%	1/2W	C6	0,01μF ± 20% 500V		D6	BZY88 C4V7
R8	100Ω ±2%	1/2W	C7	0,0047μF ± 20% 500V			
R9	180Ω ±2%	1/2W	C8	1μF 63V		VT1	2N2905A
R10	20kΩ ±2%	1/2W				VT2	BC214
R11	270Ω ±2%	1/2W				VT3	BC214
R12	680Ω ±2%	1/2W					
R13	24kΩ ±2%	1/2W					
R14	4,7Ω ±1%	3W					
R15	75kΩ ±20%	1/2W					
TH1	470Ω ±20%	KR4 71C	Microswitch		25475-556		
			Plug-in transformer assembly		6130-889		
RV1	220Ω ±20%	0,1W	Alternative to above:				
RV2	1kΩ ±20%	0,15W	Transformer Assy.		6230-394		
RV3	470Ω ±20%	0,1W	M3 Nylon Hex Nut		21810-604		
RV4	10kΩ ±20%	0,15W	M3 Pan Hd Screw 6mm		21816-525		

CIRCUIT DIAGRAM

BM7/500



S2 SWITCH POSITIONS :- 1=BATTERY CONDITION, 2=M.Ω., 3=Ω.



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The company reserves the right to change the specification or design without prior notice

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This data uses the comma as the decimal marker to align with general European usage

Part No. 6170-630 Edition 6

Printed in England MP/2.5M/9M