



MEDICAL PHYSICS DEPARTMENT

EARTHBONDING & EARTH LEAKAGE

TESTER

INSTRUCTIONS FOR USE

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1. Introduction

The KOH EBEL Tester has been developed for use, by service personnel, in the field. It provides a single test tool for routine measurement of both earthbonding resistance and earth leakage current as part of maintenance and quality inspections of both static and mobile equipment. Operation is simple and requires little familiarisation for use. The device does not require calibrating before use (check facility is provided) and is independent of supply voltage and requires no in field modifications, all functions being controlled by a maximum of three switches, one power, one range select and one start eb test. Earthbonding resistance is obtained by measuring the voltage across the probes while passing a constant dc current. Earth leakage current is measured in accordance with BS5724 part 1 subclause 19.4. Accuracy is guaranteed to within $\pm 3\%$ ± 1 digit on all ranges.

2. General

This equipment is supplied with three ranges accessible from the front panel. These are earthbonding 1 amp, earthbonding 10 amp and earth leakage. The 1 amp range is supplied in order to enable impedance's $4 < > 0.2$ Ohms to be quantitatively measured. The 10 amp range is for measuring earthbonding but has an upper limit of 0.35 Ohms for accurate measurement. The earth leakage range is in compliance with BS5724 and will measure up to 7.5mA with specified accuracy.

Earthbonding

Whenever this device is used for earthbond testing on fixed equipment it is important that the earth reference lead (terminated in a "crocodile" clip) is connected to the earth reference terminal for the room. [If an earth extension lead is used then the impedance of this should be measured and then subtracted from the subsequent readings obtained for the equipment].

When used on mobile equipment the earth reference lead should be connected to the earth pin on the equipment plug.

Prior to any usage of the device its calibration should be checked by inserting the test probe into the 0.2 Ohm test socket on the front panel and pressing the start button. The reading obtained should be within the tolerance range stated at the back of this booklet.

When performing earthbonding checks it is recommended to start with the 1 amp range and move onto the 10 amp as stated in the instructions for 1 amp testing.

Earth Leakage

In order to avoid possible damage to this equipment it is important to check that any equipment on which it is to be used is working correctly and has earthbonding within the permitted range.

5. **Earth Leakage Testing**

This function is provided for measuring earth leakage currents of mobile equipment to BS5724 normal condition, earth conductor interrupted (up to 7.5mA nominal). The procedures are as follows:-

1. Plug the equipment to be tested into the socket on top of the tester and select EL on the range select switch.
2. Plug the tester into the mains supply and turn it on at the socket and at the front switch.
3. Turn on the equipment and operate as normal (in standby mode only, do not expose) [NOTE 13 AMP MAX LOAD DO NOT EXCEED]. Note the reading of the digital display on the tester, this is the earth leakage current in mA.

WARNING : during this test the equipment is not earthed

3. **Earthbonding 1 Ampere Range**

Switch the earthbonding tester on and turn the range select switch to 1 amp. Connect the earth reference lead and then push the test probe firmly onto a suitable point on the equipment to be tested. Now push the start button on the probe and note the reading on the digital display, this is the earth bonding resistance in Ohms.

If the reading is below 0.2 Ohms then repeat the test using the 10 amp range for greater resolution.

4. **Earthbonding 10 Ampere Range**

This range will give an accurate reading of earthbonding up to 0.35 Ohms, readings above this are increasingly inaccurate and should be measured on the 1 amp range.

The procedure is identical to that outlined above for the 1 amp range, except that the range select switch should be set to 10 amps.

6. **Specification**

Input supply = 240v 50Hz nominal

Outputs = 240v 50Hz at mains socket
 12v max dc (nominal) at open circuit
 earthbonding test probes
 [$<2v$ dc typical across earthbonding probes during testing]

Fuses = mains plug 13 amp
 F1 630 mA (T)

Ranges:- Earthbonding 1 Amp 0.00 to 7.00 \pm 3% \pm 1 digit
 Ohms

Earthbonding 10 Amp .000 to .350 \pm 3% \pm 1 digit
 Ohms

Earth Leakage 0.00 to 7.50 \pm 3% \pm 1 digit mA

The reference instrument used for calibration:-

Tinsley Prism 6401 LCR Databridge

Serial number: 269103

Calibration date: 15th October 1998

Certificate of calibration: RS Components Ltd

Certificate Number 115129

7. **Test Results** Machine Number 00010

Resistor Value	1 Amp Range Reading	10 Amp Range Reading
0.099 \pm 1% Ohms	0.10 Ohms	.100 Ohms
0.120 \pm 1% Ohms	0.12 Ohms	.120 Ohms
0.155 \pm 1% Ohms	0.16 Ohms	.152 Ohms
0.200 \pm 1% Ohms	0.20 Ohms	.200 Ohms
1.004 \pm 1% Ohms	1.00 Ohms	-- Ohms
0.2 Ohm test resistor	0.20 Ohms	.201 Ohms

0.2 Ohm Test point tolerance

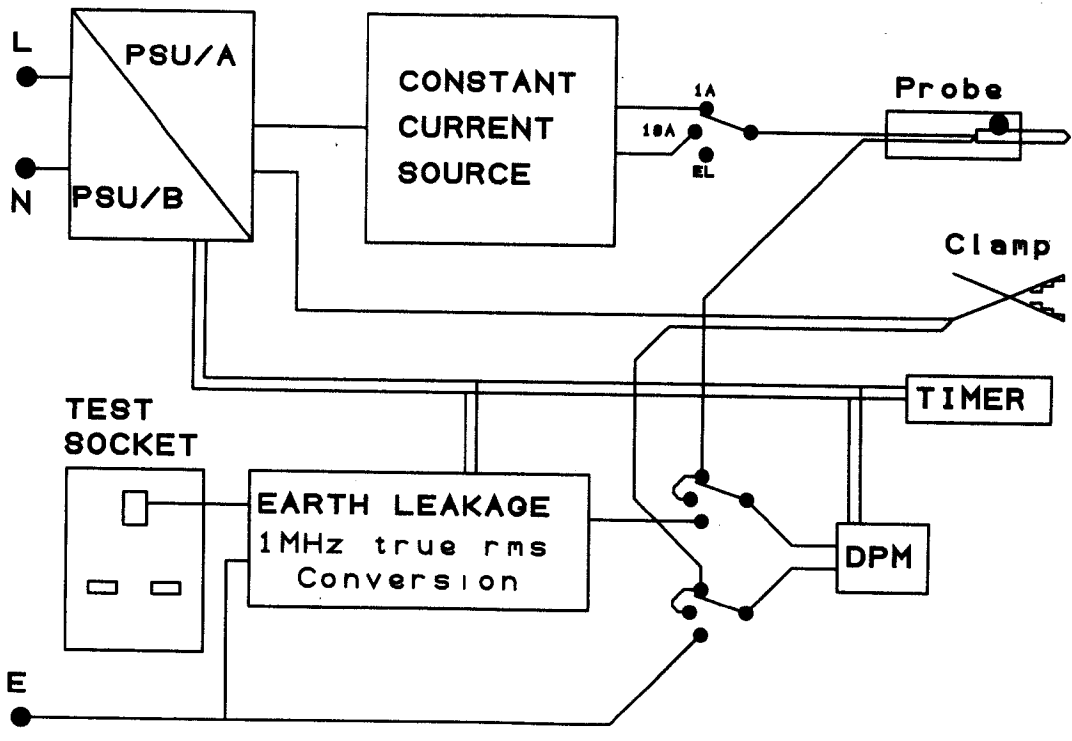
When using the 0.2 Ohm test point at the front of the tester the values obtained should be:-

1 Amp range 0.19 - 0.21

10 Amp range .193 - .207

If a value outside this range is obtained check that the probe tip is clean and inserted firmly in the test socket, if the fault persists the unit will need recalibration and should be returned for service.

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 12-2-02



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