



**OPERATOR MANUAL**

**B433R**  
**Earth Bond Tester**



**CLARE**  
INSTRUMENTS LTD.



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*Section 1 - Notices*

## Limited Warranty & Limitation of Liability

CLARE Instruments Limited guarantees this product for a period of 1 year. The period of warranty will come into effect on the day of delivery.

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## E&OE

The information contained within this manual is given in good faith and is provided for guidance only. Although all reasonable care has been taken to ensure accuracy of the information, CLARE Instruments Limited, their agents and distributors, accept no responsibility for any errors or omissions within this document, nor for any misinterpretations by the user. For clarification on any part of this document please contact CLARE Instruments Limited, or your local agent, before operating the instrument.

Due to a policy of continuous development CLARE Instruments Limited reserve the right to alter or amend equipment specifications and descriptions outlined in this publication without prior notice. No part of this publication shall be deemed to form, or be part of, any contract for the equipment unless specifically referred to as an inclusion within such contract.

## Declaration of Conformity

### ***Declaration of Conformity***

For the  
Clare B433R – Earth Bond Tester

#### **Manufactured by:**

Clare Instruments Ltd. Dominion Way, Worthing, West Sussex. BN14 8NW

#### **Millennium Statement**

This product is Millennium compliant and conforms fully to the BSI DISC PD2000-1 document.

#### **Statement of Conformity**

Based on test results using appropriate standards, the product is in conformity with Electromagnetic Compatibility Directive 89/336/EEC and Low Voltage Directive 73/23/EEC.

#### **Standards Used:**

EN 61010-1 (1993) Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

EN 50081-1 (1992) Electromagnetic Compatibility. Generic Emission Standard: EN55022 Class B.

EN 50082-1 (1992) Electromagnetic Compatibility. Generic Immunity Standard: IEC1000-4-2, -4-3, -4-4, -4-5.

The tests have been performed in a typical configuration.

Conformity is indicated by the symbol -  , for 'Conformité Européenne'

## *Section 2 - General Guidance Notes*

## SAFETY

The design of the B433R meets the European Commission Directive No. 73/23/EEC, relating to the “Low Voltage Directive”. This is in accordance with BS EN 61010-1: 1993 – Safety requirements for electrical equipment for measurement control, and laboratory use. This unit is also compliant with EN 50191.

The design of the equipment is safe when used under the following conditions:

Indoor use;

Altitude up to 2000 m;

Temperature 5°C to 40°C;

Maximum relative humidity 80% for temperatures up to 31°C to 50% at 40°C;

Mains supply voltage fluctuations of  $\pm 10\%$  of the nominal voltage.

The user **MUST** follow the remainder of this section on safety, installation, guidance and maintenance to guarantee safe operation and to maintain the equipment in a safe condition.

**WARNING!** Any interruption of the protective earth conductor (mains input earth) inside or outside the equipment is likely to make the equipment dangerous. The user must not intentionally interrupt the protective earth conductor.

When connected to the mains supply, internal terminals of the equipment may be live and the opening of covers or removal of parts is likely to expose live parts. The user must disconnect the equipment from **ALL** voltage sources before any adjustment, replacement, maintenance or repair.

Use only fuses with the required rated current and of the specified type for replacement. Mains Quick Blow Type F for plug top and ‘Safebloc’ output connectors. The user must not use makeshift fuses or short-circuit fuse holders.

The user should carry out manual handling of test equipment in accordance with regulatory guidance notes. That is those supplied by the Health & Safety Executive or Croner’s and the Health & Safety at Work Act.

## INSTALLATION AND USE OF TEST EQUIPMENT

Electrical safety tests (particularly Flash Tests) are required to comply with Legislative Documents on electrical and electronic product testing which may encroach the EMC (Electromagnetic Compatibility) requirements. This standard came into effect on 1<sup>st</sup> January 1996.

The design of the test equipment will minimise the effects of electromagnetic disturbances, but some interference may result from particular applications dependent on the type of product being tested.

Therefore, the user is responsible for installing and using the test equipment according to the manufacturers’ instructions. The user of the test equipment is responsible for detecting electromagnetic disturbances and must resolve the situation with the technical assistance of the manufacturer. In some cases it may involve constructing an electromagnetic screen (Faraday cage) enclosing the test equipment and test pieces complete with associated input filters. The user should achieve a reduction in electromagnetic disturbances to a point where they are no longer troublesome.

## ASSESSMENT OF TEST AREA

Before installing the test equipment the user shall make an assessment of potential electromagnetic disturbance problems in the surrounding area and take the following points into account -

- Supply cables (other than those supplying the test equipment), control cables, signalling and telephone cables. These can be above, below or adjacent to the test equipment.
- Radio and television transmitters and receivers within a distance of 30 metres;
- Computer and other control equipment within a distance of 10 metres;
- Safety critical equipment (i.e. the guarding of industrial machinery);
- The health of people in the surrounding area. Of approximately 2-3 metres (that is the use hearing aids, pacemakers, etc.);
- Delicate electronic equipment used for calibration or measurement.

The size of the surrounding area to be considered will depend on the overall structure of the building and other activities taking place. It is important to note that the surrounding area may well extend beyond the boundaries of the premises.

Position the equipment with adequate ventilation and easy access to all side of the equipment for maintenance purposes. Generally this means not enclosing the equipment (unless specifically designed so) or burying it under other test equipment.

## SAFE APPLICATION OF TEST EQUIPMENT

Any person operating electrical test equipment should be 18 years or over and should have had adequate training in the use of the particular piece of equipment. The degree of training should be appropriate for the competence and experience of the operator.

Position the test equipment in a clearly defined test area with access limited to the operator only. Construct all test benches of insulated material, preferably wood. Use steel benches covered in insulating material under certain circumstances only.

The item under test must be on an insulated surface (where possible, as with large or unwieldy items this may not be possible).

**DO NOT** touch or come into contact with the instrument case or any other Earthed metalwork (for example conduit or metal trunking, etc.) whilst applying the safety tests. The operator should also be on an insulated surface such as British Standard approved rubber matting or nail free duckboard.

### **THE ITEM UNDER TEST MUST NOT BE TOUCHED WHILST THE FLASH TESTS ARE APPLIED**

A supervisor should carry out the "Setting-up Procedure" before each shift to safeguard correct operation following the instructions supplied.

## MAINTENANCE

Clare Instruments Ltd. supplies a guarantee against defective material and faulty manufacture for a twelve month period from the date of delivery.

Prior to despatch the equipment undergoes careful inspection and comprehensive testing. Report any defect discovered with the equipment in respect of materials or workmanship within the guarantee period. We undertake to put right the defect at our expense subject to our standard conditions of sale.

Our responsibility is in all cases limited to the cost of making good the defect in the equipment. This does not apply to defects caused by abnormal conditions of working, accident, misuse, neglect or wear and tear.

In the event of difficulty or apparent malfunction, it is advisable to contact Clare Instruments Ltd. On –

Telephone 01903 233314 or Fax 01903 216089.

E-mail: [info@clareinstruments.com](mailto:info@clareinstruments.com) Website: [www.clareinstruments.com](http://www.clareinstruments.com)

We recommend that the complete instrument be returned to us for repair or re-calibration:

The Service Department  
Clare Instruments Ltd  
Dominion Way  
WORTHING  
West Sussex  
BN14 8NW

Please take adequate care with packing and arrange insurance cover against transit damage or loss when returning the instrument – if possible use the original packing box and supports.

Regularly calibrate all test equipment to meet internal quality or regulatory licensing authority requirements and to keep the equipment in a safe working condition. Return the equipment to Clare Instruments for this purpose.

Keep the equipment in a clean condition. Examine all input and test output leads and connectors regularly to guarantee they are in a safe working condition.

The equipment contains parts that are specific to the equipment only, therefore, order spare parts from the above address. Clare Instruments Ltd strictly forbid any use of spare parts, other than those acquired from the original manufacturer.

## SUMMARY OF SAFETY INFORMATION

Should there be any doubt about location, setting up procedure or operation of the test equipment, contact Clare Instruments Ltd. Report any apparent malfunctions immediately.

Maintain the test equipment in accordance with Health and Safety at Work Act and the Electricity at Work Regulations. The supply socket used for connection to the incoming mains system should undergo earth loop impedance measurements in keeping with the regulations to guarantee safe operation.

### **NOTE**

Your Health and Safety Inspector may, with the benefit of on-site observations, offer alternate or additional instructions to the above recommendations.

*Section 3 - Introducing the B433R*

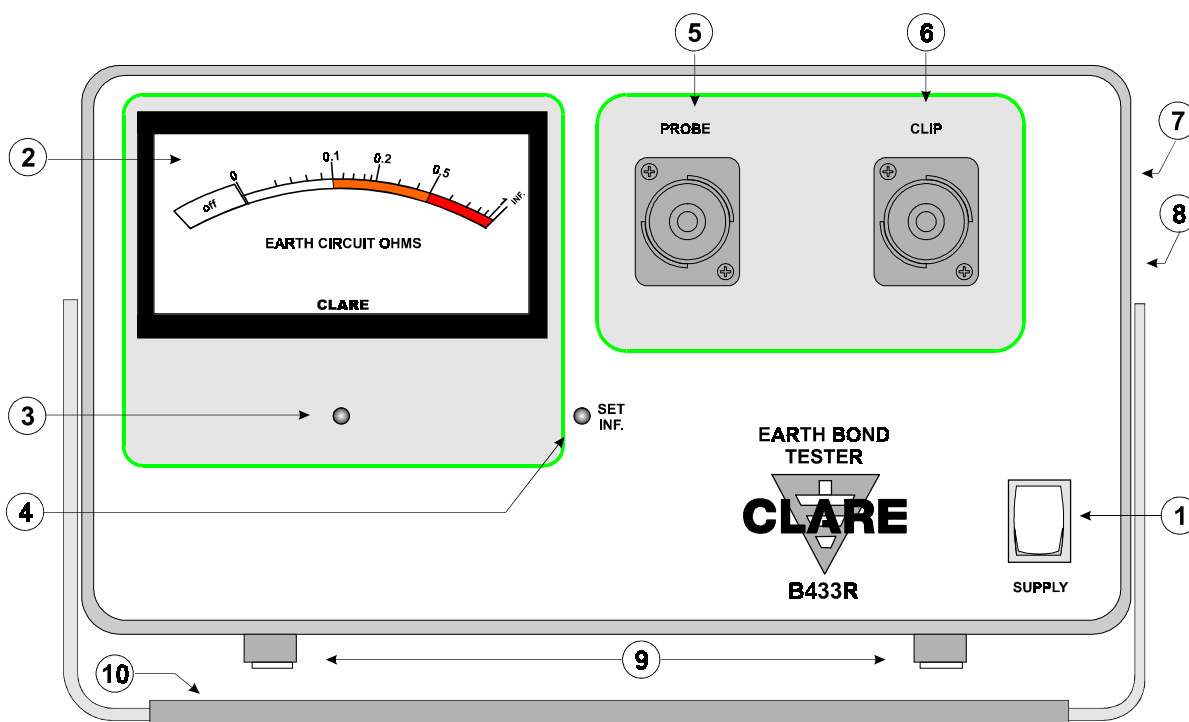


FIG.1 Facia Controls & Indicators

## Controls & Indicators

1. **Supply Switch** – ON / OFF rocker switch, illuminated in the ON position.
2. **Earth Circuit meter** – displays the ohmic value of the measured Earth path.
3. **Set Zero control** – (unmarked hole below meter) used to set mechanical zero of the meter during factory build & calibration procedures. User adjustment not normally required.
4. **Set Inf. control** – screw-driver adjuster used for setting the full scale (INF) reading of the meter to compensate for mains fluctuations, or differences, from location to location. Refer to Set-Up procedures.
5. **Probe Socket** – for connection of the special ‘no-burn’ test probe (see accessory illustrations overleaf).
6. **Clip Socket** – for connection of the ‘earth return’ clip lead.
7. **Cable Compartment** – (situated on rear of instrument) for storage of test and supply leads when not in use or during transit.
8. **Supply Inlet Socket** – (on rear panel, within cable compartment) for connection of the mains supply lead.
9. **Tilt Feet** – the instrument case can be tilted, to improve the viewing angle, by setting the front feet to their forward, upright, position.
10. **Grab Handle** – used for carrying the instrument. Can be swung to top or bottom when not in use.

## Accessories

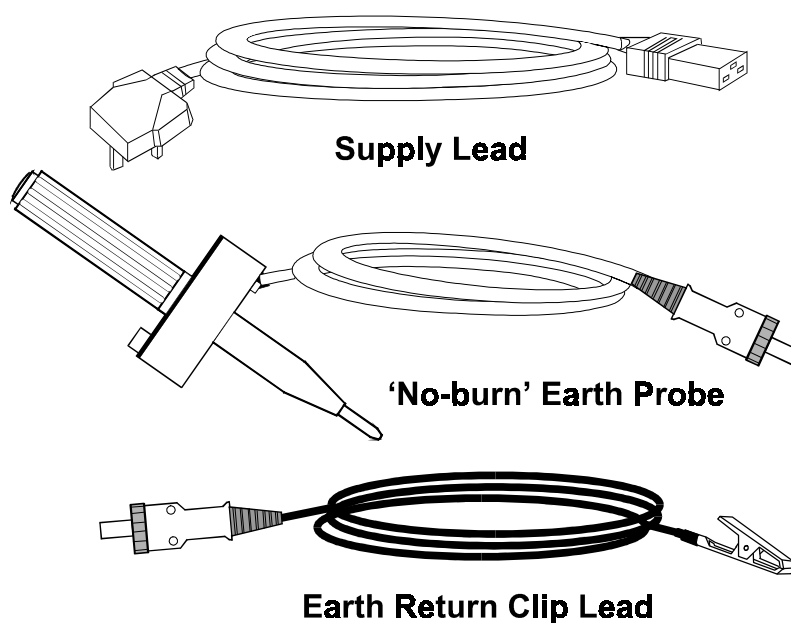


FIG.2 Accessories

## Descriptions

1. **Supply lead** - 230V, UK style, square pin plug to IEC connector.

The plug top fuse is rated at 3A, only similarly rated fuses should be used for replacement purposes.

2. **'No-Burn' Earth Probe** – a high current probe used for applying the Earth test to relevant points on the product under test.

Firm pressure of the probe tip, against the point to be tested, is required to initiate the test - this helps promote good contact and prevent damaging arcing of the test current, which may otherwise occur.

The integral green lamp, within the body of the probe, will light to show a satisfactory earth path resistance of less than 0.1 ohms.

3. **Earth Return Clip Lead** – for completing the measurement circuit.

The clip is to be connected to the main earth terminal of the product under test – where the product's supply lead is to be included in the measurement, this would be the far end of the protective (Earth) conductor or even the Earth pin of the plugtop if fitted.

## *Section 4 - Operating Procedures*

## **! WARNING !**

**THIS INSTRUMENT GENERATES A HIGH TEST CURRENT TO CHECK THE INTEGRITY OF THE MEASURED TEST PATH.**

**THIS WILL CAUSE HEATING WITHIN THE WIRING OF BOTH THIS TEST INSTRUMENT AND THE PRODUCT UNDER TEST.**

**TO AVOID DAMAGE CAUSED BY EXCESSIVE HEAT BUILD UP,  
DO NOT APPLY ANY TEST FOR LONGER THAN 5 SECONDS  
AND DO NOT APPLY MORE THAN 2 SUCH TESTS IN ANY 1 MINUTE PERIOD.**

### Instrument Set-Up

1. Ensure that the text prior to this point, especially with regard to safety and test duration, is fully understood before proceeding.
2. Sight the instrument in accordance with the General Guidelines to promote ease of use and operator safety.
3. Remove the Supply and Test leads from the cable compartment and connect into their respective panel connectors.
4. Plug the supply lead into an Earthed 230V / 50Hz socket outlet and switch ON the supply.
5. Operate the instrument's SUPPLY switch, the integral red lamp should light.
6. **Infinity adjustment** – this may require the use of a small, flat bladed, screwdriver.

With nothing connected to the Test Output leads, apply the tip of the Earth Probe to an insulated service and use a firm steady pressure to activate the test. Observe the meter pointer, which should go up-scale and sit on the INF. mark. If it does, no adjustment is necessary. Release the probe within 5 seconds.

If the pointer goes above or below on the INF. mark, repeat the procedure and use a small screwdriver to adjust the SET INF. control, on the panel, until the pointer does line up with the INF. mark. Release the probe.

#### **NOTE**

There should be no need to adjust the SET ZERO control, this is factory set and should not be tampered with since this may cause calibration errors.

The instrument is now ready for product testing.

## Test Procedure

7. Before applying an Earth Bond test, first visually inspect the product, as far as possible, to ensure that all earthed parts, including associated wiring, are mechanically sound and free from obvious defects or damage.
8. Connect the Earth Return clip lead to the main Earthing terminal of the product.
9. Firmly apply the Earth Probe to exposed, unpainted metalwork on the product for 2-3 seconds and check that the green PASS lamp on the probe lights – this will indicate that the resistance of the Earth path is generally satisfactory. Observe the meter indication, the pointer should be below 0.1 ohms and within the uncoloured zone of the scale. Release the probe, to end the test, within 5 seconds.
10. If the green PASS lamp fails to light within the 2-3 seconds, repeat the test and check the meter reading – if it is within the amber zone (up to 0.5 ohms) this may be satisfactory - depending on type of item under test and any applicable standards.

Readings in the red zone, (above 0.5 ohms) should generally be considered as unsatisfactory and may indicate loose or broken Earth wires, loose or corroded joints or even missing Earth wires.

11. Repeat the test at each designated test point on the product.

END



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