



Instruction Manual

Earth Bonding Resistance Meter

Ohm-Ex 413 A



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1. Safety information

This instruction manual contains information and warnings that must be observed for safe operation under the conditions described.

2. Faults and damage

If there are any grounds for believing the unit is no longer safe to use, it must be taken out of service and measures taken to prevent its further unintentional use. The safety of the unit may be impaired if, for example:

- external damage to the housing is visible
- the unit has not been stored correctly
- the unit has suffered transport damage

3. Safety regulations

When using the Ohm-Ex 413A, the appropriate safety regulations must be observed to avoid incorrect operation of the unit. The batteries or accumulators must only be changed outside the hazardous area.

4. Introduction

The Ohm-Ex 413A is a convenient metering device with a digital display for the quick checking of connections in electrical systems. It can be connected to the terminations in the hazardous area so that the low-resistance

connections of individual junctions of, for example, the equipotential bonding conductor can be checked quickly and easily. Other applications include the checking of protective and earthing conductors, including their connections and terminals, and the measuring of low-resistance connections, such as in tank filling equipment. The Ohm-Ex 413 A enables the effectiveness of PME and RCD protective systems to be demonstrated. To this end, the supplied box clamps are attached securely to the terminal bars. The notches in the clamping jaws ensure a good contact. Additional compensation of the contact resistance is possible with the potentiometer on the front panel. A potentiometer located on the front panel allows additional trimming of the contact resistance. The current flow can be reversed using the polarity reversal circuit, which means that electrolytic processes in the measuring circuits can be detected.

5. Use in hazardous areas

The intrinsically-safe earth bonding resistance meter is suitable for testing low-resistance connections in hazardous areas. The maximum values given on the unit must be observed. The batteries or accumulators must only be changed outside the hazardous area. Only the following elements may be used:

Primary cells to IEC LR6 or IEC6

or accumulators: Ansmann type R6 or R6S

SAFT type R6 or SR6

VARTA type 601RS or 751RS

Panasonic type P60AA or P750AA

The use of elements other than these is strictly forbidden!

6. Ex data

Certification: EEx ia IIC T6
EEx ib IIC T6

Certificate of Conformance: PTB No. Ex-95.D.2052

Maximum values: $U_{max} = 6V$
 $I_K = 473mA$

	EEx ia IIC	EEx ib IIC
C_a	2.3 μF	120 μF
L_a	0.2 mH	0.2 mH

7. Technical Data

Measuring range: 0 to 8 Ohm
 Resolution: 0.01 Ohm
 Measuring current: 200mA
 Contact resistance: can be trimmed
 Measuring range violation: indicated
 Discharge display: Lobat
 battery life: 3h
 (fully charged batteries) (continues measurement)
 Change of battery: outside hazardous area.
 Operating temperature: - 10 °C to + 50 °C
 Storage temperature: - 20 °C to + 60 °C
 Dimensions: 185 x 105 x 45mm
 Weight: approx. 800g

8. Layout of unit

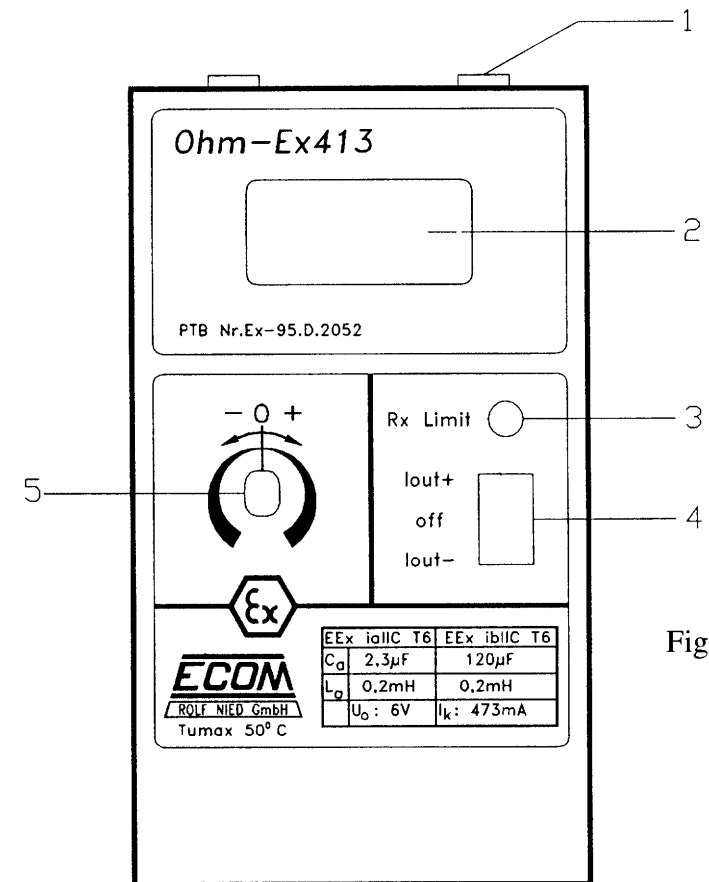


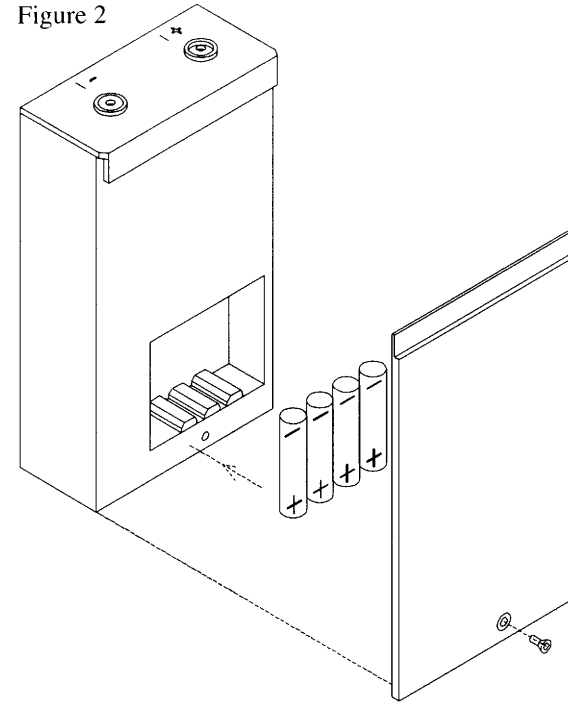
Figure 1

- 1 Connection sockets for box clamp probes
- 2 Display
- 3 Indication for >8 Ohm
- 4 Polarity reversing switch
- 5 Compensation potentiometer

9. Changing the accumulators or batteries

LOBAT appears on the display when the batteries are nearly empty. The accumulators or batteries should then be changed to ensure reliable operation. The batteries/accumulators should only be changed outside the hazardous area. When replacing them, note that only the specified replacements may be used. The use of other accumulators or batteries is strictly prohibited! To change the batteries, remove the metal plate at the base of the housing (see Figure 2) by loosening the socket head screws with an Allen key. Then push the base plate away sideways and remove both covers. The battery compartments can then be accessed. The discharged power supply elements can then be removed and replaced by charged ones. Ensure the polarity is correct, otherwise the unit will not operate. The base plate must be free of foreign bodies such as sand and dust. The battery compartment is closed in the reverse order.

Figure 2



10. Testing the unit before measuring

Connect both box clamp plugs to the instrument. After switching the polarity reversing switch to $I_{out} -$, the “Rx Limit” LED lights up, providing the two probes are not touching. If the probes are touching, the LED should not light up and the value in the display will be in the region of 0 Ohm. The zero value can be adjusted with the “- 0 +” trimming potentiometer.

It is important to connect the clamps together on the lever that is connected to the cable (see Fig 3). If LOBAT appears in the display, the batteries or accumulators must be changed.

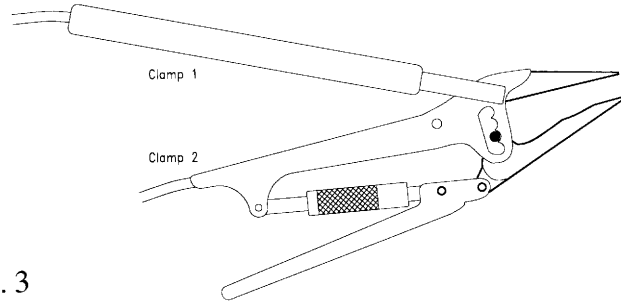


Fig. 3

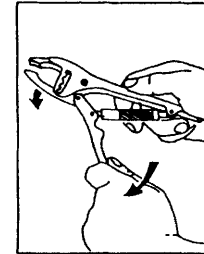
11. Technical safety notes

Please read the instructions before use.

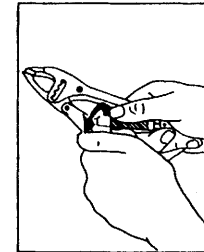
- Note that the maximum values for the hazardous area must not be exceeded.
- Only use the unit at ambient temperatures of up to 50°C and at less than 70% relative humidity.
- Set the polarity reversing switch to the “OFF” position after use.
- **IMPORTANT!**
Ensure that all connections to be measured are voltage-free, as only voltage-free circuits may be measured.

12. Adjusting the box clamp jaws

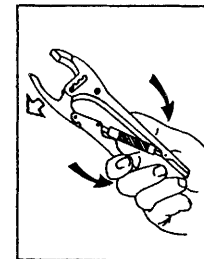
- Open the moving arm



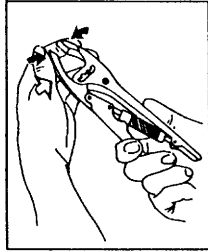
- Unscrew the knurl a few turns



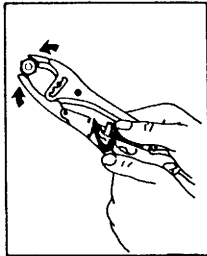
- Grip the end of the handles tightly. The lock-grip will open completely.



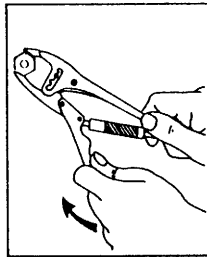
- Apply pressure to the jaws to select the required gap.



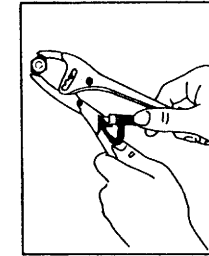
- Adjust the gap precisely by turning the knurl. The plier is now adjusted.



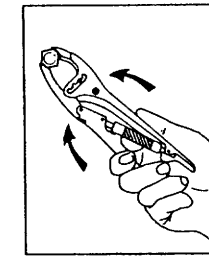
- With the lock-crip plier adjusted open the moving arm a little.



- Screw the knurl a half turn



- Grip the handles tightly. You can feel the plier lock on.



13. Operation

After adjusting the box clamps, they are attached to the objects to be measured. Ensure there is a good contact between the clamp and the object to be measured. Usually, the notches in the jaws will provide a good enough contact if the clamps are moved about a little after clamping. After setting the polarity reversing switch to the “Iout+” position, the resistance measured is shown on the display. The direction of current flow is reversed if the switch is moved to the “Iout-” position. If the same resistance value is displayed in both directions of current flow, electrolytic effects in the measuring circuit can be virtually excluded.

If the “Rx Limit” LED lights up during measurement, the resistance is more than 8 Ohms.

Note that the measurement is carried out with a test current of 200mA and the batteries or accumulators are required to supply this current. If “LOBAT” appears in the display, the measurements must be discontinued and the power supply elements changed.

14. Extension Cables

In the case is a cable with a socket and a plug. For long distances you are able to connect the extension cable. The length of this cable is 10m

15. Removal of rust and paint.

It is very important to have clean points of contact when making low resistance measurements. With the help of a saw, which is designed to fit in the jaws of the adjustable clamps, you are able to clean the measuring points. Any residual resistance is compensated for by the potentiometer

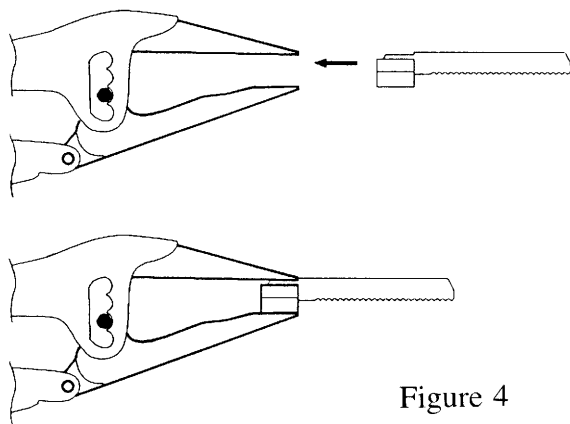


Figure 4

16. Regular checking

Test equipment should be returned regularly to the manufacturer, usually every 2 years, to check its operation and accuracy. For this purpose, the Ohm-Ex is fitted with a test label which clearly shows the test date.

17. Repair

The general terms and conditions of ELEX V apply to repair work. We recommend the repair is carried out by the manufacturer, since the protective circuits must be checked after repair for safety reasons.

18. Guarantee

The material and functionality of the Ohm-Ex 413A is guaranteed by us for a period of one year from the date of delivery. Claims can be made under guarantee by sending the defective unit to us. We reserve the right to repair, recalibrate or replace the unit.

19. Liability

ECOM accepts liability for the provisions of the guarantee. No responsibility is accepted for damage, costs or losses arising from the use or purchase of the unit. ECOM will not be responsible for any special damages that occur or for consequential damages.