

## **METREL test and measurement accessories:**



### **ρ-Adapter A1199**

### **Instruction manual**

*Version 1.1.2., Code no. 20 751 041*

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*Manufacturer:*

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Mark on your equipment certifies that this equipment meets the requirements of the EU (European Union) concerning safety and electromagnetic compatibility regulations

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# 1. Preface

Congratulations for purchasing and using METREL  $\rho$ -Adapter accessory.


The  $\rho$ -Adapter is special accessory intended for using only with METREL installation testers and designed for simple measurement with attached instrument.

In general, the  $\rho$ -Adapter is intended for measurement of specific earth resistance.

## 2. Safety and operational considerations

### 1.1 Warnings and notes

In order to reach high level of operator's safety while carrying out measurements with the  $\rho$ -Adapter A1199 as well as to keep the test accessory and equipment undamaged, it is necessary to consider the following general warnings:


- ❑  **Warning on the  $\rho$ -Adapter means »Read the Instruction manual with special care to safety operation«. The symbol requires an action!**
- ❑ **If the  $\rho$ -Adapter is used in a manner not specified in this user manual or the manual of target test equipment, the protection provided by the  $\rho$ -Adapter and equipment may be impaired!**
- ❑ **Read this user manual carefully, otherwise use of the  $\rho$ -Adapter may be dangerous for the operator, for test equipment or for the tested object!**
- ❑ **Do not use the  $\rho$ -Adapter if any damage is noticed!**
- ❑ **Never use the  $\rho$ -Adapter in energized installation!**
- ❑ **Only a competent authorized person should carry out service intervention!**
- ❑ **The  $\rho$ -Adapter contains alkaline or NiMH rechargeable battery. It should only be replaced with the same type as defined on the battery placement label or in this manual.**
- ❑ **All normal safety precautions have to be taken in order to avoid risk of electric shock when working on electrical installations!**

### 1.2 Battery

The  $\rho$ -Adapter uses 4 pieces of size AA 1.5 V alkaline or 1.2 V NiMH battery cells. Battery condition is always present by its LED on front side of the adapter when it is turned on.

Blinking LED means weak battery.

#### Notes:

- ❑  **Disconnect the  $\rho$ -Adapter from tested object and from the instrument, and turn its power OFF before opening battery cover.**
- ❑ **All four cells should be replaced each time all of the same type and capacity!**
- ❑ **If  $\rho$ -Adapter is not used for longer period, remove its battery.**
- ❑ **Insert battery cells correctly, otherwise the  $\rho$ -Adapter will not operate and the battery could be discharged.**
- ❑ **Take into account handling, maintenance and recycling requirements that are defined by related regulations and manufacturer of alkaline or rechargeable batteries!**
- ❑ **Turn the  $\rho$ -Adapter power off after finished measurement to save the battery.**

### 1.3 Standards applied

The  $\rho$ -Adapter is manufactured and tested according to the following regulations, listed below.

#### *Safety (LVD)*

EN 61010 - 1	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
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#### *Electromagnetic compatibility (EMC)*

EN 61326	Electrical equipment for measurement, control and laboratory use – EMC requirements Class B (Hand held equipment used in controlled EM environments)
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#### **Note about EN and IEC standards:**

Text of this manual contains references to European standards. All standards of EN 6xxxx (e.g. EN 61010) series are equivalent to IEC standards with the same number (e.g. IEC 61010) and differ only in amended parts required by European harmonization procedure.

### 3. $\rho$ -Adapter description

In general,  $\rho$ -Adapter consists of the following parts:

- Connector plate,
- 4-wire measuring transducer, and
- Interface cable for connection to measuring connector of test equipment.



Figure 3.1:  $\rho$ -Adapter parts

Legend:

- |   |   |
|---|---|
| 1 | Connector plate for 4-wire universal cable connection<br><b>⚠ Do not connect measuring wires to any external voltage!</b> |
| 2 | Instrument interface connector.   |
| 3 | $\rho$ -Adapter control unit enclosure.   |

#### Warnings!

- **Maximum voltage between any test terminal and ground and between test terminals should be less than 24 V!**

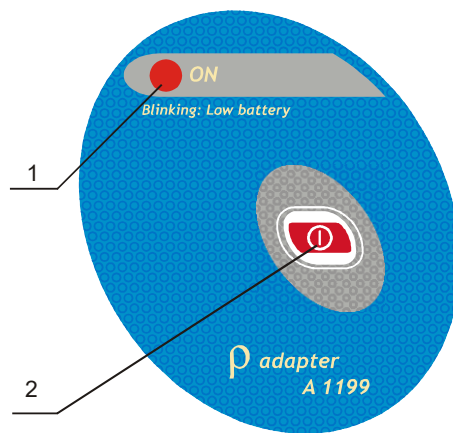


Figure 3.2: Front panel

Legend:

1	LED	Indicates active $\rho$ -Adapter. Indicates battery condition: - Continuous lighting (battery good), - Blinking (weak battery).
2	Power	Switches the $\rho$ -Adapter power on and off.

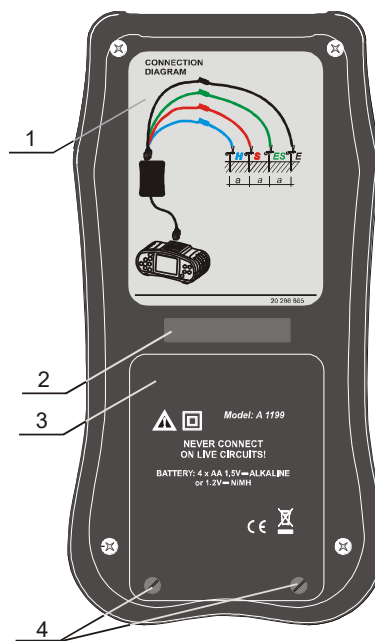


Figure 3.3:  $\rho$ -Adapter back site

Legend:

1	Back side label
2	Serial number label
3	Battery compartment cover
4	Fixing screws for battery compartment cover

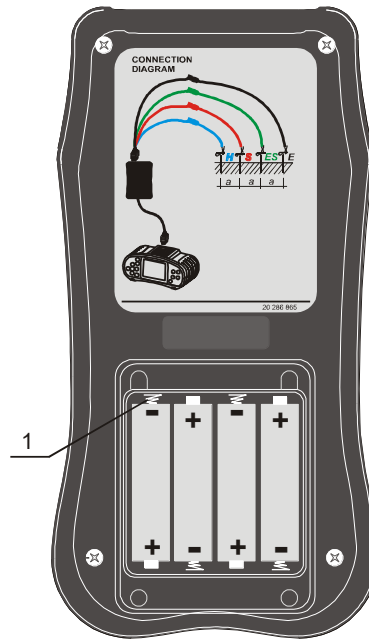


Figure 3.4: Battery compartment

Legend:

1 Battery holder For 4 pieces size AA alkaline or rechargeable NiMH battery

### 3.1. $\rho$ -Adapter set

- $\rho$ -Adapter
- Universal test cable 4-wire
- Extension cable red 15 m
- Two earthing spikes
- Small soft carrying bag

**Note:**

- Earth 3-wire 20 m set (S2026) is also required for specific earth resistance measurement. It is defined as optional accessory of the main instrument.

## 4. $\rho$ -Adapter operation

### $\rho$ -Adapter 1<sup>st</sup> use and later battery replacement

Required tool: screwdriver

- $\rho$ -Adapter must be disconnected from any device.
- Put the  $\rho$ -Adapter on desktop with backside up (*figure 3.3*).
- Remove screws (*pos. 4* on *figure 3.3*).
- Remove battery cover.
- Insert battery cells correctly in battery holder (*figure 3.4*).
- Return back the battery cover and screw it.
- Press a key on the  $\rho$ -adapter. LED (*pos. 1* on *figure 3.2*) must light.
- The  $\rho$ -Adapter is ready for application.

### $\rho$ -Adapter application

- Prepare test setup for the measurement of specific earth resistance.
- Connect test leads of the  $\rho$ -Adapter to the spikes, inserted into the ground plane.
- Connect the  $\rho$ -Adapter to the instrument and turn its power on.
- On the instrument select **EARTH** test function and  $\rho$  subfunction and enter the distance **a** between spikes.
- Start measurement(s) and store result(s) (optional) after finished measurement.
- If necessary rearrange spikes and repeat the measurements.
- After finished measurements, turn power off of the  $\rho$ -Adapter and the instrument.
- Disconnect test leads, remove inserted spikes, clean them and keep all in accessory bag.

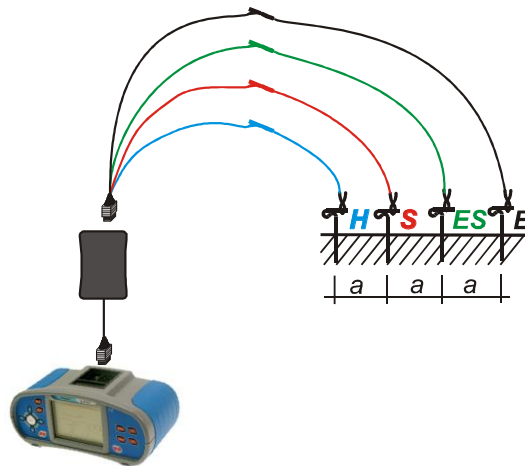


Figure 4.1: Connection circuit for measurement of specific earth resistance

Specific earth resistance is calculated according to the following formula:

$$\rho = 2\pi aR$$

with:

- $\rho$  Specific earth resistance [ $\Omega\text{m}$  ( $\Omega\text{ft}$ )].
- $a$  The distance between spikes [ $\text{m}$  ( $\text{ft}$ )].
- $R$  Measured earth resistance.

## 5. Maintenance

Unauthorized person is not allowed to open the ring adapter. There are no other user replaceable components inside it.

### 5.1. Cleaning

No special maintenance is required for the housing. To clean the surface of the  $\rho$ -Adapter use a soft cloth slightly moistened with soapy water or alcohol. Then leave it to dry totally before use.

#### Warnings:

- ❑ Do not use liquids based on petrol or hydrocarbons!
- ❑ Do not spill cleaning liquid over the instrument!

### 5.2. Service

For repairs under warranty, or at any other time, please contact your distributor.

## 6. Technical specifications

### 6.1. General data

Power supply voltage.....	6 V <sub>DC</sub> (4 x 1.5 V alkaline or 4 x 1.2 V NiMH battery cells, size AA)
Operation.....	typical 10 h
Protection classification .....	double insulation
Overvoltage category.....	50 V CAT I
Pollution degree.....	2
Protection degree .....	IP 40

Maximum voltage.....	25 V, between any two test leads
Dimensions (w × l × h) .....	100 mm × 200 mm × 50 mm
Weight .....	0.39 kg

#### Operation conditions

Working temperature range .....	0 °C ÷ 40 °C
Maximum relative humidity .....	95 %RH (0 °C ÷ 40 °C), non-condensing

#### Storage conditions

Temperature range .....	-10 °C ÷ +70 °C
Maximum relative humidity .....	90 %RH (-10 °C ÷ +40 °C) 80 %RH (40 °C ÷ 60 °C)