allsun EM480D

allsun Digital Earth Tester User Manual

Model: EM480D

1. Introduction

The allsun EM480D Digital Earth Tester is a precision instrument designed for measuring grounding resistance and AC voltage up to 200V. It is widely used in power systems, electrical devices, and lightning protection systems. This manual provides detailed instructions for the safe and effective operation, setup, and maintenance of your EM480D Earth Tester.

Figure 1: allsun EM480D Digital Earth Tester with its protective case.

2. Product Features

- **Wide Application:** Capable of measuring grounding resistance and AC voltage up to 200V, suitable for power systems, electrical devices, and lightning protection.
- **Accuracy and Reliability:** Improved circuit and structure for enhanced accuracy and convenient operation.
- **Overload Protection:** Features a complete overload protection circuit, capable of withstanding AC 380V for one minute across any two terminals.
- **User-Friendly Design:** Ergonomic design with clear and logically arranged function keys.
- **Easy Reading:** Equipped with a large, clear 3.5-inch LCD display and backlight function for visibility in various conditions.
- **Data Hold Function:** Allows holding the current reading on the display.
- **Auto Power Off:** Automatically turns off after approximately 15 minutes of inactivity to conserve battery life.

- **Low Battery Indication:** Displays a battery icon when power is low, indicating the need for battery replacement.

Figure 2: Key features of the EM480D Digital Earth Tester.

3. Parts and Components

Familiarize yourself with the components of your EM480D Digital Earth Tester:

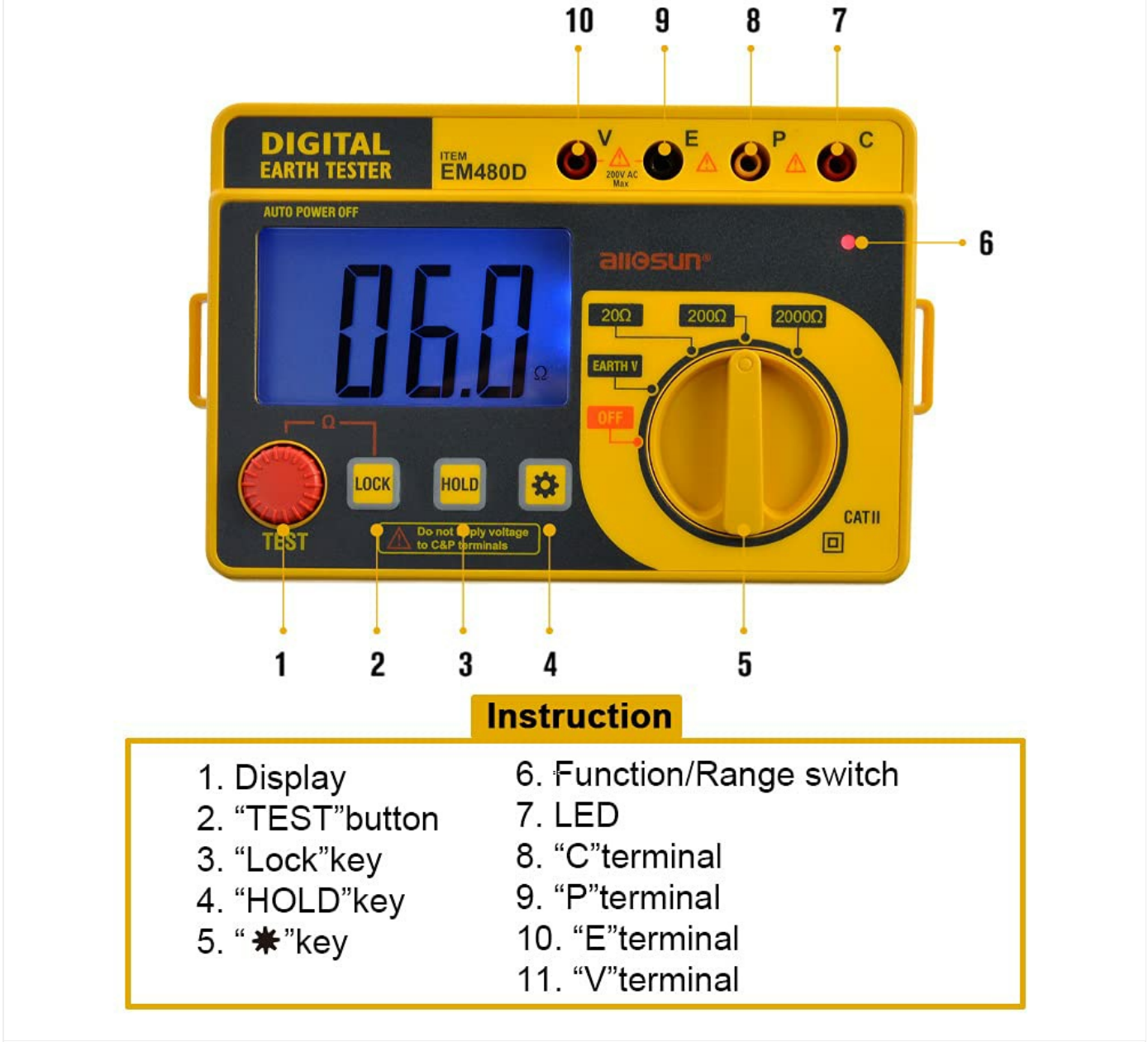

Figure 3: Front panel and terminal identification.

1. **Display:** Large LCD for showing measurement readings.
2. **"TEST" button:** Initiates the measurement process.
3. **"LOCK" key:** Used to lock the test function for continuous measurement.
4. **"HOLD" key:** Freezes the current reading on the display.
5. **"*" key:** Activates the backlight function.
6. **Function/Range switch:** Rotary switch to select measurement mode (Earth V, OFF) and resistance ranges (20Ω, 200Ω, 2000Ω).
7. **LED:** Indicator light.
8. **"C" terminal:** Current electrode terminal.
9. **"P" terminal:** Potential electrode terminal.
10. **"E" terminal:** Earth electrode terminal.
11. **"V" terminal:** Voltage measurement terminal.

3.1. Packing List

The following items are included with your allsun EM480D Digital Earth Tester:

Figure 4: Included accessories.

- allsun EM480D Earth Resistance Tester
- 1.5V AA Batteries (6 units)
- Carrying Bag
- Normal-test leads (3 pieces: 5M green, 10M yellow, 15M red)
- Auxiliary Earth Bars (2 pieces)
- Condole Belt
- Pair of Voltage Test Leads
- Simple-test leads with clip (red + green)

4. Setup

4.1. Battery Installation

The EM480D requires 6 AA 1.5V batteries for operation. To install or replace batteries:

1. Ensure the device is turned OFF.
2. Locate the battery compartment on the back of the unit.
3. Open the battery compartment cover.
4. Insert 6 AA batteries, observing the correct polarity (+/-) as indicated inside the compartment.
5. Close the battery compartment cover securely.

Figure 5: Battery compartment for 6 AA batteries.

If the display shows a battery icon or is blank after switching the tester on, replace the batteries immediately.

5. Operating Instructions

5.1. Grounding Resistance Measurement (3-Pole Method)

This method is used for precise grounding resistance measurements using auxiliary earth bars.

1. Connect the test leads to the EM480D:
    - Green normal-test lead to the "E" terminal.
    - Yellow normal-test lead to the "P" terminal.
    - Red normal-test lead to the "C" terminal.
2. Drive the auxiliary earth bars into the ground. The first auxiliary earth rod should be placed 5 to 10 meters from the earth rod under test, and the second auxiliary earth rod should be 5 to 10 meters from the first auxiliary earth rod.
3. Connect the other ends of the test leads to the earth rod under test and the auxiliary earth bars as shown in Figure 6.
4. Set the Function/Range switch to the desired resistance range (20Ω, 200Ω, or 2000Ω).
5. Press the "TEST" button to initiate the measurement. The reading will appear on the display.
6. To hold the reading, press the "HOLD" key. Press it again to release.

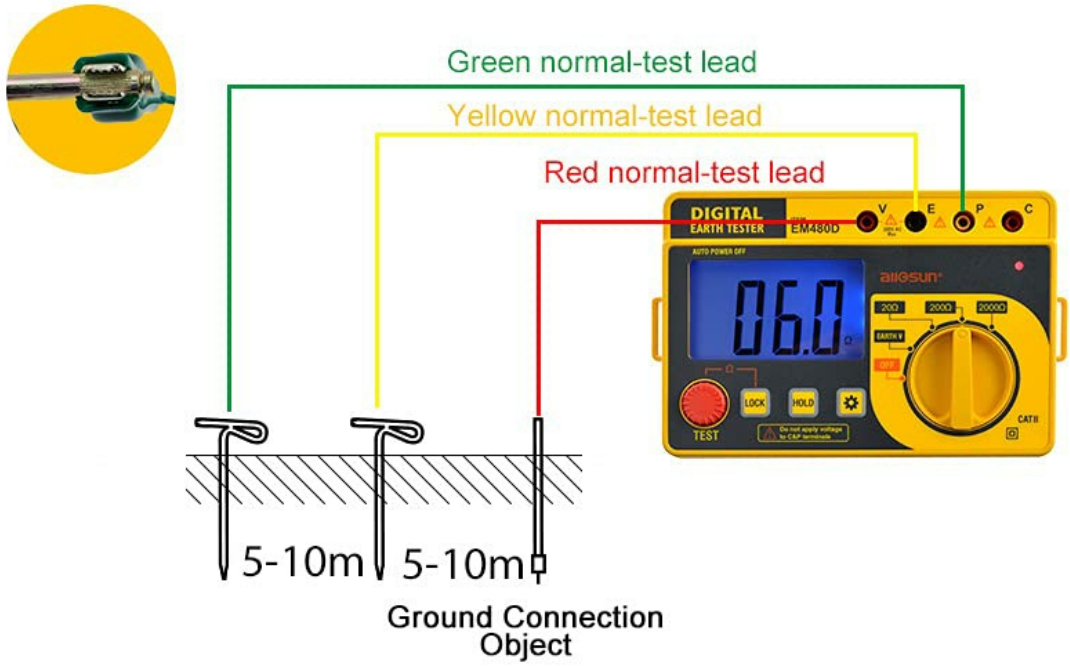

Figure 6: 3-pole grounding resistance measurement setup.

5.2. Simple Grounding Resistance Test (2-Pole Method)

This test method is used when it is not feasible to drive auxiliary earth bars into the ground. It utilizes an existing earth electrode with very low grounding resistance, such as a metallic water pipe or the common earth connection of a commercial power system, to substitute for the C1 and P1 bars.

1. Connect the green simple-test lead to the "E" terminal and the red simple-test lead to the "C" terminal.
2. Connect the green simple-test lead to the earth rod under test.
3. Connect the red simple-test lead to the existing low-resistance earth electrode (e.g., water pipe, power system ground).
4. Set the Function/Range switch to the desired resistance range.
5. Press the "TEST" button to obtain the reading.

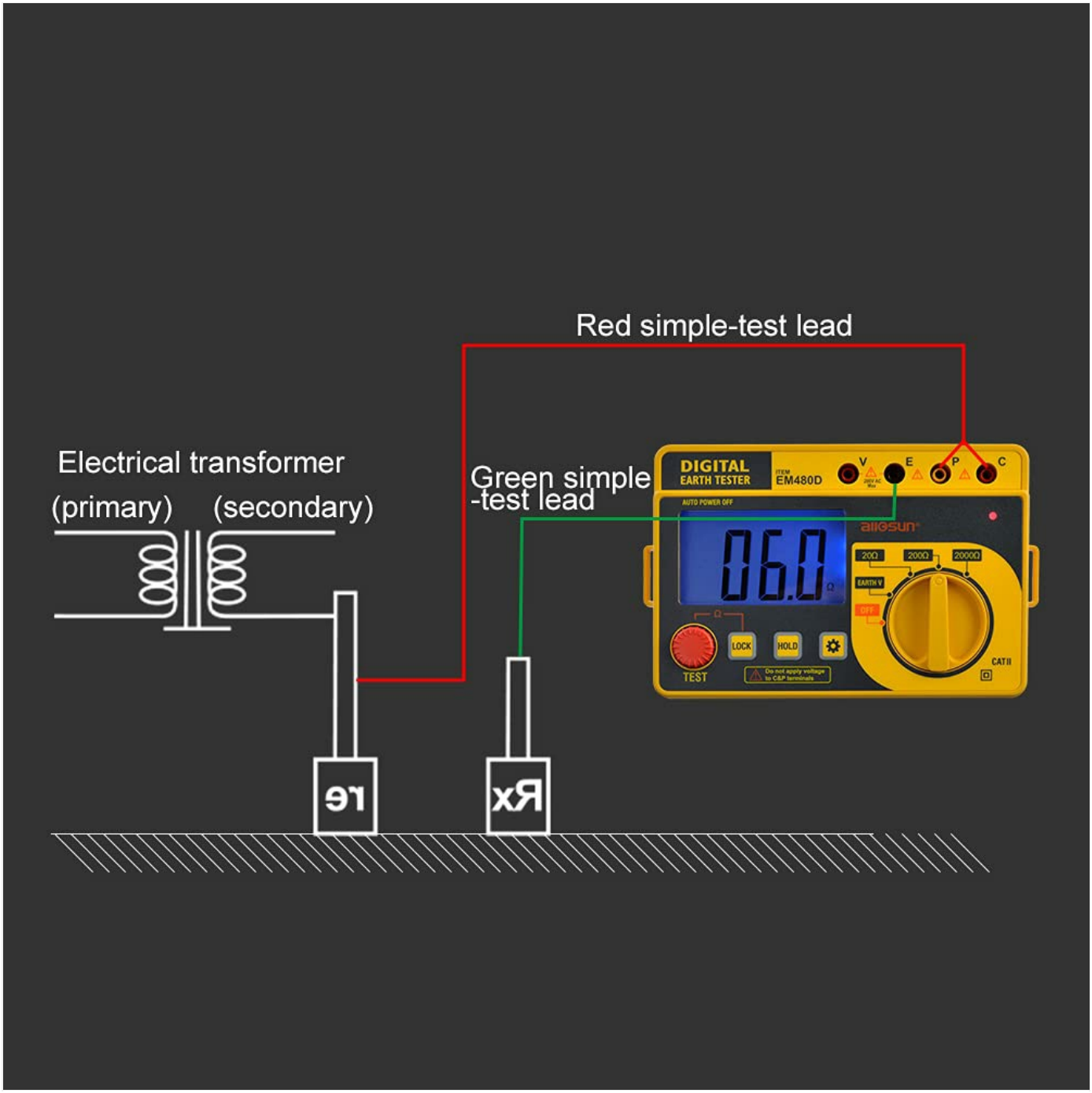

Figure 7: Simple grounding resistance measurement using an existing earth connection.

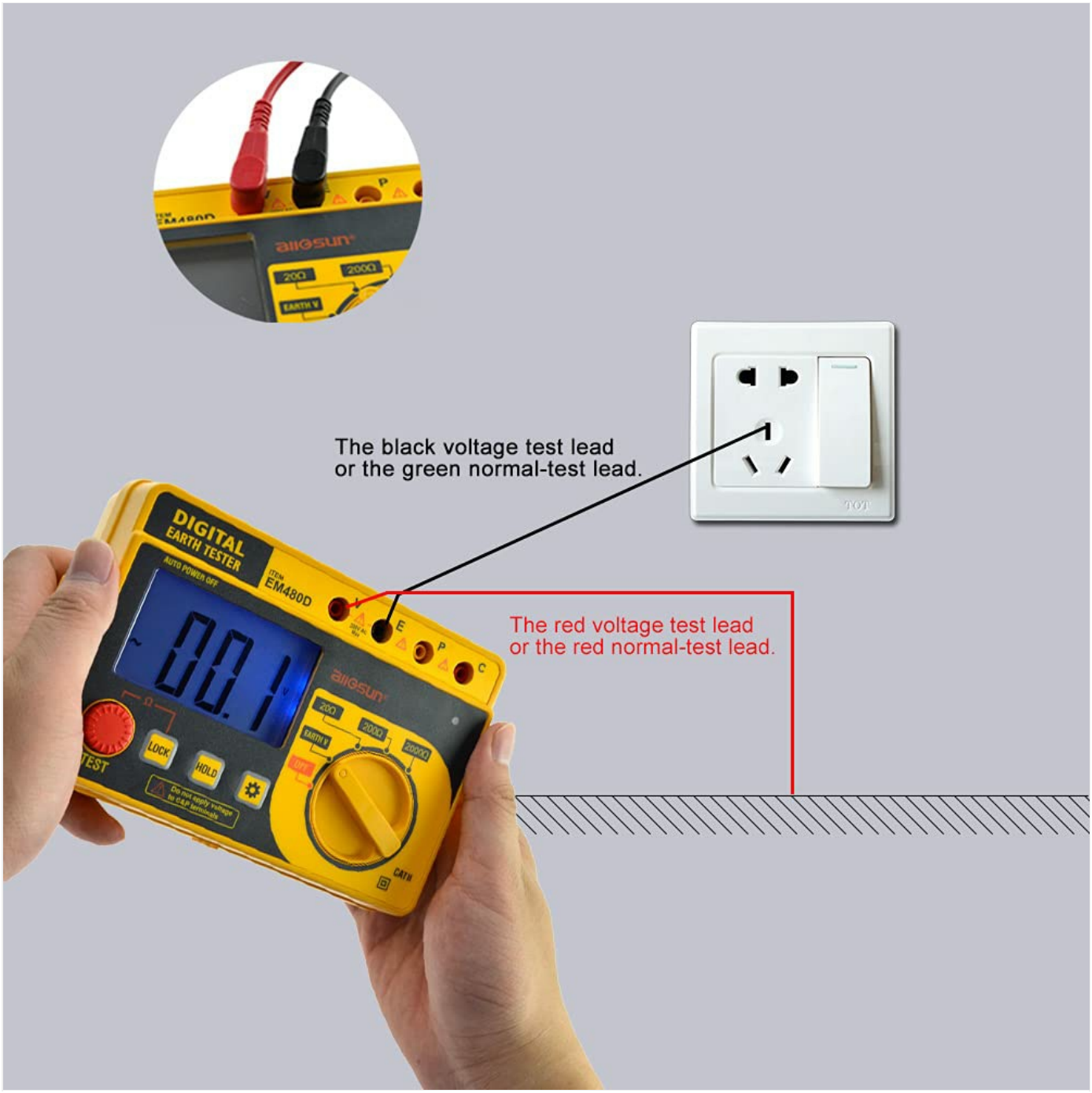

Figure 8: Example of simple test lead connection to a grounded outlet.

5.3. AC Voltage Measurement

The EM480D can measure AC voltage up to 200V.

1. Connect the voltage test leads to the "V" and "E" terminals.
2. Set the Function/Range switch to "EARTH V".
3. Connect the probes to the circuit or point where AC voltage needs to be measured.
4. The AC voltage reading will be displayed.

6. Applications

The allsun EM480D Digital Earth Tester is suitable for a wide range of applications, including:

- **Electric Industry:** Measuring ground resistance in power generation and distribution systems.
- **Telecommunications:** Ensuring proper grounding for communication infrastructure.

- **Electric Substation:** Verifying grounding integrity in substations.
- **Electrical Equipment:** Testing grounding of various electrical machinery and appliances.
- **Lightning Protection Equipment:** Assessing the effectiveness of lightning protection systems.
- **Outdoor Testing:** Its dust-proof and moisture-proof structure makes it suitable for field operations.

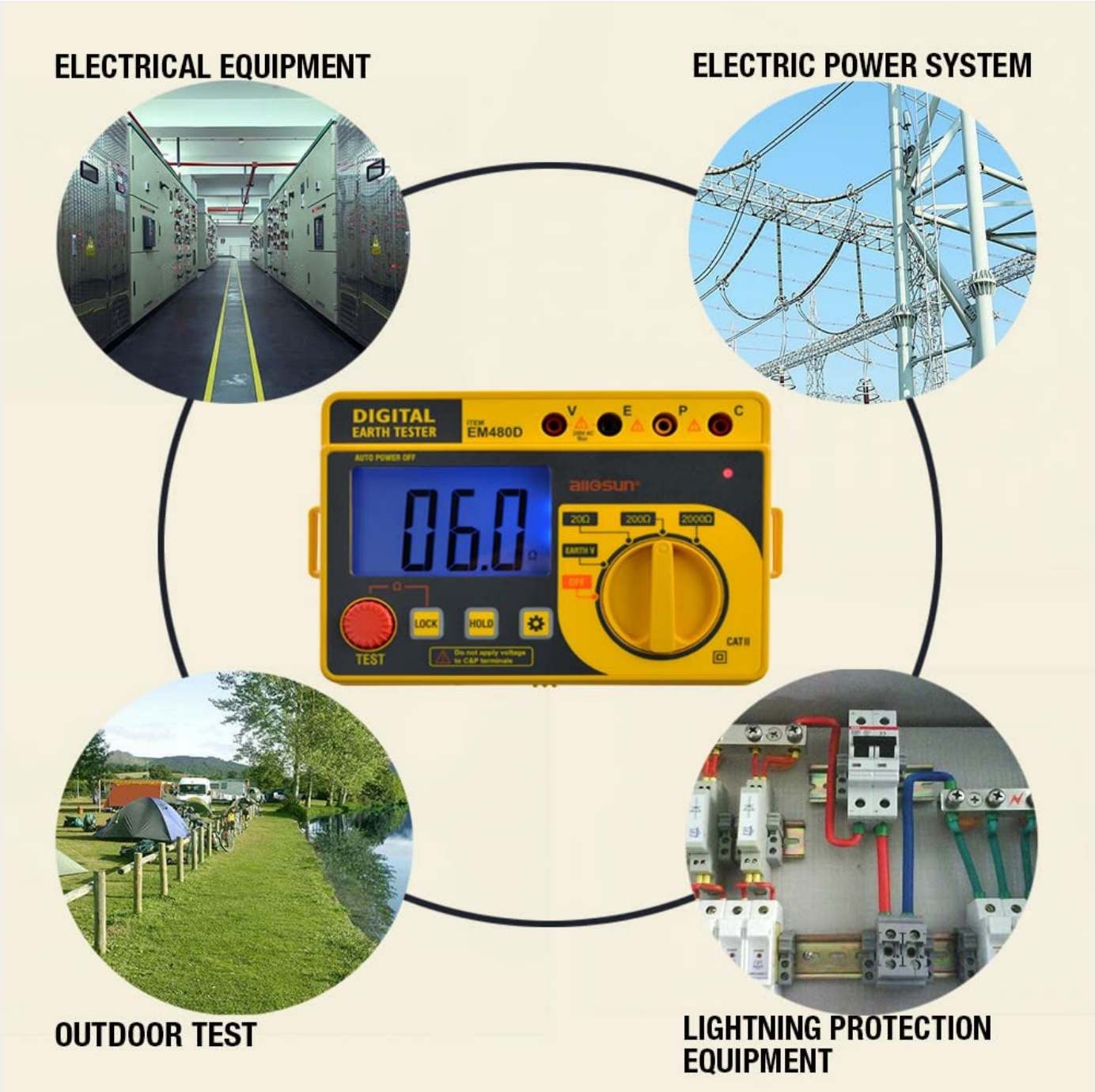

Figure 9: Diverse applications of the EM480D.

7. Maintenance

- **Cleaning:** Use a soft, dry cloth to clean the exterior of the instrument. Do not use abrasive cleaners or solvents.
- **Storage:** When not in use for extended periods, remove the batteries to prevent leakage. Store the device in its carrying bag in a cool, dry place, away from direct sunlight and extreme temperatures.
- **Battery Replacement:** Replace batteries promptly when the low battery indicator appears to ensure accurate measurements and prevent damage from battery leakage.
- **Calibration:** For continued accuracy, periodic calibration by qualified personnel is recommended.

8. Troubleshooting

Problem	Possible Cause	Solution
Display is blank or shows low battery icon.	Batteries are depleted or incorrectly installed.	Replace all 6 AA batteries, ensuring correct polarity.
Inaccurate readings.	Poor test lead connections, incorrect setup, or environmental interference.	Check all connections, ensure test leads are fully inserted. Verify the setup matches the intended measurement method. Avoid strong electromagnetic fields.
"1" displayed on screen (Overload indication).	Measurement exceeds the selected range.	Switch to a higher resistance range (e.g., from 20Ω to 200Ω or 2000Ω).
Device does not turn on.	Batteries are dead, or the unit is faulty.	Replace batteries. If the problem persists, contact customer support.

9. Specifications

Parameter	Value
Model Number	EM480D
Grounding Voltage Test Range	200V AC
Grounding Voltage Resolving	0.1V
Grounding Voltage Accuracy	± (1.5% + 3)
Resistance Range 1	20 Ω
Resistance Resolving 1	0.01 Ω
Resistance Accuracy 1	± 0.1 Ω
Resistance Range 2	200 Ω
Resistance Resolving 2	0.1 Ω
Resistance Accuracy 2	± (2% + 3)
Resistance Range 3	2000 Ω
Resistance Resolving 3	1 Ω
Resistance Accuracy 3	± (2% + 3)
Display	3 1/2 digits LCD with max. reading of 1999

Parameter	Value
Backlight Function	Yes
Operating Environment	0°C ~ 40°C, relative humidity: <75%
Storage Environment	-10°C ~ 50°C, relative humidity: <85%
Overload Indication	Only figure "1" on the display
Low Battery Display	Yes
Power Source	6 x 1.5V AA batteries
Weight	About 485 g
Size	168 × 110 × 62 mm
Sampling Rate	2.5 times / second

Accuracy is specified for a period of one year after calibration at 23±5°C with relative humidity up to 75%.

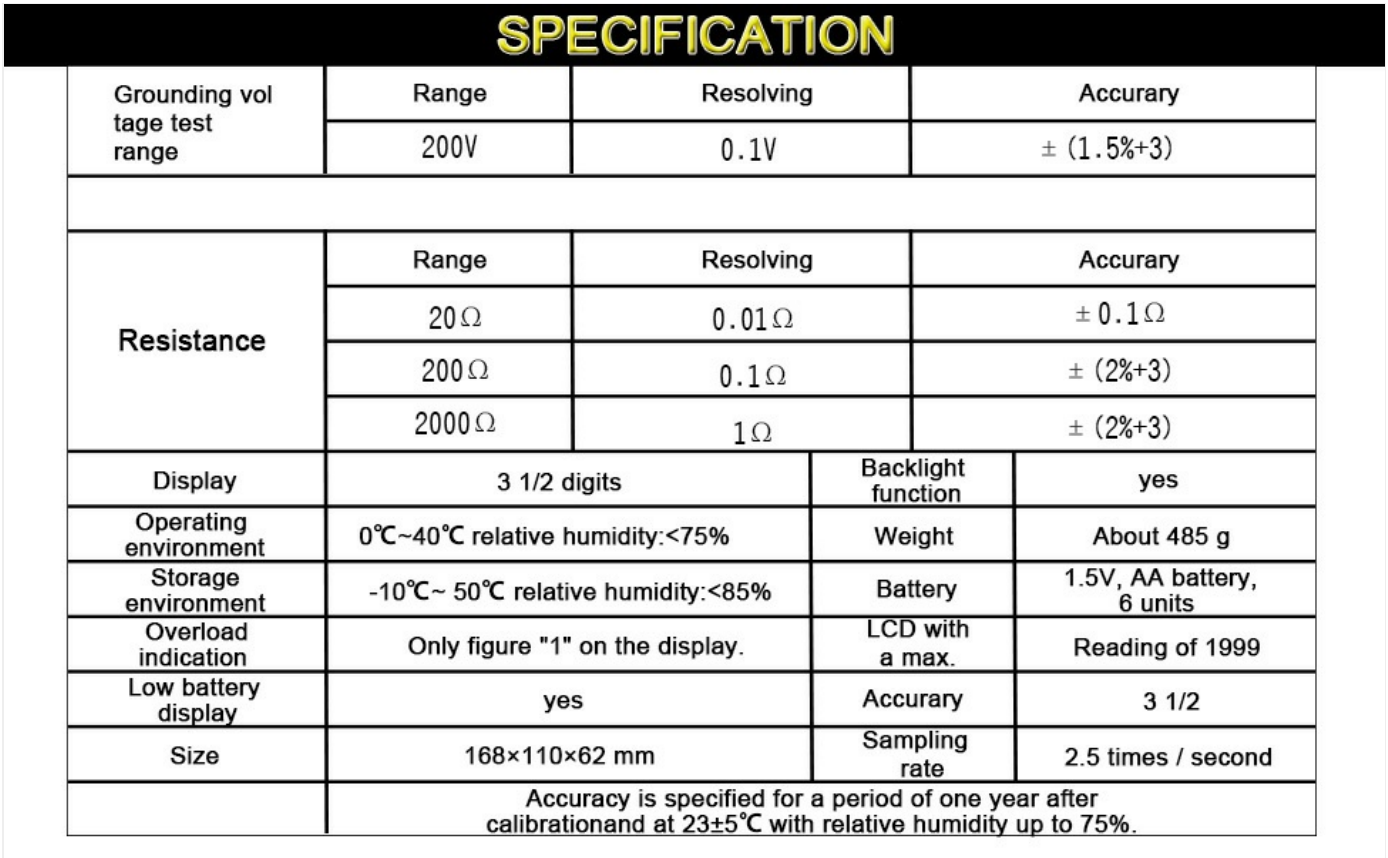

Figure 10: Detailed technical specifications.

10. Support and Contact

For technical support, warranty information, or service inquiries, please refer to the official allsun website or contact your local distributor.

You can also find additional resources and a downloadable PDF user manual at:User Manual (PDF)