

APPLICATION NOTES

EarthLite Digital Earth Resistance Tester



Introduction:

EarthLite Digital Earth Tester is a high-performance instrument designed for accurate verification and evaluation of electrical earthing installations. It enables reliable testing using Two-Pole and Three-Pole earth resistance measurement methods, ensuring precise assessment of grounding system quality in real field conditions. In addition to resistance testing, EarthLite also measures Earth Voltage, allowing users to verify site voltage conditions before conducting earthing tests, preventing hazards and ensuring safe operation. Trusted by electricians, commissioning engineers, maintenance professionals, and electrical contractors, EarthLite is a compact, rugged, and essential tool for modern electrical testing and safety assurance.

The Problem:

Proper earthing (grounding) is a critical safety requirement across residential, commercial, and industrial electrical installations. It safely conducts fault currents to the ground, protecting personnel from electric shocks and preventing catastrophic equipment damage.

However, earth resistance degrades over time due to soil drying, electrode corrosion, mechanical disturbances, and changing soil compositions. Pits that were initially compliant can develop dangerously high resistance, creating hidden hazards that violate IEC 61557 and IS 3043 standards.

Field engineers face several practical challenges during verification:

- **Complex Setups:** Inability to quickly assess resistance across multiple field test points.
- **Electrical Noise:** High electromagnetic interference in substations and industrial sites leading to unreliable readings.
- **Safety Hazards:** Lack of pre-test earth voltage verification, risking instrument damage or personal injury.
- **Data Errors:** Absence of on-site data storage, leading to manual transcription errors.
- **Harsh Environments:** Bulky, fragile instruments unsuited for rugged field conditions.

Our Solution:

The EarthLite Digital Earth Resistance Tester by Rishabh Instruments is a compact, rugged, handheld instrument engineered to solve these modern field challenges. It supports both Two-Pole (2P) for quick pit checks and Three-Pole (3P) testing using auxiliary stakes for high-accuracy assessments per IEC 61557-5.

Key Capabilities:

- **Earth Voltage Measurement (up to 450 V AC):** Verifies site voltage conditions before testing to ensure safety.
- **High Noise Rejection (up to 50 Vpp):** Delivers stable, repeatable readings in electromagnetically noisy environments.
- **Built-in Memory:** Stores up to 50 readings on-device, eliminating manual logging and supporting structured post-test reviews.
- **Wide Range (20Ω/200Ω/2000Ω):** Accommodates low-resistance power plant systems to high-resistance remote installations.
- **User-Centric Design:** Features a backlit LCD with an analog bar graph for low-light visibility, overload protection (1.2 times x measuring range), and an IP40-rated ergonomic enclosure operating from -5°C to +60°C.

The Benefits:

EarthLite delivers measurable value to every stakeholder involved in electrical safety and maintenance:

- Enhanced Safety Compliance: Ensures organizations maintain earthing systems within permissible national and international limits (IEC 61557-1/5).
- Faster Field Operations: Features intuitive controls, auto-ranging, and a HOLD function so technicians can review stable readings without maintaining continuous probe contact.
- Improved Data Integrity: Eliminates transcription errors via on-device SAVE/LOAD functionality, simplifying safety audits and commissioning reports.
- Versatility Across Applications: Adapts seamlessly to diverse infrastructures, from residential buildings to substation grounding grids.
- Reduced Total Cost of Ownership: Powered by 6 × 1.5 V AAA alkaline batteries (delivering ~1200 test operations) paired with an auto power-off function to minimize operational expenses.
- Proven Reliability: CE-certified and fully compliant with IEC 61010-1 (Safety) and IEC 61326-1 (EMC) standards.

Key Technical Specifications:

Measurement Method	2-Pole (2P) and 3-Pole (3P)
Earth Resistance Range	20 Ω / 200 Ω / 2000 Ω
Resolution	0.01 Ω (20 Ω range); 0.1 Ω (200 Ω); 1 Ω (2000 Ω)
Accuracy	<u>±</u> (1.5% of reading + 10 digits) @ 20 Ω; <u>±</u> (1.5% + 5 digits) @ 200/2000 Ω
Test Frequency	820 Hz
Interference Rejection	Up to 50 V _{pp}
Earth Voltage Range	Up to 450 V AC
Memory Storage	50 readings (volatile)
Operating Temperature	-5 °C to +60 °C
Power Supply	6 × 1.5 V AAA Alkaline Batteries (~1200 operations)
Dimensions (W × H × D)	97 mm × 205 mm × 45 mm, ~495 g
Safety Standards	IEC 61010-1, IEC 61557-1/5, IEC 61326-1, CE
Measurement Category	CAT III 600 V / CAT IV 300 V
Order Code	DET1-EL00345000000

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