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PAGE 1 — NEUTRAL EARTHING RESISTORS INFORMATION





APPLICATION SUMMARY

Neutral Earthing Resistors (NERs) are connected between the neutral point of a transformer or generator and earth in AC distribution networks. During a single-phase earth fault, the NER limits fault current to a predetermined level that reduces thermal and mechanical damage to transformers, generators, switchgear and cables, while maintaining sufficient current for protection relays to detect and clear the fault. By controlling fault current and transient overvoltage's, NERs improve personnel safety, network stability and continuity of supply. They are commonly applied in substations, power generation, mining, industrial switchboards and distribution systems, and may be supplied as standalone units, integrated with transformers or substations, or customised with suitable enclosures, current transformers, isolators, contactors and monitoring equipment to suit the system voltage, fault-current level, fault duration and installation environment.

KEY FEATURES AND BENEFITS

- **Custom-engineered ratings** — resistance, system voltage, fault current, fault duration and continuous-current requirements can be matched to the application.
- **Robust enclosure options** — configurations are available for indoor, outdoor, coastal, mining and industrial environments, with suitable ingress protection and corrosion-resistant materials.
- **Flexible integration** — available as a standalone resistor bank, packaged with a transformer or incorporated into a substation.
- **Accessory and switchgear options** — may include current transformers, heaters, isolators, vacuum contactors, circuit breakers, special cabling and monitoring equipment.
- **Standards-based design** — designs can be specified for compliance with IEEE 32 requirements for neutral grounding devices.
- **Long service life and dependable performance** — durable resistor materials and engineered construction support reliable operation in demanding applications.

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PAGE 2 — ENGINEERING INFORMATION

DIMENSIONS

Example enclosure dimensions: compact units approximately 600 mm (W) × 600 mm (D) × 1,000 mm (H); medium units approximately 1,000 mm (W) × 1,000 mm (D) × 1,800 mm (H); and higher-current units approximately 1,500 mm (W) × 1,500 mm (D) × 2,200 mm (H). Typical fabrication tolerances are ±3 mm for overall enclosure dimensions, ±2 mm for mounting-hole centres, and ±1 mm for sheet-metal features.

MATERIALS OF CONSTRUCTION

Resistor elements: stainless steel or nickel-chromium alloy. Enclosure options: 2 mm thick hot-dip galvanised mild steel, 304 stainless steel, or 316 stainless steel for coastal and corrosive environments.

ELECTRICAL, THERMAL OR MECHANICAL PERFORMANCE

Voltage and current ratings: NERs can be custom designed for typical system voltages of 3.3 kV, 6.6 kV, 11 kV, 22 kV and 33 kV. High-resistance grounding designs typically limit earth-fault current to 10 A or less. Low-resistance designs may, for example, be rated at 100 A, 200 A, 400 A, 600 A or 1,000 A, with the final rating engineered to suit the network fault level, protection coordination and specified fault duration. The resistor is rated for the system phase-to-neutral voltage.

STANDARDS AND CERTIFICATIONS

- **IEC 60076-25:2023** — Power transformers: neutral grounding resistors; primary international standard for NER design, ratings and testing.
- **IEEE C57.32-2015 / C57.32a-2020** — Requirements, terminology and test procedures for neutral grounding devices; formerly IEEE 32.
- **AS 2067:2016** — Australian requirements for substations and high-voltage installations exceeding 1 kV AC, including earthing design and installation.
- **AS/NZS 3000:2018** — Australian/New Zealand Wiring Rules for the selection, installation and verification of electrical equipment, where applicable.
- **IEC 60071 series** — Insulation coordination, including selection of withstand levels and clearances.
- **AS 60529 / IEC 60529** — Degrees of protection provided by enclosures (IP rating).
- **Project and regulatory requirements** — Final compliance is subject to the relevant Australian state or territory electrical-safety legislation, network service provider rules and the customer's project specification.