

Neutral Earthing



Neutral Earthing Resistors (NERs) – sometimes called Neutral Grounding Resistors – are employed in AC distribution networks to limit the current that would flow through the neutral point of a transformer or generator in the event of an earth fault. NERs limit fault currents to a value that does not cause any further damage to switchgear, generators or transformers beyond what has already been caused by the fault itself, and in some cases limit touch and step potentials to safer values than a solidly grounded systems. In addition, consideration is given to operation of protection relays within the required time.

The Fortress Difference

Fortress has a history of successfully managing large projects and provides value to customers by ensuring we understand the customers requirements and expectations. We place an equal importance on technical capability, manufacturing to deadlines, and providing documentation and drawings in a concise and timely manner.

Choice

An extensive range of resistor elements allows selection of the most efficient and cost effective solution for any required duty. Fortress can manufacture NERs with rated times from a few seconds to continuous, any required initial current, and for system voltages up to 132kV.

Predictability

Because we use high grade stainless steel alloys the change in resistance with temperature rise during operation is small and predictable. This means that protection levels can be predetermined accurately. A Fortress NER will not induce unpredictable phase changes or resonances into the fault current, as may occur with an earthing reactor.

Reliability

NERs may only be called upon to operate a few times in their service life, which may be 25 years or more. Reliability is essential; elements from Fortress have been proven over many years in conditions of severe vibration and extreme climate world wide.

Features of all Fortress NERs include:

- Full compliance with ANSI-IEEE 32, Terminology and Test Procedure for Neutral Grounding Devices
- Stainless steel resistors as standard
- Enclosures ratings from IP00 to IP55
- Type-tested standard designs (certificates available)

Options include:

- Supply of resistor banks only for incorporation into customers own enclosures
- Cyclone Wind Loading rated enclosures
- Seismic rated enclosures
- Provision of CTs, heaters, special cabling, and other accessories.
- Interlocked off-load by-pass isolators
- Single or multiple vacuum contactors or circuit breakers



22kV 1600A 10s NER c/w 24kV bypass circuit breaker

Neutral Earthing

Enclosure Materials and Design

The standard enclosure material is mill galvanised steel with an epoxy powder coat finish. Alternative materials include both GR304 & GR316 stainless steel.

As standard we offer IP23 enclosures. They keep out birds and vermin and are suitable for outdoor use whilst also allowing good ventilation. We also supply IP33, IP54, and IP55 enclosures. When side mounted cable termination chambers are specified they are IP54 or IP55 as standard.

We routinely supply cyclone wind load rated enclosures to customers in harsh coastal environments and seismic rated enclosures for earthquake prone areas.

Whilst our standard range of enclosures are suitable for most applications we are also happy to provide custom designed equipment if your application requires it.

Additional Switchgear

NERs can be fitted with one or more manual off-load isolators. These can be interlocked if required and can be supplied mounted in the same enclosure as the resistor, a separate compartment, or in a side mounted cable termination chamber.

For medium-voltage power generating schemes which have multiple generating sets, it is often necessary to ensure that only one of the neutrals of the running generating sets is earthed at any time. This can be achieved by fitting the NER with an appropriately rated vacuum contactor controlled from the generating set panel. Fortress can supply contactors rated from 3kV to 24kV fitted in a separate compartment to the resistor.

Fortress has standard designs for the incorporation of circuit breakers with NERs.

Transformer / Resistor Combinations

Fortress can also supply transformer / resistor combinations such as zig zag earthing transformers and single phase earthing transformers as required.



3.3kV 100A 10s Zig Zag Earthing Transformer
(supplied in conjunction with a 3.3kV 100A 10s NER)



22kV 400A 10s NER c/w 24kV interlocked disconnect switches



11kV 25A 10s NER c/w stainless steel IP55 enclosure