

Neutral Earthing Resistors

Up to 5000 A



Neutral Earthing Resistors (NERs) – also referred to as Neutral Grounding Resistors - are used to limit the fault current for safety of equipment and personnel in industrial systems.

In solid grounding, the system is directly grounded and the fault current is limited only by the soil resistance. The fault current can be very high and can damage the transformers, generators, motors, wiring and other equipment in the system. The NERs, which are inserted between neutral and ground, increase the net resistance in the event of an earth fault and limit the current to a safe level.

Advantages of NERs include:

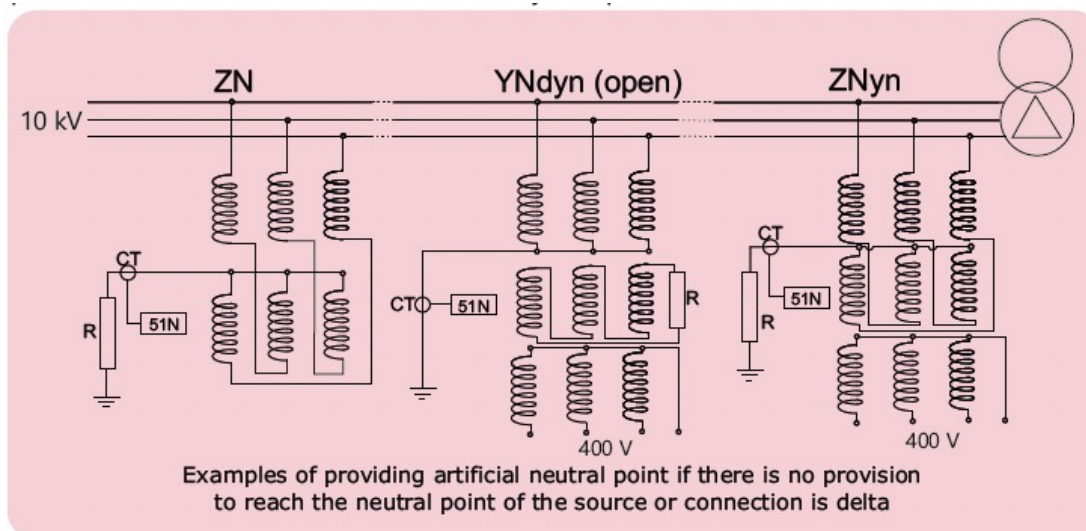
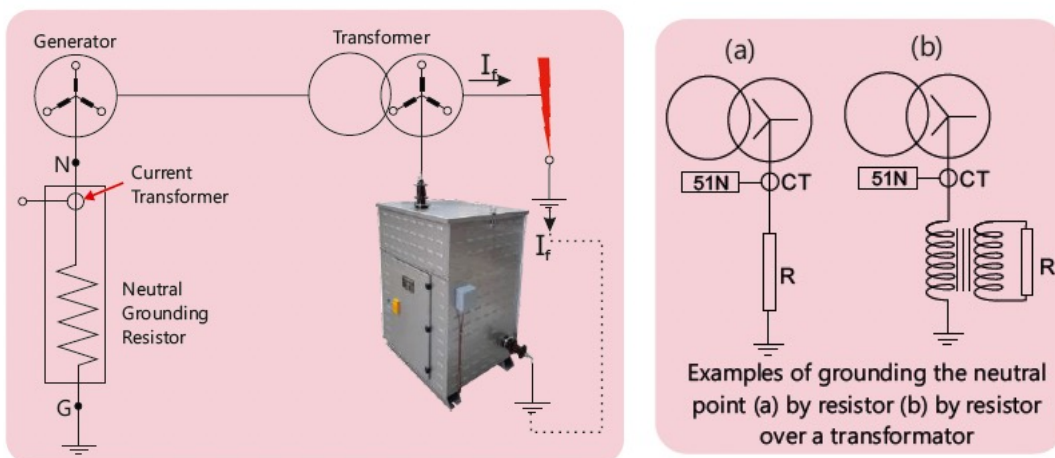
- Wind Farms
- Reduce the single phase fault currents for securing each equipment in MV electrical networks
- Reduce the transient overvoltages which can occur during an earth fault, and be monitored and used to activate the earth fault relay
- Increase protection of generators, transformers and related equipment
- Reduce operation/maintenance costs,
- Increase safety
- Provide simple, reliable, selective means of protection
- Allow the use of equipment, and in particular cables with lower insulation levels than for an insulated neutral scenario
- Reduce the step voltage

The fault current value should be limited to a value that can be safely handled by the machine or transformer. It also needs to be high enough to be sensed by the earth fault protection relays. If the NER resistance value is too high, the fault current will be very low and will not be able to activate the earth fault protection relay during earth fault conditions.

In a three phase star connection, the capacitances are formed with the ground. In the event of an earth fault, these capacitances may get charged with the line voltage and may cause transient overvoltages. The NER should have a value that permits a let-through current which enables the capacitances to discharge.

The resistances are also categorized by the time that they can withstand the fault current. Typical durations are 5-10 seconds. The extended time rating resistors are used in systems where the reliability of the system is critical, e.g. petroleum industries, mines, etc. In these situations, high resistances are used for withstanding long periods of earth fault. When an earth fault occurs in one phase, an alarm will be generated. However, the system continues to run until the next scheduled shutdown.

Hilkar Neutral Earthing Resistors are designed to absorb a large amount of energy without exceeding temperature limitations defined in IEEE 32. Hilkar NERs can be used for indoor and outdoor, and the neutral point is connected with a porcelain bushing or with a high voltage (XLPE) cable, typically (minimum cross-section = 70mm² copper or 95mm² aluminum) from the bottom, top or side. The most common protection degree preferred for NERs is IP 23 as it allows the resistor elements to cool easier and they can be used both at sea shores and deserts because the resistor elements are completely stainless steel and do not get affected by extreme environmental conditions. NERs are shipped with maintenance and installation guidelines. In these guidelines, recommended relay settings for each NER are stated as well. Hilkar provides complete technical assistance in order to meet your specifications or site conditions.



General Features

- Designed and tested to applicable IEC and IEEE Standards
- Stainless-steel resistor elements
- Current transformer included (EN 61869-2)
- Bolted resistor element connections instead of welded connections providing assemble of spare parts on site immediately
- Painted on demand
- Typically, 2 mm hot dip galvanized steel enclosure
- High thermal capacity to absorb high currents
- High altitude ratings
- Custom made lifting eyes providing secure lifting
- Rugged shock-resistant construction
- Solid top cover sloped to prevent water accumulation
- Corrosion resistant stainless-steel nameplate



Technical Specification

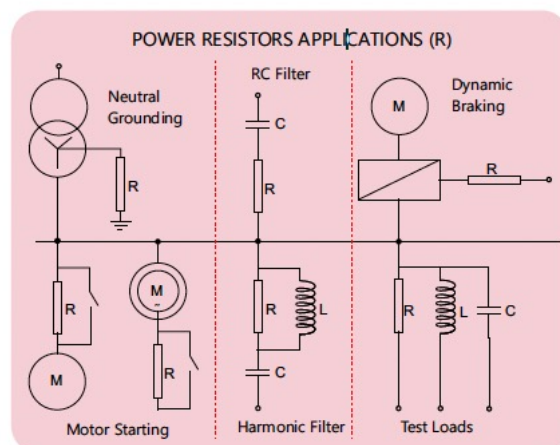
- Operation Voltage : Up to 110 kV line to line systems
- Rated Current : Up to 5000 A
- Ambient Temperature : Up to 55 C (For higher ambient temperature, consult the factory.)
- Resistance Alloy : Stainless-steel (CrNi or CrAl)
- Protection Degree : IP 23 (outdoor) and others on demand
- Standards : IEEE 32, IEC 60137, IEC 60273, EN ISO 1461, EN 10346, EN 12 ISO 129 44, IEC 60071, IEC 60060, IEC 60529

NER Options

- Elevated support stands are provided for ground clearance and safety
- Specially designed units for hazardous and extreme locations (Ex-proof, ATEX certified)
- Stainless steel or aluminum enclosures on demand
- Installation of voltage transformers
- Installation of protection relays
- Porcelain entrance bushings can be mounted on top or on the side of enclosure
- Grounding transformer installation
- Motorized or manual single pole disconnecter switches, load break switches, vacuum contactors, circuit breakers, surge arresters and heaters in the Neutral Grounding Resistors

Routine Tests

- Measurement of insulation resistance between enclosure and resistor
- Measurement of DC resistance
- Insulation test of resistor blocks
- Thickness measurement of galvanization and/or paint



Type Tests

- Temperature rise test
- Protection degree test
- Impulse voltage test (1.2 / 50 μ s)

Special Tests (on demand)

- Measurement of AC resistance
- Seismic test
- Insulation resistance test (Megger)

Selection Details

- System Voltage (kV)
- Line to Neutral Voltage (kV)
- Desired Current Rating (A)
- Desired Resistance Value (ohm)
- Maximum Time ON (seconds) and duty cycle
- Bushing Entry or Cable Entry
- Current Transformer Ratings (if applicable)
- Disconnect Switch (if applicable)
- Special Options (if applicable)

