ORION RESISTOR

Generator Neutral Grounding Resistor User Guide

Orion Resistors

2025

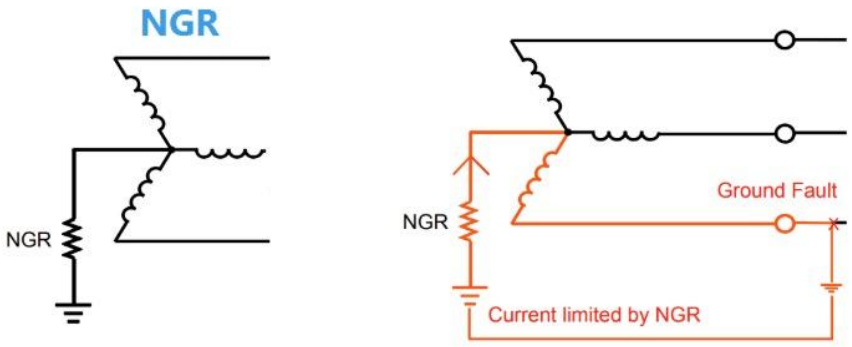
Overview

The generator is the primary driving source of a power system and must be equipped with adequate fault-response capability during operation. The grounding method of the generator neutral point plays a critical role in this process.In modern practice, the generator neutral point is typically grounded through high resistance. High-resistance grounding effectively suppresses ground-fault current, preventing stator winding damage and reducing transient overvoltages caused by arc-grounding faults. Among various high-resistance grounding schemes, the most reliable is the combination of a single-phase transformer with a resistor.

When a single-phase-to-ground fault occurs in the generator circuit and the current exceeds the allowable limit, arc-grounding overvoltages may be generated. Since the generator insulation withstand level is relatively low, this condition can lead to insulation breakdown. Excessive ground current may also cause burning or sintering of the generator core.

By applying high-resistance grounding at the generator neutral point, arc-grounding overvoltage can be effectively limited, core damage minimized, and the sensitivity of protective relays enhanced. This ensures reliable tripping action, restricts overvoltage within 2.6 times the phase voltage, prevents arc re-ignition, avoids insulation failure due to arc gaps, and suppresses ferroresonance overvoltage, thereby safeguarding the safe and stable operation of the generator.

Principle: When a ground fault occurs in the system, the fault current flows through the grounding system to the ground. The grounded neutral point allows the fault current to flow quickly, thus limiting the voltage rise at the fault point and preventing excessive voltage to ground at the equipment. The fault current is routed through protective devices (such as grounding protection relays) that quickly disconnect the faulty circuit, preventing more severe damage.



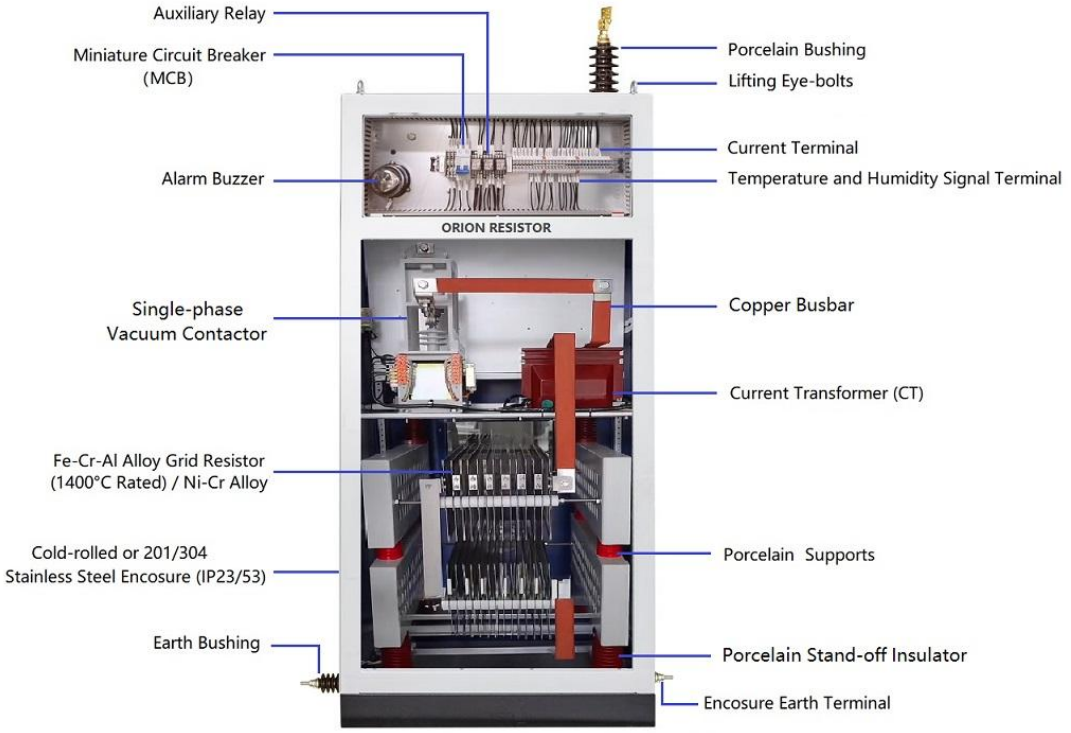
The **OR-GN Generator Neutral Grounding Resistor Cabinet** manufactured by our company is compact in size and lightweight in design. The built-in transformer has excellent impulse resistance, flame-retardant performance, and low partial discharge level.

Resistors: Fabricated from premium stainless-steel nickel-chromium alloy (Cr20Ni80) or non-metallic materials such as carbon valve plates and zinc oxide valve plates.
These resistors feature high conductivity, strong current-carrying capacity, stable resistance, high thermal coefficient, excellent corrosion resistance, toughness, and the ability to withstand temperatures up to **1600**℃ without deformation.

OR-GN Model: Equipped with a dry-type single-phase transformer, resistors, isolating switch, surge arrester, and other electrical components, enabling convenient installation near the generator neutral point.

OR-GN Model: Integrated with current transformers for accurate measurement of neutral current and analog signal output, facilitating monitoring and protection functions.

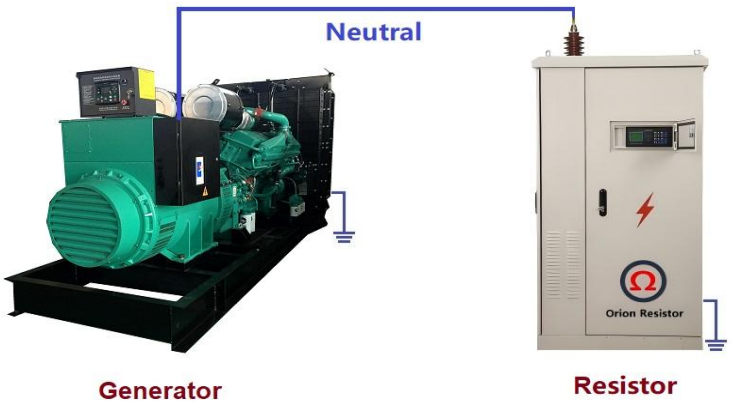
Generator NGR Cabinet Structure and Components



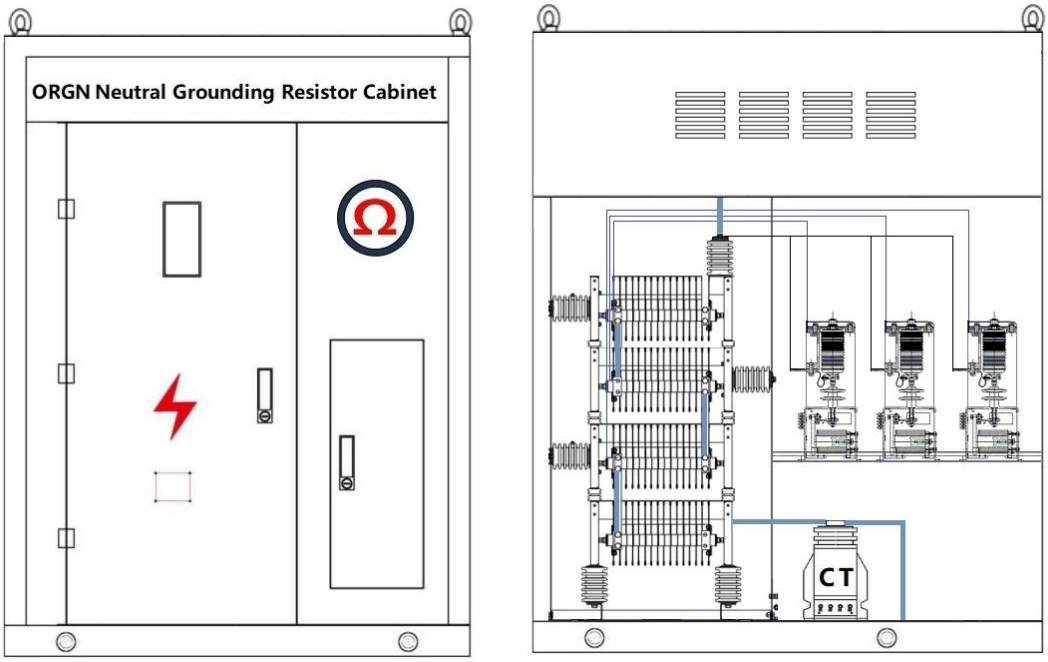
1. Model Naming Convention:

Technical Parameters：

Generator Capacity (kW)	100/125		200	300		600		900/1000	
Generator Rated Voltage (kV)	10.5	13.8	15.75	18	20	20	24	24	27
Estimated Max. Single-Phase-to-Ground Capacitive Current in the Circuit (A)	4		5	6		8		10	
Primary Side Voltage of Grounding Transformer (kV)	10.5/√3	13.8/√3	15.75/√3	18/√3	20/√3	20/√3	24/√3	24/√3	27/√3
Secondary Side Voltage of Grounding Transformer (kV)	0.22		0.22	0.22		0.22		0.22	
Rated Capacity of Grounding Transformer (kVA)	30		30	50		50		63	
Secondary Side Resistance Value (Ω)	1.0		0.8	0.5		0.4		0.3	
Grounding Protection Extraction Voltage (kV)	0.1		0.1	0.1		0.1		0.1	



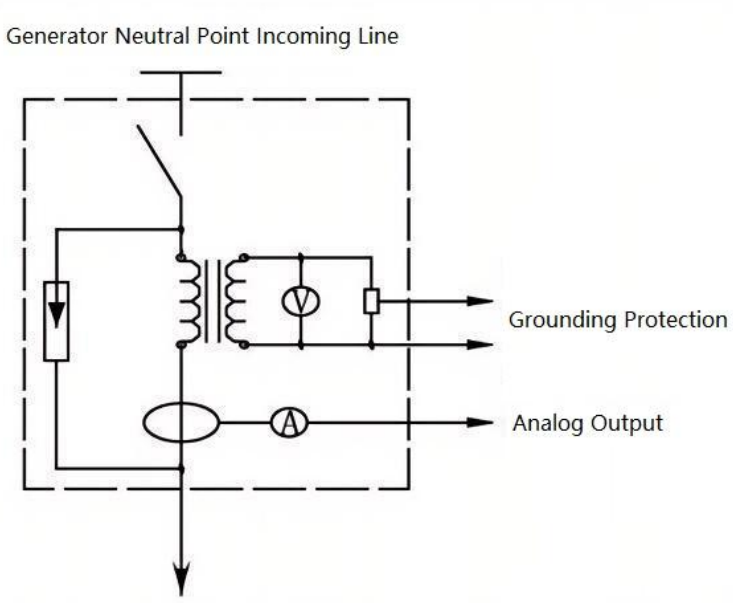
OR-TN transformer NGR cabinet outline drawing



OR - GN recommended size: 2000 * 1600 * 2000 mm (w * d * h)

Indicate: the shape, size of resistance ark, cabinet put oneself in another's material and color mark can be designed and manufactured according to customer's specific requirements.

2. Principle diagram of NGR :



Principle diagram of NGR for Transformer

3. Usage Conditions:

a.the altitude does not exceed 3000m ;

b. air relative humidity is not more than 95%, no conductive dust exists ;

c. environmental temperature: - 40 ℃ ~ + 40 ℃ ;

d. seismic intensity is not more than 8 degrees ;

e.no fire, explosives, chemical corrosion product and violent vibration.

6. **The important information before ordering:**

When placing order, please let us know the following parameters:

a. Rated voltage of the generator (kV), transformation ratio of the grounding transformer, resistance value (Ω);

b. Insulation type of the grounding transformer (dry-type or oil-immersed);

c. Transformation ratio and capacity of the current transformer;

d. Material, dimensions, color (or provide color code), protection rating (IP), and installation location (indoor or outdoor) of the cabinet;

e. Whether intelligent monitoring devices or temperature and humidity control devices are included.

7.Packing Details:

Orion Resistor has designed a special vacuum packaging suitable for long-distance maritime transportation. Both the resistor cabinet and its outer packaging are double vacuum-sealed, with high-density, fumigation-free boards used for packaging. This ensures moisture and corrosion resistance, guaranteeing that the electrical performance of the resistor cabinet remains perfectly preserved during extended sealed transportation.