

High Resistance Earthing Systems

Up to 5000 V



The design and operation of 240-5000 V systems, service continuity, personnel and equipment safety are the most important aspects in industrial systems. The use of the High Resistance Earthing (HRE) system – also referred to as High Resistance Grounding - can provide a safe, reliable and economic system for 240-5000 V networks.

HRE systems limit the fault current by placing high resistance between neutral point of transformer (or generator) and ground. As it is not possible to locate the fault point in delta connected systems, an artificial neutral point is created and delta connected system can be grounded. This allows a fault current of a few amperes thus locating the fault point gets easy. When the neutral point is grounded thru high resistance, both continuity of operation is provided during fault condition and sufficient current (typically between 2 A and 10 A) flow is provided for ease of locating the fault point.

Approximate phase to earth fault current in 240 – 5000 V networks are:

- Solidly grounded systems: 1000-6000 A
- Low resistance grounded systems: 100 - 1000 A
- High resistance grounded systems: 2 - 10 A
- Undergrounded (or delta) cable system: 0.3-2.8 A/km: 2 – 10 A

Comparison of Grounding Methods	High Resistance	Low Resistance	Solid	Grounded
Serve Line - Neutral Load	-	-	✓	-
No tripping of feeder breakers on occurrence of first fault	✓	-	-	✓
Immunity to transient over-voltages	✓	✓	✓	-
Eliminates arc flash hazard	✓	-	-	✓
Ease of locating first fault location	✓	-	✓	-
Equipment protection against arc fault damage	✓	-	-	-

Discharge Currents			
Network Voltage (V)	Cable (240 mm ²) 3I _o (A/km)	Motor (A/1000HP)	Damping Capacitor (A)
240-1000	0.3	0.01	-
2400	1.0	0.10	0.78
4200	2.0	0.10	1.35
7200-12000	2.8	0.15	2.25

General Features

- 0-10 A analog ammeter, 0-250 V analog voltmeter with setting on panel
- Automatic door switch for power shut down
- Test button to indicate fault
- Green light for normal conditions
- Intermittent alarm and red-light during ground fault
- Pulse/Normal Selector switch to magnify current and intermittent pulse during ground fault
- Auxiliary free contacts at pulse and alarm position during fault
- Dimensions (LxWxH)= 60 x 60 x 180 cm (Other enclosure types available on demand)
- Suitable for 240-5000 V three phase systems
- Optional data logging

Usage

Voltage: Up to 36 kV While locating the ground contact point of phase and ground, a fault current that is limited to approximately 2A, generating approximately 10A pulses (approx. 1 second on, 1 second off) provides ease of measurement. Thus using short time pulses is the common application in HRG systems today.

Generally measurement is performed by analogue and wide clamp ammeters. The clamp ammeter outside the phase cable current disappears on the analogue display.

High Resistance Earthing Systems are economical and practical choice especially for systems under 5000 Volts. As zero sequence currents (3I_o) flow thru neutral point due to line capacitance of cables, HRE alarm level is set to a point that is greater than 3I_o.

