Crohm Series CHG
High Resistance Grounding

High Resistance Grounding Theory

During normal power system operation, no fault current is flowing through a system. When a ground fault occurs large amounts of both thermal and mechanical energy are released as well as transient voltages (shock hazards). Per standard IEEE Std. 142-1991 limiting current during ground faults by resistance grounding reduces burning effects of faulted electric equipment, mechanical stress in circuits, electric shock hazards, arc flash hazards, as well as transient over-voltages. Resistance grounding has two varieties: Low Resistance Grounding and High Resistance Grounding. Low resistance grounding is typically utilized on medium voltage systems for short time durations (10 seconds) while high resistance grounding is ordinarily utilized on low voltage systems allowing for continuous operation during grounding fault conditions.

High Resistance Grounding System Operation

Crohm high resistance grounding systems will limit the fault current to a level that will not significantly damage the power system and immediately send an alarm signal to the user. The user can then activate a current pulse from the control interface that constantly cycles between set values. This action allows the user to quickly trace and find the faulted circuit by using a handheld ammeter to follow the pulsing current throughout the system.

High Resistance Grounding Benefits

Personnel Safety: Limits the Arc Flash Hazard to personnel who may have caused the fault or in the vicinity of the fault by up to 98 percent. A high resistance grounding system also reduces the electrical shock hazard to personnel caused by stray ground fault currents that can flow back through a return ground path.

System Protection: Offers protection by lowering and controlling fault current magnitude while providing a ground-to-neutral connection for a three-phase power system and still allowing operation as an “ungrounded system.” When the neutral of a system is not grounded, the system is vulnerable to damaging fault currents. High fault currents can thermally damage the power system by melting and even burning cable insulation, transformer and motor windings along with other critical equipment components.

Ground Fault Detection: Instantly provides a warning when a ground fault occurs through an alarm signal. An optional audible horn and/or warning beacon are available along with the standard change of state alarm contacts.

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Uninterrupted Service: There is no reason to immediately shut down the power system with a controlled and limited fault current, allowing for continued process operation and avoidance of costly downtime. Limiting the fault current of a single line-to-ground fault will also reduce the occurrence of a second fault from another phase.

Transient Over-Voltage Reduction: A high resistance grounding system reduces the magnitude of high transient over-voltages appearing during normal switching of a circuit with a ground fault. High transient over-voltages may cause component failure and equipment damage at locations on the power system outside of the fault point.

How to Specify a High Resistance Grounding System

Crohm offers a standard line of High Resistance Grounding Systems that are designed to meet your specific requirements. To order a high resistance grounding system you must have the following information:

1. **System Voltage or Line-to-Neutral Voltage**
2. **Fault Current (Typically 10 amps or less)**
3. **System Type (Wye or Delta)**
4. **Enclosure Type – Wall Mount, Free Standing Indoor (NEMA 1) or Free Standing Outdoor (NEMA 3R)**
5. **Options and/or Special Requirements**

Accessories and Options

- **Ammeter with CT**
- **Audible Horn**
- **Warning Beacon**
- **Timing Relay**
- **Undervoltage Relay**
- **Deluxe Clamp-On Ammeter with Carrying Case**
- **Enclosure Finish such as Aluminum, Stainless Steel**
- **Special Paint Colors**

Summary of High Resistance Grounding Systems Benefits

1. **Electrical system thermal and mechanical stress greatly reduced.**
2. **Personnel safety improved by reduction of arc flash hazards.**
3. **Maintenance time reduced by pulsing system location of fault.**
4. **Continued system operation during ground fault until repair can be scheduled.**