

case study

High-Resistance Grounded System Should Become Industry Standard

Process reliability has always been an important aspect in the design and operation of a low-voltage power system, particularly in the petroleum and chemical industry.

unparalleled protection

Industry

Petro Chemical

Need

Need to create competitive advantage

Benefit

Safe environment for workers, run critical processes with 2nd ground fault, meet production scheduling



Sample applications

- ▶ Albion Sands Energy – SHELL AOSP U.S. Project
- ▶ Albion Sands Energy – Bowmanville Compressor Station
- ▶ Northern Transformer – ESSO Sarnia
- ▶ Rumsey Electric – SUNOCO Eagle Point
- ▶ Ace Electric – OHS Refinery
- ▶ Wholesale Electric – SHELL PIP ELSFS01
- ▶ Celanese Diversified – Nanjing
- ▶ Siemens – Petro Canada Bantrel Project
- ▶ PEMEX Oil Company
- ▶ Coastal Aruba Refinery

About I-Gard

I-Gard provides both industrial and commercial customers with the products and application support they need to protect their electrical equipment and the people that use them. Since 1982, I-Gard is committed to electrical safety and reliability.

While process interruptions can have an impact in any industry, the loss of low-voltage power can be especially disruptive and can cause a complete upset. This scenario can cause a plant to close; create personnel and equipment safety problems; have an adverse environmental impact; and can result in substantial economic losses. As such, the need for a safe, reliable, low-voltage power source is essential.

While in the past ungrounded distribution systems were applied under the assumption of reliability, experience with multiple failures due to arcing ground faults has resulted in the adoption of high-resistance grounding as the preferred method for this critical industry.

In the 1999 IEEE paper on high-resistance grounding of low-voltage systems, A Standard for the Petroleum and Chemical Industry, John Nelson and Pankaj Sen note, “When reliability and limitation of ground fault current is essential, a high-resistance grounded system is recommended. With the proper design and testing, a high-resistance grounded system provides the safety and reliability necessary for a petrochemical or other heavy industry. As such, the high-resistance grounded system should become a standard of the industry, and the solidly grounded system should only be used where the high-resistance grounded system cannot be used for a three-phase, four-wire system.”

With ungrounded systems prone to transient over-voltages and burn down from second ground faults, and solidly grounded systems susceptible to arcing ground faults, the application and acceptance of high-resistance grounding continues to increase.

SLEUTH

SLEUTH



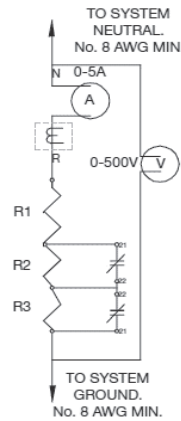
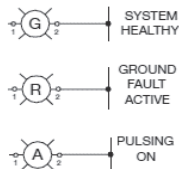
NEMA 2R enclosure containing current limiting resistor and ground fault relay

Available with artificial neutral for use on delta systems

Visual indication of system normal, active ground fault and pulsing active

Available for 480V, 600V and 4160V distribution systems

SLEUTH



FEATURES	BENEFITS
High-Resistance Grounding Resistor	This resistor is connected to the wye point of the transformer or generator supplying the facility. Its function is to limit ground fault currents to non-damaging levels under a single line-to-ground fault condition. This provides the user an opportunity to retain process continuity and to detect and clear the fault.
Hand-held Pulse-tracing Sensor	This device, similar to a clamp-on ammeter, allows the user to follow the pulses from their source at the Sleuth unit through to the specific location of the line-to-ground fault.
Automatic Pulsing System	Once the pulsing feature on the Sleuth system is selected and activated, the system will cyclically limit the fault to 100%, 75% and 50% of the available ground fault current. The cyclical pulsing combined with the hand-held pulse-tracing sensor empowers the user to trace the fault circuit to the point of the fault, even in complex distributions systems without de-energizing the load.
Ground Fault Sensing Transformer and Relay	This microprocessor-based digital relay measures ground fault current using a 1:1 zero sequence current transformer. It maintains accuracy over a range of 45Hz to 65Hz and filters out harmonics to eliminate nuisance tripping.