I & C Sales North, Inc. Releases Technical Guide

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SOUTHGATE, MI - November 03, 2026 -
I & C Sales North, Inc., an industrial automation distributor, has published a technical resource detailing the function and deployment of intrinsically safe barrier systems in hazardous operating environments.

Intrinsically safe barriers regulate electrical and thermal energy levels to prevent sparks or heat from igniting flammable gases, vapors, or dust. The newly issued documentation provides operational guidance for personnel in the oil and gas, petrochemical, chemical processing, and mining industries, where explosive atmospheres require specialized risk management protocols. These sectors operate under constant exposure to volatile airborne compounds, requiring continuous containment of potential ignition sources across all instrumentation circuits.

The publication provides an engineering overview of barrier configurations, focusing on galvanic isolation and Zener diode designs. Zener barriers utilize precision diodes, current-limiting resistors, and fast-acting fuses to divert excess electrical faults safely to ground. In contrast, galvanic isolators use transformers, optical couplers, or relays to achieve complete physical isolation between safe-area control infrastructure and hazardous-area field sensors, eliminating the requirement for a dedicated high-integrity earth ground connection.

The resource explains how these devices limit energy transmission across hazardous-to-safe area interfaces, ensuring systems operate within the non-ignition thresholds required by international safety standards, including ATEX and IECEx. It details compliance requirements under regulatory frameworks such as NEC Article 504 and Article 505 in North America, highlighting specific enclosure ratings, temperature classifications, and fault-tolerance criteria required for Zone 0, Zone 1, and Class I, Division 1 installations.

Furthermore, the publication outlines the methodology for conducting intrinsic safety loop entity calculations, evaluating the cumulative capacitance (Ca or Co) and inductance (La or Lo) of interconnecting field wiring alongside barrier and field device parameters (Vmax, Imax, Pmax). This analytical framework ensures that the energy stored within distributed cable capacitance and inductance remains below the minimum ignition energy thresholds for specific gas groups, such as Group IIC Hydrogen and Group IIB Ethylene, even in the

event of double-fault conditions on associated field wiring.

Additionally, the guide addresses integration protocols for field instrumentation, including 4?20 mA transmitters, resistance temperature detectors (RTDs), thermocouple circuits, and solenoid valves. The technical text outlines proper grounding requirements, cable capacitance and inductance calculations, and enclosure ingress standards necessary to prevent unintended electrical transfer during field component failures.

Practical implementations are documented through industrial case studies reviewing how barrier hardware functions alongside broader automated safety systems. The material covers emerging technical developments, including the interface between an intrinsically safe barrier and Industrial Internet of Things (IoT) monitoring architectures. This integration allows diagnostic data and loop resistance metrics to be tracked remotely across computerized maintenance systems without violating energy-limiting constraints. Real-time telemetry enables operations teams to detect field circuit anomalies, such as ground leakage or insulation breakdown, prior to scheduled maintenance shutdowns. Furthermore, plant engineers can safely extract sensor diagnostics from hazardous process zones without the need for specialized hot-work permits or temporary area declassifications.

To support the technical publication, I & C Sales North, Inc. will conduct informational webinars and engineering workshops addressing barrier selection, system compliance, loop calculations, and routine inspection procedures. These technical sessions will review proper testing methodologies using calibrated test instrumentation, cable run limitations, and fault isolation strategies for process engineers and instrumentation technicians.

The complete technical guide is accessible on the I & C Sales North, Inc. website.

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