Small Modular Reactors

Electrical Safety Solutions for Small Modular Reactors

Powering a safer, more sustainable future

Small Modular Reactors (SMRs) are compact, scalable versions of traditional light water reactors designed with advanced safety and engineering features. Their smaller footprint, passive safety systems, and streamlined design make them a promising option for the future of nuclear energy. SMRs demand specialized monitoring to ensure that electrical systems remain reliable, predictive, and secure during operation.

Proven Reliability

Trusted globally in legacy fission plants, Bender solutions bring decades of field-tested safety into next-generation SMR and fusion projects.

Ground Fault Detection for Reliability

Medium-voltage power circuits in SMRs and fusion applications require continuous monitoring to prevent ground faults that could disrupt power to critical systems. Common applications utilize Insulation Monitoring Devices (IMDs) which assess ungrounded circuits before startup, while Residual Current Monitors (RCMs) track grounded systems once energized. Together, these technologies provide real-time fault detection and predictive insights. This minimizes downtime, safeguards power systems, and ensures uninterrupted, safe operation.

Our technology empowers:

- **Early Fault Detection** – IMDs identify low level ground faults in ungrounded systems, preventing issues from becoming critical
- **Real-Time Protection** – RCMs continuously track grounded systems during operation, ensuring faults are detected instantly
- **Reduced Downtime** – Fast fault location and predictive monitoring minimize unplanned shutdowns and costly interruptions
- **Predictive Insights** – Continuous monitoring supports proactive maintenance and long-term reliability

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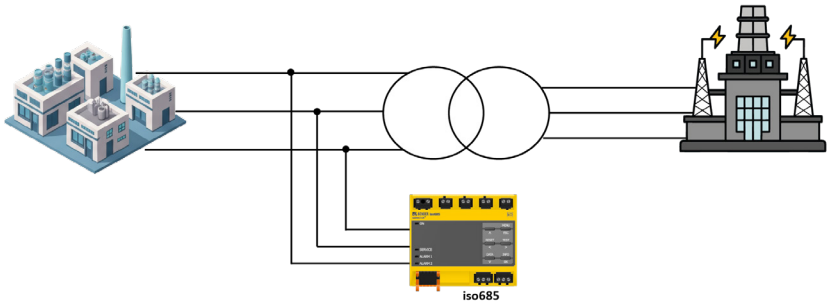
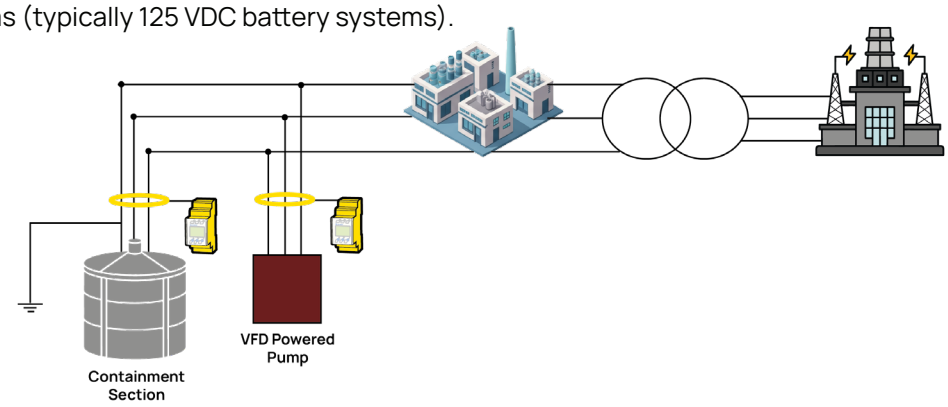
Ungrounded/Online Monitoring Systems

Bender insulation monitoring devices (IMDs) can monitor resistance to ground for energized ungrounded systems or monitor for ground faults on de-energized grounded systems. See grounded/offline monitoring systems below.



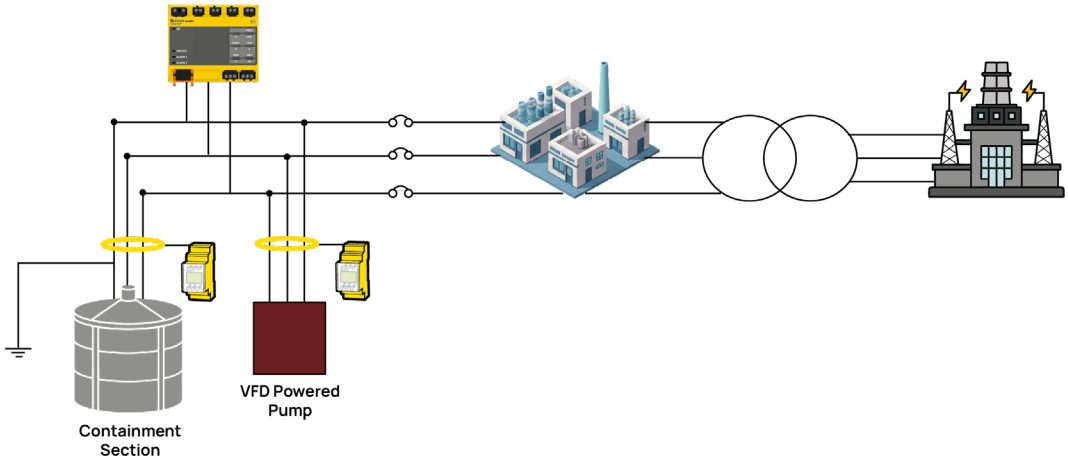
Grounded/Online Monitoring Systems

Enables ground-fault detection and displays localized ground-fault leakage current for any faults downstream of the current sensor. Using CTUB-CTBC current sensors allow some devices to monitor across a wide frequency band - where other devices are blind. Bender devices can be used on the AC power distribution and on the relay control power systems (typically 125 VDC battery systems).



Grounded/Offline Monitoring Systems

Addition of an IMD on the load-side of feeder breakers provides the look-ahead function, also referred to as lockout protection. This provides system health information and prevention of energizing a faulted system.



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