Standex DETECT Electronics

CUSTOM SOLUTIONS POWERED BY UNIQUE COMPONENTS

Renewable Energy Design



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Standex Detect has a wide range of products and technologies, plus an eagerness to work together to find solutions to problems. One such instance involves the **photovoltaic power industry.**

Critical Considerations in High-Voltage Test System Design

Grid-tie solar inverters change the direct current (DC) from photovoltaic panels into alternating current (AC) for the electric power grid. Most inverters no longer use a power transformer. This increases efficiency, reduces weight and lowers cost. However, without the galvanic isolation of the power transformer, safety concerns arise. The solar system's insulation barriers may degrade over time, so isolation monitoring between earth ground and the solar system is periodically done, as specified in IEC 62109-1/2.

To measure the isolation resistance, the solar system creates a temporary connection between the solar power electrical buses and earth ground. There are two reasons for doing this. First, it is not possible to measure the isolation resistance without creating an additional connection across the isolation barrier. Second, the connection is temporary in order to preserve the high isolation under normal operating conditions. Finding a solution to creating this connection is the problem that was solved.



Requirements

Requirements for the relay needed to make the temporary connection included:

- High electrical isolation between the control and switched terminals
- High electrical isolation across the open terminals
- Very low current capability
- High reliability and long lifetime
- Wide operating temperature of -40°C to +105°C
- High creepage distance
- Compact size

Success

As a result of the successful use of the reed relay in isolation resistance monitoring, a reed relay was also designed into another application in the solar system. Photovoltaic panels may suffer from Potential Induced Degradation (PID) over time. The normal operating potential of the solar cells may induce migration of sodium ions from the cover glass to the solar cell. This decreases the solar cell output by creating a current path that partially short-circuits the cell. The normal daytime operating potential can be counteracted by applying a reverse potential at night. The anti-PID charge equalizer requires a relay to switch in the reverse voltage at night. This reed relay has similar requirements to the one used for measuring isolation resistance.

Key Support

A Standex Detect high voltage reed relay met these requirements. The Standex sales team and application engineers worked closely with the solar system's procurement specialists and product design engineers. As the process continued, other personnel from both companies became involved. Standex strives to work closely to understand the challenge and meet or exceed the requirements. Because the solar system staff know the solar industry's requirements, and the Standex Detect staff know their product's features in detail, working closely together in a collaborative way provides the best performance for the best price.



Because of the global nature of the solar industry, it is valuable to have a supplier that is also global. In addition to a worldwide sales presence and global supply partners, Standex Detect has manufacturing and product engineering in Asia, Europe and North America. Standex Detect also has a high level of vertical integration which improves the control of quality, costs and delivery. In this case, Standex Detect manufactures not only the reed relay, but also the two major sub-components within the reed relay – the reed switch and the coil.

Although reed relays were highlighted here, Standex Detect has a wide range of standard and custom solutions available using various photo-MOS relays, optocouplers, sensors, inductors, transformers and other power magnetic components.

With a global organization that offers sales support, engineering capabilities, and technical resources worldwide – we implement customer-driven innovation that puts the customer first.

If your application requires one of our standard sensors from our catalog, that's clearly the best approach and the quickest solution to satisfying your design requirement. However, more than half of our shipped sensors and relays are from special requirements. Since many switching and sensing requirements are unique, working with customers on their special applications is expected.

To learn more about how Standex Detect can support your high-voltage test and measurement projects with custom relay solutions, visit standexdetect.com or contact our engineering team to discuss your specific application needs.

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