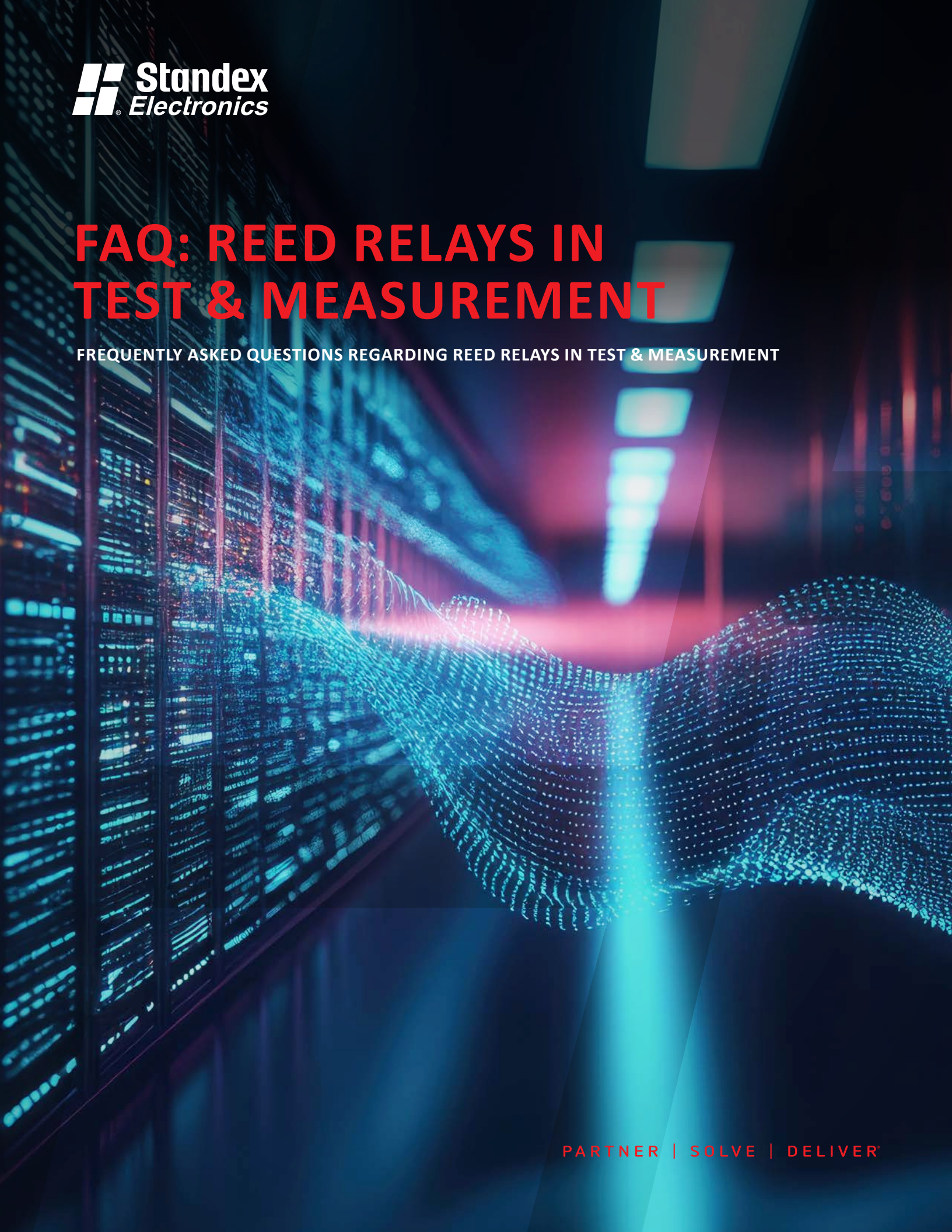
Standex Electronics

FAQ: REED RELAYS IN TEST & MEASUREMENT

FREQUENTLY ASKED QUESTIONS REGARDING REED RELAYS IN TEST & MEASUREMENT



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FAQ

Introduction

The FAQ addresses common **customer concerns** about using reed relays in test and measurement applications, focusing on the need for reliability, signal integrity, and high-voltage handling capabilities. Customers are concerned about the lifespan and durability of relays, especially in demanding testing environments. They need assurance that the relays can handle high-frequency signals without compromising signal integrity, a crucial aspect for accurate measurements.

The FAQ highlights Standex Electronics' reed relays' low capacitance, high-frequency handling, and shielding techniques to minimize signal issues. It also addresses low offset voltages for accurate low-voltage measurements.

Additionally, customers working with high-voltage applications require relays that can withstand high voltages without breakdown or leakage. The FAQ showcases the high dielectric strength, high standoff voltage, and package design features that make Standex Electronics' reed relays suitable for such applications.

Which test and measurement applications use reed relays?

Reed Relays perform signal switching in a wide range of electronic components and systems such as but not limited to: Semiconductor Testers, Automated Test Equipment, Cable Harness Testers, FCT Functional Testers, Insulation Testers, ICT In-Circuit Testers, ARC Testers, DMM & Oscilloscopes, Matrix Switches, Flying Probe, and Boundary Scanners.

How reliable are reed relays?

Reed relays have long lifespans, capable of billions of switching operations under low-level signal conditions and without wear, exceeding the lifespan of electromechanical relays.They perform well across a wide temperature range, making them versatile for different environments.

Are reed relays capable of fast switching?

Reed relays can switch quickly in hundreds of microseconds, enabling high-speed testing of integrated circuits with fast digital pulses in the picosecond range.

Why is low capacitance important in relays?

Low capacitance, typically less than 0.5 pF across open contacts, is crucial for maintaining signal integrity at high frequencies. Higher capacitance can distort the signal.

What frequency range can Standex Electronics' reed relays handle?

They can carry RF signals from 500 MHz - 13 GHz.

What advantages do Standex Electronics' RF reed relays offer over electromechanical and semiconductor relays?

They provide excellent isolation, minimizing signal leakage and interference, which ensures accurate measurements.

What is the characteristic impedance of RF reed relays?

They have a characteristic impedance of 50 Ohms, ensuring efficient power transfer and minimal signal reflections and excellent magnetic shielding to prevent magnetic interference. The RF Series, such as U, C, M or CRF, use an internal coaxial shield to maintain a consistent 50 Ohm impedance path, achieving a flat insertion loss curve from DC up to maximum frequency range specified for each series.

How does the compact size of reed relays benefit PCB design?

Suitable for switching DC signals or low frequency range, our miniature vertical reed relays suitable for high-density ATE applications include the MF, MFS, UMS, MS, and CRR series.

How do you ensure signal integrity in your low voltage measurement setups?

Maintaining signal integrity is essential for accurate low voltage measurements. Even slight heating in the instrument can create offset voltages that affect readings. Standex Electronics' reed relays are engineered to minimize the impact of thermal voltage, ensuring small signals pass through unchanged. These relays feature low offset voltages of less than one microvolt.

What other factors affect signal integrity?

Electromagnetic interference (EMI) from external fields can create noise in the signal path leading to inaccurate measurement. Magnetic shielding enhances the magnetic field strength experienced by the contacts. This enables higher coil resistance, which lowers power consumption and heat generation, thereby reducing thermal offset voltage.

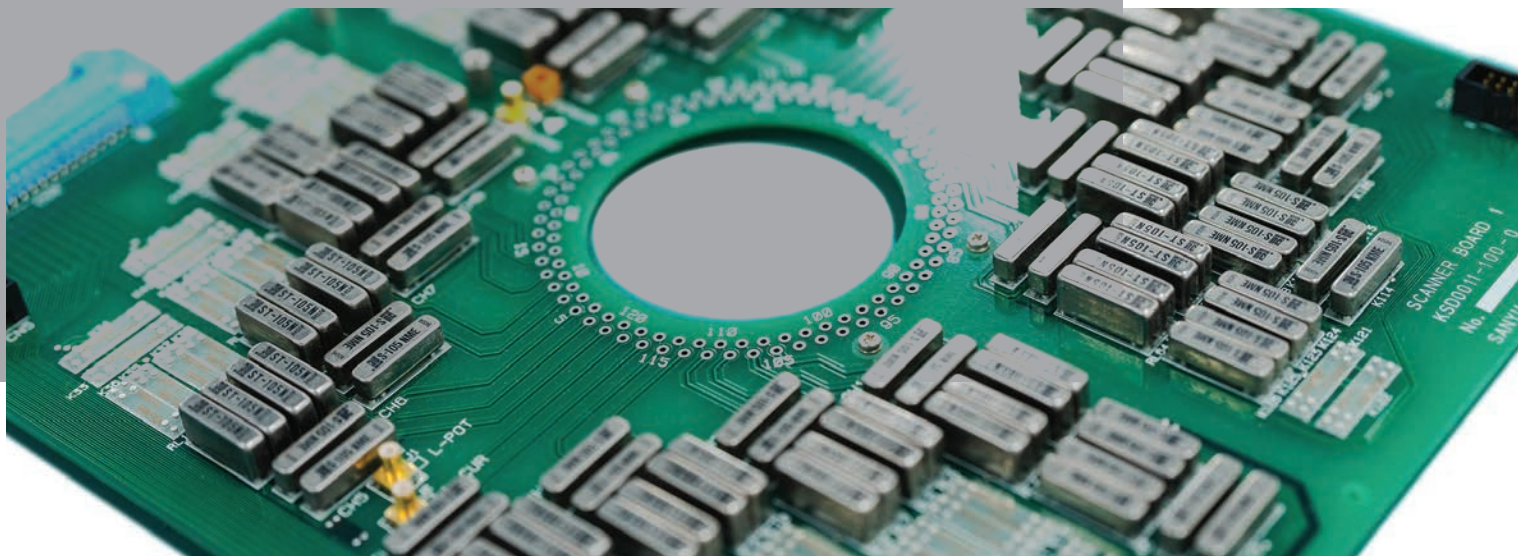
What are the main types of shielding used to mitigate EMI?

Internal magnetic shielding prevents magnetic coupling between closely stacked relays, essential for functional PCB testing. This is a key feature in Standex Electronics' reed relays.

High-frequency RF reed relays use coaxial shielding to maintain a consistent 50 Ohm impedance path, minimizing signal loss and ensuring signal integrity. This is crucial for network analyzers, RF attenuators, and RF receivers, achieving a flat insertion loss from DC to high frequencies.

What role does shielding play in specific application requirements?

Shielding plays a vital role in the performance and suitability of reed relays for specific applications, particularly those involving high frequencies, high voltages, and densely packed components.



Different shielding techniques are employed to address the unique challenges presented by each application, optimizing the relays for signal integrity, sensitivity, and reliability.

What is the insulation resistance of reed relays?

The insulation resistance can reach up to 500 TOhm, ensuring minimal leakage current and robust isolation across the open contacts as well as between the coil and contact.

What are some RF reed relays examples?

Starting with the smallest SMD mounting area for 8 GHz is the U series, measuring 7.95 x 4.67 mm. At 7 GHz, the CRF and C series offer a typical insulation resistance of 10^{11} Ohms. The CRF offers and impressive minimum dielectric strength of 1,500 VDC. The M, MT, and MH series each offer unique features including SPST-NO, DPST-NO, SPST-NC and DPST-NC versions.

Are reed relays suitable for switching high-voltage testing?

Their high dielectric strength allows them to withstand high voltages without breaking down or allowing current to flow between isolated circuits.

Standex Electronics' reed relays offer high isolation voltage between coil and contact up to 7000 VDC. These relays can switch up to 1500 volts and have a stand-off voltage of up to 5000 VDC across the open contacts.

Bigger reed relays can have breakdown voltage ratings up to 15 kVDC or even up to 20 kVDC when two contacts are stacked together in series.

How does the vacuum or inert gas environment inside the reed switch help?

It acts as a high-quality insulator between the reed blades when they are open, preventing current leakage and enabling the switch to withstand high voltages.

How are reed switches connected for extremely high voltage applications?

Two reed switches can be internally connected in series within a single relay package to meet high-voltage requirements. In case of the high current requirement, these two switches can be connected in parallel and provided increased carry current capability in a compact housing.

What materials are used for encapsulation and housing of reed relays?

The assembled reed switch and coil are encapsulated within robust materials like epoxy or polyurethane, providing additional insulation and protection.

How does the package design of reed relays contribute to their high-voltage capabilities?

The design maximizes creepage distance and air clearance, meeting international safety standards for high-voltage applications. For example, the KT series has a pin layout that supports these features.

What are the key considerations for designing with reed relays?

When designing with reed relays, ensure you use a driver circuit that supplies the correct voltage and current. For high-current or inductive loads, implement snubber circuits to prevent arcing and contact damage. In high-density applications, use magnetic shielding to prevent interference between relays. Additionally, protect relays from excessive heat, moisture, and vibration to ensure long-term reliability.

How has Standex Electronics' enhanced its capabilities in the T&M market?

Recently, Standex acquired Sanyu Switch Co., Ltd., a Japanese company specializing in reed relays for automated test equipment (ATE) and high-frequency applications. This partnership brings together the strengths of both companies, further enhancing Standex's capabilities in miniaturization, high-frequency performance, and reliability for advanced ATE and other demanding applications.

Standex Electronics is a trusted and innovative leader in the T&M market. Their dedication to customer satisfaction, global presence, engineering expertise, and ongoing innovation enables them to deliver high-quality, reliable, and customized reed relay solutions tailored to the specific needs of various T&M applications.

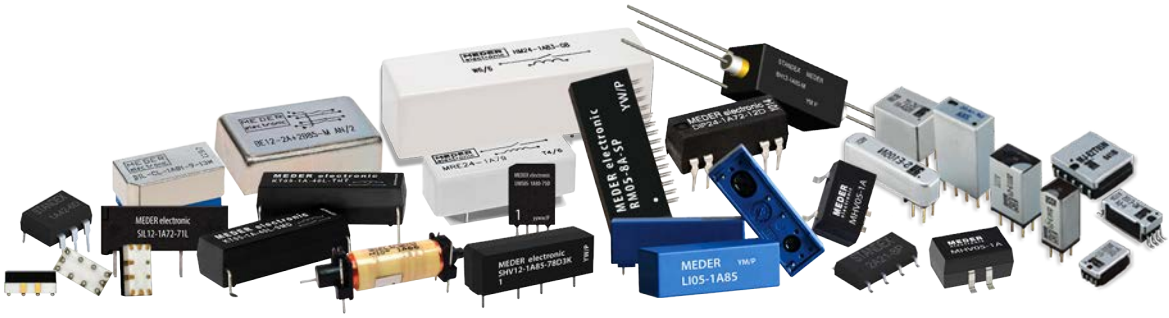
To learn more about Standex Electronics' ATE solutions, download our brochure,

HIGH FREQUENCY/RF & HIGH DENSITY REED RELEAYS

Elevate Your ATE Solutions

We hope you've found this reed relays in test and measurement FAQ helpful and informative. Still have lingering questions about reed relays?

For more information about our product offerings, contact us today and a team member will be in touch shortly.



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