



Application Alley

Telecomm - Reed Relays

Portable Radio Communication Equipment Use Reed Relays

Introduction

Portable military radios typically operate between 3 MHz and 30 MHz. These frequencies are relatively low by today's standards when compared to the telephone bands in the 1 GHz to 4 GHz range. However, even as low as 30 MHz the signals will 'ride' on the outside of their conductor (skin effect). When switching between transmit and receive, reed relays have become the design-in choice, because they are hermetically sealed and packaged in a rugged epoxy, making them a good choice for the outdoor environment. Standex Electronics uses copper plated reed switches to minimize skin effect.

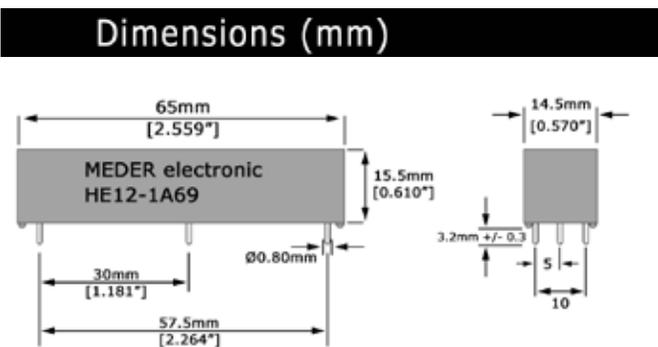


Figure 1. HE physical layout

Any Portable Military Radios Use Reed Relays For Transmitting and Receiving

When it comes to portable radio communication equipment, all the components making up the radio, must be able to withstand the rigors of the outside environment. Whether this means dirty dusty, moist environments, or cold/hot rainy/snowy conditions under a wide temperature range. The reed relay being hermetically sealed and then encapsulated in a rugged over-molded epoxy, meets the above conditions in a reliable manner when transmitting or receiving radio frequencies between 3 MHz to 30 MHz.

Features

- High reliability
- Ideal RF characteristics
- Ideal for carrying fast digital pulses with skew rates less than 20 picoseconds.
- Ability to carry RF signals from DC up to 20 GHz (SRF)
- Switch to shield capacitance < 0.5 picofarads
- Dielectric strength across the contacts 200 volts
- Dielectric strength switch to coil 1000 Volts min.
- Contacts dynamically tested

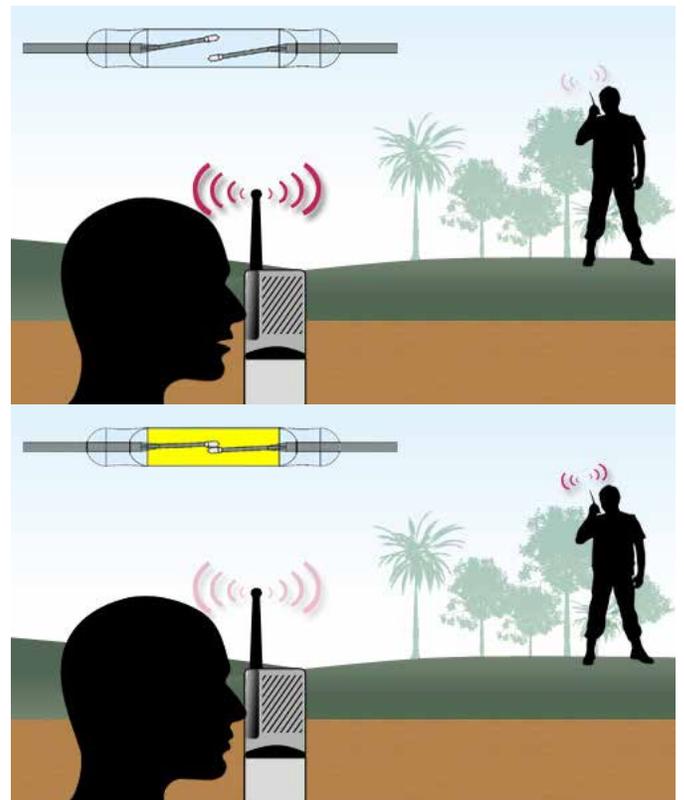


Figure 2. Reed Switch transmits RF signal in RF Receivers

Applications

- Ideal for switching high frequency matrices in medical applications
- Any applications where frequencies and/or fast digital pulses up to 20 GHz are involved.

Frequencies one MHz and above will travel on the outer wall of their conductor. Since the basic operation of reed switches requires the use of nickel/iron leads that have a high μ value, they will greatly impede the RF traveling on its outer surface. To get around this, Standex Electronics uses a copper plated reed switch. To meet the high current conditions of 6 amps or more when in the transmit mode, the highly conductive layer of copper solves the problem. Not only does it give a low stable contact resistance, but it prevents any internal heat build-up and allows for continuous transmission with a 100% duty cycle.

The HE along with its sister HM series together offer many options concerning packaging, pins outs, use of high insulation resistance wire, and multiple switches in the same package. Also, these series offer the relays in a normally closed contact configuration as well. The patented HF series uses an encapsulated electrostatic and magnetic shield making it an ideal choice for these RF applications.

The reed relay is an excellent choice because it can operate reliably over a wide temperature range, and represents an economical way to carry out billions of switching operations.

Specifications (@ 20°C) HE Series

| | Min | Typ | Max | Units |
|--|--------|-----|------|------------|
| Coil characteristics | | | | |
| Coil resistance | 45 | 50 | 55 | Ω |
| Coil voltage | | 5.0 | | V |
| Pull-In | | | 3.5 | V |
| Drop-Out | 0.85 | | | V |
| Switch characteristics | | | | |
| Contact rating | | | 100 | Watts |
| Switching voltage | | | 7500 | V |
| Switching current | | | 3.0 | Amps |
| Carry current | | | 6.0 | Amps |
| Carry current max. for 5ms | | | 10.0 | Amps |
| Static contact resistance | | | 150 | m Ω |
| Dynamic contact resistance | | | 200 | m Ω |
| Dielectric from voltage across the contacts | 10,000 | | | V |
| Dielectric voltage between contacts and coil | 10,000 | | | V |
| Operate time | | | 3.0 | msec |
| Release time | | | 1.5 | msec |
| Operate temp | -20 | | 70 | °C |
| Storage temp | -30 | | 100 | °C |

*Coil parameters will vary by 0.2% /oC

Standex Electronics's HE Series was designed for this very requirement. This series can carry these power requirements for years of satisfactory usage for the life time of the radio communication equipment. To meet the high voltage standoff of 10,000 volts the reed switch is hermetically sealed in a vacuum.

High Voltage / Current Reed Relay Series

| Series | Dimensions | Dimensions | | Illustration |
|--------|------------|------------|--------|---|
| | | mm | inches | |
| HE | W | 14.5 | 0.570 |  |
| | L | 15.5 | 0.610 | |
| | H | 65.0 | 2.559 | |
| HF | W | 19.0 | 0.748 |  |
| | L | 20.0 | 0.787 | |
| | H | 53.7 | 2.114 | |
| HM | W | 19.0 | 0.748 |  |
| | L | 19.8 | 0.780 | |
| | H | 68.00 | 2.677 | |

Find out more about our ability to propel your business with our products by visiting www.standexelectronics.com or by giving us a hello@standexelectronics.com today! One of our brilliant engineers or solution selling sales leaders will listen to you immediately.

About Standex Electronics

Standex Electronics is a worldwide market leader in the design, engineering, and manufacture of standard and custom electro-magnetic components, including magnetics products and reed switch-based solutions.

Our magnetics offerings include planar, current sense, and conventional low- and high-frequency transformers and inductors. Reed switch-based solutions include Meder, Kent, and KOFU brand reed switches, as well as a complete portfolio of reed relays, and a comprehensive array of fluid level, proximity, motion, water flow, HVAC condensate, hydraulic pressure differential, capacitive, conductive and inductive sensors.

We offer engineered product solutions for a broad range of product applications in the transportation, automotive, medical, test and measurement, military and aerospace, aviation, HVAC, appliance, security and safety, and general power and industrial markets.

Standex Electronics has a commitment to absolute customer satisfaction through a partner, solve, and deliver approach. With a global organization that offers sales support, engineering capabilities, and technical resources worldwide – we implement customer driven innovation that puts the customer first.

For more information on Standex Electronics, visit us on the web at standexelectronics.com.

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