



# Application Alley

## RF Attenuators - Reed Relays

*RF Attenuators Use Reed Relays For Attenuating RF Signals*

## Introduction

Test equipment capable of use in RF evaluations will generally require attenuation circuits to help them evaluate various aspects of RF components and RF circuitry. These attenuators need a switching device to switch the various dB levels that adjust the RF signals. Since attenuators are typically used to calibrate RF signal strength, the switching devices must be very good at handling RF so they don't end up attenuating the signal strength themselves. Also, the switching devices can be used on a regular basis which add up to a switching life concern. Electromechanical relays have been used in this application but the mechanical life is typically limited to less than one million operations. They can also be very expensive. New high frequency reed relays from Standex Electronics have become the design-in choice with their greatly improved RF characteristics and long life.

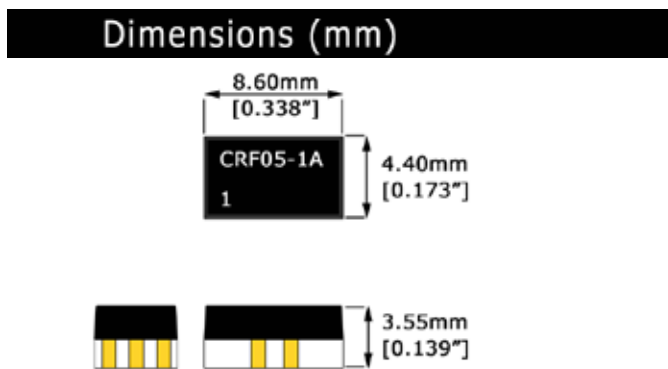


Figure 1. CRF physical layout

## Reed Relays Are Used in RF Circuits Where Attenuators Are Used

Attenuators are used throughout the RF world particularly in the test equipment area. Most RF circuits need to be calibrated. Attenuator circuits allow the RF designer and user to calibrate their components and RF circuits. Attenuators can be

switched in and out on a production basis when testing RF components and RF sub-assemblies and thereby require switches that can last 10s of millions of operations. Electromechanical relays typically begin to run into reliability problems once their mechanical life exceeds 1 million operations. Reed relays on the other hand, can switch into the billions of operations without any mechanical wear under low signal conditions. Recent new RF reed relays have flat insertion loss out to 7 GHz making its long life and excellent RF characteristics an ideal solution in RF attenuators.

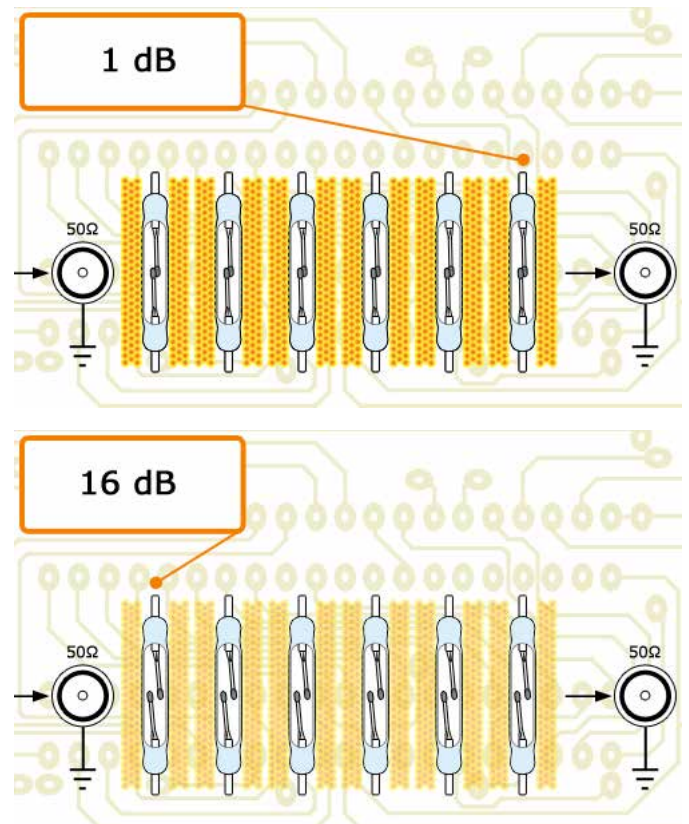


Figure 2. Reed Relays switch low signals in electrometers.

## Features

- High reliability
- Ideal RF characteristics
- Ideal for carrying fast digital pulses with skew rates less than 160 picoseconds.
- Ability to carry RF signals from DC up to 7 GHz (CRF)

- 50  $\Omega$  characteristic impedance
- Switch to shield capacitance 0.7 picofarads typ. and 0.6 pf typ. across the open contacts.
- Dielectric strength across the contacts 210 volts
- Contacts dynamically tested
- Surface mounted
- Very low profile
- BGAs available
- Rugged thermoset over-molded packaging
- Quad-shield arrangement

## Applications

- Ideal for use with systems that are switching an assortment of signals from DC to 7 GHz

Standex Electronics's reed relays use hermetically sealed reed switches that are further packaged in strong high strength thermoset molding compound, and can therefore be subject to various environments without any loss of reliability.

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.

Find out more about our ability to propel your business with our products by visiting [www.standelectronic.com](http://www.standelectronic.com) or by giving us a [hello@standelectronic.com](mailto:hello@standelectronic.com) today! One of our brilliant engineers or solution selling sales leaders will listen to you immediately.

### Specifications (@ 20°C) CRF Series

	Min	Typ	Max	Units
<b>Coil characteristics</b>				
Coil resistance	135	150	165	$\Omega$
Coil voltage		5.0		V
Pull-In			3.75	V
Drop-Out	0.85			V
<b>Switch characteristics</b>				
Contact rating			10	Watts
Switching voltage			170	V
Switching current			0.5	Amps
Carry current			0.5	Amps
Static contact resistance			250	m $\Omega$
Dynamic contact resistance			250	m $\Omega$
Dielectric from voltage across the contacts	210			V
Dielectric from voltage coil to contacts	1500			V
Insertion Loss (@ the -3 dB down point)			7	GHz
Operate time			0.1	msec
Release time			20	$\mu$ sec
Operate temp	-10		100	$^{\circ}$ C
Storage temp	-55		125	$^{\circ}$ C

### Surface Mount RF Reed Relay Series

Series	Dimensions		Illustration
	mm	inches	
CRF	W	4.4	0.173
	H	3.5	0.137
	L	8.6	0.338



## 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](http://standexelectronics.com).

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