



# Application Alley

## Electrometers - Reed Relays

*Electrometers Use Reed Relays in Their Detection Circuits*



## Introduction

Electrometers are used to measure ultra low currents at the sub-pico amp level. These electrometers are often used in radiation detection, where the radiation going through a gas cylinder ionizes the gas it comes in contact with. Ultra small currents are generated from the ionization, they need to be detected, switched into an operational amplifier, and then quantified for an early alert of the radiation level. Semiconductors have too much capacitance literally 'swallowing up' these signals. Electromechanical relays have too much leakage current and the film buildup on the contacts that needs to be broken for current to flow, never happens with these small signals. The only switch that can handle this environment is the Reed Relay. Standex Electronics's specially designed reed relays meet the requirements necessary to switch and carry this low signals.

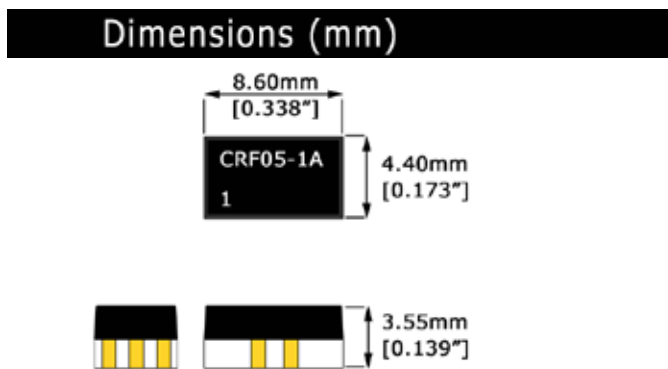


Figure 1. CRF physical layout

## Electrometers Use Reed Relays for Switching and Carrying Small Signals

Today with the vast amount of electric power being generated by nuclear generators and the threat of nuclear bombs ever-present, there is a need for detecting small nuclear radiation levels. Electrometers have been used as the most accurate way of detecting even the smallest amount of

radiation. These electrometers usually have an inert gas container with high voltage plates mounted within the gas container. Any radiation passing

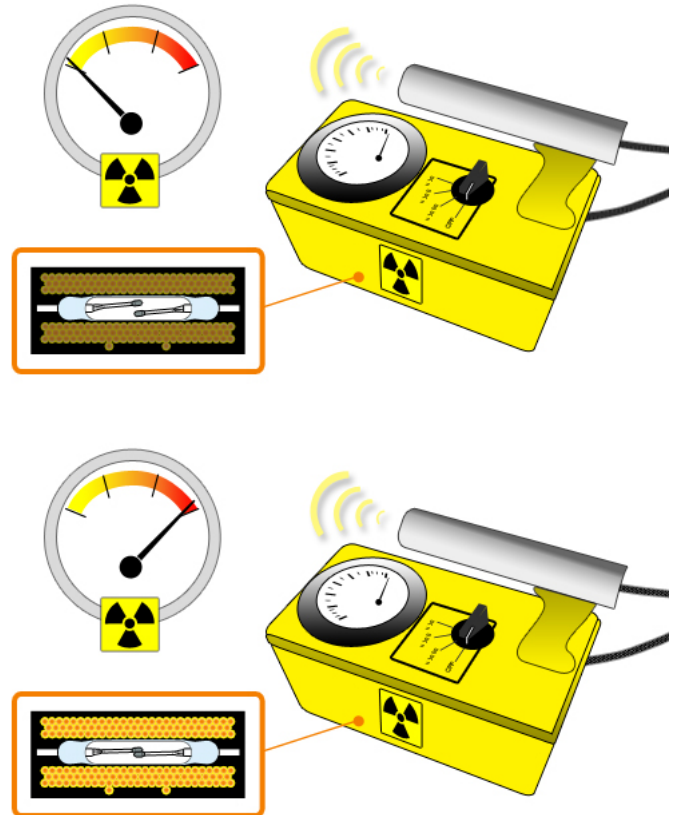


Figure 2. Reed Relays switch low signals in electrometers.

through the gas will create ionization. With this ionization, a small current will flow. This sub-pico amp current needs to be detected and then sent to an operational amplifier where the information can be quantified, compared and analyzed. Reed relays represent the only technology that can successfully switch and pass these small signals without losing signal integrity. Standex Electronics's has specialized in these types of applications and therefore has several series and special designs capable of getting the job done.

### Features

- High quality and reliability
- Very small size
- Insulation resistance > 10<sup>14</sup> Ohms
- Capable of switching and carrying fempto amps
- Dielectric strength across the contacts 200volts
- Contacts dynamically tested
- Low stable contact resistance
- Long life with up to a billion reliable operations

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

	Min	Typ	Max	Units
<b>Coil characteristics</b>				
Coil resistance	135	150	165	Ω
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	mΩ
Dynamic contact resistance			250	mΩ
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	μsec
Operate temp	-10		100	°C
Storage temp	-55		125	°C

\*Coil parameters will vary by 0.2% /oC



### Applications

- Ideal for use with systems that are switching an assortment of signals from DC to 15 GHz


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#### Surface Mount RF Reed Relay Series

Series	Dimensions	mm		inches		Illustration
		mm	inches	mm	inches	
SRF	W	4.0	0.157			
	H	3.2	0.126			
	L	7.5	0.295			
CRF	W	4.4	0.173			
	H	3.5	0.137			
	L	8.6	0.338			

### Through Hole Reed Relay Series

Series	Dimensions			Illustration
		mm	inches	
HI	W	7.5	0.295	
	H	7.9	0.311	
	L	28.0	1.102	

Standex Electronics's offers both standard through hole and surface mount in very small packages. All materials are selected for extremely high resistivity to avoid any potential leakage paths.

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.

## 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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