

A photograph of an operating room with two surgeons in scrubs and masks, illuminated by large overhead surgical lamps. The scene is dimly lit with a blueish tint.

# Application Alley

## Medical - Reed Relays

*Operating Rooms Use Reed Relays to Eliminate Instruments Left Behind After Surgery*

## Introduction

Every year billions of dollars are paid out for malpractice suits against practicing medical doctors. Most of these suits involve medical procedures or operations where a problem occurs during surgery. Since blood is ever abundant during surgery it can obscure the area being worked on. Sponges are used to soak up blood pools to facilitate the surgery. These blood saturated sponges placed between tissue can be left behind after the operation is complete. Of course, many times this gives rise to post surgical complications and sometimes death. Medical electronic designers have come up with a clever way of detecting these sponges potentially left behind in conjunction with using Standex Electronics's CRF reed relays.

to carry out the task at hand. Sponges and handy-wipes are used extensively and can quickly saturate with blood leaving them difficult to see when placed within the tissue. For this reason, they are one of the more prominent items left behind after surgery. Medical designers have come up with a clever way of keeping track of these sponges and handy-wipes by adding a microchip to each. After the operation, but just before closure of the wound, and electronic transmitter external to the body is turned on and using a matrix of relays, scans for these items. If any are left behind in the incision, they are quickly found and removed. The transmitters use an operating frequency of 900 MHz. Standex Electronics's CRF reed relay series are an ideal selection for switching and carrying these small RF signals.

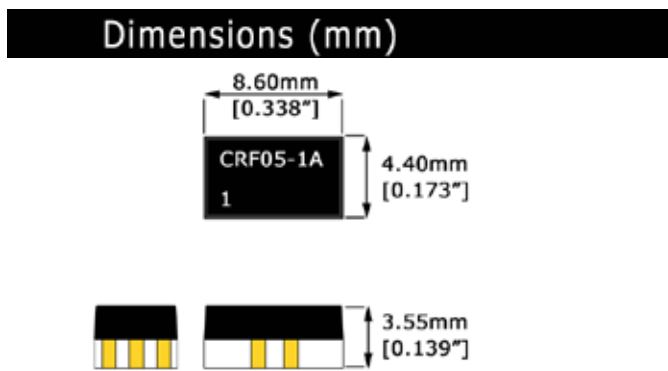


Figure 1. CRF physical layout

## Reed Relays Solve a Large Area of Malpractice Litigation for Doctors

Malpractice suits against practicing medical doctors has become a multibillion dollar enterprise. One of the more obvious and easily proved litigations is when an instrument or some implement during an operation is left mistakenly inside the person being operated on. Many 1000s of medical procedures and operations occur every day, so that the percentages, however small, become a sizable amount. In any operation, blood pools are almost always the biggest concern during an operation, because it can obscure the area being worked on making it more difficult

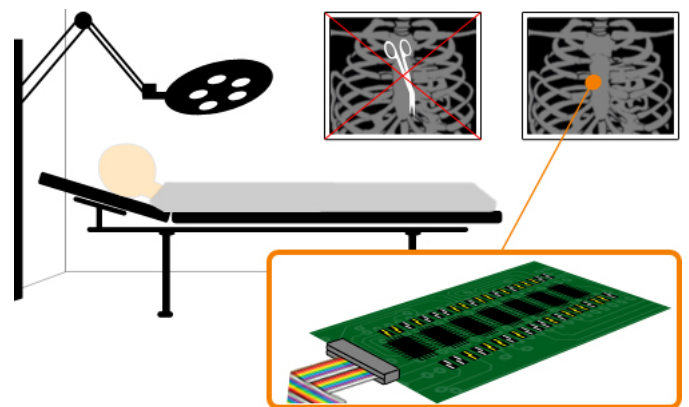


Figure 2. High frequency reed relay detects the presence of surgical instrument.

This RF ID tags system ideally uses our CRF relay taking advantage of its low profile and small size surface mountable package. Capable of handling up to 7 GHz in a 50 ohm impedance environment, it easily switches and carries the 900 MHz with no loss of signal power and no distortion. The relay carries out its job in a very reliable way eliminating many millions of dollars in malpractice litigation charges.

### 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)
- 50  $\Omega$  characteristic impedance
- Switch to shield capacitance < 0.5 picofarads
- Dielectric strength across the contacts 200 volts
- Contacts dynamically tested
- Surface mounted
- Very low profile
- BGAs available
- Rugged thermoset over-molded packaging
- Qual-shield arrangement



### 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

### 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.

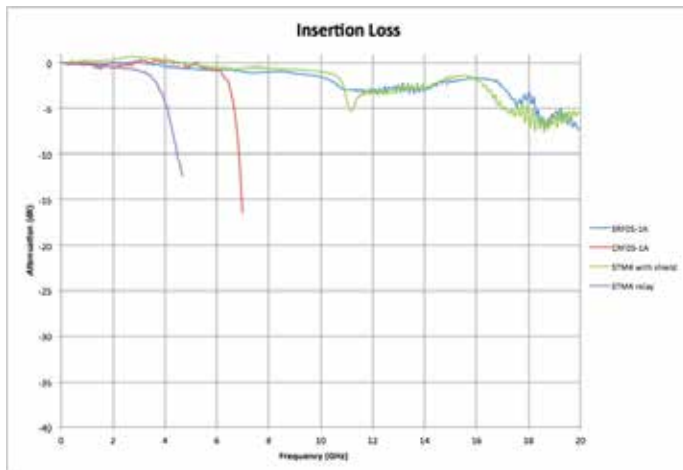
### Surface Mount RF Reed Relay Series

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			

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.

### Insertion Loss



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).

### Contact Information:

#### Standex Electronics

World Headquarters  
4538 Camberwell Road  
Cincinnati, OH 45209 USA

#### Standex Americas (OH)

+1.866.STANDEX (+1.866.782.6339)  
[info@standexelectronics.com](mailto:info@standexelectronics.com)

#### Standex Electronics Asia (Shanghai)

+86.21.37606000  
[salesasia@standexelectronics.com](mailto:salesasia@standexelectronics.com)

#### Standex Electronics Europe (Germany)

+49.7731.8399.0  
[info@standexelectronics.com](mailto:info@standexelectronics.com)

#### Standex Electronics India (Chennai)

+91.98867.57533  
[kkasaragod@standexelectronics.com](mailto:kkasaragod@standexelectronics.com)

#### Standex Electronics Japan (Kofu)

+81.42.698.0026  
[sej-sales@standex.co.jp](mailto:sej-sales@standex.co.jp)

