



# Application Alley

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## Medical - Reed Relays

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



Custom  
Engineered  
Solutions for  
Tomorrow

## 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-Meder's CRF reed relays.

### Dimensions (mm)

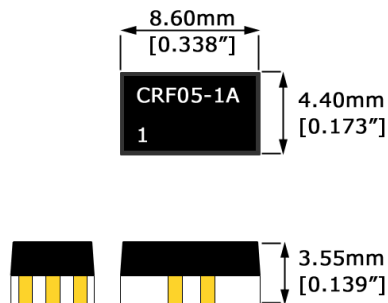


Figure 1. CRF physical layout

## 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 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-Meder's CRF reed relay series are an ideal selection for switching and carrying these small RF signals.

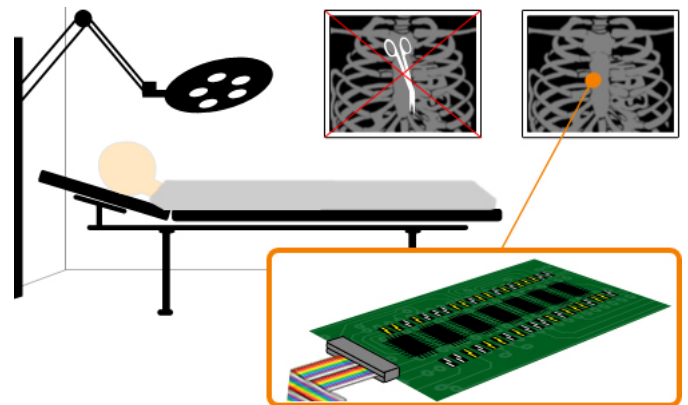


Figure 2. High frequency reed relay detects the presence of surgical instrument.

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 slew rates less than 200 picoseconds.
- Ability to carry RF signals from DC up to 7 GHz
- 50  $\Omega$  characteristic impedance
- Switch to shield capacitance 0.5 picofarads typ.
- Dielectric strength across the contacts 200 volts
- Contacts dynamically tested
- Surface mounted
- Very low profile
- BGAs available
- Rugged thermoset over-molded packaging
- Quad-shield arrangement

## Applications

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	0.75			V
<b>Switch characteristics</b>				
Contact rating			10	Watts
Switching voltage			170	V
Switching current			0.5	Amps
Carry current			1.0	Amps
Static contact resistance			200	m $\Omega$
Dynamic contact resistance			250	m $\Omega$
Contact bulk resistance Through all plated material on substrate		260	440	m $\Omega$
Breakdown voltage across the contacts	210			V
Dielectric strength coil/contact	1500			V
Insertion Loss (@ the -3 dB down point)			7	GHz
Operate time			0.6	msec
Release time			0.05	msec
Operate temp	-40		125	$^{\circ}$ C
Storage temp	-55		125	$^{\circ}$ C

The Pull-In, Drop-Out Voltage and Coil Resistance will change at rate of 0.4% per  $^{\circ}$ C

- Ideal for switching high frequency matrices in medical applications

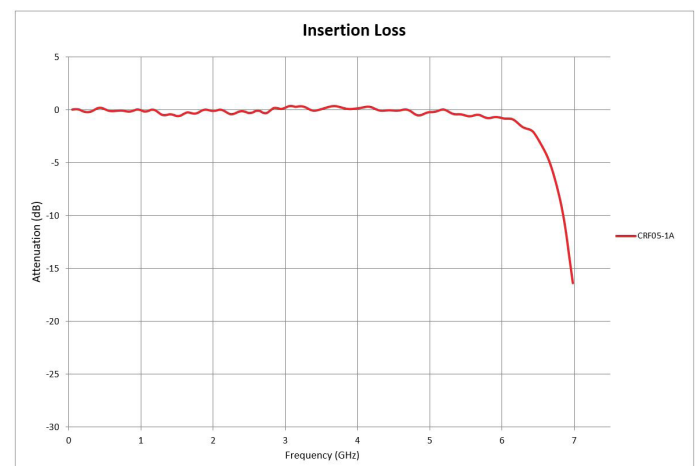
- Any applications where frequencies and/or fast digital pulses up to 7 GHz are involved.

Surface Mount RF Reed Relay Series				Illustration
Series	Dimensions	mm	inches	
		CRF	W	4.4
H	3.5		0.137	
L	8.6		0.338	

Standex-Meder'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.standexmeder.com](http://www.standexmeder.com) or by giving us a [hello@standexelectronics.com](mailto:hello@standexelectronics.com) today! One of our brilliant engineers or solution selling sales leaders will listen to you immediately.

## About Standex-Meder Electronics

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

Our magnetic offerings include planar, Rogowski, current, and low- and high-frequency transformers and inductors. Our reed switch-based solutions include Meder, Standex and OKI 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 spectrum of product applications in the automotive, medical, test and measurement, military and aerospace, as well as appliance and general industrial markets.

Standex-Meder Electronics has a commitment to absolute customer satisfaction and customer-driven innovation, with a global organization that offers sales support, engineering capabilities, and technical resources worldwide.

Headquartered in Cincinnati, Ohio, USA, Standex-Meder Electronics has eight manufacturing facilities in six countries, located in the United States, Germany, China, Mexico, the United Kingdom, and Canada.

For more information on Standex-Meder Electronics, please visit us on the web at [www.standexmeder.com](http://www.standexmeder.com).

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