



Application Alley

Portable Defibrillators - Reed Relays

Portable Defibrillators Use Reed Relays in their High Voltage Charging Circuit

Introduction

Every year many thousands of peoples' lives are saved having been resuscitated with a defibrillator after their heart had stopped beating. Many times this happens in a hospital environment. However, many people die every day from heart attacks that were not able get to the hospital in time to be resuscitated. Several medical equipment manufacturers have developed portable defibrillators that are placed in airports, bus stations, office buildings, in the home, and several places where people are apt to congregate. These portable defibrillators are battery operated and therefore, the electronics chosen to run the charging circuit must use low average power. The circuit must also be comprised with only very high reliability components. Standex Electronics's high voltage reed relays have been selected to be directly used in the high voltage charging circuit.

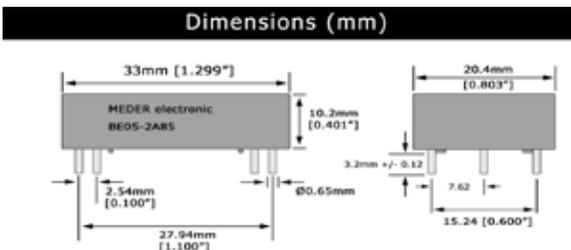


Figure 1. BE Physical layout

Features

- Several hundred million operations
- Ability to withstand up to 4000 volts across the contacts
- Ability to Switch up to 1000 Volts
- Ability to hold off 5000 volts between switch to coil
- Contacts dynamically tested

Applications

- Ideal for use in portable defibrillators

Reed relays are reliably used in portable battery operated defibrillators

Instruments that directly save lives require the best possible designs, and must use the most reliable components available. Portable defibrillators are designed so that anyone can pick up and use them with no prior experience. Portable defibrillators are only used for emergencies under life and death situations.

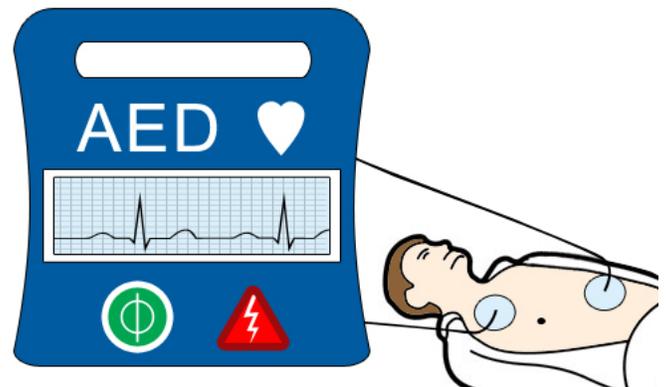


Figure 2. Defibrillator with reed relay shown shocking patient with no heart rhythm.

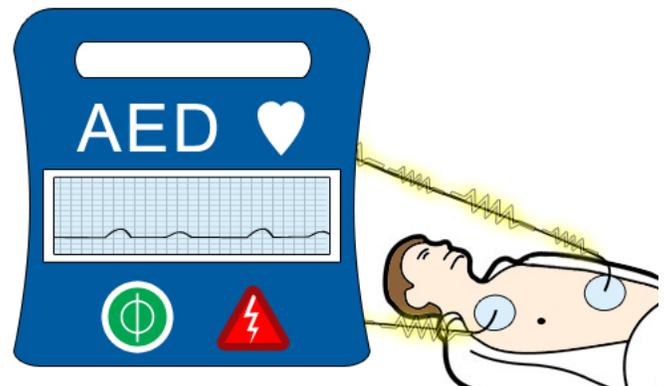


Figure 3. Defibrillator with reed relay has restored normal heartbeat with no harm to the patient.

They are only used when a person has suffered a heart attack; and is usually lying prone with their heart stopped. When the defibrillator is activated, the paddles are placed on the person's chest, and then a high voltage/current pulse is applied across the heart with the intent to shock the heart back into operation. Sometimes, repeated shocks may be required before the heart starts operating again. When repeated shocks are required, a charging circuit in the defibrillator is activated to charge the responsible circuit that will supply the next power burst. This charging circuit needs to be switched in and out in a reliable manner in a guaranteed fault free mode. Standex Electronics's special BE series design was chosen to meet the above requirements.

Standex Electronics's design is a 2 pole normally open relay that has a special spacing between the switches and coil to maintain a long path length, thereby insuring a guaranteed high isolation voltage between the coil and the switches. The design uses no internal solder joints on the reed switches to insure switching reliability. The reed switches are selected to withstand 4000 Volts minimum across the open contacts. The contacts can also switch up to 1000 volts as well.

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

Specifications (@ 20°C) BE Series

	Min	Typ	Max	Units
Coil Characteristics*				
Coil resistance	45	50	55	Ohms
Coil voltage		5		Volts
Pull-In max.			3.3	Volts
Drop-Out min.	0.65			Volts
Load characteristics				
Contact rating			100	Watts
Switching voltage	0		1000	Volts
Switching current	0		1.0	Amps
Carry current	0		2.5	Amps
Max carry current for 5 Ms			5.0	Amps
DC contact resistance			150	mΩ
Dynamic contact resistance			200	mΩ
Breakdown voltage	3000			Volts
Operate time			1.0	msec
Release time			100	μsec
Operate temp	-20		70	°C
Storage temp	-40		85	°C

*Coil parameters will vary by 0.2% / 1 °C

Through Hole Reed Relay Series

Series	Dimensions			Illustration
		mm	inches	
BE Special Series	W	20.4	0.803	
	L	10.2	0.401	
	H	33.0	1.299	

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.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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