



# Application Alley

## Multimeters - Reed Relays

*High End Multimeters Use Reed Relays To Measure High and Extremely Low Voltages*

## Introduction

With the ever increasing requirements for electronics and electronic systems, the need exists to be able to make voltage and current measurements covering several orders of magnitude. From nano-volts to kilovolts and from fempto-amps to amps. To do this with one instrument is almost impossible; however, multimeter designers have been able to expand the order of magnitude of these measurements in recent years. To be able to do this, the reed relay has become an essential component. Standex Electronics's specialized reed relays have helped designers meet this challenge.

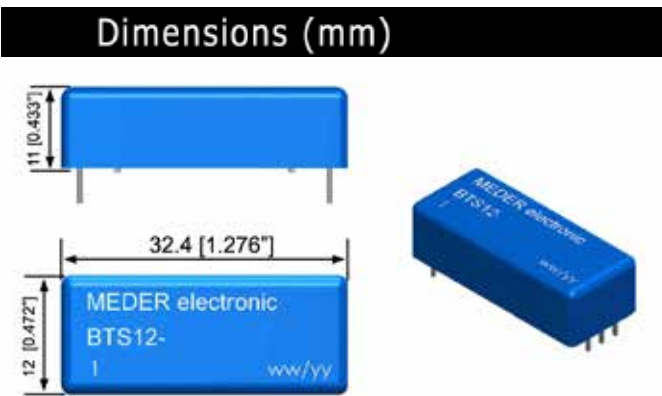


Figure 1. BT physical layout

## High End Multimeters Use Reed Relays

The need to make voltage and current measurements over several decades (several orders of magnitude) and to do so very accurately has become an increasing need. Electronic instruments and electronic systems will always require the need to measure voltages and currents very accurately as these instruments become increasingly complex.

## 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 4000 volts between switch to coil
- Contacts dynamically tested
- Ability to measure <math><1 \mu V</math>
- insulation resistance >

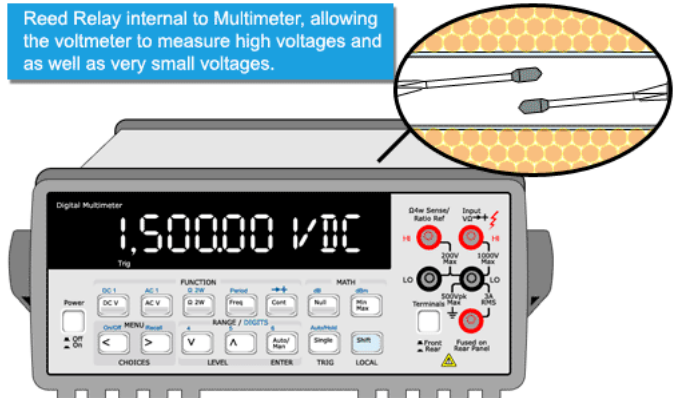


Figure 2. Reed Relay switch contacts are open.

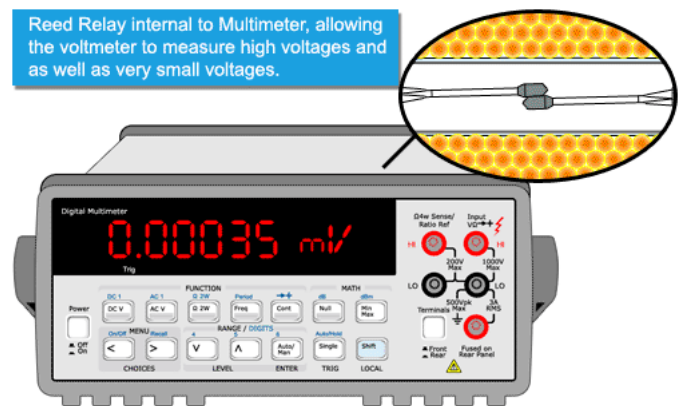


Figure 3. The Reed Relay is turned on, closing the switch contacts to measure a low voltage.

## Applications

- Ideal for high end multimeters.

When measuring very low voltages, not only the electronic components need to be carefully selected, but the materials used, because any heating that may occur in the instrument or system can produce offset voltages.

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

	Min	Typ	Max	Units
<b>Coil characteristics</b>				
Coil resistance	360	400	440	Ω
Coil voltage		5.0		V
Pull-In			5.0	V
Drop-Out	0.65			V
<b>Switch characteristics</b>				
Contact rating			100	Watts
Switching voltage			1000	V
Switching current			1.0	Amps
Carry current			3.0	Amps
Carry current max. for 5ms			5.0	Amps
Static contact resistance			150	mΩ
Dynamic contact resistance			200	mΩ
Dielectric from voltage across the contacts	4000			V
Thermal offset voltage			1.0	μV
Operate time			1	msec
Release time			100	μsec
Operate temp	-20		70	°C
Storage temp	-40		85	°C

\*Coil parameters will vary by 0.2% /oC

These offset or thermal voltages will influence any low voltage reading and potentially influence low current readings as well. These multimeters range from 6 and a half digits to the ultra accurate 8 and a half digits. Generally, a reed relay is placed on the front end of these multimeters allowing the broad spectrum of voltages, currents and resistances to be measured accurately. Standex Electronics's low thermal line of reed relays are specially made for this application.

The reed relay is ideally suited over any other technology, because it does not influence low voltage microvolt readings; it does not influence

pico-amp current readings; and high voltage readings can be taken because the reed relay's standoff voltage of up to 5000 volts. The reed relay is specially designed to eliminate thermal voltages with any small signals going through the reed relay without being altered or influenced.

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

#### Through Hole Reed Relay Series

Series	Dimensions		Illustration
	mm	inches	
BT Special Series	W	12.0	0.472
	H	11.0	0.433
	L	32.4	1.276



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](http://www.standexelectronics.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 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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