

Relay models 2200-2301, -2302, -2310, 2311 and -2314 are specifically designed to meet the rigorous specifications of the component Automatic Test Equipment industry.

Available from stock, these relays are ideal for use in new OEM designs or by the ATE user for new test fixturing as well as maintenance of existing production fixtures.

Coto's quality workmanship and designed-in reliability have become the standard in the ATE industry.

### PACKAGING

Series 2200 reed relays are fully encapsulated in a magnetically shielding steel shell

coated with a bright red, chemically resistant and insulating epoxy finish. A new proprietary potting process provides stress-free encapsulation of both coil and reed switch.

**TESTING AND RELIABILITY:** Optimizing the 2200 Series Relays' operating parameters are coil windings carefully designed for power conservation.

All reed switch capsules are dry buzzed in a test coil for one million cycles and then tested for dynamic contact resistance. This process eliminates weak, contaminated or damaged reed switches which are subject to early failure. The switches utilize a contact plating

which eliminates the low-level contact sticking failure mode.

- Dynamic contact resistance as described above, at the must-operate voltage and 100 Hz.
- Must operate time at 100 Hz.
- Insulation resistance at rated breakdown voltage between each isolated pin to all other pins tied together.
- Coil Resistance.
- See Engineering Bulletins #1 and #2 for further information on Coto testing procedures.

### RELAY SPECIFICATIONS

Model Number		2200-2301	2200-2302	2200-2310	2200-2311	2200-2314-
Available Coil Options		5 volt 150 ohms	5 volt 150 ohms	5 volt 550 ohms	5 volt 280 ohms	5 volt, 200 ohms — or — 12 volt, 800 ohms
Contact Form		1A	1A	1A	2A	2A
Package Size		A	A	A	B	B
Standard Shielding		Electrostatic 5 pin relay	Co-Axial 6 pin relay	N/A	N/A	N/A
Parameter	Test Conditions	VALUES				
Must Operate Volts	Volts DC	3.6	3.6	4.0	4.0	4.0 (5V) 9.0 (12V)
Must Release Volts	Volts DC	0.5	0.5	1.0	1.0	0.4 (5V) 1.0 (12V)
Max. Switch Voltage	DC/Peak AC	150	150	200	200	200
Max. Switch Current (Amps)	DC/Peak AC Resistive	0.5	0.5	0.5	0.5	0.5
Max. Carry Current (Amps)		1.0	1.0	1.0	1.0	1.0
Max. Contact Rating (Watts)	DC Resistive	10	10	10	10	10
Life Expectancy (Operations)	At Signal Level	500 x 10 <sup>6</sup>	500 x 10 <sup>6</sup>	500 x 10 <sup>6</sup>	500 x 10 <sup>5</sup>	500 x 10 <sup>6</sup>
	At Rated Level	5 x 10 <sup>6</sup>	5 x 10 <sup>6</sup>	5 x 10 <sup>6</sup>	5 x 10 <sup>5</sup>	5 x 10 <sup>5</sup>
Static Cont. (Ohms) Resistance (Initial)	0.050 Volt, 10 mA Contact Load	0.150 Max.	0.150 Max.	0.100 Max.	0.100 Max.	0.150 Max.
Dynamic Contact Resistance (Initial) (Ohms)	0.5 Volt, 50 mA Load 100 Hz, 1.5 msec. after coil energized	0.200 Max.	0.200 Max.	0.200 Max.	0.200 Max.	0.200 Max.
Insulation Resistance (Ohms)	Between all isolated pins @ 100V, 25 deg C, 40% relative humidity.	10 <sup>11</sup> Min.	10 <sup>11</sup> Min.	10 <sup>10</sup> Min.	10 <sup>10</sup> Min.	10 <sup>10</sup> Min.
Open Contact Capacitance (pf)	Shield Floating	.9	.9	.9	1.0	1.0
	Shield Guarded	.2	.2	N/A	N/A	N/A
Dielectric Strength (Min.) (Volts)	Between Contacts DC/Peak AC Static Conditions	250	250	250	250	250
	Contacts to Shield AC VRMS	1,000	1,000	1,000	1,000	1,000
Oper. Time (msec) (Including Bounce)	At Nominal Voltage 30 Hz Sq. wave	0.55 Max.	0.55 Max.	0.650 Max.	0.650 Max.	1.0 Typical
Release Time (msec)	Zener-Diode Clamp Coil Suppression	0.1 Typical	0.1 Typical	0.020 Nominal	0.020 Nominal	0.10 Typical
Schematics (Bottom View) Not to scale						

Unused pins are omitted.  
Pin numbers for reference only.  
Black dot on top of relay denotes pin #1.

### ENVIRONMENTAL RATINGS

Storage Temperature:  
-50°C to +100°C  
Operating Temperature:  
-20°C to +70°C  
Note: (The must-operate and must-release voltages and the coil resistance are specified at 25°C. These values vary by approximately 0.4%/°C as the ambient temperature varies.)  
Vibration: 20 G's to 2000Hz  
Shock: 50 G's

### ORDERING INFORMATION

2200-2301 through 2200-2311 are complete part numbers.  
For 2200-2314 indicate coil voltage. Example, 2200-2314-05 or 2200-2314-12.

### MOUNTING SOCKETS

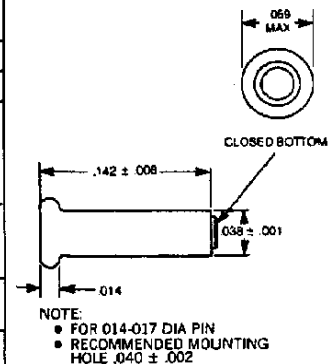
Miniature Spring Sockets suitable for use with 2301/2302 reed relays and the single pole versions of the 2200 series

### MATERIAL

Spring: Tin plated Beryllium Copper  
Eyelet: Tin Plated Copper

### PART NUMBER

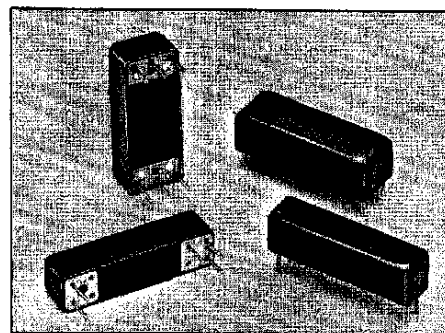
0116-0100



Coto's microminiature 2200 series relays are now available with greater than  $10^{12}$  ohm insulation resistance.

Utilizing a new low moisture absorbant bobbin material, Coto's special cleaning process and screening assures you of the most reliable high impedance relay available. This new microminiature design has been engineered to provide an improved system to lock in the terminal pins (up to 2 lbs. pull test prior to encapsulation).

The 2200 series reed relays, long recognized as the smallest high reliability relays in the industry, offer a wide variety of contact forms and coil resistances while occupying only .17 sq. in. of PC board space. Switching speeds of less than 500 micro seconds typical on most models and optional electrostatic or co-axial shielding contribute further to the versatility of the 2200 series.



### RELAY SPECIFICATIONS

Model Number & Coil Voltage	2204-05, 12	2211-05, 12	2231† 05, 12		
Contact Form	1A	1C	1A		
Package Size	A	A	A		
Available Coil Options	2, 3, 4	2, 3	2, 3		
Available Shield Options	Electrostatic or Co-Axial*	N/A	N/A		
Parameter	Test Conditions	VALUES			
Max. Switch Voltage	DC/Peak AC	200	100	200	
Max. Switch Current (Amps)	DC/Peak AC Resistive	0.5	0.25	0.5	
Max. Carry Current (Amps)		1.0	0.5	1.0	
Max. Contact Rating (Watts)	DC Resistive	10	3	10	
Life Expectancy (Operations)	At Signal Level	$500 \times 10^6$	$100 \times 10^6$	$500 \times 10^6$	
	At Rated Level	$5 \times 10^6$	$5 \times 10^5$	$5 \times 10^6$	
Static Cont. (Ohms) Resistance (Initial)	0.050 Volt, 10 mA Contact Load	0.100 Max.	0.150 Max.	0.150 Max.	
Dynamic Contact Resistance (Initial) (Ohms)	0.5 Volt, 50 mA Load 100 Hz, 1.5 msec. after coil energized	0.200 Max.	0.200 Max.	0.200 Max.	
Insulation Resistance (Ohms)	Between all isolated pins @ 100V, 25 deg C, 40% relative humidity.	$10^{10}$ Min. $10^{12}$ Optional	$10^9$ Min. $10^{11}$ Optional	$10^{10}$ Min. $10^{12}$ Optional	
Open Contact Capacitance (pf)	Shield Floating	.9	1.8	9	
	Shield Guarded	2	N/A	N/A	
Dielectric Strength (Min.) (Volts)	Between Contacts	DC/Peak AC	250	200	400
	Contacts to Shield	Static Conditions			
	Contacts and Shield to Coil	AC VRMS	1,000	1,000	1,000
Oper. Time (msec) (Including Bounce)	At Nominal Voltage 30 Hz Sq. wave	0.5 Typical	1.0 Typical	0.5 Typical	
Release Time (msec)	Zener-Diode Clamp Coil Suppression	0.1 Typical	2.0 Typical	0.1 Typical	
Schematics (Bottom View) Not to scale					

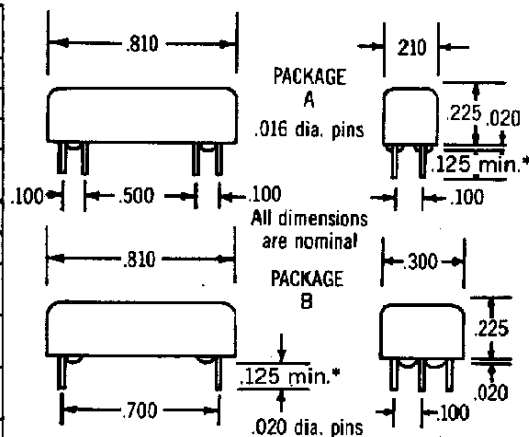
Unused pins are omitted.

Pin numbers for reference only.

Black dot on top of relay denotes pin #1.

\*On model 2204 pin #7 is the optional electrostatic shield pin, pins #6 and #7 are the optional co-axial shield pins.

†Model 2231 offers a higher contact to contact breakdown voltage especially useful in European applications.



\*.105 ±.015 for models #2200-2310 and #2200-2311

OPERATING PARAMETERS @ 25°C		
Nominal Volts	05	12
Must Operate Volts	3.75	9.0
Must Release Volts	0.4	1.0
Coil #2 Resistance Ohms*	150	900
Coil #3 Resistance Ohms*	230	1500
Coil #4 Resistance Ohms*	370	—

\*Resistance figures are ± 10%

### ORDERING INFORMATION

To order a Coto relay, assemble a part number from the data below to describe the desired parameters.

