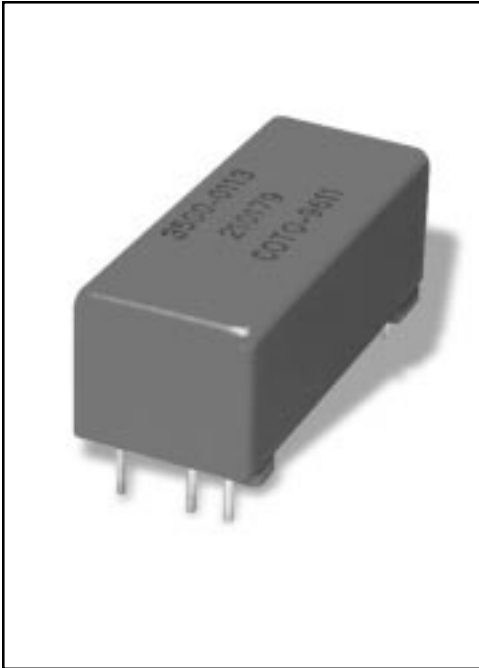


# 3500 Series/Low Thermal EMF Reed Relays

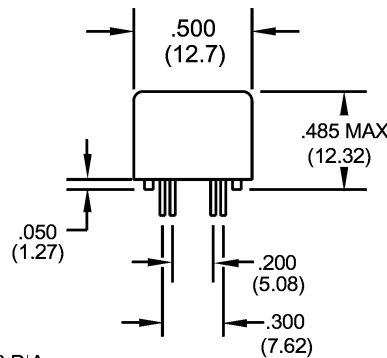
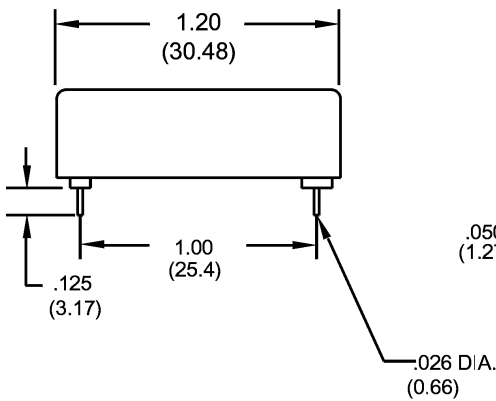


## LOW THERMAL EMF REED RELAYS

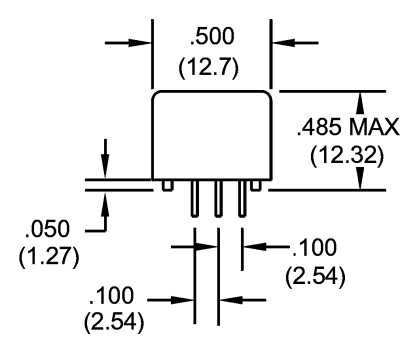
The 3500 Series is ideally suited to the needs of Instrumentation, Data Acquisition and Process Control. The specification tables allow you to select the appropriate relay for your particular application. Recommended for use in high accuracy DVM's, Multiplexers and Digital or Analog Multipoint Recorders. If your requirements differ from the selection options, please consult Coto's Factory to discuss a custom reed relay. Refer to page 41 for Thermal EMF test methods.

## 3500 SERIES FEATURES

- ◆ Low Thermal EMF:  $< 10 \mu\text{V}$  through  $< 0.5 \mu\text{V}$  with 50 nV stability.
- ◆ Patented Low Thermal Design. Patent #4,084,142.
- ◆ Low power coils to ensure low thermal EMF.
- ◆ High Insulation Resistance -  $10^{12} \Omega$
- ◆ Control/Signal isolation of 1500 VDC
- ◆ High reliability, hermetically sealed contacts.
- ◆ Form A, Dry or Hg Wet contacts. High Dielectric Strength.
- ◆ Epoxy coated steel shell provides magnetic shielding.



(For Model #'s  
3501 & 3540)



(For Model #'s  
3502, 3520, 3541)



Bottom  
View

Dimensions in Inches (Millimeters)

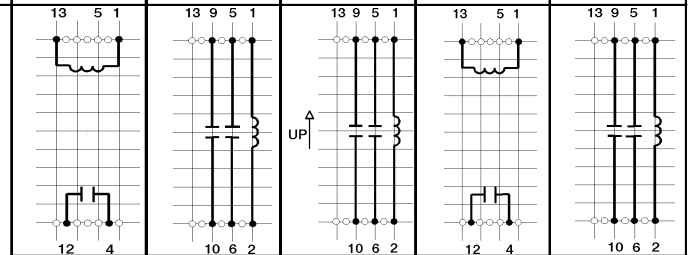
## Ordering Information

Part Number	Model Number	Coil Voltage	Shielding Options <sup>2</sup>	Thermal EMF Rating
XXXX-XX-X1X	3501 3502 3520 3540 3541	05=5 volts 12=12 volts	0=No Electrostatic Shield 1=Electrostatic Shield	See available ratings in specification table.
				1= $< 10 \mu\text{V}$ Hg Wet Only
				9= $< 5 \mu\text{V}$
				8= $< 3 \mu\text{V}$ Dry only
				7= $< 1 \mu\text{V}$ Dry only
				5= $< 0.5 \mu\text{V}$ Dry only

# 3500 Series/Low Thermal EMF Reed Relays

Model Number			3501 <sup>2</sup>	3502 <sup>2</sup>	3520 <sup>2,3</sup>	3540 <sup>2</sup>	3541 <sup>2</sup>
Parameters	Test Conditions	Units	1 Form A	2 Form A	2 Form A	1 Form A High Voltage	2 Form A High Voltage
<b>THERMAL EMF OPTIONS</b>	Measured after 5 minutes at nominal coil voltage Refer to Reed Relay Technical Section for Details	$\mu\text{V}$	Individual <5 $\mu\text{V}$ <3 $\mu\text{V}$ <1 $\mu\text{V}$ <0.5 $\mu\text{V}$	Differential <5 $\mu\text{V}$ <3 $\mu\text{V}$ <1 $\mu\text{V}$ <0.5 $\mu\text{V}$	Differential <10 $\mu\text{V}$ <5 $\mu\text{V}$ - -	Individual <5 $\mu\text{V}$ <3 $\mu\text{V}$ - -	Differential <5 $\mu\text{V}$ <3 $\mu\text{V}$ - -
<b>COIL SPECS.</b>							
Nom. Coil Voltage		VDC	5 12	5 12	5 12	5 12	5 12
Coil Resistance	+/- 10%, 25° C	$\Omega$	350 2000	350 2000	200 850	200 1500	200 1500
Operate Voltage	Must Operate by	VDC - Max.	3.8 9.0	3.8 9.0	3.8 9.0	3.8 9.0	3.8 9.0
Release Voltage	Must Release by	VDC - Min.	0.4 1.0	0.4 1.0	0.4 1.0	0.4 1.0	0.4 1.0
<b>CONTACT RATING</b>							
Switching Voltage	Max DC/Peak AC Resist.	Volts	200	200	500	500	500
Switching Current	Max DC/Peak AC Resist.	Amps	0.5	0.5	1.0	0.5	0.5
Carry Current	Max DC/Peak AC Resist.	Amps	1.5	1.5	2.0	2.0	2.0
Contact Rating	Max DC/Peak AC Resist.	Watts	10	10	28	10	10
Life Expectancy-Typical <sup>1</sup>	Signal Level 1.0V, 10mA	x 10 <sup>6</sup> Ops.	500	100	1000	100	100
Static Contact Resistance (max. init.)	50mV, 10mA	$\Omega$	0.200	0.100	0.050	0.200	0.100
Dynamic Contact Resistance (max. init.)	0.5V, 50mA at 100 Hz, 1.5 msec	$\Omega$	0.300	0.200	0.100	0.300	0.200
<b>RELAY SPECIFICATIONS</b>							
Insulation Resistance (minimum)	Between all Isolated Pins at 100V, 25°C, 40% RH	$\Omega$	10 <sup>12</sup>	10 <sup>12</sup>	10 <sup>12</sup>	10 <sup>12</sup>	10 <sup>12</sup>
Capacitance - Typical	Without shield	pF	3.0	1.7	1.7	3.0	1.7
Across Open Contacts	Shield Guarding	pF	1.9	0.2	0.2	1.9	0.2
Dielectric Strength (minimum)	Between Contacts	VDC/peak AC	700	350	1000	1500	1500
	Contacts to Shield	VDC/peak AC	1000	1000	1000	1000	1000
	Contacts/Shield to Coil	VDC/peak AC	1500	1500	1500	1500	1500
Operate Time - including bounce - Typical	At Nominal Coil Voltage, 30 Hz Square Wave	msec.	0.75	0.75	2.0	1.0	1.0
Release Time - Typical	Zener-Diode Suppression <sup>4</sup>	msec.	0.1	0.1	1.0	0.2	0.2

Top View:  
Dot stamped on top of relay refers to pin #1 location  
Grid = .1"x.1" (2.54mm x 2.54mm)



## Notes:

- <sup>1</sup>Consult factory for life expectancy at other switching loads.
- <sup>2</sup>Models 3501 and 3540, optional electrostatic shield is tied to pin #5. Models 3502, 3520 and 3541, optional electrostatic shield is tied to pin #13.
- <sup>3</sup>Model 3520 has Hg wet contacts - position sensitive, must be mounted within 30° of vertical plane. See schematic.
- <sup>4</sup>Consists of 20V Zener-diode and 1N4002 diode in series, connected in parallel with coil

## Environmental Ratings

Storage Temp: -35°C to +100°C;  
 Operating Temp: -20°C to +85°C  
 Solder Temp: 270°C max; 10 sec. max  
 The operate and release voltage 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 2000 Hz; Shock: 50 G's