

## Temperature Sensors HEL-775 Series

PLATINUM RTDs

### FUNCTIONAL BEHAVIOR

$$R_T = R_0(1 + AT + BT^2 - 100CT^3 + CT^4)$$

$R_T$  = Resistance (W) at temperature T (°C)

$R_0$  = Resistance (W) at 0°C

T = Temperature in °C

$$A = a + \frac{a d}{100} \quad B = \frac{-a d}{100^2} \quad C_{T < 0} = \frac{-a b}{100^4}$$

### CONSTANTS

<b>Alpha, <math>\alpha</math> (°C<sup>-1</sup>)</b>	0.003750 ±0.000029	0.003850 ±0.000010
<b>Delta, <math>\delta</math> (°C)</b>	1.605 ± 0.009	1.4999 ± 0.007
<b>Beta, <math>\beta</math> (°C)*</b>	0.16	0.10863
<b>A (°C<sup>-1</sup>)</b>	3.81x10 <sup>-3</sup>	3.908x10 <sup>-3</sup>
<b>B (°C<sup>-2</sup>)</b>	-6.02x10 <sup>-7</sup>	-5.775x10 <sup>-7</sup>
<b>C (°C<sup>-4</sup>)*</b>	-6.0x10 <sup>-12</sup>	-4.183x10 <sup>-12</sup>

\*Both  $\beta = 0$  and  $C = 0$  for  $T > 0^\circ\text{C}$

### CAUTION

#### PRODUCT DAMAGE

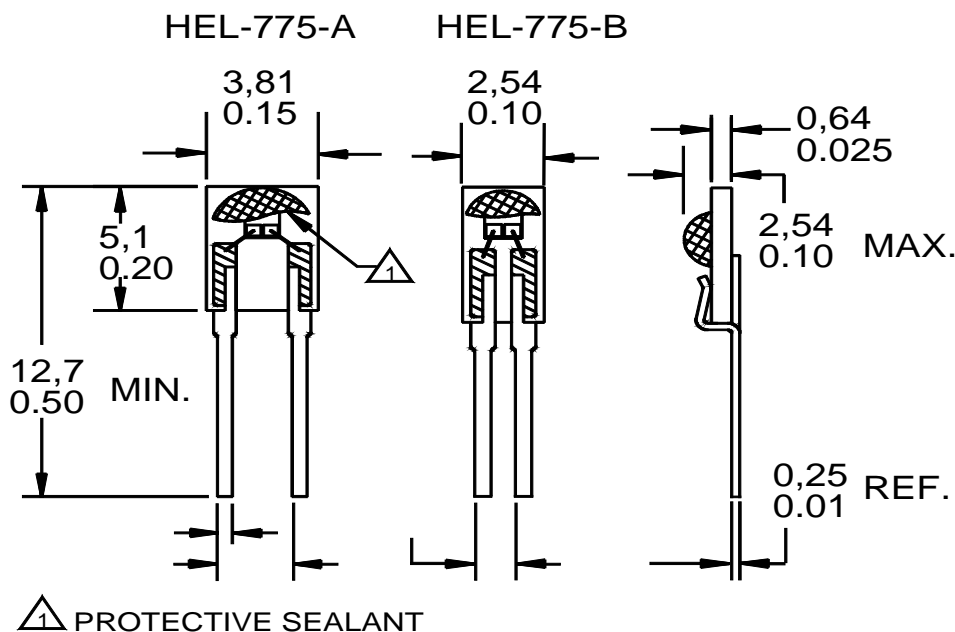
The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take normal ESD precautions when handling this product.

### ACCURACY VS TEMPERATURE

EL-700 platinum RTDs are available in two base resistance trim tolerances: ±0.2% or ±0.1%. The corresponding resistance interchangeability and temperature accuracy for these tolerances are:

Trim Tolerance	Standard ±0.2%		Optional ±0.1%	
	±ΔR (Ω)	±ΔT (°C)	±ΔR (Ω)	±ΔT (°C)
Temperature (°C)				
-200	6.8	1.6	5.1	1.2
-100	2.9	0.8	2.4	0.6
0	2.0	0.5	1.0	0.3
100	2.9	0.8	2.2	0.6
200	5.6	1.6	4.3	1.2
300	8.2	2.4	6.2	1.8
400	11.0	3.2	8.3	2.5
500	12.5	4.0	9.6	3.0
600	15.1	4.8	10.4	3.3

### MOUNTING DIMENSIONS (for reference only) mm/in



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## ELECTRICAL INTERFACING

Fig. 1 illustrates the most common method of measuring an RTD. As  $R_T$  increases or decreases with temperature,  $V_o$  increases or decreases. An op-amp is used to observe  $V_o$ . Lead wire resistance,  $L_1$  and  $L_2$ , add to the RTD leg of the bridge and may affect the temperature reading.

Fig. 2 is a simple circuit that provides a voltage output linear to within 0.1% or a  $\pm 0.3^\circ\text{C}$  ( $0.5^\circ\text{F}$ ) error over a range of  $-40^\circ\text{C}$  to  $+150^\circ\text{C}$  ( $-40^\circ\text{F}$  to  $+302^\circ\text{F}$ ).

Fig. 3 illustrates one way to detect one particular temperature, if required in an application. The potentiometer may be adjusted to correspond to the desired temperature.

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## RESISTANCE VS TEMPERATURE CURVE

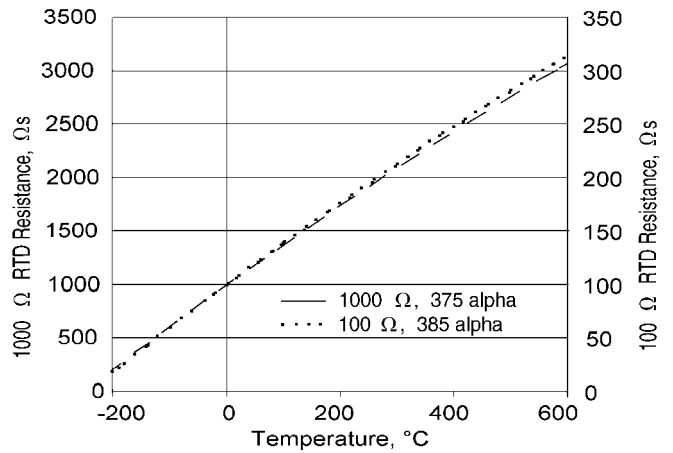


Fig. 1: Wheatstone Bridge 2-Wire Interface

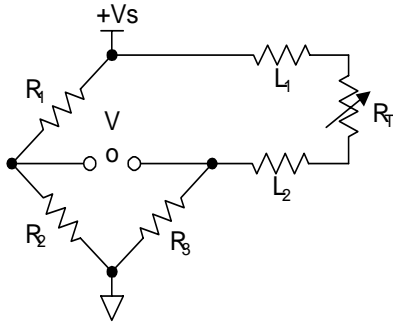


Fig. 2: Linear Output Voltage

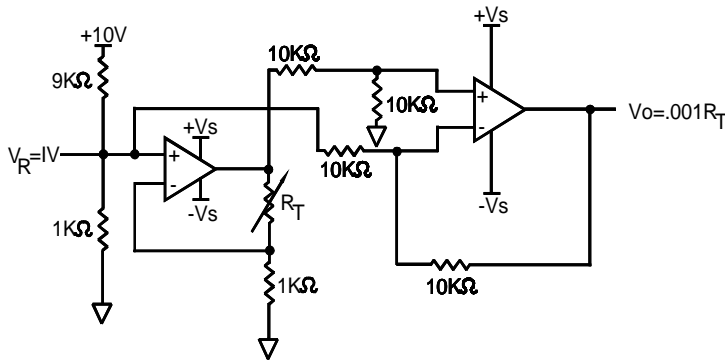
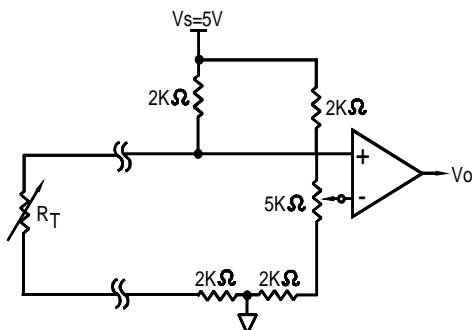


Fig. 3: Adjustable Point (Comparator) Interface



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## WARRANTY and REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance, personally, through our literature and the Honeywell website, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:

1-800-537-6945 USA  
1-800-737-3360 Canada  
1-815-235-6847 International

## FAX

1-815-235-6545

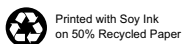
## INTERNET

[www.honeywell.com/sensing](http://www.honeywell.com/sensing)  
[info@micro.honeywell.com](mailto:info@micro.honeywell.com)

# Honeywell

## MICRO SWITCH

Honeywell Inc.  
11 West Spring Street  
Freeport, Illinois 61032



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