

## Interactive Catalog Replaces Catalog Pages

Honeywell Sensing and Control has replaced the PDF product catalog with the new **Interactive Catalog**. The **Interactive Catalog** is a power search tool that makes it easier to find product information. It includes more installation, application, and technical information than ever before.



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Interactive Catalog.**

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### **Sensing and Control**

Honeywell Inc.

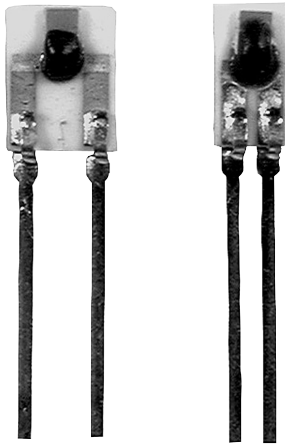
11 West Spring Street

Freeport, Illinois 61032

# Temperature Sensors

## Platinum RTDs

HEL-775 Series



### FEATURES

- Linear resistance vs temperature
- Accurate and Interchangeable
- Excellent stability
- Small size
- Printed circuit mountable
- Ceramic SIP package

### TYPICAL APPLICATIONS

- HVAC – room, duct and refrigerant equipment
- Instrument and probe assemblies
- Electronic assemblies – temperature compensation
- Process control – temperature regulation

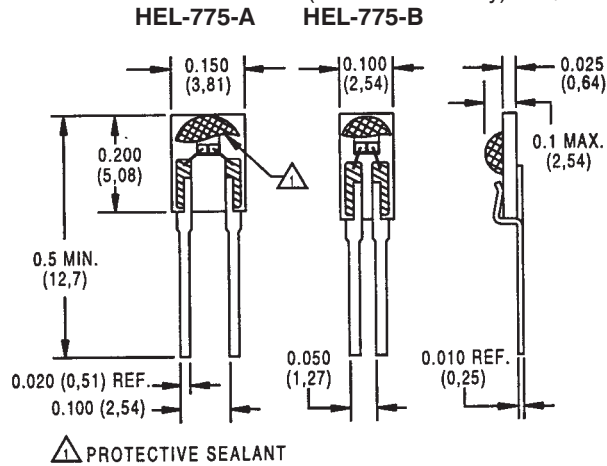
HEL-775 platinum RTDs are designed to measure temperatures from  $-55^{\circ}$  to  $+150^{\circ}\text{C}$  ( $-67^{\circ}$  to  $302^{\circ}\text{F}$ ) in printed circuit boards, temperature probes, or other lower temperature applications. Solderable leads in 0.050" or 0.100" spacing provide strong connections for wires or printed circuits.

The 1000 $\Omega$ , 375 alpha version, provides 10x greater sensitivity and signal-to-noise. The 0.050" lead space models are ideal for probes.

### ORDER GUIDE

<b>HEL-775-A</b>	Ceramic SIP pkg. 0.100" lead spacing
<b>HEL-775-B</b>	Ceramic SIP pkg. 0.050" lead spacing
<b>-U</b>	1000 $\Omega$ , 0.00375 $\Omega/\Omega/^{\circ}\text{C}$
<b>-T</b>	100 $\Omega$ , 0.00385 $\Omega/\Omega/^{\circ}\text{C}$ , DIN specification
<b>-0</b>	$\pm 0.2\%$ Resistance Trim (Standard)
<b>-1</b>	$\pm 0.1\%$ Resistance Trim (Optional)

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



### 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.

Fig. 1: Wheatstone Bridge 2-Wire Interface

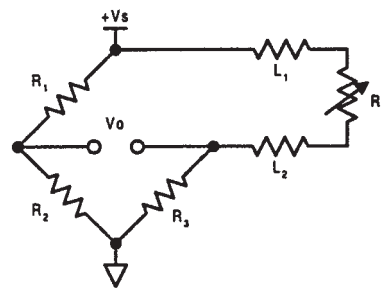


Fig. 2: Linear Output Voltage

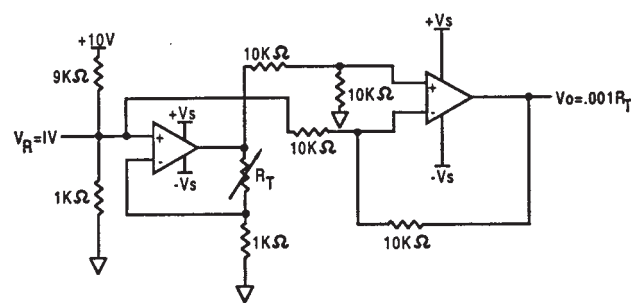
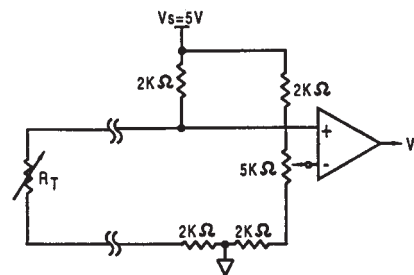


Fig. 3: Adjustable Point (Comparator) Interface



Temperature

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### FUNCTIONAL BEHAVIOR

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

$R_T$  = Resistance ( $\Omega$ ) at temperature  $T$  ( $^{\circ}\text{C}$ )

$R_0$  = Resistance ( $\Omega$ ) at  $0^{\circ}\text{C}$

$T$  = Temperature in  $^{\circ}\text{C}$

$$A = \alpha + \frac{\alpha \delta}{100} \quad B = \frac{-\alpha \delta}{100^2} \quad C_{T < 0} = \frac{-\alpha \beta}{100^4}$$

<b>Alpha, <math>\alpha</math> (<math>^{\circ}\text{C}^{-1}</math>)</b>	0.00375 $\pm 0.000029$	0.003850 $\pm 0.000010$
<b>Delta, <math>\delta</math> (<math>^{\circ}\text{C}</math>)</b>	$1.605 \pm 0.009$	$1.4999 \pm 0.007$
<b>Beta, <math>\beta</math> (<math>^{\circ}\text{C}</math>)</b>	0.16	0.10863
<b>A (<math>^{\circ}\text{C}^{-1}</math>)</b>	$3.81 \times 10^{-3}$	$3.908 \times 10^{-3}$
<b>B (<math>^{\circ}\text{C}^{-2}</math>)</b>	$-6.02 \times 10^{-7}$	$-5.775 \times 10^{-7}$
<b>C (<math>^{\circ}\text{C}^{-4}</math>)</b>	$-6.0 \times 10^{-12}$	$-4.183 \times 10^{-12}$

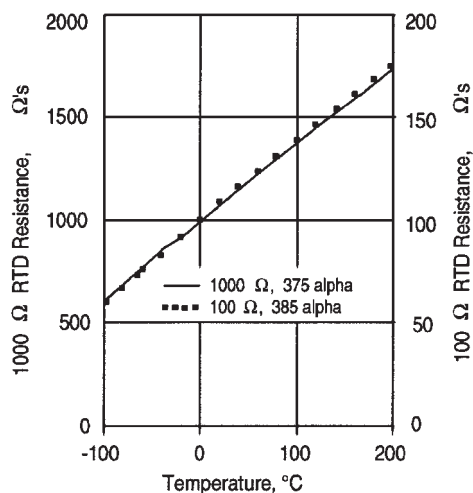
Both  $\beta = 0$  and  $C = 0$  for  $T > 0^{\circ}\text{C}$

### ACCURACY VS TEMPERATURE

Tolerance	Standard $\pm 0.2\%$		Optional $\pm 0.1\%$		
	Temperature ( $^{\circ}\text{C}$ )	$\pm \Delta R^*$ ( $\Omega$ )	$\pm \Delta T$ ( $^{\circ}\text{C}$ )	$\pm \Delta R^*$ ( $\Omega$ )	$\pm \Delta T$ ( $^{\circ}\text{C}$ )
	-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

\* 1000 $\Omega$  RTD. Divide  $\Delta R$  by 10 for 100 $\Omega$  RTD.

### RESISTANCE VS TEMPERATURE CURVE



### SPECIFICATIONS

Sensor Type	Thin film platinum RTD: $R_0 = 1000 \Omega @ 0^{\circ}\text{C}$ ; $\alpha = 0.00375 \Omega/\Omega/^{\circ}\text{C}$ $R_0 = 100 \Omega @ 0^{\circ}\text{C}$ ; $\alpha = 0.00385 \Omega/\Omega/^{\circ}\text{C}$
Temperature Range	$-55^{\circ}$ to $+150^{\circ}\text{C}$ ( $-67^{\circ}$ to $+302^{\circ}\text{F}$ )
Temperature Accuracy	$\pm 0.5^{\circ}\text{C}$ or 0.8% of temperature, $^{\circ}\text{C}$ ( $R_0 \pm 0.2\%$ trim), whichever is greater $\pm 0.3^{\circ}\text{C}$ or 0.6% of temperature, $^{\circ}\text{C}$ ( $R_0 \pm 0.1\%$ trim), whichever is greater (optional)
Base Resistance and Interchangeability, $R_0 \pm \Delta R_0$	$1000 \pm 2 \Omega$ ( $\pm 0.2\%$ ) @ $0^{\circ}\text{C}$ or $100 \pm 0.2 \Omega$ ( $\pm 0.2\%$ ) @ $0^{\circ}\text{C}$ $1000 \pm 1 \Omega$ ( $\pm 0.1\%$ ) @ $0^{\circ}\text{C}$ or $100 \pm 0.2 \Omega$ ( $\pm 0.2\%$ ) @ $0^{\circ}\text{C}$ (optional)
Linearity	$\pm 0.15\%$ of full scale for temperatures spanning $-55^{\circ}$ to $150^{\circ}\text{C}$
Time Constant	<10 sec. in air at 10 ft./sec.
Operating Current	1 mA maximum in still air for $<0.3^{\circ}\text{C}$ ( $0.5^{\circ}\text{F}$ ) self heating
Stability	<0.05 $^{\circ}\text{C}$ per 5 years in occupied environments
Self Heating	
HEL-775-A	9.7mW/ $^{\circ}\text{C}$ nominal in air at 10ft/sec, 4.3mW/ $^{\circ}\text{C}$ nominal in enclosed still air
HEL-775-B	6.8mW/ $^{\circ}\text{C}$ nominal in air at 10ft/sec, 3.0mW/ $^{\circ}\text{C}$ nominal in enclosed still air
Insulation Resistance	>50 M $\Omega$ @ 50 VDC @ $25^{\circ}\text{C}$
Construction	Alumina substrate with epoxy protection
Lead Material	Phosphor bronze with bright tin lead 60/40 plating
Lead Configuration	2-wire