

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.



**Click this icon to try the new
Interactive Catalog.**

Sensing and Control

Honeywell Inc.

11 West Spring Street

Freeport, Illinois 61032



Temperature Sensors

Platinum RTDs

HEL-776/HEL-777



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-776 and HEL-777 platinum RTDs are designed to measure temperatures from -55° to $+150^{\circ}\text{C}$ (-67° to 302°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.

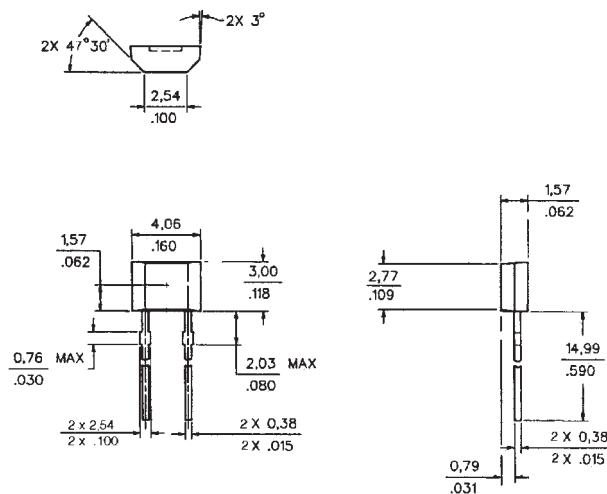
The 1000 Ω , 375 alpha version, provides 10x greater sensitivity and signal-to-noise. Both are ideal for air temperature sensing.

ORDER GUIDE

| | |
|-----------|--|
| HEL-776-A | Molded SIP pkg. 0.100" lead spacing |
| HEL-777-A | Molded SIP pkg. 0.100" lead spacing |
| -U | 1000 Ω , 0.00375 $\Omega/\Omega/\text{C}$ |
| -T | 100 Ω , 0.00385 $\Omega/\Omega/\text{C}$ |
| -0 | $\pm 0.2\%$ Resistance Trim (Standard) |
| -1 | $\pm 0.1\%$ Resistance Trim (Optional) |

MOUNTING DIMENSIONS (for reference only) mm/in.

HEL-776-A



HEL-777-A

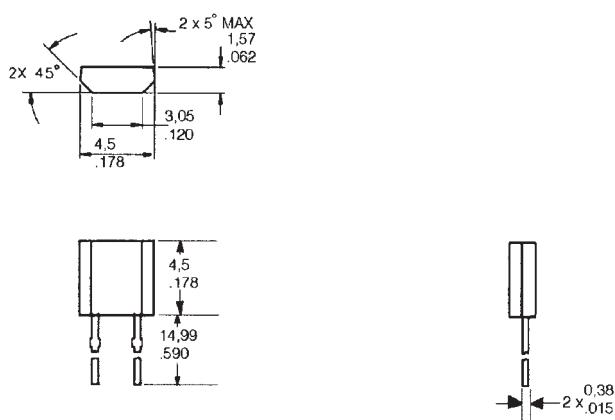


Fig. 1: Wheatstone Bridge 2-Wire Interface

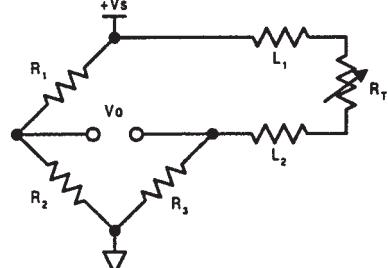


Fig. 2: Linear Output Voltage

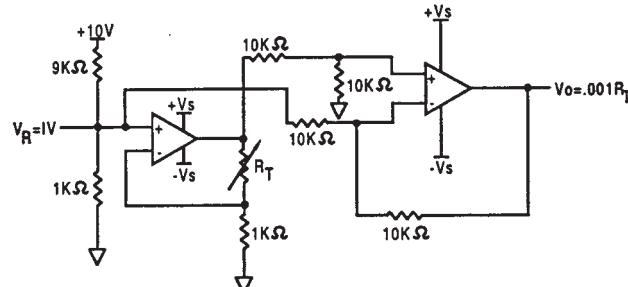
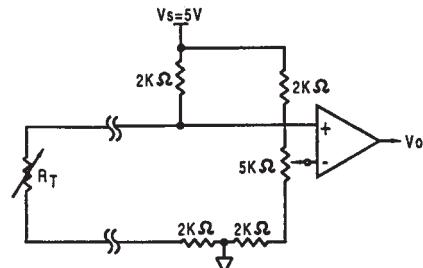


Fig. 3: Adjustable Point (Comparator) Interface



Temperature

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.

Temperature Sensors

Platinum RTDs

HEL-776/HEL-777

FUNCTIONAL BEHAVIOR

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

RT = Resistance (Ω) at temperature T ($^{\circ}\text{C}$)

R_0 = Resistance (Ω) at 0°C

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

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

CONSTANTS

| | | |
|--|---------------------------|----------------------------|
| Alpha, α ($^{\circ}\text{C}^{-1}$) | 0.00375 ± 0.000029 | 0.003850 ± 0.000010 |
| Delta, δ ($^{\circ}\text{C}$) | 1.605 ± 0.009 | 1.4999 ± 0.007 |
| Beta, β ($^{\circ}\text{C}$) | 0.16 | 0.10863 |
| A ($^{\circ}\text{C}^{-1}$) | 3.81×10^{-3} | 3.908×10^{-3} |
| B ($^{\circ}\text{C}^2$) | -6.02×10^{-7} | -5.775×10^{-7} |
| C ($^{\circ}\text{C}^4$) | -6.0×10^{-12} | -4.183×10^{-12} |

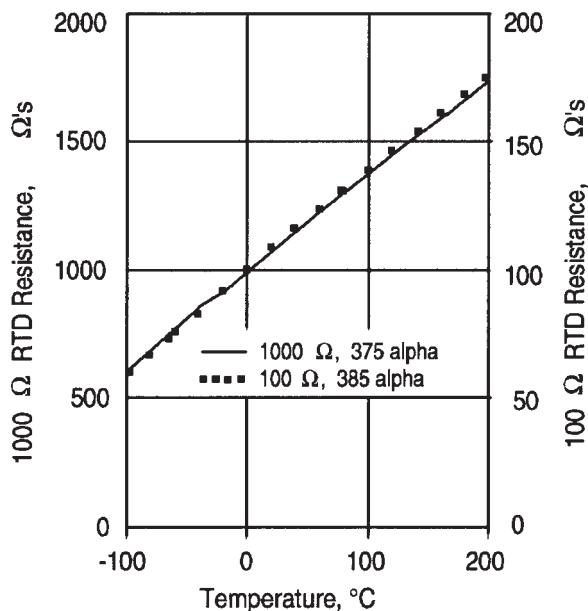
Both $\beta = 0$ and $C = 0$ for $T > 0^{\circ}\text{C}$

ACCURACY VS TEMPERATURE

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

* 1000Ω RTD. Divide ΔR by 10 for 100Ω RTD.

RESISTANCE VS TEMPERATURE CURVE



SPECIFICATIONS

| | |
|--|---|
| Sensor Type | Thin film platinum RTD: $R_0 = 1000 \Omega$ @ 0°C ; alpha = $0.00375 \Omega/\Omega^{\circ}\text{C}$ $R_0 = 100 \Omega$ @ 0°C ; alpha = $0.00385 \Omega/\Omega^{\circ}\text{C}$ |
| Temperature Range | -55° to +150°C (-76° to +302°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°C or $100 \pm 0.2 \Omega$ ($\pm 0.2\%$) @ 0°C $1000 \pm 1 \Omega$ ($\pm 0.1\%$) @ 0°C or $100 \pm 0.1 \Omega$ ($\pm 0.1\%$) @ 0°C (optional) |
| Linearity | $\pm 0.1\%$ of full scale for temperatures spanning -40° to 125°C |
| Time Constant | <10 seconds in air at 10 ft/sec |
| Operating Current | 2 mA maximum for self heating errors of <1°C; 1 mA recommended |
| Stability | <0.25°C/year; 0.05°C per 5 years in occupied environments |
| Self Heating | <15mW/°C typical |
| Insulation Resistance | >50 MΩ @ 50 VDC @ 25°C |
| Construction | Plastic case, PLASKON 3300SH |
| Lead Material | Copper alloy 194 solder dipped tin silver |