Temperature Sensors HEL-776/HEL-777 Series

PLATINUM RTDs

FUNCTIONAL BEHAVIOR

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

RT = Resistance (W) at temperature T (°C)

R_0 = Resistance (W) at 0°C

T = Temperature in °C

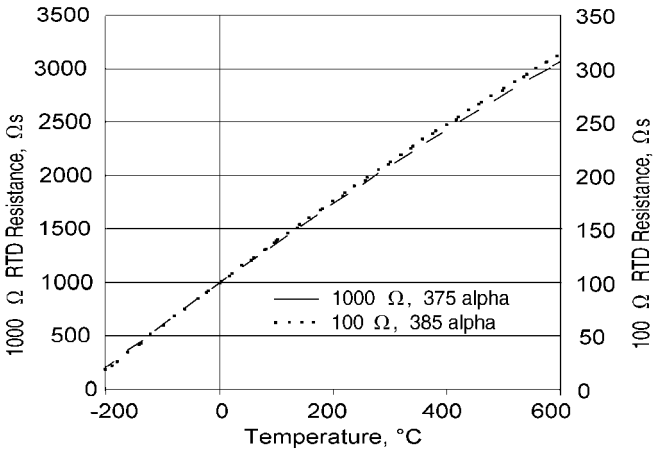
$A = a + \frac{a\ d}{100}$ $B = \frac{-a\ d}{100^2}$ $C_{T<0} = \frac{-a\ b}{100^4}$

CONSTANTS

Alpha, α ($°C^{-1}$)	0.003750 ±0.000029	0.003850 ±0.000010
Delta, δ (°C)	1.605 ± 0.009	1.4999 ± 0.007
Beta, β (°C) *	0.16	0.10863
A ($°C^{-1}$)	$3.81x10^{-3}$	$3.908x10^{-3}$
B ($°C^{-2}$)	$-6.02x10^{-7}$	$-5.775x10^{-7}$
C ($°C^{-4}$)*	$-6.0x10^{-12}$	$-4.183x10^{-12}$

*Both β = 0 and C = 0 for T > 0°C

RESISTANCE VS TEMPERATURE CURVE



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

The HEL-776 and HEL-777 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:

FOR 1000 Ω RTD

Trim Tolerance	**Standard ±0.2%**		**Optional ±0.1%**	
Temperature (°C)	±ΔR (Ω)	±ΔT (°C)	±ΔR (Ω)	±ΔT (°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

FOR 100 Ω RTD

Trim Tolerance	**Standard ±0.2%**		**Optional ±0.1%**	
Temperature (°C)	±ΔR (Ω)	±ΔT (°C)	±ΔR (Ω)	±ΔT (°C)
-200	.62	1.5	0.46	1.2
-100	.29	0.7	0.24	0.6
0	.20	0.5	0.10	0.3
100	.29	0.7	0.22	0.6

ELECTRICAL INTERFACING

Fig. 1 illustrates the most common method of measuring an RTD. As R_T increases or decreases with temperature, Vo increases or decreases. An op-amp is used to observe Vo. Lead wire resistance, L1 and L2, 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 ±0.3°C (0.5°F) error over a range of -40°C to +150°C (-40°F to +302°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.

Fig. 1: Wheatstone Bridge 2-Wire Interface

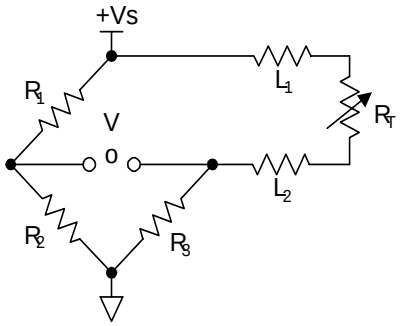


Fig. 2: Linear Output Voltage

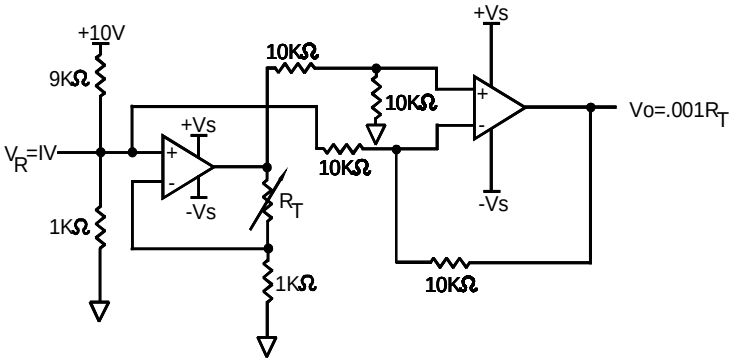
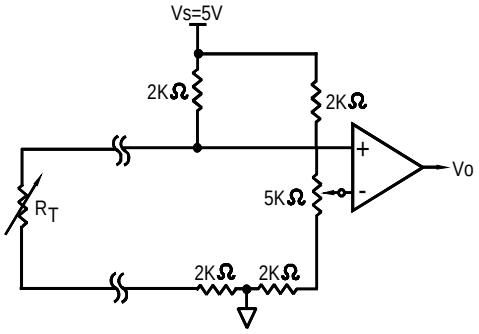
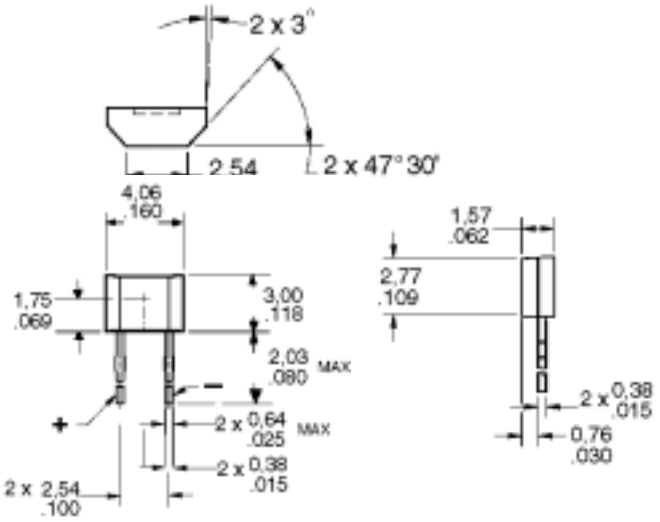


Fig. 3: Adjustable Point (Comparator) Interface

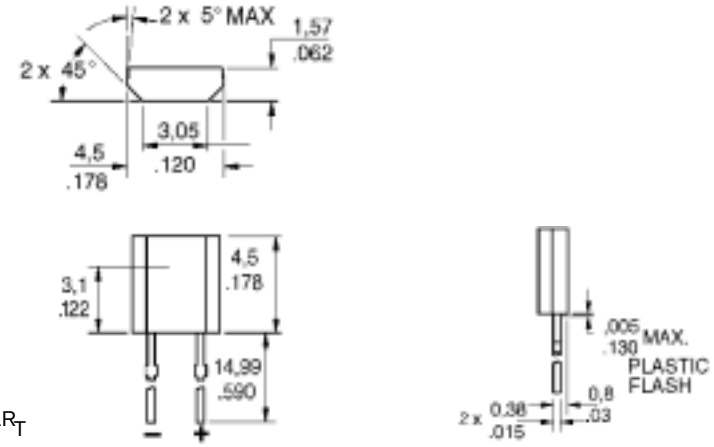


MOUNTING DIMENSIONS (for reference only) mm/in

HEL-776-A (TO-92 modified)



HEL-777-A (U package)



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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:

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