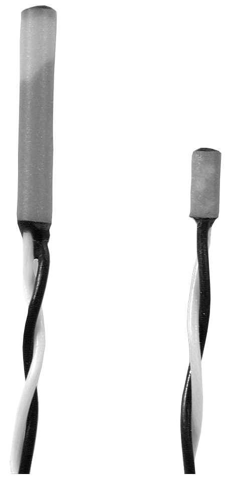


FEATURES

- Linear resistance vs temperature
- Accurate and Interchangeable
- Excellent stability
- Teflon or fiberglass lead wires
- Wide temperature range
- Ceramic case material

TYPICAL APPLICATIONS

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

HEL-700 Series elements are fully assembled, ready to use directly or in probe assemblies without the need for fragile splices to extension leads.

The 1000Ω, 375 alpha version, provides 10X greater sensitivity and signal-to-noise. Optional NIST calibrations improve accuracy to ±0.03°C at 0°C.

ORDER GUIDE

HEL-705	28 ga. TFE Teflon, 2-wire only				
HEL-707	28 ga. Fiberglass, 2-wire only				
HEL-711	28 ga. TFE Teflon (2-wire 1000Ω, 3-wire 100Ω)				
HEL-712	28 ga. Fiberglass (2-wire 1000Ω, 3-wire 100Ω)				
HEL-716	24 ga. TFE Teflon (2-wire 1000Ω, 3-wire 100Ω)				
HEL-717	24 ga. Fiberglass (2-wire 1000Ω, 3-wire 100Ω)				
	-U	1000Ω, 0.00375 Ω/Ω/°C			
	-T	100Ω, 0.00385 Ω/Ω/°C DIN Standard			
		-0	±0.2% Resistance Trim (Standard)		
		-1	±0.1% Resistance Trim (Optional)		
			-12	Lead wire length, 12 inches	
				-00	No NIST calibration
				-C1	NIST @ 0°C
				-C2	NIST @ 0 & 100°C
				-C3	NIST @ 0, 100 & 260°C

MOUNTING DIMENSIONS (for reference only)

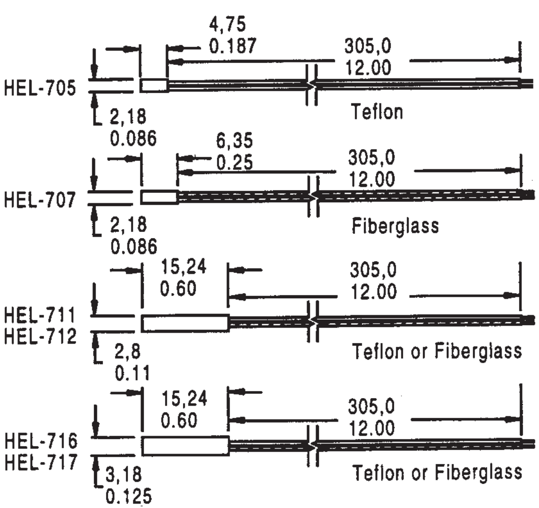


Fig. 1: Wheatstone Bridge 2-Wire Interface

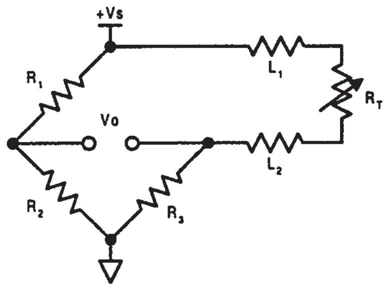


Fig. 2: Linear Output Voltage

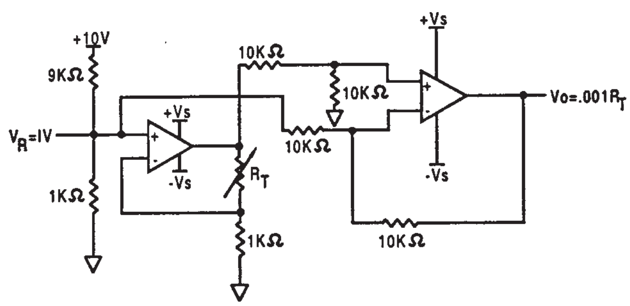
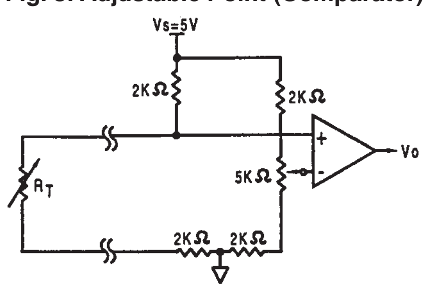


Fig. 3: Adjustable Point (Comparator) Interface



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.

FUNCTIONAL BEHAVIOR

$R_T = R_0(1+AT+BT^2-100CT^3+CT^4)$
RT = Resistance (Ω) at temperature T (°C)
R_0 = Resistance (Ω) at 0°C
T = Temperature in °C

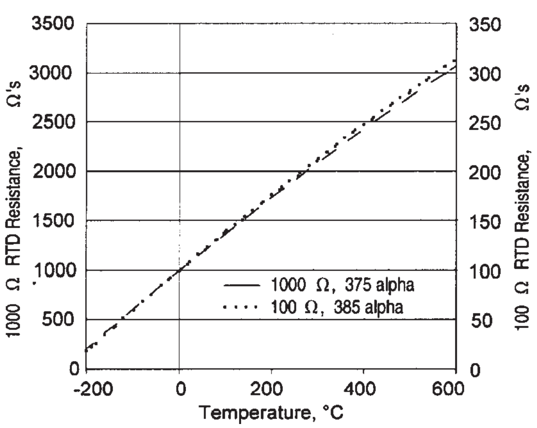
$A = \alpha + \frac{\alpha\delta}{100}$ $B = \frac{-\alpha\delta}{100^2}$ $C_{T<0} = \frac{-\alpha\beta}{100^4}$

CONSTANTS

Alpha, α (°C^{-1})	0.00375 ±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})	3.81×10^{-3}	3.908×10^{-3}
B (°C^{-2})	-6.02×10^{-7}	-5.775×10^{-7}
C (°C^{-4})	-6.0×10^{-12}	-4.183×10^{-12}

Both β = 0 and C = 0 for T>0°C

RESISTANCE VS TEMPERATURE CURVE



ACCURACY VS TEMPERATURE

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
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 Δ by 10 for 100Ω RTD.

NIST CALIBRATION

NIST traceable calibration provides resistance readings at 1, 2 or 3 standard temperature points to yield a resistance versus temperature curve with 10x better accuracy.

Calibration	1 Point	2 Point	3 Point
T (°C)	±ΔT (°C)	±ΔT (°C)	±ΔT (°C)
-200	0.9	—	—
-100	0.5	0.27	0.15
0	0.03	0.03	0.03
100	0.4	0.11	0.07
200	0.8	0.2	0.08
300	1.2	0.33	6.2
400	1.6	0.5	8.3
500	2.0	0.8	9.6
600	2.6	1.2	10.4

SPECIFICATIONS

Sensor Type	Thin film platinum RTD; R_0 = 1000 Ω @ 0°C; alpha = 0.00375 Ω/Ω/°C R_0 = 100 Ω @ 0°C; alpha = 0.00385 Ω/Ω/°C
Temperature Range	TFE Teflon: −200° to +260°C (−320° to +500°F) Fiberglass: −75° to +540°C (−100° to +1000°F)
Temperature Accuracy	±0.5°C or 0.8% of temperature, °C (R_0 ±0.2% trim), whichever is greater ±0.3°C or 0.6% of temperature, °C (R_0 ±0.1% trim), whichever is greater (optional)
Base Resistance and Interchangeability, $R_0 \pm \Delta R_0$	1000 ± 2 Ω (±0.2%) @ 0°C 1000 ± 1 Ω (±0.1%) @ 0°C (optional)
Linearity	±0.1% of full scale for temperatures spanning −40° to +125°C ±2.0% of full scale for temperatures spanning −75° to +540°C
Time Constant	<0.5 sec. 0.85 inch O.D. in water at 3 ft/sec; <1.0 sec, 0.85 inch O.D. in still water
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	<15 mW/°C for 0.85 O.D. typical
Insulation Resistance	>50 MΩ at 50 VDC at 25°C
Construction	Alumina case; Epoxy potting (Teflon leads); Ceramic potting (fiberglass leads)
Lead Material	Nickel coated stranded copper, Teflon or Fiberglass insulated