



Thin Film Platinum RTDs

HRTS Series



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Datasheet

Thin Film Platinum RTDs

The HRTS Series Thin Film Platinum RTDs (Resistance Temperature Detectors) are designed to measure temperatures from -70 °C to 260 °C [-94 °F to 500 °F]. These fully-assembled elements are ready to use in probe assemblies without the need for fragile splices to extension leads.

These products are manufactured using a thin layer of platinum deposited on an alumina substrate and are laser trimmed to a resistance interchangeability of a standard $\pm 0.2\%$ (± 0.5 °C accuracy) or an optional $\pm 0.1\%$ (± 0.3 °C accuracy). The sensor chip is then glassed, wired and potted to result in an alumina package with Teflon®-insulated lead wires.

Key Features

- Linear resistance vs temperature
- Interchangeable resistance
- Accurate
- Fast response
- Laser trimmed
- Ceramic case material
- TFE Teflon® lead wires
- Ready-to-use, fully-assembled elements

Potential Applications

Temperature sensing for monitoring, compensation and regulation in:

INDUSTRIAL

- HVAC equipment
- Instrument and probe assemblies
- Process control for temperature regulation
- Motor windings and bearings
- Battery packs
- Environmental chambers

MEDICAL

- Autoclaves

AEROSPACE AND DEFENSE

- Aircraft
- Space vehicles
- Satellites
- Rovers

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Table 1. Specifications

Characteristic	Condition	Parameter
Alpha: R ₀ = 1000 Ω R ₀ = 100 Ω	0 °C	0.00375 Ω/Ω/°C 0.00385 Ω/Ω/°C
Temperature range:	—	-70 °C to 260 °C [-94 °F to 500 °F]
Temperature accuracy: R ₀ ±0.2% trim (standard) R ₀ ±0.1% trim (optional)	—	±0.5 °C or 0.8% of temperature, whichever is greater ±0.3 °C or 0.6% of temperature, whichever is greater
Time constant, 1/e	metal surfaces	0.6 s typ.
Operating current	—	2 mA max. for self heating errors of 1 °C; 1 mA recommended
Self heating	—	0.3 mW/°C
Construction material: case leads	—	alumina nickel-coated stranded copper, Teflon® insulated

Table 2. Constant Values (β = 0 and C = 0 for T > 0 °C)

Constant	1000 Ω	100 Ω	Functional Behavior
Alpha α (°C ⁻¹)	0.00375 ±0.000029	0.003850 ±0.000010	$R_T = R_0(1 + AT + BT^2 - 100CT^3 + CT^4)$ Where: R _T = Resistance (Ω) at temperature T (°C) R ₀ = Resistance (Ω) at 0 °C T = Temperature (°C) $A = \alpha + \frac{\alpha\delta}{100}$ $B = -\frac{\alpha\delta}{100^2}$ $C_{T<0} = -\frac{\alpha\beta}{100^4}$
Delta δ (°C)	1.605 ±0.009	1.4999 ±0.007	
Beta β (°C)	0.16	0.10863	
A (°C ⁻¹)	3.81 x 10 ⁻³	3.908 x 10 ⁻³	
B (°C ⁻²)	-6.02 x 10 ⁻⁷	-5.775 x 10 ⁻⁷	
C (°C ⁻⁴)	-6.0 x 10 ⁻¹²	-4.183 x 10 ⁻¹²	

Table 3. Accuracy vs Temperature

Temperature (°C)	Tolerance			
	Standard Trim (±0.2%)		Optional Trim (±0.1%)	
	±ΔR ¹ (Ω)	±ΔT (°C)	±ΔR ¹ (Ω)	±ΔT (°C)
-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

¹1000 Ω RTD. Divide Δ by 10 for 100 Ω RTD.

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Figure 1. Resistance vs Temperature

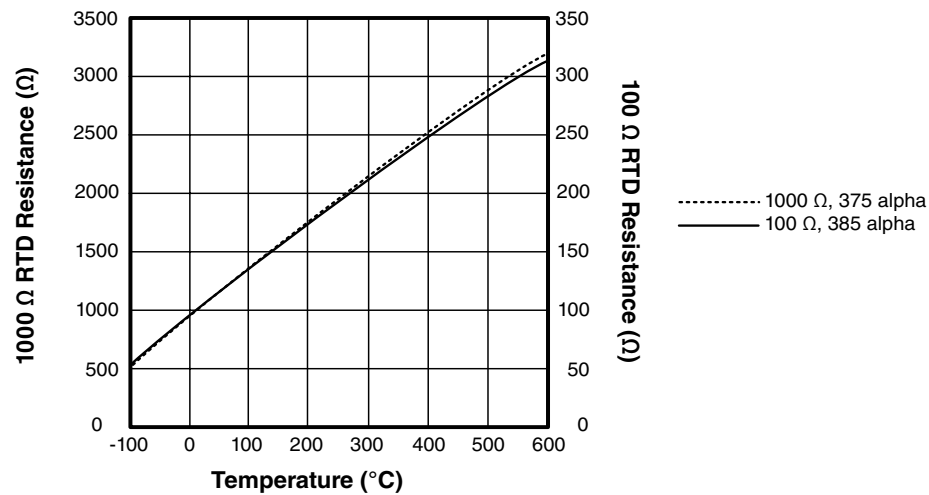
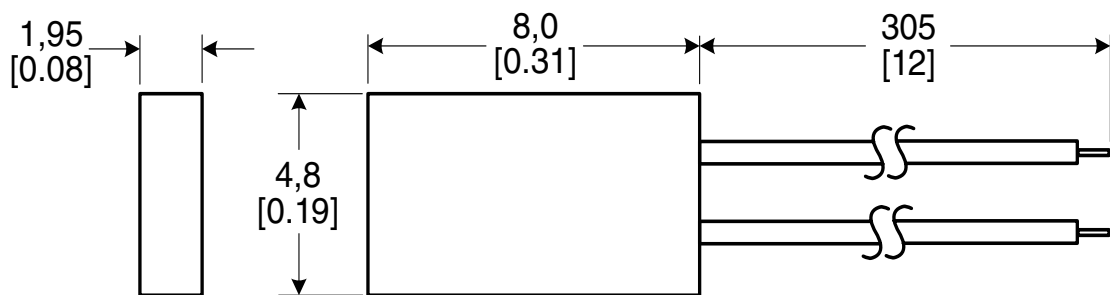


Figure 2. Mounting Dimensions (For reference only. mm/[in].)



CAUTION PRODUCT DAMAGE

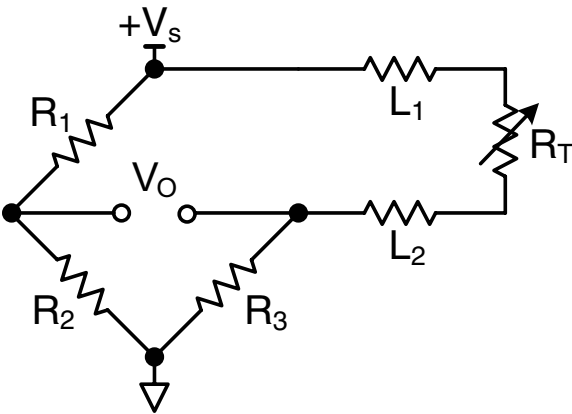
- Ensure proper ESD (Electrostatic Discharge) precautions are followed when handling this product.
- Failure to comply with these instructions may result in product damage.**

Table 4. Order Guide

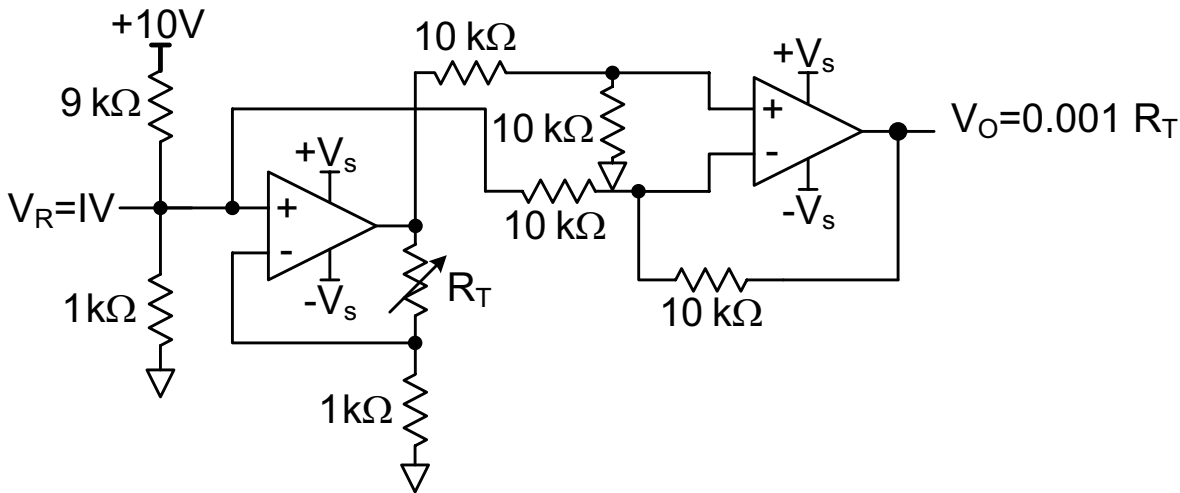
Catalog Listing	Description
HRTS-5760-B-T-0-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon®-insulated leadwires, a resistance and alpha of 100 Ω: 0.00385 Ω/Ω/°C, a standard ±0.2% trim resistance, and 305 mm [12 in] leadwires
HRTS-5760-B-T-1-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon®-insulated leadwires, a resistance and alpha of 100 Ω: 0.00385 Ω/Ω/°C, an optional ±0.1% trim resistance, and 305 mm [12 in] leadwires
HRTS-5760-B-U-0-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon®-insulated leadwires, a resistance and alpha of 1000 Ω: 0.00375 Ω/Ω/°C, a standard ±0.2% trim resistance, and 305 mm [12 in] leadwires
HRTS-5760-B-U-1-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon®-insulated leadwires, a resistance and alpha of 1000 Ω: 0.00375 Ω/Ω/°C, an optional ±0.1% trim resistance, and 305 mm [12 in] leadwires

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Figure 3. Circuits
Wheatstone Bridge 2-Wire Interface



Linear Output Voltage



Adjustable Point (Comparator) Interface

