



# Thin Film Platinum RTDs

## HRTS Series



# 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  $\pm 0.2\%$  ( $\pm 0.5$  °C accuracy) or an optional  $\pm 0.1\%$  ( $\pm 0.3$  °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

RESISTANCE INTERCHANGEABLE • ACCURATE • LINEAR

# Thin Film Platinum RTDs, HRTS Series



**Table 1. Specifications**

Characteristic	Condition	Parameter
Alpha: R <sub>0</sub> = 1000 Ω R <sub>0</sub> = 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 <sub>0</sub> ±0.2% trim (standard) R <sub>0</sub> ±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 <sup>-1</sup> )	0.00375 ±0.000029	0.003850 ±0.000010	$R_T = R_0(1 + AT + BT^2 - 100CT^3 + CT^4)$  Where: R <sub>T</sub> = Resistance (Ω) at temperature T (°C) R <sub>0</sub> = 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 <sup>-1</sup> )	3.81 × 10 <sup>-3</sup>	3.908 × 10 <sup>-3</sup>	
B (°C <sup>-2</sup> )	-6.02 × 10 <sup>-7</sup>	-5.775 × 10 <sup>-7</sup>	
C (°C <sup>-4</sup> )	-6.0 × 10 <sup>-12</sup>	-4.183 × 10 <sup>-12</sup>	

**Table 3. Accuracy vs Temperature**

Temperature (°C)	Tolerance			
	Standard Trim (±0.2%)		Optional Trim (±0.1%)	
	±ΔR <sup>1</sup> (Ω)	±ΔT (°C)	±ΔR <sup>1</sup> (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

<sup>1</sup>1000 Ω RTD. Divide Δ by 10 for 100 Ω RTD.

Figure 1. Resistance vs Temperature

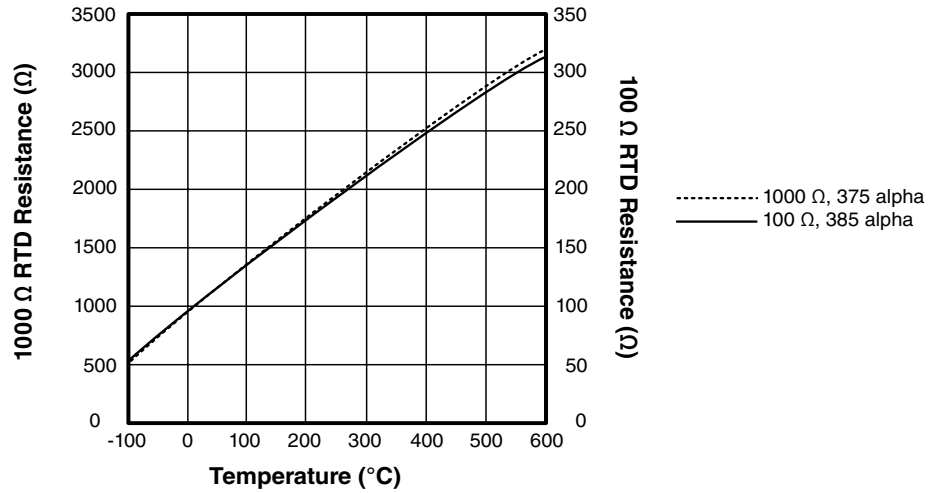
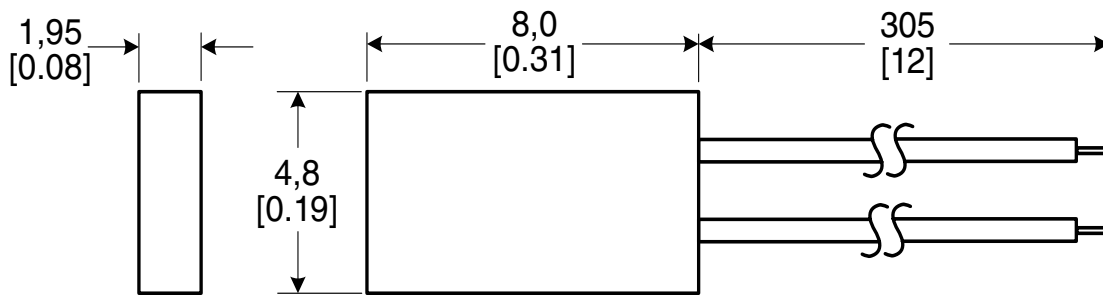


Figure 2. Mounting Dimensions (For reference only. mm/[in].)



## CAUTION PRODUCT DAMAGE

- Ensure proper ESD (Electrostatic Discharge) precautions are followed when handling this product.

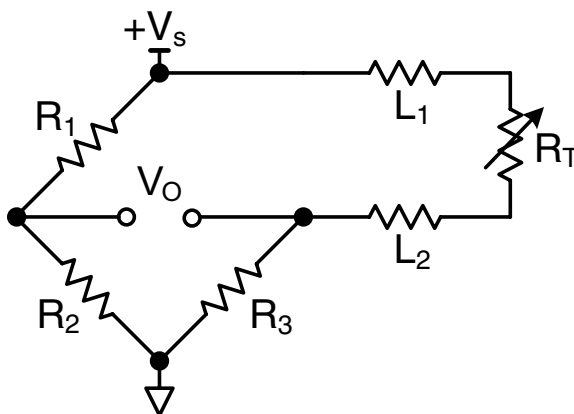
**Failure to comply with these instructions may result in product damage.**

Table 4. Order Guide

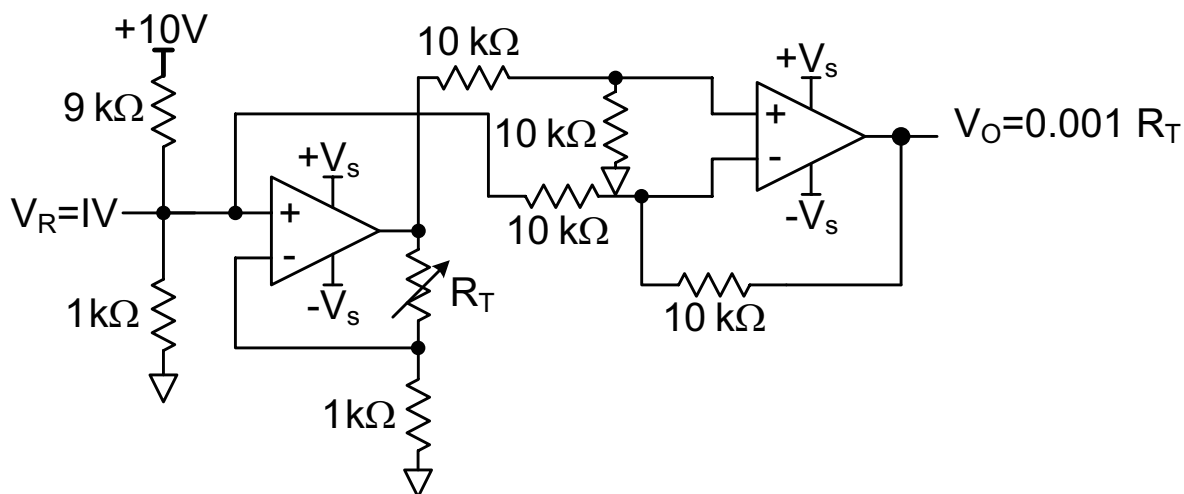
Catalog Listing	Description
HRTS-5760-B-T-0-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon <sup>®</sup> -insulated leadwires, a resistance and alpha of 100 Ω: 0.00385 Ω/Ω/°C, a standard ±0.2% trim resistance, and 305 mm [12 in] leadwires
HRTS-5760-B-T-1-12	HRTS Series platinum thin film RTD with two, 28 gauge TFE Teflon <sup>®</sup> -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 <sup>®</sup> -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
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Figure 3. Circuits

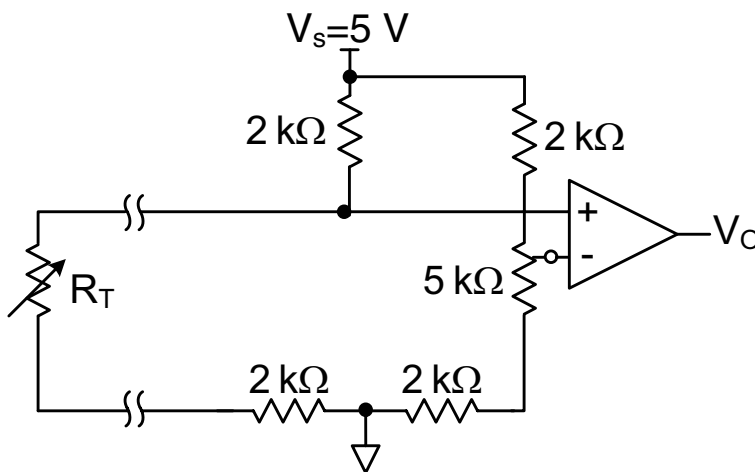
## Wheatstone Bridge 2-Wire Interface



## Linear Output Voltage



## Adjustable Point (Comparator) Interface



## ADDITIONAL INFORMATION

The following associated literature is available at [sensing.honeywell.com](http://sensing.honeywell.com):

- Temperature Sensors Line Guide
- Thermal Sensors Range Guide

### Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847** or **1-800-537-6945**, visit **[sensing.honeywell.com](http://sensing.honeywell.com)**, or e-mail inquiries to **[info.sc@honeywell.com](mailto:info.sc@honeywell.com)**

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### **⚠ WARNING** **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### **⚠ WARNING** **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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