



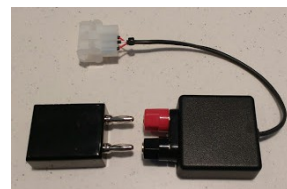
**Texas  
Components  
Corporation**

USA Manufacturer of Precision Measurement Devices  
(featuring Bulk Metal® Foil\* Technology)

**TXRTDCAL**

(Sub TX####)

**Precision RTD Calibration Kit  
Bulk Metal® Foil Resistor Adapter & Module**



**Precision Resistor Module for RTD Probe Simulation and RTD Instrument Calibration**

**Universal Scale Design; Ultra Low TCR; Ultra High Precision, Accuracy, and Stability**

**Tight Tolerance, Low Temperature Coefficient of Resistance (TCR), Low EMF, and Low Voltage Coefficient of Resistance (VCR)**

Resistors featuring Bulk Metal® Foil are renowned for their unique combination of unmatched performance in all major technical areas, including:

Temperature Coefficient of Resistance (TCR) Voltage Coefficient of Resistance (VCR) Electrostatic Discharge (ESD) Thermal Stabilization Response Time  
Power Coefficient of Resistance (PCR) Thermal Electromotive Force (EMF) Tolerance Load Life Stability Noise

**How are you calibrating your precision Resistance Temperature Detectors and Devices?**

You need precision resistors to calibrate precision RTD equipment, and no resistor is more accurate or more stable than those made with Bulk Metal® Foil technology. The TXCC line of RTD support products allow for the quick, accurate, precise simulation of ANY temperature value (including the standard RTD range of -200°C to 850°C and beyond) for any standard (ASTM E1137, IEC 60751, DIN 43760, BS-1904, JIS C1604, ITS-90, JIG 229, etc.), on any scale or type (PT50, PT100, PT200, PT500, PT1000, PT2000, PT10000, CU10, CU50, NI120, NI110, etc), available certified to Class B, A, AA, 1/3 DIN, and even 1/10 DIN accuracy when used within a wide ambient temperature range (+10°C to +40°C for K foil and -20°C to +70°C for Z foil) to simulate any RTD temperature (-200°C to 850°C or beyond). These modules have a wide physical operating temperature range (-20°C to +70°C) and will still read accurately, every time, in any environment your technicians might find themselves (hot, cold, humid, or dry). There are no mechanical switches or settings to adjust (that could introduce errors), and each resistance module seals and protects the resistive element against dust and other environmental factors. The advantages of this approach over ice water, boiling water, or even a decade box and other RTD probe simulators are many:

- Easy to use (Fast!) Just plug in the value you want to use. No dials to spin, no settings to miss, no mistakes to make. All values simultaneously accessible)
- Vastly superior accuracy, long term stability, and TCR (automatic climate control built-in)
- Zero maintenance (No switches to wear or keep clean)
- Less expensive (A full compliment of modules are still far less than a respectable decade box)
- Very rugged (Sealed and protected.)
- Less required calibration of the standard itself (Modules becomes more stable over time, unlike other technologies)
- Portability (Very light weight, and any size carrying pouch can be selected to transport as many modules as you need at one time)

**RTD SIMULATOR – CALIBRATE ALL OF YOUR RTD INPUTS**

The TXRTDCAL RTD calibration kit can simulate any RTD probe at any value in all types of environments for all types of instruments; including transmitters, controllers, medical equipment, data acquisition, process control, metrology, and other laboratory equipment. Each module comes clearly marked with its specific resistance value and the correlating temperature value. Just connect to an RTD and instantly read the temperature indicated to confirm your instrument's accuracy. Easier, faster, and more accurate than any other method, the TXRTDCAL calibration kit is also highly cost effective, having been used by many customers to significantly reduce field service costs. The TXRTDCAL calibration kit is a complete and compact unit for checking and calibrating all RTD instruments, whether in the field, shop, laboratory, or control room. Its long-term stability is designed-in and built-in, negating the effects of temperature, contamination, and humidity.

Bulk Metal® Foil technology outperforms all other resistive technologies today, making it the clear choice for applications that require high precision and high stability. This technology allows for the design and production of RTD support products that would not be possible otherwise. The TXRTDCAL family of adapters and Bulk Metal® Foil resistance modules offers ultra low TCR, exceptional load life stability, tight tolerances, fast response time, low current noise, low thermal EMF, as well as ultra low power and voltage coefficients - all in a convenient, sealed, single temperature at-a-time design using common banana jack connections. The TXRTDCAL family is virtually insensitive to common destabilizing factors that can completely undermine the accuracy and usefulness of other resistor types, including and especially those of a decade box. The resistive element used is a solid alloy that is inherently ultra stable which, along with the many other additional Bulk Metal® Foil benefits, allows designers to guarantee the highest degree of accuracy and stability available in fixed-resistor applications.

**TXRTDCAL FEATURES & SPECIFICATIONS**

- Accuracy: Calibrated resistance tolerance to ± 0.005% (and to ± 0.025°C). Available certified to Class 1/10 DIN on most scales. (See Table 1.)
- Temperature Effect (TCR): Already accounted for in the Table 1 accuracy specifications while within the ambient temperature range of +10°C to +40°C. Outside this range reduce accuracy by ± 2.5 ppm/°C to ± 4.5 ppm/°C (or < ± 0.0005%/°C) unless the Z foil option is chosen.
- Resistance range: Typically 9Ω to 40KΩ, to simulate the standard RTD range of -200°C to +850°C. (Any resistance value from 5Ω to 150KΩ is available up to 6 significant digits, to accommodate any temperature value on any scale under any standard.)
- Physical Operating Temperature Range: -20°C to +70°C (-4°F to +158°F)
- Warm Up/Thermal stabilization time: < 1 second (nominal value achieved within 10 ppm of steady state value)
- Rated power: 0.4 W at +70 °C.
- Exceptional load life stability: ± 0.005% (< 50 ppm) at +70 °C and 2000 hours at rated power!
- Power coefficient of resistance (PCR) or ΔR due to self heating: ± 5 ppm at rated power
- Voltage coefficient of resistance (VCR): < 0.1 ppm/V (essentially zero)
- Max working voltage: 150 V (and ≤ vPXR) See Table 6 for higher values.
- Electrostatic discharge (ESD): > 25 kV
- Capacitance: 0.5 pF typical; 1.0 pF max (non-capacitive design)
- Inductance: < 0.08 μH typical; 0.1 μH max; (non-inductive design)
- Rise time: 1.0 ns at 1kΩ (effectively no ringing)
- Current noise: 0.010 μV RMS/Volt of Applied Voltage (< -40 dB)
- Thermal EMF: 0.05 μV/°C typical (0.10 μV/°C max) and 1 μV/W (μV/°C relates to EMF due to ΔT wrt to leads and μV/watt due to the applied power)
- Total accumulated ΔR over life (EOL): to ± 0.05%! Pre & Post Manufacturing Operations are available to reduce this even further.
- Lifetime warranty! (excluding abuse or damage)
- Made in the USA!

\*Bulk Metal® Foil is a registered trademark of Vishay Precision Group, Inc. (VPG)  
Vishay Foil Resistors is a VPG brand  
[www.texascomponents.com](http://www.texascomponents.com)



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**TABLE 1 – ACCURACY & TCR BY RESISTANCE RANGE (K-Foil)**

| RESISTANCE VALUE (Ω)<br>(x10 for PT1000) | CALIBRATED TOLERANCE <sup>1</sup> | PT100 ACCURACY <sup>2</sup><br>(Class 1/10 DIN) | NOMINAL TCR <sup>3</sup><br>(ppm/°C) |
|--|-----------------------------------|---|--------------------------------------|
| ≥ 100Ω                                   | < ± 0.005%                        | ± 0.03 °C (> 0°C)                               | < ± 1.0                              |
| 50Ω to < 100Ω                            | < ± 0.01%                         | ± 0.05 °C (-125°C to 0°C)                       |                                      |
| 5Ω to < 50Ω                              | < ± 0.025%                        | ± 0.1 °C (< -125°C)                             |                                      |

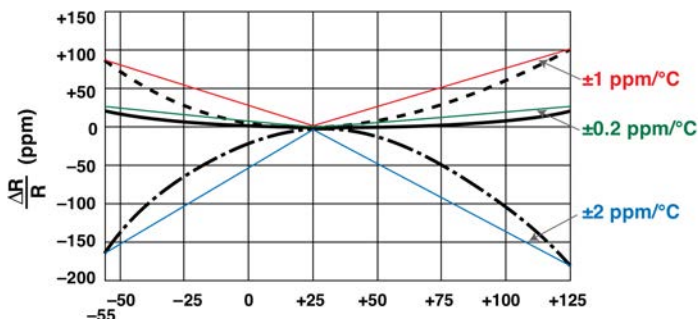
Notes:

- 1) Calibrated value/tolerance, before any connection/operating tolerances.
- 2) Accuracy value includes all operating tolerances across the ambient temperature range. (3 or, preferably, 4 wire connections are required for the class accuracy rating to apply.)
- 3) K-Foil is shown. TCR for Z-Foil is about 1/5 that of K-Foil and offers the same 1/10 DIN accuracy but across the full operating temp range, not just the ambient range.

**FIGURE 1 – NOMINAL RESISTANCE/TEMPERATURE CURVE(S) and Chord Slopes (Statistically Combined)**

Built-in Climate Control for any Environment  
Accurate and Precise Temperature Simulation  
in Any Actual Physical Environment

(The TXRTDCAL family of modules uses **K-Foil** by default, but **Z-Foil** is also available for extended temperature environments)



**TABLE 2 – SOME COMMON (IEC 60751 Scale) RTD SIMULATOR MODULE VALUES**  
(order the adapter with a cable+connector, then as many plug-in simulator modules as you need)

| TXCC PART NUMBER         | RESISTANCE VALUE (Ω) | SIMULATED TEMPERATURE |
|--------------------------|----------------------|-----------------------|
| TXRMOD-K-90R1900 (-25C)  | 90.19                | -25°C (-13°F)         |
| TXRMOD-K-100R000 (0C)    | 100.00               | 0°C (32°F)            |
| TXRMOD-K-109R730 (25C)   | 109.73               | 25°C (77°F)           |
| TXRMOD-K-128R030 (72.5C) | 128.03               | 72.5°C (162.5°F)      |
| TXRMOD-K-138R510 (100C)  | 138.51               | 100°C (212°F)         |

**TABLE 3 – INTERFACE & CABLING**

| RTD (resistance) simulator module | Interface unit, with cable to connector (3 or 4 wire to meet your need) | Connector to your existing device  | Wiring assignments (modifiable to match your device)                        |
|-----------------------------------|---|--|---|
|                                   |   | <br>Mate-N-Lok<br>(or choose your own connector type, in male or female) | ① = (Optional)<br>② = RB<br>③ = RA<br>④ = RB<br>(or choose your own wiring) |

**TABLE 4 – QUICK SPECIFICATIONS**

| MODEL                    | COMMON RESISTANCE RANGE <sup>4</sup> | TYPICAL SIMULATED TEMPERATURE RANGE <sup>5</sup> | MAX WORKING VOLTAGE                | ABSOLUTE CALIBRATED ACCURACY <sup>6</sup> | POWER RATING (at +70 °C) | OPERATING TEMPERATURE RANGE | PACKAGING |
|--------------------------|--------------------------------------|--|------------------------------------|---|--------------------------|-----------------------------|-----------|
| TXRTDCAL<br>(Sub TX####) | 9Ω to 40KΩ                           | -200°C to 850°C<br>(-328°F to 1562°F)            | 300 V<br>(and ≤ V <sub>PxR</sub> ) | 0 to 250 ppm<br>(see Table 1)             | 0.4 W                    | -20°C to +70°C              | Bulk Pack |

4) Any precise value is available up to 6 significant digits, from 5Ω to 150KΩ

5) Typical RTD range shown - this can actually be any value you choose according to your scale and needs.

6) For proper results, all connections and measurements should be made via 3 or, even better, 4 wire connectors. Texas Components will provide a custom cable to connect these modules and the adapter to your particular RTD equipment, assigning a specific custom part number to your design.



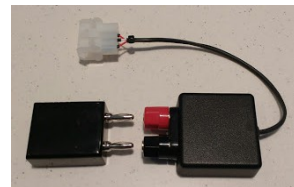
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**TABLE 5 – HOW TO ORDER THE CORRECT PART NUMBER**

| MODEL   | DESCRIPTION                                      |   | PART NUMBER  |
|---|--|---|--|
| TXRTDCAL-TX####   | TXRTDCAL Adapter Unit (with cable and connector) |   | Texas Components will assign as custom part number to your particular cable connector and wiring requirement |
| MODEL/PN  | DESCRIPTION                                      |   | IMAGE  |
| TXRTDCAL-POUCH  | Water-resistant neoprene carrying pouch          |   |                           |
| MODEL   | FOIL <sup>7</sup>                                | RESISTANCE VALUE <sup>8</sup>   | TEMPERATURE VALUE <sup>8</sup>   |
| TXRMOD  | K<br>Z   | Typically<br>9Ω to 40KΩ<br>(R = Ω, K = 1000 Ω)<br>Use 7 characters<br>(e.g. 100R000 = 100 ohms) | Typically<br>-200°C to 850°C<br>-328°F to 1562°F<br>(C = Celsius , F = Fahrenheit)                           |
| A K-foil module to simulate 0°C on the PT100 scale under the IEC 60751 standard would be ordered as:<br><b>TXRMOD-K-100R000 (0C)</b>      |  |   |  |
| A K-foil module to simulate 122°F on the PT1000 scale under the IEC 60751 standard would be ordered as:<br><b>TXRMOD-K-1K19400 (122F)</b> |  |   |  |
| A Z-foil module to simulate 100°C on the PT100 scale under the IEC 60751 standard would be ordered as:<br><b>TXRMOD-Z-138R510 (100C)</b>  |  |   |  |
| A K-foil module to simulate 100°F on the PT100 scale under the ASTM E1137 standard would be ordered as:<br><b>TXRMOD-K-114R950 (100F)</b> |  |   |  |

7) Z foil is recommended for uses outside the typical ambient temperature range.

8) Texas Components will not provide or suggest or define or be responsible for the resistance value chosen or ordered. **You must consult your application and standard and tell us the resistance value you want or need and the temperature you believe that resistance value simulates in your application.**

**Related Accessories and Services:**

Certification/Re-certification of the resistor modules is available if needed (not recommended more than annually). Order part number **TXRMOD-RECERT**

For questions, special applications and/or unique requirements, **our applications engineering department is on-site and available to help and advise.**

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For more information about this product line, please call us at (+1) **713-468-3882** or email us at [txccsales@texascomponents.com](mailto:txccsales@texascomponents.com)

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