# 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, JJG 229, etc.), on **any scale** or type (Pt50, Pt100, P200, PT500, PT1000, PT2000, PT10000, CU10, CU50, NI120, NI110, etc), available certified to **Class B, A, AA, 1/3 DIN, 1/5 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.
- **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 or better**). 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 **18Ω to 5KΩ**, 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 ≤ √PxR) 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!**

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## Precision RTD Calibration Kit

**Bulk Metal® Foil Resistor Adapter & Module**

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

| RESISTANCE VALUE (Ω) (x10 for Pt1000) | CALIBRATED TOLERANCE[1] | Pt100 ACCURACY[2] (Class 1/10 DIN) | NOMINAL TCR[3] (ppm/°C) |
|---|---|---|---|
| ≥ 100Ω | < ± 0.01% | ± 0.03 °C (> 0°C) | < ± 1.0 |
| 50Ω to < 100Ω | < ± 0.025% | ± 0.05 °C (-125°C to 0°C) | |
| 5Ω to < 50Ω | < ± 0.05% | ± 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)**

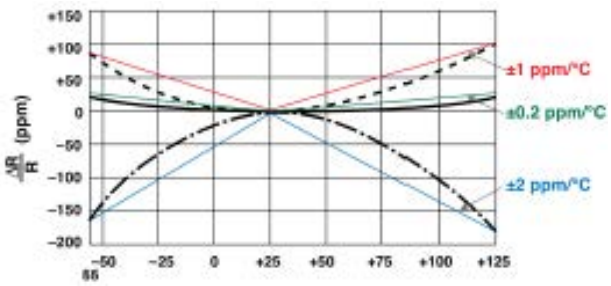



**TABLE 2 – SOME COMMON (IEC 60751 Scale) RTD SIMULATOR MODULE VALUES**
(order the adapter with a cable+connector, then as many plug-in simulator modules as you need)

| 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**

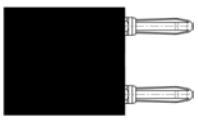
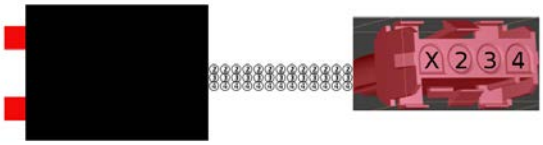
| RTD (resistance) simulator module | Interface unit, with cable to connector (3 or 4 wire to meet your need) | Connector to your existing device | Wiring assignments (modifiable to match your device) |
|---|---|---|---|
|  |   |  Mate-N-Lok (or choose your own connector type, in male or female) | ~~1~~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

**TABLE 4 – QUICK SPECIFICATIONS**

| MODEL | COMMON RESISTANCE RANGE [4] | TYPICAL SIMULATED TEMPERATURE RANGE[5] | MAX WORKING VOLTAGE | ABSOLUTE CALIBRATED ACCURACY[6] | POWER RATING (at +70 °C) | OPERATING TEMPERATURE RANGE | PACKAGING |
|---|---|---|---|---|---|---|---|
| TXRTDCAL (Sub TX####) | 9Ω to 40KΩ | -200°C to 850°C (-328°F to 1562°F) | 300 V (and ≤ √PxR) | 0 to 250 ppm (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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**Made in the USA**



Texas Components is a licensed USA manufacturer of Vishay Foil Resistors
TXRTDCAL Data Sheet (rev 20250625)

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## Precision RTD Calibration Kit

**Bulk Metal® Foil Resistor Adapter & Module**

| 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 carrying pouch | |  |
| **MODEL** | **FOIL [7]** | **RESISTANCE VALUE [8]** | **TEMPERATURE VALUE [8]** |
| 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>**TXRMOD-K-100R000 (0C)** | | | |
| A K-foil module to simulate 122°F on the PT1000 scale under the IEC 60751 standard would be ordered as:<br>**TXRMOD-K-1K19400 (122F)** | | | |
| A Z-foil module to simulate 100°C on the PT100 scale under the IEC 60751 standard would be ordered as:<br>**TXRMOD-Z-138R510 (100C)** | | | |
| A K-foil module to simulate 100°F on the PT100 scale under the ASTM E1137 standard would be ordered as:<br>**TXRMOD-K-114R950 (100F)** | | | |
| 7) Z foil is recommended for uses in environments outside typical ambient temperature range.<br>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:**<br>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

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