



**Texas
Components
Corporation**

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

TXRTDMV

(Sub TX####)

Precision RTD Probe Simulator

Bulk Metal® Foil Resistor Device



(Decade Box Replacement!)

Precision Resistor Device 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 into 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

TXRTDMV FEATURES & SPECIFICATIONS

The TXRTDMV RTD Probe Simulator can simulate any RTD probe at any temperature 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 values and the correlating temperature value under the standard you are using. Using common banana plugs, just connect to an RTD device and instantly read the temperature indicated to confirm your instrument's accuracy. Better than a decade box, the TXRTDMV is easier, faster, more accurate, and much less expensive. This TXRTDMV RTD Probe Simulator is a complete and compact unit for checking and calibrating all RTD instruments, whether in the field, shop, or control room. It's long-term stability is designed-in and built-in, negating the effects of temperature, contamination, and humidity.

Bulk Metal® Foil technology outperforms all other resistor 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 TXRTDMV RTD Probe Simulator 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 design using common banana jack connections. The TXRTDMV RTD Probe Simulator 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 in fixed-resistor applications.

- **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 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** (per resistor): 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:** 300 V (and ≤ √P×R) 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
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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)	TYPICAL TCR ³ (MAX SPREAD) (ppm/°C)
≥ 100Ω	± 0.005%	± 0.03 °C (> 0°C)	± 1.0 (± 2.5)
50Ω to < 100Ω	± 0.01%	± 0.05 °C (-125°C to 0°C)	± 1.0 (± 3.5)
5Ω to < 50Ω	± 0.025%	± 0.1 °C (< -125°C)	± 1.0 (± 4.5)

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 TXRTDM series uses **K-Foil** by default.

Z-Foil is available for extreme environments)

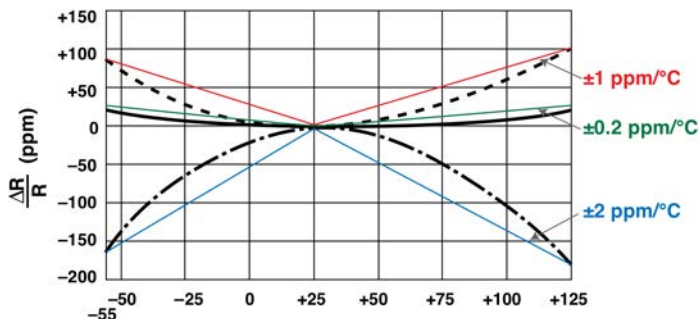


TABLE 3 - SPECIFICATIONS

MODEL	TYPICAL RESISTANCE RANGE ⁵	SIMULATED TEMPERATURE RANGE ⁶	MAX WORKING VOLTAGE	ABSOLUTE CALIBRATED ACCURACY	POWER RATING (at +70 °C)	PACKAGING
TXRTDMV	9Ω to 40KΩ	-200°C to 850°C (-328°F to 1562°F)	300 V (and ≤ V _{PxR})	0 to 250 ppm (see Table 1)	0.6 W	Bulk Pack

5) Any precise value is available, from 5Ω to 150KΩ; 6) Shown as the typical RTD range. This can actually be any value you assign according to your scale.

TABLE 4 – HOW TO ORDER THE CORRECT PART NUMBER

MODEL	FOIL ⁷	STANDARD ⁸	RTD TYPE/SCALE ⁹	RESISTANCE VALUE ¹⁰	TEMPERATURE VALUE ¹¹
TXRTDMV	K Z	ASTM E1137, IEC 60751, DIN 43760, BS-1904, JIS C1604, ITS-90, JJG 229, Custom, etc.	PT50, PT100, PT200, PT500, PT1000, PT2000, PT10000, CU10, CU50, NI120, NI110, PT385, PT3916, CU426, NI618, NI672, NIFE518, Custom, etc.	9Ω to 40KΩ (R = Ω, K = 1000 Ω) Use 7 characters (e.g. 100R000 = 100 ohms)	-200°C to 850°C -328°F to 1562°F (C = Celsius, F = Fahrenheit)

A Z-foil device to simulate a variety of values on the PT100 scale under ASTM E1137 would be ordered as:

TXRTDMV-Z-ASTME1137-PT100 (Then list up to 14 values)

A K-foil device to simulate a variety of values on the PT1000 scale under IEC 60751 would be ordered as:

TXRTDMV-K-IEC60751-PT1000 (Then list up to 14 values)

TXCC will assign you a custom part number representing your combination of specifications (TXRTDMV-TX####)

7) Z foil is recommended for use outside the indicated ambient temperature range.

8) Any standard can be supported. Just tell us your choice and confirm the values you want to use.

9) Other RTD scales and values are also supported. Contact us with your specialized requirements.

10) Any precise value is available to 6 significant digits from 5Ω to 150KΩ

11) 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:

(a) For proper results, all connections and measurements should be made via 3 or, even better, 4 wire connectors using fresh and springy banana plugs. If needed, Texas Components can provide a custom cable to connect these modules to your particular RTD equipment. (Ask about TXRTDMV-CABLE-TX####)

(b) Certification/Recertification of these resistor modules is available (and recommended no more than annually). Order part number TXRTDMV-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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