

Bulk Metal[®] Foil Technology Trimming Potentiometers

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Bulk Metal® Foil Technology Trimming Potentiometers

INTRODUCTION

Vishay Precision Trimmers have the Bulk Metal® Foil resistive element which possesses a unique inherent temperature and load-life stability. In addition, their advanced, virtually backlashfree adjustment mechanism makes them easy to set quickly and accurately and keeps the setting exactly on target.

The low TCR minimizes the influence of these gradients on resistances forming the voltage divider, preventing these resistances from drifting apart and thereby keeping the ratio essentially constant.

REASON 1

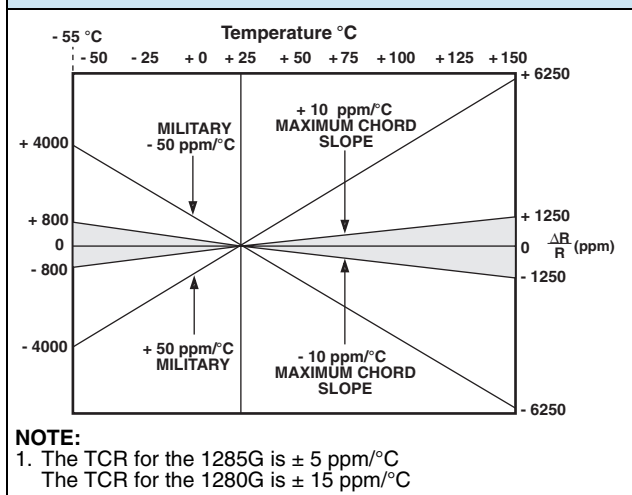
TEMPERATURE COEFFICIENT OF RESISTANCE (TCR)

The Maximum Temperature Coefficient of Resistance of standard Vishay trimmers (except the 1280G & 1285G¹⁾) is + 10 ppm/°C from - 55 °C to + 25 °C, and - 10 ppm/°C from + 25 °C to + 150 °C, which is five times tighter than required by MIL-PRF-39035 characteristic H.

NOTE:

- The TCR for the 1285G is ± 5 ppm/°C
The TCR for the 1280G is ± 15 ppm/°C

FIGURE 1 - VISHAY TEMPERATURE COEFFICIENT OF RESISTANCE (TCR) COMPARED TO MILITARY STANDARDS



This TCR specification is the result of the combination of the Bulk Metal® Foil and the matched substrate, which produces an unusually low and predictable TCR.

In real life conditions of changing ambient temperature and temperature gradients, the low TCR of Vishay trimmers plays an important role in both application modes:

- When the trimmer is used as a variable resistor (rheostat), it keeps the resistance value constant and independent of the changes in ambient temperature.

- When the trimmer is used in a voltage divider mode, the two parts of the trimmer's element see different temperatures because of temperature gradients created by heat dissipated by the trimmer and by outside heat sources.

REASON 2 SETTABILITY

Vishay Trimmers are settable to within 0.1 % maximum. The Bulk Metal® Foil has a flat, smooth surface containing redundant photo-etched current paths which provide essentially infinite resolution and enhance settability.

REASON 3 SETTING STABILITY

A multi-fingered wiper-brush rides on the Bulk Metal® Foil element with a preloaded force to maintain positive contact. The wiper is driven through a 20:1 worm gear (Model 1240 for example) which provides virtually backlash-free resistance adjustment. Together they provide a smooth, linear, resistance-rotation characteristic and exceptional stability when exposed to environmental stresses.

FIGURE 2 - 1240 TRIMMER ELEMENT

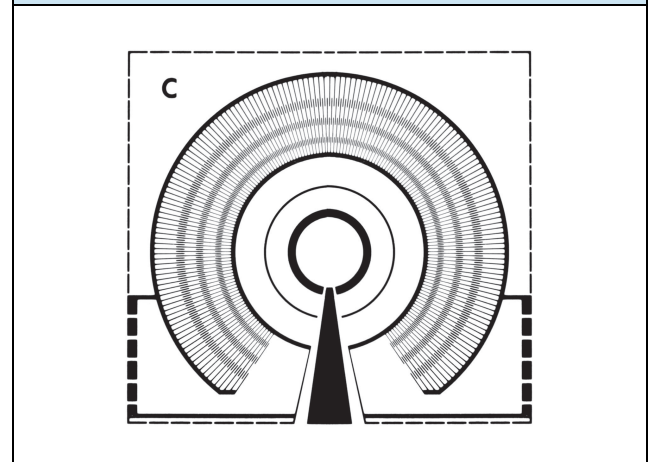
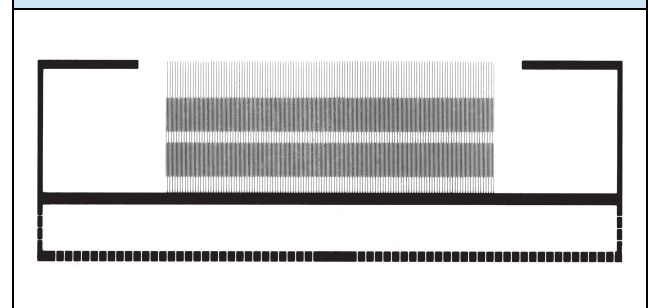
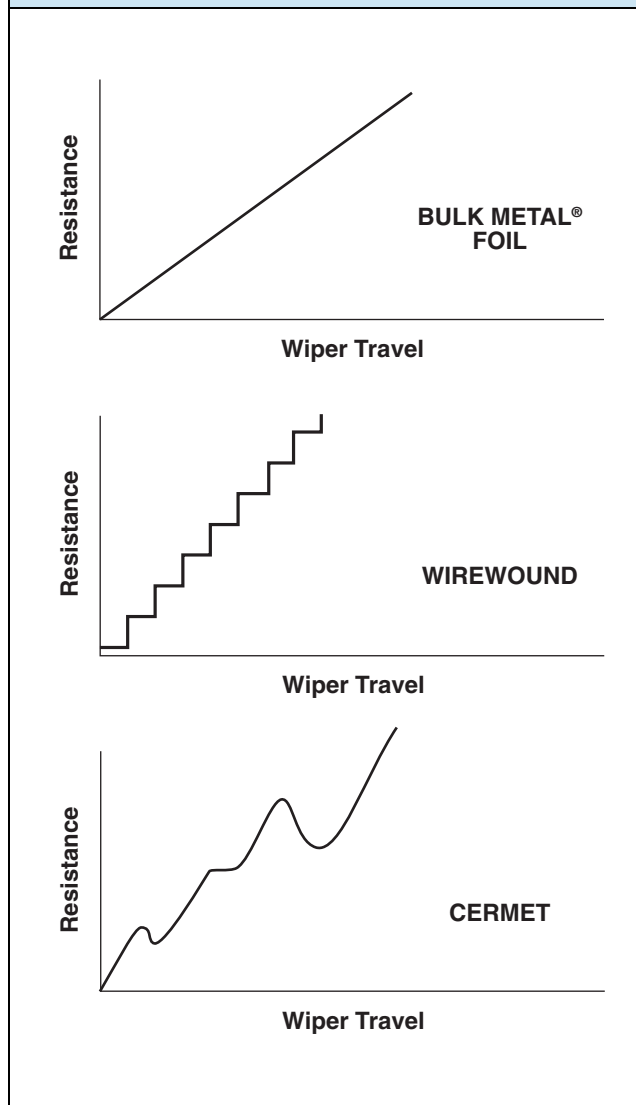


FIGURE 3 - 1202 TRIMMER ELEMENT



2. SETTABILITY/3. SETTING STABILITY Continued

FIGURE 4 - TYPICAL TRIMMER RESOLUTION BY ELEMENT TYPE



REASON 4 LOW NOISE

The flat smooth surface of the Bulk Metal® Foil, combined with the metal-to-metal contact between the Bulk Metal® Foil and the multifingered wiper, provide Vishay Trimmers with extremely low noise.

REASON 5 NON-INDUCTIVE DESIGN

The Vishay resistive pattern design on a flat substrate provides an essentially non-inductive component - 0.08 μH typical; with a rise time as fast as 10 ns at 1 k Ω - excellent for high frequency applications.

FIGURE 5 - 1240 CUTAWAY

Etched Bulk Metal® element redundant current paths eliminate catastrophic failure.

Sealed housing for moisture protection and solvent resistance.

All-welded construction maintains connection integrity under soldering.

Multi-fingered wiper.

Compression-fitted "O" ring seals adjustment screw opening.

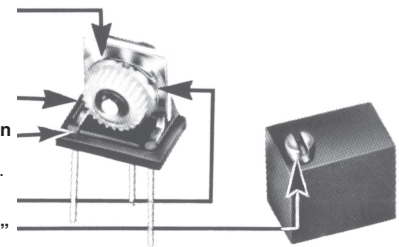


FIGURE 6 - 1202 CUTAWAY

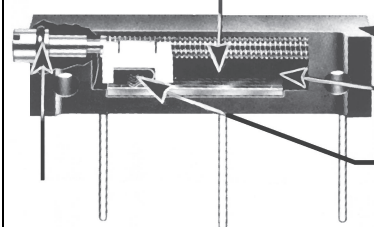
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ALL VISHAY TRIMMERS ARE INSPECTED 100 % FOR:

- Short-time overload (6.25 x rated power for 5 seconds on; and for 30 seconds off - 3 cycles)
- Immersion
- Resistance tolerance check
- End Resistance
- Visual-Mechanical
- Dynamic tests for: Continuity, CRV

By Sample For:

- TCR
- DWV