

**Product Group:** Vishay Foil Resistors

## High-Precision Programmable Resistance Decade Box for Calibration Laboratories and Industrial Applications



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Using Bulk Metal® Foil resistors from Vishay Foil Resistors (VFR), MEATEST was able to create a high-accuracy programmable decade box for RTD temperature simulation and industrial testing.

**Industry/Application Area:** Testing and simulation of resistance-based sensors

**Products Used:** S102L (2  $\Omega$  to 75 k $\Omega$ )

### The Challenge

Previously, there hadn't been a precision programmable decade box available on the world market that offered fast switching times. In creating one, two important requirements for MEATEST were eliminating the effects of zero resistance and improving accuracy over standard decade boxes. Originally, the company intended for its product to be used as a precise RTD temperature simulator for calibration laboratories. However, by using real resistors in the product - significantly improving reliability in comparison to electronic simulators - MEATEST could also offer a solution suitable for testing in industrial applications.

### The Solution

MEATEST utilized Vishay Foil Resistors' S102L high-precision Bulk Metal® Foil resistors (figure 1), which offer the high accuracy, long-term stability, and extremely low sensitivity to external and internal temperature changes needed to achieve the required decade box specifications.

## Product Group: Vishay Foil Resistor

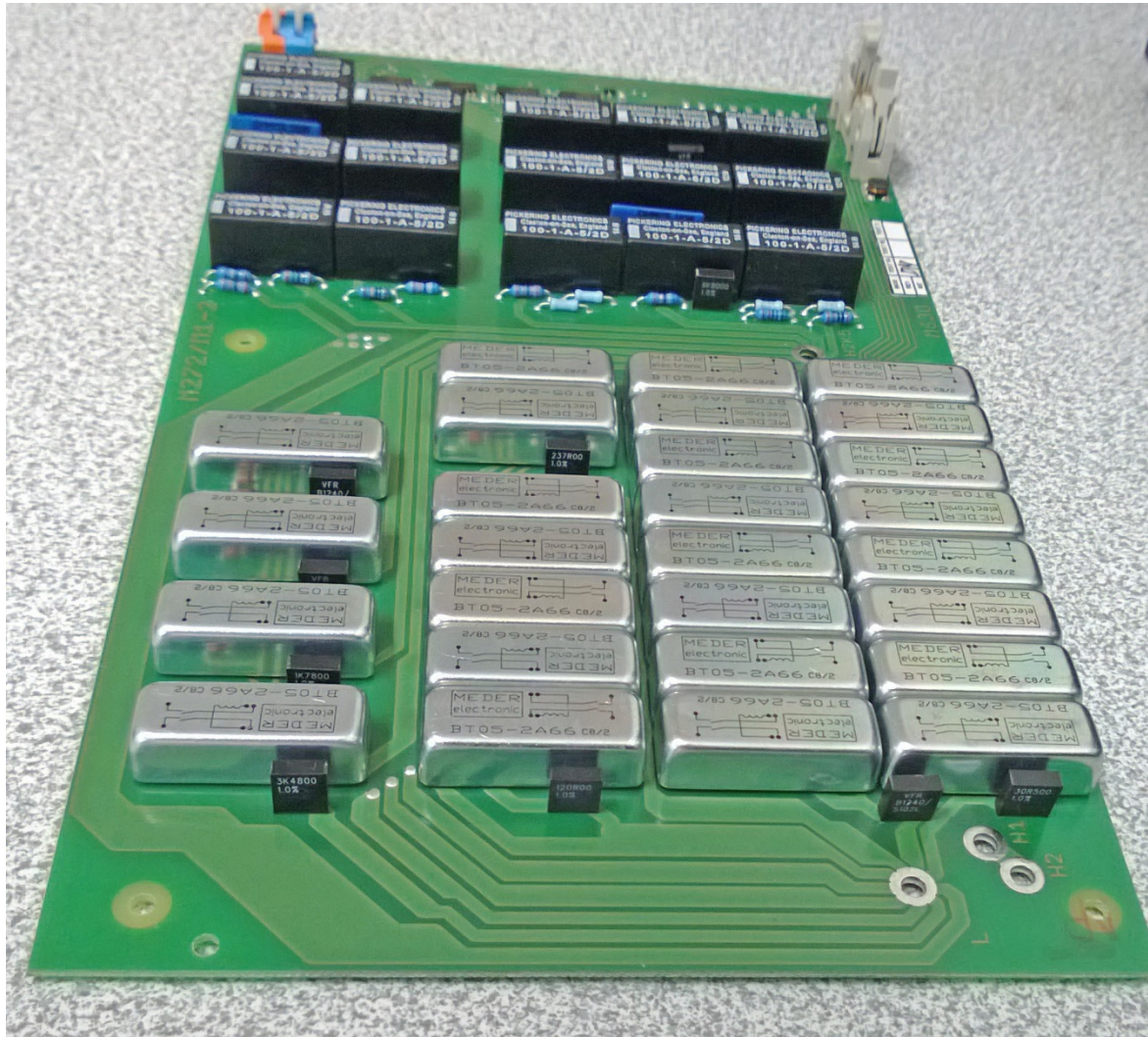


Figure 1: Vishay Foil Resistors' S102L high-precision Bulk Metal® Foil resistors on PCB for MEATEST's M630 programmable decade box

### The User Explains

We have achieved excellent results using Vishay Foil Resistors components for precision measurement in the past, so we didn't consider any other manufacturer for our decade box. The S102L in particular provides the accuracy and long-term stability we required to make the M630 (Figure 2) superior to competing products on the market, while maintaining a low cost. Utilizing the resistor, we have developed a solution perfectly suited to meet the high-precision needs of our customers.

#### Advantages of S102L Resistors:

- Low TCR down to  $\pm 1$  ppm/ $^{\circ}\text{C}$  typical from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $25^{\circ}\text{C}$  ref.
- Load life stability of  $\pm 0.005\%$  at  $70^{\circ}\text{C}$  for 2000 hours at rated power
- Resistance range from  $1\ \Omega$  to  $100\ \text{k}\Omega$

Product Group: Vishay Foil Resistors

- Fast response time: 1 ns, effectively no ringing



Figure 2: MEATEST's M630 programmable decade box (front and rear view) for RTD temperature simulation and industrial testing

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Acknowledgments:

Established in 1991, the MEATEST company develops, manufactures, and sells instruments for use in calibration laboratories and for accurate measurement in industrial applications. Click here to learn more about the [M630 programmable decade box](#) .

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