

## Strain Indicator Calibrator



A laboratory standard for verifying the calibration of strain and transducer indicators.

### FEATURES

- True Wheatstone bridge circuitry
- Simulates quarter, half & full bridge — both 120Ω/350Ω
- Three decades of push buttons
- Strain range direct reading:  $\pm 99\ 900\ \mu\epsilon$  . . increments of  $100\ \mu\epsilon$
- Transducer range:  $\pm 49.95\ \text{mV/V}$  . . increments of  $0.05\ \text{mV/V}$
- Reversing switch for plus and minus calibration
- High precision Vishay resistors used throughout to ensure excellent stability
- Accuracy 0.025 percent — traceable to the U.S. National Institute of Standards and Technology

### DESCRIPTION

Sound engineering and laboratory practices require that the instrumentation used to make critical strain measurements be periodically calibrated to verify that it is within the manufacturer's original specifications. Additionally, each type of strain indicator exhibits some degree of nonlinearity, especially for large strains during quarter-bridge operation. Since this is the most common stress analysis application of strain gages, it is important that the strain indicator be calibrated in this mode. Instrumentation span should also be checked at a number of points before each important test to avoid inaccurate data.

The Model 1550A calibrator is a Wheatstone bridge and generates a true change of resistance in one or two arms of the bridge. It simulates the actual behavior of a strain gage in both positive and negative strain.

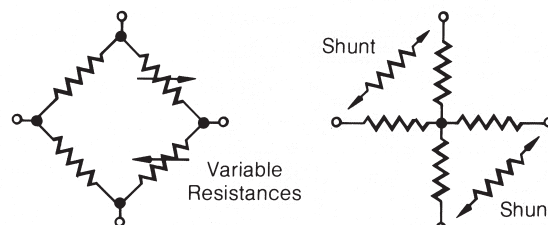
The 'star network' used in certain other commercial calibrators provides a substantially lower cost instrument

design, because component specifications are less critical, and fewer components are required.

However, the 'star network' cannot simulate quarter-bridge strain gage behavior, and cannot simulate positive strain. Another serious problem with this circuit is that the bridge input and output resistances change in an abnormal manner, leading to inaccuracies in calibration under some conditions.

A calibrator based on the Wheatstone bridge principle requires stable components. A total of 66 ultra-stable Vishay precision resistors are used in the Model 1550A calibrator to provide the stability, repeatability, accuracy and incremental steps required in a laboratory standards instrument.

### WHEATSTONE BRIDGE / STAR NETWORK



## Strain Indicator Calibrator



A certificate of calibration is provided with each Model 1550A calibrator

## SPECIFICATIONS

**Accuracy:**

0.025% of setting  $\pm 1\mu\epsilon$  (0.0005 mV/V), maximum.  
Traceable to United States National Institute of Standards and Technology.

**Repeatability:**

$\pm 1\mu\epsilon$  (0.0005 mV/V), maximum

**Stability:**

(0.001% of setting  $\pm 1\mu\epsilon$ )/°C, maximum

**Thermal EMF:**

0.5  $\mu$ V/V of excitation, maximum

**Bridge Resistances:**

120 $\Omega$  and 350 $\Omega$ .

**Input Resistance:**

$\pm 0.05\%$ , maximum, from nominal at all output settings.

**Output Resistance:**

$\pm 0.05\%$ , maximum, from nominal at "000" $\mu\epsilon$ ,  $-0.25\%$  at  $\pm 99\ 900\mu\epsilon$ .

**Circuit:**

True  $\pm\Delta R$  in two adjacent arms (opposite signs), plus two fixed arms for bridge completion.

**Simulation:**

Quarter bridge, one active arm.  
Half bridge, one or two active arms.  
Full bridge, two active arms.

**Range:**
**Two active arms:**

0 to  $\pm 99\ 900\mu\epsilon$  in steps of  $100\mu\epsilon$  @ GF = 2.00.  
0 to  $\pm 49.95$  mV/V in steps of 0.05 mV/V.

**One active arm:**

0 to  $\pm 49\ 950\mu\epsilon$  in steps of  $50\mu\epsilon$  @ GF = 2.00.

**Excitation:**

**To meet accuracy and repeatability specifications:**

**120 $\Omega$ :** Up to 10 Vdc.

**350 $\Omega$ :** Up to 15 Vdc.

**Maximum Permissible:**

**120 $\Omega$ :** 25V ac or dc.

**350 $\Omega$ :** 30V ac or dc.

**Output @ 000:**

$50\mu\epsilon$  (0.025 mV/V), maximum in full-bridge mode.

**Environment:**

**Temperature:**  $+50^\circ$  to  $+100^\circ$ F ( $+10^\circ$  to  $+38^\circ$ C).

**Humidity:** Up to 70% RH, non-condensing.

**Size:**
**Aluminum case (separable lid):**

5-3/4 H x 8-1/4 W x 7-3/4 D in (145 x 210 x 195 mm).

**Weight:**

4.8 lb (2.2 kg).

All specifications are nominal or typical at  $+23^\circ$ C unless noted.