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Strain Indicator Calibrator

FEATURES

- True Wheatstone bridge circuitry
- Simulates quarter, half, and 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 mV/V
- Reversing switch for plus and minus calibration
- High precision resistors used throughout to ensure excellent stability
- Accuracy 0.025 percent—traceable to the U.S. National Institute of Standards and Technology



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

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.

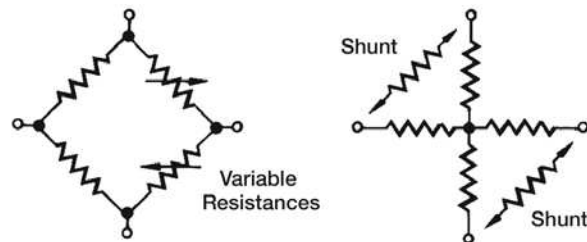
The Model 1550B calibrator is a Wheatstone bridge and generates a true change of resistance in one or two arms of the bridge. It simulates the actual behavior of a strain gage in both positive and negative strain.

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 precision resistors are used in the Model 1550B calibrator to provide the stability, repeatability, accuracy and incremental steps required in a laboratory standards instrument.

WHEATSTONE BRIDGE / STAR NETWORK



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 $\mu\text{V/V}$ of excitation, maximum

Strain Indicator Calibrator

BRIDGE RESISTANCES

120 Ω and 350 Ω

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 = 2.000 to $\pm 49.95\ \text{mV/V}$ in steps of $0.05\ \text{mV/V}$

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 Ω : up to 10 VDC350 Ω : up to 15 VDC

Maximum Permissible

120 Ω : 25V AC or DC350 Ω : 25V AC or DC

OUTPUT @ 000

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

ENVIRONMENT

Temperature

 $+50^\circ\text{F}$ to $+100^\circ\text{F}$ ($+10^\circ\text{C}$ to $+38^\circ\text{C}$)

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 $+73^\circ\text{F}$ ($+23^\circ\text{C}$) unless noted.

A certificate of calibration is provided with each Model 1550B Calibrator



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