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: ±99 900 με. . .increments of 100 με
- Transducer range: ±49.95 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

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.

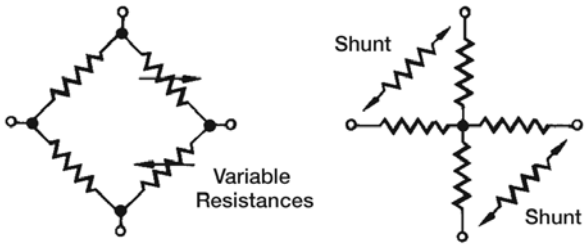
The Model 1550A calibrator is a Wheatstone bridge and generates a true change of resistance in one or two arms of the bridge. It simulates the actual behavior of a strain gage in both positive and negative strain.

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 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



SPECIFICATIONS

ACCURACY

0.025% of setting ±1 με (0.0005 mV/V), maximum

Traceable to United States National Institute of Standards and Technology

REPEATABILITY

±1 με (0.0005 mV/V), maximum

STABILITY

(0.001% of setting ±1 με)/°C, maximum

THERMAL EMF

0.5 μV/V of excitation, maximum

Strain Indicator Calibrator

BRIDGE RESISTANCES

120Ω and 350Ω

INPUT RESISTANCE

±0.05%, maximum, from nominal at all output settings

OUTPUT RESISTANCE

±0.05%, maximum, from nominal at "000" με

–0.25% at ±99 900 με

CIRCUIT

True ±ΔR 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 ±99,900 με in steps of 100 με @ GF = 2.00

0 to ±49.95 mV/V in steps of 0.05 mV/V

One Active Arm

0 to ±49.950 με in steps of 50 με @ GF = 2.00

EXCITATION

To Meet Accuracy and Repeatability Specifications

120Ω: up to 10 VDC

350Ω: up to 15 VDC

Maximum Permissible

120Ω: 25V AC or DC

350Ω: 30V AC or DC

OUTPUT @ 000

50 με (0.025 mV/V), maximum in full-bridge mode

ENVIRONMENT

Temperature

+50°F to +100°F (+10°C to +38°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°C unless noted.

A certificate of calibration is provided with