Wide Range Strain Indicator

A versatile high-performance laboratory-type instrument featuring wide-range operating controls for handling the most critical strain measuring tasks.

FEATURES

- 4-1/2 Digit LED Display
- ANSI/SEM Color-coded bridge connection terminals
- Analog output
- Transducer connector with remote sense
- Direct reading of strain, pressure, torque, load, and other engineering variables
- Convenient color-coded push-button controls
- Gage factor range from 0.0500 to 50.00 displayed on LED readout (to four significant digits)
- Bridge excitation range from 1.000 to 15.000Vdc
- Extremely wide balance range. Balance by voltage injection
- Quarter-, half-, and full-bridge circuits
- Built-in 120/1000Ω and 350Ω bridge completion
- Separate bridge excitation on/off control

DESCRIPTION

EXCEPTIONAL RANGE • RESOLUTION • VERSATILITY NEVER BEFORE ACHIEVED IN A LABORATORY INSTRUMENT

The Model 3800 Wide Range Strain Indicator is a versatile, high-precision laboratory-type instrument designed for use with strain gages and strain gage based transducers.

Principal features of the Model 3800 are wide-range control of gage factor; excitation precisely settable over 1 - 15 volt range; and wide balance range with no bridge loading effect.

With these extended operating capabilities, the Model 3800 can be used for the most demanding measurement tasks which are not possible with conventional strain measuring instruments and general-purpose transducer indicators. Resolutions achievable with the Model 3800 are 0.10με when used as a strain indicator, and 0.10μV/V when used as a transducer indicator (0.025μV/V with suppressed zero).

In addition to the wide-range features, the Model 3800 incorporates simplified operating controls that minimize set-up time, and promote measurement accuracy. The operator follows a logical sequence of steps to configure the instrument for the desired measurement. Color-coded interlocked push-button controls minimize operator errors, and make the operating mode instantly recognizable.

Gage factor on the Model 3800 is settable by front-panel controls over a range of 0.0500 to 50.00, and is displayed by the LED readout when in the SET position. The instrument allows full range display (±19 999 counts) over the complete gage factor range.

Excitation voltage is precisely settable over a range of 1 - 15 volts in 1-volt increments by a front-panel thumbwheel switch. The output display automatically tracks the excitation setting so that gage factor does not vary with bridge voltage.

The balance system in the Model 3800 has four ranges which are selected by the BALANCE RANGE push buttons. Each range is further divided into four sub ranges by the COARSE balance switch. The FINE balance control provides an additional adjustment range that overlaps the COARSE balance switch positions. This unique system provides a total of 32 overlapping ranges for achieving precise balance settings and resolution. All balance voltages are electronically injected into the input amplifier to eliminate bridge loading errors and preserve full measurement range.

The instrument will accept full-, half-, or quarter-bridge strain gage inputs; and all required bridge completion components for 120, 350, and 1000Ω gages are built in. Shunt-calibration resistors across the internal dummies are provided on the rear panel. Two remote calibration resistors, also mounted on the rear panel, are actuated by the front-panel calibration button.

Virtually all strain gage based transducers can be used with the Model 3800 via the rear-panel transducer connector. This connector provides precision remote sense capability, as well as access to the remote calibration resistors. Full-scale resolutions of 0.10μV/V are routinely possible. By using the wide-range balance controls to suppress zero, resolutions to 0.025μV/V can be achieved.

In addition to the digital LED display, the Model 3800 provides an analog output available at the rear panel. A separate analog level control totally independent of the digital display is also provided.

The Model 3800 Wide Range Strain Indicator is an exceptional, high-resolution instrument that will make a valuable contribution to any experimental stress analysis or transducer development laboratory.

Wide Range Strain Indicator

SPECIFICATIONS

Range and Display:
±19 999 counts direct-reading LED display.

Resolution:
1με at any gage factor from 0.0500 to 50.00.
0.10μV/V as a transducer indicator.

Linearity:
±0.01% of full scale.

Balance Range:
Coarse balance: ±2.5% to ±100% of full scale per step, in 32 total steps.

Fine balance: ±1.25% to ±50% of full scale; overlaps each coarse balance step.

Balance Method:
Electronically injected counter-emf.

Gage Factor:
Range: 0.0500 to 50.00; displayed by LED readout when in the SET position.

Resolution:
0.0001 from GF of 0.0500 to 0.5000
0.001 from GF of 0.500 to 5.000
0.01 from GF of 5.00 to 50.00

Linearity: ±0.05% of full scale.

Accuracy: ±1 least significant digit.

Excitation Voltage:
1.000 to 15.000Vdc±1mV±0.02%. Settable in 1V increments by front-panel thumbwheel switch.

Temperature stability: ±0.01%/°C.

Amplifier:
Temperature effect on zero: ±1.0μV/°C RTI† max.; ±0.50μV/°C RTI† typical.

Temperature effect on span: ±0.005%/°C max.

Warm-up drift: less than ±3μV RTI† from turn-on to 5 minutes.

Random drift at constant ambient temperature: less than ±1μV RTI†.

Common-mode rejection: greater than 100dB at 50-60Hz.

Common-mode voltage: ±8V max.

Input impedance: greater than 100MΩ differential and common mode.

Input circuits: quarter-, half-, and full-bridge circuits. Internal bridge completion provided for 120/1000Ω and 350Ω quarter bridges; 60 to 2000Ω half or full bridge.

Calibration: shunt calibration resistors are provided across internal 120Ω and 350Ω dummy gages to simulate 5000με±0.05%. Calibration resistors are located on the rear of instrument and may be changed to suit specific requirements. Contact closures are provided for two rear-panel-mounted resistors to facilitate any calibration configuration. Typical use is double-shunt calibration of transducers.

Analog Output:
Linear output: ±10.00V max; adjustable over 11:1 range by a ten-turn potentiometer mounted on the rear panel.

Output load: 2kΩ min.

Bandwidth: GF >0.500, dc to 4.5kHz (–3 dB nominal).
GF <0.500, dc to 2.0kHz (–3 dB nominal).

Output noise: less than 2.5μV peak to peak 0.10 to 10Hz, RTI†. Less than 2μV rms dc to 5kHz, RTI†, plus 0.005% of full scale, RTO (referred to output).

Remote Sense:
Remote sense connections provided at transducer connector.
Remote sense error: less than 0.0005%/Ω of lead resistance.
Maximum lead resistance 40Ω or less.

Power:
115/230Vac, 50-60Hz, less than 10 volt-amperes.

Size and Weight:
6.5 H x 11.0 W x 12.5 D in (165 x 280 x 318mm).
10.2lb (4.6kg).

†Referred to input
All specifications are nominal or typical at +23°C unless noted.

Companion instruments for use with the Model 3800

Model V/E-40 Decade Resistor Strain Gage Simulator, and Model 1550A Strain Indicator Calibrator — with these specialized instruments, the capabilities and sensitivity of the Model 3800 can be further extended by making critical measurements through precise strain simulation.