



7310 Dynamic Strain Gage Signal Conditioning Amplifier



Features:

- Differential signal amplifier with high bandwidth up to 800 kHz
Gain Accuracy $\pm 0.1\%$
Fully adjustable calibrated programmable gain from 1 to 9,999
- 4 digital LED display for gain, filter, excitation setting or output voltage
Accepts foil type strain gage, piezo resistive, potentiometers, etc.
Programmable or Selectable bridge Constant-voltage excitation: 0 to 15V
- Plug-in amplifier
Automatic bridge balance, with EEROM to preserve balance without power
Built-in with all bridge completion including 120 or 1000 and 350 dummies.
Built-in with shunt calibration circuits
Built-in with optically isolated shunt calibration relays
Built-in with programmable or selectable four-pole Bessel low-pass filter
- 10 Selectable cutoff frequencies of 10 Hz to 100kHz and wide-band
Front-panel monitoring: Vin, Vout and Excitation

Applications:

Dynamic Material Test
Strain/Stress Analysis
Dynamic Material Elasticity Testing
SHPB Signal Conditioning

Load Cell Signal Conditioning
Foil Strain Gage Signal Conditioning
Piezo Resistive Sensor Signal Conditioning
Semiconductor Strain Gage Signal Conditioning

Description:

7310 Signal Conditioning System is designed with and incorporates all the features necessary for dynamic precise conditioning of strain gage and transducer inputs in the most severe operating environments.

7310 Signal Conditioning and amplifier's low-level signals to high-level outputs for multiple channels can be simultaneously and dynamically recorded and displayed on external devices.





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Specification:

Input

- Strain gages: Quarter, half or full-bridge (50 to 1000)
- Built-in 120 Ω and 350 Ω dummy gages; 1000 dummy capability
- Transducers: Foil or piezo resistive strain gage types; DCDT displacement transducers
- Potentiometers

Excitation

- Fixed settings: 0, 0.5, 1, 2, 2.5, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15 VDC ± 4.5 mV
- Current: 100 mA, min
- Regulation (0-100 mA $\pm 10\%$ line change) ± 0.05 mV $\pm 0.004\%$, max measured at remote sense points. (Local sense: -5 mV, typical, 100 mA, measured at plug.)
- Remote sense error: 0.0005% per Ω of lead resistance (350 load)
- Noise and ripple: 0.005% Vp-p, max (dc to 10 kHz)
- Stability: $\pm 0.002\%/^{\circ}\text{C}$
- Level: Normally symmetrical above ground; either side may be grounded with no effect on performance.

Bridge Balance

- Method: Automatic
- Ranges (Auto ranging) : $\pm 13000 \mu\epsilon$
Resolution 2.5 μV (0.0012 mV/V)
- Balance time: 8 seconds
- Manual vernier balance range: $\pm 300 \mu\epsilon$

Calibration

- Four internal shunt calibration resistors, $\pm 0.01\%$ tolerance
- 174.8k, 1000 $\mu\epsilon$ (0.50 mV/V) 350 Ω bridge;
- 874.8k, 200 $\mu\epsilon$ (0.10 mV/V) 350 Ω bridge;
- 59.94k, 1000 $\mu\epsilon$ (0.50 mV/V) 120 Ω bridge.
- 599.88k, 100 $\mu\epsilon$ (0.05 mV/V) 120 Ω bridge.
- Activated by front-panel switch, or by optically isolated remote contact closure or low TTL level
- Internal selector switches for selection of two-point unipolar, bipolar, or two-point double shunt calibration circuits bipolar

• Amplifier

- Gain: 1 to 9,999 continuously variable.
Direct reading, Accuracy $\pm 0.1\%$ Max,
4 digital Led (X 1 to X 9.999)
plus decade multiplier (X 1 to X 1000)
- Frequency response, all gains full output
- DC coupled: DC to 800 kHz,
-3 dB Max @ $V_{out} < \pm 5000\text{mV}$
- DC to 60 kHz, -0.5 dB Max
- Stability (gain over X 100)
- $\pm 2 \mu\text{V}/^{\circ}\text{C}$, max, RTI (referred to input)

- Nonlinearity $< 0.05\%$ • Nonlinearity $< 0.05\%$

- Noise (gain over X 100, all outputs)

- 0.01 to 10 Hz: 1 μV p-p RTI

- 0.5 to 125 kHz: 6 μVRMS , Max, RTI

Display

- 4 digital LED display for amplifier output voltage
- Fine gain setting from 1.000 to 9.999

Filter

• Characteristics

- Low-pass active four-pole linearity Butterworth standard

- Frequencies (-3 $\pm 1\text{dB}$): 10 Hz, 30 Hz, 100 Hz, 300Hz, 1k, 3k, 10k, 30k, 100kHz and wide-band

- Programmable settings: 0.001 ~ 50.00 kHz, 1Hz/step or 10Hz/step, 2~10 kHz phase matching < 0.3 deg

Input & Output

- PT06A-14-15P(SR) 15 pin input connector for sensor input
- Enclosure to sensor input impedance $> 1 \text{ G}\Omega$
- BNC connector for each 7310 amplifier output, $\pm 10 \text{ V}$
- Each enclosure have one D type 15 pin connector and terminal board for output signal
- 4 Digital DVM, resolution 1mV

Operational Environment

- Operation temperature: -10°C ~ 60°C
- Storage: -20°C ~ 70°C
- Humidity: Below 95% RH, non-condensing

Power Requirement

- Input: 110 or 220 VAC $\pm 10\%$ by switch, 50 or 60 Hz, 2 A

Dimensions & Weight

- Panel: 1.3" X 5.2" (33.4 X 133.3 mm)
- Amplifier depth behind panel: 10.6" (270 mm)
- Weight: 1.32 Lb (0.6 Kg)

Order code

- 7310 : PT06A-14-15P(SR) 15 pin input connector for sensor input

Optional Accessories

- 7001CPT Single-Channel Enclosure with power supply for PT06A-14-15P(SR) input connector
- 7002CPT 2-Channel Enclosure with power supply for PT06A-14-15P(SR) input connector
- 7006CPT 6-Channel Enclosure with power supply for PT06A-14-15P(SR) input connector
- 7012CPT 12-Channel Enclosure with with power supply for PT06A-14-15P(SR) input connecto