

PE / IEPE signal conditioner

Model 123



Key features

- Three-channel PE/IEPE signal conditioner
- 230 kHz bandwidth ($\pm 5\%$)
- Optional HP and LP filters for each channel
- Gain calculation
- Gain range from 0.00 to 999.9

The model 123 is a new microprocessor controlled 3-channel signal conditioner for Piezoelectric (PE) or Integrated Electronic Piezoelectric (IEPE) sensors. The model 123 incorporates a charge amplifier when used with PE sensors. An integral 0, 4 or 10 mA, user selectable, current source with 20 Vdc compliance voltage is utilized with IEPE sensors. A user friendly interface allows programming Input Sensitivity and Output Sensitivity, then allowing the instrument to calculate the amplifier gain. All gain selections are stored in non-volatile memory and reinitialized when power is applied. Gain can also be entered directly if desired.

The model 123 utilizes a microprocessor SLEEP mode to eliminate high frequency clock noise and their associated harmonics. The microprocessor WAKES momentarily to acknowledge front panel switch depressions, then goes to SLEEP immediately after processing and executing the requested function. This allows the amplifiers to operate with minimum self generated noise and provides clean, clock free amplified signals. The model 123 also uses low noise linear voltage regulators instead of switching regulators to minimize interference.

The model 123 uses 12 bit DACs, for each channel, to set amplifier gains from 0.00 to 999.9 with 0.5% precision. Amplifier gains can be changed "on the fly" without damage to the instrument.

The model 123 provides 1.5 Hz to 230 kHz broadband frequency response, with optional plug-in, 4-pole Butterworth high pass and low pass filter modules available. Filter selection is provided via rear panel switches. Front panel annunciate LEDs display filter selections. Each channel can drive 10 mA into a 1k ohm load.

The model 123 channel-to-channel signal ground is non-isolated. However, signal ground is isolated from power ground. An internal DIP switch allows shorting signal ground to power ground.

A rear panel voltage selector switch allows selection of 100, 115 or 230 Vac, 50-60 Hz, input power.

The model 123 is designed for CE compliance for EMC emissions and immunity and for product safety.

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Specifications

The following performance specifications conform to ISA-RP-37.2 (1964) and are typical values, referenced at +75°F (+24°C) and 100 Hz, unless otherwise noted.

Input specifications [per channel]

Piezoelectric	Single-ended with one side connected to signal ground
Maximum charge input	10 000 pC
Source resistance	> 10 MΩ
Source capacitance	< 10,000 pF
IEPE	Single-ended with low side connected to signal ground
Constant current source	None, 4 mA or 10 mA selectable per channel
Accuracy	± 15%
Compliance voltage	< 20 Vdc
Maximum input voltage	< 22 Volts (AC +DC)
Input impedance	10 μF and 1 MΩ

Output specifications [per channel]

AC voltage	Single ended and referenced to signal ground. Signal proportional to input
Linear output	10V peak minimum
Output current	10 mA max
DC offset	15 mV typ
Protection	Short circuit protected

Transfer characteristics

Gain	
Range	0.00 to 999.9
Resolution	0.0025, 0 ≤ gain < 10 0.025, 10 ≤ gain < 100 0.25, 100 ≤ gain < 1000
Accuracy	±0.5% at 1 kHz with filters disabled and gain >1
Sensitivity (pC/EU or mV/EU)	0.00 to 9999
Resolution	determined by gain resolution
Output scaling (mV/EU)	0.00 to 9999
Resolution	determined by gain resolution
Linearity	0.1% of full scale, best fit straight line at 1 kHz reference with standard 10 kHz 4-pole Butterworth low pass filter installed
Noise	
Piezoelectric	0.04 pC rms + 0.012 pC rms per 1000 pF of source capacitance RTI + 1mV rms RTO
IEPE	20 uV rms RTI + 400 uV rms RTO. Input shunted with a 249 Ohm [4 mA exc] or 100 Ohm [10 mA exc] load
Broadband frequency response	± 5%, 1.5 Hz to 230 kHz, typ, referenced to 1 kHz.
Optional plug-in filter characteristics	
High Pass type	4-pole Butterworth
Low Pass type	4-pole Butterworth
Corner frequency (-3dB)	10 Hz ± 5% and 10 kHz ± 12% typ, other corner frequencies available
Crosstalk between channels	80 dB RTI min

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Rear Panel Selectable Functions (per channel)

Input type	PE or IEPE
Excitation current (Isotron only)	None, 4 mA, 10 mA
Filter	HP (High Pass) and LP (Low Pass)

Front Panel Programmable Functions (per channel)

Sensitivity (pC/EU or mV/EU)	0.01 to 99.99
	100.0 to 999.9
	1000 to 9999
Output scaling (mV/EU)	0.01 to 99.99
	100.0 to 999.9
	1000 to 9999
Gain (calculated)	0.00 to 999.9
Gain (front panel settable)	0.00 to 999.9
Memory	Serial EEPROM (1K bits)

Power requirements

Voltage	100/115/230 Vac rear panel switch selectable, 50-60 Hz
Isolation	No isolation channel to channel. Signal ground isolated from case ground.
Internal DIP switch allows	connecting signal ground to case ground.

Physical characteristics

Dimensions	8.25 x 3.52 x 9.25
Case material	Iridited aluminum
Rear connectors	
PE input	BNC
IEPE input	BNC
Output	BNC

Accessories:

Product	Description	123
EW599	Powercord	Included
IM123	Instruction manual	Included
EJ21	BNC to 10-32 adaptor	Optional
31875-XXXX-Y	Low pass filter module (see 31875 data sheet)	Optional
42875-XXXX	High pass filter module (see 42875 data sheet)	Optional

Notes:

- Maintain high levels of precision and accuracy using Endevco's factory calibration services. Call Endevco's inside sales force at 866-ENDEVCO for recommended intervals, pricing and turn-around time for these services as well as for quotations on our standard products.

Contact

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