CAENels
Gear For Science

AH501D

4-channel Bipolar Picoammeter with Analog Monitors and Bias Voltage

The AH501D is the new high-resolution bipolar picoammeter with 4-channel simultaneous inputs, analog voltage monitors and an integrated bias voltage source.

It has been especially designed as the turnkey solution for photon BPM systems as diamond detectors, ion chambers and blade gap-monitors.

Features

- From ± 2.5 nA to ± 2.5 mA current range
- Up to 26 kHz sampling frequency
- 24-bit ADC conversion
- Analog voltage monitors
- Integrated Bias voltage source (up to 30V)
- Less than 200 fA full-scale range noise
- 4-channel simultaneous sampling
- Ethernet 10/100 standard interface

Applications

- Beam Position Monitoring
- Ion Chambers Reading
- pH - metering
- Ultra-Low Current Measurements
- Diamond Detectors Readout
- Radiation Monitoring

The AH501D is a 4-channel low noise and fast sampling rate bipolar picoammeter with an integrated bias voltage source and voltage analog monitors. It is composed by a transimpedance input stage for current sensing combined with a buffered output voltage circuit that allows users to monitor the input current behavior and level with a simple oscilloscope or a tester.

This device performs bipolar current measurements from ±2.5 nA (with a resolution of 300 aA) up to ±2.5 mA (resolution of 300 pA) with a minimum sampling period of 38.4 µA (equivalent to 26 kHz, for 1 channel and a 16-bit resolution).

The simultaneous sampling of the 4 independent channels makes this instrument ideal for beam position monitoring applications or multichannel acquisition.

The presence of an internal low-noise (0.003% of full scale) voltage source, ranging from 0 to 30V, makes it extremely useful when using blade gap-monitors or diamond detectors needing a bias potential in order to increase the signal intensity and thus the signal-to-noise ratio. This built-in bias voltage source signal is available on a BNC connector and can also be set to a high-impedance state.

The AH501D is housed in a light and extremely compact box that can be placed close to the signal sources in order to reduce cable lengths and to minimize possible noise pick-up on the biasing and measuring signal paths. Low temperature drifts, good linearity and very low noise levels enable users to perform very high precision current measurements.

The AH501D picoammeter has an Ethernet 10/100 communication interface (TCP-IP and UDP) that allows easy instrument control with several programming languages and operating systems.

The AH501D has an external TRIGGER/GATE input signal on a coaxial LEMO connector in order to synchronize the acquisition of the picoammeter with external events (e.g. laser triggering). Furthermore, as for the other members of the CAENels picoammeter family, digital samples can be transferred either using ASCII format or RAW binary data format for fast data transmission.

Technical Specifications

Input Channels	4
Current Measuring Range	from ±2.5 nA to ±2.5 mA
Voltage Monitors	Yes (±5 V)
Current Polarity	bipolar
Data rate	up to 26 ksamples/s
Resolution Bits	16 or 24
Noise (@RNG2, CIN = 5pF)	150 fA (typ.)
Communication Interface	Ethernet 10/100 TCP/IP and UDP
I/O Signal	TRIGGER/GATE input, CONV output
Supply Voltage	from ±6 V to ±15 V
Bias Voltage Output	0 to 30 V
Bias Voltage RMS Noise	0.003%
Dimensions	155 x 165 x 50 mm
Weight	500 g
Input Connectors	BNC
Voltage Monitor Connectors	LEMO
Status Indicators	5 LEDs

AH501D Rear view

About CAENels

CAENels is a dynamic company that provides power supplies and state-of-the-art dedicated electronic systems to the particle accelerator community - e.g. synchrotron light sources and Free Electron Laser (FEL) facilities.

- Magnet Power Supply Systems
- Beamline Electronic Instrumentation
- Precision Current Transducers
- High-Voltage Dedicated Systems

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