CAENels
Gear For Science

TetrAMM

4-channel Fast Interface Bipolar Picoammeter

Integrated High Voltage Source

The TetrAMM ("Tetra AMMeter") is the new 4-channel picoammeter designed for quad monitoring applications – e.g. photon Beam Position Monitors.

4-channels simultaneous sampling with a 24-bit ADC resolution and 100 kHz sampling frequency.

Integrated High Voltage power supply source for detector biasing.

Features

- 4-channel simultaneous sampling
- Up to 100 kHz sampling frequency
- 24-bit ADC conversion
- Factory calibrated
- Bipolar current ranges from ±120 nA to ±120 μA (configurable upon request)
- 10/100/1000 Ethernet Connectivity
- Low-noise integrated HV source
- Firmware Remote Update
- External Trigger/Gate and Interlock
- Configurable sampling frequency
- Auto-ranging functionality
- On-board FPGA and soft-processor computations
- SFP Link
- Compact mechanical dimensions

Applications

- Photon Beam Position Monitoring
- Diamond Detectors Readout
- Ion Chambers Readout
- Ultra-Low Current Measurements
- Quadrature Photodiode Readout

The TetrAMM ("Tetra AMMeter") is the new 4-channel picoammeter designed For quadrature monitoring applications – e.g. photon Beam Position Monitors – that expands CAEN ELS picoammeter family.

The device is composed by a carrier board and by two plugins: these are the Front-End board and the High Voltage source.

The Front End board performs the analog signal conditioning and the digital data conversion: input currents range from ±120 μA to ±120 nA full-scale range and are simultaneously converted with a 24-bit resolution at a maximum 100 kHz frequency.

The High Voltage plugin board is rated at a standard +500V or -500V @ 1mA outputs but it can be configured in rating (up to 6 kV - both polarities). This source, fed on a SHV connector - is perfectly suited to be used as the biasing voltage for a detector system.

As for the previous models, the TetrAMM is housed in a light and extremely compact box that can be placed close to the detector – i.e. the signal sources – in order to reduce cable lengths and to limit noise pick-up from external sources or from parasitic effects.

Low-noise, high stability and excellent linearity enable users to perform very high precision current measurements. All measuring channels are factory calibrated.

An additional calibration can be made by the user taking into account the entire installation setup – e.g. dark currents – and can be recalled since it is stored in the device internal non-volatile memory.

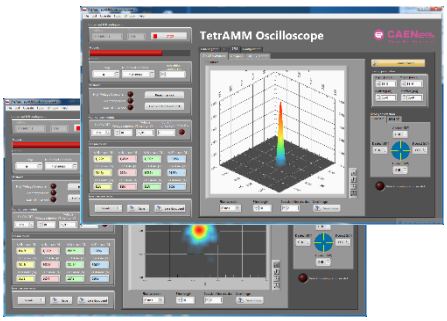
A 10/100/1000 Ethernet connection allows for very fast data transmission and easy instrument control with several operating systems and programming languages.

The TetrAMM has two different TRIGGER

and GATE signals on a LEMO coaxial connector; additional passive interlock contacts are present on the 10-pin I/O connector on the rear panel. An SFP link is also present and it will be used to integrated the device in a closed-system.

The internal firmware can be remotely updated, please check our website www.caenels.com in order to have the last available version installed on your TetrAMM.

Technical Specifications	TetrAMM	
Number of Channels	4	
Current Polarity	Bipolar	
Measuring Range	RNG0 RNG1	± 120 µA ± 120 nA
Current Resolution	RNG0 RNG1	15 pA 15 fA
Sampling Frequency - f_S	up to 100 kHz	
Analog Bandwidth - BW	5 kHz	
Equivalent Input Current Noise (@ 1 kHz)	RNG0 RNG1	1 ppm/FS 6 ppm/FS
Equivalent Input Current Noise (@ 100 kHz)	RNG0 RNG1	< 6 ppm/FS < 25 ppm/FS
Temperature Coefficient - TC	RNG0 RNG1	< 0.001 %/FS/K < 0.002 %/FS/K
High Voltage Source	500 V @ 1 mA (standard) configurable up to 6 kV	
High Voltage Noise & Ripple	< 1 mV_{RMS} < 3 mV_{PK-PK}	
Communication Interface	10/100/1000 Ethernet	
External Signals	Configurable Trigger/Gate Trigger Output External Interlock	
Input Connectors	BNC	
High Voltage Connector	SHV	
Extra Communication Interface	SFP – Small Form Factor Pluggable	
Additional Features	Auto-ranging Firmware Remote Upgrade Configurable Sampling Frequency High Voltage Readback High Voltage Current Readback High-Voltage Overcurrent Protection	
Input Voltage	+12 V_{DC}	
Mechanical Dimensions	175 × 175 × 44 mm	



Photon BPM – Oscilloscope Application
Plug & Play GUI application for quadrature photon Beam Position Monitor applications

TetrAMM – Rear View

Ordering Options

WTETRAMMPXAA	TETRAMM-500P	4-channel Fast Interface Bipolar Picoammeter with Integrated +500V HV Source
WTETRAMMNXAA	TETRAMM-500N	4-channel Fast Interface Bipolar Picoammeter with Integrated -500V HV Source
WTETRA4KPXAA	TETRA4KP	4kV (Positive) Integrated HV Source - *option*
WTETRA4KNXAA	TETRA4KN	4kV (Negative) Integrated HV Source - *option*

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About CAEN ELS

CAEN ELS is a leading company in the design of power supplies and state-of-the-art complete electronic systems for the Physics research world, having its main focus on dedicated solutions for the particle accelerator community.

- Magnet Power Supply Systems
- Beamline Electronic Instrumentation
- Precision Current Transducers
- MTCA.4 – MicroTCA for Physics

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