Beam Monitor Readout Electronics
B# Advanced Electrometer with PID

Applications

- Controls focusing elements like KB mirrors, stages, and other beam stability mechanical control elements
- Useful for setup, monitoring, and troubleshooting
- Provides actual beam data to compare to theoretical predictions

Features

- Precise four channel current readout and output with integrated ultra- stable bias output
- Four programable DAC outputs with full featured PID control that allows fast feedback control at nanometer precision
- User-friendly software to visualize data in real time

Sydor's Advanced Electrometer combines high performance 4- channel current readouts with integrated DAC outputs for feedback control of mirrors, stages, or other beam positioning elements. The device can be located in close proximity to key components, sensitive signals, and control loops. The Advanced Electrometer includes an output bias voltage to complete a position control package that is ideal for pairing with Sydor's four quadrant Diamond Beam Position Monitors (DBPMs).

Depending on the user's setup, the Advanced Electrometer can also operate in a relative or absolute position calibrated mode. The embedded proportional–integral–derivative (PID) loop can be tuned for feedback control with user-specified ranges of drift or offset. This functionality automates correction for beam movement or drift, and can maintain nanometer precision over hours of experimental operation.

The data is sampled at rates up to 2.5 kS/s with mechanical feedback at 10 Hz. The channels have five programmable gain ranges and a large 20-bit dynamic range to allow maximum signal amplification without saturating. The electrometer is sensitive to currents from 1 pA to 1 uA, with optional current attenuators to increase this range.

The system is cross platform compatible with a proprietary UI with additional support for EPICS. The software UI is tailored to allow intuitive monitoring of real time current readings. The data can be displayed as an x-y position plot, 4 channel current or two 1D position plots. can be displayed as plotted raw data or auto-scaled depending on the signal intensity.

The Sydor Electrometer produces accurate beam positioning feedback for beam control systems by acquiring precise current measurements from a number of devices including Sydor's Diamond-based Beam Position Monitors and other position measurement systems.

Product Specifications

- **Readout Channels:** 4
- **Current Measuring Range:** 1 pa-1 µm
- **Gain Selection:** 8 gains(12, 50, 100, 150, 200, 250, 300, 350 pC)
- **Data Rate:** 2.5 kS/s
- **Resolution:** up to 20 bit
- **Bias Voltage Output:** +10 V
- **I/O Control Ports:** 1 Ethernet, 4 user-definable I/O (0 to +10 VDC) (i.e. proportional output, XY position, PID)
- **Communication:** 10/100/1000 Ethernet TCP/IP
- **Input/Bias Output Connectors:** SMA
- **Mechanical Enclosure:** 19" 2U rack mount

User Interface