

## I400 Four-channel Digital Electrometer with Biased Inputs

### Features

- Four gated integrator channels with adjustable bias voltage to 400V
- Dynamic range <math><0.1\text{pA}</math> to <math>>70\mu\text{A}</math>
- Integrated digitization and communications
- Integrated calibration test source
- Selection of current and charge integration modes
- External triggering capability
- Diagnostic host software with position algorithms and multiple display options



### Applications

- Ionisation chambers
- Beam position monitors
- Photodiodes
- Diamond detectors
- General very low current and charge measurement

### Options

- Auxiliary HV output options up to +/- 1000V
- Alternative feedback capacitor options

### Specifications

Integration capacitor	Each channel has dual, software-selectable capacitors (10pF and 1000pF standard)
Input noise	<math><60\text{fA rms}</math> (1 second integration, 10 pF capacitor, 0V bias)
Input offset current	<math><3\text{pA}</math> at 0V bias, at 25°C ambient <math><5\text{pA}</math> at 400V bias, at 25°C ambient
Stability	Output drift <math><100\text{fAhr}^{-1}</math> at 25 ±1°C ambient after stabilisation
Linearity	Deviation from best fit line of individual readings <math><0.1\%</math> of maximum current or charge reading for given capacitor and integration time setting
External accuracy	0.25% of full scale charge/current for the selected capacitor and integration time
Integration time	User selectable, 100µs minimum, 10s maximum
Integration modes	Charge, current, total dose accumulation
Digitisation	Four independent ADCs, 16 bit bipolar
External gate	TTL level
Bias HV PSU	0 to 400 V programmable (polarity factory selectable), 1mA max. Noise and ripple <math><0.1\%</math>
Auxiliary HV PSU	Factory option – 0 to 1000 V programmable (polarity factory selectable), 1 mA max. Noise and ripple <math><0.1\%</math>
Analogue input	Uncommitted analogue input, 0-5V, 10 bit
Pulse output	Factory option – TTL pulse output

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Power input	+24V ( $\pm 2V$ ) DC, 350mA typical, 500mA maximum
Controls	Two rotary switches for loop address and communication mode/ baud rate
Displays	Four status LEDs (Power, Device Status, Communication Mode, Data Transmission rcv/xmit) "HV on" LED
Case material	Stainless steel sheet with polycarbonate decals
Weight	1.2kg (2.63lb)
Operating environment	10-35°C (15-25 °C recommended to reduce drift and offset), <70% humidity (non-condensing), vibration <0.1g all axes (1-100Hz)
Shipping and storage environment	-10-50°C, <80% humidity (non-condensing), vibration <2g all axes (1-100Hz)

### Interfacing

Interfaces	RS-232 or RS-485, 8-bit ASCII. Selectable baud rate Fibre-optic loop, 10 Mbit/sec serial, 9-bit asynchronous binary Ethernet connection to host through A200, A300 or A500 loop controllers
Host computer	ASCII serial communications based on SCPI Diagnostic host program supplied for Microsoft® .net framework DLLs available for Microsoft® .net, National Instruments™ Labview™ and Microsoft® C++ Enquire for EPICS, TANGO and SPECS support

### Connectors

Signal inputs Four triaxial three-lug bayonet. Mates with Trompeter PL75-23 or equivalent

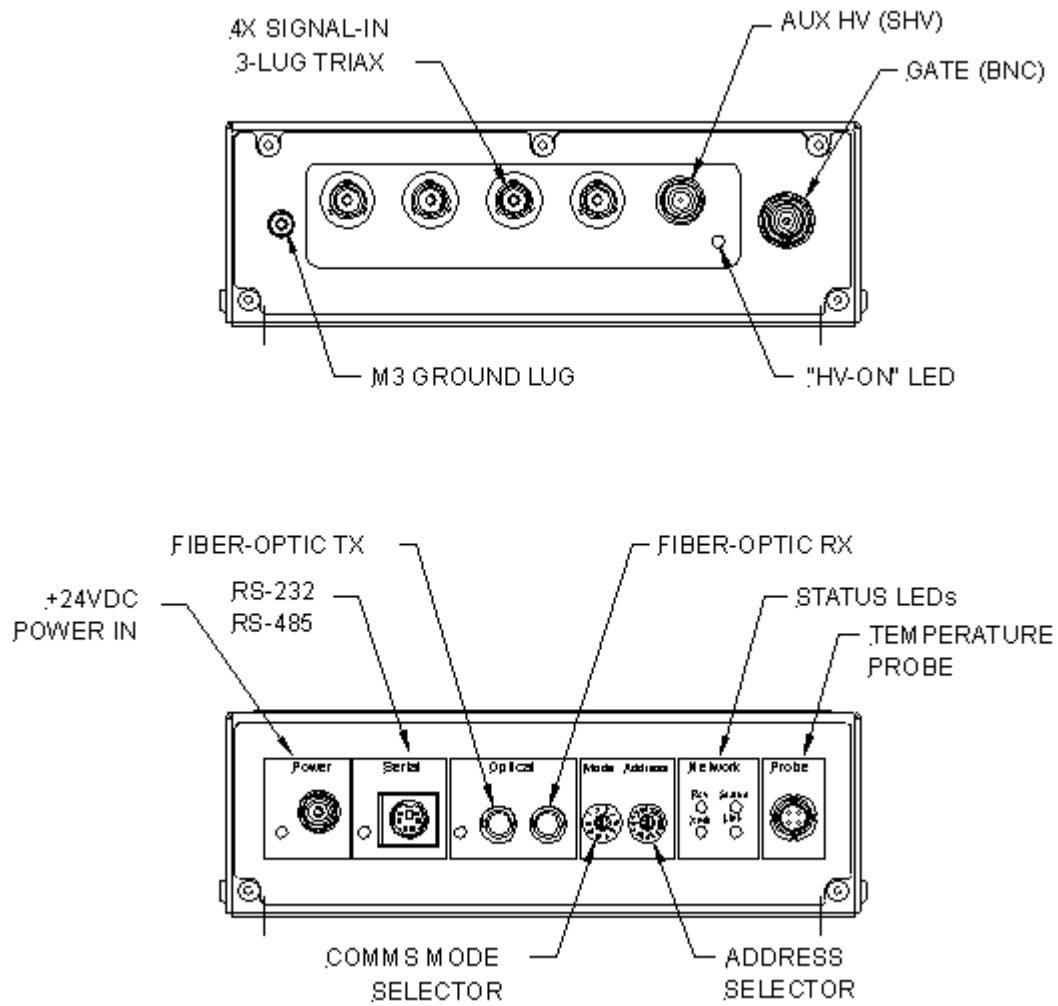
Core	Signal (at bias potential)
Inner screen	Guard (at bias potential)
Outer screen	Screen (at chassis ground potential)

Auxiliary HV out SHV  
External gate in BNC (isolated from chassis)  
RS-232 / RS485 Six pin mini-DIN ("PS/2")

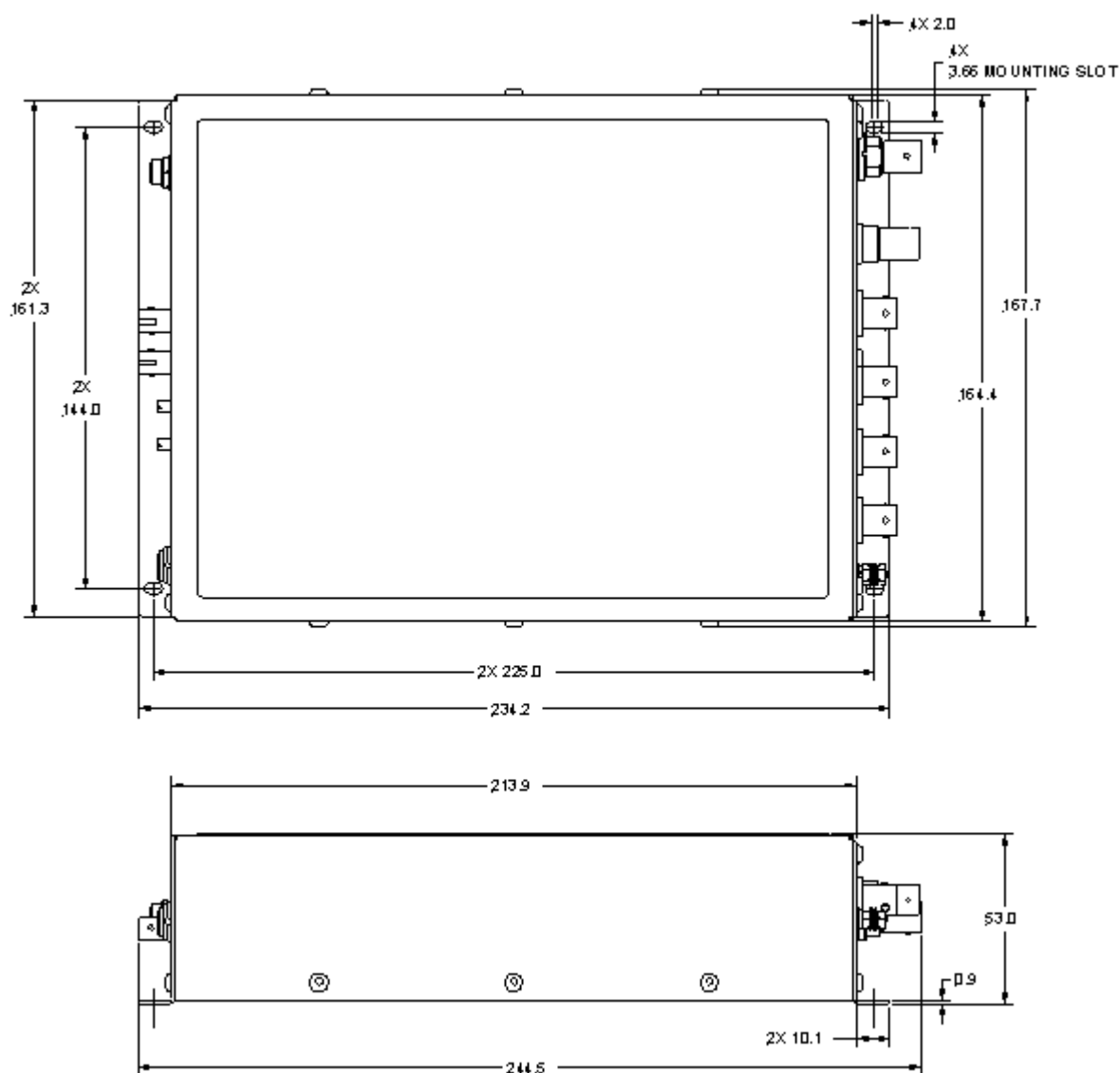
1	RS-232 Tx / RS-485 Tx-	4	n/c
2	RS-232 Rx / RS-485 Rx+	5	RS-485 Tx+
3	Gnd	6	RS-485 Rx-

Fibre optics Two 1mm Avago ST bayonet  
Power in 2.1mm threaded jack. Mates with Switchcraft S761K or equivalent  
Ground M3 threaded stud

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Dimensions in mm

### Ordering Information

I400-P (-N)	I400 four channel digital electrometer with positive (negative) input bias voltage, user manuals, software drivers, calibration data.
-XP10 (-XN)	Add auxiliary HV bias supply positive 1000V (negative)