Four-channel Digital Electrometer with Biased Inputs

Features

- Four gated integrator channels with adjustable bias voltage to to 400 V
- Dynamic range <0.1 pA to >70 µA
- 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	• Ionization chambers • Secondary-electron beam position monitors • Photodiodes and photodiode beam position monitors • Diamond detectors • General very-low current and charge measurement
Options	• Auxiliary HV output 0 to 1000 V • Pressure and temperature inputs • Alternative feedback capacitor options

Specifications

Integration capacitor	Each channel has dual, software-selectable capacitors (10 pF and 1000 pF standard)
Input noise	< 60 fA rms unloaded (1 second integration, 10 pF capacitor, 0 V bias at <= 25 C ambient)
Input offset current	< 3 pA at 0V bias, at 25 C ambient < 5 pA at 400V bias, at 25 C ambient
Stability	Output drift < 100 fA / hour at 25 +/- 1 C ambient after stabilization
Integration time	User selectable, 100 µsec minimum, 10 sec maximum.
Integration modes	Charge, current, total dose accumulation
Digitization	Four independent ADCs, 16 bit bipolar

Specifications (continued)

External gate	TTL level
Bias HV PSU	0 to 400 V programmable, (polarity factory selectable), 1 mA max. Noise and ripple < 0.1%
Auxiliary HV PSU	(Factory option) 0 to 1000 V programmable (polarity factory selectable), 1mA max. Noise and ripple < 0.1%
Temperature sensor (option)	Thermistor type B57703, -55 to +125 C, read by 10 bit ADC
Pressure sensor (option)	Internal barometer, 600 mbar to 1100 mbar, temperature compensated 5 to 50 C, read by 10 bit ADC.
Analog input	Uncommitted analog input, 0 to 5 V, 10 bit.
Pulse output (option)	TTL pulse output for dose monitor unit counters
Power input	+24V (+/- 2V) DC, 350 mA typ, 500 mA max.
Controls	Two rotary switches for loop address and comms mode/baud rate.
Displays	Status LEDs (power, device status, comms mode, data transmission rcv/ xmit). “HV on” LED.
Case material	Stainless steel sheet with polycarbonate decals.
Weight	1.2 kg (2.63 lb)
Operating environment	10 to 35 C (15 to 25 C recommended to reduce drift and offset) , < 70% humidity, non-condensing, vibration < 0.1g all axes (1 to 100 Hz)
Shipping and storage environment	-10 to 50 C, < 80% humidity, non-condensing, vibration < 2g all axes, 1 to 100 Hz

Interfacing

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

Connectors

Signal inputs — Four triaxial three-lug bayonet. Mates with Trompeter PL75-32 or equivalent.

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

Temperature sensor — Four pin Lemo type 0B female

1	Thermistor input	3	Analog input (spare)
2	DGnd	4	TTL out (option)

Auxiliary HV out — SHV

External gate in — BNC (isolated from case)

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-

Fiber optics — Two 1 mm Avago ST bayonet

Power in — 2.1 mm threaded jack. Mates with Switchcraft S761K or equivalent.

Ground — M3 threaded stud

Ordering information

I400-P04 (-N04)	I400 four channel electrometer with 400 V positive (negative) input bias voltage, user manuals, software drivers, calibration data.
-XP10 (-XN10)	Add auxiliary HV supply positive (negative) 1000 V
-TP	Add temperature and pressure inputs for ion chambers
-CX/Y	Specify feedback capacitors X pF, Y pF. (Default is 10 pF, 1000 pF.)

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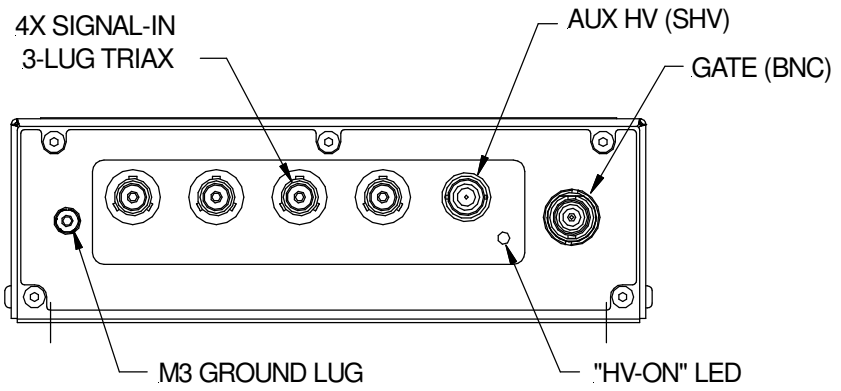
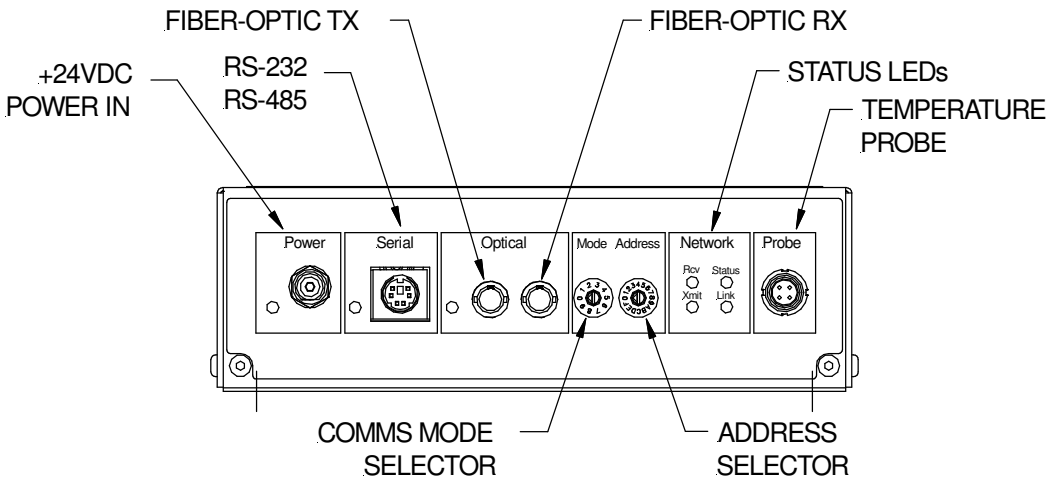
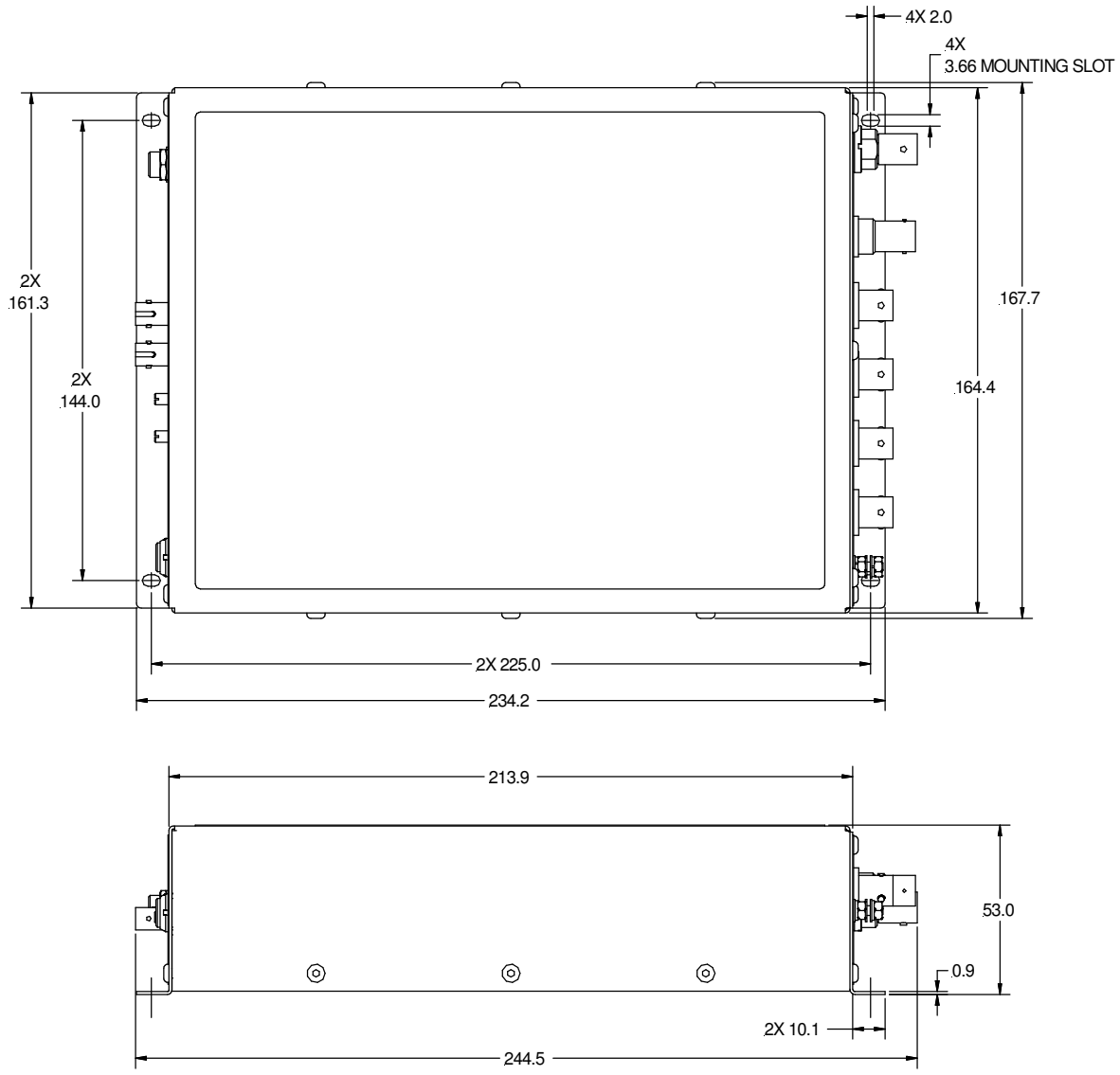
I400_DS_131223


4X SIGNAL-IN
3-LUG TRIAX
AUX HV (SHV)
GATE (BNC)
M3 GROUND LUG
"HV-ON" LED


FIBER-OPTIC TX
FIBER-OPTIC RX
+24VDC
POWER IN
RS-232
RS-485
STATUS LEDs
TEMPERATURE
PROBE
Power
Serial
Optical
Mode
Address
Network
Rcv
Xmit
Status
Link
Probe
COMMS MODE
SELECTOR
ADDRESS
SELECTOR


4X 2.0
4X
3.66 MOUNTING SLOT
2X
161.3
2X
144.0
167.7
164.4
2X 225.0
234.2
213.9
53.0
0.9
2X 10.1
244.5

Dims mm