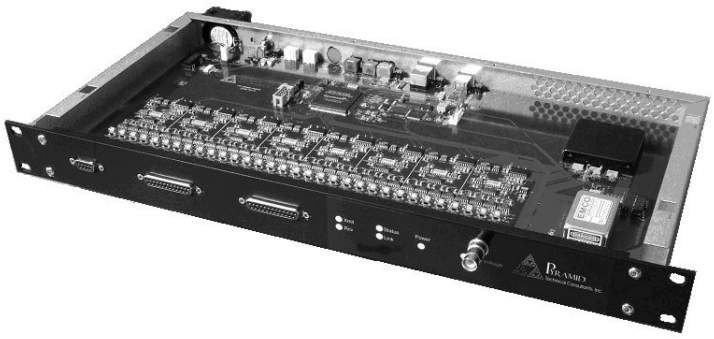
Datasheet I3200

Thirty-two Channel Digital Electrometer

Features

- Thirty-two gated integrator channels
- Dynamic range 0.1pA to 100 µA
- Optional integrated HV supply
- Integrated actuator solenoid control
- Integrated digitization and communications
- Integrated calibration test source
- Multiple current and charge integration modes
- Multiple trigger modes



Applications	• Multi-electrode ionization chambers and ionization chamber arrays • Multiwire proportional chambers operating in current mode • Multiwire beam profile grids • Multi-segment photodiode arrays
Options	• Auxiliary HV output for detector bias • Alternative feedback capacitor options • Alternative input impedance options

Specifications

Integration capacitors	Each channel has dual, software-selectable capacitors (10 pF and 1000 pF standard)
Input noise	< 100 fA rms unloaded (typical < 25 fA). (1 second integration, 10 pF capacitor at <= 25 C ambient)
Input offset current	< 10 pA at 25 C ambient (typical < 3 pA) Input offset current can be subtracted in software.
Stability	Output drift < 100 fA / hour at 25 +/- 1 C ambient after stabilization
Integration time	User selectable, 100 µsec minimum, 10 second maximum. Using A500 loop controller in binary fast mode, 20 µsec minimum.
Linearity	Deviation from best fit line of individual readings < 0.1% of maximum current or charge reading for given feedback capacitor and integration time setting.
Input protection	Back to back fast diode pair and spark gap on each input. Optional series input resistance.

Specifications (continued)

Digitization	Eight ADCs reading groups of four inputs, 16 bit bipolar. All channels sampled within 4 usec.
Maximum sampling rate	14 kHz, with typical integrator reset conditions.
Data capture time	32 channels are converted and copied to internal memory in ≤ 10 µsec
Data rate to host	> 1 kHz typical for 32 channels over fiber-optic channel, 10 kHz maximum.
Data buffering	Up to 300 readings of 32 channels can be buffered in internal memory allowing burst data capture at maximum acquisition rate.
Calibration source	Precision 83.33 +/- 0.02 nA current source can be switched to any channel. Used by automatic calibration routine to obtain individual gain and offset values for each channel. Calibration values stored in on-board EEPROM.
External accuracy	< 0.25% of full scale charge or current for the selected capacitor and integration time after calibration. Capacitive load <= 500 pF.
Flat field facility	Flat field sensor compensation function available in PSI Diagnostic host software.
Test voltage	Switched 5V test voltage provided on connector for external circuit continuity test (via external resistors)
External gates	0/+5 V TTL level or fibre-optic logic level input.
Trigger modes	Internal (free running), external start, external start/stop, external start/hold, message.
Actuator control	Switched 24 VDC for actuator solenoid, opto-isolated in/out limit switch sense readbacks
Firmware update	All embedded firmware can be updated over communication link to host computer.

Specifications (continued)

HV PSU	Factory option of range and polarity: 0 to +2000 V; 0 to -2000 V; 0 to +1000 V; 0 to -1000 V; 0 to +500 V; 0 to -500 V; 0 to +200 V; 0 to –200 V 1 watt max. Line and load regulation < 0.01%. Output ripple < 0.01 %
Power input	+24V (+/- 2V) DC, 750 mA maximum excluding current supplied to external motion actuator. 1250 mA maximum including actuator
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	1U 19” galvanized steel chassis with Al alloy front panel IP43 rating
Weight	2.7 kg (6.0 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 rates. 115.2, 57.6, 19.2 kbps USB, 8-bit ASCII 3 Mbit/sec Fiber-optic loop, 10 Mbit/sec serial, 9-bit asynchronous binary. Ethernet connection to host through A360, A500 or A560 loop controllers.
Host computer	ASCII communications based on SCPI instrument model. Diagnostic host program included for Microsoft® Windows / .NET framework. DLLs available for Microsoft® .net, National Instruments™ Labview™ and Microsoft® C++. Class library available for Linux.

Connectors

Signal inputs — Two D25 sockets. Channels 1-16, channels 17-32.

1	In 02 (In 18)	14	In 01 (In 17)
2	In 03 (In 19)	15	+5V switched
3	In 04 (In 20)	16	AGND
4	In 05 (In 21)	17	AGND
5	In 06 (In 22)	18	AGND
6	In 07 (In 23)	19	AGND
7	In 08 (In 24)	20	AGND
8	In 09 (In 25)	21	AGND
9	In 10 (In 26)	22	AGND
10	In 11 (In 27)	23	AGND
11	In 12 (In 28)	24	In 16 (In 32)
12	In 13 (In 29)	25	In 15 (In 31)
13	In 14 (In 30)		

Actuator control — D9 socket.

1	Relay n/o	6	+24 VDC out
2	PSU GND	7	Opto in B
3	+5V switched	8	Screen
4	+24 VDC out	9	Screen
5	Opto in A		

HV out — SHV

External gate in — BNC (isolated from case) and Avago HFBR ST bayonet

USB — USB B type female.

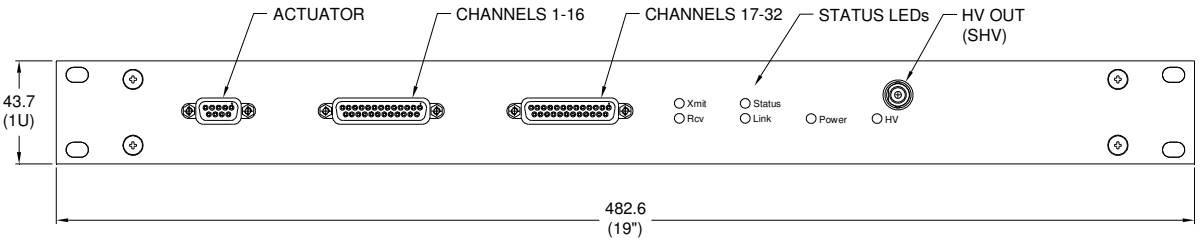
RS-232 — Six pin mini-DIN (“PS/2”)

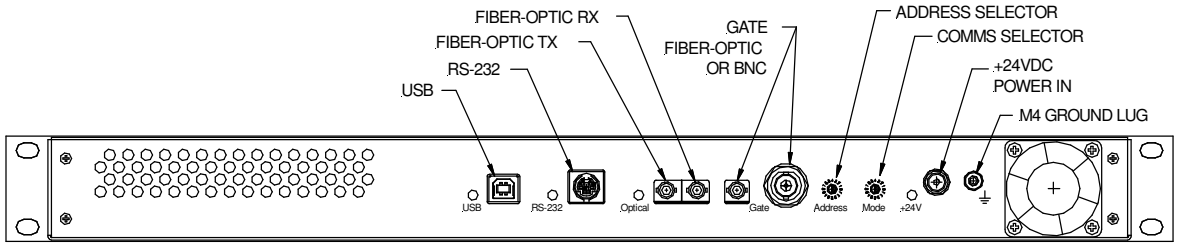
1	Tx	4	n/c
2	Rx	5	n/c
3	Gnd	6	n/c

Fiber optics — Two Avago HFBR ST bayonet (compatible with 1 mm POF and 200 µm HCS fiber)

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

Ground — M4 threaded stud





BACK VIEW
(ROTATED)

Dims mm

Ordering information

I3200	I3200 thirty-two channel electrometer with user manuals, software drivers, calibration data.
-XP20/10/5/2	Add HV supply positive 2000/1000/500/200 volts
-XN20/10/5/2	Add HV supply negative 2000/1000/500/200 volts
-Cx/y	Specify feedback capacitors x pF, y pF. Default is 10 pF, 1000 pF.
-Rx	Specify series input resistors x kohm. Default is 0 kohm.

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The information herein is believed accurate at time of publication, but no specific warranty is given regarding its use. All specifications are subject to change.

All trademarks and names acknowledged.

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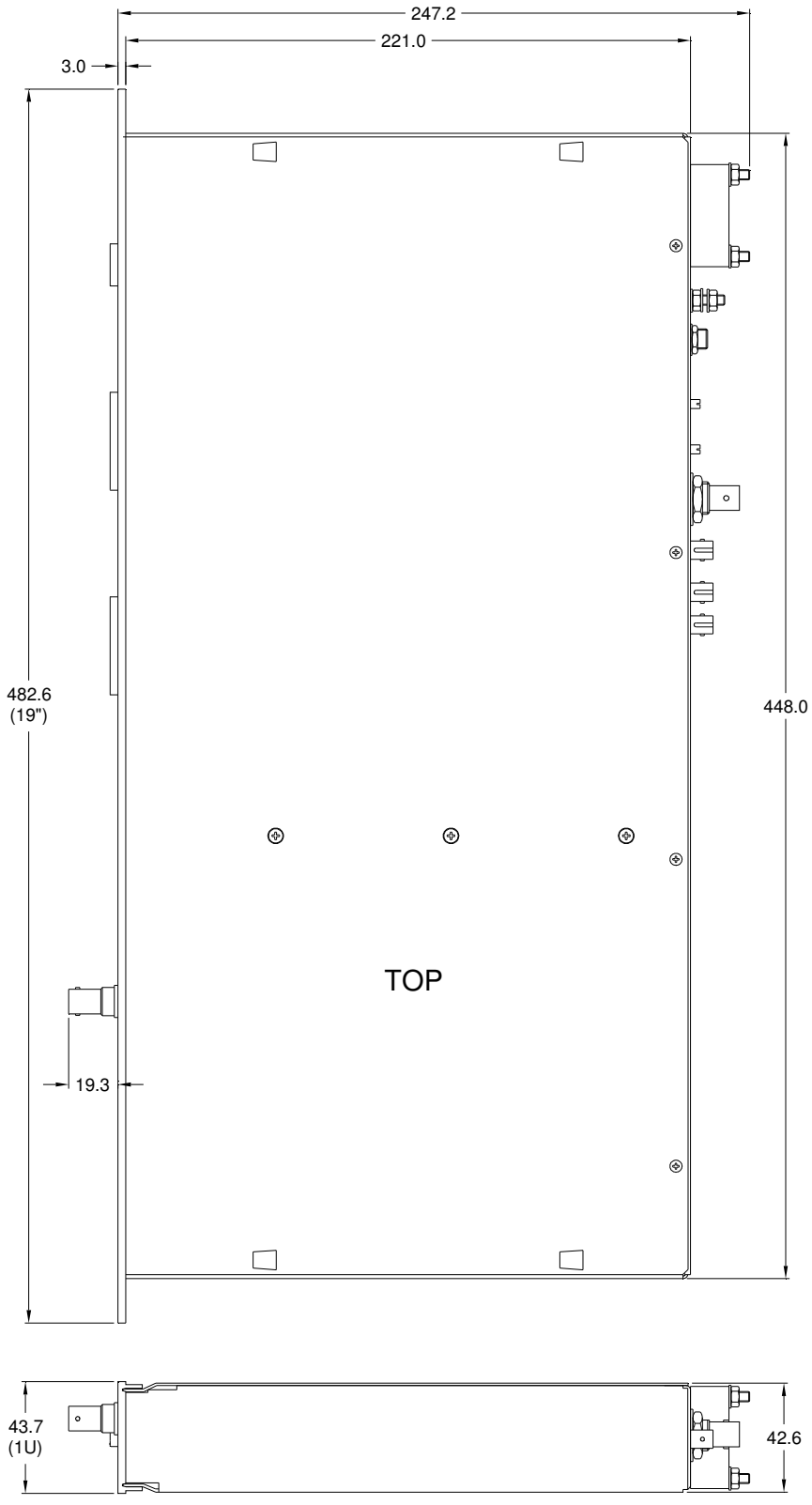

Dims mm