

Ion Chambers



Part Number	Electrode (HV) in (mm)	Electrode (Collector) in (mm)	Electrode Width in (mm)	Electrode Separation in (mm)	Cost US (\$)
105-0000-0	1.50 (38.10)	0.875 (22.22)	2.50 (63.50)	0.438 (11.11)	790
105-0000-1	3.00 (76.20)	2.375 (60.32)	2.50 (63.50)	0.438 (11.11)	840
105-0000-2	11.25 (285.75)	10.625 (269.87)	2.50 (63.50)	0.438 (11.11)	890



105-0000-0



105-0000-1



105-0000-2

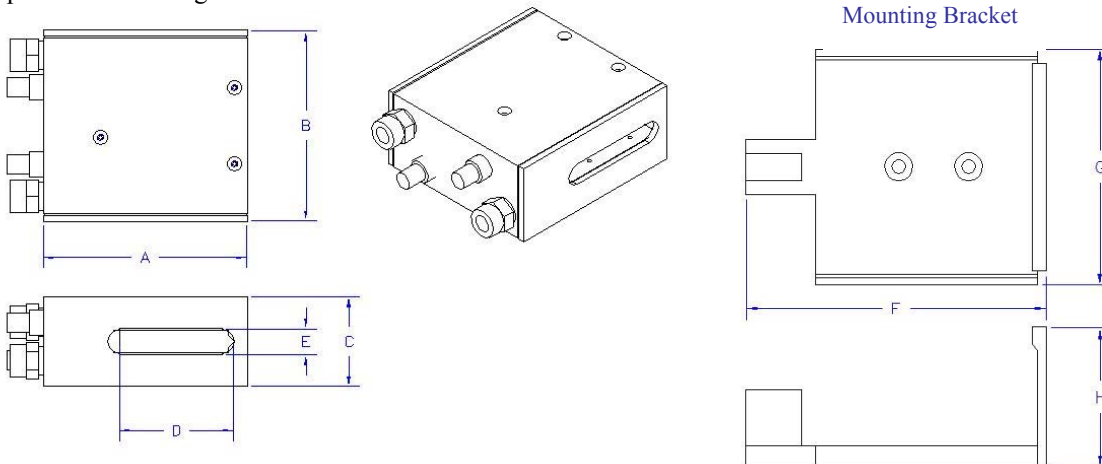


Mounting Bracket

ADC is introducing three size ion chambers (IC) with three different electrode lengths for use as general purpose intensity monitors. The housing of the detector is made of an electroless nickel plated 6061-T6 aluminum housing, 6061-T6 electrodes, SHV and BNC electrical connectors, "CPC" gas connectors, and an electrically-isolating quick-release mounting bracket.

Ion Chamber Operation

As x-rays pass through a gas, a certain fraction of the incident photons will be absorbed, ionizing the gas to some extent. This results in some equilibrium density of electron-ion pairs in the gas, which depends on the beam intensity and recombination rate of the electron-ion pairs. If a strong electric field is applied perpendicular to the beam direction, the electrons and ions can be swept out of the beam path before they recombine. The electrons and ions are collected on detector biasing plates, and the collected current is the detector signal. A high negative voltage (approx. -300V) is applied to the detector, and the positive ion current is collected. This current is usually in the microamp to nanoamp range, and is amplified by a low noise current to voltage amplifier to produce a signal of a few volts. This signal is proportional to the photon flux through the detector.



Part Number	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	G in (mm)	H in (mm)
105-0000-0	4.00 (101.60)	1.75 (44.45)	3.75 (95.25)	2.25 (57.15)	2.50 (63.50)	5.40 (137.16)	2.25 (57.15)	4.50 (114.30)
105-0000-1	4.00 (101.60)	3.750 (95.25)	1.75 (44.45)	2.25 (57.15)	2.50 (63.50)	5.40 (137.16)	4.25 (107.95)	2.50 (63.5)
105-0000-2	4.00 (101.60)	12.00 (304.80)	1.75 (44.45)	2.25 (57.15)	2.50 (63.50)	5.40 (137.16)	4.25 (107.95)	2.50 (63.5)



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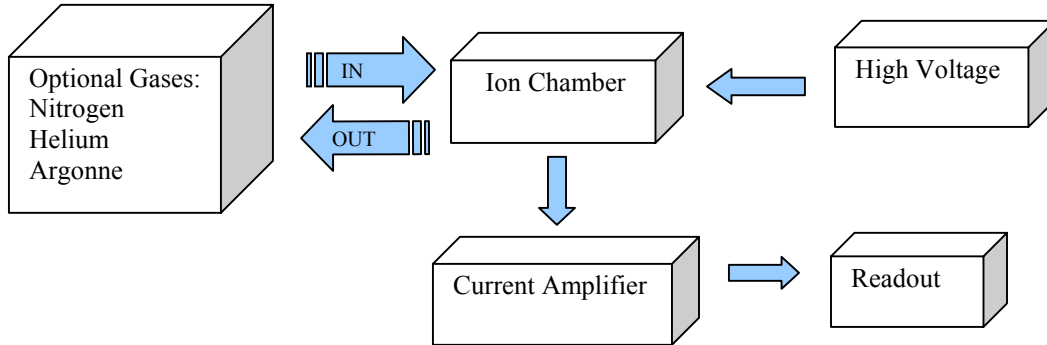
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Optional Electronics For Turnkey System

The gas ionization chamber uses standard off the shelf electronic equipment, which ADC can provide, to supply the necessary voltage, amplify the current and display the signal as shown below:



Item	Specifications	Supplier	Part Number	~ Cost
Current Amplifier	5 fA/Hz input noise 1 MHz maximum bandwidth 1 pA/V maximum gain Adjustable bias voltage with test point Variable input offset current Low Noise, High BW, and Low Drift modes Two configurable signal filters Rear panel ± 12 V power outputs Line or battery operation RS-232 interface	Stanford Research Systems http://www.srsys.com/	SR570	\$2,200
High Voltage Power Supply	0 to ± 3 kV 0 to 10 mA Digital meter reads output voltage or current Overload and short-circuited protected External control of output voltage 115 or 230 V ac, 47 to 63 Hz input power	ORTEC http://www.ortec-online.com/	556H	\$1500
Digital Multimeter	6.5 digit resolution Accuracy: 0.0015% for dc, 0.06% for ac True RMS AC volts and current 1000 rdgs/sec in ASCII format across the GPIB bus RS-232 and GPIB Standard	Agilent Technologies http://www.agilent.com/	34401A	\$1300
Mounting Rack	Standard 19" relay rack	BUD http://www.budind.com	ARR1276NF	\$150
HV coaxial cable	10 m long SHV connectors	ADC http://www.adc9001.com	120-0000-0	\$35
LV coaxial cable	10 m long BNC connectors	ADC http://www.adc9001.com	120-0000-1	\$30
Gas fitting	Mating plugs for supplied receptacles	CPC http://www.colder.com/	MC Series	\$5

The above is just a recommendation. Devices with similar specifications could be substituted.



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