Multi-range Integrated Faraday Collector Readout

Features

- Thirteen unique current ranges
- Selectable autoranging
- Dynamic range 0.1 nA to 10 mA bipolar
- Selectable summing of two input channels
- Integrated digitization and communications
- Integrated digital filtering
- Integrated precision auto-calibration test current source
- Integrated HV supply option
- External synchronization capability
- Fiber-optic control and data interface

Applications	• Faraday collector systems • Ionization chambers • Photodiodes • General low-current measurement applications
Options	• HV output (2 kV max) • 200 mA current range • External calibration current loopback (replaces input current summing) • Pneumatic actuator control

Specifications

Operating principle	Multi-range I-V converter, 50kHz low-pass filter, programmable gain amplifier, successive approximation bipolar ADC
Input impedance	< 1 ohm
Input protection	Back to back fast diode pair; current limiting resistor in I-V circuit
Noise	> 0.01% of full scale rms noise for 10 mA, 1 mA, 100 µA, 10 µA ranges.
Absolute accuracy	Readings within +/- (0.07% of nominal reading + 0.03% of full scale) relative to a traceable external standard current source.
Stability	Output drift < 5 ppm / C / hour
Digital filtering	Rectangular filter with software adjustable period

Specifications (continued)

Current ranges	Sixteen total, thirteen unique (10 mA, 5 mA, 2 mA, 1 mA, 500 µA, 200 µA, 100 µA, 50 µA, 20 µA, 10 µA, 5 µA, 2 µA 1 µA.) Alternative ranges available
Digitization	16 bit bipolar successive approximation ADC, 250 kHz
External gate	Fibre-optic logic level input
HV PSU options	2 kV, 1 kV, 500V, 200V, (polarity factory set) 1 watt max. Noise and ripple < 0.1%.
Actuator control option	Switched 24 VDC for actuator solenoid, in/out limit switch sense
Power input	+24 V (+/- 2 V) DC, 350 mA typ, 500 mA max. excluding 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 material	Stainless steel.
Weight	0.33 kg (0.73 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 100Hz)
Shipping and storage environment	-10 to 50 C, < 80% humidity, non-condensing, vibration < 2g all axes, 1 to 100Hz

Interfacing

Interfaces	RS-232, 8-bit ASCII. Selectable baud rate
	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 and A560 loop controllers
Host computer	ASCII communications based on SCPI Diagnostic host program supplied for Microsoft Windows computers C++ function libraries available Call for details of Labview(™), Python and EPICS interfacing

Connectors

Signal input	Four pin Lemo type 0B female. Suitable mating connectors Lemo FGG.0B.304.CLCD52Z (crimp) or FGG.0B.304.CLAD52Z (solder)

1	Signal 1	3	Signal 2 in (calibration current out if –LB option selected)
2	AGnd	4	Screen

HV out (option)	SHV
External gate in	Avago 1mm HFBR ST bayonet (650 nm light).

Actuator control	DSub9 female

1	Relay n/o (24 VDC switched) §	6	+5 VDC out (100 mA max)
2	PSU GND	7	Opto in B
3	Digital out B (active low)	8	Digital out A (active low)
4	+24 VDC out unswitched §	9	DGnd
5	Opto in A		

§ -ACT option only. Total current draw on 24 V must not exceed 1000 mA.
Early model F100s have different assignment of this connector—see user manual

USB	USB B type female.
RS-232	Six pin mini-DIN (“PS/2”). Adaptor to DSub9 available

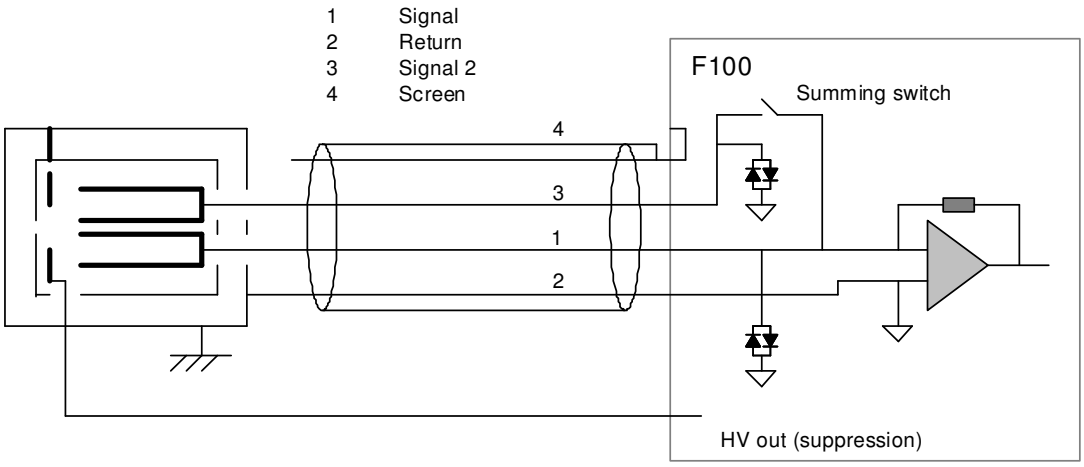
1	Tx	4	n/c
2	Rx	5	n/c
3	Gnd	6	n/c

Fiber optics	Two 1mm Avago HFBR ST bayonet
Power in	2.1mm threaded jack. Mates with Switchcraft S761K or equivalent

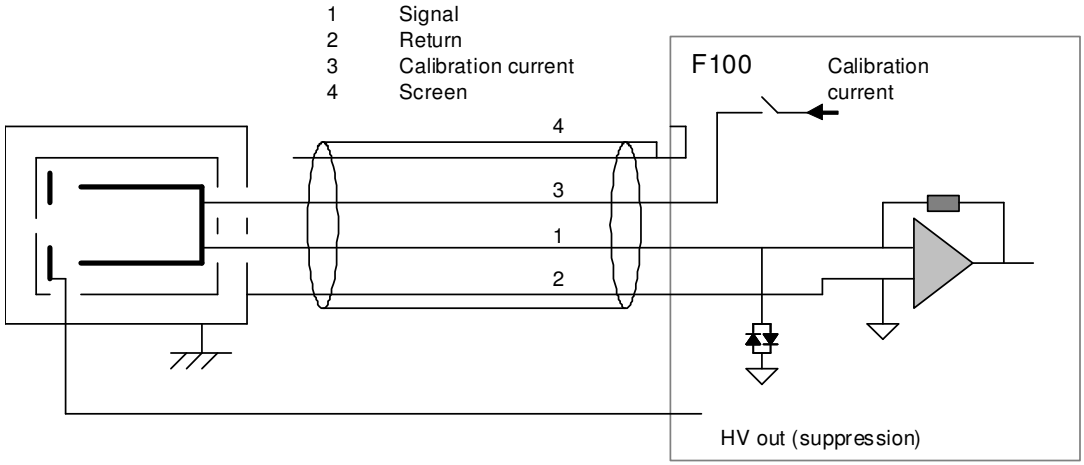
Inner	+24 VDC in	Outer	0 V

Ground	M3 threaded stud

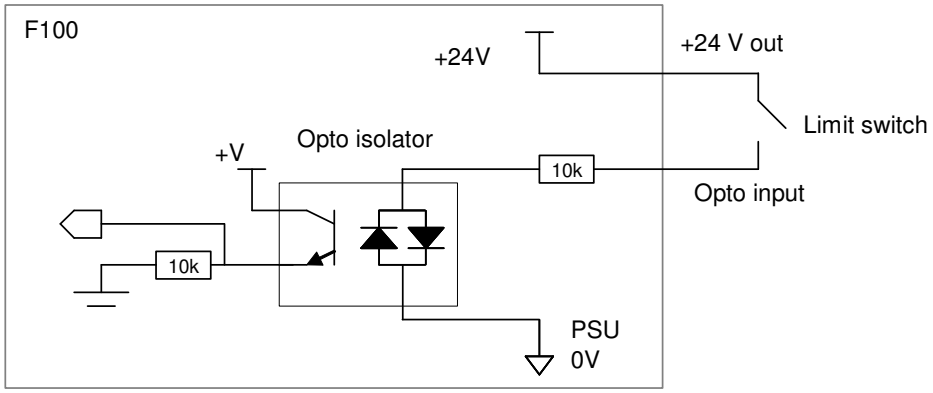
Faraday cup connection (default relay summing)



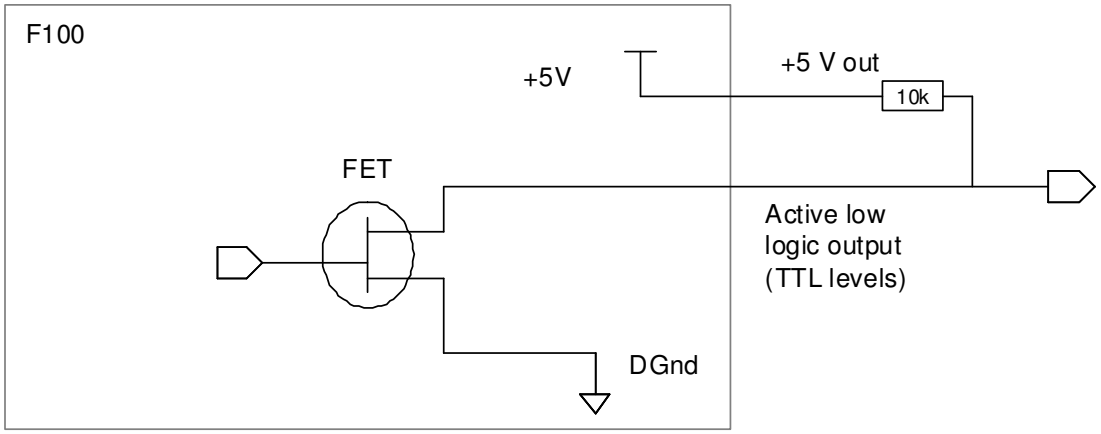
Faraday cup connection (-LB calibration loopback option)



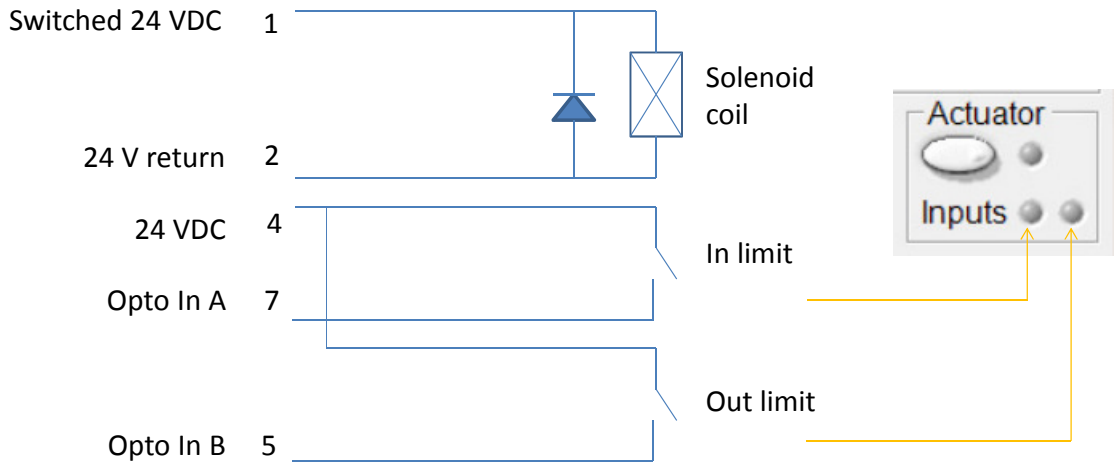
Limit switch inputs typical configuration (-ACT option)



Logic outputs typical configuration

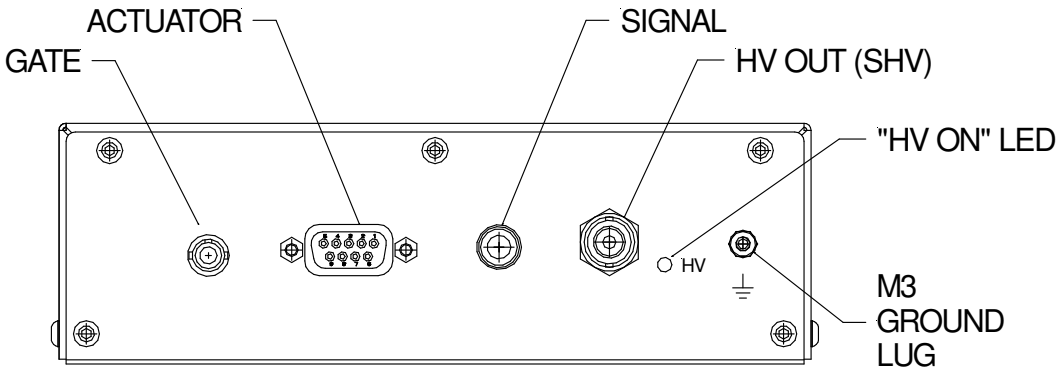


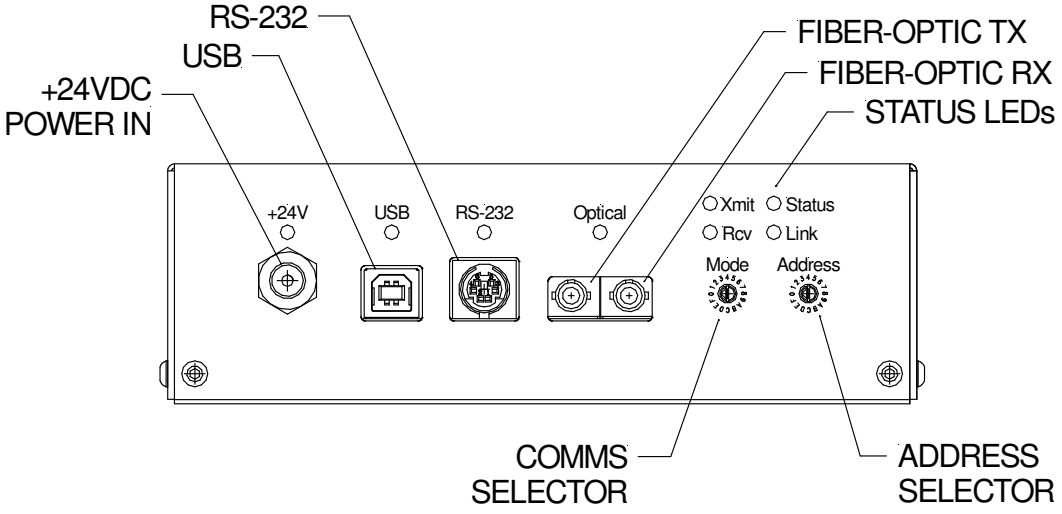
Pneumatic actuator typical configuration (-ACT option)



Ordering information

F100	F100 Faraday readout.
-XN20/-XN10/-XN02	Add HV supply negative 2000V / 1000V / 200V
-XP20/-XP10/-XP02	Add HV supply positive 2000V / 1000V / 200V
-IM200	Specify maximum current 200 mA (default is 10 mA)
-LB	Specify external loopback of calibration current (default is switchable summing of two input currents).
-ACT	Add switched 24 VDC for actuator control.





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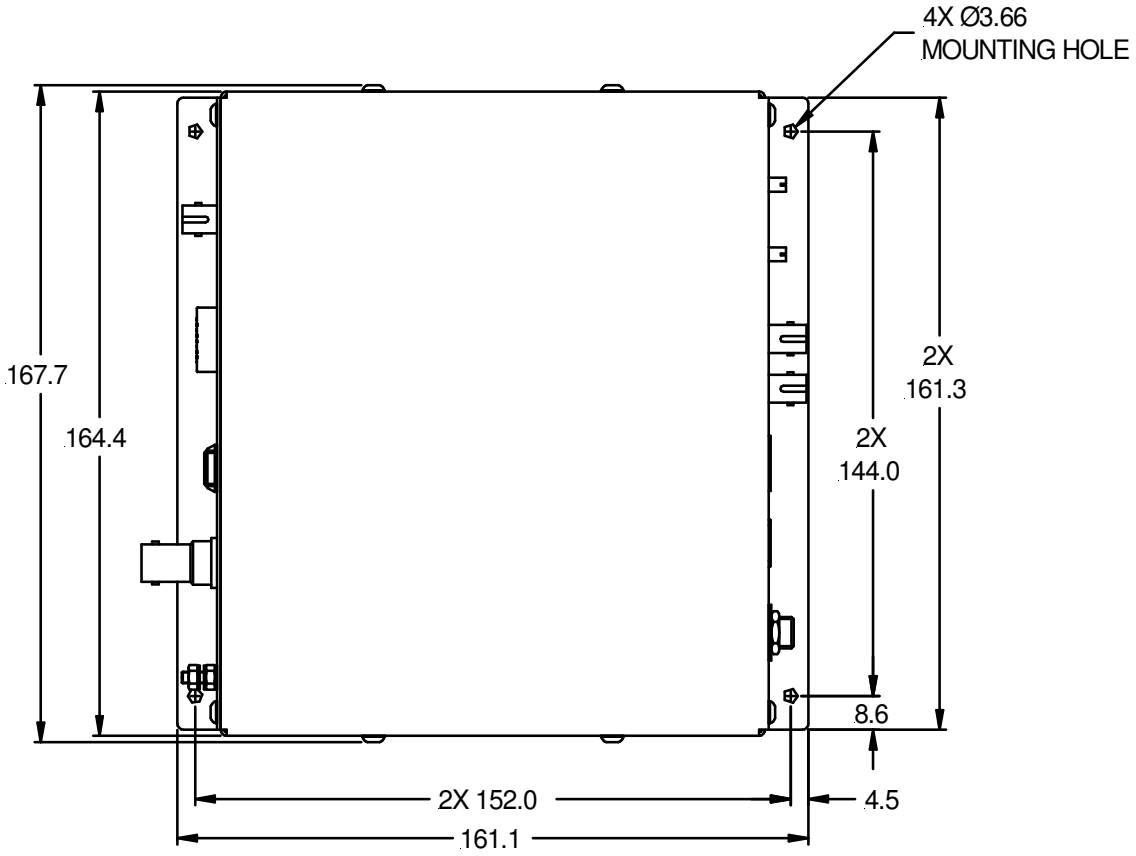
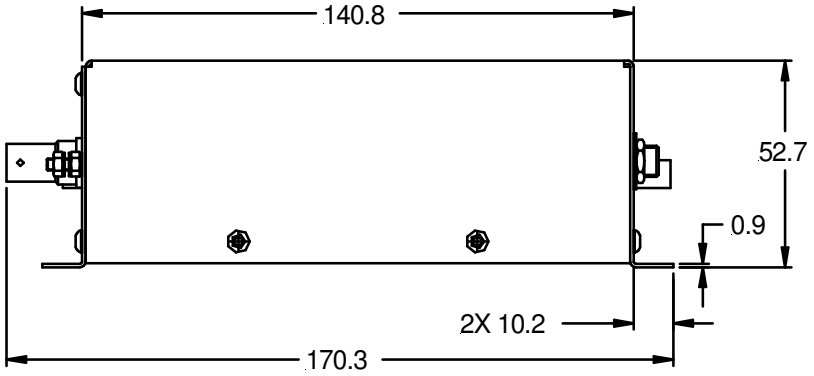

4X Ø3.66
MOUNTING HOLE
167.7
164.4
2X
161.3
2X
144.0
8.6
2X 152.0
4.5
161.1


140.8
52.7
0.9
2X 10.2
170.3

Dims mm