

## Multi-range Integrated Faraday Collector Readout



### Features

- Thirteen unique current ranges.
- Selectable autoranging
- Dynamic range 0.1 nA to 10 mA bipolar
- 200 mA optional maximum current
- Integrated digitization and communications
- Integrated precision auto-calibration test current source.
- Integrated HV supply option
- External synchronization capability
- Fiber-optic control and data interface
- Integrated actuator control
- Integrated digital filtering

### Applications

- Faraday collector systems
- Ionization chambers
- Photodiodes
- General low-current measurement applications

### Options

- HV output 0 to 1000 V for secondary electron suppression
- Alternative current range options
- External calibration current loopback.
- Relay summing of two input currents.

### 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 uA, 10 uA 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 $\mu$ A, 200 $\mu$ A, 100 $\mu$ A, 50 $\mu$ A, 20 $\mu$ A, 10 $\mu$ A, 5 $\mu$ A, 2 $\mu$ A, 1 $\mu$ A.) Alternative ranges available.
Digitization	16 bit bipolar successive approximation ADC, 250 kHz
External gate	Fibre-optic logic level input
HV PSU	0 to 1000 V programmable, (polarity factory selectable), 1mA max. Noise and ripple < 0.1%. Other voltages available
Actuator control	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 1000Hz)
Shipping and storage environment	-10 to 50 C, < 80% humidity, non-condensing, vibration < 2g all axes, 1 to 1000Hz

**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 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++.

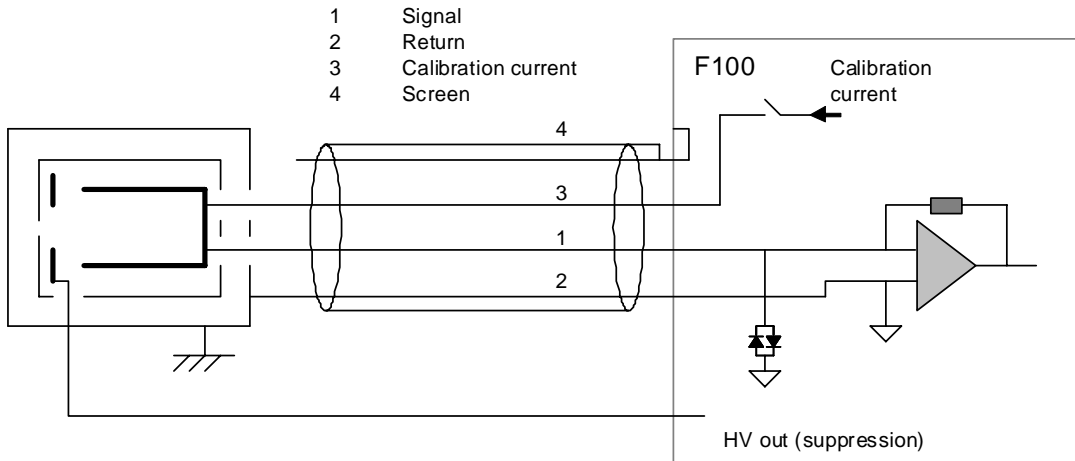


**Connectors**

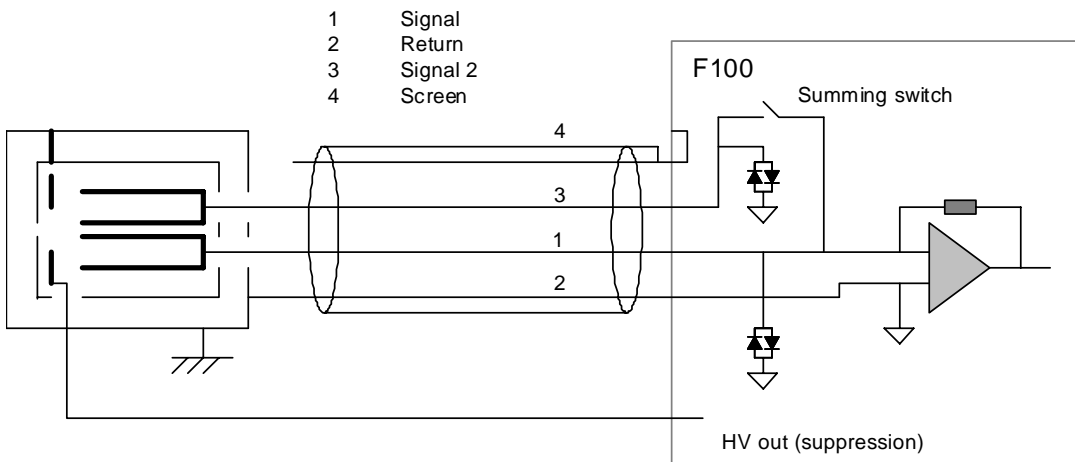
Signal input	Four pin Lemo type 0B female. Suitable mating connectors Lemo FGG.0B.304.CLCD52Z (crimp) or FGG.0B.304.CLAD52Z (solder).			
	1	Signal	3	Calibration current out / Signal 2 in
	2	AGnd	4	Screen
HV out	SHV			
External gate in	Avago 1mm HFBR ST bayonet (650 nm light).			
Actuator control	D9 female			
	1	Relay n/o (24 VDC switched)	6	+24 VDC out unswitched
	2	PSU GND	7	Opto in B
	3	Digital out B (active low)	8	Digital out A (active low)
	4	+24 VDC out	9	DGnd
	5	Opto in A		
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 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			



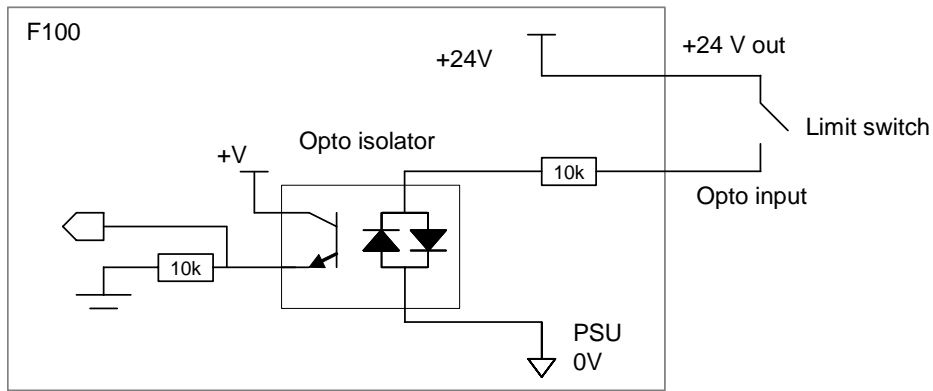
**Faraday cup connection (calibration loopback option)**



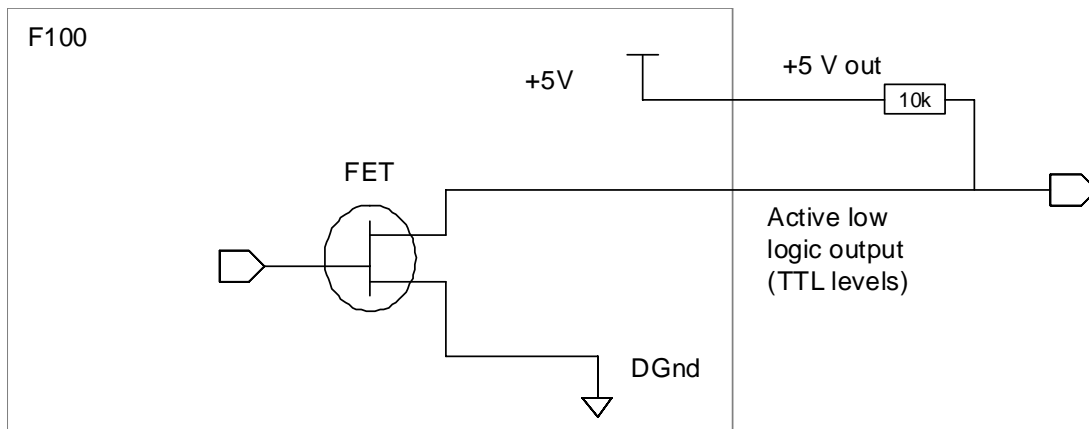
**Faraday cup connection (relay summing option)**



**Limit switch inputs typical configuration**



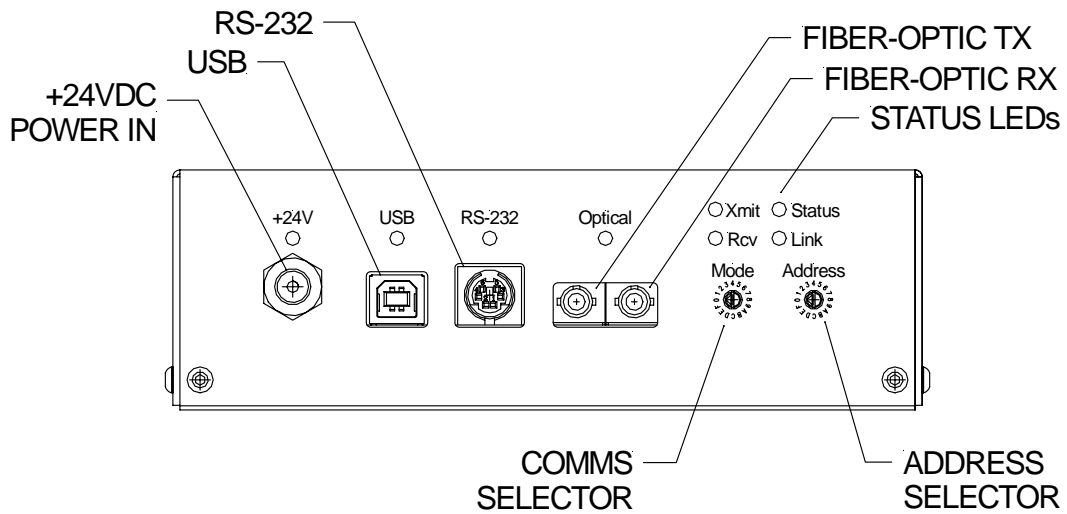
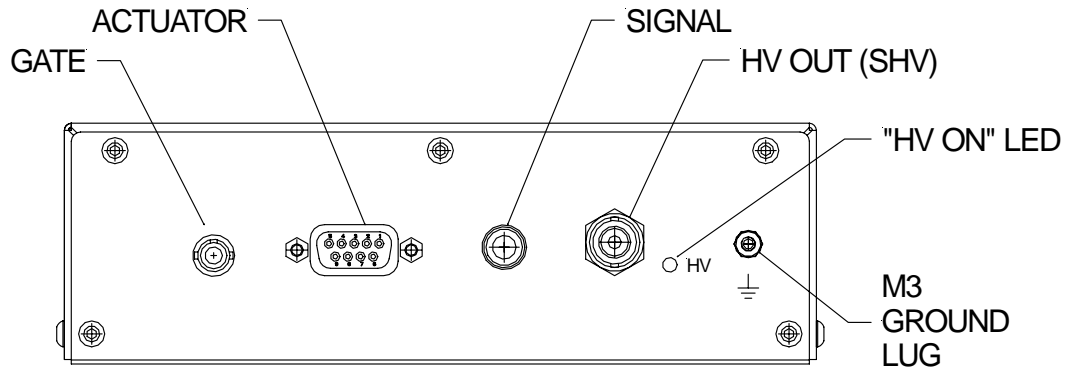
**Logic outputs typical configuration**



**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
- IM200/100/50 Specify maximum current 200 mA, 100 mA., 50 mA (default is 10 mA)
- LB Specify external loopback of calibration current.
- SM Specify switchable summing of two input currents.





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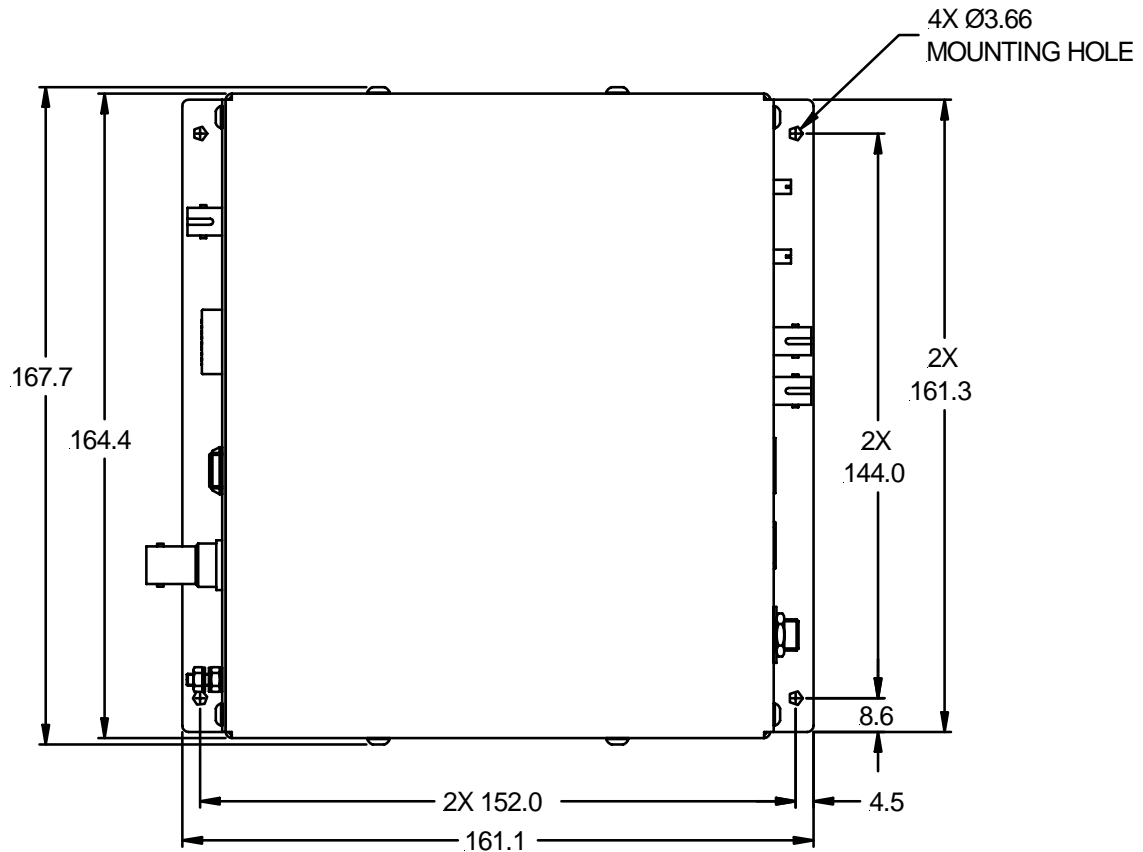
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Dims mm

