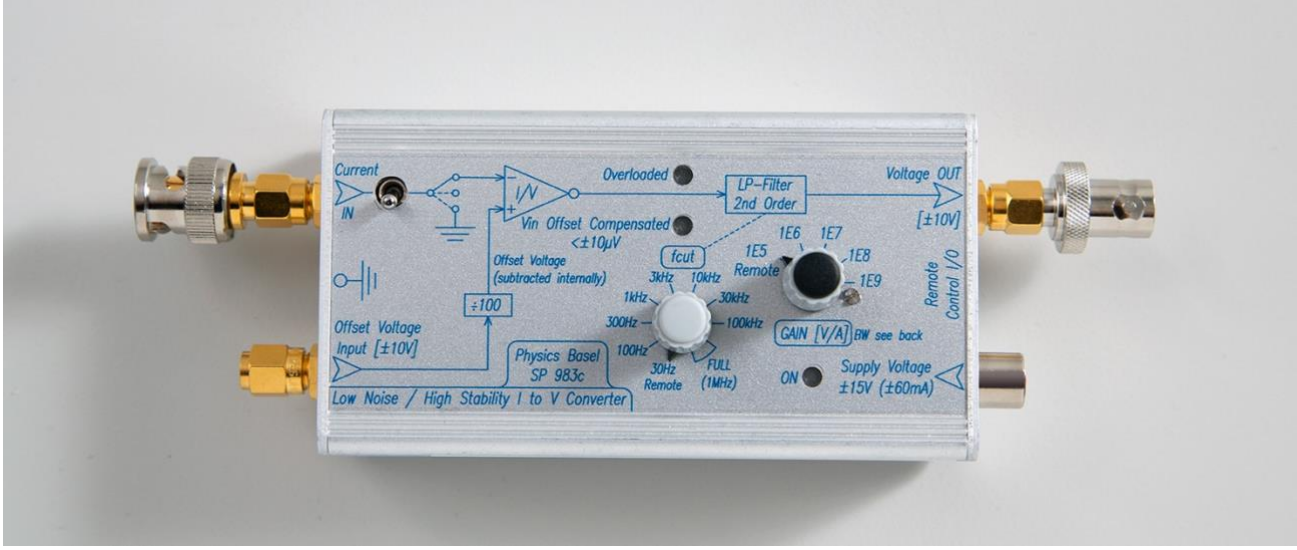
Basel Precision Instruments



Low-Noise High-Stability I to V Converter

low-noise, floating, input bias voltage, feedback stabilized

Model **SP983c**	**-IF**	**01-IF**	**-LSK**	**02-LSK**
Input J-FET	IF3602, best for R < 1 MΩ or C > 1 nF		LSK389A, best for R > 1 MΩ and C < 1 nF	
Stable, low-noise and overload protected input current				
Current noise @10 Hz & 10^9 V/A (fA/√Hz)	6		5	
leakage current magnitude (pA)	40	50 *	3	3 *
Stable, low-drift and low-noise input voltage (low voltage noise relevant for R < 1 MΩ)				
Input voltage noise @ 10 Hz (nV//√Hz) Input voltage noise @ 1 kHz (nV//√Hz)	2.0 1.2	2.6 * 2.0 *	4.5 1.9	5.0 * 2.7 *
Input voltage drift	0.15 µV/K @25°C - feedback stabilized			
Input bias voltage (internally subtracted at output)	±100 mV	±1 V NEW	±100 mV	±2 V NEW

Table shows typical specs; for details, please visit http://baspi.ch

* Noise and leakage current values are measured at zero bias and may change with bias voltage. The noise of the externally applied voltage (divided by 5 or 10) adds to the input voltage noise. Therefore, it's important to use a very low-noise voltage source, such as BASPI's LNHR DAC

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Gain	five decades 10^5 to 10^9 V/A - remote controllable	
Integrated low-pass filter	30 Hz to 100 kHz - remote controllable	
Bandwidth	24 kHz @ 10^8 V/A	
DC input impedance	33 Ω – 46 Ω	
GBWP	600 MHz	68 MHz
Dimensions and weight	small size, low weight, mountable directly on the breakout box 122 x 55 x 35 mm, 165 gr	

Applications

Low-noise and low-drift current measurements

- low-temperature experiments, e.g., quantum transport in dilution refrigerators
  optimized for filtered lines up to nF capacitances (IF models)
  optimized for high impedance loads, e.g., spin-blockade readout of a qubit (LSK models)
- scanning tunneling microscopes preamplifier
  can apply a bias voltage and simultaneously measure the current on the same lead
- sensitive current measurements with high bias voltage stability
  input voltage is actively stabilized to ensure negligible drift
- low-level light detection with photodiodes or photomultipliers

Rise/Fall Time and Bandwidth

Gain (V/A)	Rise/Fall Time (10%, 90%) (µs) Typical | Maximum	Bandwidth (-3dB) @ 1V (kHz) Typical | Minimum
10^9	192 | 270	1.7 | 1.2
10^8	13 | 15	24 | 20
10^7	3.5 | 3.7	94 | 90
10^6	1.1 | 1.2	315 | 300
10^5	0.59 | 0.62	580 | 500

Typical input Voltage Noise (Independent of Gain)

	@ 10 Hz	@ 30 Hz	@ 100 Hz	@ 1 kHz
SP983c-IF	2 nV/√Hz	1.6 nV/√Hz	1.5 nV/√Hz	1.2 nV/√Hz
SP983c01-IF	2.6 nV/√Hz	2.1 nV/√Hz	2.0 nV/√Hz	1.8 nV/√Hz
SP983c-LSK	4.5 nV/√Hz	2.7 nV/√Hz	2.2 nV/√Hz	1.9 nV/√Hz
SP983c02-LSK	5.0 nV/√Hz	4.4 nV/√Hz	3.1 nV/√Hz	2.7 nV/√Hz

Typical input Current Noise

Gain (V/A)	@ 10 Hz (fA/√Hz) IF | LSK	@ 1 kHz (fA/√Hz) IF | LSK	Theoretical Limit (fA/√Hz)
10^9	6 | 5	9 | 8	4.1
10^8	14.0 | 13.7	16 | 15	13
10^7	42 | 42	43.0 | 42.5	41
10^6	135 | 139	140 | 139	130
10^5	576 | 590	582 | 580	410