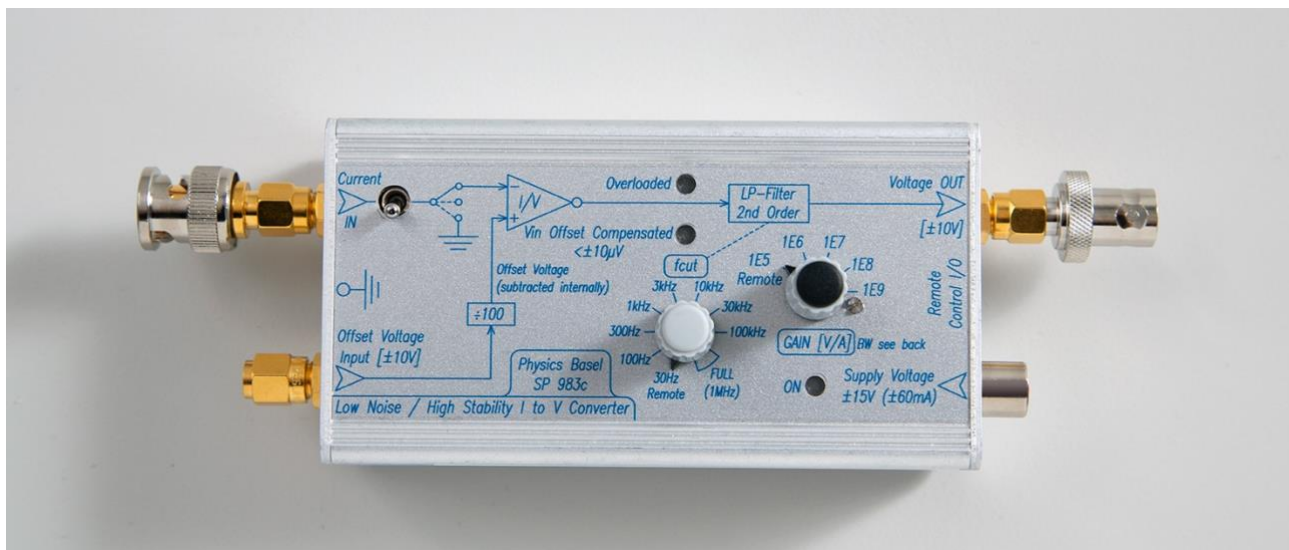




Basel Precision Instruments



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 $R < 1 \text{ M}\Omega$ or $C > 1 \text{ nF}$		LSK389A, best for $R > 1 \text{ M}\Omega$ and $C < 1 \text{ nF}$	
Stable, low-noise and overload protected input current					
Current noise @ 10 Hz & 10^9 V/A (fA/ $\sqrt{\text{Hz}}$)		6		5	
leakage current magnitude (pA)		40	50 *	3	3 *
Stable, low-drift and low-noise input voltage (low voltage noise relevant for $R < 1 \text{ M}\Omega$)					
Input voltage noise @ 10 Hz (nV/ $\sqrt{\text{Hz}}$)		2.0	2.6 *	4.5	5.0 *
Input voltage noise @ 1 kHz (nV/ $\sqrt{\text{Hz}}$)		1.2	2.0 *	1.9	2.7 *
Input voltage drift		0.15 $\mu\text{V/K}$ @25°C - feedback stabilized			
Input bias voltage (internally subtracted at output)		$\pm 100 \text{ mV}$	$\pm 1 \text{ V}$ NEW	$\pm 100 \text{ mV}$	$\pm 2 \text{ V}$ NEW
Gain		five decades 10^5 to 10^9 V/A - remote controllable			

Table shows typical specs; for details, please contact info@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



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 with high capacitance (IF model)
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

