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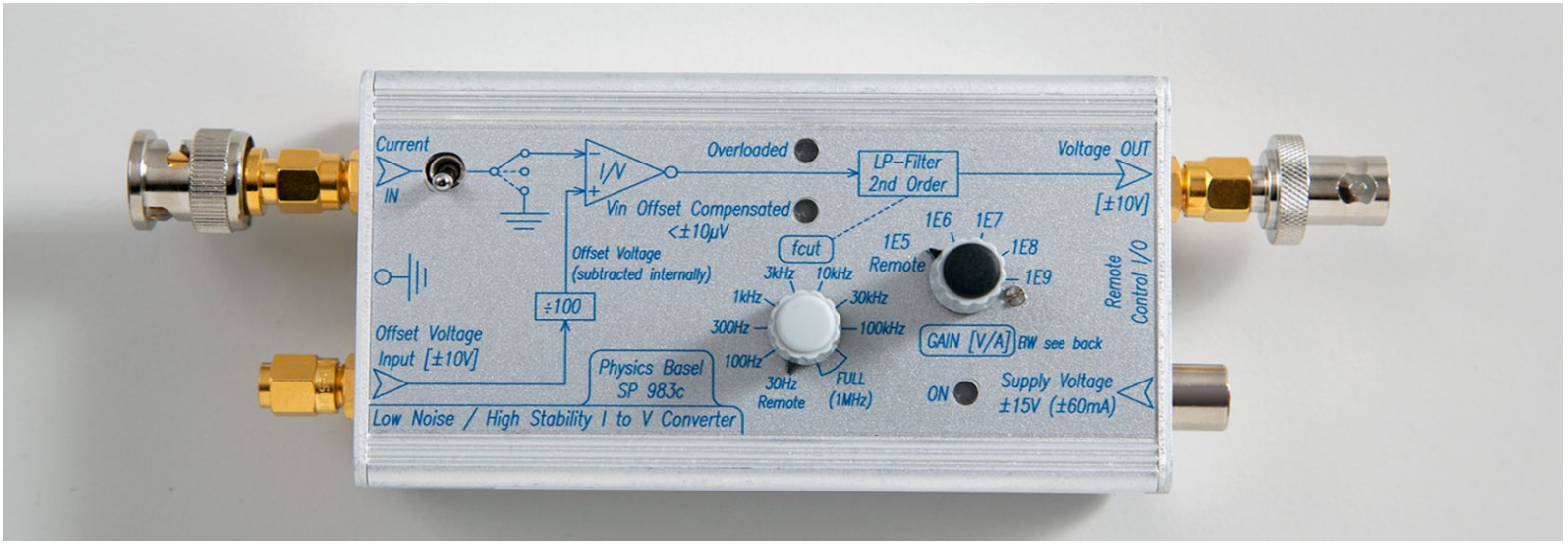

Low Noise High Stability I to V Converter

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

Models	SP983c-IF	SP983c01-IF	SP983c-LSK	SP983c01-LSK
Input J-FET	**IF3602** best for R < 1 MΩ or C > 1 nF		**LSK389A** best for R > 1 MΩ and C < 1 nF	
Input current - stable and low-noise - overload protected				
noise @10 Hz & 10^9 V/A	6 fA/√Hz	6.5 fA/√Hz*	5 fA/√Hz	5 fA/√Hz**
leakage current magnitude	≤ 35 pA	≤ 50 pA*	≤ 3 pA	≤ 3 pA**
Input voltage - stable, low-drift and low-noise (low voltage noise relevant for R < 1 MΩ)				
noise @ 10 Hz noise @ 1 kHz	2.0 nV/√Hz 1.2 nV/√Hz	2.3 nV/√Hz* 2.0 nV/√Hz*	4.5 nV/√Hz 1.9 nV/√Hz	4.7 nV/√Hz** 2.3 nV/√Hz**
drift	≤ 0.15 µV/K @25°C - feedback stabilized			
input bias voltage (internally subtracted at output)	±100 mV	±1 V NEW!	±100 mV	±1 V NEW!
Gain	five decades 10^5 to 10^9 V/A - remote controllable			
Filtering	integrated low-pass-filter 30 Hz to 100 kHz - remote controllable			
Bandwidth	24 kHz @ 10^8 V/A			
DC input impedance	33 Ω			
GBWP	600 MHz		68 MHz	
Dimensions	small size, low weight, mountable directly on the breakout box 122 x 55 x 35 mm, 165 gr			

* 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 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.

** Estimated values; to be validated. Note * also applies.

Datasheet V1.3 (November 2020); includes typical specs; for details, please go to http://baspi.ch.
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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 with the capability to apply a bias voltage
- low-level light detection with photodiodes or photomultipliers

Rise/Fall Time and Bandwidth

Gain (V/A)	Rise/Fall Time (10%, 90%) (ms) 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

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	2.3 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

Input Current Noise

Gain (V/A)	Current Noise @ 10 Hz (fA/√Hz) IF | LSK	Current Noise @ 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