

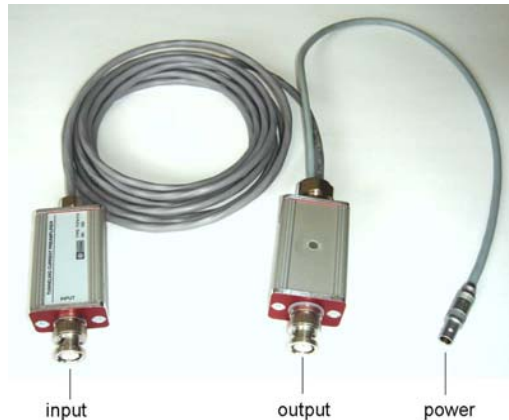
Tunneling Current Preamplifier

NANONIS TCPA-X-3 SERIES

The TCPA-X-3 series of current to voltage converters is specially designed for the application in Scanning Tunneling Microscopy (STM). The compact casing can directly be mounted on the experimental setup to keep the distance to the microscope head as small as possible, thus minimizing noise.

The amplifiers are available with three different gains of 1V/1nA, 1V/10nA, and 1V/100nA corresponding to a trans-impedances of 10⁹, 10⁸, and 10⁷, respectively. The bandwidth ranges from DC to 2 kHz (9 kHz, 13 kHz). The noise is dominated by the 1 G Ω (100 M Ω , 10 M Ω) feedback resistor and results in an output noise of 840 fA rms (2.7 pA, 7.6 pA).

The amplifiers are powered from a stabilized ± 15 Vdc source as it is directly available from the Nanonis Signal Conditioning and Connector Box. Due to noise considerations the input of the preamplifiers is protected by a 100 Ω series resistor. Therefore the amplifiers have to be handled with care to avoid electrostatic discharges and voltage peaks at the input. The analog ground of the power supply is directly connected to the casing of the amplifier and to the positive input of the operational amplifier. It serves as the defining virtual ground of the input.



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GENERAL

- dimensions 73 x 33 x 20 mm
- cable length 3 m
- operating temperature $+5^{\circ}\text{C}$ to $+45^{\circ}\text{C}$ (40 F to 115 F)
- compliance CE

INPUT	TCPA-9-3	TCPA-8-3	TCPA-7-3
• connector	BNC		
• input resistance	approx. 200 Ω		
• max. current	10 nA	100 nA	1 μA
• max. voltage	± 12 V	± 12 V	± 12 V
• max. offset voltage	0.3 mV	0.3 mV	0.3 mV
• max. bias current	100 fA	100 fA	100 fA

OUTPUT	TCPA-9-3	TCPA-8-3	TCPA-7-3
• connector	BNC		
• range	± 10 V	± 10 V	± 10 V
• output resistance	< 40 Ω , short circuit prove		
• analog bandwidth (3dB corner frq.)	1.95 kHz	9 kHz	13 kHz
• noise rms (10 Hz – 10 kHz)	< 840 μV (\rightarrow 840 fA)	< 270 μV (\rightarrow 2.7 pA)	< 76 μV (\rightarrow 7.6 pA)
• noise peak-peak (10 z – 10 kHz)	< 3.5 mV (\rightarrow 3.5 pA)	< 1 mV (\rightarrow 10 pA)	< 0.5 mV (\rightarrow 50 pA)

POWER

- connector 4 pin Lemo (FFA.0S.304.CLAC17)
- current 2mA typ. (max 40mA)
- power supply voltage ± 15 Vdc

