attoTMS

1019548

Technical Specifications

General Specifications	
type of instrument	transport measurement insert for use with attoDRY cryostats with
	integrated atto3DR double rotator module
sensor head specifics	20 pin chip carrier based sample holder mounted on 2 combined rotators
	with eucentric rotation for 3D angle-dependent transport measurements
	based on single solenoid magnet
included hardware & software	transport measurement insert for attoDRY, 2 break-out boxes, atto3DR,
	ASH/CC/20 chip carrier sample holder, ANC350/3/RES piezo controller,
	Nanonis Tramea TRC real-time controller,
	I SC signal conversion interface, LD5-1 single lock-in generator, LD5-MF
	multidemodulator and multi-input option, software license for Tramea,
Nanonic Tramos control electronice	allocontrol electronics fack, 19 Tack PC Incl. 27 Screen
hanonis framea control electronics	1x TBCe real-time controller, 1x TSC signal conversion interface and
base configuration	Nanonis V5e software
analog inputs	8 low-noise 18-bit analog inputs differential BNC connectors ±/- 10V
	input range
analog input bandwidth	DC – 100 kHz (-3 dB). 5th-order Butterworth low-pass filter
Input noise density	< 150 nV/vHz @ 10 kHz. < 650 nV/vHz @ 10 Hz
analog outputs	8 high precision and low noise 20-bit analog outputs (22-bit with hrDAC),
	differential BNC connectors, +/- 10V output range
analog output bandwidth	DC - 40 kHz (-3 dB), 5th - order Butterworth low-pass filter
output noise density	< 25 nV/vHz @ 100 Hz, < 75 nV/vHz @ 1 Hz
software upgrade incl.	LD5-1 single lock-in generator, LD5-MF multidemodulator and multi-input
	option
attocube modules for Tramea	integrated control of temperature & magnetic field of an attoDRY2100 and
	of the two rotator axes of the atto3DR from within the Tramea software
additional information on Tramea specifications	see Nanonis Tramea detailed specification sheet (or contact attocube)
Modes of Operation	
general configuration	full flexibility (multi-terminal, 4-probe, 2-probe) via generic analog in- and
	outputs, software configurable, up to 24 input, and up to 48 output
Osmala Desitionian	channels measured simultaneously
Sample Positioning	full 2D aphara via 100% for both alread loop rotators (recording 110%)
total travel range	Tull 3D sphere via $\pm 90^{\circ}$ for both closed loop rotators (reserve: $\pm 10^{\circ}$)
Siep Size	$approx. 1 m^{\circ} @ 300 K, 6 m^{\circ} @ 4 K (scan resolution: u^{\circ})$
sensor resolution	approx 6 m°
repeatability	approx. 50 m°
linearity	approx. 1%
sample holder	ASH/CC/20 fits 20 pin LCCC, connected to 20 wires as twisted pairs
Suitable Operating Conditions	
temperature range	1.5 K300 K (dependent on cryostat)
magnetic field range	015 T+ (dependent on magnet)
operating pressure	designed for He exchange gas
Suitable Cooling Systems	
titanium housing diameter	48 mm
compatible cryostats	attoDRY2100
bore size requirement	designed for a 2" (50.8 mm) cryostat/magnet bore
Options and Upgrades	
TSC add-on(s)	8 additional analog in- and outputs per TSC; maximum of 3 TSCs,
	resulting in 24 outputs and 24 inputs together with base configuration
TSO add-on(s)	16 additional analog outputs per TSO; maximum of 2 TSOs, resulting in
	50 outputs and 8 inputs together with base configuration
Nanonis Tramea software upgrades	large range of software upgrades available: multi-channel lock-ins, HR
	oscilloscope and FFI, programming interface, scripting module, generic
element e com l'étaire com que	PI controller, function generator
signal-ampliners upgrade	several different low-noise, switchable gain amplifiers, fully integrated in
	the allo I MS software as well as in the hardware with power and data
	trans impedance amplifier 0.4 fA peak to peak poice, switchable sain
	Trans-impedance amplifier, 0.4 IA peak-to-peak holse, switchable gall
Femto DI PCA-200	transimondance amplifier switchable gain 162 1011 V/A bandwidth
	DC/1 Hz 500 kHz cable to Tramea included
Femto DI PVA-100	voltage amplifier, switchable gain 20/40/60/80 dB handwidth DC 100
	kHz, switchable to 1 kHz, 5.5 nV/vHz input noise, cable to Tramea

	included
Nanonis MCVA5	differential multichannel preamplifier with 4 independent channels, Gain
	of 1/10/100/1000, 500 kHz bandwidth, cable to Tramea included
Keysight SMU B2912A	precision Source/Measure Unit, supports two-channel configuration,
	minimum source resolution 10 fA/100 nV, minimum measurement
	resolution 10 fA/100 nV, maximum output 210 V