

## Technical Specifications

<b>Suitable Operating Conditions</b>	
magnetic field range	0..15 T+ (dependent on magnet)
operating pressure	designed for He exchange gas (vacuum compatible version down to 1E-6 mbar on request)
temperature range	1.5 K..300 K (dependent on cryostat); mK compatible setup available on request
<b>General Specifications</b>	
type of instrument	transport measurement module for angledependent magneto-resistance measurements
sensor head specifics	unique low temperature compatible achromatic objectives with high numerical aperture, optimized for different wavelength ranges
<b>Suitable Cooling Systems</b>	
titanium housing diameter	48 mm
bore size requirement	designed for a 2" (50.8 mm) cryostat/magnet bore
compatible cryostats	attoDRY1000/1100/2100, attoLIQUID1000/2000 (attoLIQUID3000/5000 on request)
<b>Confocal Unit</b>	
configuration	compact and modular design, two or more optical channels; standard configuration: one excitation and one detection channel
key benefits	quick and reliable alignment of each channel, steering mirror for combined beams long-term stability
quick-exchange of optical components	beam splitters, filter mounts for up to 4 filters/polarizers, (1" diameter); optional piezoelectric rotator with filter mount
pinhole configuration	two pinholes (fiber apertures), different illumination and collection wavelength possible
pinhole size	dependent on fibers, typically 3 .. 9 $\mu\text{m}$ mode field diameter
compatible LT-objective	LT-APO/VIS, LT-APO/VISIR, LT-APO/NIR (see accessory section for more information)
inspection unit	sample imaging with large field of view: ~54 $\mu\text{m}$ (attoDRY), ~40 $\mu\text{m}$ (attoLIQUID)
<b>Compatibility with Electronics</b>	
scan controller and software	ASC500 basic (optional; for detailed specifications please see attoCONTROL section)
laser	LDM600 laser/detector module (for detailed specifications please see attoCONTROL section)
<b>Options and Upgrades</b>	
closed loop scanning & global sample coordinates	interferometric encoders for scan linearization and closed loop sample navigation
ultra-large scan range upgrade	80 x 80 $\mu\text{m}^2$ @ 300 K, 125 x 125 $\mu\text{m}^2$ @ 4 K
in-situ inspection optics	incl. with CFM I external optics head
closed loop upgrade for coarse positioners	resistive encoder, range 5 mm, sensor resolution approx. 200 nm, repeatability 1-2 $\mu\text{m}$
sample holder upgrade	ASH/QE/4CX quick-exchange sample holder (8 electrical contacts, integrated heater & T-sensor)
Voigt geometry upgrade	optional scanner for Voigt & Faraday geometry
<b>Illumination</b>	
excitation wavelength range	400 .. 1000 nm, default 650 nm (others on request)
illumination port specification	FC/ APC-connector for single mode fibers or free-beam configuration
<b>Detection</b>	
detection mode	e.g. reflection, luminescence, fluorescence, Raman (optional)
detection wavelength range	detector upon user's choice, typically Si detector (coupling of the light to other detectors)
detection port specification	FC/ APC-connector for single mode fibers or free-beam configuration
transmission option	low temperature compatible detector below the sample for transmission measurements (intensity)
<b>Sample Positioning</b>	
total travel range	5 x 5 x 5 $\text{mm}^3$ (open loop)
step size	0.05..3 $\mu\text{m}$ @ 300 K, 10..500 nm @ 4 K
fine scan range	50 x 50 $\mu\text{m}^2$ @ 300 K, 30 x 30 $\mu\text{m}^2$ @ 4 K (optional, open loop)
closed loop scan resolution (steady state, 100 ms sample time)	1 nm rms typ.
sample holder	ASH/QE/0 quick exchange sample holder and integrated heater with calibrated temperature sensor

