

# SkySpec Mini Instrument v.250

## TELESCOPE-SPECTROMETER SYSTEM FOR MOBILE PASSIVE REMOTE SENSING

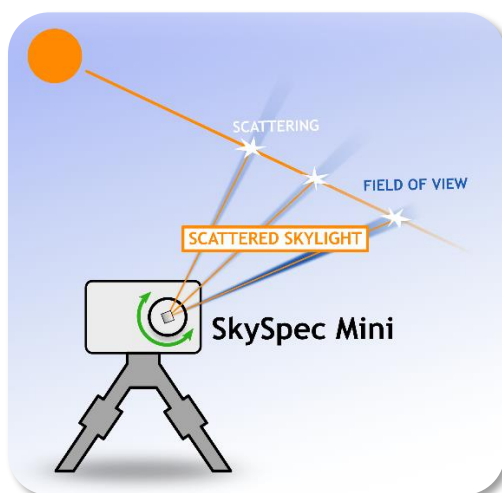
- Combined telescope-spectrometer system for acquisition of scattered skylight spectra
- Compact, light-weight and low power consumption for mobile applications and measurements in remote places with little infrastructure
- Optimized for UV/Vis-aerosol and trace gas remote sensing with the DOAS method
- Detectable gases: NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub>, HCHO, H<sub>2</sub>O, HONO, IO, BrO, Glyoxal, O<sub>4</sub>, ...
- Customizable to meet your specific requirements
- Software packages for spectral analysis, post-processing and data visualization available

### TELESCOPE:

- Motorized viewing elevation axis, fixed azimuth
- Automatic correction of telescope viewing elevation via integrated inclination sensor
- Rugged and weather-proof design with no outside moving parts
- Integrable wide angle camera for monitoring purposes



*SkySpec Mini in the field with tripod and LiPo battery pack (available accessories)*



### SPECTROMETER:

- High quality grating spectrometer
- Characterized and calibrated
- Active temperature stabilization
- Low straylight design
- Sub-nm spectral resolution
- High spectral sampling
- Homogenized slit illumination
- Available with backthinned CCD detector to maximize UV sensitivity

**For measurement principle, example applications and data, see SkySpec overview datasheet!**

## HIGHLIGHTS

### Measurement accuracy

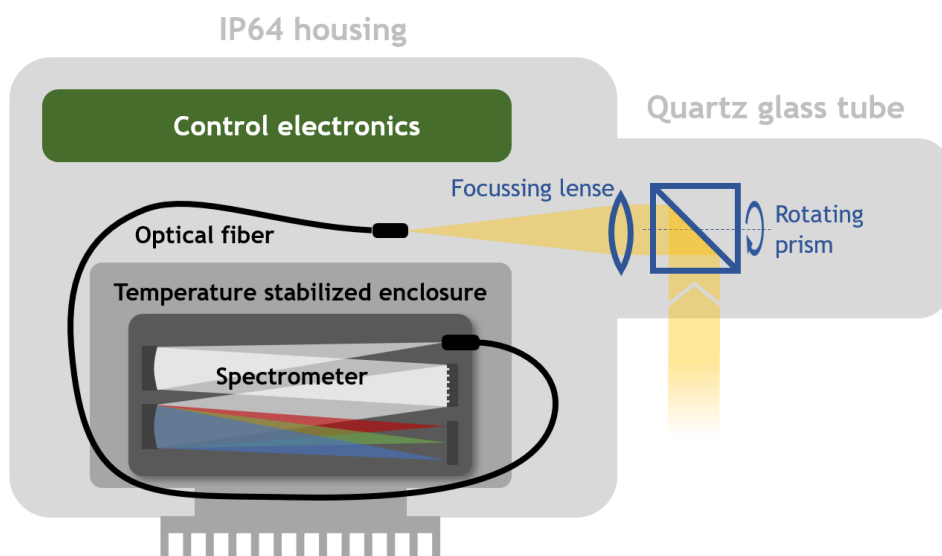
- Individual in-house spectrometer fine adjustment to optimize spectral properties
- Spectrometer characterization included: wavelength calibration, offset and dark current spectra, detector non-linearity function
- Active spectrometer temperature stabilization ensures stable properties
- High spectral sampling prevents quantization errors
- Low noise and high precision in narrow-band optical density
- Color filters and optical bench design minimize spectrometer stray-light
- Optical fiber ensures homogeneous spectrometer illumination
- Real-time correction of telescope elevation via inclination sensor, ideal for measurements on moving platforms (ships, cars) or in changing environments
- Prism deflector and optical fiber setup prevent polarization induced biases
- Small vertical field of view ( $< 0.3^\circ$ ) optimized for vertical profiling applications

### Setup, lifetime & maintenance

- Quartz glass tube design avoids outside moving parts for:
  - ▶ long lifetime even under harsh environmental conditions
  - ▶ simple cleaning
- Integrated telescope heating (activates at  $< 5^\circ\text{C}$ ) prevents:
  - ▶ freezing of mechanical components
  - ▶ water condensation, snow and ice on quartz cylinder and other optics
- Weather proof and UV resistant IP64 housings
- 12V/DC power supply with low consumption, ideal for mobile operation via battery or car-cigarette-lighter
- Easily adaptable measurement routines
- Fast instrument power-up
- Various mounting options (tripod, rail and mast adapters available)

### Customization

- Individual spectrometer configurations to best meet your spectral requirements



## TYPICAL SPECIFICATIONS

<b>Wavelength range</b>	400 - 460 nm (standard) <sup>*1</sup>
<b>Spectral resolution</b>	< 0.7 nm FWHM (standard) <sup>*1</sup>
<b>Optical filter</b>	Schott BG3 (standard) or BG40 <sup>*1</sup>
<b>Noise</b>	< $3 \cdot 10^{-4}$ at $10^3$ scans (=60s integration time)
<b>Spectral sampling</b>	> 6 points over slit function FWHM
<b>Quantum efficiency</b>	UV: > 50 % (UV, back-thinned detector)
<b>Spectrometer temp./stability</b>	Temperature: 20 °C (adjustable) Stability better than +/-0.03 °C
<b>Wavelength calibration</b>	Highly stable in-house calibration (typ. shifts < 0.01 nm), manual re-calibration possible with mercury (HG) lamp
<b>Operation temperature range</b>	-10 °C to 40 °C <sup>*2</sup>
<b>Elevation range and accuracy</b>	-10° to 190°, automatic correction with < 0.1° accuracy (1σ)
<b>Field of view FWHM, vertical x horizontal</b>	< 0.3° x 1.0°
<b>Telescope heating</b>	Automatic, if temp. below 5 °C

<b>Mechanical stability</b>	Water proof (IP 64), sun roof, robust and simple mounting
<b>Additional Sensors</b>	Temperature: 1 °C accuracy, telescope, spectrometer, electronics Pressure: 0.5 % accuracy, ambient Humidity: ± 3 % accuracy in relative humidity, Sensor inside instrument
<b>Measurement software</b>	Included, customizable measurement routine (angles, time resolution) on embedded PC with Windows 10 Prof.
<b>Start-up time</b>	< 2 min
<b>Data communication</b>	USB
<b>Power consumption</b>	Typ. < 30 W (max. 100 W), 12 V
<b>Weight</b>	≈ 6 kg
<b>Size (WxDxH)</b>	Box: 30 x 20 x 13.2 cm <sup>3</sup> Quartz tube (LxD): 16 cm x 8 cm

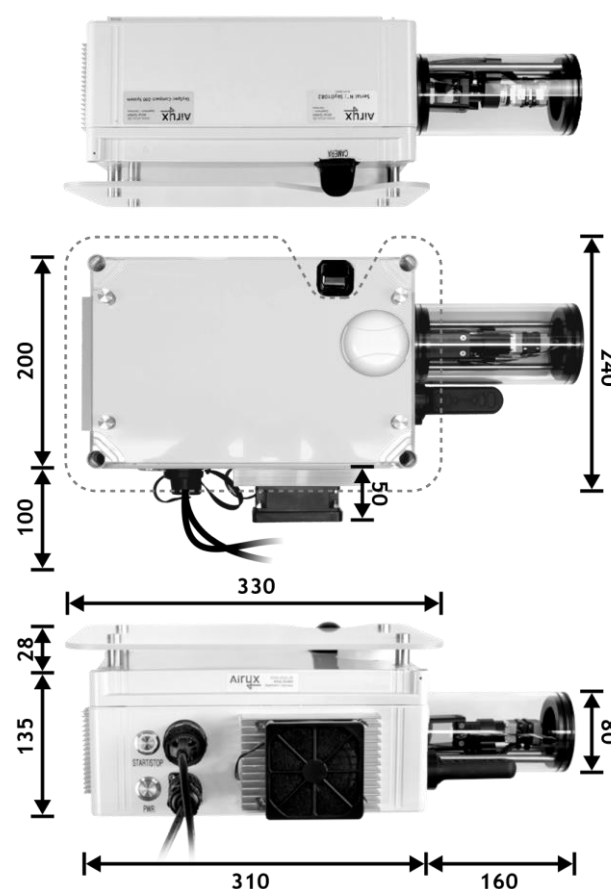
<sup>\*1</sup> Custom specifications with different wavelength ranges are possible within certain boundary conditions to guarantee optimum spectroscopic measurements.

<sup>\*2</sup> Temperature can exceed the operation range in direct sun light.

## OPTIONAL COMPONENTS & CONFIGURATIONS

- Custom spectrometer configuration and low-cost spectrometer options
- Tripod and various mounting adapters
- Handheld mercury (HG) wavelength calibration lamp
- Mobile LiPo battery in Peli case (50 Ah, 13.6 V)
- Pre-configured measurement PC (notebook/desktop)
- Integrated, wide FOV camera to monitor measurement conditions
- Spare parts and maintenance set
- Spectral evaluation software packages
- Online installation and support service

## DIMENSIONS



All dimensions in mm