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## TranSpec®

Photodiode Array Spectrometer • Made in Germany

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**TranSpec** instruments are photodiode array spectrometers which combine most innovative optoelectronics with powerful analog/digital electronics. With the use of flexible optical fiber, the TranSpec application area ranges from standard lab analysis to specialized in-line process measurement tasks.



### Innovative Optical Components

The TranSpec instruments exclusively use spectrometer modules of Carl Zeiss, Germany. With these modules, the entrance slit is imaged on a photodiode array by means of a holographic created, concave diffraction grating. All components of the spectrometer module are firmly mounted together in one unit and permanently adjusted to each other, which means that there are no mechanically moveable parts at all.

### Powerful Analog/Digital Electronics

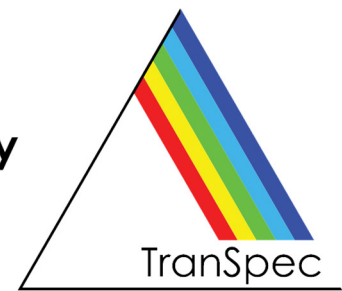
For the scanning of the photodiode array and the A/D-conversion of measured spectra, TranSpec spectrometers use a fast and highly linear 1 MHz A/D-converter. Due to the extremely short scanning time of the photodiode array (approx. 256 microseconds for an array of 256 photodiodes) the TranSpec instruments can be described as real simultaneous spectrometers. The high linearity of the A/D-converter permits reliable, reproducible photometric measurements over the entire useable signal dynamic range. The TranSpec spectrometers use the industry standard USB interface or optionally Ethernet/LAN to connect to your PC.

### Easy-to-Use Software Packages

We provide powerful and very easy-to-use software packages especially for film thickness measurement and plasma emission monitoring. Aside, our PEM-ProLib++ and FTM-ProLib++ programming libraries permit to easily create your own Windows applications using the TranSpec spectrometer system.

Technical specifications on next page ►

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**TranSpec Photodiode Array Spectrometer • Technical Specifications**

January 2023, without guarantee and subject to changes

**Mechanical Construction**

- Standard 19" chassis with 3 HU, CE certificate
- Dimensions: approximately 132 x 435 x 310 mm (H x W x D)
- Weight: approximately 4 kg

**Optical Components**

- Spectrometer modules of Carl Zeiss Germany with industry standard FSMA fiber optics connector
- Holographic created concave diffraction grating
- Photodiode arrays (PDA) with 256, 512 or 1024 pixel, no cooling required
- Special CCD version with 2048 pixel, no cooling required as well
- Permanently adjusted modules, no mechanically moveable parts, free of maintenance
- Module specific wavelength ranges: 200 - 1100 nm
- Module specific spectral resolution: 3 - 10 nm
- Module specific spectral pixel interval: approx. 0.8 - 3.3 nm
- Absolute wavelength accuracy:  $\leq 0.3$  nm
- Temperature drift: typically  $< 0.005$  nm / Kelvin

**Analog/Digital Electronics**

- 1 MHz 16 bits AD-converter AD7677 from Analog Devices, Inc.
- Spurious-free dynamic range, no missing codes at 16 bits
- Effectively useable conversion rate: 1 microsecond per pixel
- Optional external USB multi-i/o module with 8 x TTL and 4 x analog output
- Standard USB interface to connect Laptop or PC
- Optional Ethernet (LAN) interface to connect laptop or PC

**Spectra Scanning**

- Shortest integration time: 0.4 Milliseconds at 256 pixel / 0.7 Milliseconds at 512 pixel / 1.2 Milliseconds at 1024 pixel
- Longest integration time: up to 5 seconds for all modules, selectable in steps of 0.1 Milliseconds
- Raw data averaging, selectable between 2-100
- Total system noise (standard deviation, dark current at 10 ms): 5 Counts/no averaging, 2 Counts/25 measurements
- Date and time stamping of each, unique measured spectrum with a resolution of 1 microsecond
- Optionally high speed and lossless spectra burst mode into TranSpec local memory buffer
- Optionally separate real-time TTL-out port on TranSpec for trigger-out of burst mode start/stop

**Available Software**

- PEM-ProVis Professional software for plasma monitoring
- PEM-ProLib++ comfortable C/C++ class libraries for developing your own plasma applications
- Development of customized software, especially for process controlling tasks and in-line systems

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