

# MultiSpec

UV/VIS/NIR Detector Array Spectrometer Systems



MultiSpec is a modular instrument family of fast and simultaneous readout spectrometer systems for the UV/VIS/NIR. Based on flexible 19" chassis technology it is ideal for process applications. Various spectral ranges, resolutions, and PC-interfaces are available. The integrated

spectrometers are high-quality modules without moving parts and with outstanding long-term stability. Newest multiplexing technology offers multichannel operation on up to 8 channels. The standardized SMA connectors at the front side allow easy connection of fiber-optic accessories.



MultiSpec<sup>Remote</sup>

- available spectral range  
190 – 2500 nm
- fast, precise, robust, non-destructive
- modern detector array technology  
without moving parts
- drift free operation due to internal  
referencing
- standard fiber optic connection
- electrical and optical multiplexer  
technology

## Spectrometer Module

MultiSpec systems are based on the monolithic spectrometers from Carl Zeiss. The high light sensitivity and the extreme stability of these components allow together with the tec5 15/16-bit electronics very accurate measurements with high dynamic range. The modules are available for various wavelength ranges and resolutions.

Two spectrometers with different wavelength ranges can be controlled in parallel.

## Plug-In-Cassette Design

MultiSpec systems follow a modular concept. All components, such as spectrometers or light sources, are integrated in cassettes, which can be changed easily. System parameters (e.g. sensor type, sensor length, calibration coefficients) are stored within the cassettes and will be read out at system start. This keeps the necessary flexibility for future measuring demands and easy exchange during maintenance.

## Multiplexing – Multi Channel Systems

The **electronic spectral sensor multiplexer** (for Si-PDAs) provides important advantages. For multi-point applications spectra of up to 8 channels can be taken simultaneously, therefore, the costs per measurement point is reduced dramatically. With the 2-channel version sample and reference data are acquired at the same time for referencing of e.g. a Xe flashlamp. Variations and drifts of the light source are compensated perfectly. The tec5 multiplexer has no moving parts and is fast and reliable.

For NIR applications an **optical multiplexer** based on piezo technology is available. Fast switching time, low intensity reduction, a very good reproducibility and a high lifetime are the characteristics of this unit.

## Process Communication

The MultiSpec systems can be equipped with analog (4-20mA) and digital I/Os for process communication to transfer results and status information (e.g. system error, system warning, out-of-range signal) to a process control system. In addition, a remote control from an SPS or PLS is available to trigger a measurement cycle or to stop the continuous data acquisition for maintenance. Various add-on I/O-boards with and without opto-isolation and other communication protocols (Profibus, Ethernet...) are available.

## Typical applications

- quality control of liquid, gaseous and solid samples
- monitoring light emission, solar spectrum and plasma
- colour measurements
- reaction monitoring
- film thickness determination
- monitoring of extraction and distillation processes
- end point determination

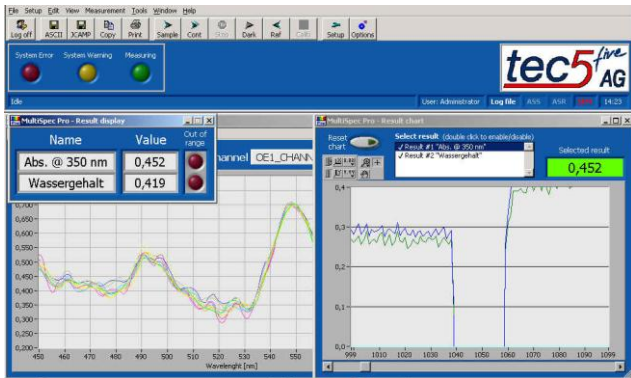
## Accessories



Equipped with appropriate fiberoptics and probes the system can be adapted for your measurement task. For rough environment a 19" rack enclosure (or Ex-proof housing) is available. We assist you in finding the optimized solution.

## Software Modules

- MultiSpec Pro Process Software with various data processing algorithms e.g. color evaluation and chemometrics based on models from The Unscrambler, NIRCal & GRAMS
- 32 bit function library for LabVIEW™ and programmer interface for C++/ VB/ Delphi for the development of application specific software
- Instrument drivers for GRAMS/AI from Thermo Galactic (21 CFR part11 compliant)
- Film Thickness Meas. Software TFFro UV-Vis
- Additional modules on request



Spectroscopy Software MultiSpec Pro



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## Light Sources

The MultiSpec systems can be equipped with various light sources, depending on the application.

- Usable wavelength range:  
Halogen lamp: 360nm – 2500nm  
Shine-through lamp: 190nm – 2500nm  
Xenon flash lamp: 200nm – 1100nm
- Lamp and shutter control by PC
- 2 internal filter ports

## Technical Data:

### Spectral sensor

(Specifications depend on applied module)

Spectral range:	190 – 2500 nm
Resolution (Rayleigh):	2.5 - 16 nm
Pixel dispersion:	0.8 - 5 nm
Wavelength accuracy:	0.2 - 0.6 nm
Number of pixels:	256 / 512 / 1024

### Operating Electronics

(Specifications depend on applied module)

Resolution:	15 / 16 Bit
Integration time:	variable from 1.5 ms – 6 s (depending on number and size of arrays)

### Optical Interface

Standard SMA connectors

### Other

Power supply:	110/220V, 50/60Hz
Dimensions (HxWxD) (Standard enclosure)	180 x 427 x 411 [mm] (3/4 HE / 84TE)
Weight:	12 kg – 15 kg
Operating temperature:	5 °C – 40 °C (32°C with PGS NIR and MCS CCD)