

# MultiSpec NIR

## NIR Detector Array Spectrometer System

MultiSpec NIR is part of the modular MultiSpec instrument family of fast and simultaneous readout spectrometer systems. 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. The standardized SMA connectors at the front side allow the easy use of fiber optics with all types of probes and cells.



### MultiSpec<sup>NIR</sup>

- **(extended) InGaAs technology**
- **possible spectral ranges:  
960 – 2500 nm**
- **fast, precise, robust**
- **high dynamic range of up to 16 bit**
- **standard fiber optic connection**
- **multi component analysis**
- **up to 8 measurement points**

### Advantages

The detector array based spectrometer design provides acquisition of whole spectra within ms. High reproducibility and long-term stability makes this technology an ideal tool for process applications. Besides standard spectrometer configurations the system can be customized. The spectral range (in between 200 – 2500nm) and resolution as well as type of detector array can be matched to meet your demands.

### 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.

### Spectrometer Modules

The MultiSpec system is based on quasi-monolithic spectrometer modules without any moving part. The high light sensitivity and the extreme stability of these modules, together with a 16 bit electronics, allow very reproducible and accurate measurements with large dynamic range.

### Light Source

The MultiSpec NIR systems can be equipped with a Halogen lamp, suitable for the full NIR range. The light source is totally software controlled. A shutter is integrated for automatic dark current correction. Two internal filter ports allow to have specific parts of the emission spectrum blocked.

### Multiplexer

The optional multiplexer module MUX-FSM which is based on piezo technology allows measurements on up to 8 channels. Fast switching time, low intensity reduction, a very good reproducibility and a high lifetime are the characteristics of this system. Alternatively we offer a 2-channel optical multiplexer, which can be used for direct referencing of the light source to compensate for long term variations.

### Process Communication

The MultiSpec systems can be equipped with analog (4-20mA), digital I/Os or profibus protocol 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 are available.

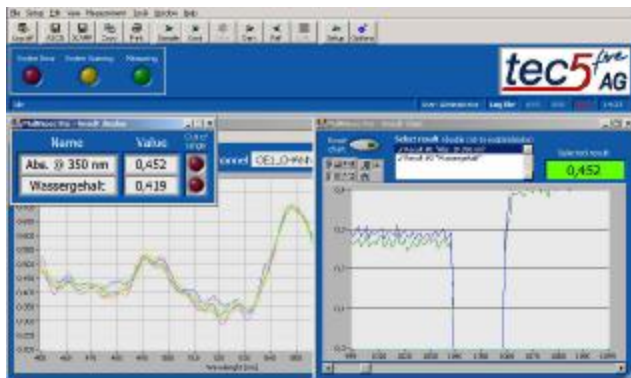
## Accessories



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 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)
- Additional modules on request



Spectroscopy Software MultiSpec Pro



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## Technical Data

### Spectrometer Cassettes - Standard Versions:

#### Zeiss NIR PGS 1.7

Spectral range: 960 - 1690 nm  
Number of pixels: 512 element array  
Resolution:  $\approx 5$  nm

#### Zeiss NIR PGS 2.0

Spectral range: 1340 - 2000 nm  
Number of pixels: 256 element array  
Resolution:  $\approx 6$  nm

#### Zeiss NIR PGS 2.2

Spectral range: 1000 - 2150 nm  
Number of pixels: 256 element array  
Resolution:  $\approx 16$  nm

Detector: thermoelectrically cooled InGaAs array

Wavelength accuracy:  $\approx 0.6$  nm (absolut)\*

Temperature – induced drift:  $\approx 0.012$  nm/K\*

\*typical values, depending on spectral range and resolution

### Optical Interface

Standard SMA connectors

### Electronics

Intensity Resolution: 16 Bit

Integration time: variable from 0.1 ms – 6 s

Readout time: 3.4ms

Interfaces: PCI, USB 2.2 (1.1 compatible),  
RS485 optional

### Other

Power supply: 110/220V, 50/60Hz

Dimensions (HxWxD) 180 x 427 x 411 [mm]  
(Std.-enclosure) (3/4 HE / 84TE)

Weight:  $\approx 12$  kg

Operating temperature: 5 °C – 35 °C