

AgroSpec®: Robust Spectrometer System for Use on Vehicles and in Process

AgroSpec is a dust and splash water protected spectrometer system designed for the harsh conditions of process and field use and all kind of agricultural applications. Key components are the fast and compact diode-array based spectrometer modules from Carl Zeiss. These modules are maintenance-free, high-end optical components without any moving parts. AgroSpec can be customized

and offers – besides the multi-channel feature – the possibility to add various optical measurement heads via light guide and SMA connector, e.g. the NIRON reflection probe. For years now, tec5 spectrometer systems are used by renowned agronomic research institutes as well as in the well-known YARA N-Sensor.

Applications

- Precision Farming
- Plant Production
- Plant Breeding
- Biogas Plants

Application Example

NIR spectroscopy (NIRS) has been proven a viable tool for online monitoring of process relevant parameters in biogas plants, such as the content of dry matter in the fermenter as well as other process influencing metabolites (fats, proteins, acetic acids, pH value etc.). In addition, real time measurements of quality relevant parameters as dry matter content of silage, oil content of rape or protein content of grain directly on harvesters can be realized. Measurements in the visible spectral range allow predictions on the expected biomass already during plant growth.

Evaluation and analysis of the spectra is often carried out by the predictions based on chemometric models.



AgroSpec® spectrometer system



NIRON measuring head

NIRON measuring head with flange

Spectral Ranges

AgroSpec is based on high-end PGS NIR and MMS VIS spectrometer modules of Carl Zeiss. Outstanding features are a high signal to noise ratio, an extraordinary wavelength accuracy and extreme longterm stability. AgroSpec systems are available within the wavelength range of 380-2150nm. Configurations shown in the table to the right.

Various versions are available:

Spectral range	Pixel width	Resolution
960–1690 nm	1.5 nm	< 5 nm
1000–2150 nm	5 nm	< 16 nm
380–1050 nm	3.3 nm	< 10 nm
380–1690 nm	3.3 nm/1.5 nm	10 nm/5 nm
380–2150 nm	3.3 nm/5 nm	10 nm/16 nm

Advantages

- Protection against dust and splash water in accordance to IP65 norm
- High-end spectrometer modules without moving parts
- Multiple channels as an option
- Wide measurement range of 380–2150 nm possible
- Adaptation to customer specific demands
- 24V power supply (12 or 230V on demand)
- PC interfaces: USB 2.0 or Ethernet

Technical Data

	AgroSpec	NIRON measuring head
Material	Aluminum	Stainless steel
Dimensions	230x330x110 [mm]	Ø91x179 [mm]
Weight	ca. 8 kg	ca. 2,5 kg
Mechanical Interface		2" thread
Communication	USB/ETH optional	Fiber-optic (Rx/Tx)
Diameter Light Guide Connector		Standard typical 600µm SMA
Lamp Power Lamp Lifetime		5W >5000 h
Operating Temperature	5°C – 35°C	5°C – 35°C
Power Supply	24 VDC (12 or 230V optional)	via AgroSpec

Measurement Heads

tec5 provides various measurement heads with integrated light source, e.g. the NIRON reflection head. NIRON is optimized for strongly structured samples as grain, plant particles, powder, etc.. An internal white standard allows the acquisition of very precise and reproducible results. It can be mounted to a 2" flange. Light of a 5W halogen source illuminates the sample through a sapphire window, the reflected light is detected under 45°. In addition, passive measurement heads with or without diffusor are available (e.g. for sunlight referencing or measurement of reflected sunlight).

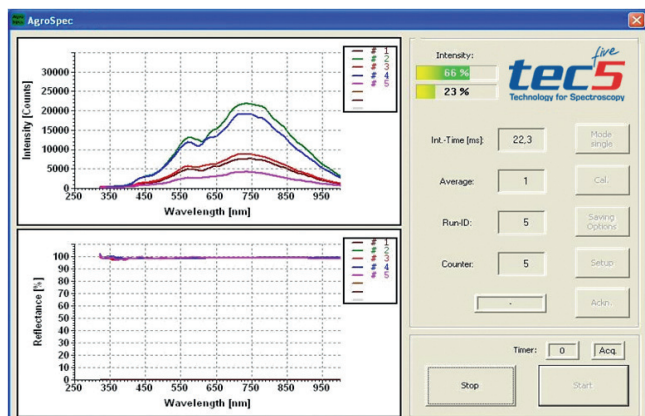
AgroSpec Software

The AgroSpec software serves as the perfect platform for the mobile spectrometer system AgroSpec as well as for the back-pack system HandySpecField^{VIS-NIR}. Easy to use, it can be handled through all types of laptops, terminals, etc.

which are based on Windows XP. The software is specially designed for the demands of agriculture, ecology and geo science. Buttons in the Graphical User Interface (GUI) have been designed to support operation via touch screen.

Scope of Operation:

- Graphic display of raw data and reflection spectra
- Continuous data acquisition
- Automatic saving of spectral data
- Automatic adjustment of integration time
- Automatic file name assignment
- Integration of DGPS data
- Chemometrical data evaluation based on models from CAMO "The Unscrambler™".
- Inclusive Excel file with VBA macro for easy import of spectral data into MS Excel and JCAMP-DX file export



AgroSpec® Software

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tec5
Technology for Spectroscopy

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