MicroNIR™ PAT–W Spectrometer

A fit-for-purpose near-infrared (NIR) analyzer for quality-by-design (QbD) manufacturing

Viavi Solutions® continues to drive spectrometer innovation with the new MicroNIR PAT-W process spectrometer. It is a rugged, scalable, next-generation system for real-time process monitoring in blend homogeneity, loss on drying, compaction, content uniformity, and other process analytical technology (PAT) applications. With proven Viavi linear variable filter (LVF) technology, the PAT-W has the smallest form factor in the process monitoring instrument market in a fit-for-purpose design. This makes it ideal for use with processing equipment of all sizes, with the performance and stability to enable smart and efficient manufacturing.

The easy-to-use MicroNIR PAT-W was designed for today's demanding GMP-regulated environments yet requires minimal system maintenance. It has no moving components or expensive fiber optic cables, enabling superior instrument stability and performance in harsh process environments. Its stainless steel/brushed aluminum cabinet resists dust and water to IP67 standards and cleans easily.

Key Features

- Non-destructive, non-invasive, and real-time near-infrared analysis
- User-selectable WiFi or Ethernet for system control and data communication
- User-replaceable, rechargeable Li-ion battery with over 8 hours of continuous run time
- Integrated multi-axis triggering
- Trigger options for different applications: internal orientation timer, push button, and external
- Real-time moving block standard deviation (MBSD) and %RSD analysis for end-point determinations for blending, drying, granulation, and coating processes
- Washable, IP67-rated enclosure
- Integrated PC enables fast and secure store and forward of collected spectral data

Applications

Pharmaceutical Manufacturing

- Blend uniformity
- Fluid bed drying
- Granulation
- Content uniformity

Food and Feed Manufacturing

- Moisture content
- Nutritional assay
- Protein
- Fat

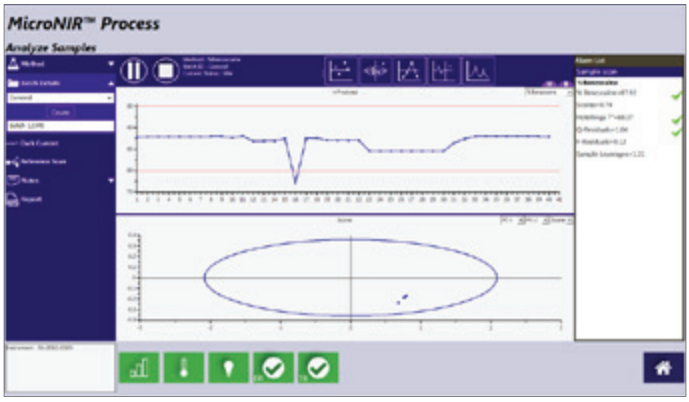
Industrial Processing

- Reaction monitoring
- Polymers
- Petrochemicals

MicroNIR Software

The software suite allows for deployment flexibility from process/ product development to manufacturing environments and features audit trails, comprehensive user management, encrypted secure data storage, and many other capabilities required for regulated GMP environments.

- The MicroNIR PAT control software enables easy data acquisition, method investigation, user management, method development, instrument performance qualification per USP 1119 criteria, and the visualization of moving block standard deviation (MBSD) trends.
- Viavi Unscrambler® X Lite regression and classification software provides a complete set of chemometric tools for calibration model development and data investigation, supporting MBSD model development with %RSD and PCA-based blending tools.
- The MicroNIR Process software is designed for easy process monitoring of different process methods from different MicroNIR spectrometers. Process Engineers can easily view collected data and trend results in real-time with simultaneous output of key process data to the plant control system.



Mounting and Process Integration

The MicroNIR PAT-W has been designed with maximum flexibility in mind to meet the many different criteria for process integration. It integrates into a process with three different mounts:

Standard

This includes a weld in base flange, a 2" sanitary (hygienic) flange mount, a sapphire window, and a retaining ring with O-rings. The base flange is welded into a hole cut in the lid of a blender and then the sanitary flange mount, window, and retaining ring are assembled. The PAT-W with an adjustable collet then secures against the window and a sanitary flange using a standard tri-clover clamp (or C-clamp). All pieces disassemble for easy cleaning and maintenance.

Threaded

This mount lets a user weld a mount into the process equipment and subsequently attach the PAT-U using the threaded tip of the spectrometer. The threaded mount also contains a removable window for easy cleaning and maintenance.

Standard mount

When used on a rotating blender, the PAT-W features an integrated 9-axis inertial measurement unit (IMU) that contains a 3-axis gyroscope, a 3-axis magnetometer, and a 3-axis accelerometer. The IMU enables highly accurate and repeatable triggering of the PAT-W .

Specifications

Parameter	Specification
Illumination source	Two integrated vacuum tungsten lamps
Bulb life	>40,000 hours
Illumination geometry	Flood illumination/ 0° observer
Input aperture dimensions	2.5 x 3.0 mm
Sample working distance	0-15 mm from window
Dispersing element	Linear variable filter
Detector	128-pixel InGaAs photodiode array
Pixel size/pitch	30 µm x 250 µm/50 µm
Wavelength range	950 – 1650 nm (10,526 – 6060 cm^{-1})
Pixel-to-pixel interval	6.2 nm for 950-1650 nm
Spectral bandwidth (FWHM)	<1.25% of center wavelength (1% typical) (for example, @1000 nm, resolution is <12.5 nm)
Analog-to-digital Convertor	16 bit
Dynamic range (max)	1000:1
Measurement time (typical)	0.25 – 0.5 second
Integration time	10 ms typical, minimum 10 µsec, maximum limited by dark signal
Computer interface	TCP/IP Cat5 Ethernet 802.11g WiFi
Spectrometer weight	Less than 1.4 kg (3 lb)
Size	160 mm x 136 mm x 136 mm (6.3 in x 5.37 in x 5.37 in)
Power	Battery: 7.5 V @6.4 Ah for >8 hr run time External: 110-240 V AC
Data format	Encrypted, Unsb, CSV, and SPC output
Operating system	Windows 8.1, 8, and 7
Software available	MicroNIR PAT, Unscrambler X Lite, MicroNIR Process
Operating temperature	0 – 40 deg C (non-condensing)
Enclosure	Stainless steel and aluminum: dust and waterproof, sealed and cleanable to IP67 standard
Trigger	Internal 9-axis IMU, external 24 V input
Mounting	Adaptable stainless steel tri-clover mount

For more information on this or other products, please contact your local distributor:

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