tec5

MEMBER OF THE NYNOMIC GROUP

Embedded

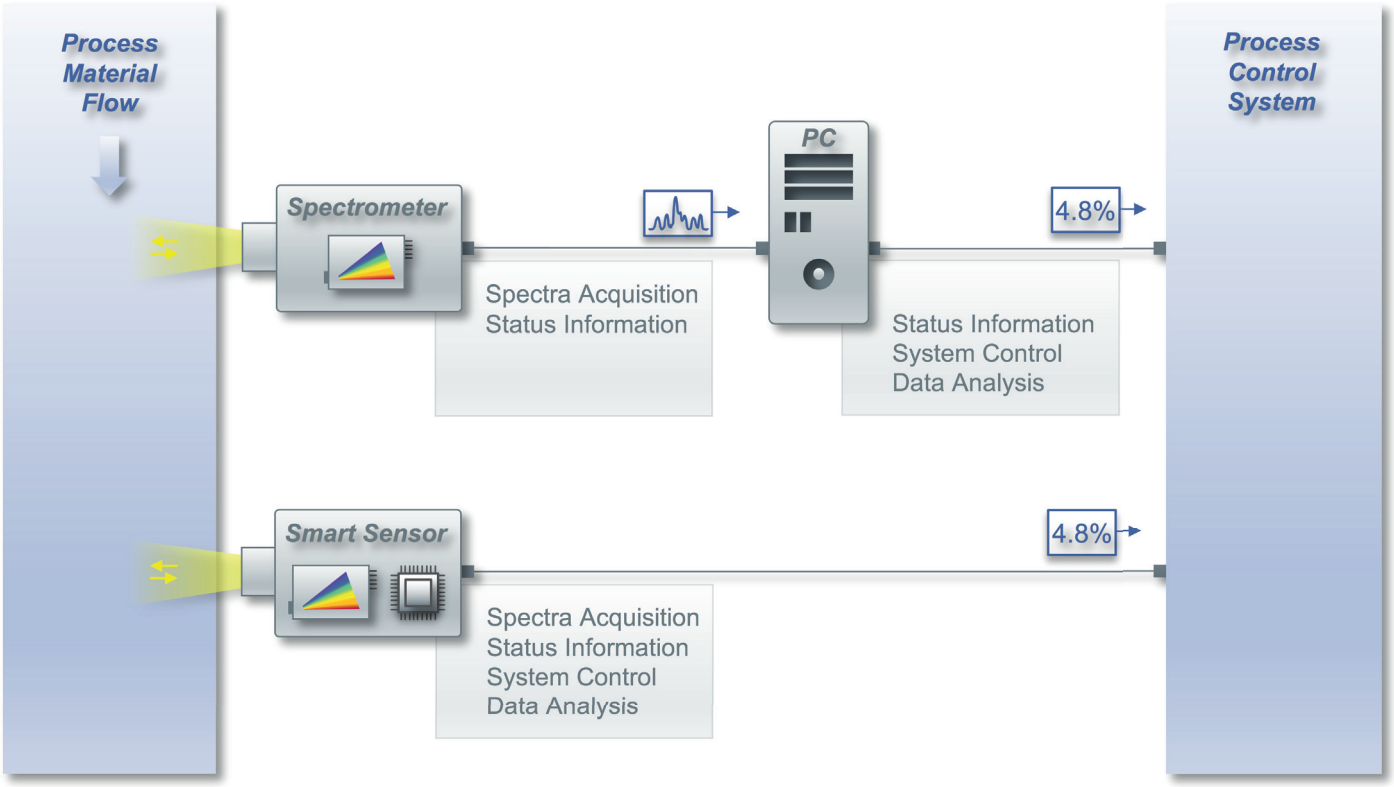
Embedded Spectroscopy

Smart Data Processing

Smart Process Analytics

A Smart Sensor is a sensor comprising not just the actual data acquisition but also the complete data processing and data evaluation within one unit. Available as compact devices, today`s smart sensor concepts – due to their autonomous, real-time operation and simple possibilities for connection to process control systems or networks – represent the basis for modern process analytical technology.

Our Embedded Spectroscopy product line consequently meets the smart sensor concept, as the data processing and evaluation is fully hardware embedded. Moreover, they continually provide information on their processing status. Therefore, Embedded Spectroscopy is one of the most important and most respected milestones on the road to the implementation of up-to-date UV, VIS, NIR or Raman technology.



Smart Sensor Advantages for Industrial Use

At first, smart sensors are used for all typical process-analytical applications, having outstanding properties:

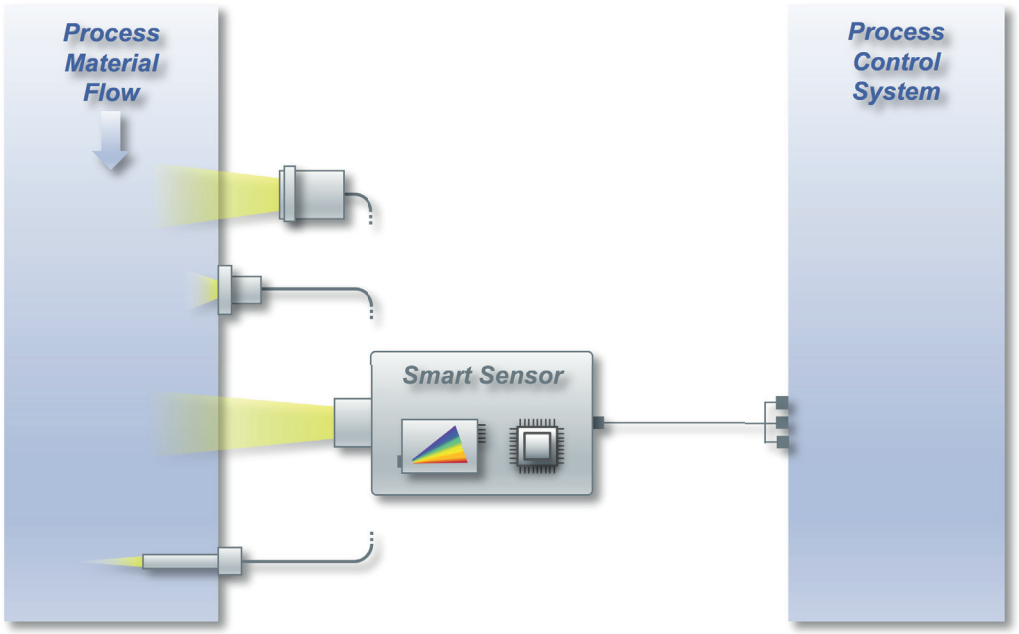
- Real time measurements and data evaluation
- Fully autonomous operation and high availability
- Independent of PC software and particularly operating systems
- Remote control via industrial standard interfaces
- Static and dynamic data (status self-diagnosis)
- Facilitated system validation, e.g. GMP
- Full IT security
- Compact design and cost effective

Smart Sensor Advantages for your Application

According to the respective industrial context, the inherent power of the smart sensors can be translated into noticeable benefits. Some examples: In the pharmaceutical and biopharmaceutical field, validation efforts and risks are considerably reduced. Smart sensors for chemical or petrochemical industries can be seamlessly integrated into existing I&C concepts. Lean and cost-effective process analytical solutions become accessible for food production. For both agricultural and mining industries, fully integrated compact sensors mounted on vehicles are superior to their PC-based counterparts.

Technology for Smart Sensing

Smart sensors should be uncompromisingly tailored to their specific application. To achieve this in the most efficient way – i.e. promptly and without development effort or even risk – a smart sensor platform is provided which, based on standardized system components, enables the simple combination of application-specific sensing solutions.
All system components of the embedded product lines are designed modularly. We can thus offer lean and competitive technology with standardized interfaces, compact integration and various housing concepts with short lead times.



Sensor Heads & Probes
Illumination and spectra acquisition either
- integrated in the sensor or
- fiber coupled

Both options available as
- immersible probes
- distance sensor heads
- contact sensor heads

Spectrometer Modules
Different spectrometer and photometer types for
- UV/VIS
- NIR
- Raman

For all types, different standard series are available from
- high-end performance to
- compact cost-effective (e.g. MEMS based)

Chemometric Data Analysis
Embedded predictor routines for multivariate data evaluation
- SensoLogic Predictor
- Umetrics Simca-Q
- Camo Prediction Engine

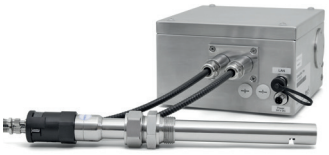
For user specific algorithms
- free formula parser

Interfaces to Process Control Systems
Different standard hardware and software interfaces
- Modbus TCP
- EtherCAT
- PROFINET, PROFIBUS DP
- CAN Bus
- OPC, OPC UA
- …

Embedded

Embedded Product Portfolio

The tec5 product portfolio includes various embedded systems, which can be tailored to project-specific requirements and can also be used as generic platform for the realization of specific OEM projects. For a direct integration into the process, the systems are configurable to a high degree, making nearly all media accessible for measurement tasks: bulk goods on conveyors; web goods such as textiles, paper or plastic films; liquids and paste-like in pipelines; media in reactors and vessels.



Interfaces to Material Flow - Sensor Heads and Probes

The generic embedded platform is compatible to a variety of sensor heads and probes. Illumination and spectral acquisition can be either integrated in the sensor or fiber coupled.

Both options are available with:

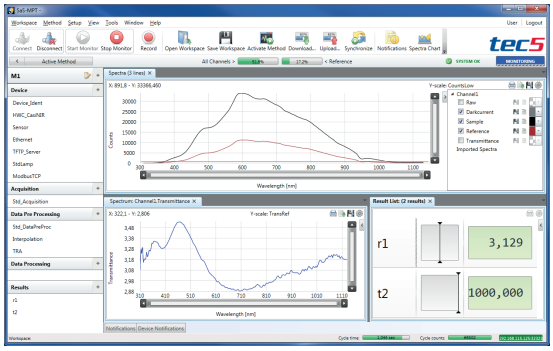
- Immersible probe
- Sensor head for distance measurenents
- Sensor head for contact measurements
- ATR probe

Micro-mechanical Fabry-Perot spectral sensors for the NIR range pave the way to implement industrial spectrometer systems in new dimensions in terms of size and cost efficiency.

Monitoring and Parameterization Tool (MPT)

For monitoring and sensor configuration purposes, the MPT tool is provided by tec5. Any PC can be temporarily connected through Ethernet to the device. After completion of the session, the PC is disconnected and not required in regular operation. The MPT supports all functionality required for setting up standard operation, including:

- Monitoring the device's operating status and measurement data
- Viewing and configuring the device's components and multiple measurement algorithms
- Upgrading the firmware, installing licenses and calibration files
- Backing up device configurations to local project files
- User friendly and customizable user interface
- Different access levels with password protection



Stationary, Mobile and Handheld Applications

Embedded spectroscopy is a generic appliance technology and therefore not limited to specific applications or industries. The configuration of process systems is always to be considered in the context of the respective final application.

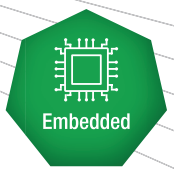
Any manufacturing or processing industry has its specific requirements for hardware and software, for functionality and methodology. In many areas, e.g. explosion protection, system cooling or regulatory frameworks are of importance.

Stationary:
Devices which will be integrated into machines or in factories can be found in the most varied production processes as highly available and autonomous inline and online analysis systems. Edge computing, i.e. the autonomous processing of data where it is generated, offers advantages which are now recognized and often pay for itself in a short time.


Mobile:
Other variants are optimized for mobile use in harsh environmental conditions and mounted to vehicles. In these cases, they provide robust and reliable monitoring data, directly linked to the vehicle's bus system - with no need for an additional PC, having the advantage of real-time data processing and thus the ability to react quickly and directly to important control variables.

Handheld:
Having reliable and valuable spectral data at hand wherever you go, by using a battery-driven, light weight smart sensor. Spectra and results may even be monitored by an Android APP and send to a cloud.

tec5 has a well-established portfolio of dedicated components, OEM modules and systems with which functional and non-functional requirements from almost any industrial sector can be met. Our expertise and our experience from a wide range of application and environments is at your disposal when selecting, assembling or customizing your system.



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