

Beckhoff control technology in the process industry

SpectroBAY® – online data for more efficient processes



→ The SpectroBAY® online spectroscopy platform from Bayer Technology Services GmbH (BTS), a subsidiary of the Bayer Group, handles process quality monitoring and determines the concentration of complex mixtures of substances. In addition to the spectroscopy system itself, optimum process monitoring requires interfacing with the production process. The data link with the control system was realized simply and cost-effectively with the BX3100 PROFIBUS DP Bus Terminal Controller from Beckhoff.

Processing of solid, liquid or gaseous substances in production facilities in the chemical, pharmaceutical or food industries requires precise knowledge of the composition of product streams. Many production facilities still rely on laborious sampling and laboratory analysis. The SpectroBAY® online spectroscopy platform enables real-time logging and transfer of this information to the plant control systems.

Platform concept for maximum flexibility

The SpectroBAY® online spectroscopy platform is a modular analysis system using different complex analyzers on the process side. On the control system side, it enables provision of measurement readings and information in the format required by the user (customer).

Spectrometers for the spectral ranges of near-infrared (NIR), medium-infrared (MIR), visual (VIS) and ultraviolet (UV) are used as complex analyzers and in Raman spectroscopy. This platform makes analyzers that are primarily designed for laboratory measurements usable for online application.

Integration with the process is preferably achieved via optical fibers connecting the spectrometer with the measuring probe in the system. One or several probes can be connected to an analyzer.

The spectrums obtained with the analyzers are evaluated on an Industrial PC using associated software. The "Analyzer Remote Transfer Software" (ARTS) developed by BTS enables data transfer to the control system. The analyzer software also deals with visualization and archiving of the values and events, and it generates the NAMUR signals for function control, failure, and maintenance require-



Bayer Technology Services GmbH (BTS), a subsidiary of the Bayer Group, is a solution provider for process automation and plant and process engineering with approx. 2,200 staff worldwide.

SpectroBAY® online spectroscopy platform.



NIR measuring cell in the process, tailored to operational requirements.

BX3100 Bus Terminal Controller for PROFIBUS DP.

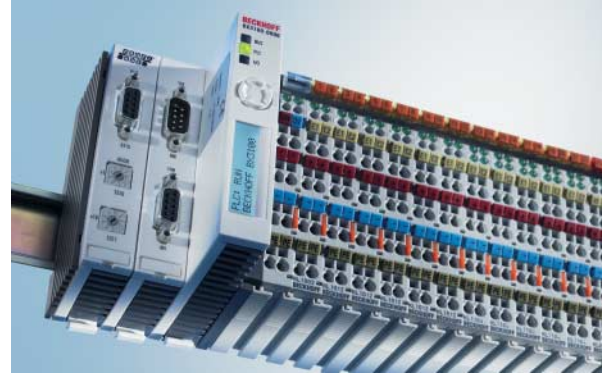
ments. The aim of ARTS is to offer users a parameterization-based option for adapting the measuring system to their requirements without the need for special programming or fieldbus know-how. ARTS reflects the modularity of the SpectroBAY® concept. On the process side, the analyzer can be selected from a list. The data link is specified on the control system side.

Beckhoff components offer full system control

The data link to the control system is realized using a BX3100 PROFIBUS DP Bus Terminal Controller. PC and BX are connected via a serial protocol. The BX3100 independently detects which Bus Terminal I/O modules are connected and transfers this information to the analyzer software, which then generates a parameterizable list. The relevant parameters, such as the measuring range, for example, are selected from this list and transferred back to the BX3100.

Dr. Helmut Berg, Account Manager for BTS, said, "The advantage of this solution is that the modular Bus Terminal system can easily be expanded at a later stage: A new Bus Terminal simply has to be mounted on the DIN rail, read, and parameterized."

In addition to analog data transfer, the system also offers transfer via PROFIBUS DP or Modbus RTU/TCP. The BX3100 provides a fixed process image that can easily be configured on the control system side. In cases where the communication parameters are not detected automatically by the BX3100, they are specified on the control system side, selected from the ARTS software via menus, and transferred to the BX3100. Once communication has been established on this basis, subsequent modifications can easily be implemented through parameterization. In addition to transfer of the raw measured data between the PC and the control system, the BX3100 also deals with the watchdog function for the PC. Via the BX3100, SpectroBAY® continuously provides the control system with information on the state of the measuring systems (e.g. "PC is being rebooted").



Intelligence fully utilized

The PLC functionality of the BX3100 is also used in the application. In many cases, external sensors or actuators have to be linked with the measuring system. One example is regular cleaning of measuring probes for powder measurements or temperature readings. Simple parameterization via ARTS enables the required functionality to be implemented on the BX3100.

The communication between PC and BX is based on predefined telegrams. The flexible BX programming options enabled the complete telegram exchange, including fault management and watchdog monitoring to be separated completely from the application functions. This program architecture is a prerequisite for validation of the software for application in the pharmaceutical and food industry.

The Beckhoff components support the full remote control capability of the overall system. A modem or ISDN connection provides a cost-effective and efficient means of calibration, as well as fast global support from BTS regarding technical issues, model refinement, or validation tasks.

→ Bayer Technology Services GmbH www.bayertechnology.com

→ Bus Terminal Controller BX3100 www.beckhoff.com/bx/