5/2 Analyzer System Manager ASM

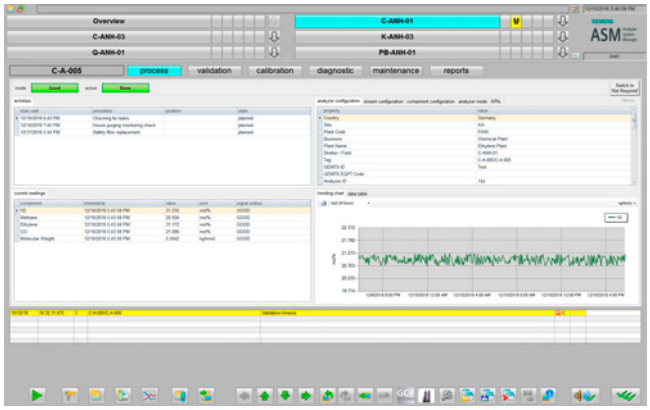
Overview

The ASM is a PC-based HMI system for monitoring, testing and management of analyzers in subsystems or in the complete plant. The relevant information from different analyzers is collected via various communications protocols and saved in a central database. Using the PC's user-friendly operator interface, it is possible to access measured value trends, device states and statistical evaluations, for example, or to start test routines for validation of the results. A comprehensive reporting module with predefined reports is available to document the evaluations. Device-specific maintenance tasks can be planned, monitored and documented using the maintenance module.

Benefits

Core functions as added value

- Just one system monitors, tests and administers the most disparate analyzers
- Visualization and operation from simple single-user or distributed multi-user systems
- Assessment of the measured value reliability by checking analyzers with a variety of validation routines, for example, reference sample method, line sample method
- Logging and statistical evaluation of validation results based on the industry standard ASTM D 3764
- Automatic calculation of operating conditions using key performance indicators (KPIs) such as availability, error rate and frequency of maintenance
- Reduction in maintenance costs through device-specific planning, implementation and checking of maintenance work
- Reporting module with predefined reports



View of the process module

Application

The ASM is ideally suited for all systems and plants where analyzer performance documentation and high reliability of the measured values are required. Distributed analyzers can be monitored from a central workstation through a modular and scalable communication network, based on standard SIMATIC components. The ASM is especially suitable for implementation in the oil and gas, petrochemical and chemical, as well as the steel industry for the optimization of analyzer landscapes in greenfield and brownfield plants.

The ASM has a flexible structure and a wide scope of functionalities and can therefore easily be adapted to individual customer requirements.

Design

System design

- PC-based HMI system
- Visualization and operation from simple single-user or distributed multi-user systems
- Logging and archiving of process and system data in a central database
- Integration of different analyzers in a uniform communications network

System software

- The ASM is based on standard SIMATIC products
- Microsoft SQL Server for archiving and data collection
- Microsoft Windows / Windows Server as the operating system

Communication

- The Ethernet protocol serves as the communication basis for the ASM
- Integration of analyzers using PROFINET, ModbusTCP or OPC data exchange
- Analyzers without a communication interface can be integrated by connecting the signals to Siemens SIMATIC components
- Data exchange with other systems possible using OPC

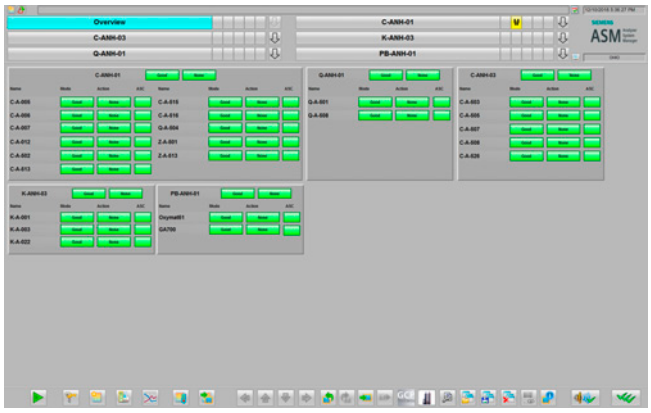
Networking

- Siemens Scalance Ethernet switches for designing electrical and optical Industrial Ethernet in line and star structures. Ring structures are also possible to increase the fail-safety of the network
- The ASM can be integrated into an existing Ethernet network

Function

General information

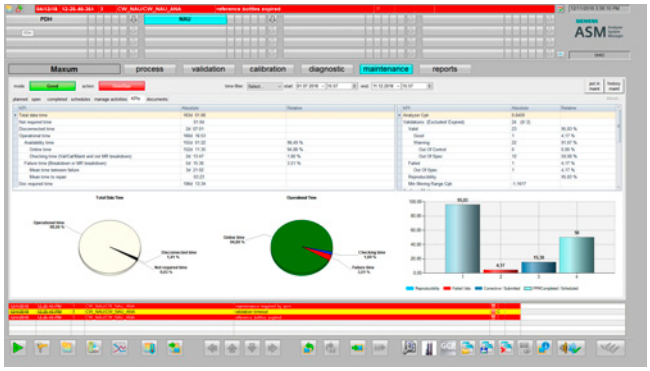
Information from the analyzers is collected over the communications network and saved in the central ASM database for further analysis. The ASM is operated from a PCS 7 environment, making it possible to navigate between overview screens, device-specific displays and general functions.



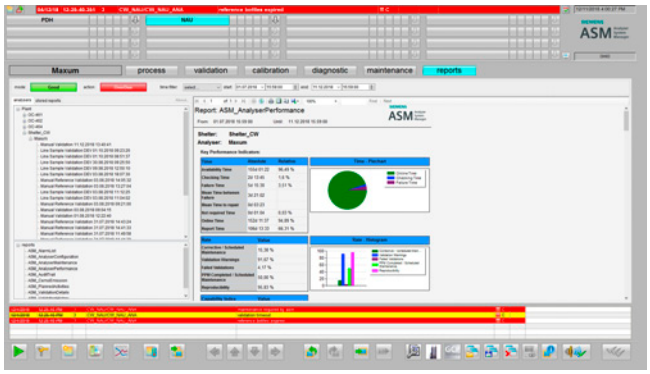
Overview of analyzers in a plant

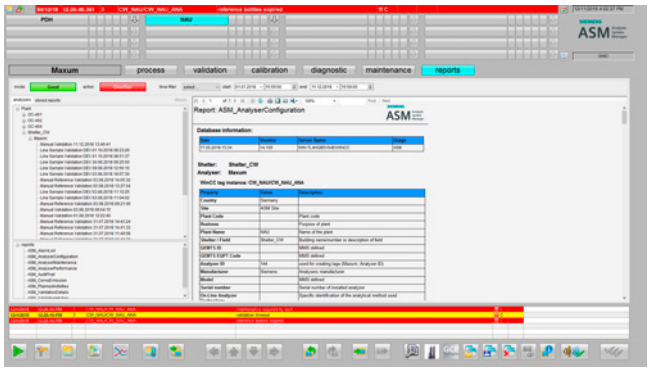
The ASM has the following function modules for each analyzer for performing operator control and monitoring tasks:

View	Task
Process	Provides a detailed overview of the selected analyzer. The current analyzer status, planned maintenance work, and configuration data are displayed. The current measured values are displayed in a table, historical values can be analyzed with the trend display using selectable time windows.
Validation	Checking the reliability of the measured values of analyzers using various routines and methods. This test can be started automatically at specific intervals or manually by the ASM.
Calibration	Carries out a calibration on the analyzer and monitors the results (this module is only available for analyzers which support remote calibration, e.g. Siemens MAXUM Ed. II, …).
Diagnostics	The ASM is capable of monitoring additional values from sample systems and analyzer houses. These are displayed as diagnostic values of the analyzer system. The operator can define different limits for each diagnostic value and the reaction of the system if one of these limits is exceeded, such as an alarm or warning. Diagnostic values are parameters which directly affect the analyzer performance, e.g. response factor, sample temperature, sample pressure, sample flow,…
Maintenance	Device-specific maintenance tasks can be specified here, their timing defined, and checked. Documentation such as maintenance procedures or manuals can be opened to support the maintenance work. The key performance indicators (KPI) view provides a fast overview of the analyzer's performance features, such as availability, error rate and maintenance frequency.
Report	This is a comprehensive function for producing customized reports. The module permits analysis of current and historical data in selectable time periods for documentation of the performance of individual analyzers up to the complete plant using the reporting module. The reports can be saved in the ASM or exported for further use.



View of the maintenance module





Examples of generated reports

Further functions are:

View	Task
SCADA	The ASM provides all typical SCADA functions, for example: • Password protection and different access privileges • User administration • Signaling, acknowledgment and archiving of alarms and events
Reference bottle management	Management and assignment of reference gas cylinders. This information provides reference values for validation using the reference sample method.
ASM Manager	For configuring the analyzers. Among other things, the analyzer-specific data is entered here, the type of validation is defined, and the number of measured values and units is entered.
MAXUM edition II operating software	Direct calling of the comprehensive Siemens configuration and operating software for Siemens MAXUM edition II. It is then possible to access the connected analyzers for maintenance, configuration, or viewing of chromatograms.
Optional views	• *Analyzer house* with locations of all elements • *Sample handling system* with locations of all elements • *Mimic panel* for visualizing alarms which influence the modes of the analyzer house. The analyzer house status will change to 'Breakdown' mode and generate an alarm message. • *Status display of the network devices.* This overview displays the statuses of the Ethernet switches (online/uncertain/fault). The analyzer alarms are integrated in the ASM signaling system. • …

Validation

One of the core functions of the ASM is checking the analyzers for reliability of the measured values. Two measuring procedures are available for recording the values, namely the reference sample method and the line sample method. The resulting values can be checked using different evaluation methods (based on ASTM D3764 or deviation). The objective of the validation is to recognize fluctuations and deviations with respect to a comparison value, and to thus permit a statement to be made on the reliability and drift of the measurement.

Measuring procedure: Reference sample method

The analyzer is disconnected from the process gas, and a reference gas connected for measurement. The composition of this reference gas was previously specified in the "Reference bottle management" of the ASM. The ASM uses these values to determine the deviation between the measurement and the reference.

Measuring procedure: Line sample method

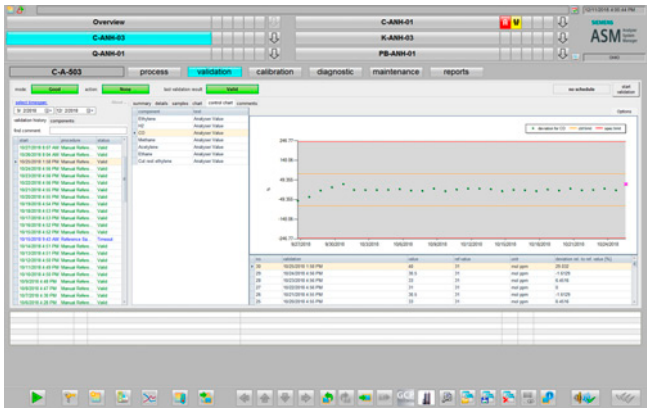
With this method, a gas sample is extracted from the stream of sample gas to the analyzer, and analyzed in the laboratory. The resulting measured values are passed on to the ASM and compared with the analyzer's measured values. With this method, the analyzer does not need to be disconnected from the process gas, and remains permanently available for the process measurement.

Evaluation based on ASTM D3764 and ASTM D6299

Based on the ASTM D3764 and ASTM D6299 international standards, the results are checked using various statistical methods, including standard deviation, Dixon outlier test, and systematic error.

Evaluation using deviation method

Limit values are defined for this evaluation: the warning limit and the control limit. Simple rules are used to define how the reliability of the measurement is to be assessed when these limits are violated. For example, it can be specified that a single violation of the limit can be tolerated, but that repeated violation is an impermissible condition.



View of the validation module

Technical specifications

Operating system	
Server	Windows Server 2016
Client(s)	Windows 10
PC hardware requirements	
Server	Standard Industrial Workstation[1)]
Client(s)	Standard Industrial Workstation[1)]

[1)] The HW configuration depends on the size of the device network supported.

Selection and ordering data

Please contact your Siemens sales partner for further information and ordering.