Communication and software
Analyzer System Manager

■ Overview

ASM is a PC-based HMI system for monitoring, testing and management of analyzers in subsystems or in the complete plant. The relevant information of 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, among others, or to start test routines for validation of the results. A comprehensive reporting module that can be tailored to customer requirements is available to document the evaluation.

■ Benefits

• Monitoring, verification and management of different analyzers in a single system
• Visualization and operation of analyzers using a single-user system or distributed multi-user systems with redundant servers
• Assessment of the measured value reliability by testing the analyzers using various validation routines, e.g. based on the industry standard ASTM D 3764
• Increase in analyzer online time by employing the line sample method
• Statistical evaluation of operating statuses and determination of key performance indicators (KPI) such as availability, error rate and maintenance frequency
• Reduction in maintenance costs through device-specific planning, implementation and checking of maintenance work
• 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.

■ Application

ASM is ideal for all systems and plants which require high reliability of the measured values and documentation for analyzer performance. Remote analyzers can also be monitored from a central workstation using various communications network protocols.

ASM is particularly suitable for use in the oil & gas, petrochemical, and chemical industries, and can be applied in new plants or also in existing plants to optimize the analyzer landscape.

■ Design

System design

• PC-based HMI system
• Visualization and operation is possible using a single-user system or distributed multi-user systems with redundant servers
• Logging and archiving of process and system data in a central database
• Integration of different analyzers in a uniform communications network

System software

• 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 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 design of electrical and optical Industrial Ethernet in line and star structures; design in ring structures is possible to increase the fail-safety of the network
• ASM can be integrated in an existing Ethernet network

View of the process module
Function

General information

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

Overview of analyzers in a plant

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

<table>
<thead>
<tr>
<th>Module</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>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.</td>
</tr>
<tr>
<td>Validation</td>
<td>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.</td>
</tr>
<tr>
<td>Calibration</td>
<td>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, Siemens MicroSAM, etc.).</td>
</tr>
<tr>
<td>Maintenance</td>
<td>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 view of key performance indicators (KPI) provides a fast overview of the analyzer’s performance such as availability, error rate and maintenance frequency.</td>
</tr>
<tr>
<td>Reporting</td>
<td>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.</td>
</tr>
</tbody>
</table>

Examples of generated reports

Further functions are:

- **SCADA**: ASM provides all typical SCADA functions, for example:
  - Password protection and different access privileges
  - User administration
  - Signaling, acknowledgment and archiving of alarms and events
- **Network screen**: 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.
- **Reference bottle management**: Management and assignment of reference gas cylinders. This information serves as reference values for the validation using the reference sampling method.
- **Equipment engineering**: 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 operation software**: Direct calling of the comprehensive Siemens configuration and operation software for Siemens MAXUM edition II. It is then possible to access the connected analyzers for maintenance, configuration, or viewing of chromatograms.
Validation

One of the core functions of ASM is checking the analyzers for reliability of the measured values. Two different methods of measurement 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.

Method of measurement: Reference sample method

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

Method of measurement: 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 ASM and compared with the analyzer’s measured values. With this method, the analyzer need not be disconnected from the process gas, and permanently remains available for the process measurement.

Evaluation based on ASTM D3764

Based on the international standard ASTM D3764, 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 defined that a single violation of the limit can be tolerated, but that repeated violation is an impermissible condition.

Technical specifications

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Windows for Client 7</th>
<th>Windows 2008 Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC hardware requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor type (recommended)</td>
<td>Server: dual core, 3 GHz</td>
<td></td>
</tr>
<tr>
<td>RAM (recommended)</td>
<td>Client: Client: dual core, 2 GHz</td>
<td></td>
</tr>
<tr>
<td>Graphics card (recommended)</td>
<td>Server: 4 GB</td>
<td></td>
</tr>
<tr>
<td>Hard disk (recommended)</td>
<td>Client: 2 GB</td>
<td></td>
</tr>
<tr>
<td>Hard disk (free space for installation, recommended)</td>
<td>Server: 32 MB, 1280 x 1024</td>
<td></td>
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<tr>
<td>DVD-ROM/USB interface</td>
<td>Server: 2 x 160 GB (Raid 1)</td>
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<td></td>
<td>Client: 80 GB</td>
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<tr>
<td></td>
<td>Server: &gt; 40 GB</td>
<td></td>
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<tr>
<td></td>
<td>Client: &gt; 1.5 GB</td>
<td></td>
</tr>
<tr>
<td>1) Hardware requirement when using Microsoft Windows 7 For software installation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Selection and ordering data

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

View of the validation module