Economical Automation with Standard Software

Process Management System
Cross topics from FAQ’s

▪ Contacts?
  ▪ Phone: +49 (621) 456 3269 / 4186
  ▪ E-Mail: WinCCAddon.automation@siemens.com
  ▪ Intranet: http://intranet.siemens.de/cocwincc
  ▪ Internet German: www.siemens.de/process-management
  ▪ Internet Englisch: www.siemens.com/process-management

▪ Downloads?
  All current product installation media can be downloaded as .iso files from the intranet

▪ Samples?
  ▪ All products have functional sample projects that can installed from the installation media

▪ Hotline?
  ▪ Worldwide support via SIMATIC hotline (cases will be forwarded to us)
  ▪ Free support hotline from 9AM-5PM (CET) WinCCAddon.automation@siemens.com +49 (621) 456 3269
Overall structure of the PM-Products

PM-CONTROL
- Setpoints, Planning values
- Process values, Calculation results, Archive values

PM-QUALITY
- Alarms, Shiftplanning
- Process values, Calculated values, Archive values for Operating cycle and operating hours counters

PM-MAINT
- Planned dates, Remaining operating cycles/operating hours

PM-ANALYZE
- Alarm archives

PM-Server

Embedded Batch Archive
- Runtime database
- Short term archive
- Export databases
- Long term archive

Embedded Batchtrends
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Embedded Batchreports
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Standalone Batchtrends+reports
- Client on office PC
- Excel Reports

Central recipe and job management
- Recipe database
- Job control

Embedded recipe management
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Embedded Job management
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Standalone Recipe + Jobmgmt.
- Clients on office PC

Central recipe and job management
- Recipe database
- Job control

Embedded recipe management
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Embedded Job management
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Standalone Recipe + Jobmgmt.
- Clients on office PC

Performance based maintenance mgmt.
- Maintenance planning
- Operation cycles
- Operating hours
- Calendar
- Clients on office PC via TCP+HTTP

Embedded requestmgmt.
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Performance based maintenance mgmt.
- Maintenance planning
- Operation cycles
- Operating hours
- Calendar
- Clients on office PC via TCP+HTTP

Embedded requestmgmt.
- WinCC
- WinCC RT Prof./Adv.
- WinCC flexible Adv.
- PCS 7

Performance based maintenance mgmt.
- Maintenance planning
- Operation cycles
- Operating hours
- Calendar
- Clients on office PC via TCP+HTTP

Standalone recipe + job mgmt.
- Clients on office PC

Process values, Calculated values, Archive values for Operating cycle and operating hours counters

Central alarm archive
- Time correct archiving of alarms from different sources (interleaving)
- Multiple archives
- Central Audit Trail
- Alarms

Alarm analysis
- Frequency analysis
- Occurrence per interval
- Duration
- Flickering analysis
- Clients on office PC

OPC UA **
- Data Access Profile
- WinCC V13 Advanced, Comfort
- …
- SIMATIC Net OPC
- …

OPC DA
- WinCC V11/V12/V13 RT Advanced, Comfort
- WinCC flexible (MP’s+PC)
- Windows EventLog
- Smart Server WebSite

PM-AGENT
- Tags, Alarme, User
- WinCC 6.2, 7.0, 7.2, 7.3*
- PCS 7 8.0, 8.0SP1, 8.1*

PM-AGENT
- Tags, Alarme, User
- TIA V11/V12/V13* RT Prof.

PM-AGENT
- Tags, Alarme, User
- TIA V11/V12/V13* RT Prof.

© Siemens AG 2014 All rights reserved.

* Starting with PM-CONTROL V10.8, PM-QUALITY V9.8, PM-MAINT V9.8, PM-ANALYZE V7.8
** Starting with PM-CONTROL V11, PM-QUALITY V10, PM-MAINT V10, PM-ANALYZE V8
Standard products - The key to success

- PM-CONTROL (Recipe management and order processing)
- PM-QUALITY (Batch reporting and long term archiving)
- PM-MAINT (Performance based maintenance management)
- PM-ANALYZE (Alarm analysis)
- PM-OPEN EXPORT (Export of process data into text files)
- PM-OPEN IMPORT (Import of process data from text files)
- PM-OPEN TCP/IP (TCP based communication)
- Historian CONNECT ALARM (Connectivity with SIMATIC IT)
- PM-OPEN HOST/S (Connectivity with SAP® R/3®)
- PM-OPEN PI (Connectivity with OSIsoft® PI)
- PM-LANGUAGE
- Universal PM-Package
Recipe management and order processing

PM-CONTROL
Premium Add-on PM-CONTROL

- Management of recipe data, parameter sets, production settings
- Target system independent recipes
- Planning and execution of production orders
- Scalable from simple up to complex plant topologies
- Flexible parameter control
- Used in production of various industry branches (Pharmaceutical, chemical, food and beverage, machine builders...)
- Configurable in multiple languages
Premium Add-on PM-CONTROL

• Available editions:
  • **Compact** (max. 50 production units without order scheduling)
  • **Standard** (one production unit with order scheduling)
  • **Professional** (max. 50 production units with order scheduling)
Premium Add-on PM-CONTROL

- **Definition production unit**

  A production unit is that part of the plant where at one point in time exactly one batch is produced.  
  If a plant consists of multiple production units, they can be operated either **in parallel/independent** or **linked**.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Compact and Professional</th>
<th>Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production unit 1</td>
<td>Production unit 2</td>
<td>Production unit 1</td>
</tr>
<tr>
<td>Production unit n</td>
<td>Production unit n</td>
<td>Production unit 2</td>
</tr>
<tr>
<td>Production unit n</td>
<td>Production unit n</td>
<td>Production unit 3</td>
</tr>
<tr>
<td><strong>Set points</strong></td>
<td><strong>Set points</strong></td>
<td><strong>Set points</strong></td>
</tr>
<tr>
<td><strong>Batch 1</strong></td>
<td><strong>Batch 1</strong></td>
<td><strong>Set points PU1</strong></td>
</tr>
<tr>
<td><strong>Batch 2</strong></td>
<td><strong>Batch 2</strong></td>
<td><strong>Set points PU2</strong></td>
</tr>
<tr>
<td><strong>Batch n</strong></td>
<td><strong>Batch n</strong></td>
<td><strong>Set points PU3</strong></td>
</tr>
<tr>
<td><strong>Independent PU's operate in parallel</strong></td>
<td><strong>Material flow</strong></td>
<td><strong>Linked PU's operate as a plant section</strong></td>
</tr>
</tbody>
</table>

Produced product batch

© Siemens AG 2014 All rights reserved.
Premium Add-on PM-CONTROL

- The topology manager defines the plant structure.
- Recipes are created and managed in the recipe system.
- Production orders are created and scheduled in the order view.
Premium Add-on PM-CONTROL

Topology Manager
- Definition of plant specific properties
- Number and mode (independent /linked) of the production units
- Operation mode (With/Without batch splitting of orders)
- Order duration calculation
- FDA options
  - Audit trail
  - Electronic signature
  - Retention periods
- Permission settings for all recipe and order relevant modifications (create, modify, delete, export, etc.)
- Integration into SIMATIC Logon
- Definition of parameters and their connection to WinCC tags
  (Parameter types: Analog, Digital (Bit field), Binary, Text, Block)
- Arbitrary parameter groups possible
- Handshake tag definition for PLC communication
- Central engineering library (PM-LIBRARY)
Premium Add-on PM-CONTROL

Recipe system

- Management of recipe data, parameter sets, production set points
- Assignment to the production units where the recipe can be produced
- Definition and checking of the parameter values
  - Grouping, Default value, Scaling, Limits, Editing policy
  - Material assignment
  - Complex parameter value calculations (VB.Net)
- Checking of validation rules upon recipe modification
- Import, export and documentation of recipes
- Extensive FDA support functionality
  - Electronic signature to release changes for production
  - Display and export of the audit trail
  - Management of recipe retention periods
  - Labels and rollback
- Separate application or embedded as ActiveX Control in WinCC, WinCC flexible PC Runtime, WinCC Professional / Advanced (TIA Portal)
Recipe to production unit assignment

**Yeast dough**
- Flour: 900g
- Eggs: 3
- Salt: 20g (for 1000g)

**Flour**
- Analog Mixer2_Flour

**Eggs**
- Analog Mixer2_Eggs

**Salt**
- Analog Mixer2_Salt

**Parameter definitions from Topology**

**Mixer 1**
- Flour: 1800g
- Eggs: 6
- Salt: 40g

**Mixer 2**
- Flour: 2700g
- Eggs: 9
- Salt: 60g

**Recipes**

<table>
<thead>
<tr>
<th>No.</th>
<th>Qty.</th>
<th>Recipe</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>2000g</td>
<td>Yeast dough</td>
<td>Mixer 1</td>
</tr>
<tr>
<td>A2</td>
<td>3000g</td>
<td>Yeast dough</td>
<td>Mixer 2</td>
</tr>
</tbody>
</table>

**Orders**

- **Mixer 1**
  - Flour: 1800g
  - Eggs: 6
  - Salt: 40g

- **Mixer 2**
  - Flour: 2700g
  - Eggs: 9
  - Salt: 60g

**PLC-Tags**

- **Mixer1_Flour**: 1800
- **Mixer1_Eggs**: 6
- **Mixer1_Salt**: 40
- **Mixer2_Flour**: 2700
- **Mixer2_Eggs**: 9
- **Mixer2_Salt**: 60

**PM-CONTROL**
Job view (only in the standard and professional edition)

- Interactive order disposition with wizard support
  - What (Which recipe)?
  - Where (On which production unit)?
  - How much (Production quantity)?
  - When (Sequence of the production orders)?
- Automatic order disposition via API
- Order processing sequentially or by request of specific order id
- Order overview in scheduling chart with all production orders on all production units
- Manual or automatic parameter loading
- Extensive FDA support functions
  - Electronic signature to release changes to production
  - Display and export of the audit trail
  - Management of order retention periods
- Separate application or embedded as ActiveX Control in WinCC, WinCC flexible PC Runtime, WinCC Professional / Advanced (TIA-Portal)
Premium Add-on PM-CONTROL

Function principal of Compact edition

Request Recipe via WinCC Tag: Recipe name Yeast dough on Mixer 1

Enter parameter values into corresponding WinCC Tags

Search Yeast dough for Mixer 1

Function principal of Standard / Professional editions

Request Order via WinCC Tag: Next scheduled on Mixer 1

Enter scaled parameter values into corresponding WinCC Tags

Search next order for Mixer 1

Recipes

Manual or script controlled order creation

The order contains:
What (Yeast dough), How much (2700 Kg), Where (Mixer1), When (Sequence)
How (Recipe set points scaled to order qty.)

Planned Orders

No. Qty Recipe Location
A1 1500kg Biscuit Mixer 1
A2 1500kg Yeast dough Mixer 1
A3 800kg Short crust Mixer 1
A4 1500kg Yeast dough Mixer 1
A5 1800kg Biscuit Mixer 1

No. Qty Recipe Location
B1 1000kg Biscuit Mixer 1
B2 1000kg Yeast dough Mixer 1
B3 1000kg Biscuit Mixer 1

Recipes

Short crust
Flour: 1000g
Eggs: 3
Salt: 20g

Yeast dough
Flour: 1000g
Eggs: 3
Salt: 20g

Biscuit
Flour: 1000g
Eggs: 3
Salt: 20g
Premium Add-on PM-CONTROL

Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest product information sheet.
Batch based archiving and reporting

PM-QUALITY
Premium Add-on PM-QUALITY

- Batch based data recording from various different sources for
  - Batch trends
  - Alarm messages / audit trail
  - Event triggered readings (snapshots)
  - Manual input values (lab results)
- Display of current and historical trends in one diagram
- Comfortable creation of multiple report layouts for displaying recorded batch data
- Long term archiving
- Scalable from simple up to complex plant topologies
- Successfully implemented in various different industries (Pharmaceutical, chemical, food and beverage, etc...)
**Premium Add-on PM-QUALITY**

- **Definition production unit**

  A production unit is that part of the plant where at one point in time exactly one batch is produced.
  - If a plant consists of multiple production units, they can be operated either in parallel/independent or linked.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Professional</th>
<th>Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production unit 1</td>
<td>Production unit 2</td>
<td>Production unit n</td>
</tr>
<tr>
<td>![Set points](Batch 1)</td>
<td>![Set points](Batch 1)</td>
<td>![Set points](Batch 1)</td>
</tr>
<tr>
<td>![Set points](Batch 2)</td>
<td>![Set points](Batch 2)</td>
<td>![Set points](Batch 2)</td>
</tr>
<tr>
<td>![Set points](Batch n)</td>
<td>![Set points](Batch n)</td>
<td>![Set points](Batch n)</td>
</tr>
<tr>
<td><strong>Independent PU’s operate in parallel</strong></td>
<td><strong>Linked PU’s operate as a plant section</strong></td>
<td><strong>Product set points</strong></td>
</tr>
</tbody>
</table>

**Material flow**

- **Produced product batch**
  - PU1-Batch
  - PU2-Batch
  - PU3-Batch
Characteristics of batch based archiving

- All data recorded is stored under the name of the corresponding batch.
- The acquisition time frame is defined by a start/stop bit.
Batch trends

- Display of batch trends by specifying the batch name
- Display of state transitions within the trend
- Display of alarms within the trend
- Display of event triggered readings (snap shots)
- Persistent annotations within the trend display
- Event list with chronological view of all recorded phases, snap shots, alarms, annotations
- Calculation of statistical metrics like min, max, average, variance, standard deviation, integral
- Axis dependent grid display, zoom, tool tips with measurement details
- Axis and connected curves freely moveable
- Free curve to axis assignment
- Display of F(t) and F(x) trends
- Comparison of trends from different batches
- Number of displayable trends only limited by system resources
Alarms

- Archiving of all alarms that occurred during the batch runtime
- Alarm acquisition and acknowledgement is done by one of the SIMATIC HMI Systems like
  - WinCC / PCS7
  - WinCC flexible
  - WinCC Professional / Advanced (TIA Portal)
- The alarms are copied into the PM-QUALITY database
- Alarms coming from different SIMATIC HMI Systems can be combined into one archive displayed in the correct time sequence on the report
- Pre- and post batch timeframe overlaps for alarm acquisition configurable
Snap shots

- Event triggered recording of actual values and set points at e.g.
  - End of dosing (set point - vs. actual)
  - Transition from one process state to the next (e.g. dosing => heating)
- One time or multiple recording of measurement groups
  - During a currently running batch
  - Subsequent after processing of a batch has already finished (e.g. manual input, lab results)
- Arbitrary grouping of readings recorded by a trigger
- Output of recorded readings of a measurement group as tables on the report
**Calculated values**

- Graphical user interface for the definition of calculation algorithms
- Calculation of metrics like e.g. availability, utilization etc.
- Statistical values like standard deviation, integral etc.
- Open and extensible framework for custom extensions
- Calculation of results from multiple different sources
- Write back for calculated metrics to HMI's
- Buffering of source values in process value archives
- Buffering of alarms for statistical processing
Available calculation blocks/functions

- Simple arithmetic function: Add, Subtract, Multiply, Divide
- Bitwise binary functions: And, Or, Not, Shift left, Shift right
- Logical binary function: And, Or, Not, Comparison (<, =, >)
- Counters: Slope counter, Time counter, Difference counter
- Statistics: Average, Integral, Min, Max, Range, Time categorization
- Misc: Limit monitoring, constant number, constant text
- …
- Extensible framework with sample blocks for customer specific extensions
Calculation schema
The calculation schema defines the algorithm
- The schema has no external connections
- The schema defines the number and type of external connections

Calculation instance
The calculation instance connects the schema to the outside world
- Each instance has its own set of connections (e.g. tags)
- Each instance has its own set of trigger conditions
Calculation results
The calculation schema may define multiple outputs
• Depending on the used calculation block
• E.g. The statistics block produces Min, Max, Average, Integral,…
• In order to be available in an instance, the output of a calculation is connected to a “pin”

A calculation schema can contain multiple calculation blocks that are connected via Drag and Drop
• Calculation results create new tags that can be used as:
  • Inputs for batch reports (curves and snap shots)
  • Write back source to display the information in WinCC
  • Inputs for higher level calculations
Calculated triggering

• Calculations can be triggered by:
  • Change of input value
  • Schedules
    • Static schedules
      (⇒ Hourly, daily, weekly, monthly, yearly)
    • Dynamic schedules (triggered by start-/stop- signal)
    • Shift schedules with graphical user interface
  • Calculation of metrics over schedule timeframes (e.g. daily utilization etc.)
  • Reporting and archiving over schedules
    (⇒ daily-, weekly-, monthly reports)
### Shift schedules

- Shift schedule consist of shift definitions
- Shift definitions specify a repetitive pattern that is displayed in a calendar view
- Exceptions from the default planning (e.g. like a holiday shutdown) can easily be defined as overrides for specific ranges.
Archiving strategy

- After release (configurable policy as either manual or automatic) the batch is ready to get exported.
- During the export the batch can be locked against further modifications.
Premium Add-on PM-QUALITY

Topology
The topology editor defines plant structure and data acquisition.

Report editor
The report editor is used to create the various report layouts.

Data view
The data view gives instant access to archived data.
Premium Add-on PM-QUALITY

Topology Manager

- Definition of all plant related properties
  - Number and operating mode (independent/linked) of the production units
  - Definition of the archiving strategy
    - Number of batches in the cyclic runtime database
    - Export paths for the long term archives
  - Permission assignment for all relevant actions (e.g. view report, print report, export batch data, configure trends etc.)
  - Transfer of permissions into long term archive (optional)
- Integration into SIMATIC Logon
- Definition of the tags used for the PLC handshake
- Central engineering library (PM-LIBRARY)
Premium Add-on PM-QUALITY

Report editor

• Creation of report layouts for production units (independent) and plant parts (linked)
• Embedding of all recorded batch data by drag & drop
  • Batch trends
  • Alarms
  • Snap shots and manual inputs
• Integrated report preview with live data
• Processing of recorded data within the report (sum, average, min, max etc.)
• Calculation of metrics by using Visual Basic Script
• Barcodes on the report
• Multi column report layouts
• Reusable report variables for simplified table display
• Creation of reusable sub layouts
• Appealing and consistent designs through the use of style sheets
Premium Add-on PM-QUALITY

Data view (PM-QUALITY Client)

- Provides access to
  - Exported long term archives and
  - The runtime database
- No explicit restore of data from long term archives required
- Output of all recorded batch data as trends or as reports
- Observance of permissions set during configuration (optional)
- Installation on office PC's (no WinCC installation required)
Premium Add-on PM-QUALITY

Excel reporting
- Plug-in for Excel 2007+2010
- Batch reports
  - Access to
    - Batch header information(=> batch name, order name, production unit, etc.)
    - Phases
    - Trend data (including aggregations like sum, min, max, average over freely definable sub intervals)
  - Snap shot values
  - Alarms
- Analysis of batch data over freely configurable time frames (i.e. analysis over multiple batches)
Data center (redundancy option)

- Improvement of data integrity and availability with the option data center
- High data availability is achieved by parallel recording of batches on two servers.
- The data center consolidates the recordings of both sources archives into a separate consistent database from where the reports are generated.
Premium Add-on PM-QUALITY

Installation scenarios

- WinCC Single station
- PM-QUALITY Server
  
- PM-QUALITY Client (Without WinCC)

- WinCC Server
  
- PM-QUALITY Client (With WinCC Client)

- Multi user system

- WinCC Server
  
- PM-QUALITY Client (With/Without WinCC Client)

- PM-QUALITY Server (Without WinCC)

- Distributed System

- WinCC flexible OPC DA

For released SIMATIC WinCC and operating systems please refer to the latest product information sheet.
Performance based maintenance management

PM-MAINT
Premium Add-on PM-MAINT

- Industry-and technology neutral maintenance management system
- Designed for close to production operation
- Performance-, calendar- and event based maintenance by utilization of
  - Operating hour counters
  - Operation cycle counters
  - Process signals
- Tracking and documentation of repairs
- Shop floor integration
  - Repair request from HMI screens
  - Write back functions for maintenance information into tags
Premium Add-on PM-MAINT

Highlights

• Industry-and technology neutral maintenance management system
• Designed for close to production operation
• Calendar-, performance- and event based maintenance by utilization of
  • Operating hour counters
  • Operation cycle counters
  • Process signals

![Diagram showing Planned order, Interval data, Interval counter, Recommended date, Runtime, Cycles, Calendar, Process signal, Operation cycles, Operating hours, Process signals, Maintenance order, and Manual.](image-url)
Characteristics

- Automatic calculation of the recommended maintenance dates under consideration of the utilization
- Optimum resource planning by notification prior to order due date
- Clear display of planned orders, notifications and active orders with comfortable selection and filtering functions
- Write back capability for maintenance metrics into HMI tags
- Multiple order feedbacks with recording of
  - Feedback data (e.g. object state, type of performed action)
  - Cost and time input for personal
  - Cost and used quantities for material
- Central material list for required maintenance material and tools
- Linking of Documents (graphs, photos, data sheets etc.) to plant objects and planned orders
- Manual orders for unplanned activities (repairs)
- Long term archive for all maintenance activities
- Excel Plug-in for comfortable mass data import (Excel 2007+2010)
Project hierarchy
Objects and attached planned orders are created in a hierarchical structure

Properties of the plant object
- Who is responsible for the object?
- State
- Cost center
- Manufacturer information
- Vendor information
- Operating cycles counter
- Operating hours counter
- Documents
- …

Properties of the planned order
- Interval
  - Time, operating hours, operating cycles
- Activities
  - What needs to be done?
- Required employee resources
  - Qualification?
  - Cost?
- Required material resources
  - Which material in which quantity?
  - Cost?
- Documents
Plant objects and orders

Plant object

- Multiple planned orders can be attached to each plant object

Feedback Time+ Material

- Emergency repairs can be directly recorded on the plant object
- Planned measures are tracked on the order

Order

- Multiple orders are generated from the planned order
  - Automatically (Interval)
  - Manually
  - From request
  - From Process signal
- Presets copied from planning
- A repair order can be created manually at any time
  - Manually
  - From request
  - No presets

Central processing element is the maintenance order
Life cycle of maintenance orders

Orders are generated from panned orders

- Automatically (Interval)
- Manually
- From request
- From Process signal

Presets copied from planning

- A repair order can be created manually at any time
- Manually
- From request
- No presets

Orders are generated from panned orders:

1. Created
   - Redraft

2. Planned
   - Start work or apply feedback
   - Set planned date manually or automatically is configurable

3. Work started
   - Apply feedback
   - Finish work

4. Work finished
   - Finish work
   - Restart work

5. Complete
   - Complete
   - Delete

6. Deleted
Premium Add-on PM-MAINT

Planned orders

- The up to date maintenance information is displayed for all planned orders
  - Interval
  - Operating cycles counter / Operating hours counter
  - Last maintenance date
  - Next maintenance date
  - Remaining number of operating cycles / operating hours until the next scheduled maintenance
Feedback

- Multiple order feedbacks can be applied until work finished state is reached
- Entry form for
  - Feedback date
  - Feedback and weak point code
  - Object state
  - Performed activities
  - Comments
  - Employee cost
  - Material cost
Documents

- Each object, planned order or order can be linked to an arbitrary number of documents
  - Characteristics curve
  - Photos
  - Data sheets
  - Descriptions
Premium Add-on PM-MAINT

Materials

- All maintenance relevant material is managed and displayed in the material list
- Comfortable filtering and sorting functions
Premium Add-on PM-MAINT

Repair requests

• ActiveX Control for the entry and the tracking of repair request by the operating personal
• Integratable into local HMI screens
  • WinCC / PCS7
  • WinCC flexible (PC based Runtime)
  • WinCC Professional / Advanced (TIA Portal)
Premium Add-on PM-MAINT

Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest product information sheet.
Analysis of process alarms

PM-ANALYZE
Premium Add-on PM-ANALYZE

- Archiving, display and analysis of alarms from multiple different systems in the correct time sequence (e.g. SIMATIC WinCC, PCS7, WinCC flexible, WinCC Professional / Advanced (TIA Portal), Event log of the operating system)

- Statistical analysis
  - Frequency analysis – Count of alarms by frequency in analyzed time interval
  - Volume analysis – Count of alarms in a timeframe that is split into multiple sub intervals
  - Flickering analysis – Identification of alarms that are occurring in bursts
  - Data interface directly to Microsoft Excel
Premium Add-on PM-ANALYZE

Online alarm view from alarm archive

- Alarm archives in PM-SERVER = Alarm basis for viewing and analyzing
- Display of alarms from different SIMATIC HMI systems in correct time sequence
- Automatic update of alarm view (default every 30s)
- Integrated quick search function
Displaying and analyzing alarms from multiple sources

<table>
<thead>
<tr>
<th>System columns (Alarm identifier)</th>
<th>User columns (configurable/WinCC Import)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station</td>
<td>Number</td>
</tr>
<tr>
<td>Flexible</td>
<td>100</td>
</tr>
<tr>
<td>Flexible</td>
<td>101</td>
</tr>
</tbody>
</table>
Premium Add-on PM-ANALYZE

Filter settings
- Filtering with absolute or relative time frames
- Individual filter sets for each archive
  - Simples filtering for alarm block content
  - Complex hierarchical filters with multiple columns as criterions
  - Automatic calculation of possible filter values based on archived data

Filter library
- Management of configured filters
  - Individually for the logged in user
  - Globally for all users
  - Combinations of multiple filters possible
  - Definition of user specific default filters
Premium Add-on PM-ANALYZE

Statistical analysis – Frequency analysis

• Calculation of the most frequent alarms in the selected time frame
• Grouping functionality
  • Ordering of analysis result by arbitrary alarm columns e.g.
    • Alarm source (technological Top x analysis)
    • Alarm number (classical top x analysis)
    • ...
  • Also over multiple columns
• Ranking according to relevance (i.e. count)
Statistical analysis – Volume analysis

- Analysis of all alarms in a given time frame that is split into several sub intervals
  - Available interval settings are hour, day, week, month, year
    (e.g. a complete month split into individual days)
- Grouping functions
  - Ordering of analysis results by column content (e.g. source)
- Optional filling of empty intervals for optimized pivot display in Microsoft Excel
Premium Add-on PM-ANALYZE

Statistical analysis – Flickering analysis

- Identification of possible flicker alarms (bursts), that occur with a high frequency sporadically in short timeframes
- Configurable threshold
- Analysis of alarm archive in configurable time range
Premium Add-on PM-ANALYZE

Installation scenarios

For released SIMATIC WinCC and operating systems please refer to the latest product information sheet.
Export of process and archive data

PM-OPEN EXPORT
Premium Add-on PM-OPEN EXPORT

- Export of process- and archive data into text files
- Flexible, individual design of target file format
- Export to arbitrary storage media (local / network)
- Dynamic generation of file names
- Flexible and cost-effective solution
- Used in production of various industry branches (Pharmaceutical, chemical, food and beverage, machine builders...)
- Integration support for WinCC 6.2+7.0 and PCS7 7.1
Premium Add-on PM-OPEN EXPORT

Functional scope

• Export of
  • External and internal WinCC-tag values
  • Data from process value archives
  • Data from user archives
  • Data from alarm archive and the current alarm list

• Exports may be triggered
  • Cyclically
  • Time based
  • Event based
Premium Add-on PM-OPEN EXPORT

Configuration
The configuration editor is used to define the export jobs.

WinCC
The runtime module is activated from the WinCC startup list.

Runtime
The runtime exports the configured process data.
Premium Add-on PM-OPEN EXPORT

Export jobs

- Exports jobs are defined in a configuration file

- The file contains the following definitions:
  - Which data shall be exported
  - When shall the export be done
  - How shall the export file be handled
  - To which destination shall the data be transferred

- The configuration file is editable with
  - The integrated configuration editor
  - The Excel (2003/2007) macros that are delivered with the product
  - or any other text editor
Importing of process data

PM-OPEN IMPORT
Premium Add-on PM-OPEN IMPORT

- Data import from WinCC flexible for centralized long term archiving in WinCC
  - Archive tags (data logs)
  - Alarms (alarm logs)
  - Operator input (Audit-Trail)
- Original alarm time stamp is preserved
- Automatic data import
- Flexible and cost-effective solution
- Used in production of various industry branches (Pharmaceutical, chemical, food and beverage, machine builders...)
- Integration support for WinCC 6.2+7.0 and PCS7 7.1
Premium Add-on PM-OPEN IMPORT

Function principal

- Display and analysis with standard WinCC features
- Export of alarms from multiple panels by panel specific alarm number offset
  - WinCC flexible
  - WinCC Advanced (TIA Portal)
  - WinCC Comfort (TIA Portal)
- Cyclical export as .csv file
- WinCC / WinCC Professional PM-OPEN IMPORT
- Audit Trail
- Alarm Archives

Export of alarms from multiple panels by panel specific alarm number offset
Premium Add-on PM-OPEN IMPORT

Data is exported by a VB Script included in the product.

PM-OPEN IMPORT assigns the files to WinCC archives.

Display and analysis is done with standard WinCC functionality.
Online computer link via TCP

PM-OPEN TCP/IP
Premium Add-on PM-OPEN TCP/IP

- Flexible and cost-effective online computer link to connect computer systems to the process-control and automation level
- Exchange of tags and alarms between WinCC and one or more peer computers
- Supports data exchange between different WinCC versions
- Link to Office World via Visual Basic for Applications
- Can be used with redundant WinCC/PCS7 servers
Premium Add-on PM-OPEN TCP/IP

WinCC Tags

- Tags are sent from PM-OPEN TCP/IP to peer computers
  - Cyclically
  - Upon change

- Data received from peer computers is written into WinCC tags
  - Process tags
  - Internal tags
Premium Add-on PM-OPEN TCP/IP

Alarms

- Alarms are sent from PM-OPEN TCP/IP to peer computers
  - Comfortable alarm filtering can be applied
- Alarms are generated in the WinCC alarm logging upon reception of alarm telegrams from e.g. supervisory computer systems
  - The time stamp from the original source is preserved
Premium Add-on PM-OPEN TCP/IP

Dialup networking

• Automatic connection and disconnection to/from the peer via dialup networking

• Modem
• ISDN
Premium Add-on PM-OPEN TCP/IP

Telegram Templates

- Telegrams may be sent in a user-defined structure from WinCC to other computer systems

- Content
  - Tags
  - Alarms
Premium Add-on PM-OPEN TCP/IP

Visual Basic for Applications

Possibilities

• Macro programming like in MS Office
• Access to WinCC data via PM-OPEN TCP/IP object model
• Event scripts for tag changes in WinCC
• Event scripts for alarms in WinCC
• Cyclical script execution
• Establish dialup connections via script
• Access to Office applications through automation interfaces
• Integrated debugger

VBA Examples

• Cyclical or event based transfer of quality data into an excel report
• Automatic creation of reports with Microsoft Word or Microsoft EXCEL
• ASCII-Files import into WinCC
• Database connectivity interfaces e.g. Access, Oracle etc.
• Sending of relevant production alarms via E-Mail to responsible employees
Connectivity with SIMATIC IT Historian

Historian CONNECT ALARM
Historian CONNECT ALARM

- Import of alarms into the SIMATIC IT Historian
  - from WinCC
    - support for multiple different WinCC versions
    - supports redundant WinCC Server pairs
  - from WinCC flexible
    - Alarm archive
    - Audit Trails
  - from other sources
    - File import
    - TCP/IP network printer interface
Installation scenarios

- WinCC / PCS7 Server PM-AGENT
- Redundant WinCC / PCS7 Server pair PM-AGENT
- SIMATIC IT Historian
- Historian Connect Alarm
- Connection of network printer
- WinCC flexible Archives

In the case of a connection breakdown, the agents are able to data buffer the alarms locally.
Bidirectional Connectivity with SAP® R/3®

PM-OPEN HOST/S
Premium Add-on PM-OPEN HOST/S

- PM-OPEN HOST/S provides services for easy to use communication scenarios connecting the controls level to SAP® R/3®.
- This allows the realization of fast and cost-effective vertical system integration solutions.
Connectivity Tools for SAP® R/3®

- PM-OPEN HOST/S includes connectivity tools to provide data from the control level for different scenarios and business processes in SAP R/3.
  - The current version includes two connectivity tool sets:
    - The R/3 System Connectivity Tool for flexible and module independent communications with the base SAP/R3 system.
    - The R/3 PM Connectivity Tool for the communication with the SAP/R3 maintenance module.
- Process connection via WinCC provides access to SIMATIC and other PLC systems.
  - OPC is also supported
- Connection to SAP R/3 via Data Dictionary Objects
  - Shipped with PM-OPEN HOST/S in transport files
R/3 System Connectivity Tool

• R/3 System Connectivity Tool for a flexible, module independent communication with the SAP/R3 base system.
• Supports different scenarios in the communication between PLC/WinCC and SAP/R3
• Examples:
  • Transfer of production jobs from the SAP R/3 modules PP and PP-PI to the PLC.
  • Transfer of production data (e.g. produces and consumed amounts of material) from the PLC to the SAP R/3 module MM
  • Transfer of machine data, primarily machine states, from the PLC to the SAP R/3 module CS
R/3 PM Connectivity Tool

• R/3 PM Connectivity Tool for the communication with the maintenance module of SAP/R3.
• Uses the SAP standard interface PM-PCS and implements the SAP scenario “Transfer of values and counters”.
• Counters, like operating hours or operating cycles, can be transferred cyclically or event-triggered to SAP R/3.
  In SAP R/3 this data is stored in measurement points which are connected to equipments or technical locations.
• With this information from the control level, performance controlled maintenance plans can be implemented in SAP R/3 PM.
R/3 PM Connectivity with notification module

• The Notification Module is used to transfer and create notifications in the Maintenance Processing of SAP/R3.
• The operator of the process visualization system can initiate a Malfunction Report for SAP/R3. This can be done alternatively direct or with the intermediate step via operator dialog.
• An SAP/R3 standard interface is used for the transfer. There are no additional components or program parts necessary in the SAP-System.
• The Notification Module can be used separately or additionally to the transfer of operating hours or operating cycles.
• The following data is used in the transfer: notification date and time, operator, function location, damage (group and code), damage text
Premium Add-on PM-OPEN HOST/S

PM-OPEN HOST/S system software

• PM-OPEN HOST/S configuration
• Configuration editor
• Transfer jobs can be easily created within the graphical user interface
• The transfer jobs describe which WinCC Tags have to be transferred at which times to SAP R/3
Premium Add-on PM-OPEN HOST/S

PM-OPEN HOST/S system software

- PM-OPEN HOST/S Application Server
- Runtime component
- Processes the bi-directional transfer jobs between WinCC and SAP R/3
- The application server runs as background task and has no user interface except for presenting diagnostic information to the user
Premium Add-on PM-OPEN HOST/S

Function principle
Bidirectional Connectivity with OSIsoft® PI

PM-OPEN PI
PM-OPEN PI allows a flexible and rapidly configurable link from the automation systems to the PI-Plant Information System.

The software product PI-Plant Information System™, produced by OSI Software Inc. CA, USA, is a universal plant information system for the display, evaluation and archiving of process data.

PM-OPEN PI can be fully integrated into the powerful Siemens SCADA system SIMATIC WinCC.
Premium Add-on PM-OPEN PI

Function scope

• The process data from the automation systems is stored in WinCC tags and can be transmitted online to the PI system.
• In addition to these external WinCC tags, internal WinCC tags and messages (status) can be transmitted.
• Transmission can be carried out either cyclically, on a change of value, or with a trigger.
• Value changes in the PI archive can also be transmitted online to WinCC
• Scaling of tag values
• Conversion between different data types
Premium Add-on PM-OPEN PI

Function scope

• Transmission and evaluation of raw data tags
• Use of different tag names in WinCC and PI archive
• Time synchronization with PI server
• Time synchronization with lower-level process components
• Redundant and buffered operation
• Live beat functionality and online diagnostics
Translation tool for the system texts of the products

PM-LANGUAGE
PM-LANGUAGE

• Translation tool for the system texts of the products

• PM-CONTROL, PM-QUALITY, PM-ANALYZE, PM-MAINT, PM-OPEN

• Delivered standard languages:
  • English
  • German

• PM-LANGUAGE allows the creation of additional languages
  (including Unicode character sets, e.g. Chinese )

• Also useful for industry specific language variants
  • e.g. „Lot“ instead of „Batch“
System integrator package

Universal PM-Package
Universal PM-Package

• Package for system integrators

• PM-CONTROL, PM-QUALITY, PM-ANALYZE, PM-MAINT, PM-OPEN

• All product versions and variants available

• Update DVD
  • Includes up to date software
  • Orderable at any time

• License only valid for configuration-, test- and presentation purposes
Contact

Hans-Juergen Burath

WinCC Competence Center Mannheim RC-DE PD SO SOU PA1
Dynamostr. 4
68165 Mannheim
Phone: +49 (621) 456 4186
Fax: +49 (621) 456 3334
Mobile: +49 (172) 6219325
E-mail: hansjuergen.burath@siemens.com

siemens.com/process-management