



EVALUATION OF PRODUCTION DATA

Increasing **productivity** through transparency

To optimize processes and improve productivity, plant and process operators need full and targeted access to production data, alarms and KPIs. However, isolated systems and the extreme complexity of HMI solutions pose significant obstacles to achieving data transparency and accessibility. Enabling comprehensive evaluation of process data is key to reducing downtime, increasing availability, and ultimately, higher productivity. This document shows how plant and process operators benefit from consistent, uniform solutions for process data evaluation using typical use cases.

SIEMENS

Contents

Identifying optimization potential through data	3
Uncover hidden potential	4
Analysis of process data and alarms	5
Evaluation of entire plants	6
KPI-based evaluation	7
AI-Guided Operations	8
Electronic shift book	9
Hardware and software from a single source	10
Control and operate for discrete industries	11

INTRODUCTION

Identifying optimization potential through data

The ability to evaluate production data and alarms provides plant and process operators with the information they need to make informed decisions in today's increasingly complex manufacturing environment.

Addressing the challenges of a changing market

The manufacturing industry is facing significant challenges. Innovation, competition, and costs have always been key drivers for business. However, in recent years, the nature of these challenges has become increasingly disruptive, putting established processes for control and operation to the test:

- **Digital transformation**
Digitalization is dramatically increasing the variety of user interaction scenarios, the number of connected devices, and amounts of data. This also increases the complexity of efficiently handling different tasks independent of devices and systems.
- **Changes in labor market**
Across the world, manufacturing operations are faced with a shortage of skilled labor. Additionally, the control and operation of distributed systems require new skills within the workforce. To address these challenges, the industry needs solutions that are intuitive to operate and facilitate the onboarding of new staff.

- **Production efficiency**
A lack of transparency and tools for planning and order management makes it difficult to reduce unplanned downtimes and to optimize production processes. Homogeneous solutions for control and operation as well as efficient tools are a decisive lever to remove this obstacle.
- **Legal and market requirements**
Stricter legislation and new regulations require the manufacturing industry to increase the traceability and transparency of their operations, e.g., to demonstrate compliance with GMP requirements.

Identifying optimization potential through evaluation of production data

Production data and alarms can provide valuable insights that help address these challenges. A uniform, homogeneous solution for evaluating production data is key to optimizing processes, reducing downtime, and improving productivity, as demonstrated by, for example:

- Identifying optimization potential through the analysis of process data and alarms
- Evaluating entire plants to uncover optimization potential
- Using KPI-based evaluation of production data to identify improvements
- Preserving knowledge and information through electronic shift logs

With their advanced data integration and visualization capabilities, WinCC SCADA systems offer an ideal solution for addressing these use cases.

SYSTEMS

Uncover hidden potential

Leveraging SCADA systems helps uncover hidden potential by enabling efficient management and archiving growing data volumes while transforming them into meaningful information.

The key to increasing productivity

Digitalization creates new opportunities for making industrial processes more versatile, more individual, and more efficient. Key components for this are integrated concepts for production. WinCC SCADA systems offer solutions from data collection and analysis to business models and strategic decision-making. With them, users can extract valuable information from production data both in control room setups and cloud-based solutions.

Connecting data

WinCC SCADA systems integrate data from different subsystems and help create a unified and reliable database. They aggregate and centrally archive data while providing access to information anytime and anywhere.

As a result, they form the basis for reliable and efficient plant operation, consistent product quality, high availability, and optimal resource efficiency.

Combining knowledge

These systems support analyses for transforming data into useful information. They help analyze and evaluate production data efficiently and in a targeted manner, shorten downtimes, support root cause analysis and benchmarking.

Digitalizing business

They are also the ideal starting point for digitalization of operations. They provide a central gateway for vertical integration and enable preprocessing of data for optimized information transfer. Combined with state-of-the-art solutions such as virtualization and cloud-based analyses, this helps achieve higher productivity and efficiency.



SCADA systems connect information and data on the production floor and link operational technology and information technology.

USE CASE

Analysis of process data and alarms

To optimize processes and improve productivity, transparency in production and evaluation are essential. The foundation for achieving this is logging production data and alarms in a shared database.

Challenge

The analysis of process data and alarms in production environments is often confronted with legacy installations that consist of isolated systems and a high complexity of HMI solutions. Different areas or lines in plants have their own HMI and data archiving systems. There is no common database for processing data and alarms. Operators and service staff can't transform raw data into useful information or only with significant effort.

Solution

SCADA systems can help collect all process data and alarms in a single database that serves as the single point of information. For this purpose, solutions such as WinCC provide high-performance data archiving in an integrated SQL database. Moreover, features for trend and alarm control facilitate the analysis of process values, trends, and multilingual messages. Tools for trend and alarm analysis also enable the evaluation of runtime process data for statistical values such as lower and upper limit, maximum, minimum and average. Alarms can be filtered in hitlists to provide details on alarm frequency, alarm time or time to alarm acknowledgement.

Benefits

Users benefit from greater transparency, efficiency, and flexibility through easy access to process data and alarm as well as uniform interfaces for analysis and evaluation.



Transparency

- Direct visualization and evaluation of online or historical data, alarms as well as statistical evaluation in the user interface and reporting
- Tailored evaluation of online or historical process data depending on your personal demand (e.g., operator, supervisor, maintenance)



Efficiency

- Reduced training effort with comprehensive and powerful prebuilt components
- Easy user-defined data evaluation (e.g., sum, average, max, min, integral)
- Easy user-defined alarm evaluation (e.g., frequency and total or average alarm time for in/out/acknowledgement)



Flexibility

- Freely configurable alarm and trend views enable the reuse of results, for example through printing (hard copy) or exporting
- Easy definition of user-specific settings for data selection (e.g., by time-range) and data range (e.g., selection by column)

USE CASE

Evaluation of entire plants

Tools for collecting and analyzing alarm messages from the shop floor support users in identifying root causes of unnecessary downtime and improving production availability.

Challenge

The production environment is typically characterized by multiple distributed and heterogeneous systems that produce large numbers of alarms, notifications, and audit messages. This data is often stored and managed in siloed architectures and in differing data formats, which prevents the efficient analysis of these data on the plant level.

Solution

Tools such as the PM-ANALYZE Add-on for SIMATIC WinCC Unified or SIMATIC WinCC V8 can integrate data from various sources, including messages and trends, to provide a holistic view of the process. Intelligent mapping and filtering functions allow the creation of central alarm archives, containing data from various sources, while still retaining the correct time sequence required for analytics. Trends and alarms can be analyzed within the add-on as a standalone solution or with the integrated trend and alarm control in SIMATIC WinCC. The add-on supports the automatic generation of reports in Microsoft Excel for documentation or compliance with regulatory requirements. With its open and secure API architecture, PM-ANALYZE provides cost effective data consolidation and analytics platform on the OT level.

Benefits

Alarms and notifications can be collated in a single database without having to change the installed base or processes in the production environment. Users benefit from seamless data transparency as well as efficient and flexible analysis and reporting.



Transparency

- Immediate data access and visualization on the shop floor
- Integrated analysis capabilities help generate actionable information



Efficiency

- Reduced training effort with comprehensive and powerful prebuilt components
- Minimized implementation time
- State-of-the-art, secure IT integration



Flexibility

- Easy scalability enables adding new lines, systems, or units at any time
- Broad range of interfaces facilitate integration in heterogeneous production environments

USE CASE

KPI-based evaluation

KPIs are a proven metric to evaluate productivity on a comparable scale for all systems. Standardized KPIs for production elements support bottleneck identification and root cause analysis for deviations or fluctuations in plant and process productivity.

Challenge

One of the key challenges in KPI-based data evaluation is the real-time collection of data and information from different systems and sources. This data must be processed into meaningful and comparable metrics, which then need to be visualized and made available to staff—preferably via dashboards for easy access. KPI-based evaluation must also enable in-depth analysis to help identify the root causes of changes in KPIs, which, depending on the specific production environment, can be a challenging task.

Solution

WinCC SCADA systems provide dedicated functions that help users define and compile specific KPIs for their operations. Users can calculate KPIs for individual aggregates, machines, or production lines, evaluate KPIs such as overall equipment effectiveness (OEE), mean time between failure (MTBF) or Mean Time to Repair (MTTR) or specific metrics to reflect their productivity targets. KPIs can be combined with basic production information such as machine states, user operations and error messages to provide more insights. All results can be accessed anytime via both the SCADA system and via Web browser or dedicated dashboards. Standard controls for data representation present the data in a clear and user -friendly way.

Benefits

SCADA-based evaluation of KPIs is an efficient and flexible way to evaluate productivity in production environment. Users benefit from the capability to define their own KPIs as well as utilize standards KPIs, which enhances production transparency.



Transparency

- Production KPIs can be displayed where and when needed
- Convenient conversion of production data to actionable information
- Easy creation of KPIs for different levels of production systems from aggregates to lines or plants
- Easy combination with additional information such as user operation, error messages, or machine states provides added information



Efficiency

- Standard tools reduced training and configuration expenses significantly
- Efficient deep-dive evaluation thanks to direct access to online and historical production data
- Integration with SCADA solutions helps minimize time to market



Flexibility

- Easy customization of KPIs
- Flexible data evaluation depending on the specific user requirements and level of detail
- Flexible integration into heterogeneous productions
- Easy integration of new or additional plants or task thanks to scalable architecture

USE CASE

AI-Guided Operations

Immediate access to relevant plant information across real-time values, alarms, messages, historical trends, and system context. Clearer view of the current plant situation by combining related data into one understandable context. Operators can identify what changed, what matters, and where to focus next more quickly

Challenge

Plant data is often complex and spread across multiple sources, making it difficult to access, interpret, and use efficiently. Operators and engineers need quicker, simpler ways to find relevant information, understand process context, and act on real-time and historical data with confidence.

Solution

WinCC Unified and WinCC V8 provide the foundation for AI-guided operator assistance by making relevant plant information available in a structured and secure way. Open interfaces and MCP-based integration concepts allow AI agents to access runtime information, alarms, system data, and historical values in a structured, secure, and governed way. These technologies can be used to connect AI models with project context, real-time values, messages, alarms, and historical process data. This creates the basis for natural-language interaction, easier data exploration, faster reporting, and AI-supported assistance for operators and engineers in daily plant operation. The system can then provide a contextual overview and guide the operator to the most relevant information for troubleshooting, monitoring, shift preparation, or decision support.

Benefits

Operators gain faster access to relevant plant information and clearer support during daily operation. AI-guided operations help them understand situations quickly, reduce manual search effort, and take better-informed actions during monitoring, troubleshooting, and shift handover.



Transparency

- Immediate access to plant information with structured visibility across real-time data, historical values, alarms, and system context
- AI-driven analysis combines operational data and context to create a clearer and more consistent view



Efficiency

- Natural-language interaction helps operators find relevant plant information faster without switching between multiple views or systems
- AI-supported context enables faster interpretation of alarms and data, improving troubleshooting, shift preparation, and operational decision-making



Flexibility

- Operator assistance can be scaled and adapted across systems, assets, production lines, and operational scenarios
- Operators receive context-aware support wherever relevant plant information is available, independent of specific workflows

USE CASE

Electronic shift book

The handover of information from one shift to another is essential for smooth and efficient operation. Solutions for structured processing and handover of shift events help improve control and operation, maintenance and plant management.

Challenge

The main challenge for information transfer is that details on events must be available with minimal effort and presented in a targeted and secure way. For this purpose, operation and event data must be processed according to specific categories and combined into meaningful, human-readable reports.

Solution

State-of-the-art SCADA solutions such as the SIMATIC WinCC Add-On PM-ANALYZE provide an electronic shift book to collect and process event data. All relevant events are summarized in a report and can be filtered, sorted, and searched including the complete editing history. Priority and status tags ensure that the operators are aware of important events, which can also be assigned to objects in the plant hierarchy. Events can be assigned to a user group for further processing, for example, to trigger a maintenance action. All data can be accessed either directly in the SCADA system or via Web browser. Access is protected through the authorization in the SCADA system (rights and roles). For added flexibility, authorized applications can access the shift book data via export functions and a documented REST API.

Benefits

Plant management, operators and maintenance staff benefit from a smooth and comprehensive transfer of information between shifts. Recurring events or issues can be managed faster and more efficiently, leading to increased overall productivity.



Transparency

- Full transparency of all events that occur during operation
- Anytime, anywhere data availability improves the time to action and supports effective and efficient operation and maintenance



Productivity

- Seamless integration with HMI supports users in creating and editing events
- Easy access to past events and data supports users during troubleshooting and optimization



Integration

- Integrated security features and authorization of access protect OT and IT data
- Easy integration of events into reports supports transfer of information

SCADA SYSTEMS AND SOLUTIONS

Hardware and software from a single source

SIMATIC WinCC offers a perfectly aligned and future-proof basis for monitoring, controlling and continuously optimizing complex processes.

SIMATIC WinCC V8: The most established system

SIMATIC WinCC V8 SCADA software is an innovative, scalable process visualization system. Its powerful capabilities enable seamless monitoring and operation of automated processes across all industries. Advanced features such as IT/OT integration powered by OPC UA, REST APIs, and MQTT, along with certified cybersecurity in accordance with IEC 62443, ensure a secure investment for future requirements.

siemens.com/wincc-v8

SIMATIC WinCC Unified: One system, everywhere from Panel to Edge and PC-based HMI and SCADA solutions

The SIMATIC WinCC Unified system offers consistent visualization concepts for all platforms, open interfaces like OPC UA, Grahl and MQTT, a high level of openness for user-specific applications and a wide range of options for industry-specific requirements.

siemens.com/wincc-unified

PM Add-ons for SIMATIC WinCC:

Modular Process Management Functionalities

The proven WinCC Premium Add-ons for all SIMATIC WinCC systems offer a modularly expandable overall solution for the optimum interaction of processes in production, quality control, maintenance, and system integration.

siemens.com/wincc-pm-add-ons

SIMATIC IPC industrial computing portfolio: future-proof PC technology for industry

SIMATIC IPC products offer a flexible, innovative platform with long-term availability and industrial grade ruggedness and quality. Integrated diagnostics ensure optimum availability and reliability by enabling preventive maintenance. Users can choose from a wide range of configurations and expansion options to ideally suit their computing needs, including the latest processor generations for industrial applications and state-of-the-art technology integration through selected partners. SIMATIC IPCs come with up to 11 years of support after delivery for excellent long-term availability and compatibility.

siemens.com/ipc

Control and operate for discrete industries

To be able to make fast and targeted decisions, plant and process operators need comprehensive access to comprehensible data and information from machines, lines, and plants. The control and operate solutions for discrete industries from Siemens enable homogeneous visualization and operation from production to management and help users save time and boost productivity.

siemens.com/control-operate-discrete-industries

**Published by
Siemens AG**

Digital Industries
Factory Automation
P.O. Box 48 48
90026 Nuremberg
Germany

**For the U.S., published by
Siemens Industry Inc.**

100 Technology Drive
Alpharetta, GA 30005
United States

Article No. DIFA-B90394-00-7600
© Siemens 2026

Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products.

The requested performance features are binding only when they are expressly agreed upon in the concluded contract.