New Perspectives with SIMATIC PCS 7 Process Control System

SIMATIC PCS 7

Answers for industry.

SIEMENS
SIMATIC PCS 7 – more than just a process control system

With over 11 years in the marketplace and thousands of installations worldwide, the innovative SIMATIC PCS 7 has become a proven system for a wide variety of industries. The uniquely scalable architecture, powerful engineering tools and comprehensive asset management capabilities allow you to operate a plant more cost-effectively and efficiently over the entire life cycle, from design and engineering, installation and commissioning to operation, maintenance and modernization.

SIMATIC PCS 7 is more than just a distributed control system (DCS). It can take you beyond the limits of your current process automation system, for example, by helping you to integrate your electrical infrastructure directly into the DCS, or by using common hardware and engineering tools for process automation, discrete control (high-speed logic), process safety and batch.

SIMATIC PCS 7 can also address the complete automation of secondary, upstream and downstream processes, such as waste water treatment or the distribution of power to a production location. Because of this versatility and functionality, SIMATIC PCS 7 is a key component of our Totally Integrated Automation (TIA) solution.

With the release of Version 7.1, we continue to address the business issues that are critical to maintaining and building up your competitive advantage, such as increasing operational efficiency, reducing total cost of ownership (TCO), protecting your automation assets, increasing the availability of your plant, optimizing the performance of your process, supporting management of your safety life cycle, providing a path to modernize your existing installed systems, and minimizing engineering costs during the whole plant life cycle.

SIMATIC PCS 7 – Takes you beyond the limits – 7 paths to make your company more successful

• Minimizing the costs of the entire plant through integration of batch, route control, telecontrol, safety, IT security and plant asset management.
• Delivering higher performance with powerful features of the new Advanced Process Library (APL)
• Continuous technology Innovation increases operator efficiency, with the introduction of a modernized user interface as well as enhanced alarm and trend controls
• Maximizing system scalability from 100s of I/O points to more than 100,000 I/O points – from laboratories up to large multi-unit plants
• Reduced risk through integrated process safety with flexible modular redundancy (FMR) and comprehensive IT Security
• Protection of automation investments through step-by-step modernization of Siemens and third-party systems
• A global network of experts providing service and support locally
SIMATIC PCS 7 provides a comprehensive set of engineering tools that minimize time and cost in design and engineering

The SIMATIC PCS 7 engineering package provides all the functionality demanded of a modern DCS. With centralized multi-user engineering of all aspects of the project, integrated simulation capabilities and bulk engineering tools such as SIMATIC Import/Export Assistant and Process Object View, engineering time and cost can be greatly reduced.

Automation of key engineering tasks with version 7.1 streamlines the engineering workflow. The use of centralized visualization schemas enables automatic propagation of graphical changes to all process pictures. Drag and drop connection of process values between controllers provides seamless communication setup.

Minimizing risk is a key goal for the design and engineering phase of a project. That’s why SIMATIC PCS 7 contains a comprehensive log of engineering changes that have been made to the system. The change log helps users comply with industry regulations and practices such as FDA 21 CFR Part 11 and GAMP. Additional tools for configuration management, Version Trail and Version Cross Manager, allow users to keep thorough records of changes and quickly analyze differences between versions.

The new Advanced Process Library provides more capability and flexibility

The release of V 7.1 marks the introduction of a new library that was created from the ground up to provide more comprehensive functionality out-of-the-box. This new library contains many capabilities that would have typically required customization by the end user or integrator in the past.

The library supports additional modes of operation such as local/remote making it easy to adapt the configuration to the plant hardware and operational philosophy. Technological function blocks can be extended with additional analog values and alarm modules. I/O signal data quality information is passed through the configuration and up to the HMI ensuring that operators know when a signal is bad, simulated or forced for troubleshooting purposes. With the library’s new design, even major configuration changes can be made online.

Advanced Process Control (APC) provides the right control tools to optimize any application

Significant operational efficiency gains can be achieved through the use of APC. SIMATIC PCS 7 provides a comprehensive set of embedded APC capabilities to help optimize all kinds of processes. These include PID Optimization, Model Predictive Control, Fuzzy Control, Neural Networks, and Control Performance Monitoring.
SIMATIC Route Control significantly reduces configuration time to automate material transport processes

With centralized engineering capabilities and "Route templates" that can be pre-configured or derived from manual operations, SIMATIC Route Control minimizes duplicate engineering and lowers design time. While direct control, monitoring and process diagnostics allow for fast, effective process optimization.

Maintenance-free, SIMATIC PCS 7 AS RTX Microbox offers strong, reliable operation in a small package

The SIMATIC PCS 7 AS RTX is ideal for process and hybrid applications where minimizing cost and footprint are critical. With no moving parts and solid-state memory, the system is extremely robust and virtually maintenance-free.

High performance controllers allow for fast execution and configurations of any size

The family of SIMATIC S7-400 controllers available for use with the PCS 7 system allows you to create a cost-effective system that can be scaled seamlessly. Configuration changes can be made during operation, minimizing production downtime and reducing engineering effort. Controllers can be made redundant to provide high availability for critical processes.

Completely integrated batch solution

The SIMATIC Batch software package enables you to flexibly automate complex batch processes. Its modular architecture with flexible scalability guarantees optimal adaptation to the size of the plant. Version 7.1 offers even greater flexibility with online master recipe modification.

Integrate process control and SCADA into a single application using SIMATIC PCS 7 TeleControl

SIMATIC PCS 7 TeleControl unifies the automation and monitoring of process control and supervisory control and data acquisition (SCADA) applications into one control console, utilizing a wide range of communication options from serial to TCP/IP Modbus, to integrate a range of 3rd-party Remote Terminal Units (RTUs). With full redundancy options and even more remote flexibility with the new, low-cost SIMATIC ET 200S RTU, TeleControl is the perfect solution for any widely distributed system.

Integrated control and safety minimizes engineering cost and time

The SIMATIC S7 F series of controllers used for process safety applications are configured using the same engineering tools as for process control applications. These controllers are able to perform process control functions and safety functions up to TÜV-certified SIL 3, and provide optional high-availability. Combined with ET 200M/S remote I/O modules with mixed standard and safety-related I/O capability, engineering cost and complexity are greatly reduced.

Safety-related programming was never simpler with the cause-and-effect SIMATIC Safety Matrix

The SIMATIC Safety Matrix allows for the programming of safety-related operation by leveraging a cause-and-effect matrix that automatically generates all necessary safety-related CFC charts. With this method, engineers can save time by assigning control actions to be carried out in response to status changes. Furthermore, all safety-related blocks are TÜV-certified up to SIL 3, significantly reducing certification time and cost.
Installation and Commissioning

Open communication standards provide highly flexible and reliable communication

SIMATIC PCS 7 leverages the power and openness of PROFINET DP to provide cost-effective, reliable communication. And with more than 250 companies and 1300 members contributing to the continued use and development of the PROFINET standard, you can be sure your investment is protected. Industrial Ethernet provides the basis for the reliable, high-speed SIMATIC system bus.

Leveraging the cost savings and flexibility of open communication, SIMATIC PCS 7 allows for connection of a wide range of devices, including those utilizing PROFINET DP/PA, Foundation Fieldbus (FF) and HART as well as a range of other protocols. Traditional 4–20mA field devices can be reliably and cost effectively connected to the system via Marshalling Termination Assemblies for redundant or non-redundant I/O.

Fault-tolerant PROFIBUS PA provides increased availability and reliable safety functionality for mission-critical instrumentation and control elements

For those who require mission-critical fieldbus applications, SIMATIC PCS 7 offers an integrated, H1 level, redundant PROFIBUS architecture. This architecture provides a high level of system availability by ensuring that control is not interrupted in the event of fieldbus communication faults such as short circuits, wire breaks, loss of bus terminators, or failure of the DP/PA coupler.

Through the use of patented technology, Active Field Splitters and Active Field Distributors, scalable, fault-tolerant PROFIBUS PA ring architectures can be created. System availability can be further extended with the ability to make configuration changes, add field devices and extend the fieldbus without taking the system offline.

The PROFIBUS architecture can be augmented with PROFIsafe TÜV-certified SIL 3 safety-related communication. PROFIsafe runs in parallel with standard communication via one PROFIBUS PA cable between controller and field device, reducing costs and complexity.

ET 200 series remote I/O modules provide connectivity options for a wide variety of applications

With a wide range of I/O modules, the SIMATIC ET 200M family of I/O provides a connection point for a wide variety of field devices. The ability to perform online modifications such as station additions, I/O module additions and parameter assignments allows for maximum system availability. While the possibility of mixing standard and safety-related I/O on the same rack means reduced installation costs and capital investment.

In addition, the ET 200S and ET 200pro provide compact and modular solutions that can be utilized to meet unique application requirements.

Intrinsically safe applications all the way to Ex zone 0 can be handled by ET 200iSP I/O modules

When intrinsically safe operation is a necessity, ET 200iSP I/O modules provide a standard, flexible solution with hot swapping capabilities. The modules can be located directly in Ex zones 1, 2, 21 or 22 while connected sensors/actuators can be installed in Ex zone 0. Like the ET 200M, online additions of stations, I/O modules and modification of module parameters are all possible during operation.

New features reduce FAT and commissioning time

Engineering checklists provide step-by-step verification of engineering steps, described in the new Engineering Compendium.

Forcing of all CFC parameters allows engineers to quickly test system functionality.
High-performance HMI improves the efficiency and productivity of the operator

The operator system of the SIMATIC PCS 7 process control system provides operating personnel an intuitive and secure window into the process. The newly designed operator interface with version 7.1 increases operational efficiency. An optimized colour schema and improved alarm control raises awareness of critical conditions. New faceplates and trending capabilities provide a high level of data transparency to enable operators to respond quickly to process changes, while wide-screen process pictures provide more space for additional information.

Ergonomic symbols and task-oriented faceplates created for the new Advanced Process Library V7.1 provide a consistent look and feel to the operator and a uniform representation of state information. Faceplate operation can be easily adjusted to be consistent with the plant’s operational philosophy (for example the use of confirmation steps when energizing a motor). New interlock faceplates allow operators to quickly identify the status of interlock conditions and to navigate to the source of the interlock.

The operator system architecture is extremely flexible and can be adapted to different plant architectures and customer requirements. The system is fully scalable from a single-user system up to multi-user systems with redundant client-server architecture. Remote process visualization can be enabled through use of a web-based HMI architecture which allows the process to be viewed through Internet Explorer or the included web browser.

Access to and analysis of process data made easy

With version 7.1, retrieval and analysis of both historical and live process data is even easier. An enhanced trend control provides access and visualization at the operator stations. The new data monitor tool provides a direct link to process data from Excel; allowing users to leverage the power and familiarity of Excel for efficient analysis and reporting. Auxiliary systems such as MES/MIS can access the data using the OpenPCS 7 interface.

Historical data can be stored in a central archive server, which offers optional redundancy to increase the availability of long-term data.

Protecting Automation Assets from Cyberspace Threats (Industrial Security)

IT security is one of the most important topics in process automation today. Siemens offers a robust and comprehensive approach to industrial security – the “Defense in Depth” strategy. This strategy advocates the creation of a layered defense consisting of firewalls, access control, virus scanners, demilitarized zones, IP hardening and implementation of an effective patch management scheme.

Advanced alarm management helps minimize unplanned downtime and achieve operational excellence

One of the most common causes of unplanned downtime is a failure to respond effectively during plant disturbances and process upsets. The SIMATIC PCS 7 alarm management capabilities such as alarm shelving, alarm suppression and state-based (smart) alarming help operators maximize process performance even during plant upsets, grade changes, manufacture of new products and startup/shutdown sequences.
Comprehensive plant asset management allows for monitoring and supervision of all critical assets.

With SIMATIC PCS 7, all critical plant assets (such as tanks, heat exchangers, centrifuges, distillation columns, motors, pumps, valves, transmitters, etc.) can be monitored for potential failure. This information can be used to implement preventative and predictive maintenance strategies proven to significantly reduce plant maintenance costs.

The integrated document management system, allowing for the storage and display of different files for each device, enables operators to quickly access vital information directly from the maintenance station. With the ability to install the maintenance station client on any operator or engineering station, stored documents and asset information can be made available throughout the plant.

The Process Device Management (PDM) system allows configuration, calibration and troubleshooting from a single location.

Leveraging the vendor-independent nature of Electronic Device Descriptions (EDD) and communications protocols such as HART, Foundation Fieldbus (FF) and PROFIBUS, more than 1,200 devices from over 100 vendors can be configured, commissioned, diagnosed, and maintained using PDM. All devices are managed through a consistent, easy-to-use interface, significantly reducing maintenance time and training requirements.

A full range of migration strategies offers you flexibility when modernizing your plant.

Siemens offers the most comprehensive selection of migration and modernization options in the process control industry. We offer step-wise solutions that allow you to upgrade to newer technologies with minimal risk, in a way that suits your operational requirements.

Our migration strategies, combined with our range of products, tools and services allow you to maximize your return on assets (ROA), giving you updated technology with minimal cost. Our migration offerings include:

- HMI Connectivity
- HMI Application Conversion
- Enhanced Batch Management
- Engineering Library
- Controller Application Conversion
- Control Network Gateways
- I/O Gateways
- I/O Interfaces
- Field Termination Assemblies

With our proven approach to migration, we have successfully upgraded many different platforms, allowing numerous customers to take advantage of PCS 7’s modern technology, while effectively preserving their existing assets.
The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.