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- SIMATIC PCS 7 Technical Product Brief
- Automating batch processes with Batch flexible

**Field technology**
- SIMATIC PDM Software tool for field devices
- Process Instrumentation and Analytics
- SIMOCODE-DP motor protection and control units

**Software**
- Industrial Framework, MES Tools, Business Modelling Factory

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Setting a New Standard of Integration
SIMATIC PCS 7

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Siemens Aktiengesellschaft
Automation and Drives
Process Automation Systems
D-76181 Karlsruhe

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Today, process control engineering has a lot to do with business strategies. It has to be able to do more than just provide functionalities.

With the increasing globalization of the market, information technology is assuming more and more importance, even in the industrial arena. Today, information technology is so cost-effective and powerful that it can be used company-wide, from the management level to the assembly line.

**Worldwide data access**

Because of the technical networking in industrial applications, data and information can be made available all over the world simultaneously via e-mail or internet. Networked plants can be monitored from anywhere in the company, allowing management global access to data from production lines, archives or logistics systems and permitting immediate analyses or comparisons. This, in turn, optimizes invested capital considerably.

**Your strong global partner: Siemens**

For a company that has decentralized its production, the global presence of a partner in process control engineering is becoming increasingly important. As a strong partner, Siemens guarantees support in all regions around the globe.

In addition to sound know-how in process control engineering, our marketing and service personnel have extensive experience in process engineering. The engineering departments also specialize in specific branches of industry, and can configure entire plants. Regional services are available from global Siemens partners called system integrators and SIMATIC solution providers.

Put this close-meshed network of experts and specialists to task for you.

“Today, process control engineering has a lot to do with business strategies. It has to be able to do more than just provide functionalities.”

“The considerable step ahead of PCS 7 over conventional DCS and PLC systems has proved to be exceptionally advantageous with our overall approach to totally integrated automation.”

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SIMATIC PCS 7 is the process control system from Siemens that transforms the vision of a totally integrated system into reality with truly innovative persistence and determination.

SIMATIC PCS 7 links different worlds

- PC world and conventional dedicated DCS computers
- PCS and PLC world
- centralized and distributed automation
- production and process automation.

The SIMATIC PCS 7 process control system provides you with all the advantages of a truly flexible and integrated system.

The distinguishing features of the SIMATIC PCS 7 process control system:

- It is modular, and builds on standard components. Mass production (more than one million SIMATIC CPUs are put into operation every year worldwide) guarantees availability and reduces the costs for everything from purchase to training, from planning and scheduling to spare parts warehousing.
- It is based on standard technologies, and therefore offers an openness which also allows it to be interfaced to systems from other manufacturers.
- The system can be used for all industrial process and production tasks. It offers an optimal open basis for branch add-ons, thus fulfilling the specific demands of various different branches of industry.
- Powerful and user-friendly, it provides all the functions and components of a modern process control system.
- It is scalable and flexible, can be optimally adapted to any process, and can be expanded as needed at any time. Its redundancy rules out any and all risks, even in view of the exceptionally high demands in the process industry, and prevents costly downtimes.
- Thanks to its flexibility at various safety levels, PCS 7 will be your first choice for safety-related applications.
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“They deliver DCS all over the world. For this reason we need a supplier who doesn’t only provide sophisticated products, but who also provides worldwide logistics. With PCS 7 and Siemens we don’t take any risks.”
Mr. Volkmann
Langbein & Engelbracht GmbH
Germany, Bochum

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Process control technology requires investment security over many years. The quality of a system concept is proven by its ability to foresee the requirements of tomorrow.”
In close cooperation with different Siemens Groups, an open system technology was developed which our branch technologists could use as a basis for converting the specific requirements of your industrial application, a standard system which could be turned into a specific technological solution through the use of branch add-ons and which provides all the important features needed to keep your production a step ahead of the competition.

SIMATIC PCS 7: the modular, flexible system based on standard components

SIMATIC PCS 7 is a composite of various different hardware and software components which, taken together, produce a complete, integrated, homogeneous system. As a result, you can
• choose from among different powerful programmable controllers – standard as well as fault-tolerant and fail-safe systems – depending on your project and plant requirements
• include centralized and distributed I/O gradually
• configure an HMI system consisting of everything from a single-user introductory system to a distributed multi-user system with client-server architecture
• expand the functionality of the HMI system by adding various software modules

SIMATIC PCS 7 uses standard SIMATIC components combined with typical system expansions to form a modern, user-friendly control system.

Combining the advantages of PLC and PCS

SIMATIC PCS 7 combines the advantages of PLC-based automation solutions for the production industry – the low hardware costs, modularity and scalability, proven quality and stability of a successful, mass-produced automation system – with the benefits of PCS functionality for the process industry; system-wide configuring and user-friendly operation.

However, the use of standard components also means
• easy, fast determination and selection of system components
• low costs for warehousing and spare parts because there are fewer parts to stock
• shorter delivery times for spare parts and expansion components because components are available all over the world
• less time and fewer costs for training because that training can be based on existing SIMATIC experience

Program package for batch processes

For the automation of discontinuous batch processes, SIMATIC PCS 7 also offers you a modular program package called BATCH flexible. This package lets you solve simple or complex tasks with discontinuous control sequences easily, flexibly, and in conformity with ISA S.88.

SIMATIC PCS 7 – open on principle

The clear commitment to international industry standards for data communications with the corporate management level, such as Ethernet, TCP/IP. OPC, iFlaGlance or SAP R/3/PP-PI makes sure that the SIMATIC PCS 7 process control system fits seamlessly into a company’s information network.

Process data for the most varied applications are made available at any time and any place within a company, for example by means of
• MIS (Management Information System)
• MES (Manufacturing Execution System)
• ERP (Enterprise Resource Planning)
• Advanced Process Control
• Asset Management & Maintenance

SIMATIC PCS 7’s openness, however, has numerous additional facets. These include the programming interface for user programs (API, or Application Programming Interface) as well as import and export options for graphics, texts and data. Communication standards such as PROFIBUS, Industrial Ethernet, and HART open the system to non-Siemens components.

“We use PCS 7, because we absolutely need complete plant-wide integration and flexibility: from simple logic combination up to complex Batch control strategies.”
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JCS Ing. Büro AG
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From raw material to final product with SIMATIC PCS 7

Thanks to the SIMATIC PCS 7 process control system, horizontally integrated automation of a factory, from the supply of materials to the production process to the packaging machine, has become possible without technology breaks for the first time ever.

Factory-wide automation with three-fold integration

This homogeneous, factory-wide automation solution is based on the strict, system-wide observance of three-fold integration:

- For data management, this means that the data need be entered only once, and are then available factory-wide. Errors caused by multiple entries and the high overhead needed to ensure data consistency are things of the past.
- In the configuring phase, you need only one engineering system to configure, put into operation, monitor and service all of the system components in the plant – and all of this can be done under a uniform, user-friendly graphic user interface which orients itself to the prevailing plant topology.
- When it comes to communication, it is not only conventional data inter-change which profits from integration. The communication mechanisms are fully integrated in each system unit, regardless of the network used to exchange data. Everything is determined by the technological configuration of the system.

Open to vertical integration

In addition to horizontal integration, it goes without saying that SIMATIC PCS 7 has the prerequisites for the practical, cost-effective and reliable vertical integration of your plant, from the sensors to the corporate management level.

SIMATIC PCS 7 – control-system-specific functionality and components that meet the highest demands

The SIMATIC PCS 7 process control system is based on selected SIMATIC components optimized for use in a control system. These components have function expansions which ensure control-system-specific system performance, such as:

- Defined starting and restarting of the process
- Operator concept with technological view of the process
- Control system fault messaging concept
- Access protection/control and operator authorization
- Sign-of-life checks and diagnostic system
- Time of day synchronization
- Simple and reliable process management
- Libraries with preprogrammed PCS blocks
- User-friendly configuring with integrated engineering tool
- Import and export functions for project data from and to CAD/CAE systems
- PCS 7 BATCH flexible software package for batch processes

Time for what’s important

In contrast to non-integrated solutions using SCADA technology in conjunction with PLC systems, in which the customer himself must provide for integration, SIMATIC PCS 7, as process control system, embodies preconceived philosophies and preprogrammed functions for meeting the special requirements of the process to be automated. These philosophies and functions become apparent in a powerful engineering system, freeing the configuring engineer from the fine details and allowing him to concentrate on the industrial process itself.

SIMATIC PCS 7 – customized, flexible, and thus particularly cost-effective

One of the most expensive disadvantages of conventional process control systems is their lack of sufficient scalability. There are systems for small-scale, mid-size and large-scale solutions. Those who wanted to automate a less complex process with user-friendlier control and visualization options using one of these systems were forced to overdimensionalize. And those who wanted to keep their options open for later process expansions were forced to choose the next larger system and thus purchase expensive reserve capacity.

Scalable from small to large

With SIMATIC PCS 7 such problems are finally past, because SIMATIC PCS 7 is scalable, in very fine increments, from “small-scale” systems, such as the PCS 7 Starter Package, to large-scale systems, with the corresponding quantity framework and performance. The PCS 7 Starter Package is ideal for use in small plants, at technical universities, for training purposes and naturally for all who want to get to know SIMATIC PCS 7 and to test it practically. It is a fully fledged SIMATIC PCS 7 system which is limited only as to the number of variables for use with approximately 250 process tags. There are therefore no system barriers that could hinder expansion and integration into a distributed architecture.

The SIMATIC PCS 7 system architecture permits optimum adaption to the relevant task and plant size. Even when extensive expansions become necessary, you can still use the same basis without changing the system, thus protecting your investment. You are always working with the same overall system and control concept, regardless of how large the plant might one day become.

SIMATIC PCS 7 – for the highest reliability and quality in your production

In the process industry in particular, every production problem is an incalculable risk, and often goes hand in hand with loss of materials and considerable costs. SIMATIC PCS 7 gets this risk under control, firstly through the reliability of the PCS 7 standard hardware and software components, secondly through the optionally redundant configuration of the programmable controllers and bus systems, the IO, and the HMI systems, and thirdly through failsafe systems that leave the process in a safe state when a fault has occurred. A production stillstand can be prevented in the large majority of cases, and plant availability can be increased as needed, allowing you to meet the prevailing safety requirements and fulfill your responsibilities as regards humans and materials.
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Until recently, tasks upstream and downstream of the process were handled by systems which normally came from different manufacturers than the process control system. The conveyor and warehousing systems, extruders, conditioning and finishing lines, and even building services management are normally handled by different, programmable controller-based systems. In future, no one will be able to afford the integration overhead for full automation and the lack of transparency and flexibility that go with it. Today, an integrated solution for all these tasks is regarded as one of the factors contributing most to your competitiveness.

Cost-effective automation means integrated automation with factory-wide data availability

Thanks to Totally Integrated Automation, it is now possible to automate upstream, mainstream and downstream production tasks—transcending all boundaries—with a single system. And SIMATIC PCS 7 is the heart of an integrated solution without technology breaks between production and process automation. SIMATIC PCS 7 thus reduces costs over the entire life span of your plant.

“We use PCS 7 for our projects because we need a plantwide integrated system to achieve the best productivity.”
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“Thanks to the concept of Totally Integrated Automation (TIA), SIMATIC PCS 7 is the leader in horizontal integration. The plantwide integration which is possible, using one unique system, of the whole automation of raw material feeding, main process, to packaging, brings enormous benefits.”

Unity in diversity: It’s the core that does it

When you use Totally Integrated Automation, you work with the technologies best suited for the task at hand. That means, for example, programmable controllers, industrial computers, HMI systems, distributed I/O, process control systems, and so on, that is to say, with the same variety that distinguishes automation today. There is one very important difference: this variety has a common core which makes of it a complete unit right from the start. This core is three-fold integration:

- Integrated configuring
- Integrated data management
- Integrated communication

This integration encompasses a company’s entire automation landscape because that landscape has a common system basis: SIMATIC. Our new SIMATIC PCS 7 process control system also uses this system basis.

SIMATIC PCS 7, however, is not only integrated within itself (other systems are, too). Its integration includes upstream and downstream automation tasks such as raw materials management, filling systems, and packaging systems.

In addition, the exclusive use of standard products from the SIMATIC family means something very special. For the first time, you can purchase a process control system at a price formerly possible only for PLC-based automation solutions!

PCS 7 reduces life cycle costs

SIMATIC PCS 7 reduces costs over the entire life of a plant, from purchase, planning and configuring to commissioning, diagnostics, maintenance and documentation to future expansions and upgrades. The system advantages always have a positive, cost-reducing effect.

Save with SIMATIC PCS 7

- Save on your initial investment through low-price SIMATIC components. The system’s high degree of scalability and modularity enables optimum implementation of every individual solution. You pay only for the performance you actually need.
- Save on commissioning and operating costs because your employees need be trained for only one system, which is used throughout the factory (Totally Integrated Automation). Even the costs for spare parts are reduced because the same components are used for all phases of the process.
- Save on factory expansions and adaptations to new processes because three-fold integration, centralized engineering and on-line documentation enable fast, problem-free integration of new plant sections. In addition, the use of standard components guarantees long-term availability.

Other features with enormous cost-saving potential are:

- System-wide availability of data once it has been entered
- Multiple use of existing automation objectives
- Technology-oriented configuring (use of preprogrammed, pretested technology and process engineering blocks)
- An integrated communication landscape from the field level to the management level

Innovation and perfect investment security

Anyone currently planning the purchase of a new process control system must know that a ten-year-old system is already out of date because innovation cycles are becoming shorter and shorter. Added to this is the fact that the innovative strength of a new system is more advantageous than the apparently lower degree of risk associated with an older system.

Changing to SIMATIC PCS 7 – child’s play

The transition to this new world is particularly easy if the existing automation landscape is based on TELEPERM M, SIMATIC PCS, or S5/COROS. You can continue to benefit from your investments in both hardware and software and carry out system expansions and functional improvements as needed.

And what about previously installed systems?

SIMATIC PCS 7 is the successor of TELEPERM M, SIMATIC PCS, and automation solutions based on SIMATIC S5/COROS. A migration to Totally Integrated Automation is completely risk-free.

Operators can obtain an overview of the situation quickly and at any time using SIMATIC PCS 7

Enormous cost saving potential through use of off-the-shelf technological and process engineering blocks

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Open to systems from other manufacturers

SIMATIC PCS 7 is based on the most modern, innovative standard technologies, such as Windows NT, OPC and Fast Ethernet. It is open to systems from other manufacturers and to the world of information technology (the so-called IT world).

At the same time, individual-component programmable controllers, operator stations and communications networks are being subjected to constant further development, which in turn benefits the system as a whole. The benefits result from the optimum interplay between the components (thanks to integrated system features) on the one hand, and from the performance capabilities and functionality of each component on the other.

And what about previously installed systems?

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Changing to SIMATIC PCS 7 – child’s play

The transition to this new world is particularly easy if the existing automation landscape is based on TELEPERM M, SIMATIC PCS, or S5/COROS. You can continue to benefit from your investments in both hardware and software and carry out system expansions and functional improvements as needed.
The SIMATIC PCS 7 process control system offers you everything you need to automate your plant, and all within the framework of Totally Integrated Automation. All system units are perfectly matched and all are part of one integrated control system. This begins with the flexible, extremely functional and user-friendly engineering system. It is the same for all configuring tasks and for all components of the process control system.

The HMI system is the window to the process. From the operator stations, the operating staff can monitor the process, modify recipes or BATCH sequences, and modify current values. A variety of SIMATIC PCS 7 automation systems with different performance and safety levels offer all functions required to solve automation and control tasks.

Communication in SIMATIC PCS 7 systems is based on the industrial Ethernet and PROFIBUS standards from SIMATIC NET. These standards were specially developed for industrial use, and are branch-independent. Other excellent features of SIMATIC PCS 7 are the configuring of centralized and distributed structures, perfect I/O interfacing, and connections for intelligent field devices.

Recipe-controlled batch processes can be implemented very economically with BATCH flexible, permitting flexible solutions for tasks from simple single line/single product processes to complex multi-line/multi-product processes. Interface software in the system supports the linking of SIMATIC PCS 7 to the production management level. It is thus possible to integrate SIMATIC PCS 7 in a company-wide information and production planning system without any additional overhead.

“Only with SIMATIC PCS 7 and its integration into the automation concept of “Totally Integrated Automation” it is possible to deploy an automation platform, which is not only the best system to cover the process itself, but also the upstream and downstream areas of a company’s operations.”

Achim Gartzke
Beiersdorf AG, Eucerin - Production
Germany, Hamburg

[Image]
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A process control system must guarantee the integrated automation of the entire process chain. That means integrated data management and communication with a homogeneous operator interface.
Factory-wide engineering
Excellent saving potential through minimum overhead
The central engineering system contains a series of optimally matched tools
• for configuring the hardware
• for configuring the communications networks
• for configuring continuous as well as sequential processes
• for designing HMI strategies
The openness of the engineering system allows you to receive project data from or transfer it to CAD/CAE tools of non-Siemens manufacturers, thus
• saving time and
• preventing errors which may otherwise occur because of multiple entries

Familiar system of concepts for technologists and production engineers
The use of preprogrammed, pretested blocks and a structuring tool matched to the needs of the technologist allow both the technologist and the production engineer to plan and configure using a familiar system of concepts.
Typical automation components such as motors, valves, and PID controllers are available as software objects, and need only to be interconnected as demanded by the process. In SIMATIC PCS 7, this interconnection process is carried out using character graphics, making it exceptionally simple, fast, and easy to survey. It is also easy to follow for technologists without any knowledge of programming.
In the engineering system, an integrated database ensures that data, once entered, are available to all tools in the system. Display and message information is thus entered during process configuring which can then be used without any additional overhead when designing the operator station. This also saves times and reduces possible error sources.
Integration with many benefits
Cross-component, factory-wide configuring under Windows NT provides the best prerequisites for saving on engineering time and costs:
• The common database and well-matched tools help prevent multiple entries and input errors
• Configuring based on the technological hierarchy enables functional structuring of the plant
• The user works only with selected objects (such as blocks) which have to do with his process engineering task
• Access to plant data from upstream CAE tools means building on data that have already been configured.

The tool set: everything you need
A complete set of engineering tools based on the system-wide, consistent database is available for configuring SIMATIC PCS 7. It consists mainly of the software products described below.
The SIMATIC Manager from STEP 7 is the standard SIMATIC configuring basis for all PCS 7 engineering. It is here that the PCS 7 project is maintained, archived, and documented. You select the required hardware from an electronic catalog. Different tools are available for configuring the programmable controllers and the I/O and network components.

The technological hierarchy (TH):
In addition to the standard view, a project can be represented in a technological view. The resources for a project are grouped according to the plant structure, thus representing existing information on a practice-oriented basis and providing the technologist with information on all his project resources.
The TH created during configuring can be used for automatic derivation of the image hierarchy in the plant structure, thus saving double engineering. The TH also serves the plant-oriented identification of process objects.

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Continuous function chart (CFC) is the tool for the graphical configuring of the continuous automation functions. Its simplicity and clarity allow you to solve your automation tasks in the shortest possible amount of time both initially and when making changes during operation. For this purpose, preprogrammed, pretested blocks are placed on CFC charts, assigned parameters, and interconnected – supported by a powerful autorouting function and integrated message configuration. As do other PCS 7 software components, CFC also provides testing and commissioning functions.

The F tool is used for configuring fault-tolerant systems. It complements automatically user-defined CFC charts with the necessary functions for fault recognition and response. Preprogrammed F blocks approved by the German technical inspectorate (TÜV) are available for that purpose.

The sequential function chart (SFC) is used for graphical configuring of discontinuous production procedures. Sequential control systems (sequencer configuration) are created in graphics mode. The desired CFC blocks are selected with simple actions such as "Drag & Drop" and "Fill in the blanks", then connected with the steps or transitions in the sequencers. The SFC also provides powerful testing and commissioning functions as well as user-friendly editing functions.

Structured control language (SCL) is similar to PASCAL, and is the high-level language for programming user function blocks to IEC 61131-3.

The import/export assistant is an important tool for fast “bulk engineering”. It shortens the configuring time considerably. Plant data that have already been configured, such as measuring points or charts from the CAD/CAE world, can be imported in the engineering system and be used for virtually automatic development of user software. Existing PCS 7 projects can be exported and reimported as sample solutions. Subsequent configuring can then build on these data.

The control system libraries reduce overhead. These are standard libraries containing preprogrammed, pretested blocks. In conjunction with powerful graphic configuring tools, these libraries make it possible to implement automation solutions effectively and to substantially reduce engineering overhead – and thus project costs.

There are libraries (more than 200 in total) for everything from simple logic and driver blocks to technology blocks with integrated operator control and signalling functions such as PID controllers, motors, valves and the like (with preconfigured faceplates) to blocks for integrating field devices with PROFIBUS capability. In addition, PCS 7-specific editors allow the user to generate custom faceplates for function blocks he has written with SCL.

The OS engineering component: An extensive set of user-friendly tools is provided for engineering the PCS 7 operator stations. The time-proven WinCC graphic editors are used for the graphical creation of plant displays. The process control system-specific configuring of alarms, messages, operator control, and so on is handled by PCS 7 wizards (assistants), making configuring considerably easier.

The range of tools is rounded off by the PCS 7 Faceplate Designer. It permits fast and easy creation – that is, without any programming skills - of project-specific faceplates and user objects, for example for use with valves, controllers and measured values.

SIMATIC PDM – the tool integrated in PCS 7 for top comfort in parameterizing, starting up, testing and managing intelligent field devices (PROFIBUS-PA and HART).

Continuous automation functions can be quickly and easily configured using CFC including efficient on-line testing facilities. Batch production lines and sequencers can be quickly and easily configured using graphics with the SFC and comfortable on-line visualization.

Flexible and convenient Import of OS displays. Here an OS plant display from the cement area using the cement process control system (based on PCS 7 as example).

"The easy-to-use graphical configuration tools provided the ideal development environment for all parts of the control system ensuring that our first three PCS 7 projects were delivered on budget and in time”

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More than just process visualization

Flexible PCS 7 operator stations are windows to your plant

SIMATIC PCS 7 provides a large selection of operator stations for operator control and process monitoring. These stations are precofigured and preinstalled as PC-based turn-key units and are accompanied by the appropriate operator control and process monitoring software.

Through the use of PC technology, the PCS 7 stations are state-of-the-art and are based on the Windows NT operating system, which is widely used in the industrial world. They are of modular design and available in finely graduated performance ranges. Whether rack or tower, whether industrial or office environment, PCS 7 always has just the right station for you. The different versions cover every contingency, from single-user systems to distributed client/server configurations with high-performance OS server class and Dual Pentium processors.

As many as 16 or more multi-clients

The structure of the operator stations can be flexibly adapted to the obtaining requirements and plant size, and range from single-user system to distributed client/server architecture. As many as six (optionally redundant) servers with as many as 16 multi-clients each can be used in one project. If 16 clients have access to all servers, the maximum number of clients may not exceed 16. In configurations in which not every client need have access to all servers, the maximum number of clients increases. The software (as many as 3000 process objects per server), which is graduated according to the number of process objects (EMSR-/PCE point*), permits a cost-effective, optimal configuration.

In addition to graduated performance ranges, expandability is also based on a number of additional options:
- Long-term data acquisition
- Two or four coordinated display screens per operator station
- Fading in of live video images
- SFC visualization, i.e. on-line representation of the sequence control system in the operator station
- Signal module for connecting external signal generators (e.g. souneder)
- Time synchronization of all PCS 7 system components via PC, CP (communication processor), DCF 77, or GPS receiver
- Access control via chip card reader for single-user or multi-user systems.

User-friendliness and clarity guarantee simple, reliable process control

The well-structured standard operator interface is clearly and ergonomically designed. The plant operator can quickly get an overview of the process, and can navigate easily between plant views. Events are quickly detected and the necessary operator entries are fast and easy to make, allowing safe, reliable plant operation. Even the training phase is shorter. It goes without saying that operator authorizations can be established and checked to ensure security and access control. A chipcard reader for electronic signatures is also available.

A lot of freedom during configuring

Apart from standard operating elements and functions, the configuring engineer has a lot of freedom to adapt operator displays precisely and individually to the relevant task. For visual monitoring, for example, images from a video camera can be integrated in the plant display. The individually configured operator displays can even be freely combined with standard displays on line.

Operator displays may also contain windows for classic office applications, such as Excel. Thanks to modern Windows techniques and the use of international data and interface standards (OPC, ODX, ODBC, etc.) as well as Web capabilities, it is also possible to service specific requests in the SIMATIC PCS 7 stations.

Multi-screen technology ensures even more user-friendliness when a PCS 7 operator station’s operator interface services two or four screens. The operator uses a keyboard and a mouse. A redundancy package for PCS 7 operator stations is offered for plants with high availability requirements.

Configuring made easy – saves time and money

In contrast to conventional systems, configuring of the operator stations is much easier and takes much less time. Whenever possible, the system itself completes configuring steps with the aid of Wizards. The generation of reusable graphic objects also makes engineering more user-friendly and reduces maintenance overhead. Automatic generation of messages and signals simplifies the engineering process and prevents errors. Other productivity tools, such as those for automatic generation of graphic objects and their automatic interconnection with automation objects, are under development.

The benefit to you: the overhead for OS configuring is substantially reduced, and projects contain fewer errors and can therefore be implemented more quickly.

The customary OS configuring of displays and graphics is done with the tried and proven SIMATIC WinCC graphic editors. PCS 7 includes additional special editors for generating user-specific faceplates using standard resources.

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Simple operating principle and user-friendly PCS 7 reduce configuring effort: thanks to automatically generated facplates for the process control points configured in the CFC

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The window to the process – the PCS 7 operator stations: flexible and scalable for various requirements
SIMATIC PCS 7 and fieldbus – a top team

Field devices with PROFIBUS-DP/-PA or HART

Programmable controllers: as powerful and efficient as you want them to be

The programmable controllers are composed of selected components from the SIMATIC S7-400 line. Modular, fan-free design, exceptionally open-ended and very rugged, with extensive communications capabilities and integrated system functions, and designed for easy connection of centralized or distributed I/O – these features make SIMATIC S7-400 the perfect programmable controller for SIMATIC PCS 7.

Various configurable controllers are available which can be optimally scaled in price-performance ratio to a wide variety of tasks. All programmable controllers are equipped with integrated PROFIBUS-DP field bus interface. As a rule, the programmable controllers are connected to the system bus via Industrial Ethernet. For systems with a high data rate and special communication security requirements there is Fast Ethernet (100 Mbit/s), with redundant optical ring and switching technology.

Flexibility at various safety levels

In addition to the failsafe SIMATIC S5-95F programmable controller, the S7-400F can also be used for safety-related applications. The AS414/F and 417/F/H systems permanently run self-test routines and set the process to a safe state in the event of a fault. They are based on fault-tolerant programmable controllers and can therefore be configured redundantly, depending on the application.

I/O links and the very best connections to the field level

The SIMATIC ET 200 distributed I/O systems provide for perfect connections between SIMATIC PCS 7 and the I/O. The I/O stations are linked to the programmable controller via the PROFIBUS-DP fieldbus. The advantage: a high degree of flexibility in configuring the I/O, regardless of whether the configuration is centralized, whether the I/O are in the same rooms as the other electronics, or distributed, whether the I/O are in upstream switchrooms – or right on site. Should you have to replace modules during operation, you can take advantage of the hot-swapping capabilities of some SIMATIC ET 200 versions.

Various configurations are possible, depending on the application and environment:
- SIMATIC ET 200M is installed in the safe area whereas the actuators and sensors may be installed in areas subject to explosion hazard when connected to the relevant modules.
- SIMATIC ET 200S is of intrinsically safe design and suitable for use in a hazardous environment.

Flexibility in data interchange with field devices

Apart from the centralized and distributed input/output modules, SIMATIC PCS 7 also supports the linking of intelligent field devices. PCS 7 is designed both for the connection of field devices with HART protocol as well as of field devices with bus capability via PROFIBUS-DP/PA. Because integration is so easy, you save up to 45% on installation costs while at the same time protecting your earlier investments by simply including the existing field instrumentation in your PLC 7 system. And to round off the system there is the SIMATIC PDM software package, with which you can initialize, configure and commission field devices either on-line or off-line.

The very best connections to the field level

- PROFIBUS-DP handles data interchange between programmable controllers and distributed I/O intelligent field devices – with very little installation overhead. The SIMATIC signal modules and the SIMATIC function modules are connected either via SIMATIC ET 200M or centrally, i.e. plugged directly into the S7-400.
- Field devices include, for instance, SIPOS actuators, SIWAREX weighing systems, SIMOCODE motor protection and control devices, SIPART DR19 and DR 21 compact controllers, MICROMASTER 420 converters and all other field devices with PROFIBUS connectivity.
- With the relevant links, AS-Interface (AS-I) and EIB can be interfaced to PROFIBUS-DP as subordinate bus systems. This allows PCS 7 to integrate additional subordinate I/O levels in one project. This means that even simple sensors and actuators can be connected to PCS 7 (via AS-Interface), as can building services management system components (via the EIB interface).
- PROFIBUS-PA in hazardous areas PROFIBUS-PA is designed for use in hazardous areas. Via DP/PA links and couplers, it is possible to combine PROFIBUS PA and PROFIBUS-DP in a typical DP tree structure.

In addition to the savings in acquisition costs, lower service costs, the problem-free replacement of field devices and the implementation of intrinsically safe applications in hazardous areas, you also profit from the use of PROFIBUS-PA in many other ways:
- Lower acquisition costs because disconnectors, terminal blocks, separate power supplies, etc., are unnecessary
- Dramatically reduced cabling costs through savings in material and cable-laying
- Reduced configuring costs through easy, central engineering of the field devices (PROFIBUS-PA and HART) with SIMATIC PDM, even when the devices are from other manufacturers
- Fast, virtually error-free installation and commissioning
SIMATIC PCS 7 and fieldbus – a top team creates transparency all around

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The very best connections to the field level

With PROFIBUS-DP PROFIBUS-PA, SIMATIC PCS 7 can be connected to the system bus via PROFIBUS-DP as subordinate bus systems. This allows PCS 7 to integrate additional subordinate I/O levels in one project. This means that even simple sensors and actuators can be connected to PCS 7 (via AS-Interface), as can building services management system components (via the EIB interface).

With PROFIBUS-PA in hazardous areas PROFIBUS-PA is designed for use in hazardous areas. Via DP/PA links and couplers, it is possible to combine PROFIBUS PA and PROFIBUS-DP in a typical DP tree structure.

In addition to the savings in acquisition costs, lower service costs, the problem-free replacement of field devices and the implementation of intrinsically safe applications in hazardous areas, you also profit from the use of PROFIBUS-PA in many other ways:

- Lower acquisition costs because disconnectors, terminal blocks, separate power supplies, etc., are unnecessary
- Dramatically reduced cabling costs through savings in material and cabling laying
- Reduced configuring costs through easy, central engineering of the field devices (PROFIBUS-PA and HART) with SIMATIC PDM, even when the devices are from other manufacturers
- Fast, virtually error-free installation and commissioning

“The main arguments in favour of SIMATIC PCS 7 were the consistent integration from the supervisory level to the field level and the openness of the system.”
Frank Sинаaert FINA Chemicals, Belgium, Antwerpen
Standards for reliable data interchange

Communications within SIMATIC PCS 7 are based on SIMATIC NET network components. Using internationally established standards, PCS 7 offers a coherent and extensive communication concept which ensures reliable data interchange between all levels and components in your plant. All SIMATIC NET products were developed specially for industrial use, and are thus the optimum solution for use in all branches and factories.

The network components satisfy even the highest demands, particularly in areas in which the components are subjected to external influences. In addition to electromagnetic fields and aggressive liquids and atmospheres, this includes hazardous areas (PROFIBUS-PA), areas with a high degree of severe pollution, or areas involving a high degree of mechanical stress.

From the time of its conception, Siemens was a member of the standardization committees working on international standards for industrial communication. For you, this means long-term investment security. You can use SIMATIC networks with different performance capabilities to implement company-wide communication – from the simplest device to a complex plant.

**BATCH flexible – the flexible solution for automating batch processes**

BATCH flexible is a price-effective, efficient way to implement recipe-controlled batch processes with SIMATIC PCS 7. BATCH flexible provides a simple, flexible way of solving complex tasks involving changing control sequences. It supports recipe control in both small-scale and large-scale applications, and its modularity allows it to be optimally matched to the obtaining requirements.

Perfect interplay between SIMATIC PCS 7 and the field devices from Siemens, with latest fieldbus technology from PROFIBUS

Simple configuring of recipes … … and optimum batching in the pharmaceutical industry with PCS 7 Batch flexible

Customized, homogeneous software integrated in SIMATIC PCS 7

The intelligent software consists of four integrated subpackages, all of which execute on an operator station under Windows NT:

- The batch recipe system is responsible for the simple graphical creation and management of an arbitrary number of recipes
- The batch control system can process and visualize several batches in parallel
- The batch data manager acquires, stores, documents and exports batch data
- The batch planning system plans batches and production orders in list form.

The entire program package is part of the SIMATIC PCS 7 system environment. No additional hardware is needed.

BATCH flexible can be interfaced to SAP R/3 (PP-PI) to link the automation system to the production management level. Using an approved interface, SAP forwards production orders to BATCH flexible, which in turn is capable of returning BATCH-relevant data to SAP. This may be used for materials management or maintenance planning.

Graphical recipe representation

A user-friendly graphics editor for recipes allows you to create and maintain equipment-specific and quantity-standardized recipes (in accordance with the ISA S.88 standard).

"Apart from the low costs, the simple generation of recipes with the BATCH flexible program was ultimately the decisive factor."

Gérard Issel
Rhom und Haas, France, Lauterbourg
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Graphical representation of recipes...
SIMATIC PCS 7 as key factor in the validation of your plant

Today, more and more plants have to be validated as regards the maintaining of quality standards as well as for marketing and legal reasons. The process control system as well as the process control system manufacturer play an important role in the validation process.

SIMATIC PCS 7 supports this with the well-structured BATCH packages as well as with the ISA S.88 conformity of these components. Siemens, as process control system manufacturer, has many years of experience in quality management, system validation, and the training of specialized personnel.

SIMATIC PCS 7 as key factor in the validation of your plant

Modern interface software optimizes the system

Beyond this general openness, Siemens also offers a variety of modern interface software products which fulfill these new demands on system optimization quite admirably.

The de facto standard interface software @aGlance is the basis for independent data interchange within your company. The 'PCS 7' IIaGlance server ensures the company-wide availability of process data for various applications at any time, anywhere. 'PCS 7' and the corresponding IIaGlance/IT client "WebIIaGlance" makes it possible to monitor processes on the Intranet or internet from any distance and in real time. The data are visualized, analyzed, and edited. All you need is a Web Browser on the operator station.

Supraordinate information systems can be linked to SIMATIC PCS 7 over the IIaGlance interface. One example of this is InfoPlus.21 from Aspen-Tech.

InfoPlus.21 is the information management system for real-time processes with which you can record all production procedures and production information. No other combination of process control systems and process data management systems – such as PCS 7 and InfoPlus.21 – offers such a measure of integration and superior performance for real-time Conti or batch applications. InfoPlus.21 is also equipped with highly-developed historical technology.

Advanced process control with INCA or MATLAB

Sophisticated control strategies (Advanced Process Control) are gaining more and more acceptance in the process industry, even though the majority of applications today can be solved with conventional PID controllers. Because of rising cost pressure and stiffer environmental laws, the demands on process control systems are constantly growing, and some of the classic control concepts have reached their limits. You can expand SIMATIC PCS 7 with APC strategies based on INCA or MATLAB, allowing you to meet prevailing demands and even win economic advantages.

The INCA tool has been designed to make process control more stable. It minimizes process variable variations thereby reducing the number of rejects and optimizing product and load changeover.

MATLAB normally supports the following:

- Data editing and preprocessing
- Process identification
- Controller synthesis and optimization
- Simulation
- On-line application

The "MATLAB DDE client" with real-time capability can be used within the framework of the PCS operator stations, either over the DDE server or over the IIaGlance server "IIPCS 7."

"With PCS 7 production optimization is a lot of fun, and it is proven by our productivity curves!"

Roland Pabst
VETROCONSULT Ltd.
Switzerland, Büsch
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With SIMATIC PCS 7 and comprehensive industrial information technology, you can tap into a considerable amount of rationalization potential in your processes.

SIMATIC PCS 7 provides an open system basis which enables fast, easy integration of many software packages in the plant management level, allowing problem-free data interchange with and data availability at the management and control level.

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Service from A to Z
But you can expect more from SIMATIC. We offer you service from A to Z, extensive service and training which match your needs perfectly.

Worldwide presence
Siemens is a reliable and stable ISO 9001-certified partner with worldwide presence, not only at the time of acquisition but throughout the life of a system, which can be many years, even decades. As per the wishes of our customers, Siemens offers the complete package, from individual components to turn-key systems.

Partner for all related areas as well
Siemens is not only your partner for automation and drive technology, but also in all related fields, such as the installation and automation of building services, logistics, EDP, factory and power station technology, and so on.

"Despite the very short time available for engineering, Siemens has proven to be a reliable partner. Our PCS 7-Plant has started production on time."
Mr. Volkmann
Langbein & Engelbracht GmbH
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Our services cover virtually everything
Whoever decides on a PCS 7 process control system can count on fast, reliable, first-class support services worldwide. Whatever service is needed and wherever it is needed, the right and competent contact is available quickly and without a lot of red tape.

We offer these services:
Consultancy services
- Advice on all questions pertaining to automation technology
Support services
- Hotline
- User support for configuring and commissioning
- Questions pertaining to documentation
- Service tools
Emergency services
- Service times to suit your schedule
- Around-the-clock service available
- Personnel at the ready and ready to dispatch

Spare parts services
- Spare parts for all products
- Worldwide delivery of spare parts, including express service
- Repair service

Modernization services
- Competent advice on modifications and expansions
- Factory modernization

Maintenance services
- Service and maintenance

Information and support for SIMATIC PCS 7
When it comes to support, high-tech is our motto. Wherever your system might be located, you can always reach us. It is for this reason that our support services go beyond the conventional:
- Around-the-clock hotline support
  Our three support centers, one in Germany (Nuremberg), one in Asia (Singapore), and one in the United States (Johnson City), are always there for you. Efficient case management and our network ensure that you will be immediately put in touch with a competent contact.
- Web support
  You can call up information over our internet pages any time, from anywhere in the world, free of charge, for example frequently asked questions, downloading software updates, and so on.

In addition, your Siemens sales contact can also help you define your new system or expand an existing one. In the case of complex projects, our specialists can go to you and work with you to find the optimum project strategy.

The right training – customized just for you!
SIMATIC PCS 7 is easy to learn. The right training helps you to use the system more efficiently - and more quickly. Regardless of whether you are “changing over” from the PLC world, just a beginner in the world of process automation, or are already knowledgeable on the subject, we offer target group-oriented, professional training.

In training centers in more than 60 countries around the world, you can learn all about the PCS 7 system or expand your existing knowledge. No matter whether you take part in a standard course or a user-specific course, SIMATIC training courses quickly school you in the use of the PCS 7 system and provide you with extensive know-how that comes directly from the manufacturer and is presented in the form of practice-related building blocks. Hands-on training provided by systems expert is also available right on site at your facility.
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The latest from SIMATIC PCS 7:
www.siemens.com/simatic-pcs7

Web-Support:
www.siemens.com/support

Interactive catalogue on web:
www.siemens.com/ca01
We measure our success in how much SIMATIC PCS 7 contributes to giving your production process a decisive advantage over that of the competition.

The variety of industrial branches in which SIMATIC PCS 7 reflects the strengths of this process control system: flexibility, scalability, modularity, openness, and continuity, to name only the most important. SIMATIC PCS 7 is a participant in the manufacturing process of many of the products we encounter in our daily lives.

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- Chemical industry
- Iron and steel industry
- Power generation
- Crude oil and natural gas production
- Gas grids
- Building services management
- Glas / stone ceramics
- Wood / cellulose / paper
- Plastics industry
- Metalworks
- Food and semi-luxuries industry
- Original Equipment Manufacturer (OEM)
- Petrochemical industry
- Pharmaceutical industry
- Navigation
- Schools and universities
- System integrators
- Textiles industry
- Transport in pipelines
- Environmental technology
- Hydroeconomy
- Cement
- Miscellaneous
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W. Gassenschmidt NETZHAMMER AG Switzerland, Basel

“Our PCS 7 Migration was a quick, easy and safe solution for moving to PCS 7. While still maintaining the existing trusted TELEPERM M software.”
Steve Elliot Uniqema England

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Anton Buyse
BASF-Antwerpen (Fertilizers)
Belgium

"Utilizing the advanced software engineering tools and integrated database concepts available on PCS 7 PCA have been able to make considerable savings in both overall costs and engineering time on all of our recent PCS 7 applications both large and small."

Michael York
Process Control & Automation Ltd
England, Worksop
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**The SIMATIC PCS 7 process control system**
- [ ] SIMATIC PCS 7 Technical Product Brief
- [ ] Automating batch processes with Batch flexible

**Field technology**
- [ ] SIMATIC PDM Software tool for field devices
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