

SIMATIC S7-1200

It's the interplay that makes the difference



SIMATIC Controller

Answers for industry.

SIEMENS

Modular. Powerful. Easy to use.

It's the common interfaces, communication, and one easy-to-use integrated engineering system for both the controller and HMI that makes the difference.

The interplay between the new SIMATIC S7-1200 controller, our seamless range of SIMATIC HMI Basic Panels and the highly integrated SIMATIC STEP 7 Basic engineering system provides a unique integrated automation solution specifically for the compact controller class.

It's the Interplay

The new modular SIMATIC S7-1200 controller is at the core of our new offering for simple but highly precise automation tasks. The optimized performance of our SIMATIC HMI Basic Panels, designed for seamless compatibility with this new controller and the powerfully integrated engineering system, ensures simplified development, fast start-up, precise monitoring and the highest level of usability. It's the interplay between these products and their innovative features that give you an unprecedented level of efficiency for small automation systems.

The Controller

The SIMATIC S7-1200 controller is modular and compact, versatile, a secure investment, and is powerfully fit for a full range of applications. A scalable and flexible design, a communication interface that fulfills the highest standards of industrial communication and a full range of powerful integrated technology functions make this controller an integral part of a complete and comprehensive automation solution.

2	The Interplay
23	The Interplay for you

4	The Controller
14	The Panels
18	The Software

6	The Controller in detail
8	– Scalable and flexible design
10	– Industrial communication
12	– Integrated technologies
16	The Panels in detail
20	The Software in detail



The Panels

The operation of small machines or simple applications can often be further improved with the addition of visualization. With the SIMATIC HMI Basic Panels offering essential functionality, this is an economical option that opens up new possibilities for creative automation solutions. The range of SIMATIC HMI Basic Panels includes high-contrast graphical displays with touch and tactile function keys, simple networking and seamless communication making them ideal for applications with the new SIMATIC S7-1200.

The Software

Our highly integrated engineering system, SIMATIC STEP 7 Basic, which includes SIMATIC WinCC Basic, is task-oriented, intelligent and provides intuitive easy-to-use editors for the efficient configuration of the SIMATIC S7-1200 and SIMATIC HMI Basic Panels. In addition to programming, it is the common engineering framework for hardware and network configuration, diagnostics and more. The functionality provided by this engineering system is the key ingredient that makes the interplay between the controller and HMI so powerful.

In the field of automation, powerful components are a key factor to success. But what really gives you a unique advantage, is all of them working together.



A modular concept for compact automation in a scalable design.

The SIMATIC S7-1200 features an integrated PROFINET interface, powerful integrated technology functions and a highly scalable and flexible design. This enables simple communication, efficient solutions for technological tasks, and perfectly fits individual automation requirements in a wide variety of applications.



Scalable and flexible design

The SIMATIC S7-1200 controller family has been designed with maximum flexibility to fit your individual machine requirements. This allows you to custom-design your controller system to meet your needs; it also makes future system expansions quick and easy.

Industrial communication

The SIMATIC S7-1200's integrated PROFINET interface provides seamless communication with the SIMATIC STEP 7 Basic engineering system for programming, with SIMATIC HMI Basic Panels for visualization, with additional controllers for PLC-to-PLC communication and with third-party devices for advanced integration options.

Integrated technology

The name SIMATIC has been a reliable symbol in the field of automation for many years. We have taken our experience and have integrated our proven and innovative technology functions into our new controller – ranging from counting and measuring, speed, position and duty cycle control to simple process control functionality. This wide variety of functionality guarantees you the ability to solve a wide array of applications based on technology that has proven its validity in the field for many years.

The Controller in detail

- Scalable and flexible design
- Industrial communication
- Integrated technologies

Communication modules

Up to 3 communication modules can be added to any of the SIMATIC S7-1200 CPUs. The RS485 and RS232 communication modules provide the connection for performing point-to-point serial communication. This communication is configured and programmed using extended instructions or with the library functions, USS drive protocol and Modbus RTU Master and Slave protocols, which are included within the SIMATIC STEP 7 Basic engineering system.



Integrated PROFINET interface



The integrated PROFINET interface is used for programming, as well as for HMI and PLC-to-PLC communication. Additionally, it supports communication with third-party devices using open Ethernet protocols. This interface features an RJ45 connector with auto-cross-over functionality and provides for data transmission rates at 10/100 Mbit/s. It supports up to 16 Ethernet connections and the following protocols: TCP/IP native, ISO on TCP, and S7 communication.

Integrated technology

High-speed inputs

The new SIMATIC S7-1200 controller comes with up to 6 high-speed counters. Three inputs at 100 kHz and three inputs at 30 kHz are integrated for counting and measuring.

High-speed outputs

Two high-speed pulse train outputs at 100 kHz are integrated for controlling the speed and position of a stepper motor or a servo drive. They can alternatively be used as pulse-width-modulated outputs for controlling the speed of a motor, position



Memory

Up to 50 KB of integrated work memory is provided with a floating boundary between the user program and user data. Up to 2 MB of integrated load memory and 2 KB of integrated retentive memory are also provided.

The optional SIMATIC Memory Card provides an easy way to transfer programs to multiple CPUs. This card can also be used for storing miscellaneous files or to update the firmware of the controller system.

of a valve, or duty cycle of a heating element.

PID control

Up to 16 PID control loops with auto-tune functionality are possible in the SIMATIC S7-1200 controller for simple closed-loop process control applications.



Scalable and flexible design



Signal boards

One signal board can be connected to all CPUs, allowing you to customize the CPUs by adding digital or analog I/Os to the controller without affecting its physical size. The modular concept provided by the SIMATIC S7-1200 allows you to design a controller system to exactly fit your application needs.

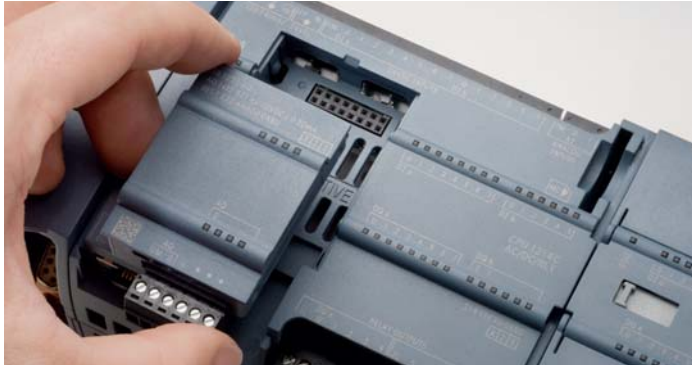
Signal modules

Up to eight signal modules can be connected to the largest CPUs for the support of additional digital and analog I/Os.

The Controller in detail

- Scalable and flexible design
- Industrial communication
- Integrated technologies

Design or expand a controller system to exactly fit your requirements.



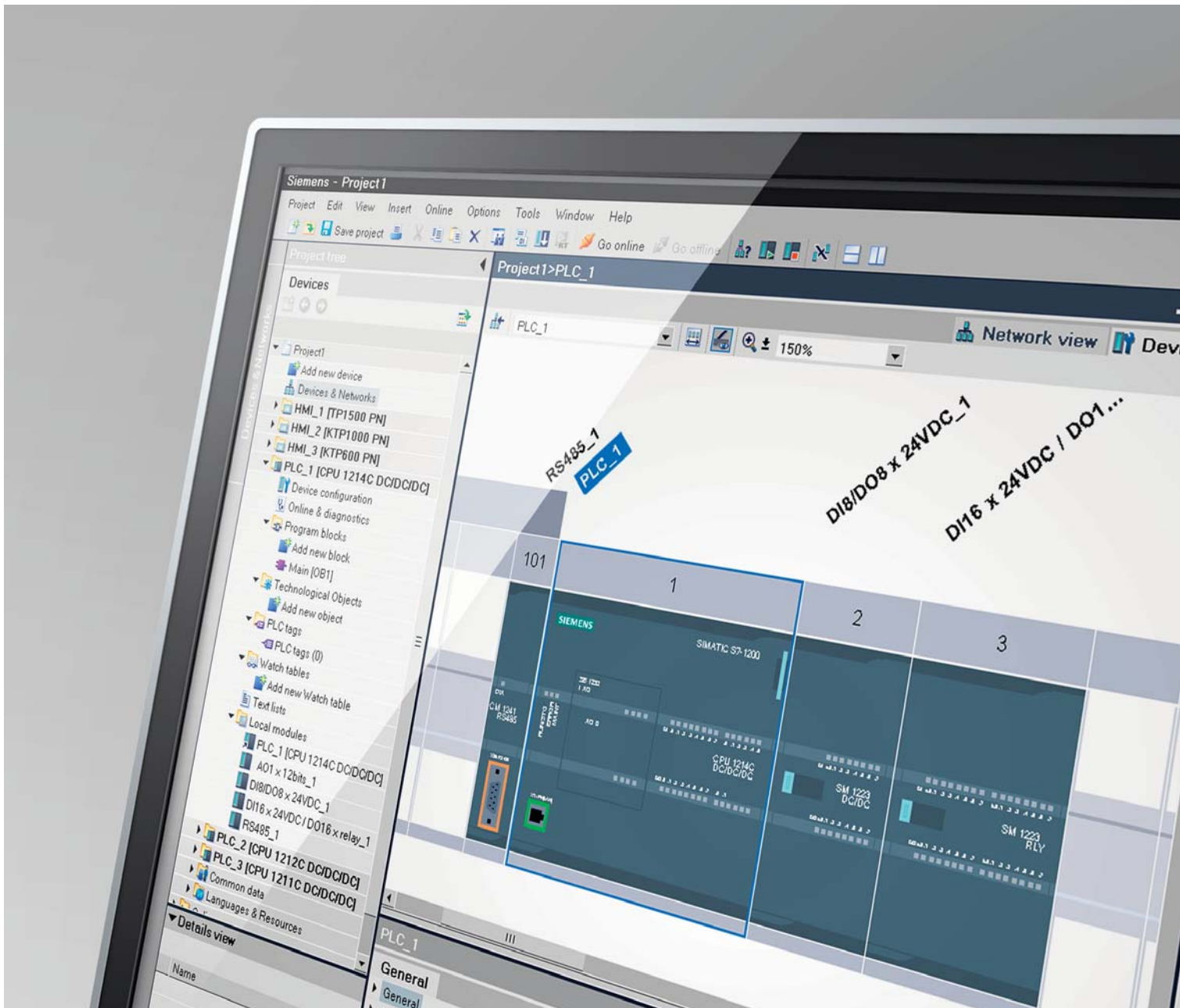
With the addition of a signal board, you can increase the number of digital or analog I/Os on the controller to custom-fit your needs without increasing the controller's footprint.

Signal boards, signal modules, communication modules

The SIMATIC S7-1200 system comes in three different models, CPU 1211C, CPU 1212C and CPU 1214C, that may each be expanded to exactly fit your machine requirements. One signal board can be added inside the front of any CPU to easily expand the digital or analog I/Os without affecting the physical size of the controller. Signal modules can be connected to the right side of the CPU to further expand the digital or analog I/O capacity. CPU 1212C accepts two and CPU 1214C accepts eight signal modules. Finally, all SIMATIC S7-1200 CPUs can be equipped with up to three communication modules on the left side of the controller for performing point-to-point serial communication.

Easy and convenient installation

All SIMATIC S7-1200 hardware has built-in clips that allow for easy and convenient mounting on a standard 35-mm DIN rail. These built-in clips can also be snapped into an extended position to provide mounting holes for situations where panel mounting is required. The SIMATIC S7-1200 hardware can be installed in either a horizontal or vertical position providing you with additional installation options. These integrated features offer users maximum flexibility during the installation process and they make the SIMATIC S7-1200 a practical solution for a wide variety of applications.



Removable terminals

All SIMATIC S7-1200 hardware is equipped with removable terminal blocks. This means that wiring only has to be done once, saving valuable time during the start-up and commissioning phases of a project. Additionally, the removable terminal blocks are an added convenience when hardware components must be replaced.

Space-saving design

All SIMATIC S7-1200 hardware has been specifically designed to save space in the control panel. For example, CPU 1214C has a width measuring only 110 mm and both the CPU 1212C and CPU 1211C are only 90 mm wide. Together with the small footprint of the communication modules and signal modules, this modular and compact system saves valuable space and offers you the highest level efficiency and flexibility during the installation process.

The device view within the SIMATIC STEP 7 Basic engineering system allows you to easily configure and visualize your SIMATIC S7-1200 controller system.

The Controller in detail

- Scalable and flexible design
- **Industrial communication**
- Integrated technologies

Fast, easy and flexible industrial communication.



The integrated PROFINET interface meets the high demands of modern industrial communication.

Integrated PROFINET interface

The new SIMATIC S7-1200 is equipped with an integrated PROFINET interface which provides seamless communication with the integrated SIMATIC STEP 7 Basic engineering system for programming, with SIMATIC HMI Basic Panels for visualization, with additional controllers for PLC-to-PLC communication and with third-party devices for advanced integration possibilities.

Simple networking

The SIMATIC S7-1200 communication interface consists of a noise-immune RJ45 connector with auto-crossover functionality supporting up to 16 Ethernet connections and providing data transmission rates up to 10/100 Mbit/s. To minimize cabling and provide maximum networking flexibility, the new CSM 1277 Compact Switch Module can be used together with the SIMATIC S7-1200 to easily configure a uniform or mixed network consisting of line, tree or star topologies. The CSM 1277 is a 4-port unmanaged switch which allows you to connect the SIMATIC S7-1200 with up to 3 additional devices. Additionally, using the SIMATIC S7-1200

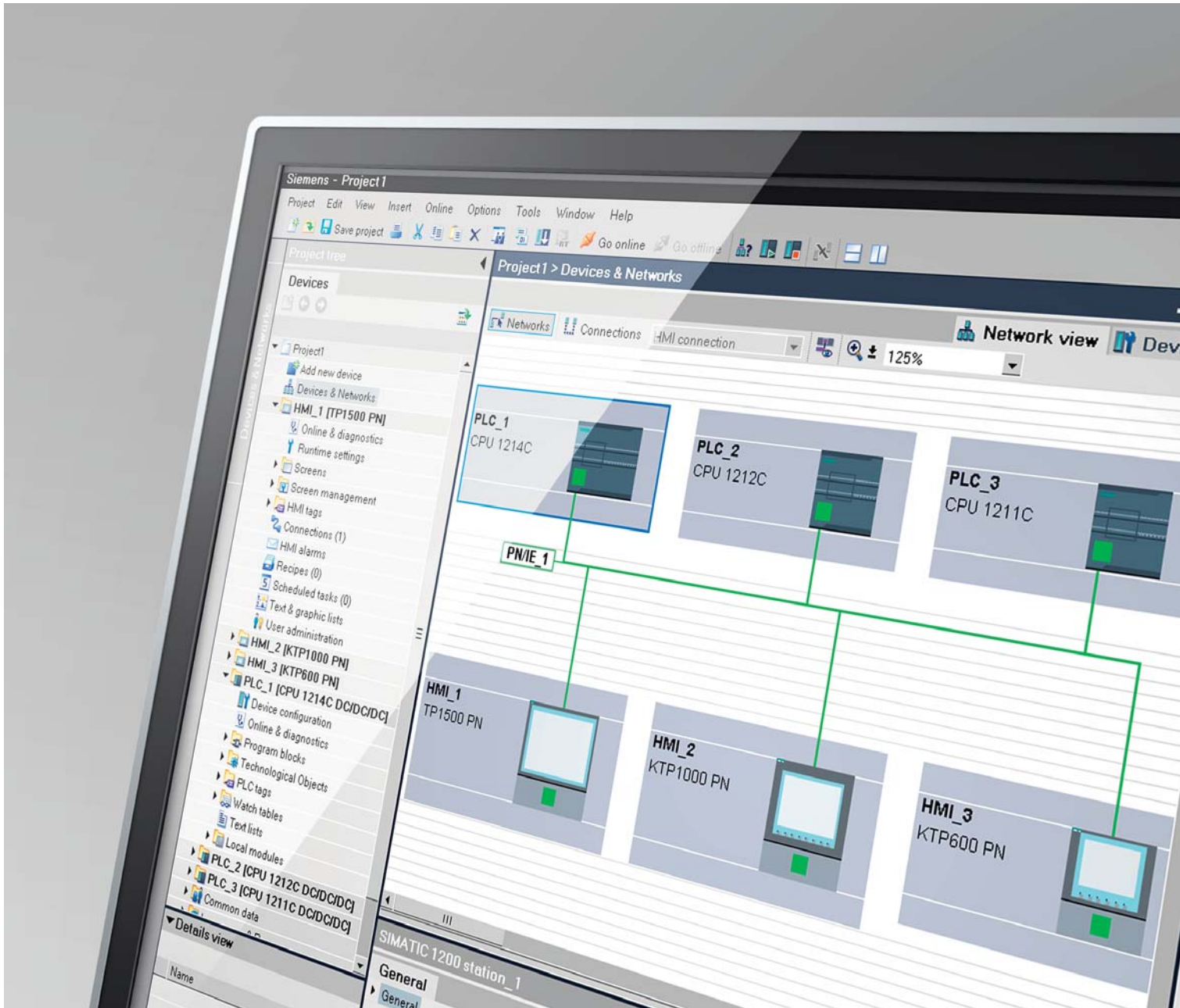
in combination with SIMATIC NET Industrial Wireless LAN components, you are provided with a completely new dimension in networking possibilities.

Communication with additional controllers and HMI devices

To ensure communication with additional SIMATIC controllers and HMI devices, the SIMATIC S7-1200 supports the connection to multiple S7 controllers and HMI devices communicating together with the proven S7 communication protocol.

Communication with third-party devices

Seamless integration of devices from other manufacturers is possible with the integrated interface on the SIMATIC S7-1200. It is possible to connect and communicate with multiple third-party devices utilizing the supported open Ethernet protocols TCP/IP native and ISO on TCP. Configured with the standard T-Send/T-Receive instructions provided by the integrated engineering system SIMATIC STEP 7 Basic, this capability offers you an even higher level of flexibility in designing your automation solution.



PROFINET – the open Industrial Ethernet standard

Utilizing established TCP/IP standards, the integrated PROFINET interface provided with the SIMATIC S7-1200 can be used for programming, HMI and PLC-to-PLC communication. In the future, it will be possible to connect distributed field devices to the SIMATIC S7-1200 via PROFINET or to use the

SIMATIC S7-1200 as a PROFINET IO device linked to a PLC which operates as PROFINET IO controller. This capability is currently in preparation and will provide the SIMATIC S7-1200 system with uniform communication from the field level up to the control level satisfying one of the most important demands currently placed on industrial automation.

The network view within the SIMATIC STEP 7 Basic engineering system allows you to easily configure and visualize your network configuration.

The Controller in detail

- Scalable and flexible design
- Industrial communication
- Integrated technologies

Powerful technology functions. Completely integrated.



Integrated technology for counting and measuring, closed-loop control and motion control make the SIMATIC S7-1200 an extremely versatile system for many types of automation tasks.

High-speed inputs for counting and measuring

Up to six high-speed counters, three at 100 kHz and three at 30 kHz, are integrated for precise monitoring of incremental encoders, frequency counting, or high-speed counting of process events.

High-speed outputs for speed, position or duty cycle control

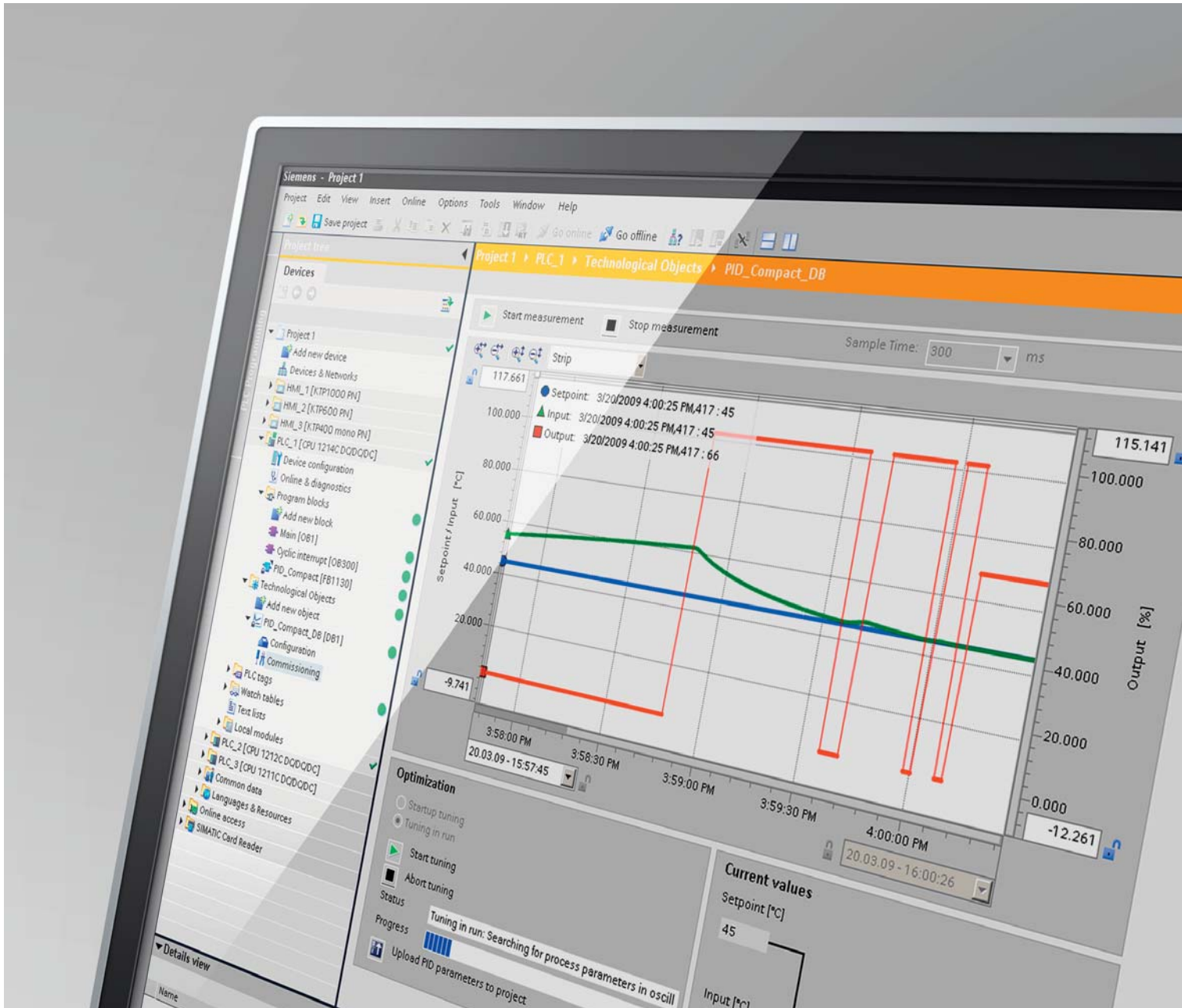
Two high-speed outputs are integrated into the SIMATIC S7-1200 controller for use as either pulse train outputs or pulse-width-modulated outputs. When configured as a PTO, a 50 percent duty cycle pulse train is provided at a rate of up to 100 kHz for the open-loop speed and position control of stepper motors and servo drives. Feedback for the pulse train outputs is provided internally using two of the high-speed counters. When configured as a PWM output, a fixed cycle time output with a variable duty cycle is provided for controlling the speed of a motor, position of a valve, or duty cycle of a heating element.

PLCopen motion function blocks

The SIMATIC S7-1200 supports the open-loop speed and position control of stepper motors and servo drives. This functionality is easily configured using an axis technology object along with the internationally accepted PLCopen motion function blocks included within the engineering system SIMATIC STEP 7 Basic. Absolute, relative and velocity moves are supported in addition to home and jog functions.

Drive commissioning control panel

The drive commissioning control panel included with the engineering system SIMATIC STEP 7 Basic simplifies the start-up and commissioning of stepper motors and servo drives. It provides both automatic and manual control of a single motion axis as well as online and diagnostics information.



PID functionality for closed-loop control

The SIMATIC S7-1200 supports up to 16 PID control loops for simple process control applications. These control loops are easily configured using a PID controller technology object and the supporting editors provided within the engineering system SIMATIC STEP 7 Basic. Additionally, the SIMATIC S7-1200 supports PID auto-tuning to automatically compute the optimum tuning values for the gain, integral time and derivative time.

PID commissioning control panel

The PID commissioning control panel included within SIMATIC STEP 7 Basic simplifies the loop tuning process. It provides both automatic tuning and manual control capabilities for a single control loop and it also provides a graphical trend view of the tuning process.

The tuning of PID control loops is fast and accurate using the commissioning control panel included with SIMATIC STEP 7 Basic.



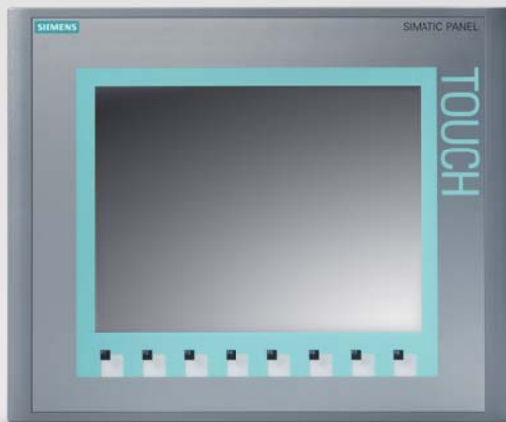
KTP400 Basic mono PN



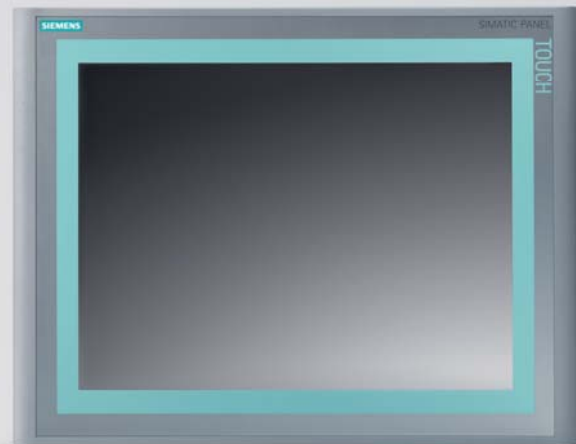
KTP600 Basic color PN

The SIMATIC HMI Basic Panels: high-quality panels at attractive prices.

The SIMATIC HMI Basic Panels are designed for seamless compatibility with the new SIMATIC S7-1200 controller. Our new SIMATIC HMI Basic Panels for compact applications provide a solution that adapts to your specific visualization requirements with optimized performance and functionality, a wide variety of screen sizes and mounting compatibility for easy upgrades.



KTP1000 Basic color PN



TP1500 Basic color PN

Optimized performance and functionality

The SIMATIC S7-1200 integrates perfectly with the SIMATIC HMI Basic Panels to provide simple visualization and control options for compact automation applications. With the seamless integration between the controller and HMI engineering software, SIMATIC STEP 7 Basic and SIMATIC WinCC Basic, the perfect solution with the best results can be achieved in the shortest amount of time.

Touch screen and tactile keys

The new SIMATIC HMI Basic Panels feature a touch display for intuitive operation. Apart from touch screen operation on 4", 6" or 10" displays, the panels also have fully programmable keys with tactile feedback. A device with a 15" touch screen is also available for applications where visualization requires a larger display area. With an IP65 degree of protection, the SIMATIC HMI Basic Panels are suitable for use in rough industrial environments.

Numerous standard functions for engineering of compact automation tasks.



The new SIMATIC HMI Basic Panels with an integrated PROFINET interface allow easy and user-friendly visualization of machines and processes. This represents an essential part of the interplay with the SIMATIC S7-1200.

PROFINET interface

Each of the SIMATIC HMI Basic Panels has an integrated PROFINET interface. This enables communication with the controller and the transmission of parameterization and configuration data. The PROFINET interface, which is integrated in the SIMATIC S7-1200 controller, makes the interplay between the controller and the SIMATIC HMI Basic Panels easy and reliable.

Space-saving design and ruggedness

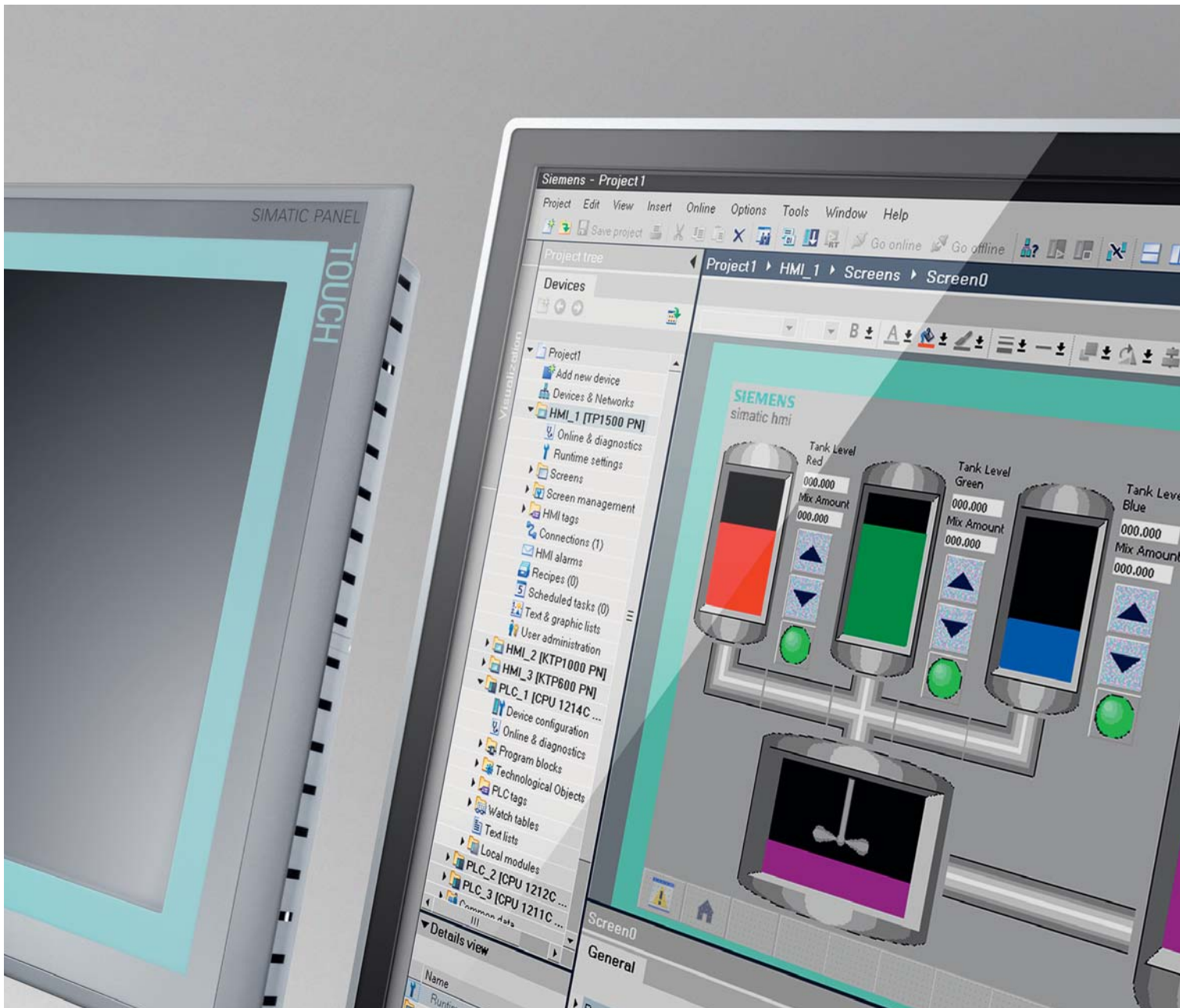
With the IP65 degree of protection, the SIMATIC HMI Basic Panels are very well suited for use in rough industrial environments. With compact installation dimensions, they are also fit for applications where space is limited. In applications where space is extremely limited, the four- and six-inch variants can be installed and configured in an upright position.

Functionalities

All SIMATIC HMI Basic Panels are equipped with a complete range of relevant functionalities, such as alarm logging systems, recipe management, trend functionality, and vector graphics. A comprehensive library with various graphics and objects is provided within the engineering system. User administration according to the demands of different industries is available as well, for example authentication with user ID and password.

Worldwide application

With various certifications and the fulfillment of different norms and regulations, configuration data being available in up to 32 languages and support of Asian and Cyrillic fonts, the SIMATIC HMI Basic Panels are perfectly fit for worldwide application. During operation, up to five languages are available and can be changed online. Language-dependent graphics additionally support intuitive operation.



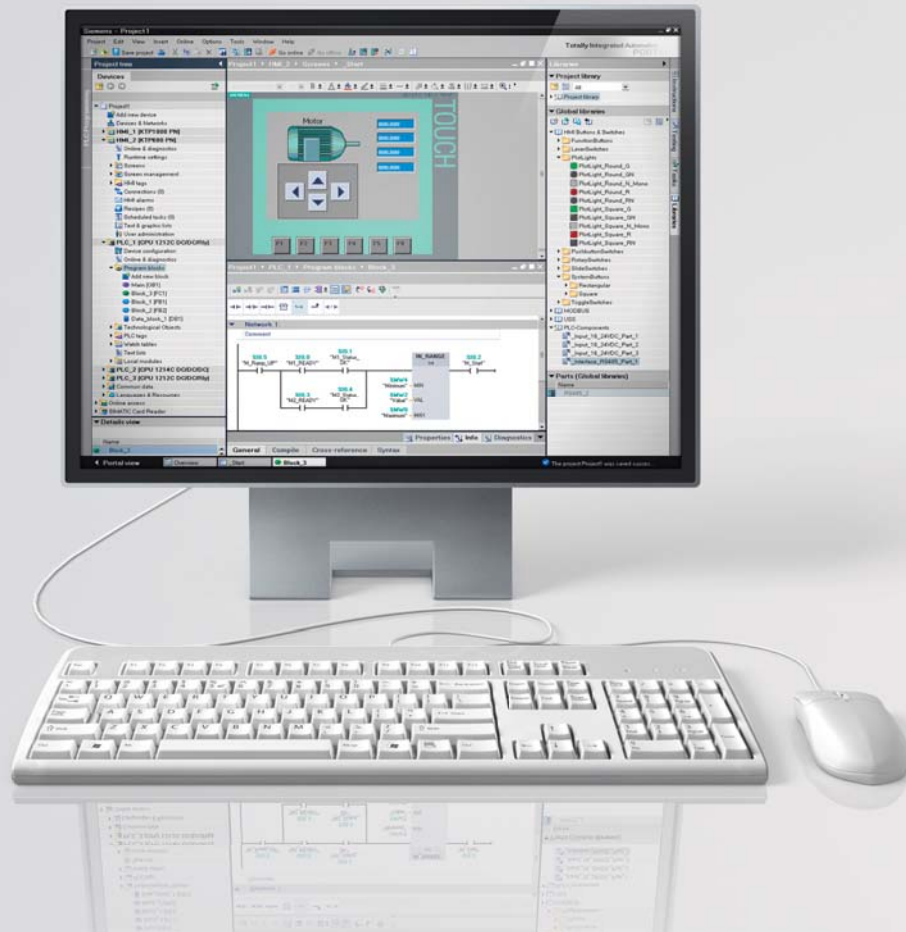
Display and graphics

The SIMATIC HMI Basic Panels have a standard touch display for intuitive operation. The use of displays with graphical functionality offers entirely new possibilities for visualization: Vector graphics, the representation of trend charts, texts, bitmaps and I/O fields enable a clearly arranged and thus user-friendly operation display.

Function keys

Aside from touch screen functionality, the SIMATIC HMI Basic Panels in sizes of four-, six- and ten-inch screens have individually configurable function keys – this means individual functionalities may be configured according to the selected display on the screen. Additional usability and operational reliability is ensured with the tactile feedback provided by these function keys.

The SIMATIC HMI Basic Panels are easily configured using SIMATIC WinCC Basic which is integrated into the SIMATIC STEP 7 Basic engineering system.



One software is all you need for basic tasks in various applications.

SIMATIC STEP 7 Basic is designed to be intuitive, easy to learn and easy to use. This provides you with highest efficiency in engineering. Smart functionalities such as intuitive editors, drag and drop functionality as well as “IntelliSense” tools simply let you engineer faster. This new software architecture comes from a stable source for future innovations – Siemens has many years of experience in software development and has thus made SIMATIC STEP 7 Basic highly future-oriented.



One common engineering framework
SIMATIC STEP 7 Basic, including SIMATIC WinCC Basic, has task-oriented, intelligent and intuitive editors that enable it to serve as one common engineering framework for programming SIMATIC S7-1200 controllers and configuring SIMATIC HMI Basic Panels. The new integrated engineering system SIMATIC STEP 7 Basic offers you intuitive and fast engineering capabilities for programming and commissioning comprehensive automation solutions.

Supporting first-time users and professionals

With SIMATIC STEP 7 Basic, ease of use is guaranteed, whether you are just starting out in engineering or have many years of routine. Engineering is easy to learn and use for starters, and fast and efficient for professionals.

Different users may choose from two different types of views – which ever suits them best. Using the portal view, you have all tasks for an automation

project at a glance. This means beginners are supported with a task-oriented user guidance and with recommended editors that are perfectly fit for their automation task. When using the project view, your entire project is hierarchically structured in the project tree, enabling fast, intuitive access to all editors, parameters and project data, ensuring object-oriented engineering. Both first-time users and professionals will be able to solve engineering tasks fast and efficiently.

A new dimension in intuitive and efficient engineering.

SIMATIC STEP 7 Basic with integrated SIMATIC WinCC Basic enables the user to perform an unparalleled fast and easy engineering. One project view for all, state-of-the-art user interface technology for intuitive graphical engineering with intelligent drag and drop functionality, shared data handling and more ensures high-quality projects.

One common project tree for controller and HMI

One common project view relieves you from handling separate files for each automation device. This makes sure that your whole project is always consistent after changes in any part of the project. Thus, high project quality is ensured. The project tree's clearly arranged structure remains organized even with complex engineering projects. This is the basis for fast access to respective devices, folders or specific views that will assist you in engineering an automation task. ①

Intelligent drag and drop between controller and HMI editors

Symbols may be assigned to hardware with the drag and drop functionality, the same method can be used for connecting tags between the controllers and HMI. This enables the user to efficiently use both HMI and controller editors within one common engineering framework. ② ③

and change between them per mouse click. Common functions for all editors enable the user to handle projects fast and efficiently. An attractive graphical user interface and immediate system responsiveness on a standard PC ensure ease of use and highest productivity from the beginning of every project.

① ② ③ ④

Higher project quality due to shared data handling and consistent symbolism

Automated data consistency ensures high project quality. Modified application data is automatically updated within the entire project. The cross-referencing concept ensures that variables are used consistently within all parts of the project and for various devices – they can thus be updated consistently. Symbols are automatically generated and assigned to respective I/Os. Data is only entered once, meaning that no additional address and data module handling is needed, which reduces the risk of errors. ① ② ③ ④

Reuse of data due to a comprehensive library concept

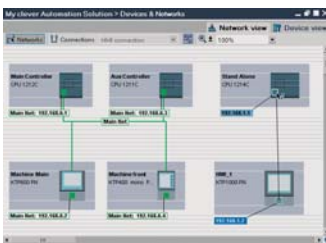
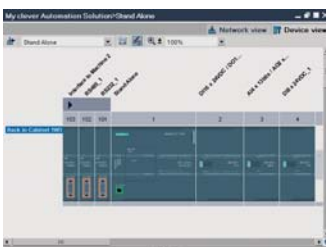
Users may save various engineering elements such as blocks, tags, alarms, HMI screens, individual modules and entire stations in local and global libraries. These elements can be reused within the same project and in different projects as well. Data may be exchanged between separately configured systems with the help of the global library. ④

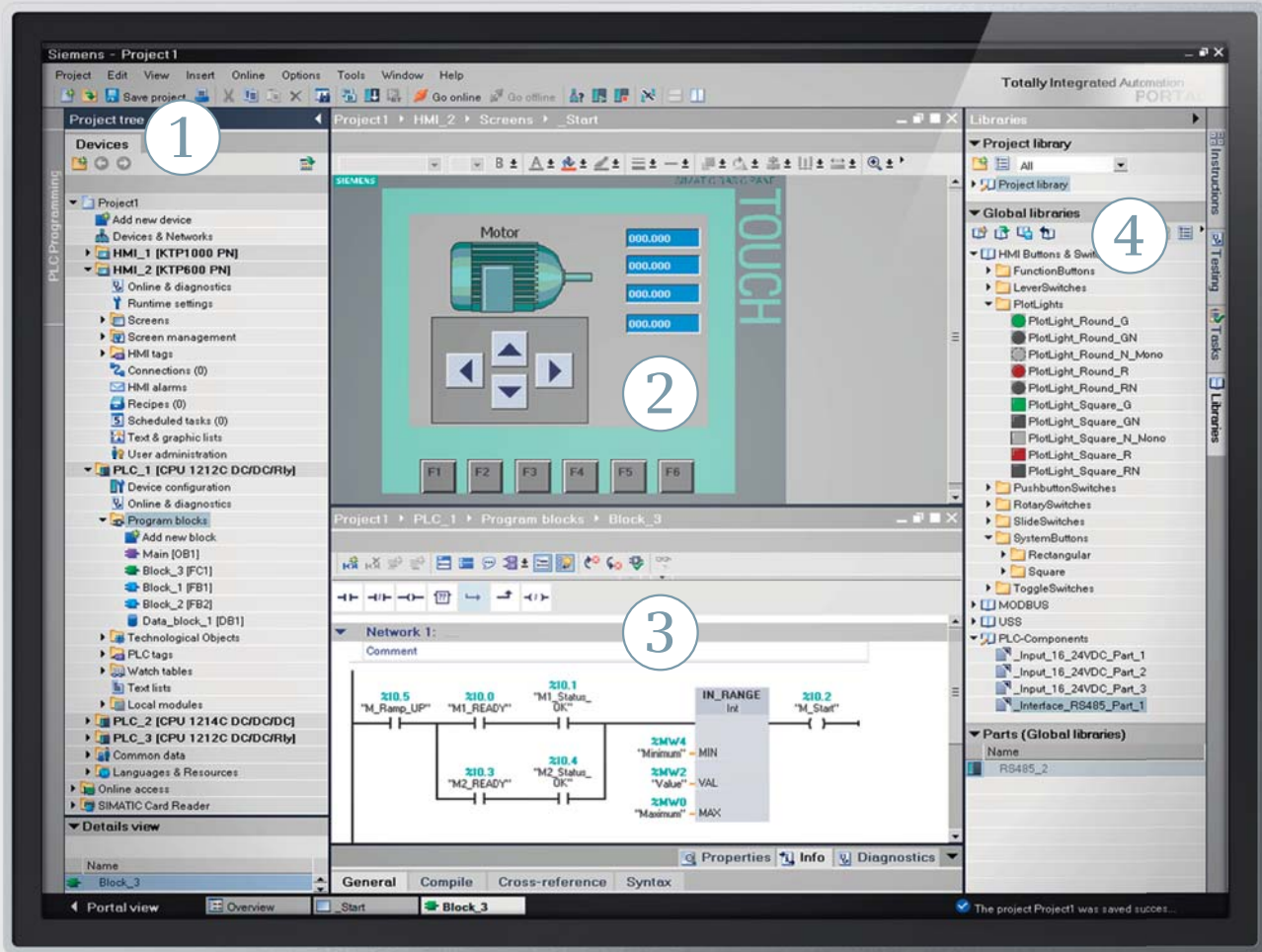
Clearly arranged graphical engineering

A fast and intuitive configuration of devices and networks is ensured by the graphical editors. Connections can be easily configured by graphically connecting the individual devices with lines. In the online mode, visual diagnostics information is provided. For users, this means complex systems may be handled easily and efficiently and large projects are still clearly arranged.

Clear and intuitive user interface for highest usability

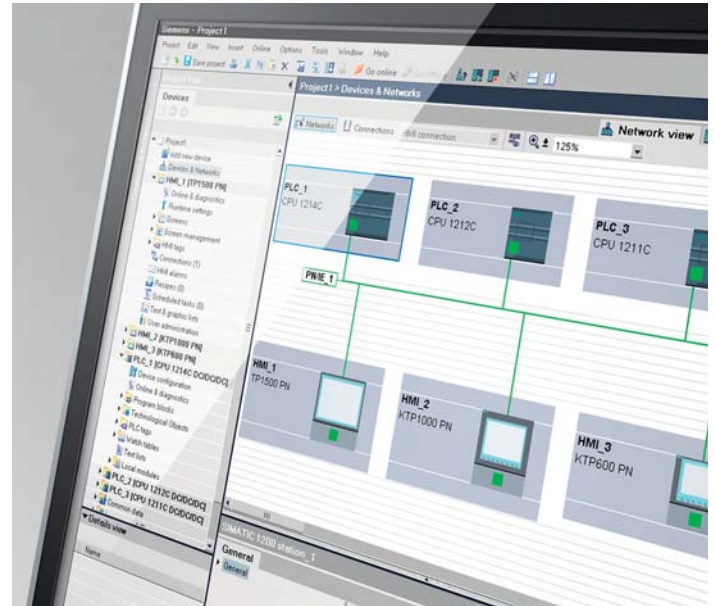
The software has a task-oriented user concept. All editors are embedded into one common framework. The user may intuitively work with all editors





More beneficial features.

Whether the direct online testing and diagnosis, the easy addition of technology objects or the library concept for time-efficient reuse of data – these and many more functions in detail add to the overall concept of a new dimension in engineering.



Online test and diagnostics

Only a single mouse click is needed to go online, even if a project has not been loaded. Once online, the project's online and offline status are immediately compared to detect possible differences. Differences or conflicts are clearly displayed, as different engineering modules can be opened in both online and offline status.

Adding technology objects

Adding technology objects is only a mouse click away as well. While adding new objects such as an axis or a PID controller, respective settings are displayed in the engineering system's "Add new object" window. The object may be named according to its function. When fine-tuning various objects, the user is supported with a function description and may obtain additional information

via help online. Once all information has been assigned, the new object is opened in the editor right away, if required.

Controller programming

Intelligent functions support the user and reduce errors. Configuration and modification of program modules is easy and efficient with only little information to put in. Frequently used commands can even be stored in a favorites list and the entire engineering modules can be copied and added to programs of other SIMATIC S7-1200 controllers; new symbols are automatically added.

Changes can be made very quickly. With a single click, functional modules can be altered subsequently. The modules may be saved, even if not all symbols or I/Os have been assigned. The symbols can also be altered within the user program.

It is also easy to configure and modify connections.

Integrated HMI

SIMATIC STEP 7 Basic includes the powerful HMI software SIMATIC WinCC Basic for efficient programming and configuring of SIMATIC HMI Basic Panels. Efficient engineering means for example: direct use of controller process values in the HMI project using intelligent drag and drop functionality. HMI is part of the entire project which means that consistent HMI data is always guaranteed. Connections between HMI and PLC can be centrally defined. Several templates can be created and assigned to other screens. Completely integrated HMI functionality makes configuring the SIMATIC HMI Basic Panels very easy, highly powerful and efficient at the same time.



Find out what the perfect interplay can mean for you.

In today's world of automation, what is the driving factor for success? Next to keeping overall development costs as low as possible, it's time. An initial idea has to turn into a marketable product as fast as possible to beat the competition. And because the competition never sleeps, we have created the perfect interplay for our new compact modular controller, offering you the highest level of engineering efficiency combined with powerful visualization and control.

Systems and solutions in the world of automation are becoming more seamless and sophisticated as we speak. Automation and technology systems are exerting more influence on the way businesses run – using them as efficiently as possible is a key factor to business success. So, this means automation is big – but only in the figurative sense. Futurists and science fiction fans, who about 50 years ago envisioned giant robots lugging equipment and materials through warehouses and room-sized computers with multi-colored blinking lights, have had to think again and think

smaller – literally. Machines have more complex and diverse functionalities integrated into smaller footprints than ever before and the challenge for today and for the future is to keep engineering and automation as simple yet powerful as possible at the same time.

Unbeatable in modularity and compactness

This is exactly why the new SIMATIC S7-1200 fits today's demands so perfectly. Keeping things simple and powerful can only be done if all components work together. This has been completely

ensured with the perfect interplay. There is no comparable controller on the market that allows you to completely control and visualize tasks so easily. The new controller is unbeatable in its modularity and compactness and its seamless communication with the engineering system and HMI panels. It's what makes it simply unique in its field. Find out what the perfect interplay can mean for your business and what it will mean for your future.

More information:
www.siemens.com/simatic-s7-1200

Siemens AG
Industry Sector
Industry Automation
P.O. Box 4848
90026 NÜRNBERG
GERMANY

www.siemens.com/simatic-s7-1200

Subject to change without prior notice
Order No. E20001-A1860-P272-X-7600
DISPO 06313
WÜ/17666 Gl.AS.S1.S120.52.9.02 / 040910.0
Printed in Germany
© Siemens AG 2009

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of 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.