

SIEMENS

SIMATIC PCS 7

SIMATIC PCS 7 PowerControl

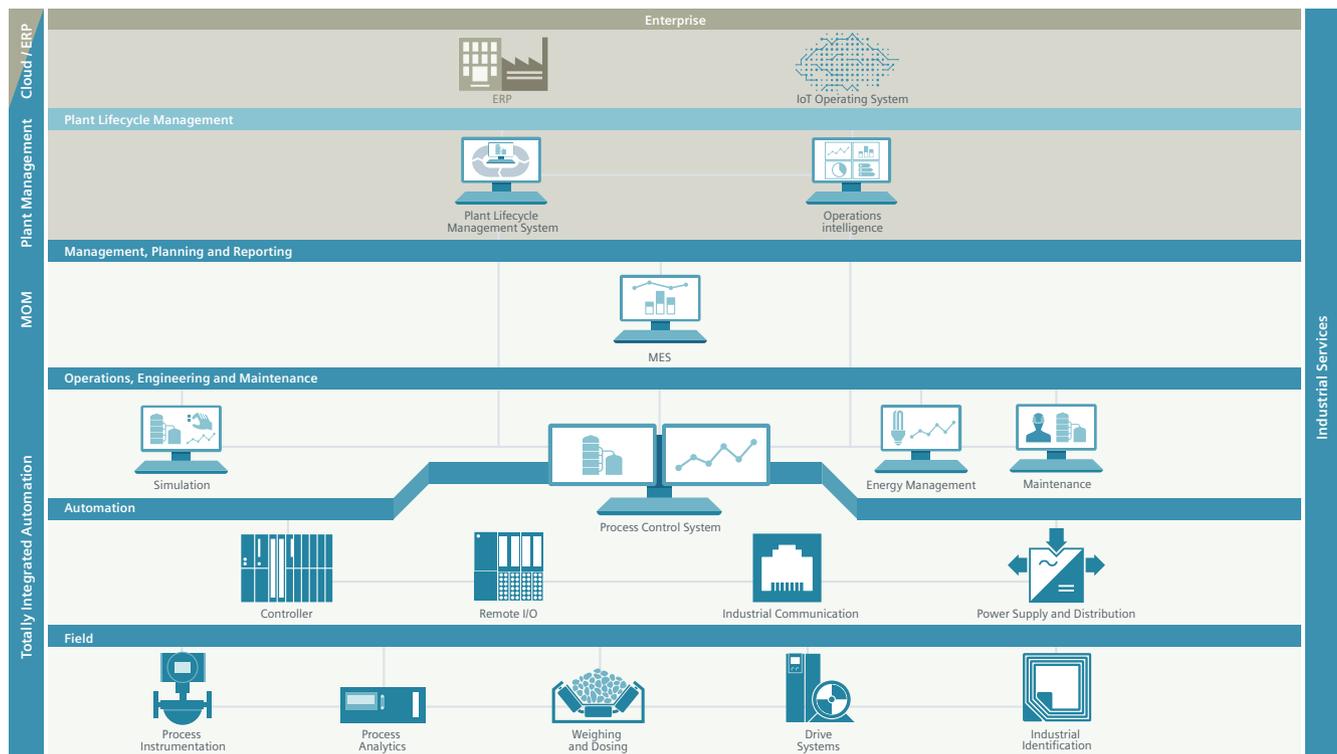
Integration of switchgears in process industries

Brochure

Edition
2017

siemens.com/simatic-pcs7/powercontrol

Totally Integrated Automation



Totally Integrated Automation: Start efficiently. Increase productivity.

In light of the growing complexity of machines and plants along with rising engineering costs, efficient engineering is a key factor for success in the manufacturing industry.

Totally Integrated Automation, industrial automation from Siemens, makes engineering efficient. The open system architecture covers the entire production process and ensures the efficient interaction of all automation components. This is achieved with consistent data management, global standards and uniform hardware and software interfaces. These common features minimize the engineering overhead. That reduces costs, shortens the time to market and increases flexibility.

The comprehensive approach of Totally Integrated Automation paves the way for better production: faster, more flexible and more intelligent.

This, in turn, is the basis for real added value in all automation tasks, particularly:

- Integrated engineering
- Integrated operation
- Industrial data management
- Industrial communication
- Industrial security
- Safety Integrated

Totally Integrated Automation creates the perfect framework for strategically harnessing optimization potential – throughout the entire production process:

- Time and cost savings through efficient engineering
- Non-productive times minimized by integrated diagnostic functions
- Greater flexibility in production due to integrated communication
- Plant and network security through integrated security functions
- Protection of personnel, machinery and the environment with seamlessly integrated safety technology
- Improved quality thanks to data consistency
- Simplified implementation of automation solutions with global standards
- Better performance thanks to the interaction of system-tested components

Content

As a result of integration into TIA of electrical switchgears with devices for protection and control functions in accordance with the IEC 61850 industry standard, it becomes possible to unite switchgear automation and process automation in a single process control system.

Homogeneous operator control and monitoring using a common control station, uniform configuration with the same engineering system, and consistent utilization of hardware components from the TIA product portfolio result in significant savings with regard to investments, operation and servicing.

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Switchgears in the process industry



In addition to the high process automation requirements in many industrial plants, it is also necessary to integrate the medium-voltage power supply switchgears into a complete automation system.

Components of such plants are electrical consumers with high energy requirements. The monitoring and control of the individual consumers via protection devices, i.e. IEDs (intelligent electronic devices).

Large electrical consumers in various industries



Chemicals
Pumps, compressors, drives,
medium-voltage supply



Pharmaceuticals
Infrastructure,
building supply



Food & Beverages
Centrifuges, pumps, compressors,
medium-voltage supply



Cement
Crushers, tube mills, rotary kilns,
medium-voltage supply



Water and Wastewater
Pumps, fans,
medium-voltage supply



Paper and Cellulose
Drives,
medium-voltage supply



Glass and Solar
Electric heating, drives,
medium-voltage supply



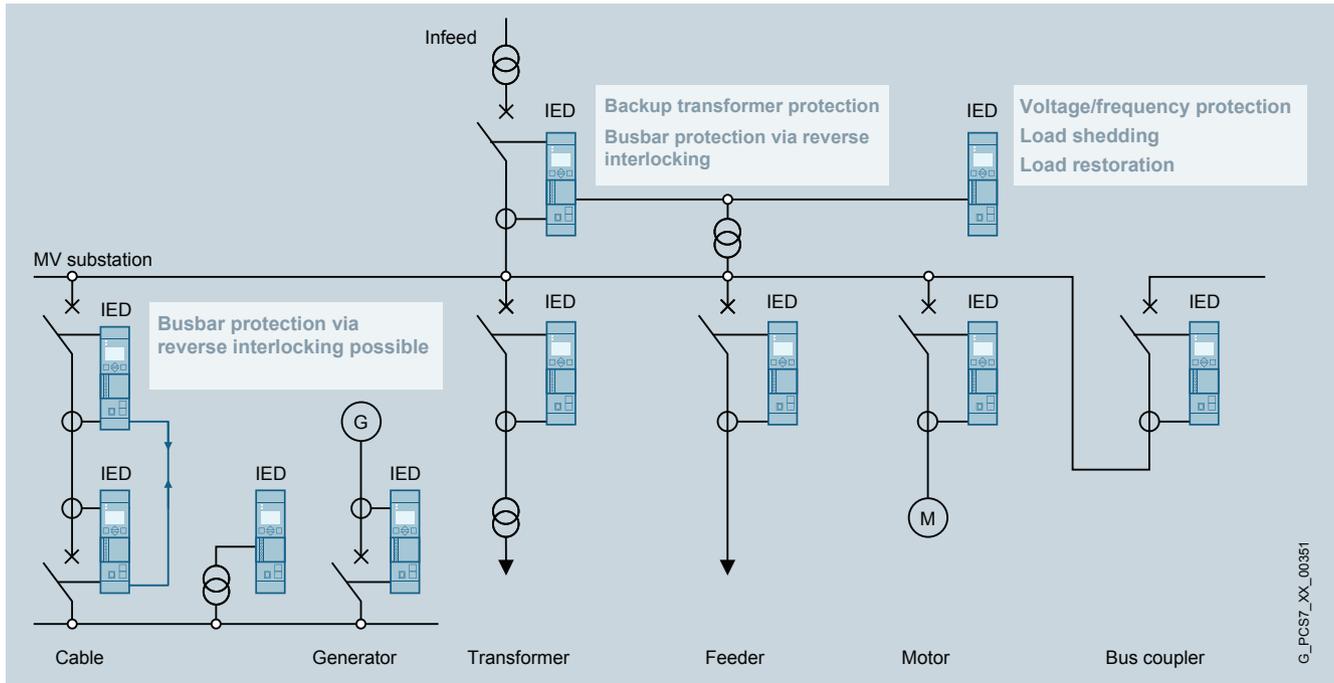
Steel, Metal, Mining
Drives, medium-voltage supply,
electrolytic and electroplating plants



Oil & Gas
Compressors, pump stations,
medium-voltage supply



Marine
Drives, medium-voltage generators,
shore power supply



Basic structure of typical medium-voltage switchgear

Task of the protection devices

The task of the protection equipment is to permit operational overcurrent on the one hand, but to prevent impermissible loading of cables and devices on the other. Because of dangerous effects in the event of a short-circuit, the associated equipment must be switched off within the shortest possible time. Then again, a fault should only result in a power supply interruption for as few consumers as possible. To achieve this, protection devices in the network must detect the fault, carry out the switch-off themselves, or output triggering commands for the associated switches.

"Intelligent electronic devices" (IEDs) are used as protection devices for control, switching, measuring, and automation. These are intelligent devices which detect abnormal operating states and faults, and provide an autonomous reaction. This is achieved by comprehensive diagnostics and signaling as well as by safe, fast and selective shutdown of the faulty plant components. This type of protective system is usually applied in power supply systems > 1 kV. The applicable variables are measured indirectly by current and voltage transformers. Circuit breakers and protection devices are used as active elements.

Appropriate selection of the protection devices in accordance with the technological requirements makes it possible to design comprehensive and complex switchgears which meets the requirements in industrial plants.

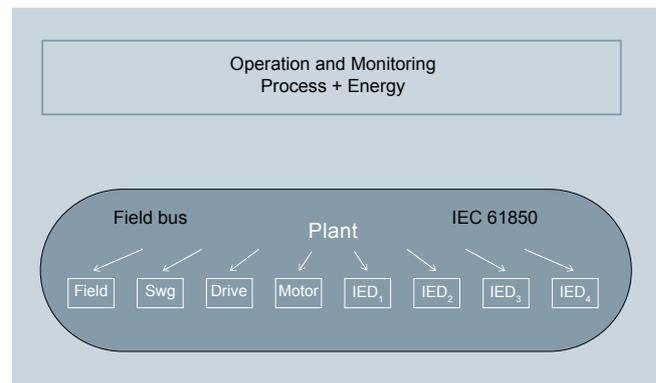
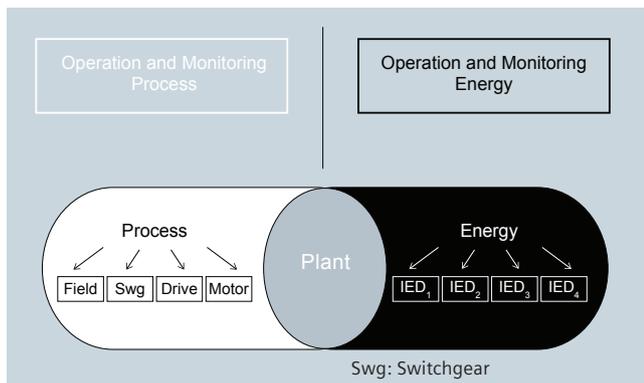
International standard IEC 61850

IEC 61850 has become established as the global communication standard for the integration of protection devices. This standard of the International Electrotechnical Commission (IEC) describes an Ethernet-based transmission protocol for protection and control technology in medium-voltage and high-voltage electrical switchgears (station automation). The IEC 61850 protocol includes comprehensive definitions with the following objectives:

- Interoperability between devices from different vendors
- Long-term investment security
- Efficient exchange of object-oriented data models

The standard was defined in cooperation with manufacturers and users in order to position protective systems, communication, and control of switchgears on a uniform, future-oriented basis. All renowned manufacturers offer protection devices in accordance with IEC 61850. As the global leader, Siemens has especially extensive experience in this field.

Merging of process control system and station control system



Classical solution – separate systems

In practice, different systems are used for monitoring and controlling the switchgears and for the actual task of process automation – a process control system for the process component and a station control system for the energy component of the plant.

Two independent automation worlds, which nevertheless have similar technology, thus come face to face in a single plant.

The implications for the operating team and operation are as follows:

- Separate worlds for the process and energy components of the plant – but a single process that needs to be performed efficiently
- Separate responsibilities regarding operator control and monitoring, maintenance/servicing – but a single plant that has to run optimally
- High integration overhead (engineering, commissioning)
- High project risk (coordination, information exchange, responsibility)
- Increased lifecycle costs resulting from two separate systems which are linked via the process and plant

This makes it more difficult for those working at the plant to manage the overall process in the optimum manner and constantly generates higher costs – throughout the plant's entire lifecycle.

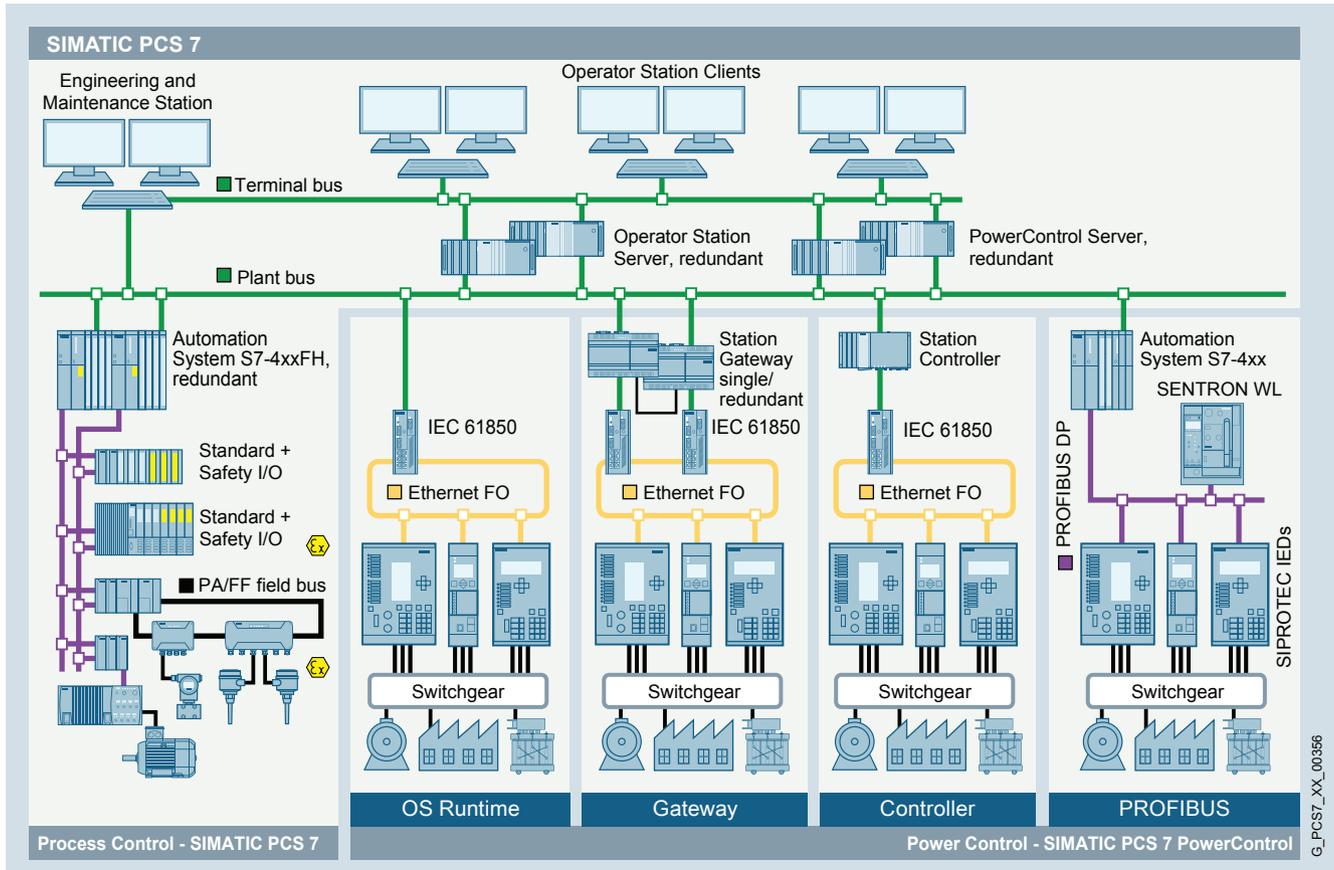
Integrated solution – a single system for both worlds

SIMATIC PCS 7 PowerControl is now able to provide a solution for electrical switchgears featuring devices for protection and control functions (IEDs, intelligent electronic devices) that is based on the IEC 61850 standard protocol. The uniform concept for integration of the switchgear automation into the SIMATIC PCS 7 process control system means that both automation worlds can be brought together, thereby increasing the degree of integration of the entire plant.

Switchgear and process automation have a uniform GUI. This permits comprehensive control of the plant, which minimizes the danger of operator errors. Standardization of the system platform for the process and energy aspects solves the problems resulting from the classical separation, and reduces the engineering and maintenance workload – with a positive effect on the lifecycle costs.

Benefits of SIMATIC PCS 7 PowerControl

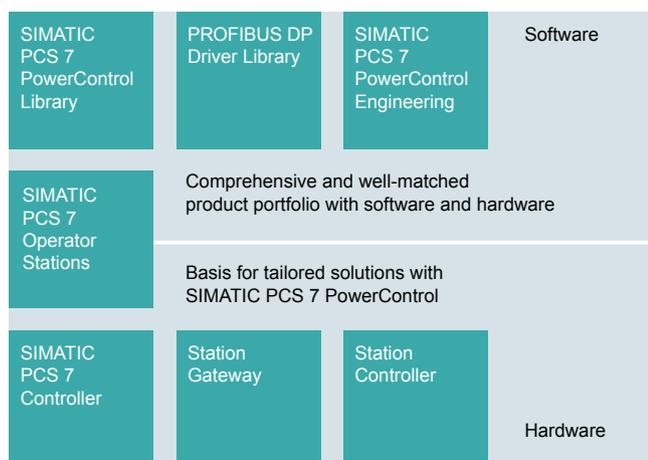
- Simpler plant structures with higher degree of plant integration
- Increased transparency in the technological dependencies process ↔ energy
- Integrated engineering and simplified commissioning
- Uniform process control with minimized risk of operator errors
- Lower administration, servicing and training overhead
- Effective energy management (evaluation of consumption values of IEDs)
- Significantly reduced lifecycle costs
- Optimized operation and maintenance of the plant reduces the risk of integrating different automation worlds



Merging of process control system and station control system. There are several ways to achieve integration: Directly on the plant bus, via station gateway, via station controller, or via PROFIBUS DP.

- +
 Homogeneous integration of protection devices in SIMATIC PCS 7 based on IEC 61850
- +
 Common system platform for process and energy automation
- +
 Data provision for IoT (Internet of Things) and data-driven services
- +
 High plant availability through redundancy concepts and integrated automation

System blocks of SIMATIC PCS 7 PowerControl



Comprehensive and well-matched product portfolio as the basis for tailored solutions with SIMATIC PCS 7 PowerControl

The basis for a tailored solution when integrating switchgears with SIMATIC PCS 7 PowerControl into the SIMATIC PCS 7 process control system is a coordinated product portfolio comprising hardware and software components.

It is possible to produce solutions for specific plant and customer requirements by deploying an appropriate combination of PCS 7 standard products and SIMATIC PCS 7 PowerControl products.

SIMATIC PCS 7 PowerControl Library

The SIMATIC PCS 7 PowerControl Library (PCL) contains blocks for automation of electrical switchgear equipment. The following functions are supported:

- Feeder
- Motor
- Generator
- Transformer
- Cable
- Synchronization unit
- Busbar

To enable engineering in conformance with PCS 7, the PCL offers technological blocks for all equipment that can be configured with the CFC editor for use with PCS 7 controller, station controller, and station gateway. These blocks can be used for protection devices from Siemens (SIPROTEC) as well as for those from other vendors.

Operator-friendly symbols and faceplates are available for visualization on the SIMATIC PCS 7 operator station and correspond to the style of the PCS 7 standard library APL. These can be integrated homogeneously into a PCS 7 project and adapted flexibly to the properties of the respective protection devices.

The faceplates are used to display:

- Measured values
- Messages (alarms, warnings)
- Device status
- Maintenance-relevant information (operating hours, switching cycles, etc.)
- User-specific views

All technological objects allow the creation of instance-specific user views. The units for power, voltage, and current can be specifically adapted to the project. Unavailable values can be hidden. Arrows next to the symbols for indicating the current direction provide increased clarity.

Feeder

The FEEDER object is highly versatile. It can be used for all incoming or outgoing circuits of a busbar, but can also be configured as an individual circuit breaker, grounding electrode or disconnecter. It is also suitable for switchable machine contactors.

The FEEDER faceplate allows flexible representation of switches. Six fields for up to five switches are available. The displayed switches can also be switched on or off manually from the faceplate.

Motor

The MOTOR object is based on the FEEDER object. The motor function is adapted by flexible configuration of the fields.

Generator

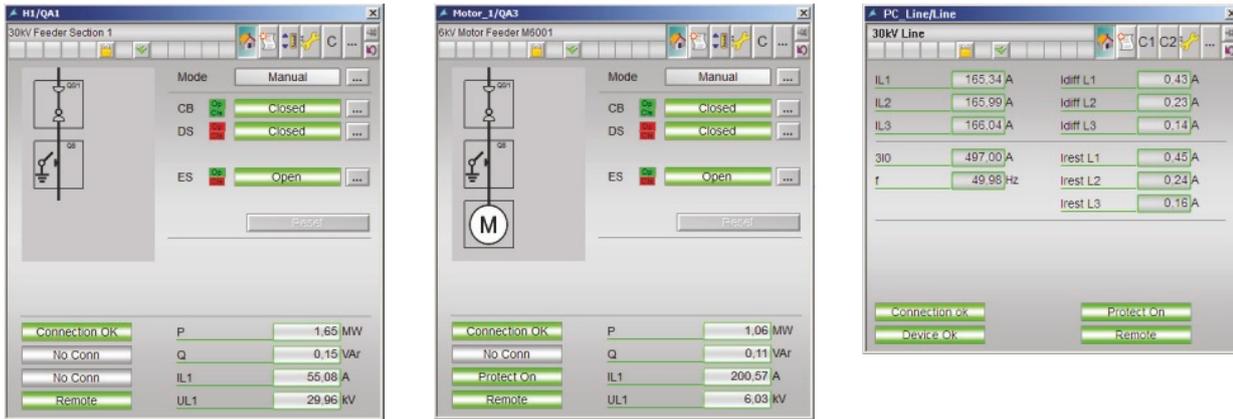
The GENERATOR object is based on the FEEDER object. It can be adapted to the function of the generator by flexible configuration of the fields.

Transformer

The TRAF0 object can be used for all transformer protection devices. The faceplate is only used for visualization, no commands are implemented.

Cable

The LINE object is suitable for line differential protection devices. The faceplate is only used for visualization, no commands are implemented.



Examples of faceplates from the SIMATIC PCS 7 PowerControl Library: Feeder, motor, cable

Synchronization unit

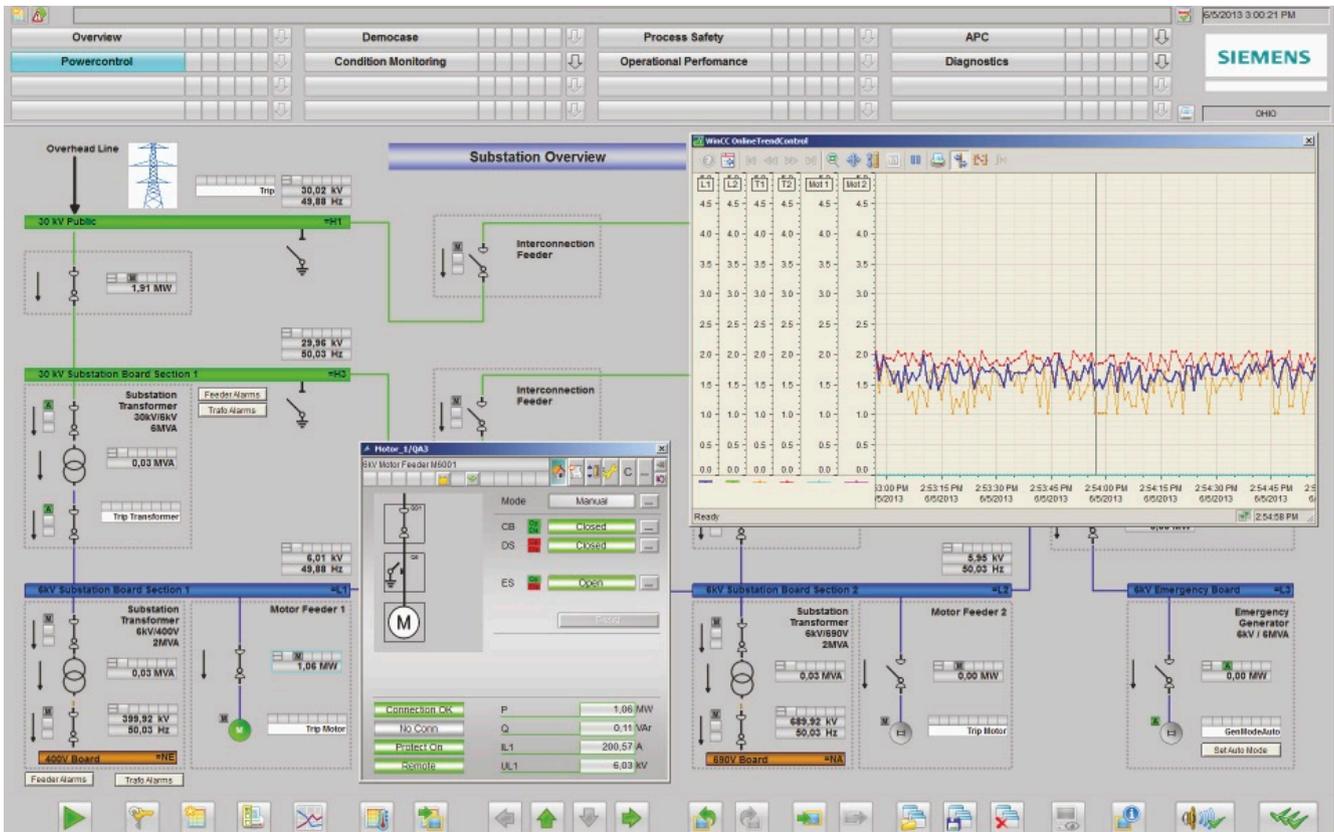
The SYNC object is provided for synchronization units. The faceplate is only used for visualization, no commands are implemented.

Busbar

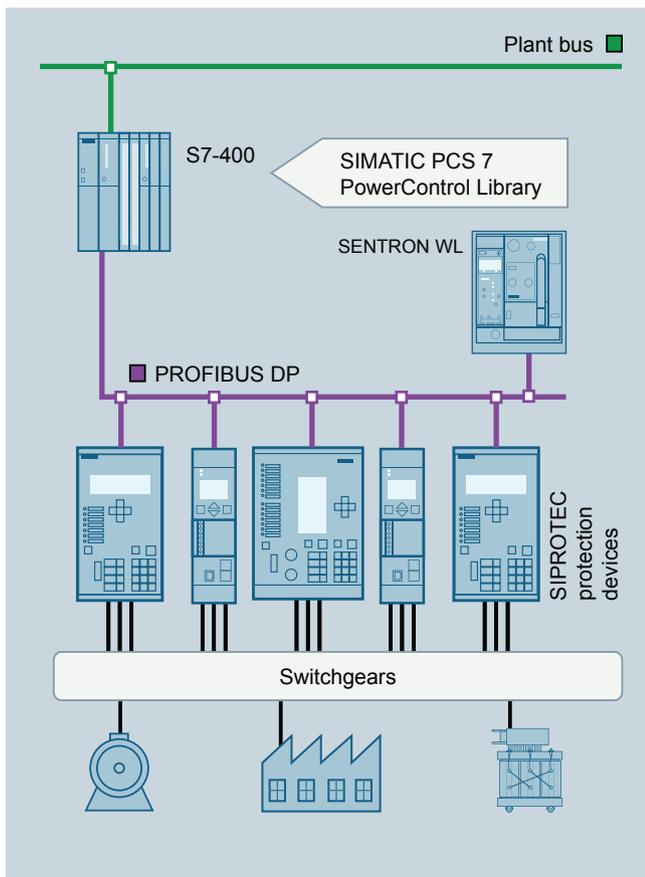
The BUSBAR object represents a busbar. There is no faceplate for this object. The symbol is copied manually into the process image and then configured.

Visualization of switchgear

The picture below shows an example of the representation of switchgear on the SIMATIC PCS 7 operator station. The layout of the protection devices is independent of the manufacturer. Commonly used, illustrative symbols are rapidly understood and mastered by plant personnel. A hierarchical screen layout supports intuitive navigation.



Example of a plant display for medium-voltage switchgear with trend window and a faceplate for a medium-voltage motor



Integration of the protection devices via PROFIBUS DP

PROFIBUS DP Driver Library

In addition to the standard solution based on the IEC 61850 protocol, the classical integration of protection devices via PROFIBUS DP is also supported in the context of SIMATIC PCS 7 PowerControl. The PowerControl PROFIBUS DP driver library is used for this and provides driver blocks for establishing communication between a SIMATIC PCS 7 automation system and the SIPROTEC protection devices connected on the PROFIBUS DP. This approach is primarily intended for the following situations:

- Reuse of an existing infrastructure with PROFIBUS DP
- Avoidance of complete modernization in existing plants
- Implementation of mixed configurations of PROFIBUS DP and IEC 61850 for plant expansion

The engineering of this approach corresponds to that of a SIMATIC PCS 7 standard solution, i.e. the protection devices are integrated via corresponding driver blocks and linked as usual in the CFC editor to the technological blocks of the PowerControl library. The matching symbols and faceplates are therefore also available for visualization.

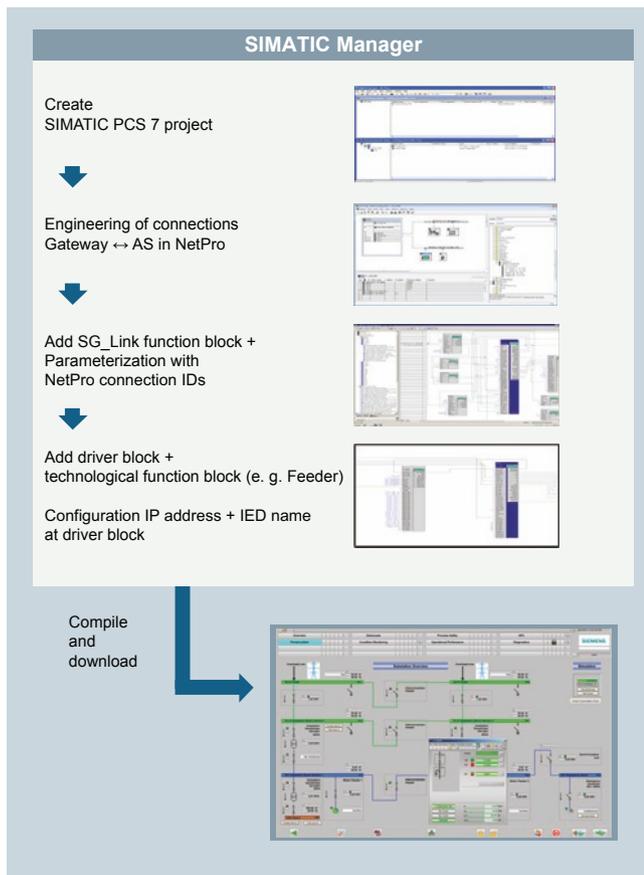
A wide range of SIPROTEC protection devices is supported, e.g. the 7SJ, 6MD, 7UM, 7UT, 7VE series.

As far as the operator is concerned, the protection devices integrated via PROFIBUS DP are operated and monitored in the same manner as the IEDs integrated via IEC 61850. The GUI based on technological objects is thus totally integrated and uniform even in mixed configurations of the two integration solutions. This makes a significant contribution toward the avoidance of operator errors and toward increasing the plant's operating efficiency.

SIMATIC PCS 7 PowerControl engineering

Configuration of a typical SIMATIC PCS 7 PowerControl project is based on known, proven tools which interact optimally and support efficient engineering.

IEDs are configured using the device-specific configuration tool – this is DIGSI for the SIPROTEC devices from Siemens. The IED data can be exported via SCD/ICD file to allow application of the existing information in further work procedures. Depending on the configuration used, for example integration via operator station or gateway, SIMATIC PCS 7 Engineering is supported by corresponding engineering tools. As usual in SIMATIC PCS 7, the symbols and the faceplates are automatically generated in each case in the corresponding OS picture during compilation and loading.



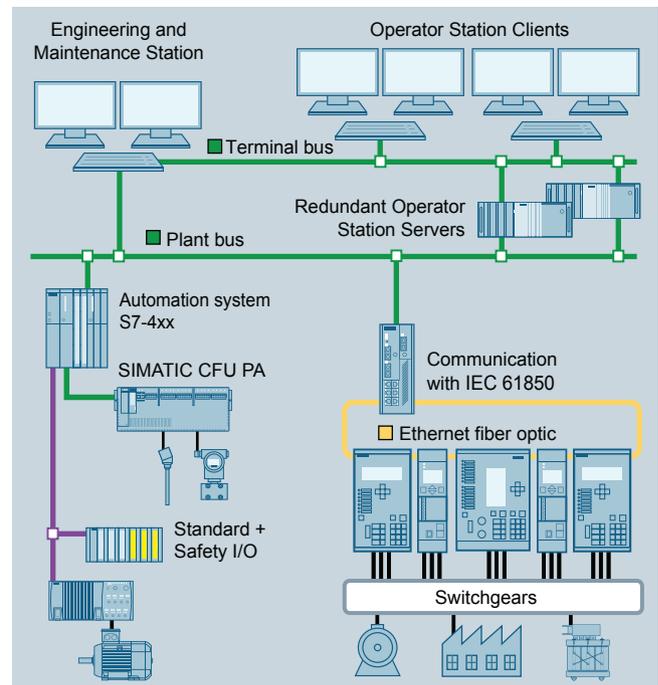
Workflow for engineering of PCS 7 PowerControl with station gateway (symbols and faceplates generated in corresponding OS picture)

SIMATIC PCS 7 operator station for PowerControl

The SIMATIC PCS 7 operator stations are based on modern industrial workstations that are optimized for use as an OS single station, OS client or OS server and can be used in office or industrial environments. Thanks to the homogeneous integration of SIMATIC PCS 7 PowerControl visualization into these operator stations, the process control system and station control system are merged at the system management level.

The runtime software of the SIMATIC PCS 7 operator station is additionally provided with the IEC 61850 communication driver by SIMATIC PCS 7 PowerControl and can thus communicate simultaneously with the SIMATIC PCS 7 controllers and the protection devices, the so-called intelligent electronic devices (IEDs).

The standard functions of SIMATIC PCS 7 are, of course, also available to SIMATIC PCS 7 PowerControl.



Integration via SIMATIC PCS 7 operator station

With this configuration, no connections exist to functions in SIMATIC PCS 7 automation systems, e.g. for interlocks. For this application scenario, there are the different configurations with the SIMATIC PCS 7 controller.

SIMATIC PCS 7 Controller

The various SIMATIC PCS 7 controllers with their scalable versions are used for typical process automation tasks, but can also be applied to automation of the energy section of the plant. The configuration possibilities available for this permit flexible consideration of the specific requirements of the respective application. The combination of a SIMATIC PCS 7 controller with a station gateway is supported for connecting a larger number of IEDs via IEC 61850. If high availability is required, redundant configurations of the controller as well as of the station gateway can be used.

A compact and cost-effective combination of automation and IEC 61850 communication is enabled with the station controller. The SIMATIC Microbox PC supports SIMATIC PCS 7 automation functions with the PowerControl Library in a non-redundant configuration, similar to a SIMATIC PCS 7 controller.

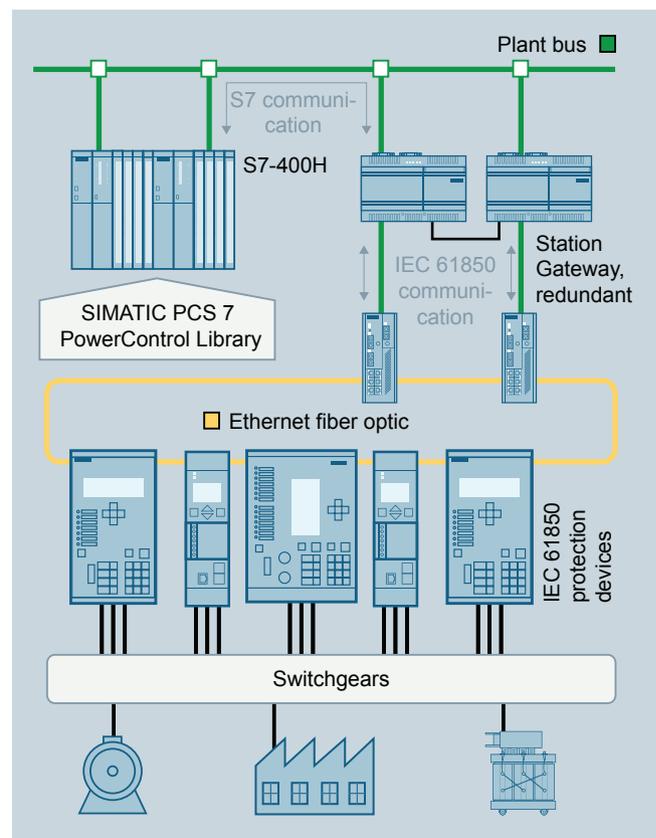
One solution with an existing PROFIBUS infrastructure is the subordinate integration of protection devices on the PROFIBUS DP into a single or redundant SIMATIC PCS 7 S7-400 automation system using the PowerControl Library and PROFIBUS driver blocks.

The protection devices are integrated into the SIMATIC PCS 7 operator station using symbols and faceplates which can be used for SIPROTEC protection devices as well as those from other vendors. As far as the operator is concerned, technological functions such as feeder, motor or transformer are in the foreground – the protection device actually used is hidden from the operator.

Station gateway

The station gateway for SIMATIC PCS 7 PowerControl integrates intelligent electronic devices (IEDs), e.g. protection devices, into the SIMATIC PCS 7 process control system. It is also suitable for redundant configurations, and is therefore preferable when there are increased availability requirements. With a maximum number of 128 IEDs, it can additionally connect a large number of protection devices.

The station gateway uses S7 connections for data exchange with the automation system. The IEC 61850 MMS protocol is used for communication with the protection devices.



A redundant station gateway supports a larger number of protection devices and provides increased availability

The relevant data of the switchgear in the automation system is available using the station gateway, and can be operated, monitored and archived using standard PCS 7 functions.

During IEC 61850 MMS communication with the IEDs, the station gateway acts like an IEC 61850 MMS client. The IEDs form the counterpart, the IEC 61850 MMS servers. All tags provided via IEC 61850 communication can be addressed via the station gateway. Time stamp, value, and status of the tags are transferred depending on the configuration. The time stamp always originates from the protection device.

The station gateway communicates with the SIMATIC PCS 7 automation system via the latter's CP 443-1 communication module or the internal Ethernet interface. Standard communication mechanisms of SIMATIC PCS 7 are used in this case.

The driver blocks available for various types of device are pre-configured for a standard range of tags, but can also be re-configured and extended without problem for special project requirements. The communication library offers comprehensive diagnostics and alarm signaling options. As a result, breaks in communication with the gateway, with the IEDs, or redundancy problems, for example, are stored directly in the PCS 7 alarm logging system. Furthermore, special driver blocks in the communication library permit connection of the SIMATIC PCS 7 PowerControl Library (PCL). The PCL is therefore an ideal supplement to integration of the switchgear with the station gateway.

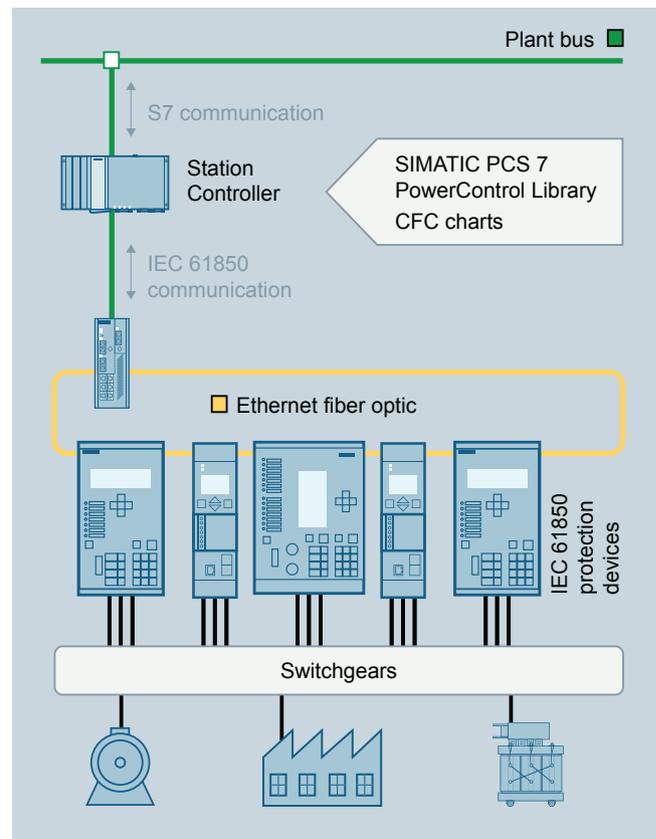
Station controller

The station controller for SIMATIC PCS 7 PowerControl permits extremely flexible and cost-effective integration of switchgears into the SIMATIC PCS 7 system. It is based on the "modular Embedded Controller" (AS mEC RTX) which has received approval as a PCS 7 controller. It thus offers the full functionality of the high-performance soft PLC WinAC RTX, coupled with the pioneering IEC 61850 protocol for integration of the switchgear. The station controller can therefore handle all automation and communication tasks in smaller plants without an additional controller.

The station controller offers a wide range of communication options. Using the standard interfaces, it can communicate with the field level or the operator system via PROFINET, S7 connection or central I/Os. On the other hand, it enables interfacing to the switchgears or higher-level systems by means of the open IEC 61850 and IEC 60870 protocols.

The station controller has the same basic functionality as the automation system. When connecting switchgears, the station controller additionally acts as an IEC 61850 MMS client. The IEDs are IEC 61850 MMS servers.

All tags provided by IEC 61850 can be addressed via the station controller as MMS client. Time stamp, value, and status of the tags are transferred to the WinAC user program depending on the configuration. The time stamp always originates from the protection device.



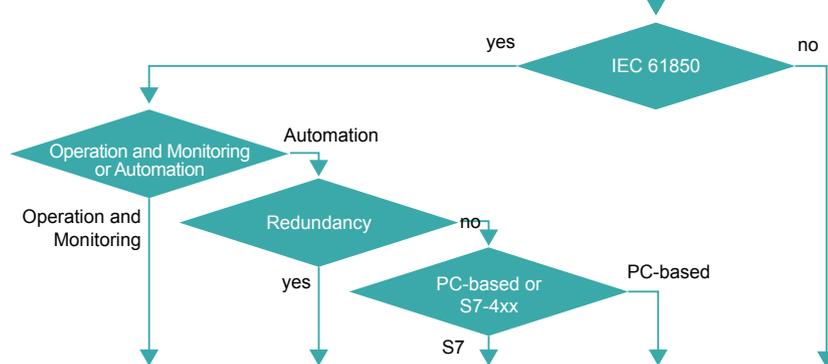
The PC-based station controller unites the functions of a PCS 7 automation system with the integration of protection devices at a highly favorable price/performance ratio.

The supplied StatCon configuration tool provides support in configuration of the data functions. The CFC block library SC_DRV included in the delivery is available on the SIMATIC PCS 7. The driver blocks included in this library enable further processing of the data from the switchgear in the automation program as well as diagnostics of the station controller. This library also contains special driver blocks for connection of the SIMATIC PCS 7 PowerControl Library (PCL). Therefore, use of the PCL is an ideal supplement to integration of the switchgear with the station controller.

The IEC 61850 and IEC 60870 protocols can be combined in any manner. This makes it possible, for example, to additionally connect the automation system and the switchgear to a higher-level system via IEC 60870 slave.

Selection aid for system components

Integration of Medium-Voltage Switchgear Plants into SIMATIC PCS 7

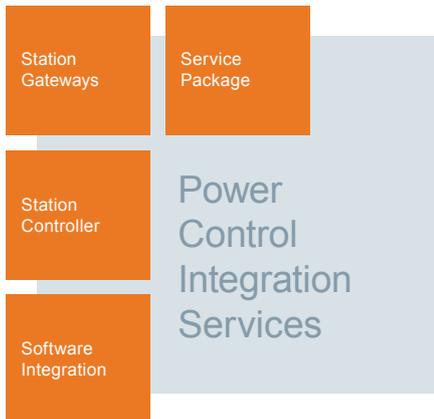


		OS Option	Gateway (red.)	Gateway	Controller	PROFIBUS
Hardware	Station Controller (< 64 IEDs)	–	–	–	×	–
	Station Gateway (< 128 IEDs)	–	×	×	–	–
	SIMATIC PCS 7 OS Server	×	×	×	×	×
	SIMATIC PCS 7 Automation System	–	×	×	–	×
Software	PowerControl Library (PCL)	–	×	×	×	×
	PowerControl OS Runtime	×	–	–	–	–
	PowerControl OS Engineering	×	–	–	–	–
	PowerControl PROFIBUS DP Driver	–	–	–	–	×

Selection aid with various possibilities for integration of switchgears in SIMATIC PCS 7

The various system components of SIMATIC PCS 7 PowerControl can be combined flexibly with each other to enable integration and automation of medium-voltage switchgears for the complete range from small and simple plants all the way to extensive and complex plants. The above graphic provides you with support for selecting the components for a user-specific solution.

Power Control Integration Services



Professional service concept

To ensure the serviceability of your plant, we offer you a professional service concept that is optimally tailored to your individual needs in terms of long-term availability of technical support and spare parts availability.

The combination of gateway, controller or software library in conjunction with the SIMATIC PCS 7 PowerControl Library enables easy and consistent integration of IEDs – from the field level to the operator station.

Furthermore, both Siemens switchgear and protection devices as well as devices from third-party manufacturers can be integrated.

Power Control Integration Services offer flexible integration into existing small plants via software as well as performance-oriented integration into existing systems using additional hardware.

This is done independent of the manufacturer of the protection devices by applying the IEC 61850 standards.

More information can be found on the Internet at:
www.siemens.com/pcis

Advantages of Legacy System Services



Efficient

Cost-effective solution based on standard (Industrial Ethernet) components



Flexible use

Scalable and flexible from just a few to several hundred devices



Lifecycle-oriented

Long-term protection of serviceability through assured spare parts availability and technical support

Protection and switching devices from Siemens



SIPROTEC protection devices and bay controllers

SIPROTEC protection devices and bay controllers for power supply and machinery protection

The comprehensive portfolio of SIPROTEC protection devices covers all feeder tasks: Protection, control, measuring, and automation.

All devices from the SIPROTEC 4, SIPROTEC Compact, and SIPROTEC 5 series support the IEC 61850 standard and can be used with ring and star communication topologies.

The DIGSI operation program is available for configuration and commissioning of all SIPROTEC devices.

With more than 1.6 million devices in use, SIPROTEC has developed into the standard for digital protective systems. Suitable devices are available for different applications:

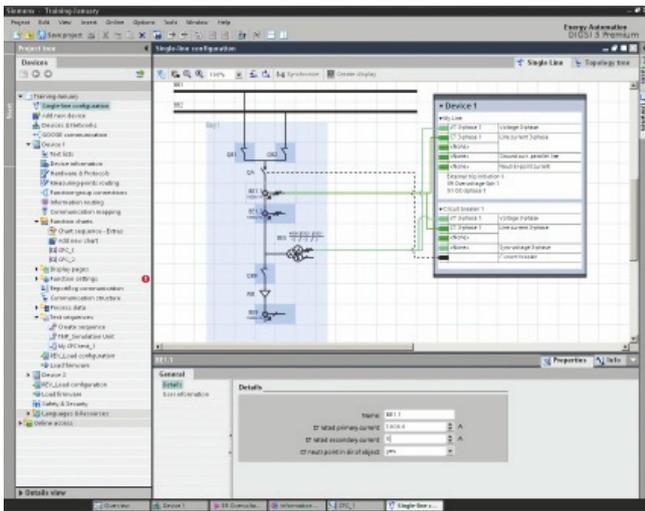
- Overcurrent-time protection
- Motor protection
- Ground-fault protection
- Transformer protection
- Line differential protection
- Distance protection
- Busbar protection
- Machinery protection

SIPROTEC Compact

The particularly compact range of devices offers flexible protection functions with minimum space requirements. The devices can be used as the main protection or backup protection.

SIPROTEC 5

The SIPROTEC 5 series is based on the long-term field experiences gained with the SIPROTEC 4 and SIPROTEC Compact series and is specially designed for the new requirements of modern networks. Thanks to the high modularity of hardware and software, the functionality can be repeatedly adapted to changing requirements during the complete lifecycle. In addition to reliable, selective protection and comprehensive automation functions, SIPROTEC 5 offers a comprehensive database for operation and monitoring of modern power grids.



DIGSI 5 Single Line Editor

Configuration with DIGSI

DIGSI is the Windows based operation program for configuration and commissioning of all SIPROTEC devices.

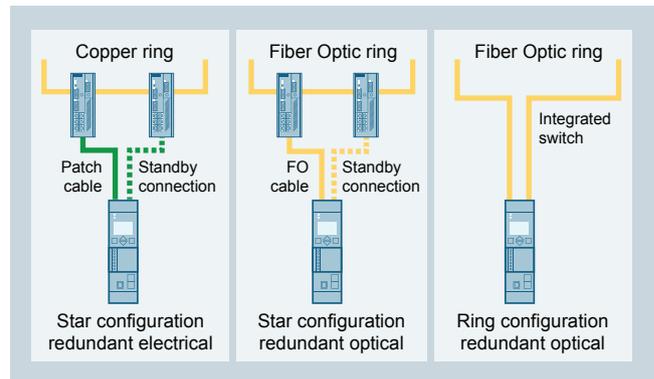
The intuitive user interface enables you to perfectly master all the tasks involved in the design, implementation, commissioning and operation phases.

Representation and evaluation of fault recordings from digital protection devices in the Comtrade format is also possible.

Using the export interface in DIGSI, the SIPROTEC device data relevant for integration in SIMATIC PCS 7 PowerControl can be exported as an IID file or via IEC 61850 as an SCD file and then imported into the SIMATIC PCS 7 PowerControl Engineering.

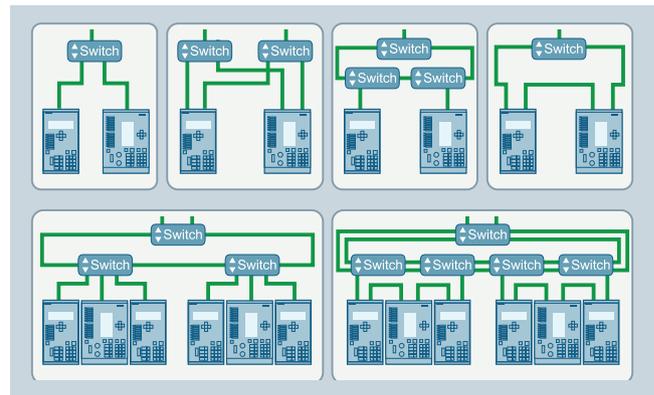
Integration of the protection devices

SIPROTEC devices offer flexible communication options according to IEC 61850. They support electromagnetically compatible fiber-optic transmission and the design of redundant ring topologies. All Ethernet communication modules of the SIPROTEC devices have an integrated switch. This enables the communication network to be set up in a compact, rugged and simple manner.



Star and ring as possible communication topologies

The protection devices can be integrated in a complete configuration using graded network topologies, e.g. in the form of star, ring or star/ring topologies. Thanks to the hardware flexibility of the SIPROTEC 5 devices, physically separate communication networks can be set up. Different availability requirements can then be taken into consideration.



Typical examples of the integration of protection devices in a complete configuration using different network topologies

Thanks to standardization based on IEC 61850, it is possible to integrate devices from other vendors into SIMATIC PCS 7 PowerControl in addition to the SIPROTEC protection devices from Siemens. Device-specific adaptation may be necessary in such cases.

More information can be found on the Internet at:
www.siemens.com/siprotec

Communication in switchgears



Switches of the RUGGEDCOM product line

Switches for harsh industrial environments and electrical substations

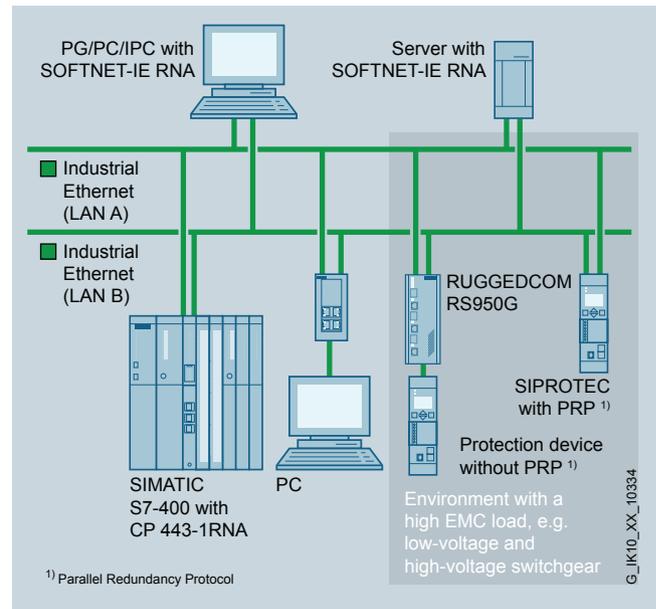
The switches of the RUGGEDCOM product line are managed Industrial Ethernet switches with degree of protection IP30 or IP40. They are designed for use in harsh industrial environments as well as in electrical substations with IEC 61850. They permit the communication of switching and protection devices in medium-voltage and high-voltage substations. The switches come with all the necessary EMC approvals for this field of application (IEC standard 61850-3). The devices for increased availability requirements are offered with various power supply options (24 V DC, 48 V DC, wide-range power supplies 88 - 300 V DC or 85 - 264 V AC).

RUGGEDCOM Ethernet switches were specially developed for electric utilities. They are extremely rugged (metal enclosure/no fans) and feature a high temperature range (-40 to +85 °C). With conformal coating, they can also be used in hazardous areas. The switches are available as compact devices as well as 19" rack devices.

Bumpless redundancy for PRP and HSR networks

Redundant network structures increase network availability, but are usually associated with brief delays in data transfer when switching to a different network path in response to a connection failure.

Such types of message frame delay can be avoided by using Redundant Network Access (RNA) for hardware and software which supports both PRP (Parallel Redundancy Protocol) and HSR (High-availability Seamless Redundancy Protocol).



Example configuration: redundant network topology with PRP communication

The switches from the SCALANCE X204RNA EEC range enable the configuration of redundant networks. They are available in versions for two separate networks (PRP) and for ring networks (HSR).

Further RNA products for direct connection of terminal equipment are:

- Communication processor (CP) for connecting a SIMATIC S7-400 or S7-400H PLC to parallel networks via PRP
- SOFTNET-IE RNA as a software product which permits integration of PCs in redundant, parallel network structures based on PRP
- RUGGEDCOM RS950G Redundancy Box (RedBox) according to IEC 62439-3 supports both High Availability Seamless Redundancy (HSR) and Parallel Redundancy Protocol (PRP)



Devices with "Security Integrated": Industrial Security Appliances SCALANCE S, Security CP 443-1 Advanced for S7-400 or CP 1628 for PCs and RUGGEDCOM RX1500 or RX1511

Network security

It is becoming increasingly important to protect automation systems because of the increased networking of automation plants and the application of open standards. Unauthorized access – by persons or also by malware – must be prevented in order to avoid manipulation or data espionage and also to ensure that plant availability is not endangered.

To avoid expensive plant downtimes and the loss of know-how, concepts which protect the automation plants and the networks in particular are imperative. This includes the supervision of all interfaces, e.g. between office and plant networks or for remote maintenance over the Internet. The standard protection measures include the deployment of firewalls and the establishment of a DMZ (demilitarized zone). The Industrial Security Appliances of the SCALANCE S range have been especially designed for such applications:

- SCALANCE SC63x-2C with firewall as well as 2 - 4 × 10/100/1000 Mbit/s RJ45 and 2 × 100/1000 FO Combo Ports (SFP)
- SCALANCE S615 with firewall and VPN as well as 5 × 10/100 Mbit/s RJ45 ports
- SCALANCE SC64x-2C with firewall and VPN as well as 2 - 4 × 10/100/1000 Mbit/s RJ45 and 2 × 100/1000 FO Combo Ports (SFP)

Secure segmentation of the plant network into individually protected automation cells (cell protection concept) minimizes risks even further. The cells are divided and devices are assigned according to the communication and protection needs. In addition to the Industrial Security Appliances of the SCALANCE S range, it is also possible to use communication processors for SIMATIC controllers equipped with additional security functions, e.g. CP 443-1 Advanced for SIMATIC S7-400. The Security CP 1628 for PCs or the SOFTNET Security Client can also be used to set up secure VPN connections from PCs or operator stations to the cells protected by SCALANCE S or Security CPs.

For the medium-voltage and high-voltage substations, the RX1500 with the RUGGEDCOM APE module (Application Processing Engine) provides an ideal platform for network, safety-related and third party applications. Examples include Intrusion Detection Systems (IDS), firewalls, network protocol and load analysis software.

More information can be found on the Internet at:
www.siemens.com/industrial-communication

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Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a comprehensive, state-of-the-art industrial security concept. Siemens' products and solutions form only one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the Internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Attention should also be paid to Siemens' recommendations on appropriate protective measures. You can find more information about Industrial Security by visiting **www.siemens.com/industrialsecurity**.

The products and solutions from Siemens undergo continuous development to make them even more secure. Siemens strongly recommends applying product updates as soon as they are available and always using the latest product versions. Using versions that are obsolete or no longer supported increases the risk of cyber threats.

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