SIEMENS

Your partner for success in the oil and gas industry

Boost competitiveness while staying sustainable, reliable, and safe in operation.

Oil and Gas Industry – **Tailored Solutions**

Transforming Oil & Gas: Leveraging Digitalization and AI to Enhance Safety, Reliability, and Efficiency in Electrification, Automation, and Operations - from Exploration to Distribution!

Shaping the change

The oil and gas industry is transforming from fossil to renewable energies, embracing digital transformation to optimize operations and drive sustainability. Siemens, as a one-tech company, is a knowledgeable provider of core components for electrification, automation, and digitalization, empowering this shift with IoT and AI solutions.

With our wide portfolio, we are a trusted companion over the entire lifecycle of a plant. From process design to integrated engineering to integrated operation and maintenance. It is tailored to the needs of Original Equipment Manufacturer (OEMs), EPCs and owner/operators. This encompasses the simulation and operation of safe, efficient, and sustainable projects, leveraging data-driven insights. Siemens Xcelerator, Electrifcation X, Building X and the Digital Enterprise enable oil and gas companies to deploy new business models and new solutions using IoT and AI to make informed decisions that meet both growth and sustainability goals, and aim for a sustainable future.

Content

Information and Ordering

Further Information

Comprehensive portfolio for digital transformation
siemens.com/oilandgas

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sieportal.siemens.com

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oilandgas.industry@siemens.com

Digitalization

Electrification X

Electrification X combines the real and digital worlds in the Xcelerator IoT Software as a Service (SaaS) offering, designed to master the challenges of energy transition. It helps renewable energy operators, transmission system operators (TSOs), distribution system operators (DSOs), data centers, industries and infrastructure customers to manage their energy networks, increase uptime and improve reliability, asset utilization, cybersecurity, and energy efficiency to reach sustainability goals.

Electrification X has an integrated user experience, meaning that all data of one station is available to the user in one place with a harmonized data structure und user experience. For example, there is one login to the system, a general map view of all connected station, a list of all alarms and events, and a common asset topology with all connected assets.

Electrification X has six feature sets that have dedicated use cases and value propositions: Load Management, Network Fault Management, Asset Management, Sustainability/Energy Management, Distribution Grid Monitoring, and OT Companion.

With different feature sets, Electrification X helps our customers to:

- Manage rapidly growing EV charging networks while keeping the grid stable
- Localize and manage network faults efficiently
- Increase uptime and improve asset utilization while reducing OPEX
- Reduce energy cost and CO2 emission
- Keep the distribution grid stable
- Ensure cybersecurity

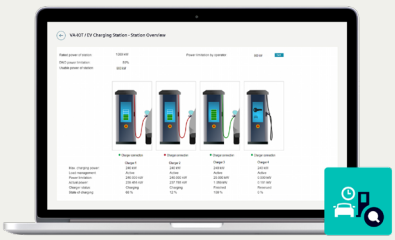
Electrification X - Asset Management

Electrification X – Asset Management is a digital caretaker of your entire energy distribution, automation systems and networks at medium- and low-voltage levels. It allows visualization and continuous monitoring of electrical assets from one substation or across multiple locations, provides operational data, health status information and visualizes all alarms along with their status and details.

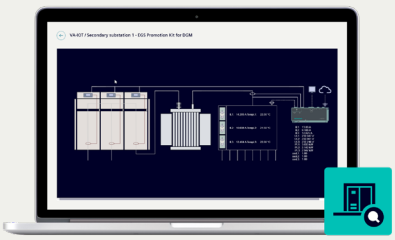
Digitalization

Electrification X - Sustainability/ Energy Management
The first step towards energy efficiency required for the energy transition.

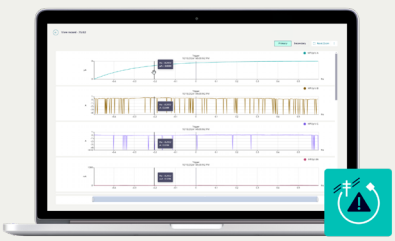
Electrification X - Sustainability/Energy Management is designed to overcome industrial challenges and provide competitive advantage by improving energy efficiency, optimizing costs, reducing carbon emissions and optimizing energy mix.



Electrification X - Load Management
Electrification X – Load Management offers you transparency of EV-charging network status and load, EV-charging station remote control and dynamic load management following instant power limitations by the Distribution Network Operator, avoiding costly limit violations.

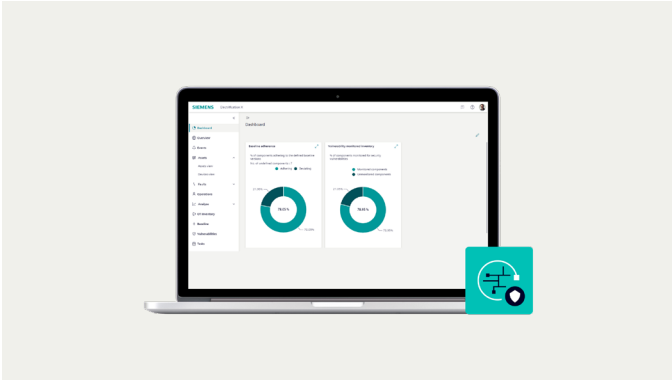


Electrification X - Distribution Grid Monitoring
Electrification X – Distribution Grid Monitoring offers precise monitoring of all distribution grid stations and street cabinets of medium voltage (MV) and low voltage (LV) grid. Comprehensive load monitoring in the low voltage distribution grid provides insights into the power grid's utilization, the load of critical grid components and, in particular, identifies bottlenecks in the power supply.



Electrification X - Network Fault Management
Electrification X - Network Fault Management (NFM) feature set provides comprehensive transparency of electrical faults within both transmission and distribution networks. It employs various approaches to ensure users have an efficient and guided approach to managing electrical faults. This feature set enhances the visibility and insights of the overhead and underground electrical networks, facilitating prompt and effective fault management.

Digitalization



Electrification X - OT Companion

Electrification X - OT Companion is your partner in the management and protection of Operational Technology (OT) assets. Tailored for municipalities, distribution and transmission companies, it makes it easier to navigate the challenges of IT/OT convergence. From asset discovery and monitoring to proactive vulnerability management.

SIMARIS control

SIMARIS control – an on-site digital twin of your substation that unlocks the full potential of field devices from medium-voltage switchgear to low-voltage switchboards, transformers, and peripheral devices.

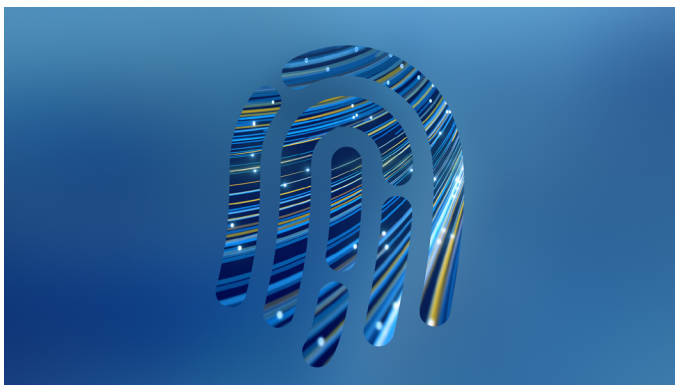
SIMARIS control can provide asset monitoring and control, simple temperature monitoring to condition-based health status monitoring, energy monitoring, digital documentations, remote visualization, and cloud gateway functionality.

SIPROTEC DigitalTwin

Both energy suppliers and industrial customers demand energy automation solutions that increase efficiency and flexibility while saving costs at the same time. The SIPROTEC DigitalTwin is a real-time digital replica of a physical SIPROTEC 5 device including interfaces, functionality and algorithms. The innovative cloud-based SIPROTEC DigitalTwin offers comprehensive test of

SIPROTEC 5 devices:

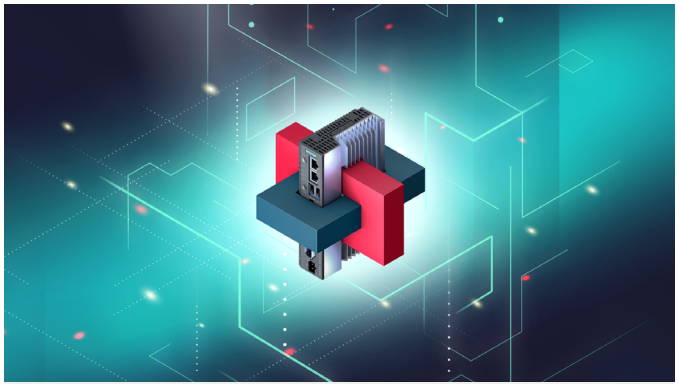
- Virtual testing before start of commissioning
- Simulation and validation of product properties



SIEM – Security Information & Event Management

Our SIEM (Security Information & Event Management) service for operational technologies (OT) helps you detect early attempts to attack your energy automation and control center systems so that you can respond effectively before the systems' functions are affected by a cyber incident.

Digitalization



CloudConnect – cloud connectivity for connecting existing plants

Cloud applications are an important prerequisite for utilizing the benefits of digitalization in an industrial setting. With the Industrial IoT gateways, e.g., SIMATIC CloudConnect 716, even existing plants can be easily connected to a wide variety of cloud platforms that support the standardized MQTT protocol. Other IoT gateways such as RUGGEDCOM RX1400 with CloudConnect for special environmental conditions, SITRANS CC240, and SIMATIC IOT2050 complete our spectrum.

Digitalization

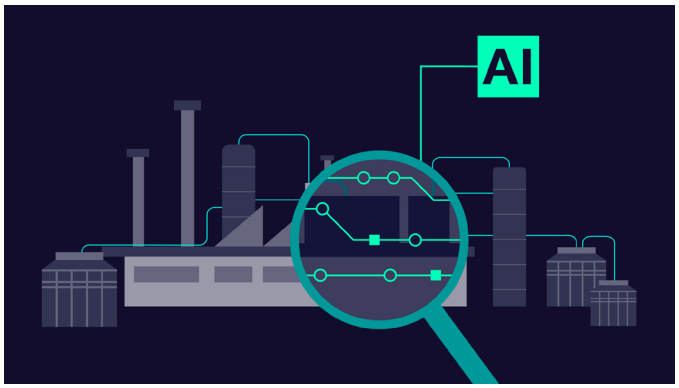
SITRANS IQ – enabling you to talk to and understand your production plant

SITRANS SCM IQ

- Provides smart condition monitoring for mechanical plant assets to detect imminent equipment failures and prevent unexpected plant downtimes
- System comprises IIoT multisensors SITRANS MS200, industrial gateway SITRANS CC220, and the SITRANS SCM IQ app
- Condition monitoring of all vibrating or rotating plant components, e.g., pumps, compressors, gearboxes, agitators, etc.
- Analysis of condition data based on artificial intelligence, allowing early detection of potential failures before they occur
- Event-related warnings enable predictive maintenance

SITRANS mobile IQ

- Free app for easy commissioning, parameterization, and monitoring of Bluetooth-enabled field instrumentation via smartphone or tablet
- Automatically detects and displays all supported and difficult-to-access field devices in the vicinity
- Convenient, quick commissioning or detailed setup, including graphical support
- Displays device status and profile of selected measured and diagnostic values



SITRANS Soft Sensor Engine IQ

SITRANS Soft Sensor Engine IQ (SITRANS SSE IQ) is a virtual measurement technology combining a unique Artificial Intelligence approach and process expertise. The software solution from Siemens enables the accurate prediction of measurement results for a broad range of applications without the need of having a dedicated physical sensor.

Digitalization

SITRANS AID IQ

- Predictive maintenance software for Siemens Analyzer
- All information about health status of analyzer at a glance
- Identification of wear or other problems within devices before they occur by predefined intelligence
- Provision of diagnostic parameter to enable evaluation of health status by Service

Siemens Predictive Analytics (SiePA) – a tool system for predictive maintenance of mission critical processes and equipment

Key Features

- Historical operating data for detection of process parameters correlated to the performance and health status of the equipment
- Model training based on integration of Machine Learning and domain experience
- Equipment and process condition pre-alert/prediction
- Problem diagnosis based on Natural Language Processing
- Modern dashboard with interactive and user-friendly data visualizations

User Benefits

- Increases asset uptime
- Enables remote monitoring and issue identification
- Increases operation efficiency
- Consolidates expert knowledge by constructing models to reduce workload of limited experienced engineers
- Supports better decision accuracy by combining data-driven solution with domain knowledge

Plant Engineering Software (COMOS)

- Integrated data management over the entire plant life cycle
- Common database with object-oriented data management
- Process engineering, pipe specification and isometrics
- Electrical, instrumentation, and control system engineering
- Project and plant documentation
- 3D virtual reality visualization

Digitalization

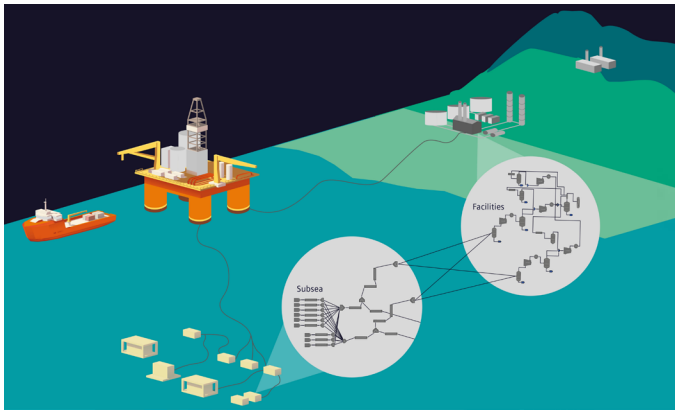
SIMIT Simulation Platform

- Virtual commissioning with SIMIT even without access to real systems and machines
- Extensive integration and use of existing data for easy creation of the Digital Twin
- Operator Training System (OTS) for safe and efficient training of plant personnel in a virtual environment
- Ready-to-use libraries with simulation components provide a quick-start in creating a virtual plant
- The Component Development Center (CDC) supports users in creating individual simulation components

gPROMS Process Digital Twin Technology

- Single modeling platform for design and operation
- High-fidelity unit operation libraries within flowsheeting platform enabling rapid generation of accurate process models covering upstream and midstream application
- Built-in thermodynamics, with advanced equation of state options such as GERG and SAFT-γ Mie, for accurate prediction of physical properties suitable for even the most challenging oil and gas applications such as cryogenic and high CO_2 processes
- Steady state and dynamic simulation, optimization, and uncertainty analysis - using the same model and the same platform for 100% consistency
- Powerful capabilities to apply rigorous optimization to the design and operation of individual unit operations, plant sections, entire plants, or even multi-site applications
- MINLP (Mixed Integer Nonlinear Programming) allows for optimization of continuous and integar decisions, e.g., turning compressor trains on and off (gas processing) or inclusion of routing decisions (oil field)

Digitalization



Safety Verification and Analysis (gPROMS Flare)

- Relief, flare, and blowdown analysis and verification software using high-fidelity non-equilibrium models for greater predictive accuracy
- Ensures safe design for depressurization and flare systems while minimizing CAPEX
- Coupled process and flare system analysis possible as single modeling platform used to model the process, relief devices and flare system, incl. radiation
- Smaller flare systems where space is a premium, such as offshore platforms, thanks to a coupled dynamic analysis
- Accurate thermodynamics, enabling design of even the most challenging high CO2 oil and gas fields
- Complex thermodynamic behavior can be predicted, incl. dense phase depressurization and dry ice formation
- Related safety services

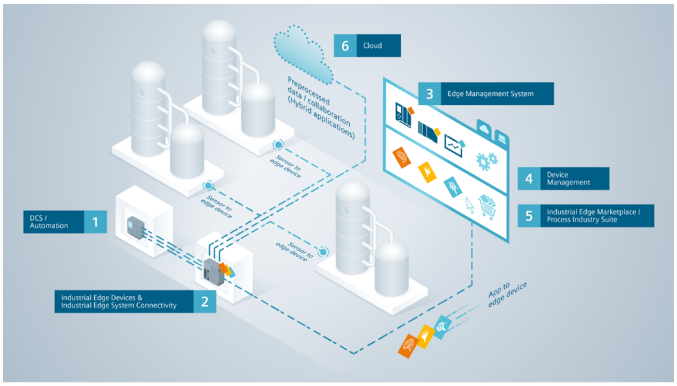
gPROMS Digital Applications for Real-time Optimization of Operations

- gRTO for optimization of process operations, incl. highly integrated LNG and NGL plants, to minimize emissions and energy usage (reduction of 1-3%)
- gPROMS Oilfield for both well and integrated well-to-facilities oil field production optimization to maximize daily production value (increase of production of 1-10%)
- Suitable for both planning and daily optimizations, even for the largest fields, due to optimization calculation speed being orders of magnitudes faster than other tools typically used
- Integrated multi-site gas network optimization, management, analytics, and visualization solutions (1-5% increase in total production and significant flaring reduction)

Digital Worker – taking plant operation to the next level

- Designed for efficiency and safety
- Enables predictive maintenance and real-time documentation
- Merges the real with the virtual world to create new levels of efficiency for your plant operation

Digitalization

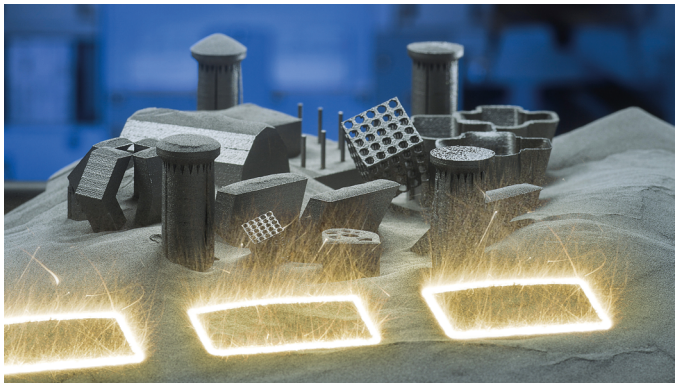


Edge Computing with Industrial Edge

A highly functional system with Edge applications, devices, and management

- Optimal use of data in the field
- No more resource- and time-intensive manual updates
- Data acquisition and processing directly and securely at the machine
- No latency using self-designed software and a central system for administration, deployment, and updates
- A security solution for the protection of data
- Shorter innovation cycles and greater flexibility
- Reduce the time to market
- Open ecosystem with low initial barrier

Digitalization



Additive Manufacturing

- Full digital thread from order to final part
- Advanced simulation for parts and processes
- Manufacturing execution with AM specific functionality
- Financing options for AM
- Consulting offerings for AM

Siveillance Analytics

Security systems produce large amounts of data about various events and alarms in buildings. This data is stored by the respective software, but often remains unused. Siveillance Analytics is a cloud solution that collects data from security systems and turns it into actionable insights. Siveillance Analytics aims to enable better decision-making with prepared information.

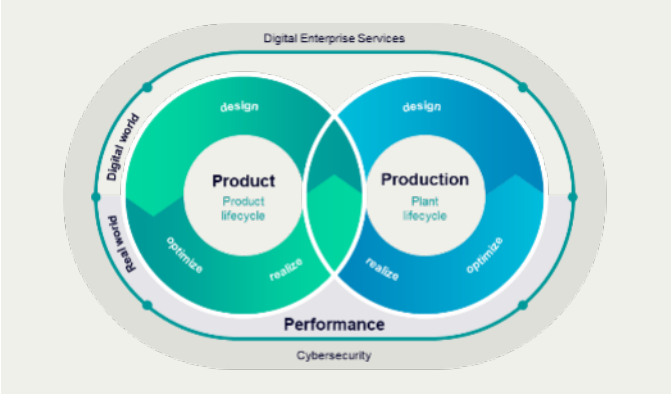
Key Features

- Dashboarding and reporting functionality for data from Siveillance security systems
- Secure cloud connectivity
- Intuitive UI
- Software as a service
- Optional consulting and support services

Analyzer System Manager

- Software solution to optimize analyzer reliability
- Centralized monitoring of all analyzer data
- Prediction of maintenance needs by advanced data analysis function
- Automation of validation/calibration execution and statistical quality control
- Maintenance, planning, and execution, incl. remote access
- KPI reporting for performance transparency

Digitalization



Key challenges on the path towards future-ready oil & gas operations

Addressing the challenges requires you to accelerate your pace of innovation. To stay ahead of the competition, you'll need to embrace new technologies, transforming productivity, performance and sustainability across the oil & gas supply chain, and throughout the asset lifecycle, whilst delivering more predictable outcomes for your projects and operations. So how can you overcome these challenges? The gamechanger lies in your ability to combine the real and digital worlds, with a comprehensive digital twin approach that allows you to seamlessly integrate the complete lifecycle of your products and production. From design to realization, and across the entire value chain. A true digital enterprise where you can harness the unlimited power of your data and gain valuable insights to make faster and better decisions. Enabling a continuous loop of optimization, both for the product and the production.

Integrated Design and Configuration for EPC / Equipment Manufacturer

Industrialize your engineering design processes to power business outcomes, sustainability, and innovation.

- **Multi-Discipline Design & Re-Use**
  Synchronize design processes and engineer better designs, faster
- **Advanced Design Automation**
  Automate design rules and processes to rapidly engineer custom solutions
- **Systems-Driven Design**
  Ensure contractual and regulatory compliance with a systems-driven approach

Digital Lifecycle Excellence for Owner / Operator / EPC

Connect the lifecycle of your capital assets to unleash new levels of productivity, performance and sustainability.

- **Enterprise Data Management**
  Unlock the full value of your data to power projects and operational performance
- **Advanced Program Planning & Execution**
  Transform project delivery to execute better projects, faster
- **Connected Digital Lifecycle**
  Realize new levels of productivity and performance with a connected lifecycle approach

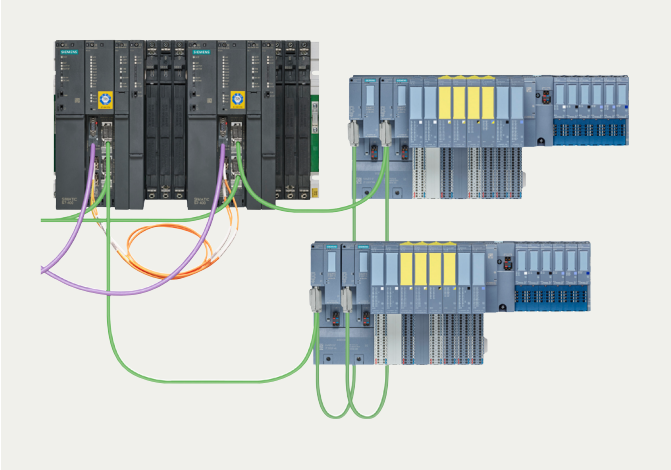
Digitalization

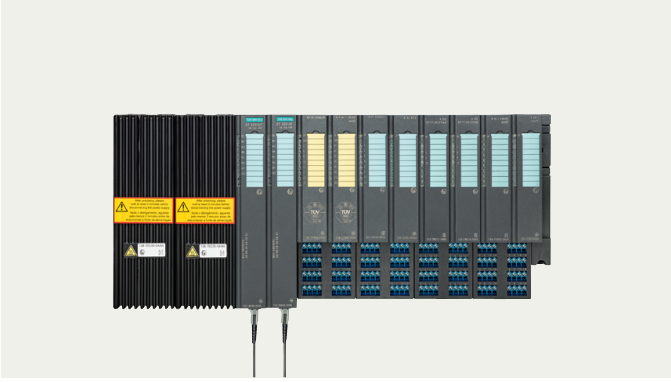
Operational Excellence for Owner / Operator / Equipment Manufacturer

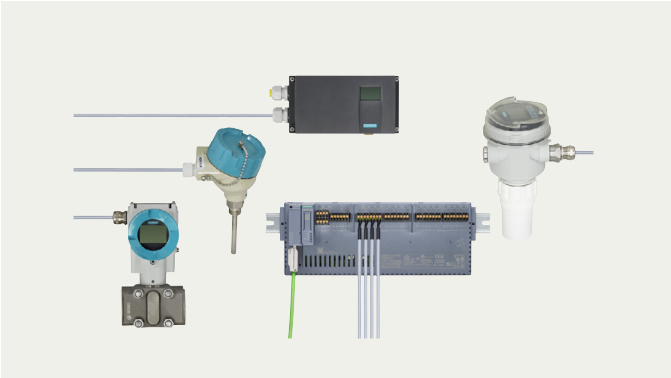
Harness the power of your data to continuously optimize and adapt your production

- **Integrated Pro-duction Operations**
  Integrate core production systems to synchronize continuous improvement opportunities
- **Operational Analytics**
  Real-time performance insight to optimize operations and sustainability
- **Executable Digital Twin**
  Connect operating assets with engineering and simulation for improved modelling, diagnostics and sensing

Distributed Control System (DCS)







SIMATIC Hardware for DCS

The SIMATIC PCS 7 and SIMATIC PCS neo process control systems are based on the same hardware. The modular portfolio provides everything you need for a customized system, which is powerful, future-proof, fully scalable, and highly available.

Fast and Powerful Automation Systems

Our controllers are flexibly configurable and thus ideal for complex applications in the process industries. Depending on your requirements, you'll find fail-safe and extremely powerful controllers as well as components for tasks in which especially harsh environmental conditions call for robustness.

- SIMATIC CPU 410-5H is the fastest and most powerful controller on the market, offering high scalability based on the number of process objects. Its unique scaling concept makes it suitable for entry-level as well as high-end applications. The controller can be used in existing installations based on PROFIBUS and new installations based on PROFINET.

High-Performance I/O systems

The SIMATIC PCS 7 and SIMATIC PCS neo process control systems take advantage of the various benefits of distributed process I/O from Siemens. These enable maximum availability for 24/7 operation 365 days a year through redundant configurations or for use in explosive gas/dust atmospheres:

- SIMATIC ET 200SP HA offers highest availability with PROFINET R1 redundancy, I/O redundancy, and Change in Run (CiR)
- SIMATIC ET 200iSP brings fail-safe I/O directly into Ex zone 1/21 with redundant power supply and is certified up to SIL 3
- SIMATIC Compact Field Unit (CFU) and its variants perfect for small and medium-sized applications and process near installation of PROFIBUS PA & HART field devices, and freely configurable I/O directly in the field

Distributed Control System (DCS)

SIMATIC PCS 7

- Continuous, batch, and sequential control
- Integrated asset management
- Advanced process control
- Flexible and scalable architectures
- Integrated control and process safety
- Batch management
- Cybersecurity
- High-performance graphics
- Virtualized solutions
- Service and support
- Process simulation (SIMIT)
- Energy management solutions
- Alarm management

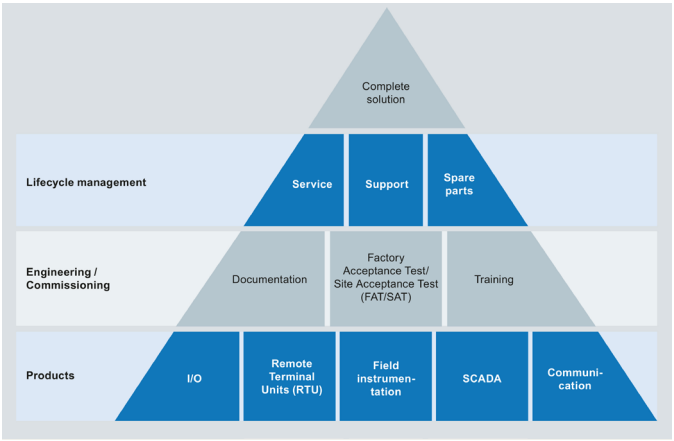
SIMATIC PCS neo

- Process control innovation which opens up entirely new possibilities in the age of digitalization
- Based on the same hardware portfolio and application architecture as SIMATIC PCS 7
- Completely web-based process control system without installation effort
- Multi-User Engineering for global collaboration on projects
- Intuitive graphical user interface (GUI) for all users and applications in a single workbench
- Object-oriented data management for highly efficient and consistent workflows in engineering and operations
- Open and flexible architecture for modular automation and highest scalability (MTP)

Distributed Control System (DCS)

Safety Systems

- TÜV certified according to IEC 61508 up to SIL 3
- Fail-safe communication based on PROFIBUS/PROFINET with PROFIsafe up to SIL 3
- High availability and redundant fail-safe IO with ET 200SP HA
- Flexible Modular Redundancy (FMR)
- Burner management (BMS)
- High integrity pressure protection (HIPPS)
- Fire and Gas (F&G)
- Fault tolerant architecture to reduce spurious trips
- Emergency Shutdown Systems (ESD)
- SIMATIC S7 Safety Matrix, the Safety Life Cycle tool with cause and effect with PCS 7
- Compliant to IEC 61511 and ANSI/ISA standards
- Supports OSHA PSM requirements
- Cybersecurity
- User management and syslog messages



Telecontrol Technology (RTU)

- Combining automation of central plants and monitoring of distributed units in a single process control system
- Homogenous operator control and monitoring using a common control station
- Uniform configuration with the same engineering system
- Consistent utilization of hardware components from TIA
- Remote Terminal Units (RTUs)
- Supported by SIMATIC
- Performance classified as small, medium, or large
- SIMATIC F controllers for implementing safety-related applications on-site
- SIMATIC F controllers automatically set plant to safe status in event of a dangerous fault
- Fulfill international standards such as IEC 61508, IEC 61511, and ISA S84 and are SIL 3 TÜV certified

Distributed Control System (DCS)

The SIMATIC RTU3000C Family – remote yet reliable

- Compact, energy self-sufficient, low-power Remote Terminal Units (RTUs)
- Reliable monitoring of most remote measuring points
- Flexible power supply concept: 2 x 3 redundant battery modules, accumulator with a solar panel, or 12 – 24 V DC power source
- Operating condition from -40 to +70 °C
- IP68 degree of protection for use in areas at risk of flooding

Telecontrol Protocols Supported

- TeleControl Basic
- SINAUT ST7
- DNP3
- IEC 60870-5-104

Tank Farm Management System – TMS

Safety. Transparency. Availability. Efficiency. Today's tank farms must fulfill all of these criteria to operate successfully. As a partner with comprehensive knowledge of seaport terminals, tank farms, loading and unloading stations as well as highly customizable solutions, including for digitalization, we can support your specific applications every step of the way.

Measurement Intelligence

In Situ Continuous Process Gas Analysis

- Continuous determination of concentrations of one or more gases in a gas mixture
- Control and monitor process flows
- Emission monitoring

Analytical Application Sets

- Standardized system solutions
- Supplement the range of individual system solutions
- For a wide range of sector-specific applications

Analyzer System Manager

- PC-based HMI system for monitoring, testing, and management of analyzers
- Information collected via various communication protocols and saved in a central database
- User-friendly operator interface for accessing measured value trends, device states and statistical evaluations, or starting test routines
- Comprehensive reporting module with predefined reports for documenting evaluations
- Maintenance module for planning, monitoring, and documenting device-specific maintenance tasks

Measurement Intelligence

Pressure – SITRANS P

SITRANS P is a complete range of measurement instruments for measuring relative, differential, and absolute pressure. In addition to high measuring accuracy and ruggedness, the modular system features superb operating convenience and functionality as well as a perfect safety concept.

SITRANS P320/420 – the first pressure transmitter for remote commissioning of functional safety

- Time and effort savings due to remote commissioning of SIL devices
- Ready for plant digitalization with the HART 7 pressure transmitter: data logging functions and event control deliver users in-depth control and analysis
- User-friendly due to clear display and diagnostic icons in accordance with NAMUR NE107
- Maintenance cost reduction due to proof test interval up to 10 years

Temperature Measurement – SITRANS T

SITRANS T products offer a wide range of solutions for tasks in temperature measurement technology. The communicative and highly reliable SITRANS T meet the expectations in all environments – hot, cold, or hazardous.

- Safe transmitters in head, field, and rail mounting with outstanding characteristics
- Complete measuring points as resistance thermometers or thermocouples
- Dual RTD four-wire technology for sensor and transmitter: combines the safety of hot backup with the stability and accuracy of four-wire circuitry into a unique feature that reduces costs and increases safety
- Extensive certificates for many countries for explosion protection, marine, SIL 2/3 according to IEC 61508 etc.
- Local operation directly on the device display

Measurement Intelligence

Level – SITRANS L

Whether you need to detect liquids, slurries, solids, or interfaces, the SITRANS L portfolio provides the right technology:

- Radar and guided wave radar
- Ultrasonic
- Capacitance
- Point level

Flow – SITRANS F

When measuring gases, liquids, or steam, the correct flowmeter is decisive for productivity. This is where the SITRANS F line comes in. Our portfolio contains the right flowmeter for every application and medium, with five different flow technologies available to suit a wide range of operating conditions: Coriolis, electromagnetic, ultrasonic, vortex, and differential pressure.

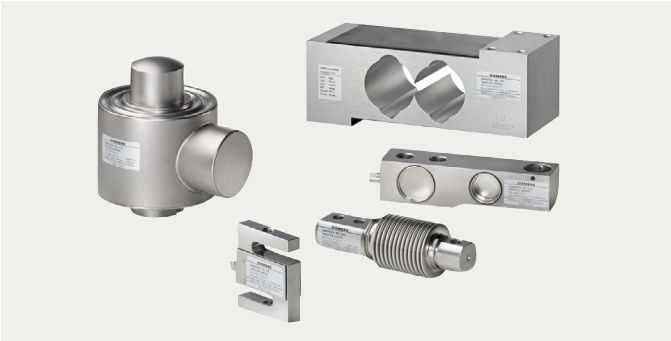
Measurement Intelligence

SIPART Valve Positioners

- For linear and part-turn actuators
- SIPART PS2: particularly flexible stroke ranges, intelligent diagnostics, and various communication protocols
- SIPART PS100: simple handling and fast commissioning for standard applications

SIWAREX Weighing Components for Automation Systems

- Comprehensive range of weighing electronics
- Continuous SIMATIC hardware
- Seamless integration into Step 7, TIA Portal, and PCS 7
- Long-term availability



SIWAREX Load Cells

- Correct load cell for every nominal load
- Wide selection of different designs: from platform load cells to bending and shear beam, s-type, and compression cells
- Static and dynamic weight measurements

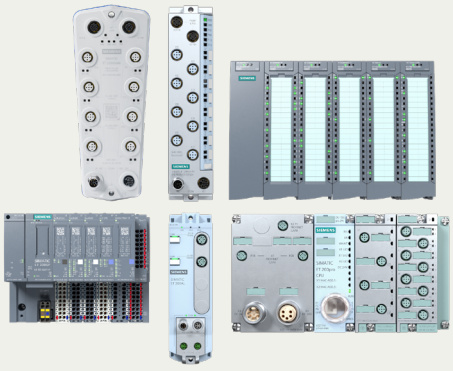
Discrete Automation

SIMATIC Controllers

- Basic controllers for simple and standalone automation tasks (S7-1200)
- Advanced controllers for medium and highly complex machine/plant automation (S7-1500)
- Distributed controllers for package units with limited footprint and machines with distributed architecture (ET 200SP, ET 200pro CPU) and the possibility of usage of MTP (Module Type Package)
- Software controllers for PC-based automation (S7-1500 software controller, WinAC)

SIMATIC S7-1500

- CPUs with display for plain text information about system settings and diagnostics
- System diagnostics integrated in CPU, activated by default
- Integrated PROFINET and PROFIBUS interfaces
- Integrated Modbus TCP interface
- Supports Telecontrol protocols such as IEC 60870-5-101/104 and DNP3
- Fail-safe SIMATIC S7-1500F Controllers for processing standard and safety programs on the same controller
- Additional access protection by means of a firewall and establishment of secure VPN connections (using communication processor CP 1543-1)
- SIMATIC ET 200SP open controller is a robust, compact control system for special or serial machines or for the peripheral control of systems



SIMATIC Distributed I/O

- I/O Systems inside control cabinet, IP20 (ET 200SP, ET 200MP)
- I/O Systems without control cabinets, IP65/67 (ET 200AL, ET 200pro, ET 200eco PN)
- Modular, scalable, compact, flexible
- PROFIBUS, PROFINET, Modbus TCP or EtherNet/IP
- Safety Integrated
- Integrated motor starter option (ET 200SP, ET 200pro)

Discrete Automation

Totally Integrated Automation (TIA) Portal Software

- Single engineering framework
- Reduced engineering time
- Increased transparency and diagnostics
- Intuitive
- Common tag database
- Custom libraries

SIMATIC PC-based Automation

- Industrial PCs
  - Rack
  - Box
  - Panel
  - HMI Panel Ex
- Industrial Monitors and Thin Clients (SCD Monitors, Flat Panels, Industrial Flat Panels, Thin Clients)
- Expansion components/accessories
- Customization
- PC-based Controllers (S7-1500 Software Controller)
- Embedded Controllers (S7-1500 Open Controller)
- Embedded Bundles/Software Packages (Box Bundles, PC Bundles, Software Packages)

SIMATIC HMI Panels

- Unified comfort panels for performance, openness, and user-friendliness (high-end, 7–22 inch operartor panels)
- Comfort panels for performance and functionality (Standard, Outdoor, INOX)
- Basic panels for economical, high-resolution visualization solutions (2nd gen)
- Mobile panels for maximum mobility and flexibility (2nd gen)
- Key panels for flexible expansion with keys or safety functions (KP8/KP8F, KP32F)

Discrete Automation

SCADA System SIMATIC WinCC

- User-friendly, scalable system to meet your needs
- Absolute openness
- Integrated process database and Plant Intelligence
- Innovative web solutions
- Openness and international standards

SCADA System SIMATIC WinCC Open Architecture

- Object orientation
- Scalable to plus 10 million tags
- Platform-independent
- SIL 3 certified according to IEC 61508
- Platform for customized solutions
- Comprehensive range of drivers and connectivity

SIMATIC Safety Integrated

- One controller
- Engineering and communication for standard and fail-safe automation
- Wide range portfolio from micro-processors to PC-based controller
- Ability for local safety modules
- Centralized safety IO, PC-based safety, wireless safety
- Wide range of integrated drive technology
- Safety controller with single processor for TÜV approval

Industrial Network Components

Industrial-grade network components enable secure, reliable, and high-availability connectivity in challenging environments. With key international industry approvals including ATEX, UL HazLoc, IECEx, and IEC 61850, these products ensure greater operational efficiency and object recognition.

Industrial Security

Industrial Security Appliances from SCALANCE and RUGGEDCOM protect industrial networks and automation systems by segmenting the network and establishing secure communication channels.

SCALANCE X Industrial Ethernet Switches

- Large portfolio with compact, flat, modular, and 19" rack devices in layer 2, layer 2/3
- High data rate up to 10 Gbps and Power over Ethernet (PoE)
- NAMUR NE21-compliant variant: conformal coating (G3), temperature range -40 °C to +70 °C, installation altitude up to 4 000 m, IP65 degree of protection for applications without control cabinet
- Approvals for ATEX Zone 2/IECEx, cULus HazLoc, FM

SCALANCE S Industrial Security Appliances

- User-specific firewall and securing local network access
- Simple device replacement with C-PLUG
- Redundancy mechanisms through VRRPv3
- Flexible and user-specific access rights

RUGGEDCOM Multi-Service Platforms

- All-in-one layer 3 router, VPN, and firewall
- Provide enhanced IPsec and encryption performance for data security
- Easily deploy third-party applications for Edge computing and cybersecurity at the OT Edge, for example: secure access management, next-generation firewalls, intrusion prevention, and anomaly detection with RUGGEDCOM APE1808 (application processing engine)

Industrial Network Components

RUGGEDCOM Layer 2 Switches

- Ideally suited for mission-critical control applications
- High degree of reliability and availability in extreme harsh environments
- Smooth operation in extended temperature range from -40 to +85 °C

WIRELESS APPLICATIONS

SCALANCE W Devices

- Offer reliable industrial wireless communication at various automation levels
- Support fail-safe data transmission according to IEEE 802.11n standard

SCALANCE M Family

- Secure remote access
- Implementation of a cell protection concept in the fields of telecontrol or teleservice
- Remote machines or systems can be connected to a central network or service center from around the world
- Includes modems and routers
- For wired or wireless private and public IP-based networks
- High level of immunity to EMI, shocks, and vibrations

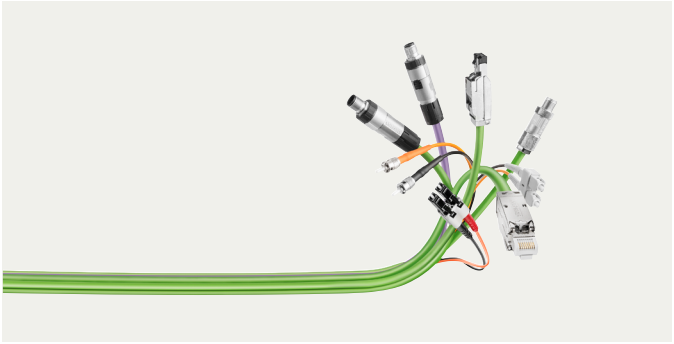
RUGGEDCOM WIN

- Broadband wireless product portfolio for private networks
- Delivers the benefits of carrier-grade 4G technology

SINEC NMS – OT Network Management System

- Flexible and scalable
- Overall and transparent monitoring of the entire industrial network
- Policy-based configurations of the network infrastructure
- Centralized firewall/NAT and firmware management via topology-based rollout
- Policy-based user management
- Northbound interface for connecting to other systems, e.g., for sending security-relevant messages via syslog

Industrial Network Components



FastConnect Cabling System

- Designed for industrial networks
- Optimally matched components for quick configuration and assembly of network structures
- No specialist knowledge necessary

Additional Products

- Multi-service platforms
- Media converters
- Serial device servers
- Software solutions
- Compact RTU3000C
- Communication modules, e.g., CP 1542-1 IRC supporting telecontrol protocols (TeleControl Basic, SINAUT ST7, DNP3, IEC 60870-5-10x) for modular RTUs based on SIMATIC Controller

Industrial Controls – Power Circuit Components

SIRIUS 3RV20 Motor Starter Protector

- Manual motor controller, disconnect, short circuit and overload protection
- 3RV201/2 – Size S00, S0, Trip Class 10 up to 40 A
- 3RV203 – Size 2, Trip Class 10 or 20 up to 65 A
- 3RV204 – Size 3, Trip Class 10 or 20 up to 100 A
- Screw or spring clamp connections
- UL-approved as Self Protected Combination Motor Controllers (Type E)

SIRIUS 3RV27/28 Circuit Breakers

- UL489-rated
- Sizes S00 to S3
- For motor and transformer protection
- Range 0.16 A to 70 A
- S3 delta rating 10 A to 30 A at 480 V AC
- Screw or spring clamp connections

SIRIUS 3RV29 Infeed System

- Space saving infeed system for group motor starter installation
- Use with sizes S00 and S0, 3RV20 MSP, and 3RT contactors
- Expandable up to 63 A
- Plug-in design for quick installation and reduced wiring

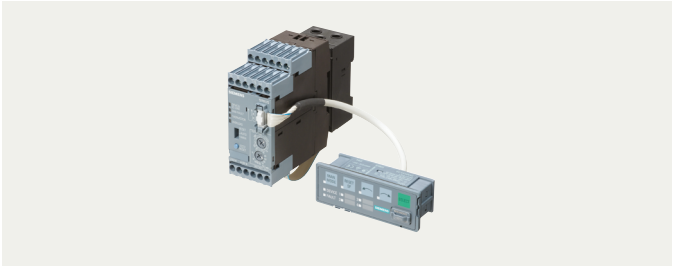
SIRIUS 3RU Thermal Overload Relays

- Sizes S00 to S3
- Up to 100 A, Trip Class 10
- 1 NO + 1 NC Aux contacts
- Manual/automatic reset
- Switching position indication

SIRIUS 3RB2 and 3RB3 Solid-State Overload Relays

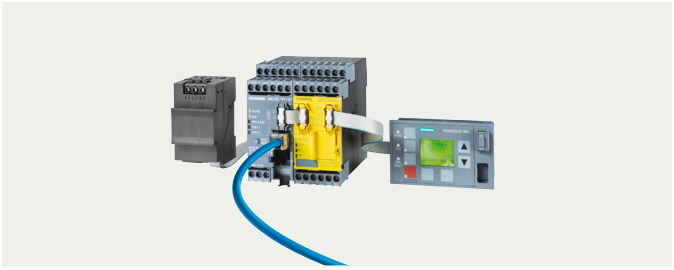
- Sizes S00 to S12
- Up to 630 A, Trip Class 5, 10, 20, or 30
- 1 NO + 1 NC Aux contacts
- Manual/automatic reset
- Self-evaluating and indication

Industrial Controls – Power Circuit Components



SIRIUS 3RB24 Electronic Overload Relay with IO-Link Communications

- Overload protection, control, and monitoring of three-phase and single-phase motors
- Easy 3-wire connection interface to IO-Link master
- Flexible trip class selection (5, 10, 20, 30)
- Spring or screw connections (removable)
- Available operator panel for local interface



SIMOCODE pro 3UF7 Motor Management System

- Extensive motor protection, monitoring, and control functions, independent of the automation system
- Detailed operational, service, and diagnostics data – at any time or place
- Open communications via PROFIBUS DP, PROFINET, OPC UA, Modbus RTU or EtherNet/IP
- Safety relay function for fail-safe shutdown of motors up to SIL 3 – also supports PROFIsafe communication to fail-safe SIMATIC S7 controller
- Scalable, flexible solutions for all plant configurations
- Integration in process control systems such as SIMATIC PCS 7 as well as TIA Portal software
- Sensorless pump dry-run protection for ATEX areas and flammable liquids

ESP200 Solid-State Overload Relay

- Rugged and reliable design for both industrial and commercial applications
- Self-powered
- Market leading trip accuracy greater than 99%
- Trip class selectable (5, 10, 20, 30)
- Class 958 version provides protection for sealed compressors and artificially cooled motors
- Class 958L version is designed for oil market and pumping applications with precise trip curve
- Rugged and reliable design for NEMA

Industrial Controls – Power Circuit Components

SIRIUS 3RT2 Contactor

- Designed for premium efficient motor control (IE3/4 ready)
- Energy-efficient coil and contacts reduce energy costs and heat generation during operation
- Available in sizes S00 to S3 (75 kW)
- Available with extended temperature and rail-certified
- Resistive load rated up to 110 A with 3RT23 series
- Screw or spring-loaded terminals
- Safety-rated according to IEC 60947-4
- S6 – 12 up to 400 kW available

SIRIUS 3RF Vacuum Contactor

- UL-rated to 700 kW at 480 V
- AC and DC coil options
- Ideal by-pass contactors for large low voltage Soft Starters and VFDs
- Accessories available

NEMA Rated Class 40 Contactor

- Available NEMA sizes 00 to 8
- AC and DC coil options
- Open and enclosed options
- Enclosed NEMA 1, 4/4X SS, 4X FG, NEMA 7 & 9 Hazloc, NEMA 12 & 3/3R water proof
- Up to 900 kW at 480 V
- Accessories available
- Reversing version Class 43

SIRIUS 3RA2 Reversing Contactors

- Designed for premium efficient motor control (IE3/4 ready)
- Energy-efficient coil and contacts reduce energy costs and heat generation during operation
- Completely assembled out of the box with 3RT2 contactors
- Touch-safe connection system
- Available in sizes S00 to S3 (75 kW)
- Resistive load rated up to 110 A with 3RT23 series
- Screw or spring-loaded terminals
- Safety-rated according to IEC 60947-4
- S6 – S12 up to 400 kW available

Industrial Controls – Power Circuit Components

SIRIUS 3RF Solid-State Switching Devices

- Reliably switch a wide range of different loads with alternating voltages in 50 and 60 Hz systems
- Solid-state relays and contactors with a particularly long endurance
- Made for areas with high switching frequencies, tough conditions, high mechanical loads, and noise-sensitive areas
- Long service life
- Precise and reliable switching
- Space-saving and compact side-by-side mounting
- Reliable operation up to an amibent temperature of +60 °C

SIRIUS 3TC V DC Power Contactor

- Ideal applications include pole rectifiers, battery chargers/testing, solar, rail, heaters, lamps, cranes, plating, etc.
- 1-pole and 2-pole
- Up to 600 V DC at 330 A
- AC and DC coil options
- Available in sizes 2, 4, 8, 12
- 2 NO and 2 NC mirror Aux contacts

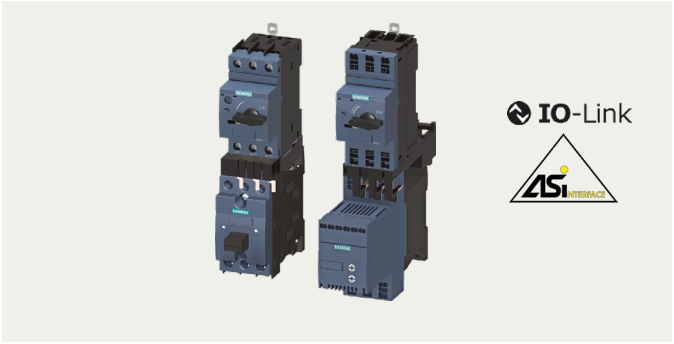
SIRIUS 3RM1 Hybrid Motor Starter

- Easy load monitoring
- Up to 3 kW at 480 V
- Slim design, only 22.5 mm width
- Non-reversing, reversing, O.L protection, and available safety integrated
- Hybrid start uses solid-state switching on start-up and relay on run
- Optional control bus and comb system reduces wiring for installation with 3SK safety relays

SIRIUS 3RA6 Compact Motor Starter

- Up to 20 kW at 480 V
- Modular motor control system with plug-in design for non-reversing and reversing motor starters
- 3RA68 power bus offers snap-in design for adding starters up to 63/100 A
- Available in standard and networkable, AS-Interface, and IO-Link
- Spring or screw connections (removable)
- Motor modules consist of circuit breaker disconnect, contactor, and overload protection

Industrial Controls – Power Circuit Components



SIRIUS 3RA2 Combination Starter

- Integrated 3RV2 MSP and 3RT contactor offers circuit, O.L protection, and contactor in one unit
- Mounting rail or FastBus busbar system mounting
- Designed for premium efficient motor control (IE3/4 ready)
- Energy-efficient coil and contacts reduce energy costs and heat generation during operation
- Available in sizes S00 to S3 100 A
- Screw or spring-loaded terminals

SIRIUS 3RA22 Reversing Combination Starter

- Integrated 3RV2 MSP and 3RT contactor offers circuit, O.L protection, and dual contactors in one unit
- Mounting rail or FastBus busbar system mounting
- Designed for premium efficient motor control (IE3/4 ready)
- Energy-efficient coil and contacts reduce energy costs and heat generation during operation
- Available in sizes S00 to S3 100 A
- Screw or spring-loaded terminals

NEMA Rated Class 14 Motor Starter

- Available NEMA sizes 00 to 8
- AC and DC coil options
- Includes ESP200 solid-state overload relay on common mounting plate
- Open and enclosed options
- Enclosed NEMA 1, 4/4X SS, 4X FG, NEMA 7 & 9 Hazloc, NEMA 12 & 3/3R water proof
- Up to 900 kW at 480 V
- Accessories and field kits available

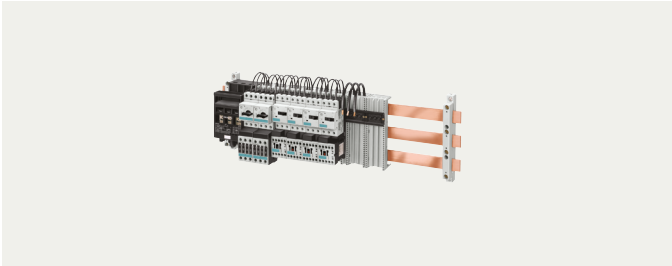
NEMA Rated Class 22 Reversing Starter

- Same features as Class 14
- With dual contactors

Other NEMA

- Class SMF Fractional HP Starters
- Class MMS and MRS Switches
- Class 11 Starter and Switches
- Class 17, 18 Combination Starters
- Class 25, 26 Combination Reversing Starters
- Class 30 Multi-Speed Starters
- Class 32 Combination Multi-Speed Starters
- Class LE, LC, CLM Lighting Contactors

Industrial Controls – Power Circuit Components



8US FastBus

- Ideal applications include automotive power distribution panels
- 3-phase insulated busbar system
- Permits flexible, high-density panel design of motor starters and power control components up to 1 400 A at 600 V
- Ideal for 3RA2 and 3RA22 combination starters up to 75 kW as well as 3VA and SENTRON circuit breakers
- Busbar shoes available for circuit breakers, starters, and other products
- U.S. and international approvals
- Extensive line of accessories available

SIRIUS 3RW Soft Starters

- Reduce current peaks on motor starts with configurable ramp-up times
- Integrated by-pass contactor after ramp reduces heat and provides increased energy efficiency
- Available in (3) series depending on the motor size and needs of the application
- 3RW30: standard applications, 2-phase controller for 1.5 kW to 75 kW at 200 – 480 V
- 3RW40: standard applications, 2-phase controller for 7.5 kW to 300 kW at 200 – 600 V, overload protection, and current limiting
- 3RW44: high-feature, 3-phase controller for 15 kW to 900 kW, communication and advance motor management, configuration with Soft Starter ES software
- Available in enclosed versions

Industrial Controls – Power Circuit Components

SENTRON 3WA Air Circuit Breaker (ACB)

Technical Features

- Rated current: 630 A – 6 300 A
- Rated voltage: up to 1 150 V
- Breaking capacity: I_{cu} up to 150 kA
- Ambient temperature: - 40 °C up to + 70 °C
- High mechanical and electrical life cycle
- Trip unit: easy upgrade, flexible adaptation at any time
- Trip unit with integrated metering function according to IEC 61557-12
- Voltage tap integrated
- Ethernet ports: simultaneous use of Modbus TCP and PROFINET IO

Benefits

- Reduced complexity due to less engineering, avoiding misinterpretation, and wrong order number
- Updatable and upgradeability at any time
- New protection feature and ready for digitalization: new market solution and opportunities
- Cybersecurity: prevent the possibility of unauthorized remote switching and protection hacking attempts

3WL5 Air Circuit Breakers

- 3WL5 ACB Standard
  - UL 489, UL 489B
  - IEC 60947-2
- Ranging from 1 000 A to 5 000 A and up to 100 kA $I_{cu} = I_{cs}$ @ 480 V AC
- As incoming-feeder, distribution, tie, and outgoing-feeder circuit breakers in electrical installations
- For switching and protecting motors, capacitors, generators, transformers, busbars, and cables
- Innovative software products for parameterization, operation, monitoring, and diagnostics of circuit breakers both locally or via PROFIBUS DP, Modbus, or Ethernet/Intranet/Internet
- Complete integration of the circuit breakers into the Totally Integrated Power and Totally Integrated Automation solutions
- UPS battery and capacitator
- Power Security modules

Industrial Controls – Power Circuit Components

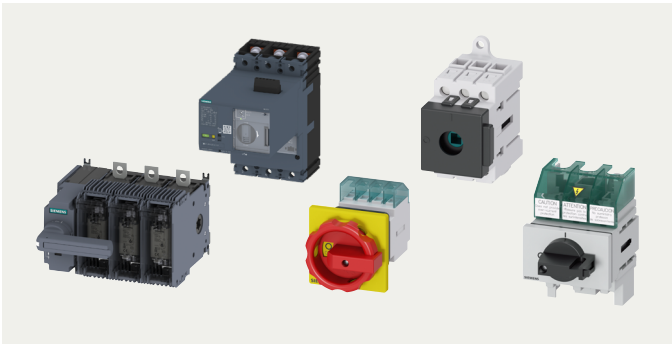
SENTRON 3VA Molded Case Circuit Breakers (MCCB)

Technical Features

- 3VA available from 15 A to 600 A and up to 150 kA
- VL-150-1600 A frame, global ratings, and up to 100 Kaic interrupt ratings
- G Frame: 25 A and less and interrupt ratings to 65 Kaic
- Supplementary protection
- UL 489 – 5SJ power circuit protection
- UL 1066 – 5SY control circuit protection
- Rated current: 100 A – 1 600 A
- Rated voltage: up to 690 V
- Breaking capacity: 3VA1 (TMTU) I_{cu} up to 70 kA, 3VA2 (ETU) up to 150 kA
- No derating up to +50 °C
- Mounting: fix, plug-in, draw out version
- Trip unit with integrated metering function according to IEC 61557-12
- Ethernet (Modbus TCP) and PROFINET

Benefits

- Reduced complexity: same internal accessories up to 1 000 A frame
- Easy selection and assembly
- Digital available support tools from planning phase up to test/maintenance phase
- QR code for fast and easy commissioning (test and maintenance)



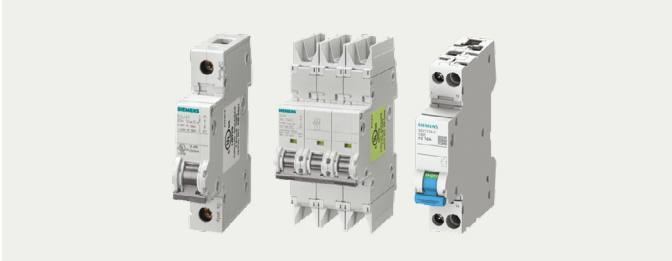
Fuseless Switch Disconnector, SENTRON 3K, 3V, 3LD

Technical Features

- Rated current: 16 A – 2 000 A
- Rated voltage: up to 690 V
- Breaking capacity: up to 100 kA

Benefits

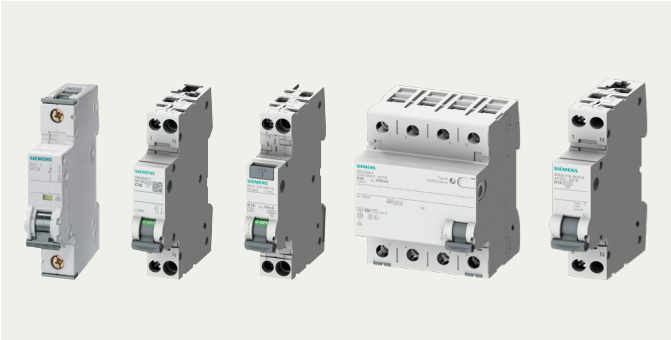
- The right solution for your customized application



5S Branch Circuit and Supplementary Protectors

- 1-pole to 4-pole circuit protection
- UL 489- or UL 1077-rated
- AC or DC voltage options
- Up to 63 A (5SP4 up to 125 A)
- 5SY1 CBE for equipment protection behind the DC power supply
- DIN rail mountable
- Accessories available

Industrial Controls – Power Circuit Components



Short Circuit and Overload Protection

- Two MCB lines: 5SY for industry and 5SL for infrastructure applications
- Extensive auxiliaries portfolio
- Approvals for worldwide application
- Quick mounting and timesaving installation

Personal and Fire Protection

- RCD type A, AC, F
- 5SV3 RCCB type B, B+ for inverter applications
- Extended inspection period of up to 48 months
- 5SV1: the most compact voltage independent RCBO in only 1 MW
- AFDD for prevention of dangerous arc faults
- 5SV6: the most compact AFDD with integrated MCB in only 1 MW

Overvoltage Protection

- Graded portfolio of lightning and surge protection devices
- Majority of lightning arresters have remote signaling contact
- Defect protection modules can be replaced modulary

Switching and Control Devices

- Safe switching with switching devices in AC/DC-technology usable in many applications
- Monitoring devices for electrical values enable monitoring of motors and other applications
- Energy efficient operation with 5TT4 remote control switches

SENTRON PAC Measuring Devices

Technical Features

- Energy Counters, Branch Circuit Monitoring Systems, Power-Multimeters and Power Quality Meters (Class S) for buildings and all industrial applications
- PRONINET, PROFIBUS, Modbus TCP, Modbus RTU, M-Bus, and S0-Interfaces
- High accuracy up to Class 0.2S; fulfill IEC 61557-12
- Digital and analog I/Os to integrate further signals

Benefits

- Energy efficiency optimization for cost savings (e.g., supporting ISO 50001, EN 16247 Energy Audits)
- Identification of power-intensive processes and loads
- Adjustment of usage behavior
- Cost savings through adjustments to energy supply contracts
- Early intervention in case of limit value violations
- Prevention of system outages due to overload
- Cost center specific billing for energy costs
- Efficient use through multi-site power monitoring

Industrial Controls – Control Circuit Components

SIRIUS 3SU1 Pilot Devices

- 22 mm pilot devices include indicator lights, pushbuttons, illuminated pushbuttons, emergency-stop pushbuttons, selector switches, and stations
- Quick and easy installation, mounting is 50% faster with single screw installation
- High degree of protection IP69K standard
- Available in plastic and metal options
- Options for 30 mm mounting
- Innovative 4-position RFID selector switch available
- Networkable via IO-Link, AS-Interface, and PROFINET including PROFIsafe

Pilot Devices

Class 50

- Available standard NEMA 1 & 1B and heavy duty NEMA 4 pushbutton stations
- Flush or surface mounting

Class 51

- 30.5 mm hazardous location NEMA type 7 & 9 pilot devices, selector switches, pushbuttons, and stations
- UL and cUL listed for Class I (gases), Groups C & D; Class II (dust), Groups E, F & G; Class III (fibers) hazardous location ratings

Class 52

- 30.5 mm heavy duty, watertight/oiltight pilot devices, selector switches, pushbuttons, and stations
- Meets type 1, 3, 3R, 4, 4X, 12, 13 NEMA protection standards
- BlackMax version is available for increased corrosion-resistance in harsh environments

SIRIUS 8WD4 Signaling Columns

- Two series available: 8WD42 50 mm, IP54 and 8WD44 70 mm, IP65
- Flexible and modular design for visual and acoustic warning
- Shock- and vibration-resistant
- Available with AS-Interface for 2-wire networking with power

SIRIUS 8WD53 Beacons

- 70 mm, IP65 protection
- 24 V to 230 V AC/DC operating voltage
- LED and incandescent lamp options
- 360 degree continuous or flash indication
- Easy mounting base with screw and nut

Industrial Controls – Control Circuit Components

SIRIUS 3RS2 Temperature Monitoring Relays

- Monitors temperatures of solids, liquids, and gaseous media
- Two series available: analog or digital adjustable
- Due to an integrated infrared interface (SIL 1), the digital basic unit can be expanded by up to three sensors and an analog input (4 ... 20 mA)
- Spring or screw connections (removable)
- Local or remote configuration
- Built-in IO-Link communications

SIRIUS 3RN2 Thermistor Motor Protection Relay

- Overheating protection for motors
- Bimetallic and PTC sensor inputs for low cost and high feature protection options
- Plug and play installation, no configuration required
- Spring or screw connections (removable)
- ATEX hazardous location options

IO-Link

SIRIUS 3UG4 and 3RR2 Electrical and Mechanical Monitoring Relays

- Monitoring and protection of various electrical and mechanical parameters
- Digital local and IO-Link configuration
- Stand-alone (3UG4) or integrated on 3RT2 contactors (3RR2)
- Line- and single-phase voltage monitoring (3UG4)*
- 3RT2 contactor mounting for current monitoring (3RR2)*
- Current and power factor monitoring (3UG4)*
- Residual current monitoring (3UG4)*
- Speed monitoring of motors and belts (3UG4)*
- Spring or screw connections (removable)

*Available IO-Link communications

SIRIUS 3RP25 Timing Relays

- Cost effective 17.5 mm and high feature 22.5 mm relay options
- Wide voltage range 12 to 240 V AC/DC
- Up to 27 timing functions make relay flexible for all timing applications while reducing inventory
- Spring or screw connections (removable)

SIRIUS 3RA28 Timing and Electrical Interlocking Functions for 3RT2 Contactors

- Direct mount to 3RT2 contactors expands functionality
- Timing, IO-Link, and AS-Interface
- Local configuration
- Load and auxiliary functions

Industrial Controls – Control Circuit Components

SIRIUS 3RQ1 Coupling Relays

- Wide voltage ranges from 24 to 240 V AC/DC
- Force-guided contacts
- Safety certification based on functional safety up to SIL 3, PL e (IEC 61508/ISO 13849)
- Usable as an output expansion for SIRIUS 3SK safety relays via a device connector
- Genuine load contacts, including in NC circuit
- Push-in or screw connection

SIRIUS 3RQ2 Coupling Relays

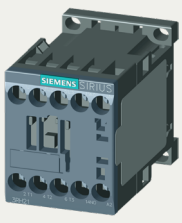
- Wide voltage range from 24 V to 240 V AC/DC
- Optionally with one, two, or three changeover contacts
- High contact reliability thanks to hard gold-plated contacts

SIRIUS 3RQ3 Coupling Relays

- Cost-effective and space saving isolation only 6.2 mm wide
- Multiple options for voltage and contacts or solid state
- Available with replaceable relays and indication
- Bridging combs and universal accessories available
- Push-in or screw connection
- Built-in arc suppression diode

SIRIUS 3RS70 Interface Converters

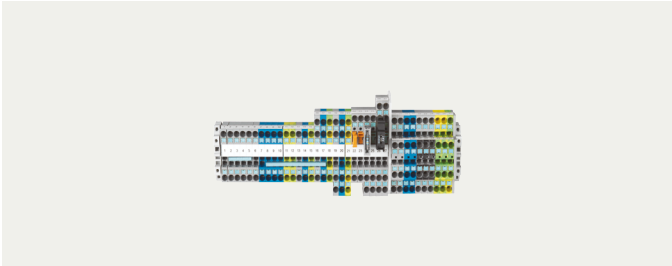
- Simple signal conversion of standard and non-standard signals, both analog and frequency for interface to controllers or other devices
- 3-way isolation keeps signals separate
- Push-in or screw connection



SIRIUS 3RH2 Control Relays

- 4-pole control circuit relays
- 10 A current rating
- AC or DC coil options
- Surge suppressor options
- Spring or screw connections

Industrial Controls – Control Circuit Components



8W Terminal Blocks

- Globally accepted
- Connection types available
  - 8WH1 – screw
  - 8WH2 – spring loaded
  - 8WH5 – combination
  - 8WH6 – push-in
  - 8WH3 – insulation displacement
- Single- and multi-tier
- Compact design
- Accessories available

3SE5 International (IEC) Limit Switches

- Different operator types and styles
- Available in plastic and metal
- Different sizes available (31, 40, 50, 56 mm)

3SE03 North America (NEMA) Limit Switches

- Modular, plug-in design
- Heavy duty
- NEMA 6P rated, submersible available
- Different connections available
  (Plug-in, Pin connector, Prewired cable)

SIRIUS 3SE Mechanical Safety

- Machine door and perimeter guarding solutions
- 5 different families with many options in plastic and metal
- 3SE7 Cable-operated switches
- 3SE5 Interlock switches with separate actuator
- 3SE5 Interlock switches with solenoid locking
- 3SE5/3SE2 Hinge switches
- 3SE6 RFID non-contact safety switches
- 3SE6 Magnetic monitoring systems

Industrial Controls – Control Circuit Components

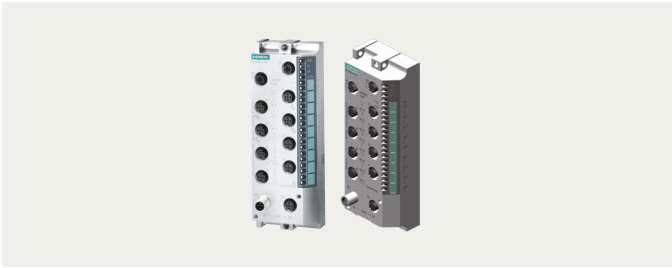
SIRIUS 3SK Safety Relays

- Simple to advanced safety functions can be handled by the 3SK series of safety relays
- Modular and flexible design
- Available bus for simple expandability
- Safety-rated according to SIL3, PL e
- 3SK1 Standard: simple functions with DIP switch setting
- 3SK1 Advanced: same as Standard, expandable with additional functions
- 3SK2: software configurable and expandable with up to 20 inputs, configurable independent outputs
- 3SK2: diagnostic display optional
- Easy integration with 3RM1 motor starters

Industrial Communications

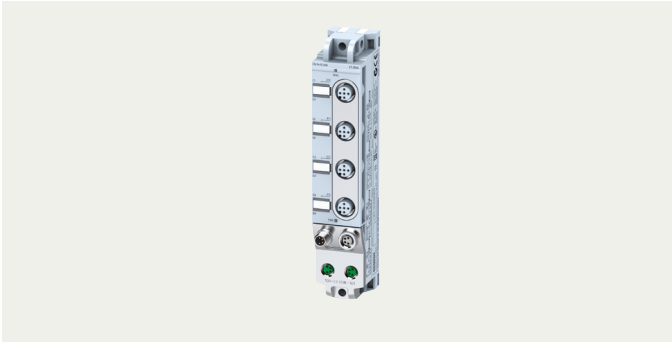
CM 4 x IO-Link Master for SIMATIC ET 200SP

- 4-channel IO-Link module
- IP20 degree of protection
- 32 bytes input and output per channel
- IO-Link specification v1.0 and 1.1
- Data rates supported: 4.8 k, 38.4 k, and 230.4 k baud
- Configured with Port Configuration Tool (PCT)
- Programming and setup supported by TIA Portal



ET 200eco IO-Link Master

- 4-channel IO-Link module, additional non-IO-Link inputs and outputs onboard
- IP67 degree of protection
- M12 connections
- 2 models available: 30 mm and 60 mm width
- 32 bytes input and output per channel
- IO-Link specification v1.0 and 1.1 on 30 mm model, v1.0 only on 60 mm model
- Data rates supported: 4.8 k, 38.4 k, and 230.4 k baud
- Configured with Port Configuration Tool (PCT)
- Programming and setup supported by TIA Portal



ET 200eco IO

- 4-channel IO-Link module
- IP67 degree of protection
- M12 IO connections, M8 backplane and power connections
- 30 mm width
- 32 bytes input and output per channel
- IO-Link specification v1.0 and 1.1
- Data rates supported: 4.8 k, 38.4 k, and 230.4 k baud
- Configured with Port Configuration Tool (PCT)
- Programming and setup supported by TIA Portal

K20 IO-Link Input Modules

- Connection to IO-Link Master allows standard sensors, either 4 or 8, to be connected to 1 IO-Link channel
- Ideal for replacing “sensor boxes”
- IP67 degree of protection
- 2 models available: 4 inputs which uses M12 connections with Y pin and 8 inputs which uses M8 connections
- 20 mm width

Industrial Power Supplies

SITOP Power Supplies and Power Security

- Extensive line of single-phase and three-phase DC power supplies, some with networking
- DC UPS with batteries or capacitors
- Add-on modules for redundancy, selectivity and buffering

Reliability

- Flexible wide range input
- Excellent load characteristics
- All relevant certification
- Add-on modules counteract disturbances on the DC voltage or line side

Efficiency

- Low power loss – even during no-load operation
- Power supply outputs can be specifically switched off via PROFINET or IO-Link
- TIA Selection Tool makes it easy to select the right power supply, add-on modules and DC UPS uninterruptible power supply

Integration

- SITOP UPS1600 can be easily integrated via USB or Ethernet
- SITOP library for SIMATIC PCS 7 enables transparent 24 V supply in the process control system during ongoing operation
- SITOP PSU8600 and SITOP UPS1600 can communicate via PROFINET and OPC UA
- OPC UA server enables direct incorporation of controllers or PCs into automation applications with OPC UA clients from different manufacturers
- SITOP PSU8400 power supply and SITOP SEL1600 selec tivity system communicate via IO-Link

Drives and Motion Control

SINAMICS Drives – the reliable path to maximum safety

The oil and gas industry is characterized by extreme demands placed on the drive technology used – from high explosion risk to the aggressive salt laden air offshore, extreme low temperatures in polar regions, or the heat and dust of the desert. Drives for the oil and gas industry meet the IEC and NEMA standards and offer maximum protection for people, machines, and the environment.

SINAMICS drives are failsafe and extremely durable in operation even under the most extreme conditions and in hazardous areas. Their performance profile makes them the ideal solution for all applications in the process industry from pumps, fans, and compressors to extruders, separators, and agitators.

Standard Performance Drives

- SINAMICS V20 0.12 – 30 kW
- SINAMICS G120C 0.55 – 132 kW
- SINAMICS G120 0.55 – 250 kW
- SINAMICS G130/G150 110 – 2 700 kW

Industry Specific Drives

- SINAMICS G180 2.2 – 6 000 kW
- SINAMICS G120X 0.75 – 630 kW

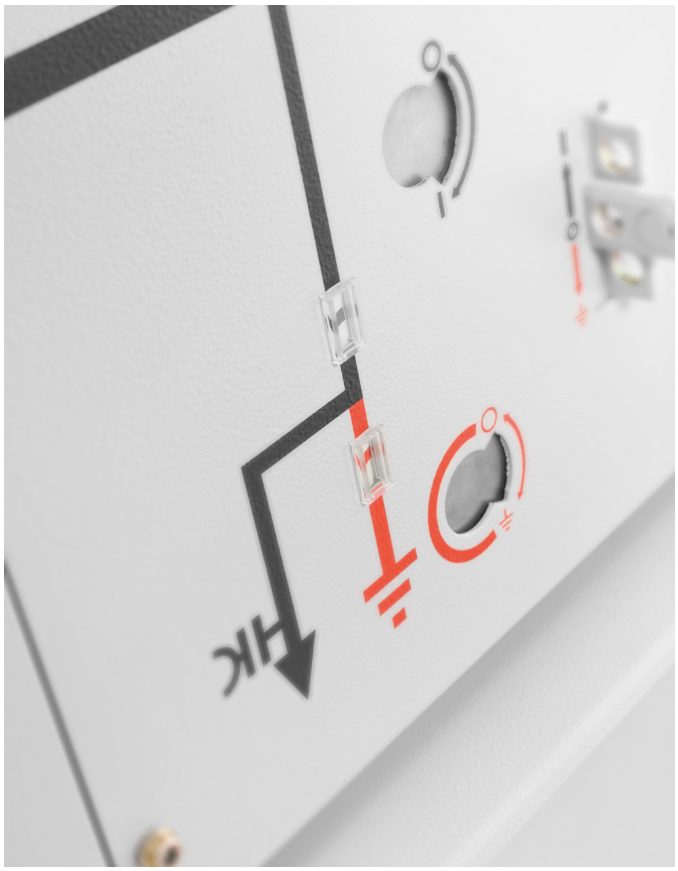
High Performance Drives

- SINAMICS S120 0.55 – 6 840 kW
- SINAMICS S150 110 – 1 200 kW
- SINAMICS DCM 1 – 2 500 kW
- SINAMICS G220 0,55 – 55 kW

Servo Drives

- SINAMICS S120 0.25 – 6 840 kW
- SINAMICS S210 0.1 – 7 kW

DCPower Distribution



Medium- and Low-Voltage Switchgear, Circuit Breakers, and Controls

- Medium-voltage, air-insulated switchgear, type-tested as per IEC (up to 50 kA)/ANSI (up to 63 kA)
- Medium-voltage, maintenance-free, gas-insulated switchgear in single-phase encapsulated design
- Smart low-voltage switchboard with best arc flash mitigation solutions and with powerful motor management system
- High-current and generator switchgear with vacuum switching technology answers highest technological, quality, and personnel safety requirements enabling maximum operational reliability in oil and gas applications up to 450 MW
- Low-voltage busbar trunking systems for flexible power distribution for both indoor and outdoor applications
- Medium-voltage outdoor distribution equipment including Live/Dead tank circuit breakers, vaccum reclosers, traction breaker, and accessories
- The fusesaver is the perfect protection solution for overhead spur lines against temporary faults
- Low-voltage replacement circuit breakers designed with a direct connection to the primary contacts and with arc flash mitigation
- Medium-voltage vacuum roll-in replacement circuit breakers for ANSI switchgear applications
- Power distribution center solutions to house various types of electrical equipment, i.e, E-House

Power Distribution

blue GIS

Technical Features

- Up to 24 kV / 40 kA / 2500 A (8DAB 24)
  Up to 24 kV / 25 kA / 2500 A (busbar), 2000 A (feeder) (NXPLUS C 24)
  Up to 24 kV / 21 kA / 630 A (8DJH 24)
- Single- or double-busbar system
- Type-tested switchgear according to IEC 62271-100 and IEC 62271-200
- Insulating medium based on the components of the ambient air
- Switching principle based on proven vacuum technology
- All the benefits of our gas-insulated switchgear

BENEFITS

Environmentally friendly

- Only components of the ambient air (N2, O2, CO2)
- No use of F-gases (PFAS)
- Global warming potential < 1
- No negative environmental impact

Safe

- Non-toxic
- Non-inflammable
- Highly stable
- Suitable for lowest ambient air temperatures

Cost-efficient

- Minimum demands on training, transport, installation, and operation
- No gas recycling required
- No documentation and reporting specifications
- Regulation-proof, also in the future

Power Distribution

NXAIR Air-Insulated Switchgear (AIS)

Technical Features

- Up to 17.5 kV / 50 kA / 4 000 A; up to 24 kV / 25 kA / 2 500 A; up to 36 kV / 31.5 kA / 2 500 A
- Factory-assembled, type-tested metal enclosed switchgear according to IEC 62271-200
- Evidence of the making and breaking capacity of the CB and the make proof earthing switch tested inside the panel
- Air as insulating medium always available
- Marine certification

Benefits

- Maintenance interval for switchgear >10 years
- Positively driven lockable shutters
- Fast access to all switchgear compartments
- All operations with HV door closed
- Logical mechanical interlocks as standard

8DA10/8DB10 Gas-Insulated Single-/Double-Busbar Switchgear

Technical Features

- Up to 40.5 kV / 40 kA / 5 000 A (busbar), 3 150 A (feeder)
- Hermetically sealed primary enclosure
- Factory-assembled and type-tested switchgear according to IEC 62271-200
- Busbar and circuit breaker are single-pole encapsulated in different vessels (IP65)
- Logical mechanical interlocks according to IEC 62271-200

Benefits

- Maintenance-free and climate-independent
- Two- and three-phase short circuits not possible because of single-phase encapsulation
- Extension 8DB10 without shutdown of the busbar
- Highly available: zero ingress of moisture, small animals, and dust

Power Distribution

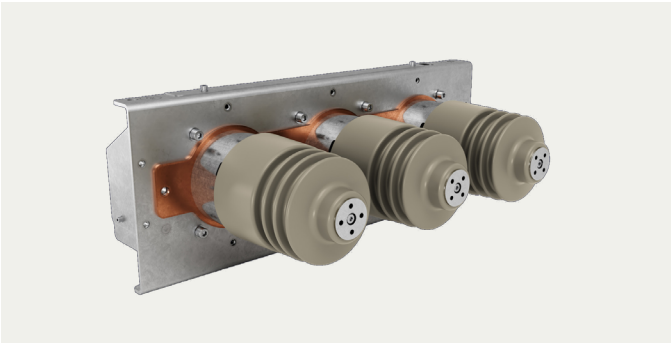
NXPLUS C Gas-Insulated Single-/Double-Busbar Switchgear

Technical Features

- Up to 17.5 kV / 31.5 kA / 2 500 A;
  up to 24 kV / 25 kA / 2 500 A; up to 38 kV / 25 kA / 2500 A (busbar), 1250 A (feeder)
- Factory-assembled and type-tested switchgear according to IEC 62271-200
- Hermetically enclosed (SF6), solid insulated
- Only permitted operations possible due to logical mechanical interlocks
- Climate-independent and reliable even under the most extreme ambient conditions
- Marine Certification

Benefits

- Compact design
- Maintenance-free for lifespan
- Highest personnel safety and highest security of operation
- CAPEX and OPEX efficient



SIQuench® by Siemens

Technical Features

- Active arc effect mitigating system
- Quenches the internal arc in sub-cycle times
- Reduces pressure and avoids thermal, contamination, and toxicity effects which damage the equipment and its surroundings
- Minimizes duration of downtime for operations and reduces economic losses in event of internal arc fault

Benefits

- Highly increased equipment and process availability
- Reusable: can switch 5 times without the need for replacement
- Maintenance-free for 20 years
- Can switch 30 times without load for testing/commissioning purposes without need for replacement
- Contains no explosive medium as energy storage for switching operations

Power Distribution

SIVACON S8plus Power Distribution Board and Motor Control Center

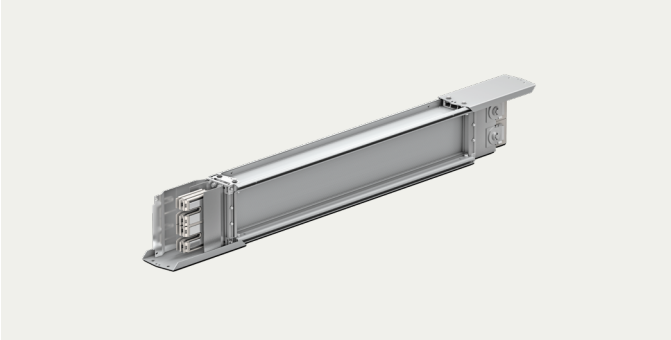
Technical Features

- Up to 690 V / 150 kA (I_{cw}) / 7 010 A
- Integrated solution for intelligent power distribution with links to automation and energy management systems
- Design verified power switchgear and control gear assembly according to IEC 61439-2 in single-/double-front designs (Marine Certification available)
- High level of safety for personnel and switchboard: arc fault test according to IEC/TR 61641 and optional, active, and resettable arc fault protection system
- Combination of different mounting designs: withdrawable, fixed mounted, and plug-in

Benefits

- Flexible, modular, cost-efficient, and space saving solution
- Preventive maintenance supported by diagnostic information

Power Distribution



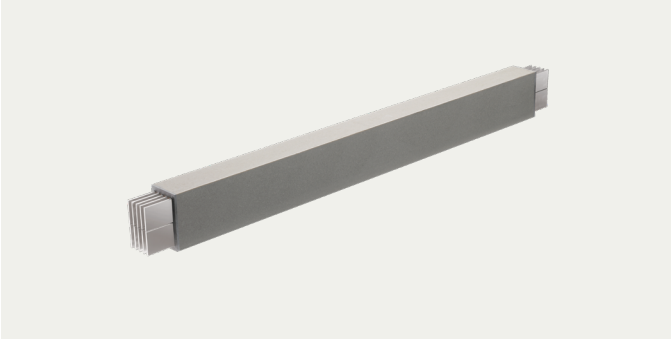
SIVACON 8PS – LI Busbar Trunking System

Technical Features

- 800 A to 6 300 A
- Design verified switchgear and control gear assembly according to IEC 61439-1/-6
- Safe connection to SIVACON S8 switchboards and transformers
- High short-circuit rating
- High degree of protection and fire safety
- Reliable operation due to high operating voltage and full load at high ambient temperature (40 °C)

Benefits

- Integrated solution for safe and efficient power supply for infrastructure and industrial applications
- Cost-efficient infrastructure
- Smart data transmission with innovative powerline technology for data transparency and predictive maintenance



SIVACON 8PS – LR Busbar Trunking System

Technical Features

- 400 A to 6 300 A
- Safe connection to SIVACON S8 switchboards and transformers
- High short-circuit rating
- High degree of protection IP68 (suitable for outdoor) and fire safety
- Epoxy cast-resin housing
- Easily combined with LI system

Benefits

- Reliable busbar for high protection in harsh ambient conditions (air humidity and corrosive or salty atmospheres)
- Strong resistance to chemical substances and high mechanical rigidity
- Flexible power transmission with low space requirements thanks to various junction elements

Power Distribution

Generator Circuit Breaker

Technical Features

- Up to 24 kV / 110 kA / 15 000 A
- Type-tested according to IEC/IEEE 62771-37-013
- Compact and space saving design

Benefits

- Increased cost efficiency and service continuity
- Minimized installation and maintenance costs
- Optimum personnel safety
- Eco-friendly design
- Solutions tailored to individual requirements

E-House

Technical Features

- E-House Substation, E-House Skid or Mobile E-House
- Customized solutions for all industrial applications and verticals
- Efficient equipment installation in controlled environment
- Testing and pre-commissioning off-site
- "Plug & Play delivery" for rapid deployment on-site

Benefits

- Speed up of overall project lead times
- Reduced manhours and EHS risks on-site
- One single point of contact from ordering to execution
- Local and global E-House expertise
- Global footprint for site services and after-sales service

8DJH, 8DJH36 Gas-Insulated Switchgear

Technical Features

- Up to 36 kV / 25 kA / 630 A
- Factory-assembled and type-tested switchgear according to IEC 62271-200
- Gas-insulated, sealed for life
- Flexible due to extension option and block formation

Benefits

- Maintenance-free and climate-independent
- Compact design for low space requirements
- Interlock control prevents mal operation
- Totally flexible switchgear concept, extendable on both sides with panels or blocks

Power Distribution

3TM Vacuum Contactors

- Different pole-center distances (120 mm or 150 mm)
- 1-pole, 2-pole, and 3-pole versions
- Type test documentation based on IEC 62271-106
- Country specific standards (GB, DL, UL, DNV-GL, CSA, GOST)
- Highly shock-resistant
- Suitable for ambient temperature from -40 °C to +70 °C
- Suitable for applications at altitudes of up to 5 000 m
- Set of individual switching times
- Different operating directions for the release of the mechanical latch

SION 3AE5 Vacuum Circuit Breakers

- Up to 17.5 kV / 40 kA / 3 150 A
- Maintenance-free design up to 10 000 operation cycles, with proper maintenance up to 30 000 operations possible (without M30)
- Fast switch-off time (without additional release) of 30 ms (3 cycles)
- Meets the requirements of IEC 62271-100 revised 2017
- Very compact design
- Additional insulating shells allow further increase in the insulation level
- Expandable with various release and interlocking mechanisms
- Future-proof through the use of the latest interrupter type
- Available for different pole-center distances

Energy Automation, Protection, and Power Quality

Highest levels of power availability and preventing power outages are most important for the oil and gas industry. To ensure day-to-day reliability and availability of their equipment in hostile environments, companies require robust power supply solutions. These solutions must also be safe, flexible, and cost efficient – over their entire lifecycle. And as even smallest fluctuations in power supply can harm upstream, midstream, and downstream process steps, optimal power quality also becomes a key success factor. Totally Integrated Power, the hassle-free solution for power distribution across all voltage levels, is our answer to this challenge. Our Power Management and Control Systems ensure increased power availability, quality, and efficiency. They keep your production running smoothly – in any upstream, midstream, or downstream application.

SOLUTION

Our Power Management and Control Systems feature

- A centralized monitoring and control system of the overall power infrastructure, e.g., switchgear, transformers, generators, batteries, etc.
- Automation controllers to integrate multiple devices (protection devices, power quality recorders, sensors, etc.) with different interfaces (e.g., IEC 61850, Modbus, etc.) and execution of automated control sequences
- Protection for critical devices and assets against possible damage
- Additional applications like Power Quality, Load Shedding, Generation/Microgrid Control, or Photovoltaic Plant Control for renewable integration

SYSTEM

The Power Management and Control Systems are based on a common platform with different integrated application and functions.

SICAM Load Shedding

- Fully integrated, fast Load Shedding application powered by SICAM with response rates < 70 ms to keep production running

SICAM Generation/Microgrid Control

- Keeps system frequency and voltage in a specified range
- Maintains intended value of interchange at tie lines
- Shares total generated power between assigned generators, incl. decentralized energy resources, and load optimization
- Provides access to energy and reserve power markets

Energy Automation, Protection, and Power Quality

SICAM Photovoltaic Plant Control

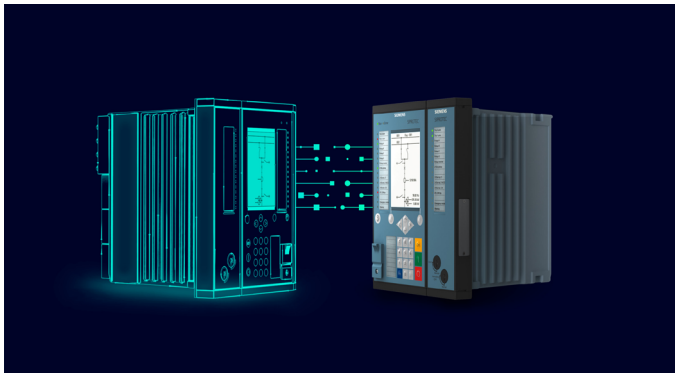
- Maximizes renewable production controlling for active and reactive power
- Ensures grid code compliance
- Supports hybrid plants with wind and batteries

SICAM PQS – data collection and archiving

- Central collection and archiving of all fault records and power quality data from field level devices, irrespective of their manufacturer

SICAM PQ Analyzer – monitoring and analysis

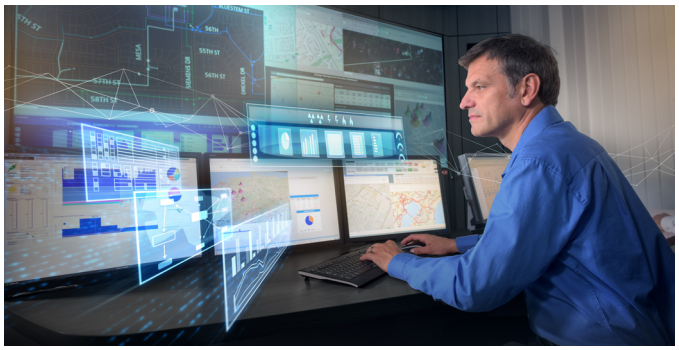
- Comprehensive evaluation options for archived PQ measuring data and fault records
- Measured value testing compared to Power Quality Standards and individually specified limits (Grid Code Evaluation)
- Target-oriented analysis and reports



Digital Solutions and IoT

- SIPROTEC Digital Twin integrates all data, models, and other information of a physical asset generated during engineering, commissioning, operation, or service. Role of the Digital Twin is to predict and optimize performance of a physical asset (whether for design, production, or operation). To this purpose we use simulation methods and/or data-based methods. Key is to reduce a lot of work during the engineering, parameterization and commissioning.
- SIPROTEC Dashboard enables power grid operators to monitor the operational status of their SIPROTEC devices and optimize maintenance activities.

Energy Automation, Protection, and Power Quality

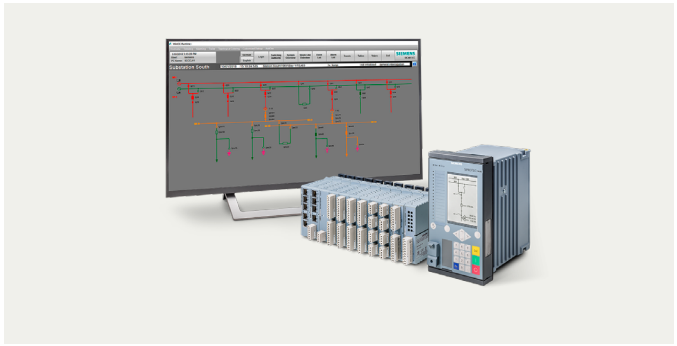


COMPONENTS

Control Center

Spectrum Power™ 5

The flexible, large control center for archiving and analyzing control center data, integrated load management, and forecast applications



SICAM SCC

The process and visualization system SICAM SCC is a central element of energy automation solutions. The system is independent of the substation technology installed. SICAM SCC is compatible with the SICAM PAS Power Automation System, the products of the SICAM RTUs line. And in case you are not using a substation controller in your station: SICAM SCC communicates directly with bay units and protection devices that support the IEC 61850 communication standard. As a result, it can be used as an overall HMI system for devices. The SIMATIC WinCC based SICAM SCC system is scalable and offers efficient engineering for energy automation applications at utilities and industrial enterprises.

Substation Automation

SICAM PAS

SICAM PAS (Power Automation System) meets all the demands placed on a distributed substation control system – both now and in the future. Amongst many other standardized communication protocols, SICAM PAS particularly supports the IEC 61850 standard for communication between substations and IEDs. SICAM PAS is an open system and – in addition to standardized data transfer processes – it features user interfaces for the integration of system-specific tasks and offers multiple automation options. SICAM PAS can thus easily be included in existing systems and used for system integration, too. With modern diagnostics, it optimally supports commissioning and maintenance. SICAM PAS is clearly structured and reliable thanks to its open, fully documented and tested system.

Energy Automation, Protection, and Power Quality

SICAM 8

SICAM 8, the industry's most advanced substation automation platform, empowering grid modernization with unparalleled performance, security, and flexibility.

SICAM 8 accelerates digital transformation:

By implementing advanced automation and control technologies, power systems can efficiently integrate renewable energy sources, optimize operations and accelerate digital transformation.

The outstanding features of SICAM RTUs can be found in the hardware of SICAM A8000 and SICAM EGS, as well as in the SICAM S8000 software.

The SICAM 8 platform also offers a huge number of applications such as SICAM SIAPP, SICAM DLM, SICAM PPC Compact, SICAM LS, SICAM HMI, etc.

PROTECTION

SIPROTEC 5

SIPROTEC 5 is part of the new generation of incomparable modular, flexible, and intelligent digital field devices. With modularly designed hardware and software and its high-performance DIGSI 5 engineering tool, the SIPROTEC 5 product family of field devices is perfect for protection, control, monitoring, and measuring applications in electrical energy systems. SIPROTEC 5 offers a wide product range with modular elements for every application and requirement.

SIPROTEC 5 Compact

The universal protection relay SIPROTEC 7SX800 has our high development and manufacturing quality, is equipped for future challenges, and is predestined for beginners and professionals alike. This efficient and compact device protects your feeders, lines, and motors in the medium-voltage power grid in the utility and industrial sectors.

Energy Automation, Protection, and Power Quality

Reyrolle

The comprehensive range of Reyrolle products provides the total protection requirements of distribution markets and industrial applications – ranging from overcurrent protection via transformer protection and voltage control to a full spectrum of auxiliary and trip relays. The portfolio includes many famous products such as “Argus, “Duobias”, “Solkor”, “Rho”, etc. Through successive generations, Reyrolle numerical products have been developed to increase value for system operators.

POWER QUALITY

SICAM Q100

The SICAM Q100 multifunctional measuring device is used for acquisition, visualization, evaluation, and transmission of electrically measured variables such as alternating current, alternating voltage, frequency, power, harmonics, etc.

SICAM Q200

SICAM Q200 is a network analyzer for the high-definition acquisition and assessment of the power quality in electrical power supply systems. It offers algorithms and functions for energy management applications. The device supports continuous acquisition and analysis of all relevant parameters. These results help to identify and implement quality programs to ensure the supply quality.

SIPROTEC Fault Recorder

The complexity of electrical power systems has increased, making the monitoring of wide areas essential. Fault recording and wide-area monitoring involve understanding the conditions in the wide area while analyzing the fault location, protection behavior, and system stability as well as monitoring the phasor measurement. In this case, fault recorders and phasor measurement units (PMUs) are used.

Energy Automation, Protection, and Power Quality

BENEFITS

General Advantages

- Modular or fixed design
- Open standardized architecture
- Certified Cybersecurity framework according to the international standard IEC 62443
- IoT connectivity to the cloud for easy monitoring with Grid Diagnostic Suite

Improved Efficiency

- Lower CAPEX
- Integrated functions and modular approach
- No additional systems and infrastructure needed
- Easy future expansion
- Reduced OPEX
- Central operation, switching, and administration of the power system and optimized power generation
- Prevention of critical situations early-on
- Countermeasures in time through consistent and permanent grid and quality monitoring
- Trend supervision: take preventive measures to eliminate faults in advance
- SICAM: controlling and telecontrol for small to large data volumes

Higher Availability

- Avoiding power outages
- Automated reactions in case of faults, e.g., fast load shedding of low priority loads, starting of additional or boost of generators and switching to backup batteries
- Ensuring fast reaction
- Minimizing downtimes by central operator information on fault type and location to define countermeasures
- Fast reaction of mobile workforce with dedicated location, affected equipment, and related spare parts

Protection and Safety

- SIPROTEC and Reyrolle: protection of primary equipment, e.g., generators, switchgear, transformers, cables, etc.
- Personnel safety

Building Technology

Building Comfort

- Building Management System
- Room Automation

Fire Safety

- Fire protection systems
- Detection
- Alarming and evacuation
- Extinguishing
- Danger management

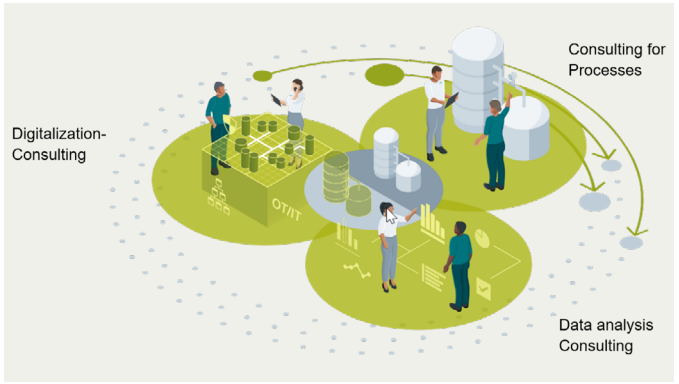
Electronic Security

- Access control
- Intrusion detection
- Perimeter intrusion control
- Physical security information management
- Video surveillance and analytics

Services

Global Project Execution Capabilities

- Complete professional project management
- Design clarifications
- Basic and detail designing
- Hardware engineering
- Software engineering
- Project documentation
- Extensive testing
- Factory acceptance testing
- Delivery
- Commissioning and site acceptance
- Warranty support



Consulting Services for Process Industries

Professional support on your way to digital transformation

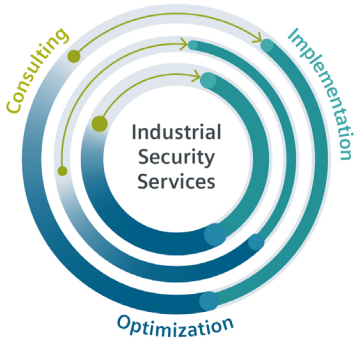
- Digitalization-Consulting
- Consulting for optimized Processes
- Data analysis Consulting

new.siemens.com/global/en/company/topic-areas/digital-enterprise/process-industry/services/consulting-services.

SIPIX-based Mobile Asset Management

The on-site engineer and the remote expert can collaborate remotely with the pre-installed SIPIX RC App via Real-Time Audio/Video transmission to fix the malfunction. This provides a short response time and avoids travel and mobilization time for an on-site field service of the expert.

Services



Industrial Security Services

- Necessary hardware and software
- Service experts with expertise in automation, digitalization, and security
- End-to-end approach

Security Consulting – evaluation of the current security status of an industrial environment

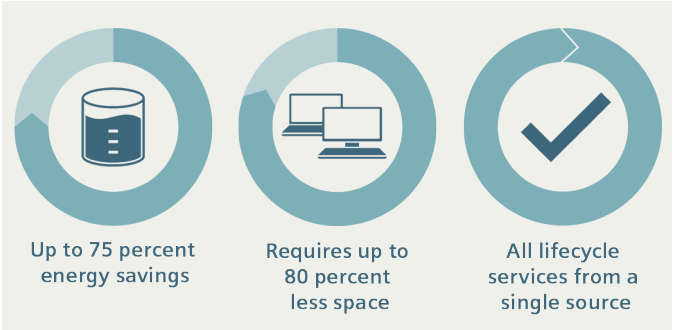
- Security Assessments: identifying security gaps and defining countermeasures
- Scanning Services: faster transparency over assets and vulnerabilities
- Industrial Security Consulting: support with policies and secure network design

Security Implementation – risk mitigation through the implementation of security measures

- Security Awareness Training: cybersecurity knowledge transfer from a production perspective
- Automation Firewall: continuous network protection with Next Generation Firewalls
- Endpoint Protection: continuous endpoint protection with Whitelisting and Antivirus

Security Optimization – comprehensive security through managed services

- Industrial Anomaly Detection: early detection of cyberthreats
- Industrial Security Monitoring: proactive protection thanks to comprehensive end-to-end monitoring
- Remote Incident Handling: rapid response to cyberthreats
- Industrial Vulnerability Manager: efficient vulnerability management to improve availability
- Patch Management: managing critical updates in Microsoft products
- SIMATIC Security Service Packages: unleashing your assets' full security potential



SIMATIC Virtualization as a Service

Offers a preinstalled and preconfigured virtualization system with all associated hardware and software components, including the necessary lifecycle services like spare parts and online support – all perfectly coordinated and from a single source

siemens.com/sivaas

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