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Ingenuity for life

product news

Innovations for the
Digital Enterprise

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Reaching the next digital level using artificial intelligence – with smart solutions for collecting and analyzing data.

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Industrial 5G

Private spectrum makes the difference

The mobile wireless standard 5G will bring new possibilities and use cases for industry, such as assisted work with augmented reality, autonomous machines and logistics, or edge applications. But not all the promising features of 5G are available right from the start. The three main scenarios of 5G are based on the Releases 15, 16, and 17 of the 3rd Generation Partnership Project (3GPP; responsible for the global standardization of mobile wireless networks). Based on these, wireless chips and industrial hardware are developed.

5G will offer three scenarios:

- **1. Enhanced Mobile Broadband (eMBB) (Release 15: December 2018)** High data rates for data-driven use cases, for example high-definition video streaming.

- **2. Ultra-Reliable Low-Latency Communication (URLLC) (Release 16: June 2020)** Reliability and low-latency requirements for mission-critical applications, for example for mobile robots, autonomous logistics, automated guided vehicles (AGVs), safety applications, etc.

- **3. Massive Machine-Type Communication (mMTC) (Release 17: December 2021)** Connection of a large number of devices, for example for IIoT applications, where typically a lot of connected devices are deployed in a small area.
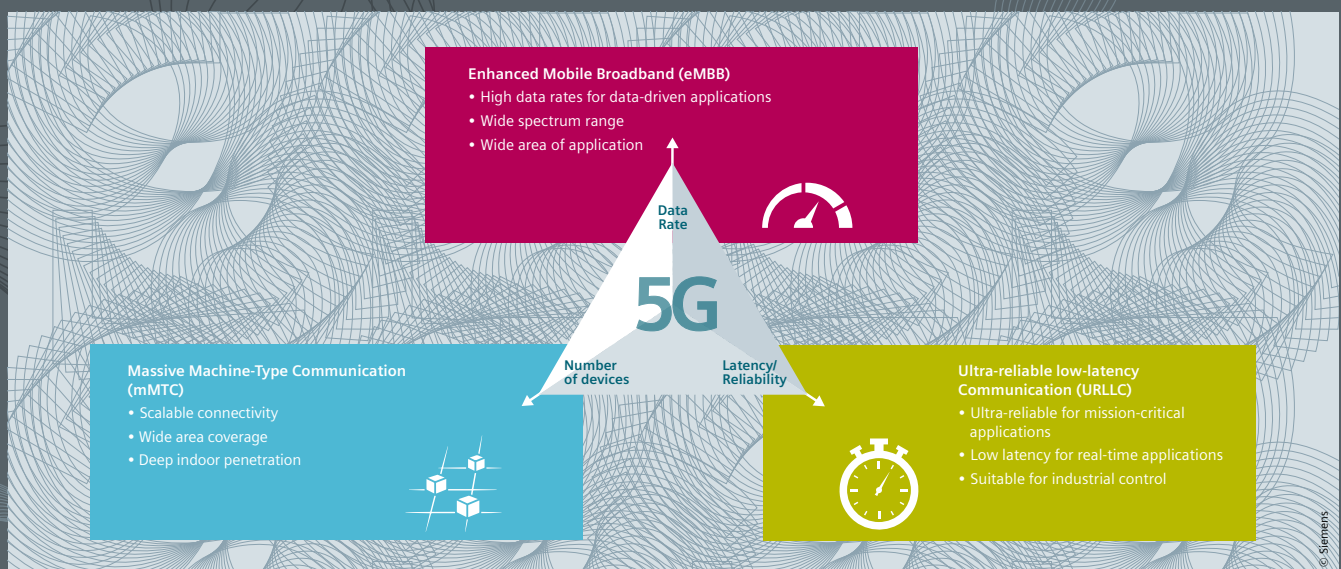
The scenarios cannot be used simultaneously to the full extent. Users need to decide which scenario is the most important for their application and design the network accordingly.

An important factor to benefit most from 5G for industry is a private network working on a private frequency and independent of public providers. With a private network, users own and control their network and are able to "customize" it depending on the use cases it needs to serve. Industrial applications require reliable communications and will benefit more from URLLC. Private networks bring data privacy as an additional benefit. In a self-owned network the data stays on-site and the owner decides what data and where the data will be processed.

For private networks the industry needs to have spectrum available. Germany, for example, has reserved 100 MHz from 3.7 GHz – 3.8 GHz for local use in industrial environments. Companies can rent private spectrum for a reasonable fee to use within their own premises. Other countries are following this example.

Supporting solutions for private networks, together with Release 16, industry-grade hardware, and the support of industrial protocols such as OPC UA and Profinet, make 5G truly fit for industry! ■

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Enhanced Mobile Broadband (eMBB)
- High data rates for data-driven applications
- Wide spectrum range
- Wide area of application

Data Rate

5G

Number of devices

Latency/ Reliability

Massive Machine-Type Communication (mMTC)
- Scalable connectivity
- Wide area coverage
- Deep indoor penetration

Ultra-reliable low-latency Communication (URLLC)
- Ultra-reliable for mission-critical applications
- Low latency for real-time applications
- Suitable for industrial control

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Artificial Intelligence

The next digital level

With digitalization, industrial manufacturing is undergoing a profound transformation, and the use of data-based technologies is playing a major role. Cutting-edge technologies such as artificial intelligence are currently all the rage. But what is AI really about? First and foremost, it involves using intelligent technologies to enable machines to perform tasks that formerly required human intelligence. In other words, machines are no longer limited to performing the tasks assigned to them, but are also able to learn from their experiences. Production can adapt faster to new and partially unknown conditions and fulfill assignments that only would have been possible through human action.

Data as the basis

However, a great deal of data has to be collected and analyzed with the help of machine learning methods to support AI. With Digital Enterprise, Siemens has created a platform that offers companies a basis for this pathway to digitalization. Thanks to Edge computing, the data generated can be preprocessed and transferred into the cloud as compressed data and can be collected and evaluated either in the cloud or in Edge devices. Processing directly at the machine via Edge allows for quick reaction times, whereas cloud-based data processing manages especially computationally intensive tasks.

Production optimized through analysis

The availability of this data combined with constantly increasing computing power enables users to design production even more efficiently. To take just two examples: AI enables machine tools to learn to detect faults before they arise – and facilitates predictive maintenance. But AI can also help a robot's hand handle parts for which it hasn't been programmed. The use of artificial intelligence in manufacturing allows users to improve their factory automation, optimize processes, and reduce costs. ■

› **siemens.com/ futureofautomation**

Computer Vision

Computer vision makes it possible to imitate human vision. The technology can be used in areas such as package monitoring, barcode reading, product assembly, 3D inspection, and quality assurance.

Natural Language Processing (NLP)

NLP plays an important part in making human commands machine-readable, which in turn makes programming unnecessary.
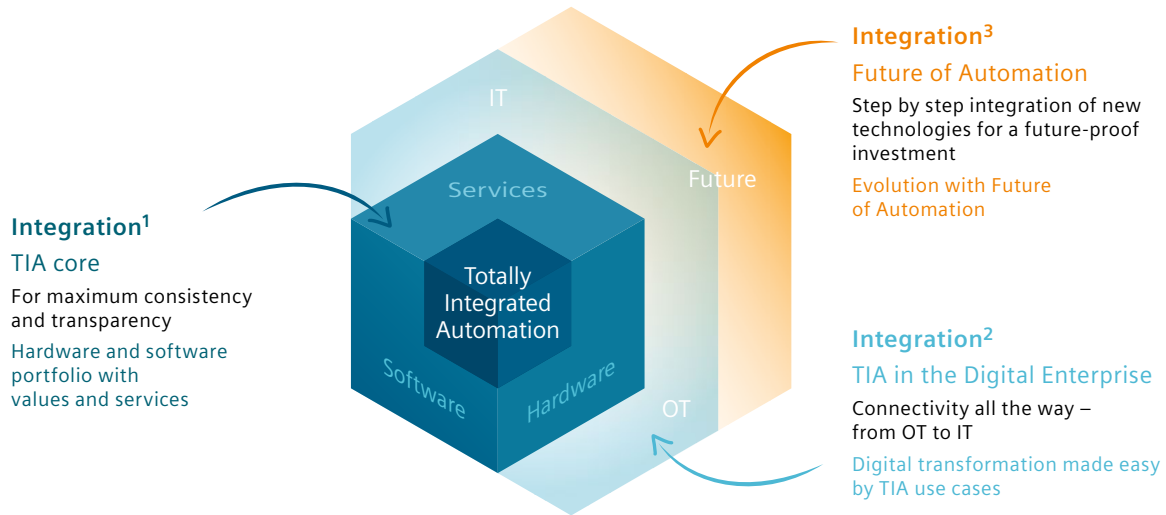
Cognitive Computing

Cognitive computing gives AI the capability it needs to bring intelligence to data-driven processes. It proactively identifies faults and prevents costly product recalls. It also enables real-time computing.

Machine Learning

Machine learning provides data that can be used to improve preventive and predictive maintenance, thus empowering companies to discover new business models.

Future-proof to enter new dimensions

Integration³

Future of Automation

Step by step integration of new technologies for a future-proof investment

Evolution with Future of Automation

Integration¹

TIA core

For maximum consistency and transparency

Hardware and software portfolio with values and services

IT

Services

Future

Totally Integrated Automation

Software   Hardware   OT

Integration²

TIA in the Digital Enterprise

Connectivity all the way – from OT to IT

Digital transformation made easy by TIA use cases

In order to remain competitive, manufacturing companies, but also the mechanical and plant engineering industry, need to become faster and more flexible – preferably with higher quality, lower resource input and ideally more cost-effectiveness. This is where conventional automation quickly reaches its limits, but tremendous potential can be found in the complete integration and digitalization of the entire value chain.

A fundamental requirement for this transition is Totally Integrated Automation (TIA) from Siemens. Within its stable automation core, hardware, software, and services interoperate seamlessly – from the field level to the company management level. This in turn makes room for future technologies.

Each individual component and competence harmonises with each other (Integration¹) – both horizontally and vertically (Integration²). At the same time, technologies and developments of tomorrow are already being conceived today in TIA and integrated step by step (Integration³). The result is real added value across all industries – regardless of the phase of automation or a company's current degree of digitalization.

Totally Integrated Automation provides

- **End-to-end engineering** – from mechanical design to electrical layout and automation

- **Efficient communication** – no language barriers for horizontal and vertical communication all the way to the cloud

- **Integrated security and defense mechanisms** – maximum security for machines and plants, despite increased connectivity and open standards

- **Future technologies such as Industrial Edge integrated in the standard portfolio** – local, high-performance data processing as a part of automation, with all the benefits of the cloud

Thanks to a stable automation core, TIA and the scalable solution packages (TIA use cases) can simplify the transition to the next dimension – all the way to the digital enterprise. For example, the TIA use case "Continuous Integration of Engineering Tasks" shows how efficient and agile ways of working are applied in small and large development teams in the digital age.

TIA use case "Continuous Integration" for efficient teamwork

Methods derived from agile software development are increasingly in demand in the automation environment. In this field as well, programs are becoming more and more complex and require that several people work on a single automation project. As a result, versioning is now a key criterion for effective teamwork.

It is frequently the case that a new working version needs to be integrated into a document, and it is only noticed afterward that the document has already been fundamentally modified by another person in the team. Finding and merging the changes made by the different team members in order to bring the document up to date is time-consuming work. Continuous integration is the continuous amalgamation of a project from different software components to form a "build." At brief intervals, a developer checks the states of development into the system. These states are then automatically integrated into the current application and tested as automatically as possible based on predefined test cases. This allows the developers to receive constant feedback on the functioning of their software changes,

which in turn enables them to make additional, targeted changes when necessary to ensure software quality.

The TIA use case "Continuous Integration of Engineering Tasks" makes this process, which is characteristic of software development, usable in automation as well. This means that several people on the team can work on one TIA Portal project while a developer continuously checks the subprojects into a versioning environment. The checking-in process automatically triggers the assembly of software components into an overall project as well as automated testing. A report furnishes developers with constant feedback on the results of testing, which they can quickly integrate into their software components. ◼

To find more package solutions in the form of application examples that meet specific customer requirements, or for information about Totally Integrated Automation, visit

› **siemens.com/tia**
› **siemens.com/tia-portal-ci**

Highlights

- **Accelerated software development process**
- Improved **software quality**
- **Fewer faults,** resulting in reduced risks
- **Automated development steps** instead of manual tasks

TIA Portal Test Suite

Save time and money with efficient function and application tests

For several years, the digital twin of Simatic S7-1500 – the virtual S7-PLCSIM Advanced controller makes it possible to simulate complete applications without any hardware. Therefore, the functionality of the control program as well as the communication between controllers – including OPC UA – can be verified before the real commissioning. Using the HMI simulation integrated in TIA Portal, the interaction between the user interface and the control program can also be tested. This enables a complete application test in the office environment that is powerful, efficient, and requires minimum effort.

The new TIA Portal Test Suite option package offers users two basic options for ensuring consistently high program quality. The "Styleguide Checker" function is used to define programming rules and verify that projects comply with these rules. The "Application Test" function allows developers to write test cases for Simatic S7-1500 applications and perform the tests using the virtual controller.

The Styleguide Checker defines programming style guides in which rules (such as error messages or warnings) for PLC variables, blocks, and UDTs (user defined data types) are easily established in TIA Portal. The styleguide rules recommended by Siemens are made available in a global library. The testing of one or more style guides can then be initiated by either the user or via TIA Portal Openness, with the option to select the area to be tested. Afterward, the user receives a summary of the test results with the option to access the source of error directly and correct the program error immediately.

With the Application Test, users can develop test cases for either a single block (function) or a group of function blocks (process). The test includes connections of block calls that are then furnished with simulated values. Based on the analysis of the output parameters and the comparison between expected and actual variable values, it is possible to define whether a test was successfully run. The test is

performed virtually with PLCSIM Advanced, the digital twin of the Simatic S7-1500 controller. Only tested codes are approved for use on real controllers. Continuous regression tests also ensure stable software codes.

The digital twin of a machine permits all the functions and interactions between mechanical components, electrical equipment, and automation to be simulated and validated. Not only does this save time during the real commissioning, it also serves to identify errors at an early stage so that they are not transferred to the real plant. PLCSIM Advanced SPS codes can be simulated, validated, and optimized in TIA Portal. Simit allows the sensors and actuators in a machine or plant to be simulated. ∎

› **siemens.com/tia-portal**
› **siemens.com/ virtual-commissioning**
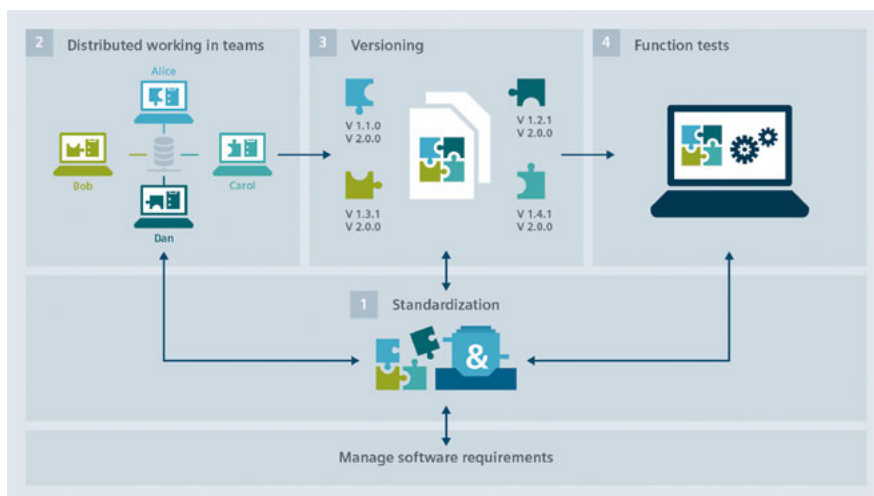
Highlights

- **TIA Portal Test Suite option package** for consistently high program quality

- **Easy location of recurring errors,** because the original sources of error are marked

- Connection of PLCSIM Advanced via the **integrated API**

Highlights

- **Completely web-based process control system** for global collaboration at the same time without installation effort
- **Intuitive graphical user interface (GUI)** for all users and applications in a single workbench
- **Object-oriented data management** for highly efficient workflows in engineering and operations
- **Open and flexible system architecture** for modular automation and highest scalability

Simatic PCS neo

Working more efficiently with a web-based process control system

Simatic PCS neo is a groundbreaking new and completely web-based system software that offers users brand-new opportunities in the age of digitalization. The new system uses the recently innovated hardware portfolio of the comprehensive, powerful Simatic PCS 7 V9.0 process control system. The upgraded hardware portfolio permits the use of Profinet all the way down to the field level, and allows the data in process plants to be used even more effectively. But a hardware platform isn't the only thing that Simatic PCS 7 and Simatic PCS neo have in common. They also share the same application architecture, meaning that plant operators can later choose to migrate to Simatic PCS neo without losing their investment.

With Simatic PCS neo, users have reliable access to all relevant information via a secure Internet connection and can work on projects simultaneously from anywhere in the world. Centralized, object-oriented data management ensures data consistency as well as fast and reliable decision-making.

Thanks to a single workbench for all disciplines and an intuitive graphical user interface, Simatic PCS neo is also easy to operate via mobile devices. Its flexible scalability makes it suitable for the smallest applications as well as world-scale plants. Process modules can also be efficiently integrated into existing systems.

With its flexible licensing model, Simatic PCS neo offers additional transparency and cost-effectiveness based on the latest standards in modern software licensing. It is supported by the "my Simatic PCS neo" web platform, which offers a whole new world of information management across the entire project and plant lifecycle. ◼

› **siemens.com/simatic-pcs-neo**

Siemens Industrial Edge

IT in production

Whether automobile manufacturer, bottler, or plant constructor: in industrial production, every day huge volumes of data are generated by controlling and monitoring most diverse processes. Cloud solutions and Edge computing promise a gain in knowledge for industrial enterprises from this heap of data to drive productivity. Edge computing closes the gap to the cloud by processing and preprocessing huge volumes of data on a local and decentral level.

Siemens Industrial Edge brings data processing closer to the data source or the machine. The advantages are lower latency and reduced costs of data storage and an appropriate handling of sensitive data. However, Industrial Edge is more than just an option for processing data before they are stored in the cloud. With IT using methods such as machine learning and moving closer to the data source, there are new opportunities for using data in production. Furthermore, Industrial Edge facilitates the integration of all end devices into a common management infrastructure, for more efficient, more secure, and more cost-effective management of distributed systems in the intelligent factory.

Highlights

■ **Efficient integration** of IT and data processing functions in automation

■ **Maximum flexibility** in terms of Edge applications and Edge-capable automation devices

■ **Edge applications** for data processing, analysis, and exchange

■ **High security** thanks to secured Edge runtime on the devices and frequent updates

■ **User-friendly** management, operation, and scaling of hundreds of Edge devices worldwide **using apps**

A key feature of Siemens Industrial Edge is decentralized data processing and analysis at the production level using Edge devices or integrated into the automation portfolio using specific Edge apps. Short paths and minimal latency, even for large data volumes, allow for high-performance data processing, based on high-level languages, in real time. However, the data can also be stored and preprocessed in the automation system so that only compressed and relevant data are sent to the cloud or IT systems. Users can distribute the app and system software between their devices as a decentralized concept and perform security updates on the machines at regular intervals. This not only meets the requirements for openness and flexibility, but also for high IT security, and allows Edge computing solutions to be scaled to hundreds of Edge devices distributed around the world. ■
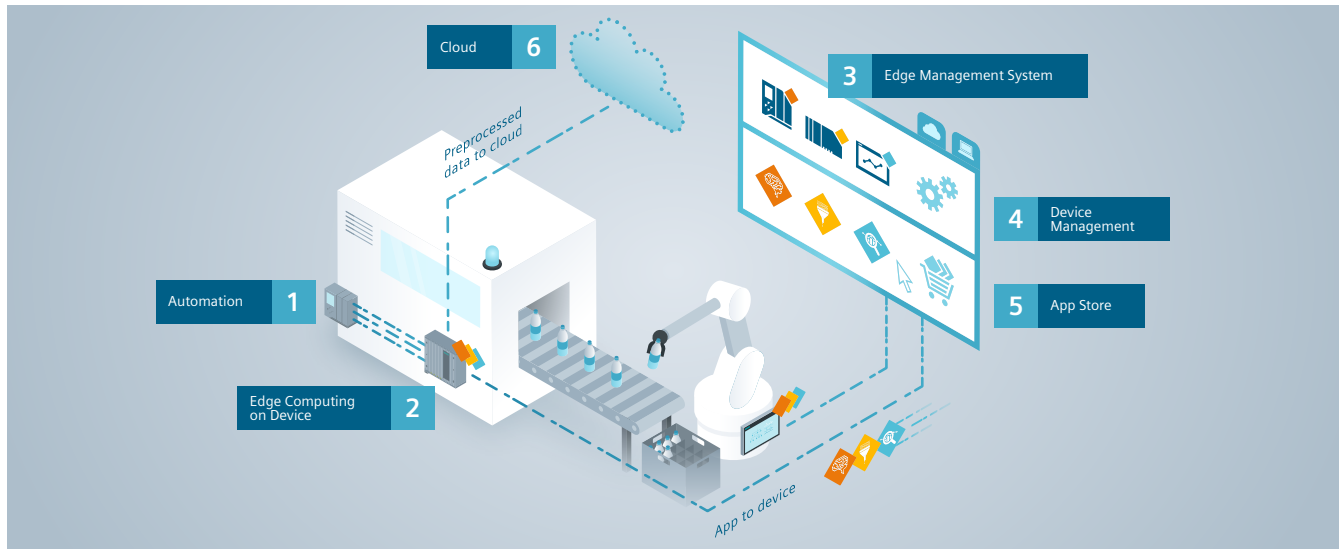
The open Edge system from Siemens

The combination of hardware and software in the Siemens Industrial Edge portfolio improves the flexibility, openness, and security of industrial automation. This transforms the way in which data is handled and processed within production.

Edge Management System

This system is used worldwide to manage hundreds of Edge devices centrally – either from the cloud or on-site within the factory. Edge apps and Edge functions, such as security updates, can be downloaded centrally. This allows for a high degree of flexibility.

Edge App Store

Using the central app store, app developers, system integrators, machine builders, and users can exchange apps with one another and benefit from this global connection. With a free choice of available Edge apps from Siemens and its partners, it is very easy for users to get started.

Integrated connectivity

Users can port existing software and applications effortlessly to Industrial Edge and benefit thereby from integrated security and connectivity into cloud and automation. They only have to take care of their applications that are based on the IT standard Docker. With Docker, data processing and analysis capabilities can be integrated easily and scalably into automation on the basis of typical IT functions and high-level languages such as C, C++, Java, Python, or Node.js. For data transfer, the following protocols are integrated as standard:

- Simatic S7
- Sinumerik
- OPC UA client/server
- MQTT

There is also the option to implement every type of connectivity on the basis of Docker.

>

For plants with Simatic, Sinumerik, or third-party controllers

Siemens Industrial Edge is available in two configurations: one for machines and plants using Simatic Edge, and one for machine tools using Sinumerik Edge. In both cases, Siemens provides an open system for maximum flexibility and any type of application, as well as market-specific add-ons such as domain-specific Edge devices, Edge apps, and connection to Simatic, Sinumerik, or third-party systems.

Simatic Edge applications

A large number of predeveloped Edge apps are available for the Simatic environment. These cover the most common applications in discrete manufacturing and the process industry, and can be implemented with minimal effort.

Simatic Flow Creator

An easy way to get started with local data processing: the graphic user interface supports the creation of a custom solution for data processing and connectivity, using a set of predefined functions.

Simatic Performance Insight

This flexible performance monitoring tool monitors the key indicators for machines, production lines, and the plant as a whole. A personalized dashboard can be created in just a few minutes to reveal optimization potential.

Simatic Notifier

Downtimes can be reduced thanks to additional information. The Simatic Notifier Edge app sends relevant notifications to the mobile devices of operating and maintenance personnel. If the material for a machine has run out, the service technician is automatically notified on their smartphone with a push notification – no matter where they are at the time.

Simatic LiveTwin

Simulation models can be integrated into Edge devices in order to implement virtual sensors and a model predictive control. For example, the heating up of the drive system can be predicted by means of a continuous analysis of the electric current. The integrated model then calculates when the drive would overheat.

Simatic Assistant for machines

A speech recognition system using a headset or chat makes it possible to interact with the machine to identify the sources of faults as quickly as possible. For example:
"Machine, tell me the maximum drive temperature in the last 24 hours."
"Certainly: 60°C."
"Show me the data in detail." ...

Simatic Machine Insight

This condition monitoring app enables better maintenance and diagnostics of the machines. It monitors and provides information via notifications concerning machine events, diagnostic data, and machine status, thereby helping to identify the sources of faults and improve service efficiency.

Sinumerik Edge applications

Sinumerik Edge is a machine-oriented Edge platform designed specifically for the machine tool industry. A range of applications enable feedback-free data processing from the machine tool sensors. Alongside Siemens' own applications, third parties and machine tool operators can also develop their own apps, thanks to a specially adapted development environment. The resulting new applications make it possible to minimize costs, for instance those arising as a result of downtimes, outages, or defects. At the same time, the productivity of the machine tools is increased, without changing anything on the proven machine itself.

Analyze MyWorkpiece /Vision

With the aid of a camera image, this AI-based software detects whether the right workpiece is in the correct position in the machining space. It is also possible to integrate detection of tool wear into the process, for improved machining and process quality.

Analyze MyWorkpiece /Capture

With this Edge app, users can record all real-time workpiece-machining data for subsequent visualization and analysis in Analyze MyWorkpiece /Toolpath in order to optimize quality. With the Capture4Analysis version, the data can be used for any data analytics tasks.

Analyze MyWorkpiece /Trochoidal

This Sinumerik Edge app can be used to program the most advanced form of trochoidal milling directly on the machine. By taking account of dynamic data from the machine and variable tool path velocities, it is possible to increase tool life and shorten machining time.

Analyze MyMachine /Condition

This app provides a comprehensive, data-based map of the machine status. Early detection of deviations makes it possible to avoid machine failures, resulting in increased machine availability. The data interpretation facilitates more intelligent maintenance interventions and optimization of machine parameters.

Edge devices

With Industrial Edge, new opportunities to analyze and process data emerge, for example using artificial intelligence. Simatic Edge devices, such as IPCs, fulfill these challenging tasks. Edge-capable automation devices such as controllers, HMIs, and network routers also support the integrated Edge functionality. ■

Simatic IPC

Industrial PC in a scalable performance class for data acquisition and analysis directly in the manufacturing environment – with integrated connectivity to IT and the cloud.

Simatic S7-1500 TM MFP

Technology module for central connection to any Simatic S7-1500 CPU and distributed connection to any Simatic S7-1200, Simatic Drive Controller, and Simatic ET 200SP CPUs, with Simatic Industrial OS and Edge runtime for Siemens Industrial Edge applications at the control level.

Unified Comfort Panel

First HMI panel with integrated Edge functionality (see p. 27 for further information).

Ruggedcom APE1808 Module

For the RX1500 switch and router family (see p. 45).
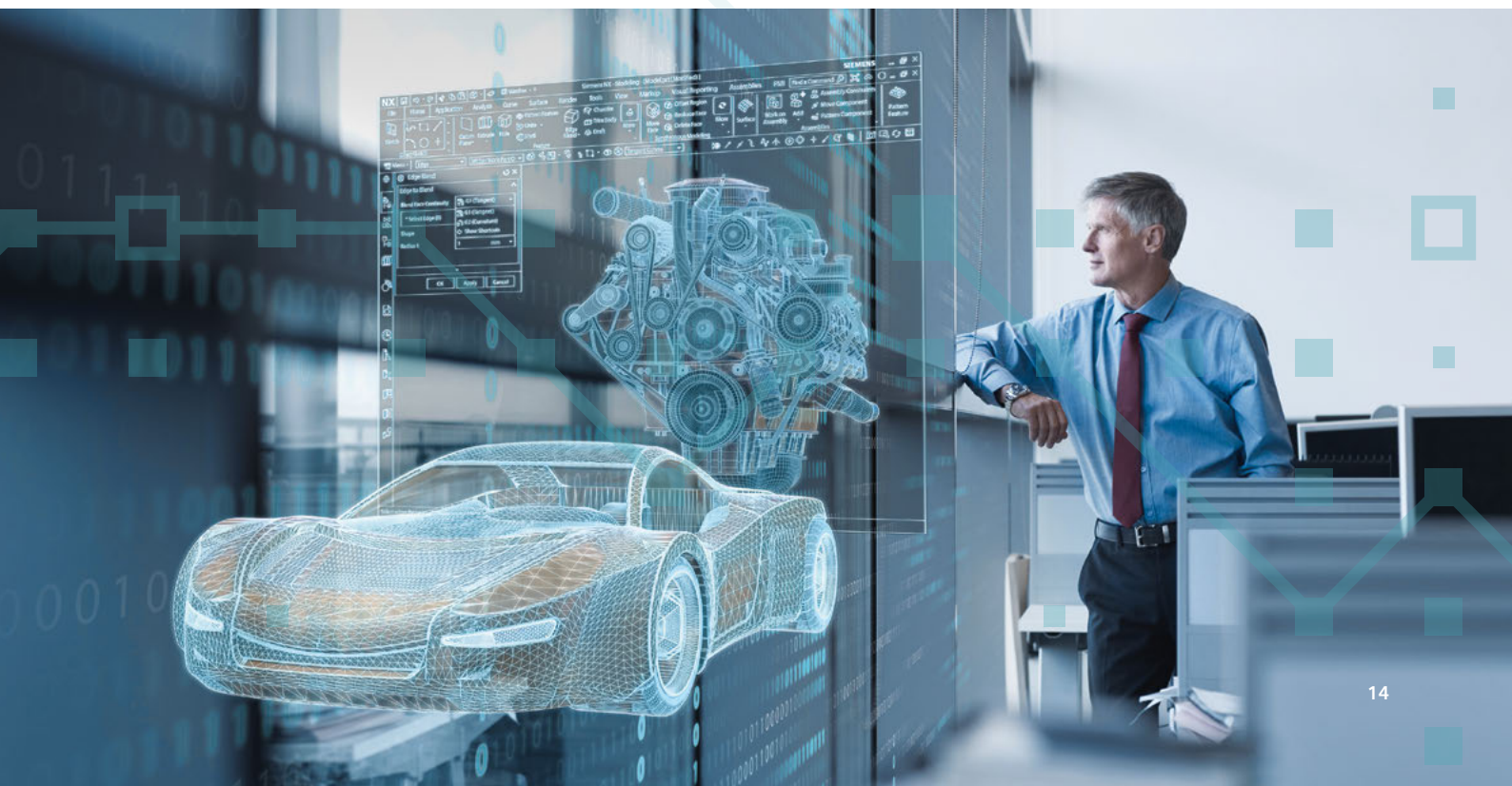
› **siemens.com/industrial-edge**

Fast-tracking the evolution of the digital enterprise

Highlights

- **Comprehensive digital twin capabilities** for blurring the boundaries between hardware and software, virtual/physical, and design/manufacturing worlds

- **Move at one's own pace** with personalized, adaptable solutions including cloud offerings

- Ready access to a **flexible, modern ecosystem**

- Easy **integration of third-party solutions**

The cycle of design, manufacture, and utilization has been valid since the rise of industrialization. But innovation has made it possible, and increased competition and customer expectation have made it necessary, to digitalize production processes no matter the industry. Until today, digitalization continues to transform the way goods and services are created and consumed. In order to compete and thrive, companies are forced to keep pace in this ongoing transformational process.

Siemens Digital Industries Software, former Siemens PLM Software, enables companies to speed up their digital transformation and their design-manufacture-utilization cycle with a newly combined portfolio called Xcelerator. It offers a comprehensive and integrated portfolio of software, services, and an application development platform with which both digital threads and digital twins can be created. Digital threads bring together traditionally disparate domains such as hardware/software, electrical/mechanical, and production planning/execution. They can create connections across cycles and build up networks including suppliers, partners, and even end users. Digital twins illus-

trate processes across domains (software, electronics, and mechanical) and across development phases (design, manufacturing, and feedback from product utilization). The target is to reduce complexity and turn it into a competitive advantage.

Xcelerator offers depth at each phase of the modern industrial design cycle and provides tools to meet the challenges of each domain and phase in order to optimize production and unlock powerful industrial network effects. ■

› **siemens.com/software**

Design tools

- **Polarion**
  Managing software for defining, developing, verifying, and deploying cyber-physical systems resulting in more agility for and control over application lifecycles

- **Calibre/Mentor EDA**
  Solution for IC development teams for designing custom analog and digital chips, RLT synthesis, digital place and route, mixed-signal, and system-on-chip (SoC)

- **Capital**
  Software suite for the engineering of electrical systems for large platforms (cars, aircrafts) and management of increased electrical content due to trends such as powertrain electrification and increased vehicle autonomy

- **NX**
  Design, simulation, and manufacturing solution for coordinating disciplines, preserving data integrity and design intent, and streamlining entire processes

- **Simcenter**
  Combination of system simulation, 3D CAE, and tests for predicting product performances throughout entire product lifecycle, particularly leveraging physics-based simulations and data analytics

Manufacturing tools

- **Opcenter**
  Manufacturing operations management (MOM) solution for completing the digitalization of manufacturing operations providing end-to-end visibility of the production and enabling identification of areas in need of improvement within product design and associated manufacturing processes

- **Tecnomatix**
  Digital manufacturing solutions for creating cloud-based digital twins of factory floors, enabling synchronization of product and manufacturing engineering, production, and service operation

Utilization tools

- **MindSphere**
  Cloud-based, open IoT solution for connecting products, plants, systems, and machines to collect data and interpret them with advanced analytic tools; providing access to a growing number of apps and a dynamic development ecosystem

- **Teamcenter**
  Adaptable product lifecycle management (PLM) system for connecting people and processes across functional silos

- **Mendix**
  Low-code application development platform for creating applications without the need to write code, thus simplifying and accelerating app development across the organization

Technology CPUs / portfolio expansion

Scalable motion control solutions
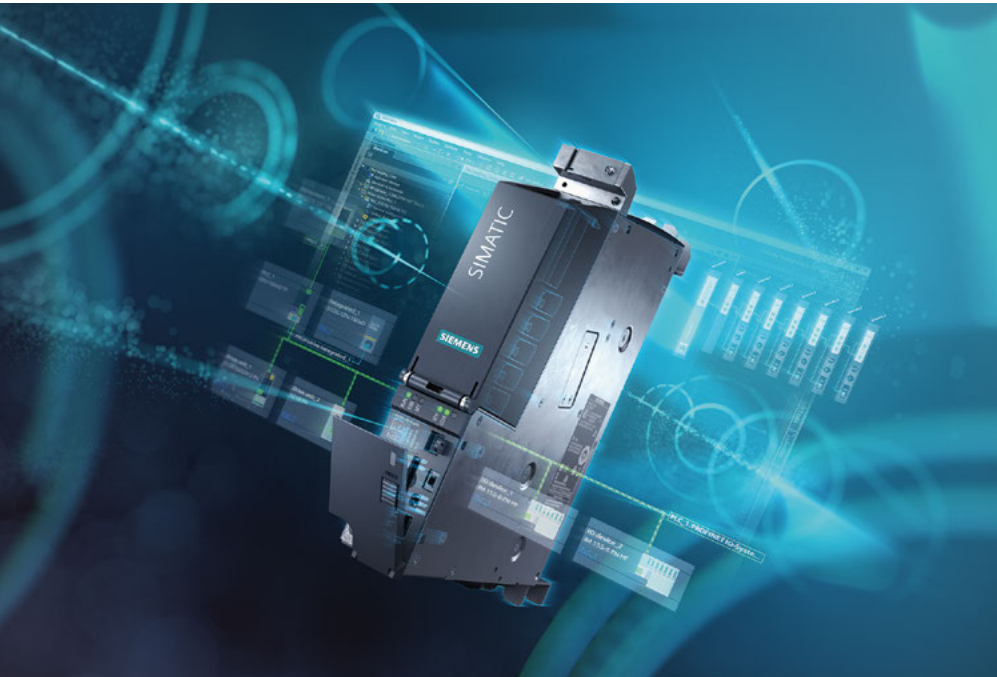
Highlights

- Support for **Simatic Safe Kinematics** by the CPU 1517(T) F-3 and CPU 1518F-4 Advanced Controllers and the CPU 1515SP PC2 TF Distributed Controller

- CPU 1504D TF and CPU 1507D TF **Drive Controllers as drive-based design**

- **Convenient engineering** of Simatic Drive Controller **in TIA Portal** using Simatic Step 7 and Sinamics Startdrive

- CPU 1515SP PC2 T and CPU 1515SP PC2 TF Distributed Controllers in a **bundle with WinCC Runtime Advanced**

Customized products require machines and production lines that can be quickly and easily adapted to different formats, sizes, product types, and production processes. Manufacturing in particular requires a maximum amount of flexibility, efficiency, precision, and availability. The issue of reliability when it comes to monitoring all movements in production machines also plays a key role. Among other things, Simatic Safe Kinematics enables the fail-safe monitoring of kinematics types such as delta picker, roll picker, and serial kinematics with up to 12 joints in the cartesian space. For serial kinematics, fail-safe monitoring of the tool center-point orientation is also possible.

The new Simatic Drive Controller sets the benchmark for the integration of the Simatic S7-1500 control system and the Sinamics S120 multi-axis drive system. Without requiring additional space for the PLC in the control cabinet, it directly integrates motion control, technology, PLC, and safety functions into the modular, highly dynamic Sinamics S120 multi-axis drive system. The comprehensive range of integrated interfaces and technology I/Os is available in two performance classes and enables the efficient implementation of compact, modular automation and drive solutions.

It's now also possible to control the modular, individually configurable Multi-Carrier-System (MCS) transport solution using Simatic Advanced and Distributed Controllers with integrated Technology CPU functionality. In addition, our expansion of the Technology CPU portfolio to include pre-configured Distributed Controllers allows the time and effort for configuration and installation to be reduced and enables fast commissioning of PC-based motion control applications, thanks to preinstalled HMI WinCC Runtime Advanced software.

Cross PLC-synchronous operation is now available as a function in all Technology CPUs. This permits gearing or camming between axes located on different CPUs, which makes it easier to implement modular automation concepts and distribute performance across multiple CPUs. ■

› **siemens.com/drive-controller**
› **siemens.com/simatic-technology**

Simatic S7-1500 / CPUs 1513pro (F)

IT integration and capabilities across multiple devices

With the 2.8 firmware version for Simatic S7-1500 CPUs, Simatic S7-1500 controllers can now be accessed externally via different IP networks. Sensitive email data are protected via secure emails with file attachments and encrypted before sending. An innovated web server based on JSON ensures straightforward and secure integration of the data. Furthermore, the new Simatic S7-1500 CPUs provide a range of diagnostic functions: the cross-device project trace allows improved plant diagnostics and with the diagnostic functions for the OPC UA server, communications errors can be fixed faster.

With the two new Simatic CPUs 1513pro (F)-2 PN in an IP65/67 degree of protection, standard and fail-safe controllers are available for installation directly on the machine. Thanks to the possibility of connecting a Simatic Field PG via RJ45, the devices are easily put into operation. Diagnosis via web server ensures high transparency. A larger RAM and higher performance enable the achievement of significantly shorter cycle times with the new devices, which facilitates every kind of modernization. ■

› **siemens.com/s7-1500**
› **siemens.com/et200pro**

Highlights

- **Simatic S7-1500 CPUs**
  - **IP routing across multiple devices** with IP forwarding and IP accessibility
  - **Secure encrypted email,** optionally with attachment
  - **OPC UA** in **all** S7 starter kits
- **Simatic CPU 1513pro/ CPU 1513pro (F)**
  - Two **Profinet interfaces**
  - Ports for up to **16 modules** (1.2 m)
  - Engineering in **TIA Portal V16**
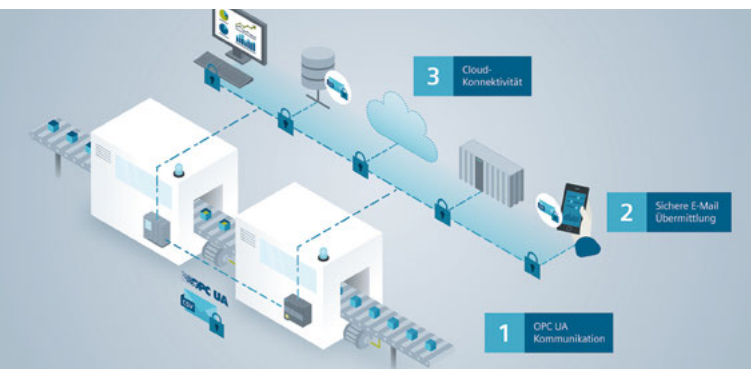
Highlights

- **OPC UA** in **all** S7 starter kits
- Straightforward adaptation to industry-specific companion specification with **Siemens OPC UA Modeling Editor** (SiOME)
- DNS name resolution for symbolic addressing with **open user communication (OUC),** including encryption
- **Send emails securely,** optionally with attachment
- **Cloud** connectivity

Simatic S7-1200, FW 4.4

Extended connectivity

Simatic S7-1200 has an extensive range of communication options. This makes it possible to use a wide range of field devices, exchange data with other controllers, and forward these to any chosen management systems. The new 4.4 firmware version expands the communication functions, in particular for improved data transfer between devices. This makes the controller ideal for use in industry, agriculture, and infrastructure projects. OPC UA Data Access as server provides for standardized horizontal and vertical communication, as well as compliance with any industry-specific requirements such as OMAC PackML, Weihenstephan, and so on. The optional push-in terminal blocks ensure straightforward, tool-free installation. ■

› **siemens.com/s7-1200**

17

LOGO! with cloud connection

Simple networking

To solve small automation tasks as simple as possible is the goal of the logic module LOGO!. With this proposition, the new version 8.3 of the controller LOGO! will feature a cloud connection. The cloud connection offers even more options for centrally controlling and analyzing multiple machines or applications independent of location.

Thanks to the Ethernet interface and the associated interfacing options, LOGO! can also be used as a gateway to the cloud, regardless of whether the plant is controlled by LOGO!, Simatic, or a third-party system. This allows data to be exported to the cloud when, for example, storage space in the controller is limited. As a result, the data from individual machines can be gathered in a central location, remote access to distributed systems can be enabled or retrofitted, new models such as pay-per-use can be implemented, and much more.

LOGO! 8.3 is easily configured via LOGO! SoftComfort, which can also be used to configure and activate the cloud connection. The free-of-charge "LOGO! Web Editor" (LWE) tool can be used to create a dashboard for cloud data. Users with no HTML experience continue to be able to design websites that can be accessed locally or worldwide via the cloud.

The data collected in the cloud is available for ongoing processing and analysis. LOGO! now opens up many new options – whether for benchmarking energy data, performing predictive maintenance, or implementing service concepts. The new basic module will be commercially available as of fall 2020. ■

› **siemens.com/logo**

Highlights

- Cloud connection easily established using **LOGO! SoftComfort "Wizard"**

- Websites created with no HTML experience using the **LOGO! Web Editor**

- **Security provided by TLS encryption** of the AWS cloud to LOGO!

- **Unlimited data storage** and analysis options **in the cloud**

Multi-Carrier-System (MCS)

More dynamics and flexibility in the production process
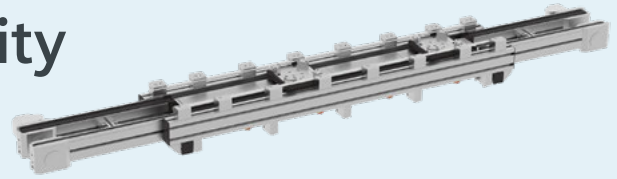
MCS breaks up the rigid concatenation of conventional transport sections, which enables modular, highly flexible, and extremely dynamic production processes. The centerpiece of the system is the workpiece carriers driven by linear motors. Each carrier moves precisely and dynamically within the process steps and freely and flexibly to the individual stations in the process. This is how MCS achieves shorter cycle periods exactly where the process requires it. In addition to increasing throughput, it enables series production in batch size 1, thanks to the fast and flexible adaptation of production processes and machines to different machining steps.

Whether it's for small, large, light, heavy, solid, or liquid loads, for different product formats or seasonal product versions, to eliminate bottlenecks, and much more – the modular and scalable MCS transport solution creates new potential. MCS can also be combined with standard transfer systems such as FlexLink X85P, Elcom TLM 1500, and TS 2plus from Bosch Rexroth AG, enabling its seamless integration into the material flow.

MCS is available with Simatic T-CPU and TIA Portal and with Simotion and Simotion Scout. Since February 2020, the MCS Virtual Commissioning (VC) Toolkit has also been available for automatically generating the standardized digital twin of the MCS section in NX MCD and Simit. Simatic Machine Simulator can be used to test the functionality of the PLC program and simulate the behavior of the MCS section. This enables optimization at an early stage and a reduction in valuable commissioning time. ◾

› **siemens.com/mcs**

Highlights

- Shorter **time to market**
- Innovative **software solutions**
- High **dynamics and precision**
- Ideal for **short-cycle transfers**
- Series production in **batch size 1**
- Can be combined with **standard transfer systems**

Simatic Field PG M6

Switch on and go

For mobile engineering, commissioning, and service tasks in the automation environment, engineers need a reliable programming device. With its robust magnesium enclosure, the semi-ruggedized Simatic Field PG M6 is ideally equipped for mobile use in harsh environments. The device is unaffected by shocks, vibration, and electromagnetic interference in machine-oriented industrial environments. Equipped with all the important automation interfaces, it can be connected to machines and plants via Profibus and two fast Profinet interfaces. Serial connections are also supported. The Simatic memory cards can be deleted and programmed directly in the corresponding slots. The necessary Simatic software, the TIA Portal Engineering Framework, and Sinema RC are already preinstalled, which allows users to start engineering immediately. ◾

› **siemens.com/simatic-pg**

Highlights

- **Windows 10 Enterprise operating system,** 64-bit, also configurable without operating system

- **Two hardware versions:** Comfort with Core i5 and Advanced with Core i7

- Internal **M.2 NVMe SSD** and exchangeable **SATA SSD** selectable with a maximum of 3 Tbytes memory

- **TIA Portal V16** preinstalled

Simatic ET 200SP CM CAN

Integration of CAN devices

The new CM 1 x CAN communication module for Simatic ET 200SP allows CAN/CANopen devices to be connected directly to an ET 200SP station. Via the communication module, Simatic ET 200SP can now also communicate with field bus CAN and CANopen – with up to 60 CAN accounts. Three operational modes can be used for this, while in CANopen mode external device description files (.eds files) can be imported or exported. The CAN bus is connected via push-in terminals of the BaseUnit. A terminating resistor can be added to the BaseUnit through wiring.

Thanks to the small footprint of Simatic ET 200SP, the communication module is suitable for CAN connection of automation solutions in restricted spaces – especially in the logistics and AGV industries. Here, the CAN connection is used for automated guided vehicle (AGV) systems or e-car charging, for example, where it is required for CAN-based charging via CHAdeMO. ■

› **siemens.com/et200sp**

Highlights

■ **Three operational modes:** CANtransparent, CANopen Manager, or CANopen Slave in accordance with CiA 301 & 302

■ **Cyclic or acyclic** data transfer

■ **Engineering completely in TIA Portal** (from V15.1) – no additional tool needed

Simatic ET 200SP DALI

Simple lighting control

With immediate effect, the ET 200SP electronic module CM 1×DALI offers the option to control lighting applications directly from the Simatic user program via the DALI lighting control system (Digital Addressable Lighting Interface). This means that lighting controls can be integrated into automation easily and cost-effectively. One DALI line with up to 64 lights and 63 sensors can be connected per CM 1×DALI multi-master module. CM 1×DALI is thus suitable, for example, for controlling the lighting in tunnel applications, on the shop floor, or in logistics plants. The integrated DALI bus power supply can provide DALI upstream devices and sensors with a current of 160 mA. A function library for TIA Portal offer a simple option for controlling the connected devices. ■

› **siemens.com/et200sp**

Highlights

■ **Save space** for additional control devices thanks to the small footprint of Simatic ET 200SP

■ **Save time** when engineering thanks to simple parameterization and programming in TIA Portal

■ **Freely scalable** quantity structure thanks to the option of plugging several modules into each station

Weighing processes with minimum footprint

In rotary filling plants, space is very tight. The new Siwarex TM WP351 weighing module for Simatic ET 200SP enables fast, precise dosing and filling tasks in the limited space available in these plants. The high resolution and fast scanning of this compact and seam-lessly integrated solution for automated, calibrated weighing applications delivers optimal results. ■

› **siemens.com/siwarex**

Highlights

■ Suitable for **applications requiring official calibration** in accordance with OIML R51, R61, R76, and R107

■ Simple commissioning and service via **web server interface**

■ Various **interfaces onboard**

Simatic ET 200SP HA F-DI/DQ

Powerful I/O system goes safety

The advantages of a scalable peripheral system can now also be leveraged for procedural safety applications with the new digital fail-safe modules for Simatic ET 200SP HA. Components with a redundant design increase the availability of systems and safety-oriented applications significantly. Next to the possibility of connecting the Simatic ET 200SP HA station redundantly through the Profinet interface, standard and fail-safe peri-pheral modules can also be installed redundantly.

The compact design of the only 22.5 mm-wide modules, the tool-free connection technique with push-in terminals and the permanent wiring ensure space-saving and efficient installation and assembly. ■

› **siemens.com/simatic-et200spha**

Highlights

■ **16** channels for **digital input** or **10** channels for **digital output**

■ **Certified** for safety applications **up to SIL 3**

■ **Programmable diagnostic functions**

■ Installation up to **Ex zone 2**

■ Extended temperature range: **−40°C to +70°C**
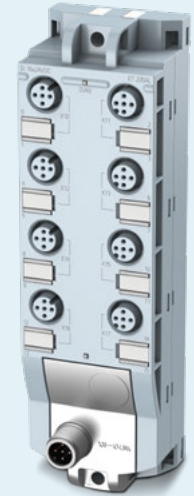
■ Can be used in heights up to **4,000 m**

Harmonizing communication with the field level

Simatic ET 200AL IO-Link I/O modules, to be introduced into the market in mid-2020, enable the connection of standard sensors and actuators with machine and plant control. Signals are transmitted and power is supplied via IO-Link. The connection of the IO-Link I/O modules with the IO-Link master and a combination with other Simatic ET 200 I/O modules make it possible to combine the fieldbus line topology with the IO-Link star topology in any way and therefore to optimally adjust it to the requirements of machine and plant. The IO-Link I/O modules can be connected to an IO-Link master under IP20 degree of protection as well as under IP67 degree of protection. The IO-Link I/O modules are easily engineered via the engineering of the IO-Link master. A device description file (IODD) for the IO-Link I/O modules will be made available. ◾

› **siemens.com/et200al**

Highlights

- **Reduced costs** for connection technology
- **Star-shaped structure** of I/O modules (star topology) via point-to-point connection of IO-Link
- **Same system features** as I/O module Simatic ET 200AL except communication and power supply
- **Well-balanced portfolio** of digital input, output and input/output modules designed such as Simatic ET 200AL

More channels, less room and costs

Highlights

- **4x Port Class A** and **4x Port Classs B IO-Link master** with 4 digital inputs
- **Support** of **IO-Link specification** V1.0 and V1.1
- **Configuration** through GSD file or S7-PCT
- **Two** M12-L-coded **power plugs,** up to **20 cable lengths,** up to **32 bytes of input and output data**

The compact and robust I/O system Simatic ET 200eco PN has been completely innovated. The portfolio of digital modules now comprises just six modules – five digital modules and an IO-Link master. Up to eight IO-Link devices can be connected to the 45 mm-wide 8-port master. An automatic backup of device parameters while changing the IO-Link device, re-parameterization while in operation, and a master backup via PLC function block ensure high operational security.

The functional expansion of the new modules, as well as the harmonization of module widths, have made it easier to standardize machine designs and cut storage costs. All this also reduces planning effort. ◾

› **siemens.com/et200ecoPN**

Simatic ET 200MP / Simatic S7-1500 IOs

Simple and direct migration

Highlights

- **Excellent price-performance ratio** for price-sensitive applications

- **Minimum footprint** thanks to highest possible channel density

- **Hot swapping:** the new active backplane bus makes it possible to replace modules in distributed configuration during ongoing operation

- **Tool-free and time-saving use** of Simatic Top Connect system cabling

The new high-density channel modules for Simatic ET 200MP/S7-1500 minimize the footprint of distributed and central stations. A total of four new digital modules with 64 channels each and two analog modules with 16 channels each allows for space-saving and cost-efficient installation of large numbers of channels in the control cabinet. The new active backplane bus for Simatic ET 200MP stations allows hot swapping of modules: this means that in the event of failure, modules can be replaced while the plant is running and the unaffected modules remain in operation. Particularly in combination with redundant Simatic S7-1500 R/H systems, the active backplane bus increases the plant availability. Especially, proven existing Simatic ET 200M/S7-300 systems with a high number of channels or active backplane bus can now be migrated easily to the new Simatic ET 200MP/S7-1500. ■

› **siemens.com/et200mp**

Simatic ET 200SP MultiFieldbus Interfaces

Planning security in a global environment

Highlights

- **MultiFieldbus IMs** for ET 200MP (IM156-5MF ST), ET 200SP (IM156-6MF HF), ET 200eco PN (in preparation), PN/MF couplers

- **Simultaneous communication** to the modules of a station via the same line using all protocols

- **Engineering via MFCT** (MultiFieldbus Configuration Tool)

- **MultiFieldbus coupler** for low-effort integration of Simatic controllers in existing machines/plants

Thanks to MultiFieldbus IMs for Simatic ET 200, Simatic ET 200SP stations and modules can now be connected to controllers using Modbus TCP or EtherNet/IP as well as Profinet. Users save costs and planning effort due to the fact that the same I/O configuration can be used irrespective of the higher-level controller when designing machines or plants. The same IM can be used for all bus systems, meaning it is not necessary to amend electrical circuit diagrams, for example. The MultiFieldbus IMs offer excellent flexibility, since the same Simatic ET 200 station/module can be accessed from multiple controllers using the shared device function. The same I/O station can communicate with different controllers simultaneously over the same cable, even where different bus protocols are used. ■

› **simatic.com/et200sp**

Simatic Micro-Drive
## F-TM ServoDrive

Drive system for Simatic ET 200SP

The compact and powerful Simatic ET 200SP system is now able to control drives. In combination with EC motors, the new Simatic ET 200SP technology module F-TM ServoDrive enables positioning and steering at speeds up to 280 W in extremely narrow spaces. Engineering in TIA Portal represents consistency in a single tool. This simplifies drive design, commissioning and service. The new drive system comprises the F-TM ServoDrive actuator as the new member of the Simatic Micro-Drive family, the BaseUnit (U0), flexible-use motors with gearbox and connecting cables. ■

› **siemens.com/micro-drive**

Highlights

- **Safety extra-low voltage drive controller** 24–48 V DC, up to 280 W

- **High power density:** 20 mm wide

- **Safety Integrated:** STO hardwired (SIL2)
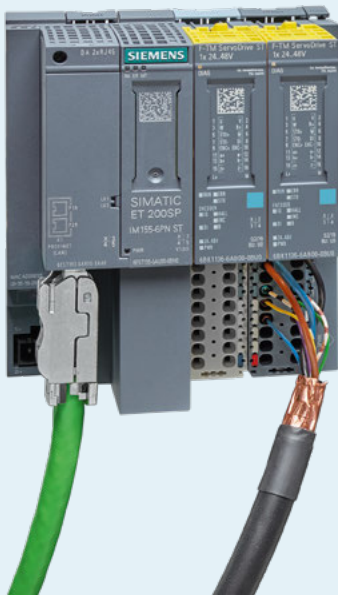
Simatic IOT2000

Intelligent gateway for IoT solutions

Highlights

- **TI ARM SoC, 64 bit,** up to 4 cores

- **2x Gbit LAN,** 2x USB, 1x serial, 1x Arduino interface, 1x mPCIe

- **Display port**

- **Internal eMMc memory** can be expanded with microSD card

- **Software** for IoT use case (such as node.js, cloud protocols)

IoT gateways make it possible to implement future-oriented production concepts in an existing plant. The new generation boasts significantly improved performance: Simatic IOT2000 brings together the latest generation of processors with 2 GB DDR4 RAM and integrated eMMc memory, and comes with Simatic Industrial OS preinstalled.

Simatic IOT2000 supports a range of communications protocols and programming languages. The intelligent interface makes it possible to harmonize communication between the various data sources, analyze data on-site, and forward these to the corresponding recipients. As a result, it is easy to implement applications such as preventive maintenance and to connect production to the ERP level. The IoT gateway thus contributes to making production more flexible, reliable, and efficient. ■

› **siemens.com/iot2000**

Simatic Industrial OS V1.5

Seamless functioning in the industrial environment

Simatic Industrial OS V1.5, an update of V1.3, offers extended hardware support and software functionality. Since it was specifically developed for and tested on Simatic IPCs, this operating system is ideal for applications in the industrial environment and other tough application areas. Based on Debian 9, Simatic Industrial OS constitutes an alternative to the proven Microsoft Windows operating system that is also available for Simatic IPCs.

The new operating system is impressive with its narrow footprint, but it is equipped with all the components necessary for fast commissioning and simple ongoing development. Many important functions can be quickly and easily installed via a service USB flash drive and initial setup. Since only one image is required for all Simatic IPCs, optimal scalability and reusability are ensured. At the same time, however, Simatic Industrial OS also offers users a high degree of openness and flexibility. The operating system can be easily integrated into other Simatic products or features and comes with the same product support as other Simatic products. ■

› **siemens.com/industrial-os**

Highlights

- **Real time-capable,** thanks to the "PREEMPT RT Patch"
- **Profinet driver** for standard Ethernet and CP1625
- Support for **additional IPCs**
- **Expanded diagnostics** package for IPCs
- **Simple backup and restore** concept via service USB flash drive

Highlights

- **New slimline front design** 15"/19"/22"/24" in full HD resolution (1,920 x 1,080)
- As **built-in** unit or **PRO version**
- All devices are **shipbuilding-** and **ATEX-cerified**
- Can be **located at a distance of up to 100 m:** HDBaseT V2 technology
- **More interfaces:** 1x DP, 1x DVI, 2x USB 2.0 interfaces

Simatic Industrial Flat Panel V2

Innovative operating concepts, modern machine design

With their rapid response time for real-time operator control and monitoring, Simatic Industrial Flat Panels are highly suitable for use as industrial monitors. The multitouch panels are equipped with a widescreen display with a full glass front and projective-capacitive touch technology for implementing innovative operating concepts. Even in poor lighting conditions, all displays are easy to read thanks to the scratch-proof, AR-coated surface. Simatic Industrial Flat Panel V2 can also be reliably deployed in harsh environments, because the monitor automatically recognizes unintentional contact. It can also be operated while wearing gloves. ■

› **siemens.com/ifpv2**

Highlights

- **Web technologies** such as HTML5, SVG, and JavaScript
- **ODK and OpenPipe interfaces** for easy data transfer
- **Connecting** the SCADA level to the MES and IT levels
- **Local backbone** for extensive data analysis and training of AI algorithms in other runtime environments such as Edge apps
- **Plant Intelligence options:** Performance Insight and Calendar

Simatic WinCC Unified System

Web-based visualization for industrial applications

The Simatic WinCC Unified System, a completely new overall system for operating and monitoring industrial plants, consists of the Simatic WinCC Unified visualization software and the new generation of HMI panels: Simatic HMI Unified Comfort Panels. The high scalability of the platform enables end-to-end solutions across applications of all sizes, from operator panels at the machine level to complex, distributed SCADA systems. When designing the system, special emphasis was placed on openness: Interfaces were implemented that, on the one hand, enable automated configuration (TIA Portal Openness) and, on the other hand, make it much easier to transfer data during operations. This in turn significantly simplifies collaboration between devices.

Simatic WinCC Unified permits users to either integrate their own application or take advantage of available options. With the Plant Intelligence option Performance Insight, they can easily calculate KPIs such as overall equipment effectiveness (OEE). A calendar option provides for the structured planning of production sequences. It allows users to define templates for typical production days during runtime and apply them to specific days.

Simatic WinCC Unified is configured consistently in TIA Portal. Once created, components can be reused across all platforms, including panel, PC, or, in the future, apps in the cloud or Edge environment. The software can be accessed using any modern web browser without having to install separate plug-ins. Thanks to native, future-ready web technologies such as HTML5, SVG, and JavaScript, the system can be accessed from anywhere in the world at any time.

The first version of WinCC Unified is available for panel- and PC-based solutions. Inversions for Edge and cloud environments will be available in a later delivery stage. ■

› **siemens.com/wincc-unified-system**

Simatic HMI Unified Comfort Panels

More user-friendly, powerful, and expandable with apps

The new generation of high-end, 7- to 22-inch operator panels – part of the new Simatic WinCC Unified System – brings numerous improvements compared with predecessor devices, including to user-friendliness and visualization. Thanks to their capacitive glass front with multitouch technology, the Unified Comfort Panels are as convenient to use as a smartphone or tablet. The sharp colors and contrast improve readability and ease of use. Visualization on the devices is based on the new Simatic WinCC Unified visualization system in TIA Portal and is suitable for scalable solutions, from machine-level applications to distributed SCADA solutions. This creates many new opportunities and functionalities for the user across all device sizes. Brand-new to the Simatic HMI product portfolio is the option to expand functions with apps. Previously, HMI panels were used exclusively for visualization software. Thanks to the integration of Siemens Industrial Edge, users can now run other programs simultaneously alongside this standard device functionality. This means that project-specific requirements can be implemented quickly and easily. ■

› **siemens.com/unified-comfort-panels**

Highlights

- **Visualization options such as**
  - consistent visualization based on Scalable Vector Graphics (SVG)
  - extensive UI controls
  - custom web controls
- Extremely rugged **multitouch technology** optimized for industrial environments
- Improved **hardware performance** and **higher system limits** for significantly larger applications, thanks to the panel-based system
- Integrated **IT security** mechanisms to protect the plant from cyberattacks

Simatic WinCC Open Architecture V3.17

More flexibility for licensed software

With the launch of Simatic WinCC OA V3.17, the software licensing process was completely revised. Code-Meter technology from Wibu-Systems offers users increased flexibility for editing, extending, and moving licensed software configurations. Simatic WinCC OA licenses can now be ordered directly from the Siemens Industry Mall, as well as through a regional sales contact. Customers access the ordered licenses using a ticket that they receive via e-mail after purchasing the licenses. The customer or the relevant system integrator can manage the license portal directly.

Customers perform central license management via a web portal that enables them, among other things, to activate licenses for target devices, move them from server to server, or – in the event of a hardware loss or similar emergencies – restore them. This allows customers to quickly and autonomously solve many acute problems, to perform autonomous maintenance, and even to extend licenses to additional components. Thanks to the new software containers, licenses can also be activated on servers or even on virtual machines without additional hardware protection (dongles). If necessary, a hardware dongle can be used for the licenses. Offline activation is also an option.
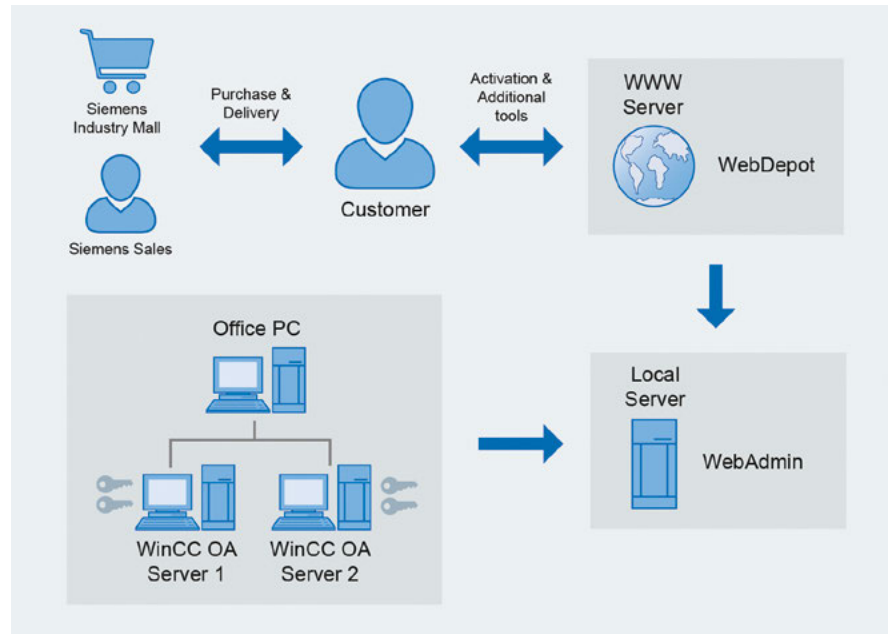
Customers can access all the information on their license options at any time. Locally, the CodeMeter Control Center service integrated in Simatic WinCC OA V3.17 provides users with an overview of all the licenses assigned to a device. Technical licenses and their properties, including version number and expiration date, can also be viewed via a web administration user interface. ■

› **siemens.com/
wincc-open-architecture**

Highlights

- **Autonomous managing of own licenses** without having to contact the license issuer directly

- Option to **autonomously transfer licenses between servers,** because no hardware code is needed

- **Shorter commissioning time** thanks to direct ordering and administration by the customer

- **Greater flexibility** when ordering new services, drivers, and user interfaces

- Services can be ordered immediately **with licenses**

Sitop PSU8600

Base unit for 1-phase grids

The Sitop PSU8600 modular power supply system has a wide input voltage range for connection to AC systems between 100 V and 240 V without switchover and for DC systems between 110 V and 220 V. This makes it ideal for connecting to 1-phase grids, and it can also be connected to the 2-phase 240-V grids that are found in North America.

This new base unit provides four outputs with overload monitoring and can be expanded to as many as 36 outputs using expansion modules. Every output can be dynamically changed or switched on and off during live operation. To bridge power failures, the system can be expanded to include buffer components and can even be extended to a full DC UPS.

The new power supply module is ideally suited for digital automation because it communicates via two Ethernet/Profinet ports, just like the previous 3-phase base units. It's integrated in TIA Portal and can also be incorporated into open systems, for example via OPC UA, and using the Sitop Manager engineering and monitoring software.

Sitop PSU8600 also offers functionalities beyond those of a mere power supply, such as diagnostic capabilities for preventive maintenance. This enables gradual changes in a load branch to be identified before they lead to a shutdown. ◼

› **siemens.com/sitop-psu8600**

Highlights

- **Compact 1-phase** 20 A **base unit** with four 5-A outputs monitored for overload

- **Wide input voltage range** 85–275 V AC and 93–275 V DC

- **Buffering during power failures** from seconds to hours

- **Fast and easy connection** of add-on modules with no wiring overhead using System Clip Link

- **Comprehensive diagnostics** for preventive maintenance with Profinet and OPC UA

Digitalization in drive technology

Turn data into valuable knowledge

Highlights

- **Efficient engineering tools** such as Sizer, DT Configurator, and Sinamics Startdrive
- **Connectivity modules** to connect drives to the MindSphere cloud
- **Bundling IoT products and services** with Sidrive IQ: for example, MindSphere applications such as Analyze MyDrives for low-voltage drive systems, Sidrive IQ Fleet for low-voltage motors, and digital services

Vast numbers of drives are running in both the process and the manufacturing industries. Of fundamental interest to industry is improving the availability of machines and plants as well as the process safety. The drives' status and performance must be inspected regularly to obtain the knowledge needed to make these improvements.

Drive technology offers the perfect entry into digitalization for machine builders, plant manufacturers, and users. The goals differ in each case, however: While machine builders mainly want to improve their development processes and machine characteristics, operators are more interested in the stability, flexibility, and efficiency of their production or manufacturing processes. But no matter how different their viewpoints, they share an equal focus on drive characteristics, status, and behavior.

Digitalizing their drive trains assists machine builders and users along the entire value chain from design to planning, engineering, production, and services. An integrated database in conjunction with simulations and tests at the digital level enables virtual commissioning, which shortens the time needed for real-life commissioning.

With cloud applications, operational data can be collected, evaluated, and used to optimize operations. For instance, actual service requirements can be identified by monitoring the drive components.

A new concept study about connecting drive systems with the Industrial Edge platform states that in the future, besides low- also high-frequency drive data can be used for analyzing and deriving recommendations for actions. This enables cloud-based data

processing as well as local options of processing and analyzing drive data.

The Sinamics converter and Simotics motor portfolios combine proven hardware with innovative software, ensuring transparency along the drive train and reliable operation. New interfaces and connectivity modules allow all components to be digitalized.

Siemens accompanies customers on their path to digitalization with a comprehensive service portfolio – from consulting and implementation to optimization. That's the way to increase productivity in manufacturing. ■

> **siemens.com/digital-drives**

Simatic Micro-Drive

Ideal drive for many applications

Simatic Micro-Drive proves a winner as a versatile, seamless, and safety-integrated drive for all kinds of requirements in the extra-low voltage range: for positioning tasks, in production machinery, or in innovative applications such as shuttles for storage and retrieval machines and storage rack systems, and automated guided vehicle (AGV) systems. The drive can also be deployed in medical technology (for safe maneuvering of examination beds in MRIs and positioning of the ceiling-mounted arm in radiography), among many other applications.

Simatic Micro-Drive PDC (ProfiDriveControl) and Simatic Micro-Drive F-TM ServoDrive, the new drive controller module for Simatic ET 200SP, complement each other perfectly in terms of performance. They complete the portfolio with versatile motors and connecting cables, and controllers like Simatic round out the range of motion control functionalities.

To ensure that the drive technology complies with as many customer requirements as possible, Siemens utilizes the individual and supplementary products of selected partners (Dunkermotoren, ebm-papst, Harting, and KnorrTec) for the motors and connecting cables. This gives users access to an individual combination of suitable products from the Siemens Product Partner Program.

With Simatic Micro-Drive, the drive controller and motors are fully integrated into the Siemens automation technology based on Totally Integrated Automation (TIA). In addition, versatile tools covering the entire machine-building cycle ensure extremely efficient engineering and fast commissioning. Therefore the servo drive system provides the perfect entry to digitalization. ■

› **siemens.com/micro-drive**

Highlights

- **Fast and safe communication** via Profinet

- **PDC:** Safety integrated with a new function: SLT (safely limited torque)

- **F-TM ServoDrive:** Power density with integrated STO function (SIL2/hardwired)

- **Easy commissioning** and servicing via TIA Portal

- **Easy selection** and dimensioning in the TIA Selection Tool

Note:

See also the article on p. 24: Simatic Micro-Drive F-TM ServoDrive

# Simplified handling for precise servoapplications
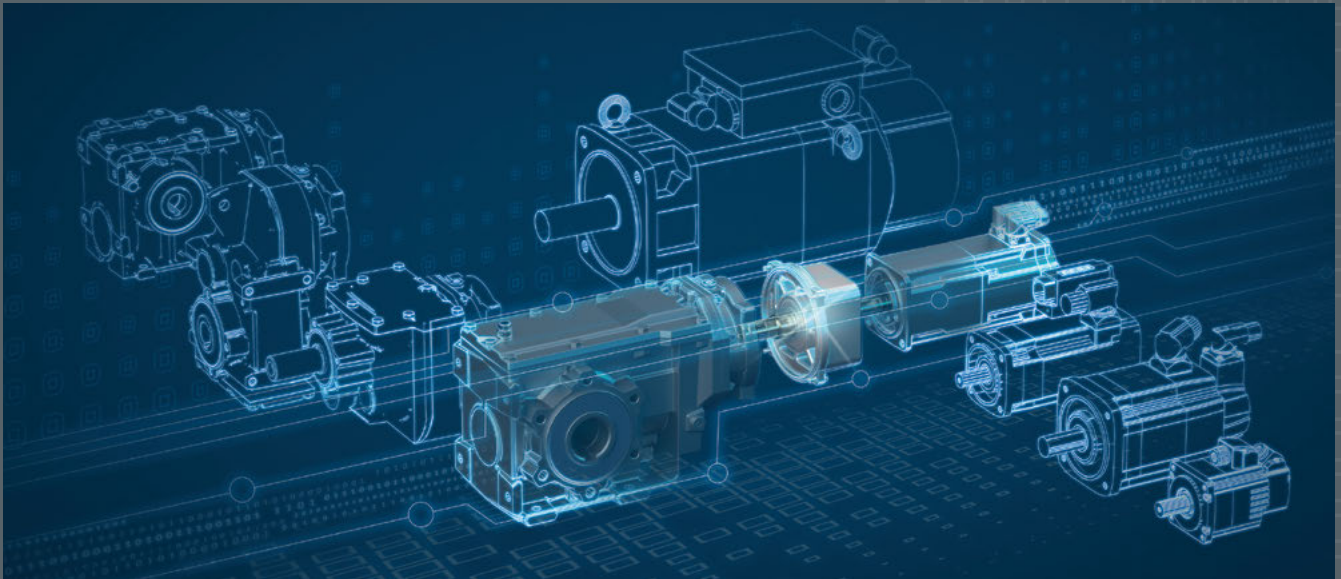
The new Simogear coupling adapter links different Simogear gear unit types and Simotics servomotors without requiring a dedicated adapter for each motor. The Simotics motor series S-1FL6, S-1FK2, S-1FK7, S-1FT7, and M-1PH8 can be connected to virtually any size or type of gear unit. This means that the Sinamics frequency converters work together perfectly with Simotics servomotors and Simogear gearboxes and offer the most flexible solutions from the servo drive systems portfolio with gearboxes. Thanks to the Simogear KS adapter´s flexibility and the simple motor assembly and disassembly, costs and downtimes are reduced by optimized stockkeeping.

The new KS adapters are designed for four different gear unit types (helical, parallel shaft, bevel and helical worm) and are particularly suited for use in applications involving stringent demands in terms of precision, positioning, dynamics, compactness, and weight. Sectors that stand to benefit in particular from the new adapter include machine building and conveyor systems as well as manufacturers of production and packaging machinery, machine tools, and storage and retrieval systems. The servo drive system with Simogear KS adapter can be easily selected and configured with TIA Selection Tool to meet the technical requirements of the machine. ∎

› **siemens.com/simogear**

Highlights

- ∎ Designed for **four different gear unit types**
- ∎ **Flexible extension** of Simotics servomotors
- ∎ **Easy assembly and disassembly** of the motors
- ∎ **Backlash-free design** requires no feather key
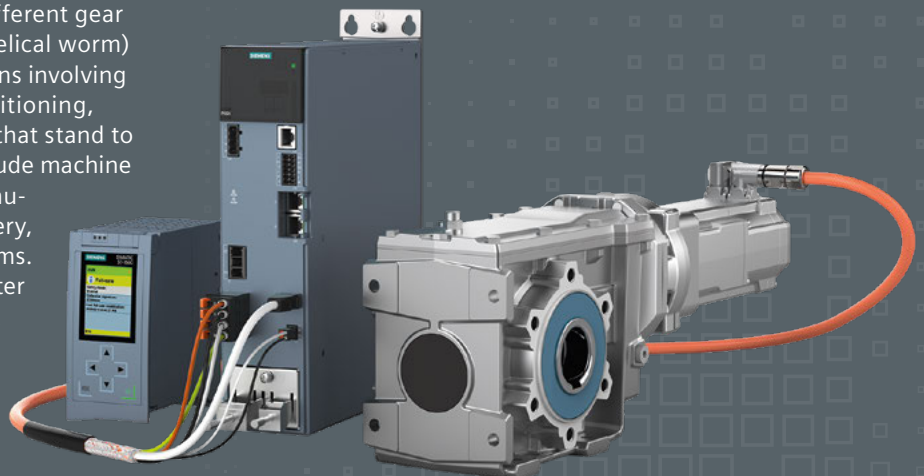
Sinamics IOP-2 Intelligent Operator Panel

New operating concept, more application functions

The flat IOP-2 Intelligent Operator Panel enables the fast commissioning, error diagnostics, and intuitive operation of Sinamics G frequency converters. It contains an innovative, central multifunction sensor-control field with a wide range of settings.

A new operating concept for status-screen layout allows users to switch seamlessly between displays in number format, as trends, and as bar graphs, without leaving the screen. It's also easy to edit the displayed values without having to return to the control panel settings. The new and improved support functions for the command data set now also let you set inputs and outputs for various command data sets, so you can operate the drive both locally and by remote. The design has also been improved: users can now switch between different command data sets with just a click.

The application functions available in the Sinamics IOP-2 have been steadily expanded to include more drive functions. The user interface now allows easy access with text and graphic support to all parameters associated with a given function. This means less frequent recourse to the expert parameter list.

Sinamics IOP-2 can be used in three ways: for direct connection to the converter's control unit, for door assembly for operation outside the control panel, and for use via IOP-Handheld in the case of cable-based operation in locations with difficult access. ∎

› **siemens.com/sinamics-g120**

Highlights

- **New concept** for status screen
- **New application functions** for expanded initial power-up and commissioning (jogging and multi-pump control)
- **Improved support** for the command data set (CDS)
- **Compatible with** Sinamics G120, G120C, G120P, G110D, G120D, G120X/XA, and G110M converter series, and with Simatic ET 200pro FC-2

Sinamics S210

High performance, easy engineering
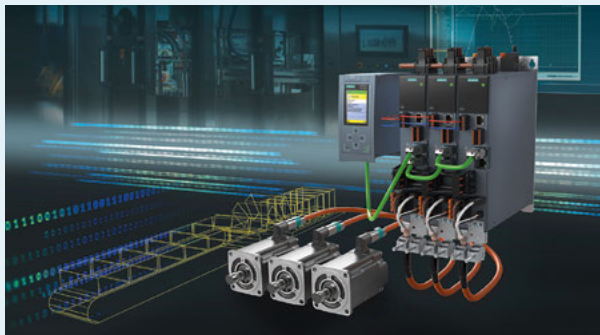
Highlights

- **Medium power range** from 50 – 750 W for 1 AC 230 V and from 0.4 – 7 kW for 3 AC 400 V

- **Usable internationally** thanks to approvals such as UL and 1 AC 200–240 V and 3 AC 200–480 V connection voltage variants

- Commissioning via **web server** or with **Sinamics Startdrive / TIA Portal**

- Ready for **Advanced, Open,** and **Software Simatic Controllers**

High overload capacity, dynamics, and precision: the Sinamics S210 single-axis servo-drive system is ideally suited for use in machines for packaging, handling, wood and ceramic processing, and digital printing. The drive system is now available across all power and connection voltage ranges. An optional infeed rail system is available for the new 3-phase device versions. A common DC link coupling reduces waste heat and increases the travel cycle of individual axes. Integrated safety is also a winner in this converter: in addition to STO, SS1, and SBC, safety functions such as SLS, SSM, and SDI can be activated via an optional license. The Simotics S-1FK2 servomotors with one cable connection developed for the system can be ordered with absolute single-turn or multi-turn encoders in 22-bit resolution. ■

› **siemens.com/sinamics-s210**

Simotics SD next generation

Better than the new efficiency requirement

The efficiency of electric motors is the most important factor when it comes to reducing power requirements in industrial operations. That's why the European Union is once again significantly tightening efficiency requirements for electric motors with effect from July 1, 2021, and expanding the application of the standard from "up to 375 kW" to 1,000 kW. Even in its standard version, Simotics SD is now also available in the maximum currently defined efficiency class, IE4, across its entire power range up to 1,000 kW – which means that this motor already exceeds the requirement that comes into force in mid-2021 by one full efficiency level. In addition to energy efficiency, Simotics SD next generation also scores in areas such as its extreme sturdiness, small envelope dimensions thanks to increased power density, and highly flexible plant integration. The motor can also be installed horizontally with no supports using a flange-mounted design up to a shaft height of 355 mm. That reduces installation overhead for plant integration, while improving the accessibility of the working machine. ■

› **siemens.com/simotics-sd-nextgeneration**
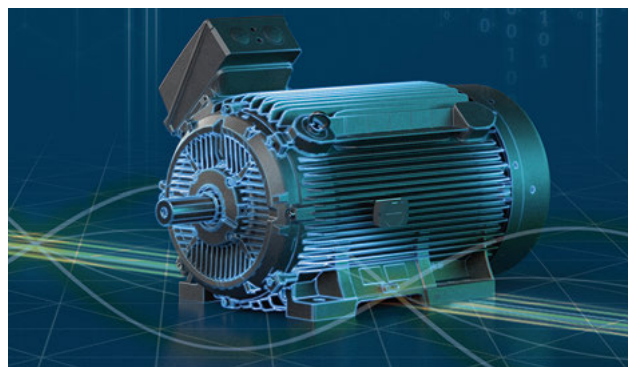
Highlights

- **IE3 and IE4** from 160 kW – 1,000 kW

- **Highest system efficiency class** IES2 with Sinamics frequency converter

- Certified for **international use**

- Operation with **fixed** or **variable speed**

Simotics XP / Simotics XP Chemstar

The efficient way to maximum safety

Highlights

- Simotics XP Chemstar with **preselected option packages** for chemicals or oil & gas

- **Technological integration** also provided for Simotics motors without explosion protection

- Power range up to **1,000 kW**

- **Energy-efficient:** Standard efficiency rating IE3 (Premium Efficiency)

- **Easy business:** Implement projects more quickly and easily

Simotics XP is the integrated platform for explosion-protected motors in all types of protection for gas and dust: Ex db, Ex eb, Ex ec, Ex tb and Ex tc, and combinations of gas and dust explosion protection are also available. By offering maximum safety when there's an extreme risk of explosion and maximum reliability in the harshest environments, the entire series is perfectly suited for use in the process industry. The highly efficient Simotics XP units are future-proof: e. g. for type of protection Ex eb, the standard efficiency level is already one level higher than the EU standard will require from 2023 onward. Simotics XP units come with all industry-specific certificates. The flame proof motors are certified for marine applications, so they can be used on oil and LNG tankers. Plus, certification for variable-speed operation on converters means there's no need for additional tests. Along with standardized tools, processes, components, design principles, and now even shorter delivery times, this saves time and costs for users. ■

› **siemens.com/simotics-xp**

Simotics Connect 400 / Sidrive IQ Fleet

The quick and easy route to the "digital motor"

The combination of the Simotics Connect 400 connectivity module and Sidrive IQ Fleet provides the ideal solution for cloud-based monitoring of low-voltage asynchronous motors from all manufacturers, whether factory-new or after many years of use. The sensor module takes just a few minutes to assemble. If the motor isn't already equipped with Simotics Connect 400 when you receive it, it's easy to install it in the low-voltage motor. Commissioning is just as easy via the plug-and-play principle using a connection to a local WLAN network and onboarding in Sidrive IQ Fleet. With just a few basic settings for secure communication with the cloud via WLAN, the motor is onboard and ready for remote data analysis. Simotics Connect 400 records condition data such as vibration and

temperatures and electric operating data such as on/off status, speed, and power. These are transmitted automatically at adjustable intervals to Sidrive IQ Fleet for cloud-based analysis and optimization. This means that any changes in operating performance or any anomalies such as unusual vibration or excessive temperature can be recognized at an early stage. ■

› **siemens.com/digital-drives**

Highlights

- Intended for low-voltage motors with **shaft heights of 132 to 450 mm**

- **Integration** of new and existing motors **into the digital enterprise**
  - The perfect basis for preventive, data-assisted maintenance strategies
  - Detailed analysis of condition data

- "Digital motor fleet" ensures **maximum** plant **availability and productivity**

Simatic MV560

High resolution with double RAM

Thanks to its high image resolution, the new Simatic MV560 optical reader is especially suited to reading very small codes in large image fields or a large number of codes on large objects. Its compact design and IP67 degree of protection make it ideal for use in industrial environments with limited space.

Its large RAM enables Simatic MV560 to read codes even in production lines with very fast-moving workpieces. Since a series of images is stored directly on the reader, and therefore staggered reading is also possible, even fast-moving objects can be reliably captured. In addition, the high-capacity RAM means that even large volumes of diagnostic information such as fault images can be stored directly on the device and rapidly retrieved if required. Diagnostics can thereby be improved, plant availability increased, and downtimes considerably reduced, without investing in additional infrastructure.

The modular structure of the readers in terms of optics and illumination makes Simatic MV560 suitable for a wide range of production conditions. Thanks to the automatic focusing and software-controlled illumination, the camera can also be used for mixed operation with changing objects.

Configuration is conveniently carried out via web-based management (WBM) and integration in TIA Portal. Moreover, one-button configuration for network parameters enables IP addresses for a connected PC to be assigned automatically. One-button configuration for read parameters, by contrast, allows the read parameters, the lens focus, and the illumination to be automatically set directly on the device without opening web-based management. ■

› **siemens.com/optical-identification**
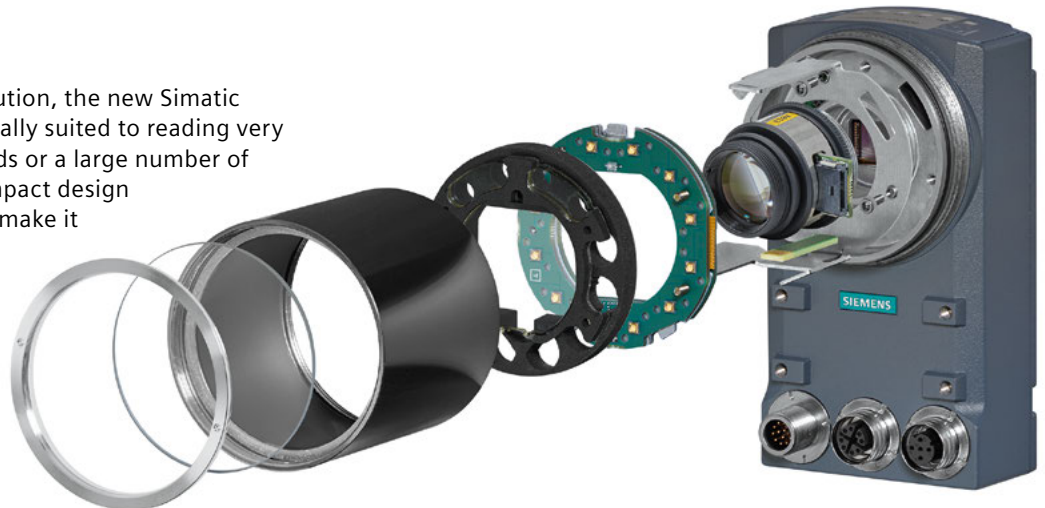
Highlights

- **SCAN mode** for separating image capture and image processing

- **Additional Gigabit Ethernet interface** for transferring fault images without disrupting communication with the controller

- **Customizable accessories** such as E-Focus lenses and flexibly controllable built-in ring lights

- **Connection to cloud applications** via Simatic S7-1500 and CP 1545-1 communication processor

- User-friendly thanks to **one-button configuration**

- Developed and made in **Germany**

36

Ultra-heat-resistant SmartLabel with very high range

Highlights

- **UHF Class 1 Gen 2 technology,** on the basis of **standard ISO 18000-63**

- **Heat-resistant up to 230°C** in the short term

- **Large storage capacity:** up to 448 bits of EPC plus 2,048 bits of user memory

- **High IP67 degree of protection** for use in harsh industrial environments

- Developed and made in **Germany**

The new SmartLabel Simatic RF682L is ideal for the direct RFID-supported identification of objects with high temperature stress in production logistics, for example paint shops. Its shape and imprint can be adapted to customer requirements on request. The passive, maintenance-free label is remarkable for its long reading range of up to six meters and its large storage capacity. Thanks to its broadband design, Simatic RF682L can be used worldwide and can be read using proven RFID readers from the Simatic RF600 portfolio. ■

> **siemens.com/rf600**

Ultra compact, long range

The Simatic RF600 portfolio of ultra-high-frequency (UHF) identification systems is being expanded to include two new Simatic RF630L SmartLabels. The passive and maintenance-free labels feature a reading range of up to 5 m and were developed primarily for warehouse and distribution logistics and for product identification. Thanks to their high degree of protection of IP67, these self-adhesive and individually printable labels are ideal for use in harsh industrial environments.

Despite their very compact design, Simatic RF630L SmartLabels provide a large storage capacity. Large amounts of data can thus be stored directly on the product, which enables efficient logistics throughout the entire process chain. Simatic RF630L labels can be read using proven RFID readers from the Simatic RF600 portfolio. ■

› **siemens.com/rf600**

Highlights

- **UHF Class 1 Gen 2 technology,** on the basis of **standard ISO 18000-63**

- **Compact design:** 73 x 12.5 mm or 75 x 20 mm

- **Large storage capacity:** up to 448 bits of EPC plus 2,048 bits of user memory

- Suitable for **worldwide use,** thanks to the broadband design

- Developed and made in **Germany**

Simatic RF166C

Transparency in Profibus networks

Highlights

- **Supports OPC UA** as IoT interface via Ethernet

- L-coded M12 connectors enable a **high current feedthrough** of up to 16 A

- Grounding via a fastening screw for **high electro-magnetic compatibility**

- **Profibus address visible** at all times through transparent cover caps

- Developed and made in **Germany**

The new Simatic RF166C communication module allows up to two Simatic RFID readers or Simatic MV series optical readers to be integrated into Profibus networks. Two connectors each for Profibus and the power supply support the setup of a Profibus line topology without additional Y connectors. Simatic RF166C has various features that make commissioning, diagnostics, and servicing easier. As well as access to configuration and diagnostic data, web-based management is now also available for a Profibus module (via an additional Ethernet connector). Error messages and operating statuses can also be indicated by LEDs.

The new communication module offers the option of running Profibus in parallel with the OPC UA function. The Profibus results can thus be forwarded to an OPC UA client – either a PC or a cloud application. This requires an Industrial IoT gateway, such as Simatic CC716 (in preparation). ∎

› **siemens.com/communication-modules**

ANT 12, ANT 18, ANT 30 stainless-steel antennas

Precise installation, fast replacement

Siemens is adding three RFID antennas in a stainless-steel version to its portfolio. The ANT 12, ANT 18, and ANT 30 antennas with a reading range of up to 60 mm are primarily used in small assembly lines and for tool identification. Their high degree of protection and extended temperature range of −20°C to +70°C make these stainless-steel antennas ideal for use in industrial environments.

The stainless-steel round antennas – which are extremely cost-effective compared to the proven plastic antennas of the same design – also convince with their trailing antenna connecting cable that's pluggable at both ends. This means that if an antenna is defective, it isn't necessary to remove the entire cable from the duct; this permits quick and easy device replacement. Thanks to their double-ended connecting cable, compact design, and the option of flush mounting in metal, these antennas require minimal installation space and can be positioned extremely accurately in the plant. ∎

› **siemens.com/rfid**
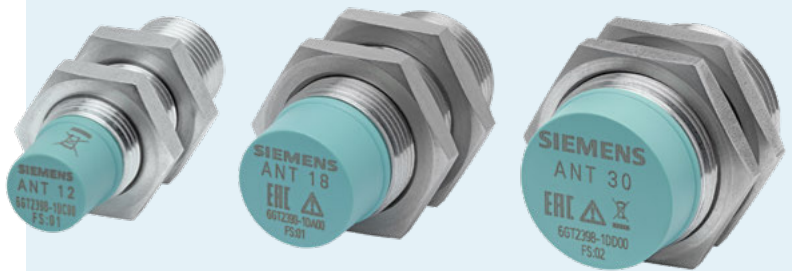
Highlights

- Connectable to the RFID readers **Simatic RF250R, RF350R,** and the handheld **Simatic RF350M**

- Connecting cable with **one M8 straight and one M8 angled connector** each for two-side connection to reader or antenna

- Developed and made in **Germany**

Simatic RF1040R

Access control for machines and plants

Highlights

- **Config card** for customer-specific parametrization of the reader

- **USB interface** for integration into software applications, hardware solutions such as HMIs, or control infrastructure panels

- **Serial RS232 interface** for connection to the Simatic RF170C communication module, the Simatic ET 200SP distributed I/O system, PCs, and third-party HMIs
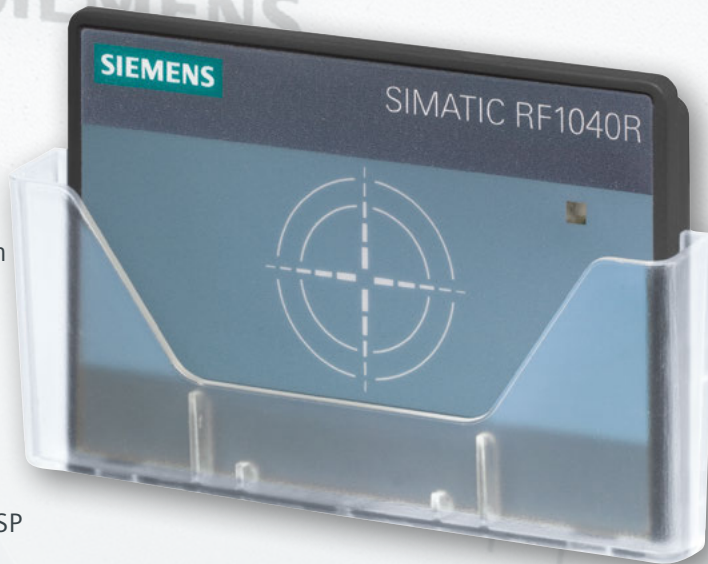
Electronic access management based on existing employee IDs is user-friendly and cost-effective. Operating personnel can be identified and access to machines documented by controlling access rights individually. With the new Simatic RF1040R reader, companies can now also use existing employee IDs to control access to machines and plants when these are based on the low-frequency range (LF, 125 kHz). As well as the low-frequency range, Simatic RF1040R also meets the high-frequency system standards ISO 14443 A/B (Mifare – contactless chip card technology) and ISO 15693. Securing and documenting access to equipment in this manner can provide operating errors.

Thanks to the compact design and IP65 degree of protection (when installed), the reader is particularly suitable for use in industrial environments with limited space at temperatures from –25°C to +55°C. ∎

› **siemens.com/rf1000**

CloudConnect

From sensor to cloud – professionally

Cloud computing is the first step toward profiting from the benefits of digitalization in industry, which include shorter development cycles, higher productivity, and improved quality.

But this can only work if the cloud receives valid data from the field. Power consumption, temperature, vibration, and corresponding curve progressions over time provide indications of plant statuses and process quality. When combined with more information, such as the type of material used or tool condition, this creates entirely new possibilities: for example, improved product quality, process optimization, and the option for preventive maintenance.

With CloudConnect products, this information can be optimally transferred to a wide variety of cloud platforms such as MindSphere, Microsoft Azure, and Amazon Web Services (AWS). ■

› **siemens.com/cloudconnect**

Highlights

Simatic CP 1545-1 for modern TIA installations

- Easy and professional transfer of Simatic S7-1500 field-level data to cloud systems

- Integrated Stateful Inspection firewall to protect against unauthorized accesses

- Trigger management for event-driven and cyclic communication

- Full integration in TIA Portal

Simatic CloudConnect 7 for existing plants

- Simatic CC712: connection of one Simatic S7-300 or one S7-400 via Industrial Ethernet using the S7 protocol

- Simatic CC716: connection of one to seven Simatic S7 controllers via Industrial Ethernet or Profibus/MPI interface

- Quick and fault-free configuration using data transfers from Step 7

- Reduced network load and costs for data exchange thanks to event-driven communication

Ruggedcom RX1400 with CloudConnect for extreme conditions

- All-in-one cellular router for data acquisition, filtering, and conversion

- IIoT data transfer to cloud-based solutions

- Trigger management for event-driven and cyclic communication

Straightforward cabling for data centers

Highlights

- **Reliable communication** in industrial data centers

- **Error-free transition** between industrial and patch cables

- **End-to-end portfolio** of FastConnect cable technology
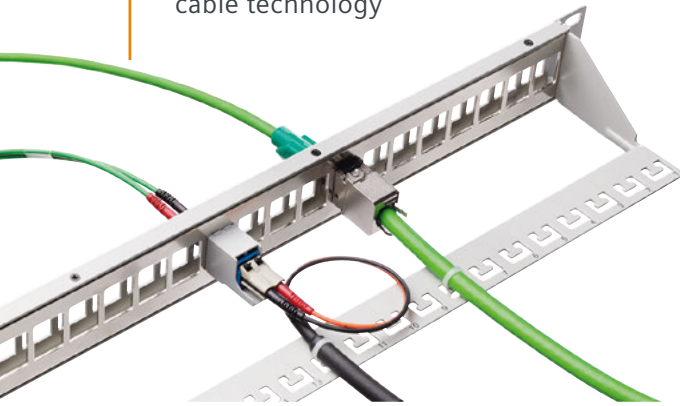
In addition to robust components, industrial data centers need cabling suitable for industrial use. The 19" module frame is available as a patch system in which both copper and fiber-optic connectors can be installed in less time and without errors.

The 19" module frame is installed in the 19" control cabinet using the integrated mounting brackets. The IE FC Keystone RJ45 and FO LC coupler connectors are snapped into one of the 24 openings in the 19" module frame. However, they aren't only used in 19" mounting frames. Their flexible modular principle means that they can also be used for a range of installation scenarios: for example, connecting two cables or mounting on a 35 mm DIN top-hat rail.

In conjunction with a Cat6$_A$ cable, the IE FC RJ45 Keystone from the FastConnect product range is also designed for data rates of up to 10 Gbit/s, making it appropriate for the high data rates found in data centers. ∎

› **siemens.com/fastconnect**

Profinet network transition for process automation

IE/PB Link HA is optimized for use in the process industries and permits Profibus field devices to be connected to a redundant controller such as Simatic S7-400H.

IE/PB Link HA functions as a Profinet S2 device and supports Profinet H-CiR (Configuration in RUN) for changes during normal operation. The PN IO controller treats the connected Profibus DP slaves such as PN IO devices with a Profinet interface, with the IE/PB Link HA as their proxy. That's how the IE/PB Link HA can integrate existing Profibus segments in PCS 7 plants with redundant networks. Changes can also be made to the configuration of the connected Profibus DP slaves during normal operation. ∎

› **siemens.com/ie-pb-link**
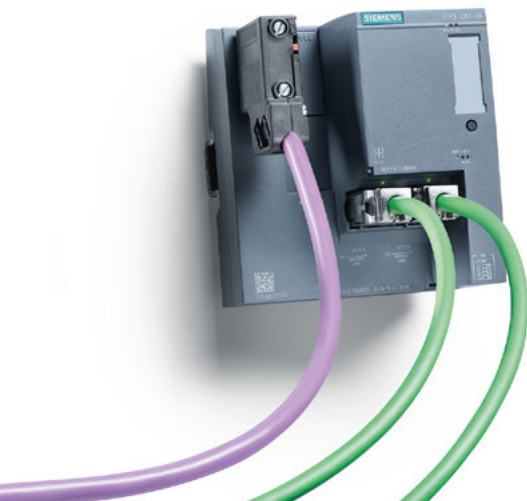
Highlights

- Implementation of highly available, redundant **Profinet infrastructures** – via both an MRP ring and redundant Profinet infrastructures (R1)

- Phased use of **modern Profinet networks** in processing plants

- **Reliable operation**, including under harsh ambient conditions (NE21, −40°C to +70°C, conformal coating)

Simatic RTU3000C / RTU3041C

New applications in LTE-M/NB-IoT networks
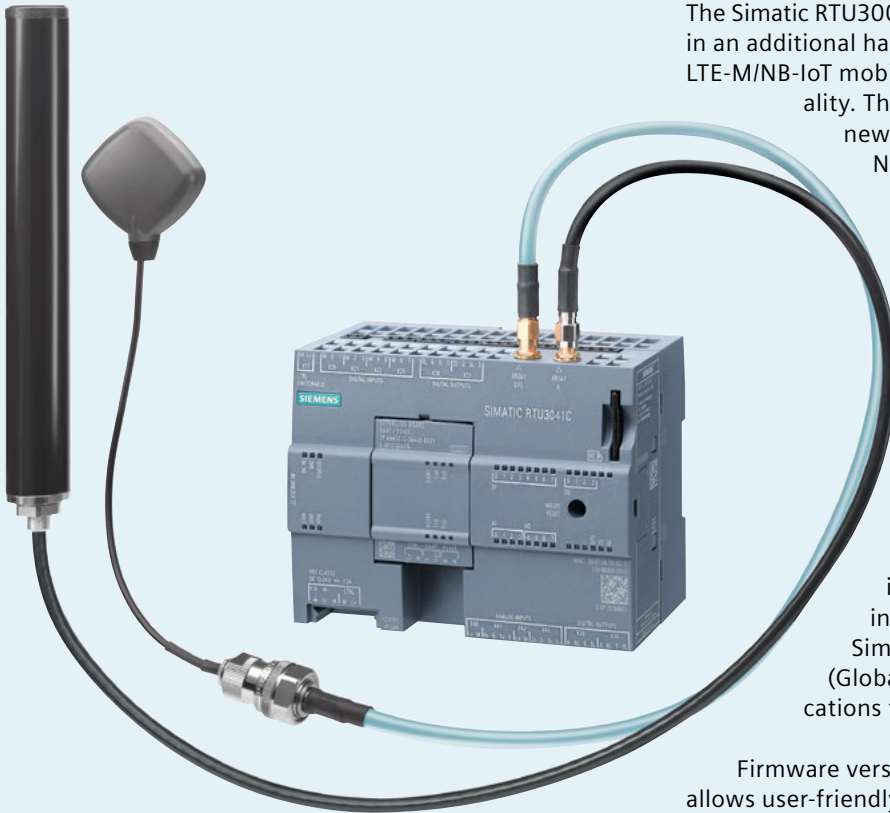
The Simatic RTU3000C remote terminal unit is now available in an additional hardware version: Simatic RTU3041C for LTE-M/NB-IoT mobile wireless networks and GPS functionality. The new remote terminal unit gives users new possibilities, because the LTE-M and NB-IoT (Narrowband Internet of Things) radio technology standards allow for greater ranges, which means better network coverage. Modes with lower power consumption are also available.

The compact RTUs are optimized for low-power operation and are suitable for off-grid use in environments without a mains power supply. The RTUs are configured via web-based management. Connection to the telecontrol network is made via an integrated mobile wireless modem or industrial router, such as Scalance M. Simatic RTU3031C and RTU3041C with GPS (Global Positioning System) also cover applications that require positioning.

Firmware version 3.1 and higher of Simatic RTU3000C allows user-friendly remote access to Modbus RTU or HART sensors for remote maintenance applications. Simatic PDM (Process Device Manager), a manufacturer-independent tool for the configuration, diagnostics, and maintenance of intelligent sensors and field devices, is used for this purpose. The process data collected by the remote terminal unit are provided with a time stamp and transferred to the control center via telecontrol protocols. Data can also be read via remote connection. With firmware version 3.1 and later, RTU3000C also supports connection to a redundant DNP3 master, more efficient encryption mechanisms, faster dial-in time in the mobile wireless network, and additional logging functions. ■

› **siemens.com/rtu3000c**

Highlights

- **Connection of HART sensors** via the Extension board HART/RS485

- **Remote access** to the connected **Modbus RTU or HART sensors** through Simatic PDM

- Support of telecontrol protocols **IEC 60870-5-104, DNP3, Sinaut ST7,** and **TeleControl Basic**

- **Low-power operation**, power supplied by batteries, rechargeable battery with solar panel, or DC 12–24 V power supply unit

Highlights

- **Quick and easy initial setup** of Scalance and Ruggedcom network components using the Sinec PNI commissioning tool

- **Central network services** conveniently at a glance with Sinec INS

- **New version V1.0 SP1 of Sinec NMS:** Security-related network settings can be easily managed, e. g. through firewall and NAT management with device-specific rules, policy-based configuration of the network infrastructure, and Syslog client

Sinec

Software for the modern industrial network

The new products of the Sinec software family help to meet the challenges of digitalization – including the ever-increasing numbers of network participants, changing requirements for security and clarity, and the growing complexity of networks.

To supplement the Sinec NMS (Network Management System), the portfolio is being expanded to the new Sinec PNI (Primary Network Initialization) setup tool. This tool allows the fast and easy initial setup of Scalance and Ruggedcom devices in the network and enables the user-friendly basic initialization and accessibility of these network components. It can also be used to initialize controllers/CPUs – making it simple, for example, to assign IP addresses and device names.

The other new member of Sinec family is Sinec INS (Infrastructure Network Services). This is a software tool for central network services that are frequently required, especially in the area of operational technology (OT). It enables OT itself to use these services directly – decoupled from IT services – set up an autonomous network, and host these services itself. Via a uniform user interface, Sinec INS provides users with an overview of all the network services necessary for operating an industrial network. ◼

› **siemens.com/sinec**

Even more efficient and transparent remote access

Highlights

- **Central user management** with connection to Active Directory
- Secure connection to **higher-level monitoring and analysis systems**
- Transparency by logging all actions in the central **Syslog server**

The new version 2.1 of Sinema Remote Connect enables secured remote access to distant machines and plants. Security-related activities can now be logged in the Sinema Remote Connect server, making user activities and any potentially critical system events transparent.

Logging takes place locally in the Sinema Remote Connect server and centrally in the Syslog server. The logged events can be forwarded securely by means of Syslog TLS to, for example, higher-level security information and management (SIEM) systems.

The connection to a user management component (UMC) system enables central user management and a connection to Active Directory. Existing users and groups can then be integrated easily from central systems. This makes remote access with Sinema Remote Connect even more efficient and transparent, since all rights are assigned centrally and all actions are logged centrally. ■

› **siemens.com/ sinema-remote-connect**

Building zero packet loss networks is now easy

Ruggedcom RMM2972-2RNA is a field-installable PRP/HSR module for the Ruggedcom RST2228 and RST2228P L2/L3 Ethernet switches that transforms them into a PRP/HSR Redundancy Box. QuadBox (HSR to HSR) and coupler (PRP to HSR) configuration is possible with two such RNA modules in one switch. With one RNA module, these high-port-density switches can support up to 24 legacy SAN (Singly Attached Nodes) devices, helping you avoid costly infrastructure investment when redesigning your industrial network to eliminate downtime due to single points of failure. They are rated to operate smoothly under high vibrational stress and over a wide temperature range of −40°C to + 85°C, ensuring high availability for industrial networks that transmit mission-critical data. ■

› **siemens.com/rst2228/rna**

Highlights

- **Adds PRP/HSR capabilities** to RST2228 and RST2228P switches
- **0 ms failover time:** Eliminates packets lost due to single point of fault
- **Enhanced IEEE1588 support** (Precision Time Protocol) for Transparent Clock mode
- Supports many different **complex redundant network configurations**
- **Rugged rated**

Ruggedcom APE1808

A utility-grade platform for cybersecurity and Edge computing

Ruggedcom APE1808 is the latest utility-grade application processing engine (APE) for the RX1500 Multi-Service Platform. It can commercially available Siemens and third-party applications, dispensing with the need for an external industrial PC. It provides a standards-based platform to run advanced cyber-security applications such as Intrusion Detection System (IDS),

seamless integration of Edge applications into the network architecture, thereby expanding the open Siemens Industrial Edge ecosystem to harsh environments. Even demanding data processing tasks such as network traffic analysis can run natively on

Deep Packet Inspection (DPI) and Next Generation Firewall (NGFW) from industry leaders in cybersecurity. The APE1808 can operate from −40°C to +75°C, making it suitable for mission-critical applications in industries with harsh environments, including electrical power, oil & gas, and transportation. Ruggedcom APE1808 can be inserted in devices from the RX1500 family of products and allows for

APE1808 to function as an Edge device, eliminating any further hardware investment in additional Edge computing resources. Ruggedcom APE1808 offers much-needed flexibility in a fast-changing landscape as the hardware backbone for software solutions for industrial cybersecurity and Edge computing. ■

› **siemens.com/ape**

Highlights

- Intel quad core **x86_64 architecture**

- **8 GB RAM, 64 GB storage,** and TPM support

- Available with **Debian Linux** or **Windows 10 IoT Enterprise**

- **Interfaces:** display port video connector, micro SD card slot, 2 x USB 3.0 ports, 2 x Gigabit Ethernet ports

Monitor power quality – prevent faults

Power quality is a key parameter for the fault-free operation of all connected loads and equipment. Detecting disturbances is often difficult, because they usually occur sporadically and for just a fraction of a second. The newly developed Power Quality Analytics service ensures that such events do not result in damage or high outage costs.

The first essential requirement for detecting faults at an early stage is continuous power quality monitoring with the Power Quality Recorder from the Sicam series. Continuous data transfer is provided by the Sinema RC VPN solution.

The next major challenge is to identify the truly relevant events among all the data. Artificial intelligence methods, such as cluster analyses, image recognition, and expert systems, are used to speed up the classification of events. A Siemens PTI expert then reviews the results of the pre-classification and makes the final diagnosis.

Communication between the Siemens PTI expert and the customer also plays a major role. Using the PQApp smartphone app, customers can access measurement evaluations and diagnoses at any time and from anywhere and are instantly informed of impending events. Grid experts with many years of experience also help customers identify suitable optimization measures. ■

› **siemens.com/pqa**

Power Quality Analytics
Fault prevention as a managed service

PTI PQ Lab

Siemens PTI

Customer

VPN   VPN   VPN   VPN   VPN

Scalance M876
Sicam Q200/Q100/P855

Scalance M876
Sicam Q200/Q100/P855

Scalance S615
Sicam Q200/Q100/P855
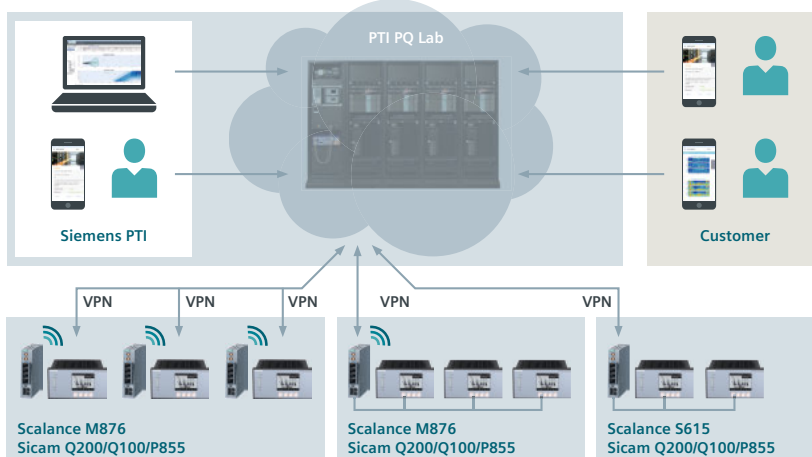
Highlights

- **Continuous monitoring and analysis** of power quality to prevent faults

- Consulting services and **recommendations for grid optimization**

- **Service packages** with different contractual periods and different scopes, for example for monitoring multiple measuring points

Grid Diagnostic Suite

IoT-based energy automation applications
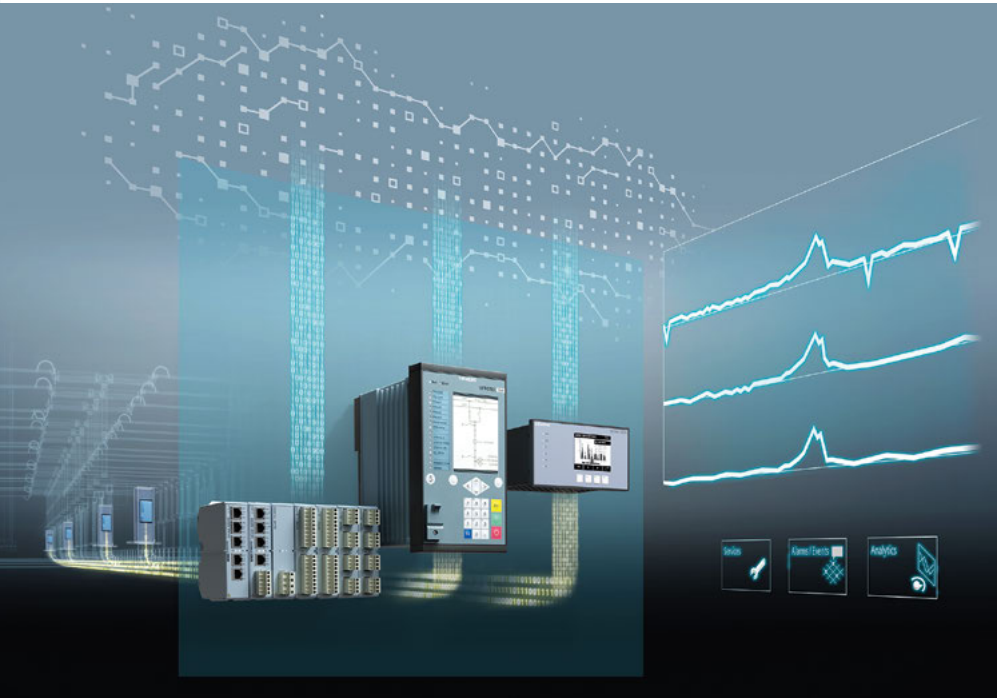
Highlights

- **Faster overview** of grid-wide energy automation systems
- **Increased availability** of smart grids and **enhanced cost efficiency**
- **Predictive maintenance** and **improved service quality**
- **Manufacturer-independent,** thanks to IoT standards

Power grids in particular are facing new challenges due to the expansion of e-mobility and the increasing infeed of volatile generating capacity. The IoT-based applications in the Grid Diagnostic Suite let operators manage the growing complexity of their power grid, increase its availability, and operate it cost-effectively.

The Grid Diagnostic Suite includes a total of four different cloud-based applications that can collect essential data from the installed energy automation field devices and analyze it in the cloud. The device data is securely transferred to the cloud via Sicam GridEdge – which functions as a data concentrator and gateway – and is made available there with no additional engineering effort.

The Siprotec Dashboard displays data such as fault recordings and fault logs quickly and clearly in a map view, station view, or device view. Users can get access to these machine data easily in the cloud. The Sicam Navigator provides comprehensive monitoring of wired medium- and low-voltage grids and secondary distribution stations. This makes it possible to present power grid performance transparently and, in the event of a fault, precisely pinpoint the exact grid section. For distribution grids with overhead lines, Sicam Localizer provides detailed information on the status of individual grid segments and clearly and concisely displays faults.

For operators of geographically distributed power grids, power quality (PQ)

is extremely important, for example, to ensure the quality of supply to industrial plants, data centers, and electrical distribution systems. The PQ Advisor Premium app can record and display grid parameters such as voltage, current, frequency, and harmonics with no gaps.

In the central MindSphere cloud, users can seamlessly consolidate, visualize, and evaluate the data from the Grid Diagnostic Suite. This enables distribution grid operators to quickly tap into useful information on the state of their grid. Grid faults can be detected at an early stage, vulnerabilities identified, and necessary measures implemented on schedule. ◼

› **siemens.com/ioe**

Electrification in the digital age

Energy data as backbone of the IoT

Control-panel builders face a variety of challenges from the very beginning, starting with planning the right components and the associated engineering. Planning and engineering tools are used for generating digital twins of control panels, switchboards, and busbar trunking systems, for visualizing interactions between electrification and automation components, and for planning end-to-end solutions, which prevents faults during subsequent operation and significantly reduces planning effort. Customers are provided with a complete product range for a fully digital workflow – from CAx data and integration in e-engineering systems to planning software and graphical configuration programs with integrated ordering functions.

Thanks to the integration of protection, switching, and measuring devices in TIA Portal and the Energy Suite, configuration and energy data is also available in the automation environment, thereby enabling coordinated, simplified engineering and production processes. Protection, switching, and measuring devices installed in control panels, switchboards, and busbar

trunking systems initially record relevant characteristics such as power, current, voltage, and temperature. This data can then be visualized on the diagnostics station – the digital twin of the switchboard – and transferred to open, cloud-based IoT operating systems such as MindSphere for further processing. Analysis of the data reveals starting points for improving energy efficiency as well as opportunities for predictive maintenance (e.g., for checking system and device status). This makes it possible to recognize impending faults well ahead of time, which in turn minimizes downtime. Gateways and IoT data platforms make it easy to connect to the IoT (Internet of Things). The gateways and platforms gather and process power and status data and serve as a central interface to local monitoring systems and open cloud systems such as MindSphere.

In addition to the integration of existing networks, the data can also be transferred via busbar trunking systems with powerline technology. An additional data cable is no longer needed. In data centers, busbar trunking systems with currents up to 2,500 A

simplify planning and support fast installation and flexible and reliable operation. ■

› **siemens.com/controlpanel**
› **siemens.com/ lowvoltage/digitalization**
› **siemens.com/sivacon-S8**
› **siemens.com/sivacon-8PS**

Highlights

■ **Control perfection with Sirius:** Industrial controls for simple engineering, targeted use in applications, and maximum transparency in the plant

■ **Load Feeder Configurator+ (IEC):** Engineering tool for cost-effective, standards-compliant electrical planning of control panels

■ **Electrification in the digital age:**
 ■ **Sentron:** Protection, switching, and measuring devices for transferring energy measurement data to the cloud
 ■ **Sivacon:** Switchboards and busbar trunking systems for reliable power distribution and intelligent data and process management

■ **Power Distribution:** LData busbar trunking systems up to 2,500 A for tomorrow's data centers

■ **Sirius Industrial Controls:** Components for switching, protecting, and monitoring motors
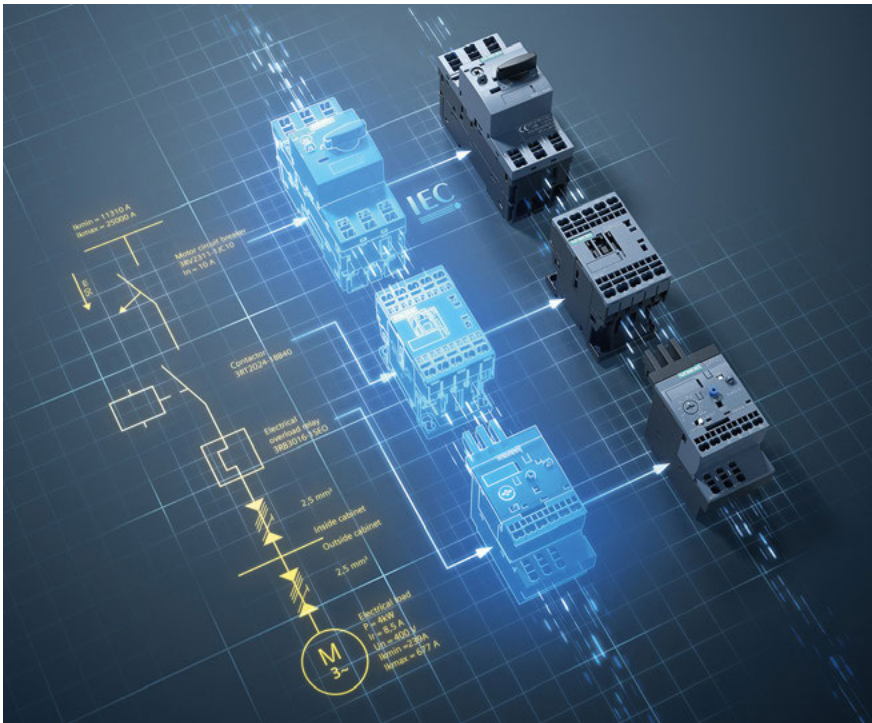
Highlights

- Automatic **short-circuit calculation** and **cable dimensioning** for fuseless IEC load feeders

- Selection of **suitable switching and protection** devices for the motor

- **Single-line display** of the load feeder simultaneous with the selection of suitable components

- **Complete PDF documentation** of technical data and calculation results (e.g. for verifying short-circuit strength)

Load Feeder Configurator+ (IEC)

Simplified electrical design

With the Load Feeder Configurator+ (IEC), Siemens is offering a function in the TIA Selection Tool that allows users to select devices and dimension cables, and handle short circuits in fuseless motor feeders up to 55 kW with the press of a button. This makes the work of electrical planners much easier, because not only are they provided with suitable switchboards and standards-compliant, calculated values, they also receive support for cable layout planning. To plan the cable layout, electrical designers have to comply with all specifications from IEC 60204-1 and other standards. They can do this more quickly and easily using the Load Feeder Configurator+ (IEC), because they no longer have to calculate cable cross-section and short-circuit currents manually.

All that is necessary for configuration is the latest offline version of the free TIA Selection Tool and information on the motor's mechanical load. On this basis, users are guided step by step through the configuration process by means of freely selectable parameters, such as method of installation, number of loaded circuits or cables, and ambient temperatures. They are also shown suitable devices for the complete motor feeder, which they can then easily add to an order list in a subsequent step.

Finally, users are provided with complete documentation of the technical data and calculations – which is needed, for example, for verifying shortcircuit strength. This proof is performed based on the risk assessment of electrical equipment for machines and is also mandated by the new version of DIN EN 60204-1 – Electrical equipment on machines – published in June 2019. ■

› **siemens.com/controlpanel/tools**

Highlights

- End-to-end solutions for **collecting and evaluating energy data**

- **App Sentron powermind** for **real-time analysis** of all relevant energy data directly in MindSphere

- **Intuitive operation** of Sentron powermind without specific IT knowledge

SENTRON powermind

Power monitoring in the cloud

Record and analyze energy data in real time

The power monitoring system from Siemens' Sentron portfolio includes communication-capable measuring and protection devices as well as the Sentron powermanager analysis software. The system makes it possible to precisely measure and evaluate electrical characteristics such as current, voltage, and frequencies from infeed to individual loads. V4, the latest version of Sentron powermanager, can be used as stand-alone software and, for the first time, it can also be integrated as an expansion module in the Desigo CC building management system. Small and medium-sized enterprises benefit most from the user-friendly, intuitive software. It allows them to quickly identify potential ways to save on energy consumption, detect system errors, reduce their energy costs, and cut CO_2 emissions.

With the aid of Sentron powermanager and the 7KN Powercenter 3000 IoT data platform, data can be directly integrated into MindSphere, the cloud-based, open IoT operating system from Siemens. The new Sentron powermind application then analyzes the data in real time: the data is collected, preprocessed, and transferred to the cloud via the 7KN Powercenter 3000 IoT data platform. Users receive a real-time overview of current energy consumption as well as trends over time – both for entire systems and for individual electrical loads. The combination of Sentron powermind and 7KN Powercenter 3000 also offers inexperienced users easy entry to cloud-based energy management. It gives them the foundation they need for operational energy management according to ISO50001 and allows them to sustainably increase their energy efficiency. ■

› **siemens.com/powermonitoring**

Sirius 3RW55 soft starters / OPC UA and web server

Open-standard and web diagnostics

The Profinet High Feature communication module now contains an integrated web server and a server for OPC UA, the standard for manufacturer-independent communication in automation technology. Via the web server and using an Internet browser, users can flexibly retrieve all the diagnostics and service data for the motor feeder via a network connection from anywhere in the world – and even control the motor via a secure connection.

Thanks to the integrated OPC UA server, users can view their diagnostics data in customized displays adapted to their application. Control signals can also be sent to the control system via a secure connection, making it possible to monitor and control drives more effectively and therefore provide them with better protection.

The new OPC UA and web server functionalities can easily be upgraded by means of a firmware update of the Profinet High Feature communication module to V2.0. Hardware changes in the application are unnecessary. ■

› **siemens.com/soft-starter**
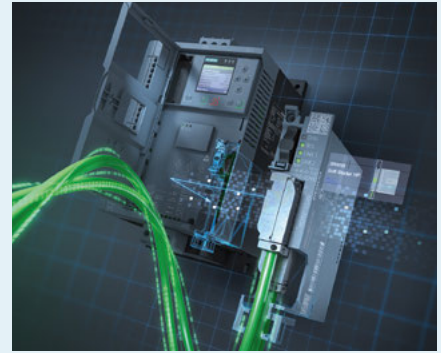
Highlights

- Control and diagnostics using **a standard web browser without additional software**
- Direct integration **into MindSphere**
- Reduced load on bus system from automation system, thanks to **direct client-server communication**

Highlights

- Uniform and consistent **integration into Simatic PCS 7** V9.0 - SP2
- **Standardized blocks** for simple integration and optimal operation
- **Higher process transparency**, thanks to greater information density in the control system
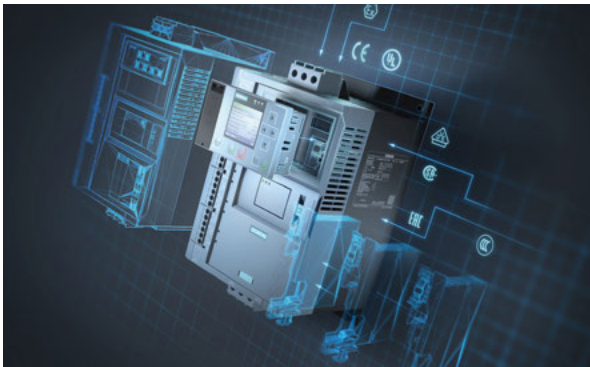
Sirius 3RW5 soft starters / PCS 7

Easy configuration

Sirius 3RW55 and 3RW52 soft starters can now be easily and conveniently integrated in the Simatic PCS 7 V9.0 SP2 process control system with Advanced Process Library (APL) via the 3RW5 soft starter block library for PCS 7.

The number of configuration steps required has been significantly reduced. The configuration of blocks is based on PCS 7 standard configuration processes and is optimally adapted to the functions of the soft starter. Prepared templates are available in the library for all of the Sirius 3RW5 soft starter's control functions. These templates simplify engineering for the configuration of blocks and support their correct functioning. ■

› **siemens.com/soft-starter**

Taking maintenance to a new level with Predictive Services

Highlights

- User support for **digitalizing drive systems**
- **Data analysis** for sustainable process optimization
- Predictive Services: **optimized maintenance** and **reduced downtime** using cloud-based analyses
- **Digital and traditional services** working together **for increased productivity**

Digital Drive System Services adds new functions to traditional services. A targeted analysis of the operational and performance data from motors and converters makes it possible to increase system availability and boost productivity. Customers are supported in three steps: detailed reviewing and consulting, customized implementation, and establishing of a sound foundation for optimization.

In the first step, digitalization experts perform a Digitalization Check to determine how the motors and converters can be connected to MindSphere. Based on these results, they give users specific, comprehensive recommendations for the next steps in the digitalization process. This eliminates project-based barriers and achieves the high transparency needed for making sustainable decisions.

In the second step, the drive systems are connected to MindSphere. Customized connectivity modules are available for the different converter and motor types. This makes the key operational data of their motors and converters completely transparent.

In the third step, advanced algorithms turn data into valuable knowledge. The targeted analysis of data allows operators to optimize processes: for example, by extending the service life of machines, reducing costs, and improving quality.

As the new IoT offering, Predictive Services for Drive Systems supplements the local service contract and improves productivity thanks to optimized maintenance cycles and activities. It proves its worth in particular in critical applications such as fans in production halls and blowers in cement kilns. These are the areas where automatic monitoring is especially important, because outages are expensive.

Thanks to the combination of expert support and a MindSphere application, the operating states of motors and converters are completely transparent, and users are provided with detailed information on impending maintenance. At the same time, they benefit from a simplified order process when planning, performing, and documenting their maintenance activities. ■

› **siemens.com/drivesystemservices**

Sinumerik Service Assistance

Higher plant availability with cloud-based fault analysis

The MindSphere application Sinumerik Service Assistance is a standardized option that supports service experts in performing fault analyses on machine tools with Sinumerik controllers. With Machine Transparency, all currently installed hardware components as well as firmware and software versions and their changes are recorded automatically. Machine Condition enables the cyclic recording of extended status data on the control and drive technology and its selective evaluation. Error Analysis efficiently identifies and evaluates fault states and disturbances in machine tools based on intelligent filter options and a user-friendly interface.

Thanks to increased transparency, technicians can perform diagnostics before arriving on-site. This allows them to draw precise conclusions about the current fault situation and correct faults sooner. ■

› **siemens.com/ motioncontrolservices**

Highlights

- **Free** three-month **trial version**
- Support for **brownfield controllers** (Brownfield Connectivity Services)
- **Increased plant availability** and **reduced service costs**
- **High security standards,** thanks to the latest cloud technology

PCU Retrofit for Sinumerik 840D

HMI update closes security gaps

Highlights

- Improved IT security, thanks to the latest **Windows 10 operating system**
- Increased productivity, thanks to **reliable spare-part availability**
- Improved functionality, thanks to the **latest software version with HMI Advanced**

After more than a decade of operation, high-quality machine tools remain in excellent mechanical condition and can continue to produce for many years. Even the control technology for machine tools equipped with CNC Sinumerik 840D and HMI Advanced control software is generally still functioning at a level that allows it to be used for a long time to come. Nevertheless, to prevent IT security vulnerabilities and unavailability of spare parts, the PCU 50 operator panel must be updated with HMI Advanced control software.

The PCU Retrofit service offering for Sinumerik 840D powerline and solution line, which includes engineering for testing, installation, and commissioning, is now available to users. The use of a Simatic industrial PC with the latest Windows 10 operating system and the latest version of HMI Advanced and HMI Pro control software upgrades IT security to the state of the art and ensures spare-part availability for years to come. Users also benefit from the updated control software's increased functionality and the resulting boost in productivity. ■

› **siemens.com/motioncontrolservices**

Sitrain access

Off to a good start with digital learning
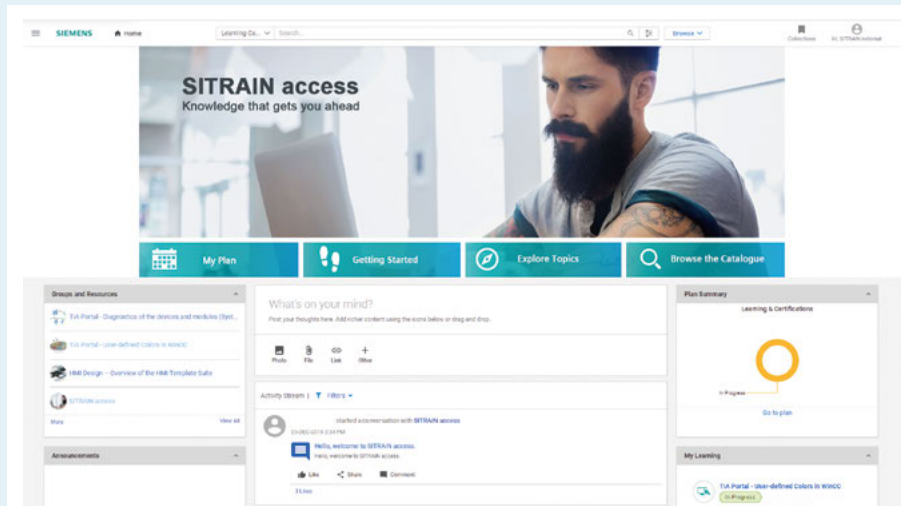
Highlights

- **Innovative:** Training opportunities for the digital age
- **Customized:** Wide range of topics, a variety of training methods, large practical component
- **Location-independent:** The option for continued training whenever and wherever needed

New forms of learning that combine different learning methods, flexibility of location and time, and learning integrated into the work process are becoming increasingly important. Megatrends such as knowledge culture, new work, connectivity, and customization are changing learning behavior, along with the expectations of customers and their employees. It was with this in mind that the Sitrain Digital Industry Academy developed Sitrain access. Thanks to its diverse offering of multimedia learning methods, this new range of digital training courses provides innovative access to digital training opportunities that enable participants to build their knowledge of industry subjects on an individual basis.

Using Sitrain access, learners can choose courses and then select from a wide range of training opportunities on numerous topics – from web-based training courses and tutorial videos to blended learning, practical exercises,

chat forums, and much more. The high proportion of exercises in a virtual training environment and the systematic use of multimedia and tests ensure deep-rooted knowledge, an optimal learning outcome, and a continuous assessment of the trainees' level of knowledge. Participants can also interact with experts or in chat forums and obtain fast and reliable support.

Thanks to online digital courses, learners can increase their knowledge independently and individually, regardless of their location or the time of day. Yet another benefit: the employees' learning progress is transparent, so companies can use this information to manage their expertise. Sitrain access is an innovative, advanced training approach that serves as a useful supplement to conventional methods of knowledge transfer such as traditional classroom training. ■

› **siemens.com/sitrain-access**

IT infrastructure for the digital enterprise

Industrial Automation DataCenter is a preconfigured, preinstalled, and ready-to-use IT platform, with virtualized software applications, supplemented by suitable hardware and software components for backup, archiving, networking and security in industrial environments. Hardware variants enable individual scaling of the data center including complete lifecycle services, spare parts, and online support.

This all-in-one data center is designed for customers who not only rely on virtualization for maintenance and modernization, but also value the user-friendly archiving and backup solutions in combination with virtualized systems. The main users are to be found in process industry plants using Simatic PCS 7, TIA Portal, or WinCC. ■

› **siemens.com/iadc**

Highlights

- **Preconfigured** and **preinstalled**
- **Service package** included
- **Security measures** implemented

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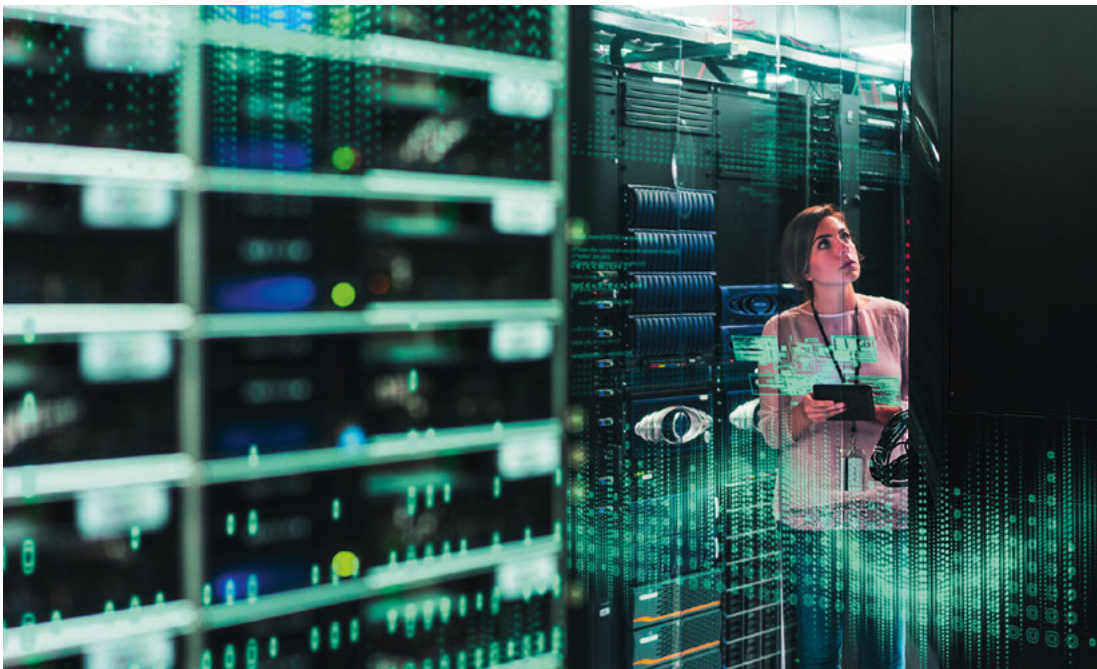
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To meet increasingly individualized customer requests, plant operators need to accelerate their time to market and become more efficient and flexible. At the same time, it is key to maintain or even improve quality. Consistent digitalization along the entire value chain offers great potential for achieving this.

The TIA Newsletter Team looks forward to provide you with tips and support your implementation of the Digital Enterprise.
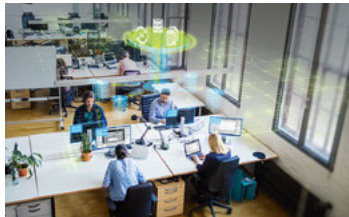
TIA use case Continuous Integration
Less costs and better software quality through optimized engineering of automation projects in TIA Portal.

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