Practice-proven solutions, known as TIA use cases, help companies of all sizes to implement the digital enterprise.
Future of automation

Taking production from automated to autonomous

Great strides are being made in the digital transformation of the manufacturing and process industries. With the IT technologies of the future – artificial intelligence, augmented reality, and Edge computing – companies today are standing at the threshold of autonomous manufacturing.

The manufacturing of the future is a cyberphysical, autonomous system that continually optimizes itself. Autonomous machines and robots are capable of learning and can interpret their environment. Within a defined scope, they adapt to changing conditions and requirements, and make decisions. This is made possible by IT technologies such as artificial intelligence (AI), augmented reality (AR), and Edge computing.

Intelligent automation
Artificial intelligence is a crucial lever for increasing productivity in the manufacturing automation system. AI makes it possible for machines to do jobs that previously could only be done by humans. With AI technologies, manufacturers can increase efficiency and optimize their entire operations. For example, visual quality inspections and model-based analyses can be used to improve quality, while autonomous handling or transport systems serve to increase manufacturing flexibility, and anomaly detection and condition monitoring form the basis for planning preventive maintenance work to minimize downtimes.

In the future, augmented reality (AR) could completely reshape complex product development and manufacturing processes by supporting the digital simulation of a product or of information. The flexibility and efficiency of manual production processes could be increased by displaying step-by-step instructions and real-time information tailored to the user’s perspective.

Edge computing is becoming established as a key technology for gathering, managing, and analyzing production data in local...
Totally Integrated Automation

networks. High-performance Edge devices and apps help users fully exploit the potential of Internet-based service models. Edge computing provides updates and modifications remotely, increases transparency, and improves overall equipment efficiency on the basis of various data sources and KPIs.

Siemens is working on a scalable, highly customizable range of AI applications at all levels of the TIA portfolio, which could help give customers a decisive competitive advantage well into the future.

siemens.com/futureofautomation

Future of process automation

Level of efficiency

The process industry today is being driven by rising demand for individualized products with optimal quality, reliable process safety, and maximum flexibility. Assets have to meet the highest requirements in terms of availability, safety, sustainability, and regulatory compliance.

At the same time, it is vitally important to enable collaborative engineering with global partners and to integrate industry-specific IT applications as well as cloud-based services. New possibilities – for example, the integration of package units and industry initiatives such as NOA (Namur Open Architecture) – are having an increasing impact on the competitiveness of plant operators and plant engineers.

Process control systems will have to handle the growing complexity. For example, they will need to facilitate effective global collaboration in the future – with immediate access to all project information for all stakeholders. This will also require optimized usability and easy system access as well as innovative support for the operator.

Fully web-based process control system

At Hannover Messe 2019, Siemens will be presenting its Process Control Innovation, a completely web-based system that lays the foundation for a digital twin of the plant. It boasts a user-friendly graphical user interface for all operational tasks while the object-oriented data management ensures that all information is consistent at all times. The uniform workbench for all tasks gives users safe, direct access to all information – in just two clicks. They can access the entire system with any device, at any time, from any location via a secure Internet connection.

The system’s simplicity, usability, scalability, and lightning-fast reactions to all market requirements promise to take the efficiency of plant processes and plant automation to a new level of efficiency.

siemens.com/process-control-innovation

siemens.com/futureofautomation
Siemens helps machine and plant manufacturers as well as plant operators to implement the digital enterprise with approaches that have been proven in practice (TIA use cases).

Companies around the world are looking for new ways to harness the full potential of digitalization. Siemens offers a unique range of products and services that allow companies of all sizes to implement their digital transformation gradually. Totally Integrated Automation provides three digital twins, representing the product, production, and the performance of product and production. This allows users to exploit new potentials for more productivity, efficiency, and flexibility in all phases of the value chain.

- **Digital Workflow** – code verification, simulation, and testing of different machine scenarios, and digital interaction between multiple disciplines such as mechanical systems, electrical systems, and automation.
- **Integrated Engineering** – from automatic code generation to interdisciplinary engineering solutions.
- **Transparent Operation** – efficient execution, monitoring, and continuous optimization of actual production.

TIA use cases are generalized application examples that facilitate the implementation. They describe the customer requirements for implementing the digital enterprise and show how Siemens solutions can be used to overcome the challenges of digitalization in machine and plant manufacturing and operation.

More TIA use cases can be found at [siemens.com/tia](http://siemens.com/tia)
Digital workflow
Work in an open, virtual, networked environment

TIA use case
Virtual commissioning

Integrated engineering
Reduce time to market

TIA use case
Collaborative automation design

Transparent operation
Increase productivity

TIA use case
Edge computing

Efficiently preprocessing huge data volumes

Digitalization opens up entirely new ways to detect errors early in the product lifecycle: from the optimization of machine functionality using simulation tools to the virtual commissioning of entire production lines. Simatic S7-PLCSIM Advanced, the digital twin of a real Simatic S7-1500, allows for simulations encompassing all communications tasks, knowhow-protected modules, the safety program part, and the web server functionality of the real CPU. It supports multiple and distributed instances to simulate several controllers on a PC or on the network. A documented public interface (API) additionally performs a simple data exchange with co-simulations such as NX-Mechatronics Concept Designer or test software such as Matlab. This makes it possible to conduct intensive testing of PLC programs in the context of a machine, line, or even more complex plants, and to eliminate errors at an early stage.

Shorter innovation cycles are having a dramatic impact on engineering. This calls for optimization of the development process for machines and plants. The Automation Designer links the available data from the mechanical drafting and planning process with the electrical and automation design. A common database ensures data consistency across all disciplines and enables parallel engineering with a central application. The necessary wiring diagrams and associated automation programs can also be generated on the basis of predefined rules and templates, instead of being programmed manually. This increases engineering efficiency, improves the quality of the automation solution, and reduces the risk of errors. All this speeds up development and shortens the time to market.

Industrial Edge Computing brings data processing down from the cloud and closer to the data source. This opens up new ways to use data in the manufacturing process. It also makes it even easier to connect devices to each other in a common infrastructure for administration and maintenance. Data acquisition and analysis are handled by distributed components with corresponding applications that are directly installed in the factory. The necessary computing power is available right where it is needed: at the edge of the network, directly at the process. Siemens Industrial Edge consists of a central management infrastructure, which is used to manage Edge devices and applications. The distributed Edge devices provide the necessary hardware and software for the applications. The data acquisition and analysis functionality is located e.g. in the Edge apps, which are developed and maintained either by Siemens or its partners, or by the users themselves.
Totally Integrated Automation

A high level of efficiency is already demanded at the engineering stage, as the first step toward better production: faster, more flexible, and more intelligent. With Totally Integrated Automation Portal, Siemens has an intelligent answer to this.

TIA Portal V15.1

Using virtual controls to make virtual machines

The most efficient way to meet the need for more rapid commissioning of production plants, while simultaneously improving production quality, is to use a digital twin. Virtual testing, simulation, and optimization save time when it comes to the actual commissioning. Faults are detected at an early stage and kept out of the real plant. This avoids unplanned machine behavior that can result in delays and significant costs. It also dramatically reduces project risks.

In TIA Portal V15.1, Simatic S7-PLCSIM Advanced can be used to create a digital twin of a Simatic S7-1500 controller. As a software suite for virtual commissioning, Simatic Machine Simulator combines the Simatic S7-PLCSIM Advanced V2.0 virtual controller with Simit V10. Together with the NX Mechatronics Concept Designer simulation software for mechatronic machine concepts, Simatic Machine Simulator forms the basis for the virtual validation of entire machines. This makes it possible to synchronize mechatronic and control models, including simple or more complex behavioral models, and thus to simulate and virtually validate machine-level applications. Combining the simulation models of the control system and mechanical system results in a digital twin of the real application. This allows the machine to be simulated and validated, and preliminary optimization options to be verified, doing away with the need for real prototypes.

HIGHLIGHTS

- Simatic Machine Simulator, combined with NX MCD, connects control and mechanical systems, creating the digital twin of a machine
- Support for redundant and high-availability applications with S7-1500R/H CPUs
- Software units for faster, more flexible commissioning of an S7-1500 controller as part of a team
- Fault-tolerant software import and CPU upload via TIA Portal Openness

NEW FEATURES

- Fast and easy introduction to configuration with TIA Portal
- High-performance test environment
- No installation effort
- Can be flexibly used on any PC or tablet hardware
- Very low demands on the engineering hardware
- Centralized data management for TIA Portal projects in the cloud

TIA Portal in the cloud

High-performance test environment – easy to use!

In this age of ever-faster development phases for machines and plants, the engineering environment is also critically important. In general, users want fast, easy, low-effort access to an environment in which TIA Portal can be used as the engineering system.

Subscribe to the newsletter, and we will notify you directly when TIA Portal is available in the cloud.

siemens.com/tia-portal
Collaborative automation projects are subject to special workflow requirements. TIA Portal offers a variety of options to support this throughout the entire process and to increase team efficiency. TIA Portal Multiuser Engineering allows project work to be allocated on the basis of technology or function. Changes are easily and automatically shared with the team. The commissioning mode allows for particularly fast commissioning by automatically synchronizing all Multiuser client downloads via the server project. Software units can be independently programmed and edited, stored in standardized form in libraries, and used for other projects. TIA Portal supports the use of Multiuser Server in combination with the storage of automation projects in Teamcenter via Teamcenter Gateway. Thanks to reference project functionality, users can compare TIA Portal projects that are managed in Teamcenter and thus further improve the engineering workflow.

www.siemens.com/tia-portal

NEW FEATURES
• TIA Portal Multiuser Engineering for optimized work allocation
• Project milestones can be saved in Multiuser Server to enable rollback at any time
• Modular program structures for engineering and commissioning, with software units
• Use of the Multiuser function of TIA Portal projects managed in Teamcenter

TIA Portal / Working as a team

Efficient engineering and commissioning

TIA Portal offers users a standardized modular system for planning, development, testing, and integration that makes workflows more efficient and improves the quality of the solution. The standardized Automation Markup Language (AML) data format allows hardware data to be automatically imported into TIA Portal. Then, thanks to TIA Portal Openness, the API (application programming interface) integrated in TIA Portal, the user can create a custom configurator that combines the standardized elements as required for the desired configuration. If an application is created on the basis of a user’s own standard, it will then need to be tested. Simple logic tests can already be performed using the functions integrated in TIA Portal. If the logic also needs to be validated in conjunction with behavioral models, S7-PLCSIM Advanced is the tool for the job. Since many companies have several machines operating as a group that are required to exchange data with each other or with higher-level systems, the standardized OPC UA protocol is the perfect choice. OPC UA Companion Specifications allow users to standardize the entire machine data interface, thus making it easy to provide access to other systems. Moreover, SiOME (Siemens OPC UA Modeling Editor) makes it possible to define the OPC UA interface and to link the variables from the control system with the interface via a simple drag-and-drop operation. The final interface is then imported into TIA Portal and loaded in the control system.

www.siemens.com/tia-portal

NEW FEATURES
• Planning: Automation Markup Language (AML) data format
• Development: integrated TIA Portal Openness interface
• Testing: S7-PLCSIM Advanced for logic testing in conjunction with behavioral models
• Integration: OPC UA open communications standard and Siemens SiOME tool

TIA Portal / Standardization

Basis for the digital workflow

TIA Portal offers users a standardized modular system for planning, development, testing, and integration that makes workflows more efficient and improves the quality of the solution. The standardized Automation Markup Language (AML) data format allows hardware data to be automatically imported into TIA Portal. Then, thanks to TIA Portal Openness, the API (application programming interface) integrated in TIA Portal, the user can create a custom configurator that combines the standardized elements as required for the desired configuration. If an application is created on the basis of a user’s own standard, it will then need to be tested. Simple logic tests can already be performed using the functions integrated in TIA Portal. If the logic also needs to be validated in conjunction with behavioral models, S7-PLCSIM Advanced is the tool for the job. Since many companies have several machines operating as a group that are required to exchange data with each other or with higher-level systems, the standardized OPC UA protocol is the perfect choice. OPC UA Companion Specifications allow users to standardize the entire machine data interface, thus making it easy to provide access to other systems. Moreover, SiOME (Siemens OPC UA Modeling Editor) makes it possible to define the OPC UA interface and to link the variables from the control system with the interface via a simple drag-and-drop operation. The final interface is then imported into TIA Portal and loaded in the control system.

www.siemens.com/tia-portal
Profinet communications standard in conjunction with OPC UA and TSN

Mastering the industrial communications of tomorrow

Significant changes in communications are expected as a consequence of the continual advances being made in the digitalization of automation. No longer are field-level data streams only relevant for the control level; now they also form the basis for SCADA or MES systems up to the cloud (e.g., MindSphere). This will require integrated networking across all levels and systems. Ethernet-based networks can be used to accomplish this. Thanks to the current standards of modern protocols and profiles, the industrial communications requirements of tomorrow are already being met today. Profinet – the leading Industrial Ethernet standard for automation – is playing a key role in this. As the most advanced field-level standard, it meets all requirements for openness, performance, flexibility, and efficiency.

The OPC UA (Open Platform Communications Unified Architecture) communications standard provides the perfect addition to ensure open, vendor-neutral, secure communications. The Simatic OPC UA S7-1500 option activates all functions of the OPC UA server and client in Simatic S7-1500 – enabling vertical connection and open machine communications. Internationally defined interfaces under OPC UA, known as companion specifications, can be easily linked with the variables from the control system and imported via TIA Portal, using the free OPC UA Modeling Editor from Siemens (SiOME). Sinetplan V2.0 enables efficient network planning and validation by allowing hardware data to be easily imported with .aml from ECAD systems or the TIA Selection Tool. The port-granular simulation of network nodes and network load ensures planning reliability and protection against outages even in times of rapidly increasing data volumes.

The interaction of OPC UA and Profinet is already becoming the sustainable foundation for the industrial communications of the future, offering users the investment security that they need. In the future, OPC UA and Profinet will rely on the Time-Sensitive Networking (TSN) Ethernet standard and will use it as a kind of “turbo” – reaping the benefits of better Quality of Service (QoS), higher bandwidths, lower transmission latencies, and convergence in the network.

siemens.com/profinet
siemens.com/opc-ua
siemens.com/tsn

HIGHLIGHTS

- Integrated networking thanks to Ethernet-based networks
- Export/import of Sinetplan V2.0 AML
- Time-Sensitive Networking (TSN) as “turbo power” for OPC UA and Profinet

... one network for everything!
Automation Systems

Simatic automation systems offer the right industrial controller for every application: for small to large quantity structures and widely varying performance or environmental conditions. Simatic controllers are available in a fail-safe version, the S7-1500 Advanced Controller, with integrated advanced Motion Control functionality, as a multifunctional platform, and in redundant design.

Virtual commissioning and new safety functions of the Technology CPU

Scalable Motion Control solution

Digitalization is increasing the level of automation and the use of kinematics for handling tasks in the field of machine and plant construction. Production environments in particular require maximum efficiency, precision, and availability. It is also important to ensure safety, for example, by monitoring kinematic motions in space during the setup and production process. Siemens provides technological solutions for this based on its Advanced and Distributed Controllers.

Simatic Technology CPUs offer predefined kinematics such as cartesian portals, roller pickers, SCARA robots, and delta pickers to make it easy for users to control kinematics with up to four interpolating axes, for example, for pick-and-place tasks. Free transformation interfaces allow seamless integration into the user’s kinematics. An intuitive configuration editor with graphical support is available for the parametrization of the kinematics. The programming environment for programming the motions in space is the familiar Simatic Step 7, with standardized, PLCopen-compliant function blocks. TIA Portal features an integrated kinematic trace with trace marking to visualize and diagnose the movements. It also has a kinematics control panel for commissioning. Virtual commissioning of kinematics can be carried out using PLCSIM Advanced (virtual controller) as well as the provided libraries of standard kinematics (digital twins), which enable fast implementation in NX Mechatronics Concept Designer. This makes it possible to simulate and validate the machine movement program in a software-in-the-loop environment.

The Simatic Safe Kinematics software library for the fail-safe S7-1500 Technology CPU (CPU 1517TF-3PN/DP) can be used in conjunction with Sinamics S120 (FW5.1 and higher) to safely monitor the motion of selected kinematics in space. The speeds of selected points in the kinematics (e.g., tool center points) as well as freely configurable zones (e.g., working and protection zones) can be monitored to protect machine tool operators. Sophisticated Motion Control tasks can be accomplished efficiently and easily in TIA Portal V15.1 with the help of Simatic S7-1500 T-CPUs and the Sinamics V90 (with Profinet), Sinamics S210, and Sinamics S120 servo drive systems.

NEW FEATURES

- Control of kinematics with up to four interpolating axes, for example cartesian portals, roller pickers, SCARA robots, articulated arms, and delta pickers
- Virtual commissioning to simulate and validate the movement program with PLCSIM Advanced and NX Mechatronics Concept Designer
- Reliable monitoring of kinematic motion in the space (supported kinematics: cartesian portals, vertical roller pickers, articulated arms, and SCARA robots)

siemens.com/t-cpu
siemens.com/simatic-technology
Redundant CPUs complete the range of Simatic S7-1500 controllers. They are engineered like a standard CPU, with program and data synchronization being handled by TIA Portal V15.1 and the redundant CPUs. There is no additional work for the user.

CPU1513R and CPU1515R are suitable for small and medium-sized projects. The strength of these CPUs is their redundancy. If one CPU fails, the backup CPU will automatically assume control of the process. This prevents data loss and allows the process to resume quickly. The field devices are linked to the CPUs in order to increase the devices’ availability for communication. This way, none of the devices are disconnected even if the fieldbus is interrupted, provided the devices support Profinet’s S2 redundancy (e.g., ET 200SP).

CPU1517H has the same features but is more powerful in order to handle larger-scale applications. This CPU uses a dedicated synchronization module that allows for a faster, more fluid switchover. Support for redundant Profinet networks is planned in the next development steps.

HIGHLIGHTS
- Engineered like a standard CPU
- Link field devices using a Profinet ring

siemens.com/s7-1500
Simatic S7-1500 / ET 200MP TM NPU

Artificial intelligence provides added value

Simatic S7-1500 / ET 200MP TM NPU is equipped with a USB 3.1. and a Gigabit Ethernet port and has no other function “out of the box.” It only becomes functional when a trained neural network is loaded via an SD card. The TM NPU (Neural Processing Unit) has an integrated AI chip, which allows it to process neural networks efficiently. The interfaces can then be used to process the data from the connected sensors (e.g., images, audio, vibrations) and from the CPU program, on the basis of the loaded neural network. This results in much more efficient, “human-like” behavior. In the past, camera-based recognition of workpieces was only possible if the system was “taught” each workpiece precisely and in advance. Now, users can design this process with much greater flexibility based on information such as existing image data. The resulting advantage is evident in pick-and-place applications, for example, where a mobile robot has to be able to recognize, remove, and position components that are lying loose in a box. Added value is also realized in quality inspections, where expert human knowledge about a product or process can be transferred to the module by continuously training a neural network with these (image) data by means of a connected camera.

HIGHLIGHTS
• New module for Simatic S7-1500 / ET 200MP with integrated AI chip
• Evaluation of input data (video, audio, CPU data) via neural networks
• More efficient implementation of tasks such as pick-and-place applications or quality checks based on expert (human) knowledge
• Connection of sensors via USB 3.1. and Gigabit Ethernet port
• Engineering and handling via TIA portal and AI toolkit

Simove

Mobilizing production

Automated guided vehicle (AGV) systems are playing an ever-increasing role in the improvement of production. Simove offers users an extensive system platform based on standardized automation and drive components. With it, machine builders and end customers alike are able to automate their AGV applications in production and logistics without a problem. End customers, for example, benefit from low-effort maintenance and spare parts management, while AGV manufacturers benefit from shorter implementation phases and easier programming. The open design of the standard gives users a large number of options for future innovations and a great deal of freedom when creating specific machine and plant concepts.

NEW FEATURES
• Simatic automation components and customized software libraries
• Based on Profinet – the leading Industrial Ethernet standard for automation
• Easy programming via TIA Portal
• Competence team for application support

siemens.com/simove

siemens.com/et200mp
Innovation cycles are becoming shorter and shorter. Systems and companies are becoming increasingly networked. The effects of digitalization are being felt at home as well as in the workplace. Companies that want to be and remain competitive have to be able to react flexibly to changes. In addition to their core tasks, they are faced with the challenge of finding efficient and cost-effective solutions to processes such as update handling and IT security.

Closing the gap between local and cloud computing
Local or central, on-site or via the Internet, in-house or through service providers – companies take different paths to collect and analyze production data and to continually improve their processes based on these data. Many are moving away from traditional local data processing, which keeps all hardware and software in the company, but entails complex and time-consuming software maintenance. Instead, they rely on data processing and analysis based on cloud computing. This makes it easy to update and manage the applications, with updates being installed on all devices via a central cloud management system. For this to happen, companies need to be able to process data locally while also leveraging the benefits of the cloud. Edge computing is the logical addition to this.

The Siemens Industrial Edge ecosystem is a portfolio consisting of hardware and software. Simatic Edge devices can be used to (pre)process production data on a distributed
The Simatic IPC227E Edge device is an extremely compact and flexible embedded industrial PC. With its closed, all-metal enclosure, Simatic IPC227E offers maximum industrial functionality for flexible use even under harsh conditions – while remaining maintenance-free. These features make it the ideal hardware platform for Edge applications.

Examples of Edge apps:

**Analyze MyWorkpiece /Capture**
With this Edge app, users can record all real-time tool-machining data for subsequent visualization and analysis in Analyze MyWorkpiece /Toolpath. This greatly improves process and quality analytics.

**Analyze MyMachine /Condition**
This application makes it possible to identify deviations at an early stage and thereby help optimize machine operation and avoid machine downtimes. This significantly increases the availability and productivity of the machine tool.

**Optimize MyMachining /Trochoidal**
Sinumerik Edge can be used to program the trochoidal milling function online directly on the machine. This permits full utilization of the tool, greatly reducing the necessary machining time.

**Notifier app**
This Simatic Edge application is used in the event of plant downtime. A push notification informs users about the downtime immediately on a mobile device such as a smartphone or smart watch.

**Inventory app**
In an increasingly complex automation environment, this Simatic Edge app gives users a comprehensive overview of which automation components are being used in which machine.

### HIGHLIGHTS
- Fast commissioning, because Edge software is already preinstalled
- Powerful platform for running Edge apps
- Integrated connectivity for automation and the cloud system

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For Simatic- and Sinumerik-controlled plants

Siemens Industrial Edge comes in two configurations: one for machines and plants with Simatic Edge and one for machine tools with Sinumerik Edge. In both cases, there is a package consisting of a Simatic Edge device, a specific driver for connecting the Simatic Edge device to Simatic or Sinumerik, and Edge apps.

### Flexible devices combined with high IT security

A defining characteristic of Siemens Industrial Edge is decentralized data processing and analysis on production-level Edge devices or integrated in the automation portfolio via special applications known as Edge apps. This means short paths and minimal lag times, even for large data volumes, which enables high-performance data processing virtually in real time. The data can be stored in the automation system and preprocessed there, with only relevant information being transferred to the cloud or to IT systems. Even stringent IT security requirements can thus be met. Devices and apps are still managed centrally in MindSphere, under Edge Management. This allows users to distribute system and application software to their devices as well as deliver periodic security updates to their machines, satisfying both the desire for open and flexible devices and the requirement for high IT security.

![siemens.com/industrial-edge](https://example.com/industrial-edge)
There are two new applications for the Sinumerik Integrate open digitalization platform that help improve tool availability, thereby avoiding machine downtimes. The Manage MyResources software solution can be used to visualize the complete tool cycle – from setting, through tool storage, to the machine. The application provides program management support for the whole CAD/CAM CNC chain. The customer benefits from increased tool life and the ability to easily optimize resources.

Using the second new application, Optimize MyProgramming /NX CAM Editor on Sinumerik, in combination with Manage MyResources, users gain direct access to a set of NX CAM parameters. NC programs that have been created can be directly optimized and modified using the controller on the machine. A 3D preview of the tool path can also be generated. This provides an intuitive, transparent illustration of a range of customer requirements. The resulting transparency allows customers to carry out performance and capacity analyses. By identifying optimization potential the app makes it possible to increase productivity. Optimized planning ensures the reliability of deliveries and reduces production costs.

The Manage MyMachines MindSphere application gives machine builders and operators an overview of the most important data and operating statuses of their machines – at all times and from any location. The application can be used to record, analyze, and visualize relevant machine data and statuses. Increased transparency allows users to react quickly to critical statuses, thus improving machine availability and productivity.

Manage MyMachines can also be extended with the Manage MyMachines /Remote application to enable remote access to the CNC HMI. The related communications are channeled through a fail-safe, encrypted Internet connection. This makes service calls faster and more efficient, while remote maintenance reduces the cost of service calls. Maintenance sessions are recorded and documented in MindSphere, ensuring transparency and traceability of the actions taken.

siemens.com/machinetools-digitalization
NEW FEATURES

- Monitoring machine and plant performance
  - Monitoring and comparing machines, plants, and locations
  - Flexible dashboards for detailed insights and analyses
  - Widgets (trend, speedometer, bar chart, Gantt chart) for displaying machine statuses and performance figures over time
  - Configurable time intervals for analyzing potential and performance retrospectively

- Easy dashboard configuration
  - Formula editor for calculating individual performance indicators on the basis of various parameters
  - Type/instance concept allows dashboards and KPIs to be reused easily

Simatic Performance Insight

Analyzing machine and plant data worldwide

The Simatic Performance Insight MindSphere application allows users to optimize the performance of machines and plants on the basis of current operating data. The application provides greater transparency for everything from a single machine to complete production lines and even machinery or plants distributed around the world. The data can be used to calculate individual KPIs and thereby optimize important performance figures, such as overall equipment efficiency, quality, or output. Clearly arranged dashboards and graphics allow the user to compare the performance of different machines, plants, locations, and even production shifts. This gives plant operators a solid basis for their decisions and helps machine builders provide better service to their customers.

siemens.com/simatic-mindapps

3D geometrical parameters and simplifies the identification and correction of errors throughout the process. A unique feature is that the data can also be updated in NX CAM once the machine has been optimized.

siemens.com/machinetools-digitalization

- Increased tool life and easy resource optimization with Manage MyResources
- Easy optimization and modification of NC programs with Optimize MyProgramming /NX CAM Editor
- Improved tool availability and minimized machine downtimes
Distributed I/O Systems

With the Simatic ET 200, Siemens offers a modular and precisely scalable system for distributed automation in the control cabinet or directly on the machine.

Simatic ET 200MP CM 8xIO-Link

Avoiding downtime with IO-Link in the control cabinet

When it comes to data transparency and intelligence at the field level, the importance of the IO-Link communications standard can hardly be overstated. It offers a wide range of benefits, such as device-independent detailed diagnostics down to the field device level, wire breakage detection, and the ability to reparameterize connected actuators or sensors (IO-Link devices) from a control center during ongoing plant operation.

The new IO-Link Master for Simatic S7-1500/ET 200MP can be used to connect devices directly in the control cabinet. The module has eight ports, each with up to 32 bytes of input or output data. This significantly reduces the wiring effort required in the control cabinet when combined, for example, with Sirius switching devices or motor starters that are connected as IO-Link devices via a plug-in function module. Downtimes can also be reduced or even eliminated entirely, since the IO-Link devices offer more diagnostic capabilities (for example, before a component fails, it provides an early warning based on previously parameterized thresholds). Moreover, when a defective IO-Link device is being replaced, its parameterization can be directly applied to the new device from the IO-Link Master module.

If the IO-Link Master fails, the user can easily take the port configurations stored in the master and save them to the CPU using the freely available TIA Portal function block IO_LINK_MASTER_8. The configurations can then be reloaded when replacing the master. The basic parameterization can be easily implemented either via the interface of the S7 Port Configuration Tool (S7 PCT) or directly in TIA Portal. No additional tools are required for the basic configuration of the IO-Link device, as the user can simply use the module’s autostart function.

siemens.com/et200mp
A new eight-channel analog input module for the Simatic S7-1500 controller and the ET 200MP I/O system for recording current, voltage, resistance, and temperature has further increased the scalability of the system. The basic version of the new module offers a particularly affordable entry-level solution, especially for applications with higher numbers of channels, to complement the existing standard and advanced versions in the portfolio. A new feature in the module allows resistance thermometers to be connected via a three-wire circuit, which improves measurement accuracy, particularly at higher temperatures. The included shield clamps can be installed in a few steps without any tools, making the product even easier to use – especially for applications with high numbers of channels. The module can be attached to any Simatic S7-1500 Advanced Controller or ET 200MP interface module.

siemens.com/et200mp

NEW FEATURES

- New eight-channel analog input module in affordable basic design for price-sensitive applications
- Measurement of current, voltage, resistance, and temperature
- Connection of resistance thermometers via three-wire circuit
- Integrated shield concept for tool-free installation of shield

Simatic ET 200SP TM ECC PL ST

Fast and efficient charging of electric vehicles

A key component when charging electric vehicles is the communication between the electric vehicle and the CPU installed in the charging infrastructure. The new Simatic ET 200SP TM ECC PL ST technology module enables powerline Green PHY communication as defined in DIN SPEC 70121 in combination with a pulse-width-modulated signal in accordance with IEC 61851. Based on this communication, the Simatic ET 200SP TM ECC PL ST technology module can be used for conductive DC charging of electric vehicles in charging mode 4. Apart from the communication, the technology module also offers two digital outputs for standards-compliant shutoff of the DC disconnector within 30 ms. It can be used within a Simatic ET 200SP station or centrally at DC charging stations as well as at decentralized charging points in conjunction with an IM 15S-6. The user is free to choose the position of the plug-in connector. Depending on system requirements, the Simatic ET 200SP CPU 1515 PC Open Controller can serve as a basis for billing software or back-end connections (via OCPP), and further Simatic ET 200SP modules, such as Simatic ET 200SP AI 4xRTD/TC, can be used to monitor the temperature of the charging cable. This creates a flexible, modular overall concept.

siemens.com/et200sp

NEW FEATURES

- AC/DC charging with Simatic ET 200SP
- Basic communication in accordance with IEC 61851
- DC charging process in accordance with DIN SPEC 70121
- Back-end connection via OCPP
- Reliable shutoff of charging power
- Modular design in the Simatic ET 200SP system
- Configuration via TIA Portal V15
The condition monitoring and analysis of mechanical components can be easily integrated into Simatic S7-1200 with the Siplus CMS1200 Condition Monitoring System. This allows users to detect damage early and plan maintenance tasks promptly. Siplus CMS1200 records vibration signals via IEPE vibration sensors, analyzes and diagnoses them, and visualizes them in a web browser. The system then transmits the results of the analysis to the Simatic CPU and can provide decision-making aids for maintenance staff. For example, the chronological progression of measured values can be used to estimate how much longer the system can reliably operate. The interaction between Siplus CMS and MindSphere opens up entirely new prospects. Originally designed to analyze large quantities of data, MindSphere allows users to monitor machinery fleets distributed around the world and thereby reduce downtimes. This turns mechanical condition data into digital added value.
Simatic HMI – Taking efficiency to a new level: that is the motto of the seamless, consistent human-machine interface product range that allows the most diverse applications to be implemented efficiently and economically.

Simatic WinCC Open Architecture V3.16

More flexible designs, increased IT security

Simatic WinCC Open Architecture V3.16 places the focus on IT security, without neglecting innovations in design. The modernized trend feature allows users to create innovative and customized views for displaying curves. Using layout management and the integrated bird’s-eye view simplifies selection of the required information. Customizing legends, trend axes, and comments on data points provide users with many different options for seeing relevant data at a glance. Alarms can be stored directly in the trend display, allowing for quicker analysis of causes and thus better avoidance of outages and malfunctions of the monitored plant.

With regard to security, the connection to third-party authentication systems has been expanded. These systems – as well as customers’ proprietary systems – can now be integrated in WinCC Open Architecture. Another important feature is the expansion of the TIA Importer: it now supports projects with TIA Portal V15. This makes it easier to integrate TIA Portal projects and significantly reduces configuration effort.

Simatic HMI Template Suite

Expert HMI design

Simatic HMI Template Suite is a TIA Portal library that supports users with a variety of templates, images, and objects, and makes the HMI development process easier and faster. All components can be combined into a modern, user-friendly, and appealing operating concept. This ensures optimal usability for machine operation in industrial environments.

HMI Template Suite allows users to create HMI solutions based on an operating concept that has been developed in collaboration with user interface experts. This shortens the time required to produce aesthetic, functional HMIs that fulfill specific requirements with a constant focus on machine operators. With the right template, it takes only a few minutes to create a customized user interface for a specific application. Users can change the color of any element, add new navigation areas, or adapt the operating concept to devices with different display sizes in next to no time. The result is a custom HMI design with full control over layout and design. HMI Template Suite thereby turns the interaction into a positive experience for the operator.

NEW FEATURES

- Solid design system in the engineering framework TIA Portal
- Faster and easier HMI development process
- Adaptable, extensive modular library
- Optimized for industrial environments
- Ensures high usability for machine operation
- Can be used without prior experience

siemens.com/hmi-template-suite
PC-based Automation

From compact, fanless embedded IPCs to powerful expandable high-end IPCs, the products in the Simatic IPC portfolio are the ideal foundation for many PC applications in the manufacturing environment.

Simatic IPC6x7 / IPC8x7

Maximum performance and flexibility in industrial environments

When it comes to quickly processing and saving very large volumes of data, completing demanding visualization tasks, or individually expanding industrial PCs with a number of cards or modules, the Simatic IPC627E, IPC647E, IPC677E, and IPC847E high-end IPCs provide an ideal balance between innovative high-performance technology and excellent investment protection. The devices in the new generation have an improved enclosure design and are available as a rack, box, or panel PC. They are intended for use in the control room or as high-performance, machine-level systems in data-intensive processes. Powerful 8th Gen. Intel processors and fast onboard HD graphics can handle even the most challenging tasks. Whether the user wants rack PCs for the control room or box PCs for use in control cabinets or on machines, high-end IPCs provide a rugged, future-proof platform for industrial environments. The devices feature a high degree of installation, interface, and software compatibility.

siemens.com/ipc

NEW FEATURES

• State-of-the-art technology for maximum performance (8th Gen. Intel processors, 64 GB RAM, NVMe SSD, USB 3.1 gen. 2, USB Type-C)
• Maximum expandability (3 graphics interfaces, 3 LAN, 6 USB, and up to 11 PCI(e) ports) for flexible integration in new and existing plants
• Panel PC with 19”, 22”, or 24” multitouch glass front
• Maximum data and system availability in 19” rack, in the control cabinet, or directly on the machine

Simatic ET 200SP Open Controller CPU 1515SP PC 2

For distributed and PC-based applications

The new Simatic ET 200SP Open Controller CPU 1515SP PC 2 distributed automation controller is especially high-performance for standard and fail-safe applications up to performance level e. It is particularly well-suited for series machine manufacturing, combining the functions of a PC-based software controller with visualization, Windows applications, and central I/Os. The new fail-safe CPU 1516pro-2 PN for the Simatic ET 200pro Distributed Controller is likewise capable of tackling standard and fail-safe automation tasks up to performance level e. Safety functions have been integrated into the Simatic S7-1500 Software Controllers. The CPU 1507S F, a perfect solution for special-purpose machine manufacturing, is the world’s only software controller with fail-safe PC-based control that can operate independently of the operating system. This ensures high system availability and fast controller startup, thus eliminating the need for an additional hardware controller.

siemens.com/simatic-controller

NEW FEATURES

• Distributed Simatic ET 200SP Open Controller for standard and fail-safe applications up to performance level e
• Functions of a software controller with visualization, Windows applications, and central I/Os
• Software controller with fail-safe PC-based control that can operate independently of the operating system
Simatic IPC1047

Maximum computing and graphics performance

Simatic IPC1047 offers machine builders, plant manufacturers, control cabinet manufacturers, and IT service providers a high-performance, highly flexible 19" rack PC platform for industrial use at the machine level. The Microsoft operating systems and Intel Xeon E5 processors preconfigured for multi-core technology ensure higher performance and better multitasking in industrial environments. The use of two processors, each with up to 14 processor cores and Hyper-Threading, makes the processors ideal for acquiring data or processing images during quality testing, visualizing production processes, and virtualizing computers. It also enables simultaneous execution of several demanding applications, such as graphics-intensive visualization applications or computationally intensive programs. The 19" all-metal enclosure (4HE) of Simatic IPC1047 provides a high level of mechanical ruggedness against vibrations/shocks and EM compatibility. Thanks to its outstanding thermal design, the rack PC can run in an ambient temperature of up to 50°C without any loss in performance. Simatic IPC1047 can also be equipped with up to two maximum-performance Nvidia Quadro P5000 GPU's (Graphics Processing Unit). The multi-display architecture makes it possible to connect several screens and thus significantly increase productivity.

siemens.com/ipc1047

Simatic IPC127E

Ultra-compact IoT Industrial PC

Its ultra-compact design allows Simatic IPC127E to be easily integrated in the automation solution, requiring minimal space in the control cabinet or directly on the machine. Users can get the product they need in next to no time, thanks to preconfigured versions. Networking existing plants is often a big challenge. Machines made by different manufacturers and representing different generations of technology speak different languages when it comes to data processing. In addition to standard IPC applications, Simatic IPC127E can also be used as IoT Gateway, as an open platform for collecting, processing, and transmission of data from production to higher-level systems. Unlike Simatic IOT2000, Simatic IPC127E can be either Windows- or Linux-based, making it a fitting addition to the Simatic IoT gateway portfolio. The embedded IPC is ideally suited for use between the cloud or the company's internal IT level and production.

siemens.com/ipc127e

NEW FEATURES

- Platform for artificial intelligence (AI), machine learning, Edge computing, and machine vision
- Maximum computing performance with two Intel Xeon CPUs
- Maximum graphics performance with two Nvidia Quadro P5000 GPUs
- High expandability thanks to six PCIe slots, six USB interfaces, and a serial interface
- Product designed for industrial environments, with all-metal enclosure that has high EM compatibility

HIGHLIGHTS

- Ultra-compact enclosure (0.3 l) with various mounting options (standard rail, wall, portrait mounting)
- Optimal performance/volume ratio:
  - Quad-core Atom processor, 4 GB RAM, 128 GB SSD
  - Up to three LAN and four USB ports
  - Preconfigured versions available from stock
Power Supplies

A reliable DC power supply is essential for efficient plant operation. The portfolio of Sitop power supply units and add-on modules can protect companies in any industry in the world from plant downtime and production losses.

Sitop PSU3400

Stable supply in spite of fluctuating direct current

Siemens has expanded the portfolio of Sitop PSU3400 DC/DC (direct current) converters for standard rail installation. The products now cover a wide power output range for input voltages of 12, 24, 48 V DC and 200 to 900 V DC as well as output voltages of 12 V DC or 24 V DC. They supply a current of 3.5 A to 20 A, depending on the type selected. If more power output is needed, two devices of the same type can be connected in parallel. The new product line is installed compactly in a slim metal housing and has a large input range with reverse polarity protection. This provides a high level of safety when connecting the DC/DC converter. The high level of efficiency of up to 93% ensures low heat generation in the control cabinet.

Sitop DC/DC converters can be used as "refreshers" – the module guarantees a reliable power supply to a remote load when bridging large distances with long cables. They can also serve to stabilize unstable infeeds, such as in driverless, battery-powered transport systems. In such systems, the output voltage of the battery will vary depending on the charging status. A Sitop DC/DC converter ensures a stable 24-V DC supply to connected loads, such as a control unit (CPU).

However, Sitop DC/DC converters can do more than just stabilize the input voltage at the same level – they can also function as a transformer. If the voltage supplied by a battery is different from the voltage required by the load, the DC/DC converter can transform it to the right level. This is useful, for example, for equipment used at train stations to control station displays, payment systems, train station clocks, and so on. Special conditions apply to shipbuilding in order to comply with safety requirements: the task here is to isolate potential between primary and secondary circuits. This galvanic isolation can also be accomplished using a DC/DC converter.

NEW FEATURES

- Stabilization of DC voltage where there is fluctuating input voltage
- Refreshing of DC voltage when bridging long distances
- Reverse polarity protection at the input to avoid improper installation
- Adjustable output voltage to compensate for voltage drops
- Low heat generation in the control cabinet due to high energy efficiency of the power supply (up to 93% efficiency)
- Industry-specific use in shipbuilding (maritime applications) thanks to DNV GL and ABS marine approval

siemens.com/sitop
The range of Sitop expansion modules, which protect the 24-V supply, even in the event of unexpected faults, has now been expanded with new components. With their slim design, consistent look and feel, and easy commissioning thanks to push-in terminals, they are the perfect complement to the Sitop PSU6200 power supply family.

Sitop selectivity modules distribute the load current over several load circuits. Overload or short circuits in one or more load circuits are reliably detected, and the faulty load circuit is immediately shut down, while supply to the other loads continues with no interruption. In contrast to the current Sitop PSE200U selectivity modules, the new Sitop SEL1200 and Sitop SEL1400 selectivity modules have eight outputs – instead of the previous four. Another innovation is the diagnostics interface. As in the Sitop PSU6200 power supply, status data such as set point and actual current for each output and, in the event of a shutdown, the reason for the shutdown are transmitted. The controller reads this information via a digital input and, if necessary, immediately initiates an appropriate action. Now, two outputs can be connected in parallel to increase power output.

Selectivity modules have different shutdown characteristics. The limiting shutdown – in the current Sitop modules and Sitop SEL1400 – ensures that the voltage for the load being supplied never falls below 20 V. This guarantees increased protection of the components in the control cabinet. The switching shutdown characteristic – in Sitop SEL1200 – permits a short-term voltage drop below 20 V for the other loads, which is non-critical for loads that comply with the PLC standard.

Sitop redundancy modules protect the supply from a defective power supply unit. In the event of a defect, the functioning module takes over the power supply without interruption. Even in the case of a short circuit in the secondary circuit of the defective power supply unit, the disconnection allows the plant to continue operating. If more than two power supply units are connected in parallel to increase power output, and one of them is defective, the increased current flow must be prevented from reaching the defective power supply unit. This is accomplished via the disconnection with one redundancy module per power supply. The new Sitop RED1200 redundancy modules can be used for an input voltage range of 12 V to 48 V, enabling a wide variety of applications beyond the range of 24-V control circuits. The high level of reverse voltage protection makes it possible to connect several power supplies in series for output voltages of up to 96 V.

Sitop also offers various buffer modules and uninterruptible power supplies to bridge power failures. Users with this comprehensive range of 24-V power supply protection are well prepared for all eventualities, thus avoiding plant outages and the associated high costs.

NEW FEATURES

- Sitop SEL1400 and SEL1200 selectivity modules with eight outputs
- Two shutdown characteristics: limiting (SEL1400) and switching (SEL1200)
- Sitop RED1200 redundancy modules: input voltage range of 12 V to 48 V
Sinamics G120X is the new series for use in infrastructure applications. Its specialty: controlling motors that drive water and air, while impressing users with maximum simplicity, reliability, and efficiency.

Every industry and every application has special requirements. Sinamics G120X is optimized for pump-and-fan applications in infrastructure. The new series can meet any challenge with its available power output range of 0.75 kW to 630 kW – from irrigation, desalination, and drinking water or wastewater treatment to fresh air supply/exhaust in road tunnels and subway systems. Sinamics G120X can operate with any motor, but it is most effective with Siemens synchronous-reluctance motors.

Sinamics G120X offers precisely those characteristics that are needed in infrastructures: all devices in the series are consistently designed for cost-optimized, resource-saving operation at all voltages and in all power supply systems. Its compact design saves space in the control cabinet, and it offers motor cable lengths of up to 150 m without an additional output reactor. The integrated safe torque off (STO) safety function is SIL3 certified.

Ready for the future
Sinamics G120X is ready for digitalization thanks to a cloud connection. This allows users to visualize and analyze the statuses of the converter and machines. Sinamics Connect 300 is available for easy connection to the cloud. The Analyze MyDrives MindSphere application makes maintenance easier by providing users with valuable data to optimize their processes and their maintenance strategy.

Impressively efficient
Not only does Sinamics G120X meet all relevant EU energy-saving standards, it is also exceptionally efficient, with an efficiency level of over 98%. An extensive range of integrated, application-specific energy-efficiency functions, such as flux reduction, keep running mode, pump boost, or eco mode, complete this new converter of the future.

Reliable and rugged
With its rugged design, Sinamics G120X is predestined for use in infrastructure applications. The drip-proof housing, coating boards, high EMC category C2 (optional C1), and protection class IP20 (optional IP21 in UL open type) ensure reliable operation in all environments. Using the optional line harmonics filter (LHF) allows for harmonic effects (THD) to be reduced to under 5%, resulting in lower power loss and higher power quality. Thanks to an integrated DC link reactor, it also operates under all grid conditions. Other options such as output chokes and sinus filters are available to enhance the motor lifecycle, reduce further power losses and to limit the rate of rise of voltage and capacitive currents.

Easy to use
The new converter is remarkably simple. Even inexperienced users will have no problem operating and handling it. The Smart Access Module and the IOP-2 operating panel make short work of commissioning. Selecting and ordering Sinamics G120X is fast, too. All a user needs for this is an order number in the Siemens Drive Technology Configurator.

siemens.com/sinamics-g120x
Siemens offers all-in-one solutions for the entire drive technology that can be seamlessly integrated into any automation environment and over the entire lifecycle – for more efficiency, reliability, and productivity.

NEW FEATURES:

- Increased productivity
- Assured plant availability
- Reduced costs
- Optimized asset and resource management

Services for Sinamics G120X

Comprehensive service package

An extensive service concept ensures the availability of the new Sinamics G120X series and provides the basis for continuous improvements during ongoing operation. Customers looking for efficient drive protection can gain six months of extended product cover from Siemens, free of charge, simply by registering online for Drive Service Extended Exchange. There is also an option to insure Sinamics G120X drives for up to 7.5 years. This ensures continuous availability throughout the entire product lifecycle.

The Drive System Retrofit for Masterdrives and Micromaster ensures optimal spare parts supply even when switching to the Sinamics converter family. Service experts with decades of experience will also develop the best Sinamics replacement strategy and implement it in the plant.

Register your Sinamics converter now:
siemens.com/drive-registration

siemens.com/drivesystemservices

Sinamics S120 FW V5.2

Easy to use, more power output

Firmware V5.2 has further improved the user-friendliness of the web server in the Sinamics S120 converter. For example, typical diagnostics, service, and maintenance activities no longer require special commissioning tools.

NEW FEATURES:

- Integrated web server for intuitive use
- Responsive design for user-friendly view of each client device
- Parallel connection of Active Line Modules (ALMs) for higher power output without an additional chassis device

Moreover, the process of creating, managing, and deleting parameter lists is now much more intuitive. Backups of parameter settings can be easily stored on the web clients using the web server and browser and then reloaded in Sinamics S120 using the restore function. Whether the user prefers to use a PC, notebook, tablet, or smartphone – the new responsive design of the web server ensures automatic adaptation of the pages.

The hardware for Sinamics S120 has also been enhanced with the new firmware V5.2. The 55-, 80-, and 120-kW Active Line Modules (ALMs) can now be connected in parallel. This expands the power output range of the booksize versions. A higher rated power can be achieved without using an additional chassis device or an external busbar. There can also be a power exchange in the DC link. An advantage for commissioning: the topology is represented as a single ALM.

siemens.com/sinamics-s120
Simatic Micro-Drive servo drive system

Servo drive system for safety extra-low voltage (24 V - 48 V)

There is a new addition to the Siemens converter family in the safety extra-low voltage range: Simatic Micro-Drive. The versatile servo drive system comprises the PDC (ProfiDriveControl) servo converter as well as flexible-use motors and plug-in cables. The system covers a wide range of applications in the safety extra-low voltage range from 24 V DC to 48 V DC. The motion control functions are completed with appropriate controllers such as Simatic and Simotion. To ensure 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 plug-in cables. This gives users access to an individual combination of the best products from the Siemens Product Partner Program.

Simatic Micro-Drive is a versatile, seamless, safety-integrated drive that performs impressively in a wide variety of applications: high-precision positioning tasks, innovative application areas 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 example for safe maneuvering of examination beds in MRIs and positioning of the ceiling-mounted arm in radiography, among many other applications. Simatic Micro-Drive provides an ideal entry into digitalization. Converters and motors are fully integrated into the Siemens automation technology on the basis of Totally Integrated Automation (TIA). Diverse tools for the entire machine building cycle ensure highly efficient engineering and fast commissioning.

siemens.com/micro-drive

NEW FEATURES:

- Custom-combinable servo drive system
- Fast and safe communication via Profinet
- Safety Integrated with additional new SLT function
- Easy commissioning and servicing via TIA Portal
- Dimensioning in the TIA Selection Tool (incl. all partner components)
From now on, additional power output and supply voltage variants are available for the Sinamics S210 high-performance single-axis servo drive system for midrange applications. The existing power output range of 50 W to 750 W (with 1AC 230 V) will be gradually expanded with device variants from 0.4 kW to 7 kW (with 3AC 400 V) and the associated Simotics S-1FK2 servomotors with shaft heights up to 100 mm. The first new frame size with a power output of 0.4 kW to 1 kW (with 3AC 400 V) heralds the comprehensive expansion of the converter system.

Sinamics S210 has a wide-range power supply connection of 3AC 200 V to 480 V for worldwide use. The new device variants have been functionally expanded with an optional infeed rail system and a common DC link coupling. The converter’s DC link coupling enables power compensation during dynamic reversing operations. This reduces the waste heat generated during braking via the integrated braking resistor and increases the travel cycle of the individual axes.

Sinamics S210 can use Simatic S7-1500 Advanced Controllers for higher-level control, but now it can also use Simatic ET 200SP CPUs and Open Controllers or Simatic S7-1500 Software Controllers, all connected via isochronous Profinet IRT. The converter also boasts integrated safety features: in addition to the standard functions, users can now obtain an optional license to activate extended safety functions such as SLS, SSM, and SDI. With the introduction of the extended safety functions, the encoders installed in the Simotics S-1FK2 motor were also increased to a 22-bit resolution. Simotics S-1FK2 servomotors, whether compact or highly dynamic depending on the user’s requirements, achieve maximum dynamic response and precision in conjunction with the rapid sampling and smart control algorithms of Sinamics S210 and a high-quality feedback system. All this is combined with low rotor inertia and high overload capacity. They are therefore primarily suitable for use in packaging machines, handling, wood and ceramic processing, and digital printing.

The configuration and commissioning of the Sinamics S210 drive system have also been expanded: the TIA Selection Tool provides user-friendly support for the technical design of the components required for a drive task. Apart from simple direct commissioning via the converter’s web server, Sinamics Startdrive also enables engineering via TIA Portal (version V15.1 and higher). The tool for configuration, commissioning, and diagnostics has been optimized for consistent use of the benefits of TIA Portal – a common working environment for PLC, HMI, and drives.
Sinamics S120 Chassis-2 & Cabinet Modules-2

Fit for digitalization

The innovated generation of Sinamics S120 Chassis-2 and Sinamics S120 Cabinet Modules-2 are Siemens’ answer to changes in the requirements for frequency converters. The new, high-performance converters boast maximum reliability, exceptional ease of use, compatibility, and digitalization capability. They are primarily used in the metal and paper processing industries as well as in cranes and conveyor belts. The electrically/mechanically innovated Sinamics S120 Chassis-2 and Cabinet Modules-2 now have an improved cooling concept and increased alternating load capability. This further expands the possible applications and increases reliability. The optimized housing simplifies engineering tasks, and the OEM kit makes it easy to install the converters in the control cabinet. They are also ready for digitalization, thanks to integrated condition monitoring and the digital twin.

![Image](siemens.com/sinamics-s120-innovation)

NEW FEATURES:
- Expanded power output ranges: MoMo 315–450 kW (frame size 2), MoMo 710–800 kW (frame size 4)
- New ALM/AIM infeed unit as Chassis-2 in FS2 and FS4 and Cabinet Module-2 with 335–900 kW power output:
  - ALM: higher clocking;
  - AIM: more stable and robust in response to grid conditions, additional ranges of RSC (rated short current – grid stability), more flexibility for hard and soft grids
- Standardized spare parts for MoMos (all frame sizes) and ALM

Simotics XP

Even more flexibility in use

After a final expansion of the Simotics XP product range, the new generation of explosion-proof low-voltage motors now covers all applications in potentially explosive environments. Now, in addition to the existing Ex db, Ex ec, Ex tb, and Ex tc types of protection, there is also an integrated range up to 165 kW available in the Ex eb type of protection. The Ex eb type of protection designates “increased safety” and is suitable for Zone 1. This type of protection eliminates possible ignition sources, such as sparks, electrical arcs, or impermissible temperatures, on all parts of the motor. For the flameproof Simotics XP motors, users can also select a terminal box with a flameproof (Ex db) enclosure like that of the motor instead of a terminal box with increased safety (Ex eb). This ensures the optimal motor and terminal box combination for each application and for each specific hazard situation. The new version offers maximum safety and reliability in all areas, with significantly reduced effort – from planning, procurement, engineering, and integration to service and spare parts management.

![Image](siemens.com/simotics-xp)

NEW FEATURES:
- Integrated range up to 165 kW in Ex eb type of protection
- Optional junction box with flameproof (Ex db) enclosure as an alternative to the terminal box with increased safety (Ex eb)
Simogear reluctance geared motors

Energy efficiency with high dynamics

The new Simogear synchronous reluctance drive system consists of a Simogear gear unit, a Simotics reluctance motor, and a Sinamics frequency converter for control. Comparable to IE4, this solution impresses with its higher efficiency and lower losses, especially in partial load, than comparable asynchronous motors. Highly energy-efficient, the motor heats up less and ensures high operation reliability due to its thermal behavior and high overload capacity. Thanks to this, it requires little maintenance. The solution achieves high dynamics thanks to the motors' lower moment of inertia and optimized control. The motor also boasts higher acceleration in cyclic operation and more precise torque control thanks to highly dynamic vector control. Commissioning is quickly and easily completed by entering the motor code into the Sinamics converter. The constant torque-speed characteristics up to the rated speed make an external fan redundant.

NEW FEATURES:

• 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

NEW FEATURES:

• Motor efficiency comparable to IE4
• High reliability of operation due to low motor temperature
• Precise speed even without encoder
• Low intrinsic moment of inertia
• Continuous overload of an average of about 60% in the speed range of 1:10

Simogear KS adapter

Simplified handling for precise servo-applications

The new Simogear coupling adapter links different Simogear gear unit types and Simotics servomotors without requiring a dedicated adapter for each motor. The S-1FL6, S-1FK2, S-1FK7, S-1FT7, and M-1PH8 Simotics motor series can be connected to virtually any size or type of gear unit. Thanks to the Simogear KS adapters 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.

siemens.com/simogear
Digitalization in drive technology

More transparency and productivity

Drive system failures can bring entire production processes to a halt. Digitalization makes it faster and easier to realize and optimize drive systems and increases the efficiency of maintaining them throughout the entire lifecycle – from design, planning, and engineering to commissioning and service. Today, the right solutions are available for a wide variety of industries and applications. For example, an integrated database makes it possible to perform commissioning virtually, with simulations and tests in the digital world, which dramatically reduces the time required for real-world commissioning. With cloud applications, operational data can be collected, evaluated and used to optimize operations.

The Sinamics and Simotics portfolio combines proven hardware with innovative software to ensure transparency along the drive train as well as reliable operation. New interfaces and connectivity modules make the components ready for digitalization.

Sidrive IQ, the IoT digitalization offering for drive systems, allows for optimization throughout the entire drive train – from production to services. Regular data analysis gives users an efficient and quick overview of the operating statuses of their motors and converters. This allows them to plan servicing in accordance with requirements – while also benefiting from higher plant availability and productivity. Sidrive IQ offers MindSphere applications for the visualization, analysis, and monitoring of drive data. The Analyze MyDrives MindSphere app enables monitoring of fundamental operating statuses of Sinamics low-voltage converters. This allows users to see promptly where there is a need for optimization and initiate appropriate service measures.

Drives can be easily connected to Sidrive IQ using one of several available connectivity modules, such as Sinamics Connect 300 for low-voltage converters, Simotics Connect 400 for low-voltage motors, Sinamics Connect 500 for medium-voltage converters, and Simotics Connect 600 for high-voltage motors. The Sidrive IQ digitalization portfolio also includes customized services.

HIGHLIGHTS

- Optimized maintenance via connected drive systems
- MindSphere Apps Analyze MyDrives (manufacturing industry) and Sidrive IQ Fleet (process industry applications) for analyzing and monitoring the drive data
- Connectivity modules for easy connection of many different drives to the cloud

Siemens' product news 1/2019:
Drive Systems

Siemens AG

HIGHLIGHTS

- TIA Selection Tool/Sizer
- SinaSave
- Simotics Startdrive
- Simotics Digital Data App
- Connectivity modules and MindSphere apps

Siemens.com/sidrive-iq
Siemens.com/sinamics-digitalization
Sidrive IQ Services
Digital expert support

HIGHLIGHTS

• Networked drive systems create transparency and allow users to optimize maintenance activities
• Easy to connect to high-voltage motors via Simotics Connect 600 and medium-voltage converters via Sinamics Connect 500
• Customized Sidrive IQ services

Sidrive IQ Services is the innovative approach for the new generation of Remote Services and Condition Monitoring Services – from corrective actions and troubleshooting to preventive maintenance services and proactive solutions for optimized performance. Sidrive IQ Services provides users with digital expert support to optimize the availability and productivity of their plant. The service experts continuously monitor the connected components, inform the user of any anomalies, and provide support with troubleshooting. This allows for optimal planning of maintenance and service activities. In addition to customized services such as Digital Check and Connect Package, Sidrive IQ Services now also comes with services for medium- and high-voltage applications: Expert Assistance and Expert Diagnostics. Expert Assistance automatically triggers an alarm in the event of a fault in the drive train. A service expert, who has a full view of all operating parameters thanks to Sidrive IQ, contacts the customer to provide direct support in getting the drive train back in operation. This avoids wasting valuable time transferring data. With Expert Diagnostics, the service experts continuously monitor the status of the connected devices. Once a weak point is identified, they inform the customer and provide an appropriate service recommendation. An expert report for an in-depth assessment of the status can optionally be requested.

siemens.com/sidrive-iq-services
Cloud computing is a key factor when it comes to reaping the benefits of digitalization in industry. It can improve product quality via big data analysis of all relevant parameters, allowing operators to evaluate globally important key performance indicators regarding the use of machines or robots from different manufacturers and thus providing higher availability. The technology also opens up new pay-per-use marketing models for machine builders.

In order for these applications to work, they need to be fed with field-level data. Power consumption, temperature, vibration, travel speeds, and the corresponding curve progressions over time can be used to draw conclusions about plant statuses and process quality. Combined with further information, such as the material used, the specific supplier, or the status of the tools used, this opens up whole new possibilities for optimizing processes.

The right solution for every application
With its CloudConnect products, Siemens offers a professional way to transfer this information to a wide variety of cloud platforms, such as MindSphere, Microsoft Azure, or Amazon Web Services (AWS). For the flagship Simatic S7-1500 Advanced Controller, the new CP 1545-1 communications processor automatically supplies the data points selected in TIA Portal to the cloud. Existing plants that are intended to benefit from digitalization use Simatic CloudConnect 7. The best part: the existing Step 7 program does not have to be modified. Moreover, the Industrial IoT gateway Ruggedcom RX1400 with CloudConnect offers a number of different interfaces that enable countless options for implementing additional applications.

User-friendly engineering with all products
Selectable profiles allow users to set all parameters for the different cloud platforms with a few clicks of the mouse. At the field level, Simatic CP 1545-1 can directly access the Simatic S7 CPU database. Simatic CloudConnect 7 uses S7 communications and Modbus to query data from field devices cyclically. Users can even implement their own protocols with Ruggedcom RX1400, including application-specific processing logic.

Whether they are used as a permanent part of modern TIA installations, as an easy option for existing plants, or as a robust all-rounder for several different IIoT implementations – CloudConnect products always provide the right answer.

siemens.com/cloudconnect
From the simple connection of a sensor to the collection and transmission of all of a factory’s quality and production data – the whole package for industrial communication enables the efficient integration of all company divisions.

**NEW FEATURES**

- IIoT data transfer to cloud-based solutions for existing Simatic S7 plants (investment protection)
- Fast and error-free configuration due to data transfer from Step 7
- Event-driven communications reduce the network load and the costs associated with data exchange

The Simatic CloudConnect 7 Industrial IoT gateway can easily read data from S7-based devices and transfer it to a number of different cloud platforms, such as MindSphere, Microsoft Azure, or Amazon Web Services (AWS), using the standardized MQTT protocol. The key information can be selected and transferred without having to modify the existing automation program. The Simatic CC712 version enables the connection of a Simatic S7-300 or S7-400 via Industrial Ethernet using the S7 protocol, whereas the Simatic CC716 version supports connection of a maximum of seven Simatic S7 via Industrial Ethernet or Profibus/MPI interface. The connection to cloud systems via Internet or mobile communications is made either via an existing infrastructure or directly in combination with Scalance M Industrial Ethernet routers. The data read from S7 stations by Simatic CloudConnect 7 can be made available as OPC UA tags (server). This, in turn, allows standardized data exchange with, for example, MES systems, the HMI, or other manufacturers’ controllers.

> siemens.com/cloudconnect7

**Simatic CP 1545-1 communications processor**

For modern TIA installations

Simatic CP 1545-1 with CloudConnect functionality enables easy and reliable transfer of all data from Simatic S7-1500 to MindSphere or to a cloud solution that supports the standardized MQTT protocol. The communications processor has an integrated stateful packet inspection (SPI) firewall that protects the S7-1500 station from unauthorized access. The CloudConnect function of CP 1545-1 is easy to configure using a small number of input masks in TIA Portal. First, all the necessary parameters for the different cloud platforms are specified. Next, the data intended for the cloud are selected from the Simatic S7-1500 data tags and stored as topics to be transferred, with appropriate trigger conditions. The CP reduces the data volume by transferring the individual data points in different cycles or only when the value falls outside of a defined range.

Simatic CP 1545-1 can also be integrated in an IPv6 infrastructure. The CP supports connection to additional automation devices, such as HMI and so forth, in parallel with the connection to cloud applications, via Industrial Ethernet using the Simatic S7 protocol.

> siemens.com/cp1545-1

**NEW FEATURES**

- Easier IIoT data transfer to cloud-based solutions
- Trigger management for event-driven and cyclic communications
- Full integration in TIA Portal
**Ruggedcom RX1400 with CloudConnect**

The robust all-rounder

The Ruggedcom RX1400 cellular router is now available with the Siemens CloudConnect IIoT gateway solution for data acquisition, filtering, conversion, and communication with cloud-based applications, including those hosted on MindSphere, the cloud-based, open IoT operating system. When using Ruggedcom RX1400 with CloudConnect, it is now possible to easily and reliably pull data from Modbus TCP- and S7-based devices and to preprocess them prior to transfer to MindSphere or any cloud solution that supports the industry-standard MQTT protocol. The router’s multifunctional capability allows end devices to connect via wireless LAN, serial, copper Ethernet or fiber Ethernet connections. The connection to the cloud can be set up with redundant paths, either via LTE or copper/fiber Ethernet, and users benefit from the high bandwidth connectivity to remote locations. Proven reliability and the ability to function in extreme temperatures from –40°C to +85°C and in harsh environments make Ruggedcom RX1400 with CloudConnect an ideal choice for IIoT data acquisition in industrial applications such as electrical power, transportation, and oil and gas.

**HIGHLIGHTS**
- Plug & play router for IIoT data transfer to cloud-based solutions
- Trigger management for event-driven and cyclic communication
- High bandwidth connectivity to remote locations

**Scalance SC-600**

Effective protection for plant networks

The Scalance SC-600 Industrial Security Appliances have been extended with new functions to allow users to implement special security concepts. They provide effective protection for machine and plant networks at the field and aggregation levels. The bridge firewall function makes it possible to implement protective firewall mechanisms even in flat networks. For example, users have direct and local access to automation components in Profinet cells without sacrificing protection against unauthorized access. The support for the Media Redundancy Protocol (MRP) enables the integration of Scalance SC-600 in the Profinet ring redundancy – as an MRP client without an additional managed Industrial Ethernet switch. If there is a ring interruption, all network components in the ring switch to the redundant path within 200 ms, thus preventing production standstill in the event of a fault. In addition to supporting MRP, the security components also support Virtual Router Redundancy Protocol (VRRPv3) for Layer 3 redundancy.

**HIGHLIGHTS**
- Bridge firewall for protecting flat networks and implementing service bridge applications
- Support of the MRP, HRP, and VRRPv3 function for implementing redundancy applications
- User-specific firewall for implementing individual protective measures

The new, user-friendly function of user-specific firewalls enables the configuration of firewall rules for individual accesses.

⇒ siemens.com/rx1400

⇒ siemens.com/scalance-s
Scalance XF-200BA, XC-200EEC, XP-200EEC

Robust switches for the process industry

The Scalance XF-200BA, XC-200EEC, and XP-200EEC Industrial Ethernet switches are designed for the process industry. They have special hardware characteristics and new firmware functions to allow for flexible, reliable, and high-performance networking of devices. The switches have coated printed circuit boards (conformal coating), an expanded temperature range from -40°C to +70°C, and an installation altitude of up to 4,000 m. All these features make them suitable for use in harsh environments, such as in the oil and gas or food and beverage industries. The switches are designed to be used in high-availability control concepts. The Scalance XC-200G devices have a design identical to that of Simatic S7-1500.

HIGHLIGHTS
- Managed Industrial Ethernet switches for high-performance networks
- Up to 24 electrical and 4 optical ports with a bandwidth of 1 Gbit/s
- Approval for trackside rail applications

siemens.com/xc-200

Scalance XC-200G

Gigabit switch for high bandwidths

The new Gigabit versions of the Scalance XC-200 Industrial Ethernet switches are perfect for building high-performance network infrastructures. In addition to the existing configurations (up to 24 electrical and 2 optical ports), there are now versions available with up to 24 RJ45 and 4 optical ports with a data rate of up to 1 Gbit/s. While the Scalance XC-200G devices are ideally suited for conventional automation tasks, they are primarily designed for applications involving broadband-intensive communications, such as traffic infrastructure applications and height monitoring in tunnels. However, they are also ideal for use in production, where they can reliably transmit video recordings directly to the MES level for precise documentation of production lots. The Gigabit versions come with Profinet and Ethernet/IP diagnostics for integration in various automation solutions. Features such as H-Sync support are available for use in high-availability control concepts. The Scalance XC-200G devices have a design identical to that of Simatic S7-1500 as well as reduced port depths, making them perfect for installation in control cabinets. Permanent monitoring of the fiber-optic segment increases the reliability of data communications and helps avoid plant downtimes.

siemens.com/xc-200

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Radio transmission in line with the current WLAN standard IEEE 802.11ac Wave 2 in demanding industrial environments: Scalance W1748 Client Modules complete the Siemens portfolio of 11ac-capable devices in the high-end range. The new generation of devices in this family fit seamlessly in the existing portfolio thanks to the time-tested Scalance W configuration interfaces. Using the 11ac standard, Scalance W1748 Client Modules enable optimal connection of wireless devices that have particularly high bandwidth requirements. Possible applications include networks with high user density or systems requiring high-performance transfer of video data. The innovative multi-user (MU) MIMO technology enables even more-efficient data throughput. It allows a Scalance W1788 Access Point to communicate simultaneously with several Scalance W1748 clients. The switch integrated in the client has two Gigabit Ethernet ports that provide a high-performance connection between devices on mobile applications, such as cranes or automated guided vehicle (AGV) systems. Even installation outside the control cabinet is not a problem thanks to the high IP65 degree of protection as well as screwed M12- and N-Connect connections. The industrial Parallel Redundancy Protocol (iPRP) iFeature developed especially for industry enables seamless redundancy via WLAN using the CLP removable data storage medium. In mobile applications, such as AGV or railway applications, redundant wireless communication ensures reliable data transfer.

HIGHLIGHTS

- Robust, X-coded M12 plugs with IP65/67 degree of protection
- FastConnect system for quick local assembly
- Integrated portfolio of FastConnect cabling products

NEW FEATURES

- High performance in line with IEEE 802.11ac Wave 2 with max. 1733 Mbit/s gross data rate
- Use in demanding environments thanks to IP65 protection class
- High-performance connection of devices via two ports with Gigabit Ethernet
- Seamless redundancy via WLAN with iPRP
- For use in mobile plant components and freely movable objects
Sinema Remote Connect V2.0

Dedicated, secured remote access

The new version 2.0 of Sinema Remote Connect, the management platform for remote networks, provides dedicated, secured remote access to machines and plants with a customizable user interface. It is a user-friendly means of connecting to individual machines in subnets via VPN. Dedicated device access (DDA) allows user-specific access rights for dedicated devices in the subnet to be centrally stored in the role and rights management of Sinema Remote Connect Server. This makes it possible to determine exactly which user is allowed to access which IP addresses in the subnet behind the respective VPN endpoint (e.g., Scalance M-800 industrial router). This, in turn, cuts down errors resulting from access by unauthorized personnel. Each machine within the subnet can be unambiguously identified because the connections within the subnet that are released for the individual user are displayed clearly in the Sinema Remote Connect Client with dedicated IP addresses and device names. This makes the process of establishing connections to the machine even faster and more user-friendly.

The user interface of Sinema Remote Connect Server and Client has been optimized in version 2.0. New customization options, such as displaying, hiding, and moving individual columns in the client, provide a clearer view of the relevant information. The settings are stored in the user profile.

Scalance M804PB

Remote access to Profibus systems

The new Scalance M804PB industrial router allows Profibus/MPI machines, plants, and automation devices to be connected to Ethernet networks. This means that older machines and plants can also be easily and economically connected to the Sinema Remote Connect management platform for remote networks. A VPN tunnel is used for secured communication. Thanks to integrated TIA Portal Cloud Connector functionality, now users can also easily access existing Profibus systems via centrally administered engineering tools such as TIA Portal or Step 7 (version 5.6 and higher). The Scalance M804PB Profibus/MPI router has two RJ45 interfaces in the form of a Fast Ethernet two-port switch and a slot for C-Plug/Key-Plug. It supports VLAN, firewall/VPN (IPsec)/NAT, OpenVPN (as the client), and VRRP/RSTP, and can be configured via web-based management, CLI, and SNMP. Scalance M804PB has the same firmware basis, the same user interface, and comparable performance characteristics to Scalance M-800 and S615. This ensures easy handling as well as compatibility with existing systems, which in turn simplifies remote access to existing plants, for example for remote maintenance.

HIGHLIGHTS

- Connection of existing machines and plants with Profibus and MPI (Multi-Point Interface)
- Secured remote access via the Sinema Remote Connect management platform
- TIA Portal Cloud Connector connection
- Suitable for use in industries such as automotive, food and beverage, chemical, and pharmaceutical
Sinec NMS, the new Network Management System from Siemens, meets the high demands placed on communications networks in Industry 4.0. Two overarching elements – System Administration and Northbound Interface – make it the optimal solution for the requirements of industrial networks. These elements enable centralized, user-friendly monitoring, management, and configuration of 50 to 12,500 devices. Users have round-the-clock access to at-a-glance information on the current diagnostic status of the devices in the network ensuring maximum transparency on the complete architecture of the industrial network. Sinec NMS makes it easy to integrate new components in the network and to configure and maintain existing devices on a continuous basis. The policy-based configuration generates considerable time savings when configuring network devices and troubleshooting, especially in large networks with a large number of devices.

The decentralized approach of Sinec NMS makes it easy to adapt flexibly to a wide variety of plant networks. If required, it can even easily map large quantity structures with up to 12,500 devices. To this end, the system is divided into two levels: Control and Operation. Control is the central instance in Sinec NMS. This level displays a quick status overview of the entire network and allows users to manage the Operation levels. These, in turn, are distributed within the network, where they take the configuration requirements from the Control level and implement them on all devices.

As a modern Network Management System, Sinec NMS covers all five pillars of the FCAPS model defined by the International Organization for Standardization (ISO): fault management for fast and easy fault localization; configuration management to reduce the time and work involved through centralized configuration and maintenance of the whole network; accounting management for security based on network reports and reliable documentation of events; performance management for flexibility based on network optimization, transparency based on the statistics generated, and high availability based on permanent network monitoring; and security management for increased network security.

HIGHLIGHTS

- Optimal for complex network structures and high data volumes
- Policy-based configuration of the network infrastructure
- Central firmware management with topology-based rollout
- Suitable for multi-sector use in all industries

siemens.com/sinec-nms
Simatic Ident portfolio

**Industrial identification – primed for digitalization**

Siemens is continually developing the entire Simatic Ident portfolio to make it even easier for companies to implement digitalization strategies.

Digital enterprises seek to ensure full transparency by recording and processing data at strategically relevant points – industrial identification provides the necessary clarity. Which product or component is located where, and what is its status? The Simatic Ident portfolio allows companies to track this information seamlessly, making industrial identification a key technology for the digital enterprise. Siemens offers a uniquely integrated and scalable portfolio of RFID and optical identification systems for the realization of different identification solutions.

Individual product features in the Simatic Ident portfolio have been continuously improved and new, unique functions integrated in order to create a comprehensive, well-thought-out system. As part of Totally Integrated Automation (TIA), Simatic Ident contributes to the digital transformation of industry. With the components directly integrated in the TIA Portal engineering framework, configuration is done in next to no time. This ensures consistent ease of use for operators even during ongoing operation. The overall simplification of the engineering process increases plant availability and reduces downtimes.

**Simatic Ident – clearing the path to the digital future**

Simatic Ident meets the challenges of the digital world by uploading production data to the cloud. The Simatic RF600 UHF RFID system and the new Simatic series of communication modules support OPC UA as IoT (Internet of Things) interface. This enables manufacturer-independent communication in automation and a standardized connection to cloud applications via an Industrial IoT gateway, such as Ruggedcom RX1400 with CloudConnect. The new communication modules also implement HF-RFID-based digitalization solutions in industrial automation and pave the way for connecting the Simatic RF200 and RF300 systems to the cloud. The Simatic MV500 series of optical readers can also connect reliably and easily to cloud applications such as MindSphere, the cloud-based, open IoT operating system from Siemens, via the Simatic S7-1500 controller and the CP 1545-1 communications processor – opening up whole new possibilities for data usage.

**More data for greater transparency**

By sending data to cloud applications, Simatic Ident supports their analysis, which, in turn, provides for manufacturer-independent transparency of production and logistics processes. This transparency enables optimization of production processes and supply chains, resulting in increased efficiency and quality in production, logistics, asset management, and other areas across all industries.

[siemens.com/ident](https://siemens.com/ident)
Industrial processes in digital enterprises demand complete transparency. Recording and processing data at strategically relevant points is a crucial factor for long-term commercial success. Key technologies in this area are industrial identification and real-time locating systems (RTLS).

**Simatic MV550**

**A watchful eye on production and logistics**

Simatic MV550 is the second device in the new high-end Simatic MV500 series to hit the market. The new optical readers significantly outperform the predecessor Simatic MV400 series with higher computing power for accelerated read processes, increased read reliability thanks to in-depth evaluation of image information, and high-performance accessories such as E-Focus lenses and flexible-control built-in ring lights. To ensure user-friendly configuration, the devices can be configured via web-based management and integrated in TIA Portal. Commissioning is also easy with the one-button configuration for network and reading parameters. The additional Gigabit Ethernet interface can be used for diagnostics and service purposes. Thus, images that are recorded in applications with very high read rates can be forwarded to an IT server and archived. The interface can also be used for service and maintenance. Also a network separation is possible, enabling simultaneous, fault-free communication from the camera to the controller, and from the camera to the server. Moreover, the Simatic MV550 can connect reliably and easily to cloud applications, such as MindSphere, the cloud-based, open IoT operating system from Siemens, via the Simatic S7-1500 controller and the CP 1545-1 communications processor.

[siemens.com/optical-identification](siemens.com/optical-identification)

**Simatic RF610R**

**Ultra-compact UHF RFID reader**

Simatic RF610R is the second compact reader to be launched, featuring an integrated, circularly polarized antenna and impressively small dimensions of 133 x 133 x 45 mm. The reader was developed as a cost-efficient variant, with no digital inputs or outputs and no external antenna port. This allows it to be used as a direct read point within an installation, achieving read/write ranges of up to 1 m. Time-tested access to configuration, commissioning, and diagnostics tools via web-based management, in combination with an LED status display that encircles the device and shows operating statuses and error messages, make light work of commissioning, troubleshooting, and service. The proven “UHF for Industry” algorithms ensure maximum reliability during the read-write process even in difficult radio environments.

Simatic RF610R supports OPC UA Auto ID Companion Specification V1.0 – a manufacturer-independent interface for connecting to the IoT world as well as into automation. It also allows an easy and reliable standardized connection to cloud applications, such as MindSphere, via an Industrial IoT gateway.

[siemens.com/rf600](siemens.com/rf600)
**Simatic RF186CI/RF188CI**

**High-performance basis**

There are now two additional new communication modules on the market – Simatic RF186CI and RF188CI. Besides the ports for connecting two or four RFID or optical readers, both modules have an additional port for digital I/Os. The basis for this is an integrated IO-Link master, which enables connection to various IO-Link hubs. A standard sensor or actuator can also be connected. Mixed connection and operation of up to eight actuators and sensors is possible with an integrable I/O expansion module. Configuration, commissioning, and diagnostics tools can be accessed via TIA Portal as well as via web-based management. This, along with diagnostics and LED-based display simplify commissioning, troubleshooting, and service. All new communication modules allow for an increase in data throughput of up to 20% compared to their predecessor modules, depending on the application.

Simatic RF186CI/RF188CI supports OPC UA Auto ID Companion Specification V1.0, which is a manufacturer-independent interface to the IoT world as well as into automation. This makes it possible, for example, to establish a standardized and reliable connection from the Simatic RF200 and RF300 HF RFID systems to cloud applications via an Industrial IoT gateway – thereby expanding the possible uses of the data obtained from the RFID transponders.

> siemens.com/communication-modules

**Simatic RF642L**

**Suitable for direct mounting on metal surfaces**

The Simatic RF600 ultra-high-frequency (UHF) product family now includes the Simatic RF642L on-metal label. The new passive, self-adhesive smart label was designed for direct mounting on metal surfaces and achieves a read range of up to 2.8 m under these conditions. With IP68 degree of protection and temperature resistance from –20°C to +85°C, Simatic RF642L is particularly well-suited for use under demanding industrial conditions: in production, logistics, and assembly lines, for example for RFID-based asset management or for identification of load carriers, containers, and other metal equipment.

The 50 x 22.5 x 1.65 mm label is based on UHF Class 1 Gen 2 technology and comes with a large 448-bit Electronic Product Code (EPC) memory capacity, plus 2048 bits of user memory. Two frequency ranges – ETSI (865 to 868 MHz) and FCC (902 to 928 MHz) – allow the label to be used in a number of countries. Simatic RF642L is recorded with the time-tested RFID readers from the Simatic RF600 portfolio.

> siemens.com/transponder
Simatic RTLS

One infrastructure – countless possibilities

The Simatic RTLS locating platform provides locating information by wireless in real time, with accuracy measured in centimeters. This enables more transparent and dynamic production and logistics processes. Once installed, a wide variety of applications can be implemented in the company.

The Simatic RTLS4000 product family offers the right components for many applications. The stationary reference components in the Simatic RTLS infrastructure are Anchors and Gateways. An Anchor passes the data of the runtime-based distance measurement to the Gateway. The Gateway, which also has all of the characteristics of the Anchor, is the interface between the wireless network and the IT infrastructure. It bundles all recorded data and transmits them to the Locating Manager. The Locating Manager uses these transmitted distances to calculate the real-time locating information and then forwards this to a higher-level system. Both devices have innovative hybrid technology that enables locating in the range of 2.4 GHz or UWB. This allows flexible use of a single infrastructure for a wide variety of applications.

Additionally, there are transponders transmitting a radio signal to Anchors and Gateways at defined intervals. Their type and use depend on the respective application. The RTLS4030T transponder is impressively compact, making it ideal for locating even smaller items such as carriers and boxes. The best solution for forklifts and automated guided vehicle (AGV) systems is the RTLS4060T transponder, which comes with an 8-pin sensor plug for data transfer from the AGV or forklift. The RTLS4083T and RTLS4084T transponders have an e-ink display, which enables position-dependent visualization of information on pallets, workpieces, workpiece carriers, or containers. Bidirectional communications allow important data to be directed not only to the higher-level system, but also back to the transponder. A standardized interface connection to cloud applications, such as MindSphere, is also possible.

siemens.com/simatic-rtls

NEW FEATURES

• Flexible hybrid technology for a wide variety of applications
• Real-time locating with accuracy measured in centimeters for demanding industrial environments
• Adaptable integration by means of standard ISO interfaces
• Scalable for any number of different applications with a single infrastructure
Modern controls in digital enterprises

Companies that want to leverage the full benefits of digitalization will also need to integrate industrial controls into digital worlds. The completely revamped Sirius portfolio gives panel and machine builders, not to mention plant operators, the tools they need to meet the new challenges.

Not much can happen in industry without controls. With that in mind, Siemens has continued to further develop the Sirius portfolio and optimize it for the digital transformation. The products in the four clusters Sirius Control, Sirius Hybrid, Sirius Command, and Sirius Monitoring offer improved features and new, unique functions that promise to impress. Users stand to benefit from a comprehensive, well-thought-out system that is part of Totally Integrated Automation (TIA).

Completely innovated generation of devices
Electrical planning times can be greatly reduced through the use of digital twins of devices. Siemens facilitates this by providing universally available CAx data – including for Sirius Control, the largest switching and protection portfolio on the market, available in seven sizes up to 250 kW. The completely innovated generation of devices has over 50,000 tested and approved combinations for worldwide use. The scalable Sirius Hybrid portfolio offers more than just the right device for starting motors for any purpose. Particularly compact, thanks to low-wear hybrid technology, the products also feature integrated measurement functions that ensure transparency in terms of plant statuses.

Modular solutions with integration potential
Users looking to improve the availability of their plants by means of data analyses and predictive maintenance can safely rely on Sirius Monitor devices. The modular solutions can be flexibly expanded with minimal engineering and training – including integration in higher-level systems such as automation or MindSphere. In addition, they comply with international standards and all machine safety standards. Finally, the robust products in the Sirius Command cluster meet all commanding and reporting needs in a large number of industries. These products also come with communication interfaces that can be flexibly integrated without additional expense. Rounding out the Sirius portfolio is the expert knowledge available to users at any time to answer questions about digitalization and frequently changing standards in electrical engineering.

siemens.com/control-perfection
Industrial Controls

With Sirius Control, Sirius Hybrid, Sirius Monitor, and Sirius Command, Siemens offers a coordinated portfolio for industrial controls that is easy to install in the control cabinet and straightforward in its integration into distributed I/O systems.

Sirius Monitor: Sirius 3SK2 with Profinet/Sirius SIM 3SK2

Always on the safe side

NEW FEATURES

- **Sirius 3SK2 with Profinet**
  - Seamless integration of safety applications on the automation level
  - Parameterization and diagnostics from any location with Safety ES
  - Plant information on all devices, such as smartphones

- **Sirius SIM 3SK2**
  - Offline simulation of applications – find the right device
  - Creation and testing of configurations

For years, Siemens has been making it easy to implement local safety applications quickly and efficiently – with Sirius 3SK. The 3SK basic units offer maximum functionality while also saving space in the control cabinet.

The flexible, modular family of safety relays has now been expanded to include the Profinet communication interface. This helps users seamlessly integrate safety applications into their automation systems. Sirius 3SK2 makes it possible to implement safety concepts in a single device in which multiple safe shutdown paths are required. Highlights of the 3SK2 include safety functions such as protective door monitoring with tumbler mechanism or muting. The devices are easy to parameterize using drag and drop with the intuitive Sirius safety software. This opens up new possibilities without expensive wiring or programming. Profinet enables remote access to parameterization settings and extensive diagnostic functions. This considerably simplifies commissioning and diagnostics, which, in turn, helps shorten downtimes or even avoid them completely. Plant operators can quickly access the specific plant information they need on end devices such as HMIs or smartphones.

Many operators are faced with the need to find the right device for their application quickly and easily. The free Sirius SIM 3SK2 simulator gives users the chance to become familiar with the extensive range of functions in 3SK2 based on existing applications. Configurations can also be created and tested in the simulator. The ability to quickly and easily create and test configurations saves time and money during the engineering phase, since there is no need for real components, and the applications can be adjusted with great ease and in short timescales.

siemens.com/sirius-relays
Sirius Hybrid: Sirius 3RW5 soft starters

More flexibility for soft starting of motors

With the new frame size 5, Sirius 3RW55 soft starters can now soft-start motors up to 1,200 kW. There are also three new communication modules to ensure even greater flexibility when integrating the soft starters in higher-level communications networks. The devices can transmit their data via Profinet, Profibus, Modbus TCP, Modbus RTU, and Ethernet IP – for example, for integration into the world of Totally Integrated Automation (TIA).

The new Profinet High Feature communication module, with its integrated Ethernet switch, offers a special benefit in terms of media redundancy: it enables a ring topology, which allows communications to be maintained through a second port even in the event of a network interruption.

Sirius Monitor: Sirius Asset Monitor

MindSphere app for transparency

The Sirius Asset Monitor MindSphere app provides transparency for low-voltage devices in plants. The app enables round-the-clock access to the Simocode pro motor management system from anywhere in the world. Users receive detailed device status messages as well as errors and warnings. The application provides a clear view of events that led to errors, enabling long-term optimization of operation and maintenance. Sirius Asset Monitor also provides an overview of values such as power consumption, active power, and apparent power, which can be used for power monitoring.
Electrification in the digital age

Digitalization in electrical power distribution

Electrical infrastructure is a crucial factor for the smooth operation of automated production plants. Integrated in digital environments, it ensures a safe, reliable, and efficient power supply. All process steps in electrical power distribution can now be completely digitally supported.

Planning and engineering tools can be used to generate digital twins of power distribution systems, to simulate and test virtual interactions between electrification and automation components, and to plan end-to-end power distribution solutions. Thanks to the integration of communication-capable protection, switching, and measuring devices from the Sentron portfolio into TIA Portal and the Energy Suite configuration and energy data are available in the central automation environment. This simplifies the engineering process and allows the power distribution to be adapted to the operating, machine, and process workflows.

Transparent energy flows
Recording energy flows allows digital enterprises to gain important transparency – as a basis for greater energy efficiency and reliability. Sentron protection, switching, and measuring devices, installed, for example, in Sivacon S8
switchboards and Sivacon 8PS busbar trunking systems, record electrical parameters such as power, current, and voltage. This data can be displayed directly on the plant and can also be forwarded to higher-level systems using standard protocols. MindSphere integration is also possible. Large volumes of data can be processed, evaluated, and compared via the open IoT platform. Operators, switchboard manufacturers, and machine builders can develop new applications and services, for example, for predictive maintenance or to optimize energy consumption.

**Simple introduction to digitalization ...**
Digital solutions increase energy efficiency and switchboard availability, optimize operating workflows and maintenance, and simplify the entire value added process. The *Simaris control diagnostics station* installed in the Sivacon S8 switchboard allows users to generate a digital twin of the switchboard based on energy data. The Health Status function records switching cycles and short-circuit breaking events for each feeder. This information can then be used to determine switchboard statuses, detect impending faults at an early stage, and remedy errors. The visualization of sensor data reduces downtimes, while monitoring and predictive maintenance increase switchboard availability. All data are available for on-site diagnostics and control as well as for higher-level automation, energy management, and cloud-based analysis systems.

... and connection to the cloud
The digitalization solutions in the Sentron portfolio now include the 7KN *powercenter3000 IoT data platform*. This platform gathers and processes energy and plant data and serves as the central communication interface to local monitoring systems and to open IoT platforms, such as MindSphere. 7KN powercenter3000 from the Sentron portfolio makes entry into cloud-based energy management simple even for small and medium-sized enterprises. Existing power monitoring systems can be easily connected to cloud systems.

The powermanager power monitoring software is now also available with a direct cloud connection. The software displays electrical characteristics for individual devices or entire plants in a clearly presented dashboard, and it analyzes energy consumption values. These can be used directly to derive cost-cutting measures and quickly pinpoint faults.

**Efficient data transfer**
The powerline technology integrated in the Sivacon 8PS busbar trunking systems allows energy data from the measuring and switching devices installed in the tap-off unit to be forwarded directly via the conductors of the busbar trunking systems. An additional data cable is no longer needed. Existing systems can be retrofitted with powerline modules, and busbar runs can be quickly and efficiently added at any time. This enables economical and reliable data transfer to higher-level systems or IoT solutions.

[siemens.com/lowvoltage/digitalization](http://www.siemens.com/lowvoltage/digitalization)
Totally Integrated Power

Planning, configuring, and testing energy systems used to be a rather time-consuming affair. Often, all the devices and systems had to be physically set up and connected to each other in advance, and the process signals had to be wired up. This usually meant days or weeks of preparatory work before the first field tests could be carried out. The remedy: Siemens Electrical Digital Twin solutions. They connect the virtual and real worlds and provide grid operators with a central source for data modeling within the overall IT landscape of the energy company.

The new, cloud-based Siprotec DigitalTwin is the virtual digital twin of a real Siprotec 5 device, including all interfaces, functions, and algorithms. It enables comprehensive testing of the power output, safety, and availability of Siprotec 5 devices as part of the energy automation system.

These tests include the validation of the protection and automation functions of a Siprotec 5 device, the testing of the GOOSE functionality between two Siprotec 5 devices, the testing of the communication interfaces to substation automation systems (Siam PAS, Sicam SCC, Siam PQS), and fault recording and analysis.

Siprotec DigitalTwin is available around the clock from any location and enables you to reduce your costs for engineering, process data simulation and staff training. The digital twin also enables fault analysis, such as the reproduction of fault records.

siemens.com/siprotec-digitaltwin
The innovative Reyrolle 5 series of protection relays is suitable for use in high- and medium-voltage networks as well as in industrial networks. The improved hardware platform makes it even easier to operate and manage the protection relays. Reyrolle 5 offers an intuitive design with a large graphical display, tactile pushbuttons, programmable LEDs, and the user-friendly, next-generation Reydisp software. More than just user-friendly, Reyrolle 5 is also impressively efficient. The protection relay already comes standard with a wide-range power supply, configurable digital input thresholds, current and voltage transformer connections, and serial and Ethernet communication. All communications protocols are also available as standard. The small number of device variants means easier ordering, engineering, and spare parts management. Thanks to its push-in design, Reyrolle 5 can even be replaced while the switchgear is in operation. This reduces downtimes to a minimum.

siemens.com/reyrolle5

NEW FEATURES

• Small number of hardware variants and MLFB options, for easy ordering and efficient engineering
• Reliable operation with proven algorithms
• Standard integrated protection functions such as vector-jump protection and auto-reclosing
• Compliance with IEC 61850 as standard
• Cybersecurity with secure communications, digitally signed firmware, and access control

Siemens devices with conformal coating as a standard

Secure, robust, reliable

Conformal coating refers to the coating of electronic modules. This coating protects against extreme moisture, corrosive gases, and aggressive dust or any combination of these. It also provides mechanical protection against improper handling and external influences.

Even without a coating, Siprotec devices are known for their excellent availability and long lifetime. The new coating offers additional security for Siprotec devices that are used in particularly harsh environmental conditions. Such conditions include leaking H₂S gas, which is present in certain industrial environments and can attack SMD components at concentrations as low as 10 ppm, or under constant exposure to silver sulfide, which can lead to so-called silver whiskers on the surface of SMD components. These negative influences can be even further intensified by high air humidity. Conformal coating is available as standard, at no additional charge, in all new Siprotec 5 and Siprotec Compact devices.

siemens.com/conformal-coating

NEW FEATURES

• Highest lifetime and availability of Siprotec devices even under extreme environmental conditions
• Increased protection against harmful environmental influences such as corrosive gases and salts
• Additional mechanical protection against dust, abrasion, and insects
• Increased protection of modules against moisture
• Highest coating quality due to qualified production process
Industry Services

Siemens offers a comprehensive portfolio of product-, system-, and application-related services throughout the entire lifecycle of machines and plants – from planning and engineering through to modernization.

Lifecycle Management Suite

Optimizing maintenance

The Lifecycle Management Suite optimizes the planning, execution, and documentation of all service activities for plant maintenance. This improves the efficiency and transparency of maintenance processes. The Comos MRO-based, preconfigured system provides standard operating procedures (SOPs) in the form of checkpoints for lifecycle services, which are assigned to the Simatic PCS 7 system components.

Data on maintenance objects, system status, product data, lifecycle status, and service standards are bundled and available in the system. These data are used to derive the individual functions of the Lifecycle Management Suite and to provide them to users at various levels. All levels, whether maintenance managers, asset managers, or on-site service technicians, benefit from intelligent maintenance and resource planning, obsolescence management, data-based automated inspections, and reporting.

The modular portfolio enables needs-based adaptation to plant requirements. From mobilization and suite hosting through to complete maintenance service management, the Lifecycle Management Suite offers just the right solution for every service need.

The Lifecycle Management Suite is a cloud-based complete solution – instead of an upfront investment, users simply pay an annual fee.

siemens.com/lms

NEW FEATURES

- Preconfigured CMMS system with populated assets and service checkpoints
- Consistent data management thanks to integration in a single data platform
- Mobile data access on-site with maintenance information and documentation in real time
With each passing second, manufacturers generate an enormous amount of operational machine data. However, most legacy plant systems lack the compute power to process all of this accumulated data. Therefore, only a fraction of data is typically analyzed for optimizing operations. To remain competitive, manufacturers have to find a way to achieve greater data proficiency and uncover game-changing productivity insights. That’s where MindSphere enters the picture.
MindSphere is the cloud-based, open Internet of Things (IoT) operating system developed by Siemens. MindSphere successfully powers the needs of the Industrial IoT (IIoT) market with innovative technologies that combine full factory connectivity with centralized mass data aggregation and analysis. With these capabilities, operations become completely transparent and allow a wide range of decisions driven by insights from near real-time data.

Using Industrial IoT to optimize productivity
The benefits of IoT combined with MindSphere range from basic condition monitoring and predictive maintenance to a closed-loop digital twin that feeds real data into virtual models, connecting the actual performance of a product back to its digital origins. Asset management, for example, provides an inventory of physical assets and identifies, classifies, profiles, and tracks assets, making service as cost-effective as possible. Condition monitoring offers valuable insights by keeping track of key parameters, such as vibration or temperature. By identifying and reporting faults at an early stage, predictive maintenance allows scheduled maintenance based on parts reaching certain thresholds, asset availability, and resource allocation. This reduces scheduled and unscheduled downtimes. MindSphere also supports resource optimization by tracking energy consumption and material use, allowing informed decisions based on these insights. In addition, using digital twins in the digital factory facilitates product and process optimization. A complete, closed-loop digital twin is possible through MindSphere by feeding real-time, physical performance data back into the virtual product or production model. MindSphere also opens up new sales channels with new business models. Leasing machines and charging for product use is one example of this. Companies can also offer maintenance as a service to customers with the ability to remotely monitor plants, systems, and machines.

New business models with Industrial IoT
As the world’s leading bearing manufacturer, SKF is actively using MindSphere to enable new business models. For instance, SKF is offering reliable rotation as a fixed-fee service, provided on a pay-per-performance basis. This transition from transactional to outcome-based purchasing of products and technologies offers significant benefits and savings that were not previously possible for their customers. To successfully enable and support industrial champions such as SKF, Siemens has developed a three-phased approach: Connect & Monitor, Analyze & Predict, and Digitalize & Transform.

Start with operational transparency
The MindSphere Connect & Monitor package solution helps businesses connect critical assets, gain complete operational transparency, and take action to optimize performance and health, thus maximizing production efficiency and profits. The first stage of this solution involves connecting all of a company’s physical assets. This can be done through MindConnect, Siemens’ proprietary connectivity solution that seamlessly connects all of a company’s assets – Siemens and non-Siemens – to a centralized location. Assets can use any protocol or communication standard.

Once data aggregation begins, solution components – Visual Flow Creator, Visual Explorer, Condition Monitoring – begin to facilitate asset management, asset performance management and condition monitoring. The Visual Flow Creator solution transforms incoming data in real time. It aggregates and integrates data from connected assets or machines with in-line analytics services to generate information from which new insights can be gained. Workflows can be designed to create rules, define KPIs, and trigger actions, such as email notifications if a threshold value is reached. Visual Explorer creates customized, advanced data visualizations and dashboards from complex data sets using Tableau®. This solution enables all users in a company, regardless of their individual skill set, to easily access, analyze, and quickly interpret large quantities of data. Condition Monitoring enables the tracking of key operating parameters of industrial assets. It detects and alerts users to deviations from normal operating conditions so customers can maximize machine availability and increase operational transparency.

Leveraging data-driven insight
The next phase of the IIoT process is delivered by the Analyze & Predict package solution. It enables manufacturers to use integrated data sets and modern data analytics to predict and prevent unplanned asset downtime. Using data that have been collected over time, machine baselines and thresholds are identified. These thresholds are then used as guides for maintenance prediction, allowing manufacturers to eliminate scheduled and unscheduled downtime. Moreover, aided by real-time alerts to deviations, operators can perform root-cause analysis on operational assets to predict failures across products and plants – further reducing unexpected downtime.

Key solutions and capabilities in the Analyze & Predict package that support predictive analysis include Predictive
Learning, Visual Flow Creator, Visual Explorer, and MindConnect Integration. **Predictive Learning** builds models that evolve using machine learning techniques—it helps to predict future asset performance and to optimize product quality. This helps reduce to performance issues and prevent potential asset failures. **MindConnect Integration** provides full contextual analysis of critical assets by combining legacy databases, enterprise systems, and cloud data sources with data collected on the shop floor.

**Expanding your strategic footprint**

The third package solution, **Digitalize & Transform**, enables manufacturers to develop powerful, targeted applications that can be used internally and sold to customers. The MindAccess DevOps Plan provides open standards, a robust set of application programming interfaces (APIs), a broad and deep range of cloud services, an unlimited number of routes, test assets, and user management scenarios, developer resources, and managed backing services.

With these developer tools, users can create a closed-loop digital twin that allows them to integrate operational data throughout the value chain. Performance data collected with MindSphere provide detailed insights into real-world manufacturing processes. By feeding these data back into high-fidelity digital twin models, companies create a digital thread that runs throughout their production. This helps to speed up development, optimize manufacturing processes, and improve new product versions or iterations.

> siemens.com/mindsphere

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**Rapid App Development with Mendix**

Speed up MindSphere application development with the Mendix low-code platform. Mendix enables rapid app development with its visual-based modeling environment that brings business and IT together throughout the entire app lifecycle from ideation, deployment and operation. Developers can quickly leverage a comprehensive set of MindSphere APIs, facilitating app development that can be up to 10 times faster and utilize up to 70% less resources than traditional code-based development approaches.

**Partnering with global infrastructure providers**

MindSphere partners with secure cloud infrastructure providers: Amazon Web Services (AWS), Microsoft Azure, and Alibaba Cloud. Through these collaborations, MindSphere has the level of stability, scalability, and resiliency needed to serve as a central piece of the Siemens digitalization portfolio. Customers worldwide gain greater flexibility and choice to develop and implement a tailored Internet of Things solution.

**Discover online training**

Learn at your own pace from your preferred location, 24/7 with the MindSphere Academy. The Basic Online Training Membership provides access to all available web-based courses that are geared to getting you started with MindSphere. The training covers the setup of MindSphere for the duration of one year, the best connectivity solutions, and the basics of application development based on Cloud Foundry.
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.

Hannover Messe 2019
Visit us at Europe’s leading trade fair for electrical automation and learn how to profit from the digital transformation – today and tomorrow.

Industrial Edge – the best of both worlds
Benefit from cloud intelligence and scalability directly in your production – easily, with high-performance, and without data leaving your production facility.

Always up to date with the TIA Newsletter
The Totally Integrated Automation (TIA) newsletter presents innovative automation systems and refers to specific TIA digitalization use cases to show the benefits that can be achieved with the Digital Enterprise.

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