Efficient remote access to machines and plants with SIMATIC

Telecontrol and teleservice solutions – modular, flexible and secure
Industrial remote access – a factor for success

Would you like to maintain your machines and plants installed across the world from a central point? Do you want to scan data from distant outstations and mobile applications for further analysis, and monitor and control plant-wide processes securely: saving time, costs and resources? Siemens has an intelligent answer to this.

Innovative solutions for widely distributed plants

Whether in factory automation, the process industry or in public infrastructure sectors: Our comprehensive spectrum of products, systems and solutions for telecontrol and teleservice provide you with secure and cost-effective remote access to your machines, plants and applications that are spread over a wide geographical area – regardless of their size.

Telecontrol

Telecontrol involves the connection of distant process stations to one or more central control systems. Various different public or private networks can be used for communication for the purposes of monitoring and control. Event-driven or cyclic exchange of process data is performed with special telecontrol protocols and enables the operating personnel to manage the overall process effectively.

Teleservice

Teleservice involves data exchange with distant technical systems (machines, plants, computers, etc.) for the purpose of error detection, diagnostics, maintenance, repair or optimization.
Part of Totally Integrated Automation

Our solutions for Industrial remote access are based on SIMATIC, the leading automation system worldwide — and are therefore a part of Totally Integrated Automation, our open system architecture for plant-wide, seamless automation. Totally Integrated Automation stands for the perfect interaction of all implemented components — and therefore creates a firm basis for constantly increasing productivity.

Plant control with telecontrol

Whether for simple monitoring and control tasks or for extensive plants in which high availability and data security are in the foreground: Our telecontrol solutions enable you to monitor and control your process stations securely and cost-effectively from a distance. We offer a wide selection of perfectly interacting system components and solutions for the control center, outstations and the network. Configurations can therefore be implemented that are perfectly tailored to your wishes and requirements. Our product range also gives you maximum investment protection — because, even during development of our products and systems, we consider their long lifetime and migration capability.

Plant maintenance with teleservice

Our teleservice solutions are the answer when the requirement is for efficient, resource-saving diagnosis of distant systems, or for planning and implementing preventative maintenance. Teleservice also reduces the engineering costs for commissioning and saves on travel time and travel costs.

Further advantages: generation of a reliable diagnosis in the event of a fault, optimization of subsystems and controllers by means of remote programming and downloading updated program modules.

Siemens Remote Services

The service concept of Siemens Remote Services provides a powerful, secure platform for remote access to machines and plants. The inclusion of “Shared experts” ensures effective support — from Siemens as well as from the internal company specialists.
Industrial plants frequently span large areas, in some cases, extending beyond national boundaries. This is when efficient telecontrol, with our innovative solutions, pays for itself: It allows outstations to be monitored and controlled from a central control point over a telecommunications network. We offer you solutions for small systems with minimal functional scope (TeleControl Basic) as well as for extensive process plants with a high degree of automation (TeleControl) – solutions that can be implemented independently and also combined.
Reduced to the essentials – TeleControl Basic for simple tasks

With TeleControl Basic, we are offering you a system that is not only ideal for simple monitoring and control tasks, but also for the transmission of process data and for remote diagnosis and remote maintenance via GPRS and the Internet. Typical application areas are maintenance, the control of process plants and optimized operation of plants to achieve energy savings. The software and control concept is as well suited to the smallest applications with few stations as to large-scale projects, e.g.:

- Plants in the water supply, water treatment or environmental sectors (e.g. irrigation systems)
- Centrally controlled building management (e.g. lighting, heating)
- Control and monitoring of traffic technology (e.g. traffic light systems, tunnel projects)
- Monitoring of energy supply systems for measuring consumption and controlling costs (e.g. district heating networks, wind power generation)
- Remote monitoring of machine control systems and automation equipment (e.g. air-conditioning systems, vending machines)

Efficient and economical

TeleControl Basic connects the control center via the TeleControl Server Basic control center software to the substations that are based on SIMATIC S7-1200, S7-200 and S7-300 controllers. Wireless GPRS technology is available as the transmission medium. A substation can communicate remotely with a control center (service center) as well as with other substations.

Small-scale applications with few outstations can therefore be implemented as well as large-scale plants comprising up to 5000 outstations. International approvals permit worldwide use.

- **GPRS with its numerous advantages**
  - The worldwide mobile telephone standard for many providers
  - Constant online connection with low-cost GPRS tariffs
  - Data can be transferred immediately
  - Station failure can be detected immediately

- **Economical**
  - Low investment costs
  - No investment necessary for the communications infrastructure, because GPRS/Internet is available worldwide

- **Easily configurable**
  - Quick and easy commissioning thanks to perfectly interacting system components
  - Easy and convenient configuring of the outstations – by several users simultaneously (multi-user capability)
  - Changes and expansions are possible during normal operation at any time
  - Convenient and reliable generation of alarms
  - Alerting of the standby personnel through multi-level escalation management
  - Interfacing to the control center software, e.g. WinCC over OPC interface

The complete solution also includes the teleservice function. This gives internationally active plant and machine manufacturers, for example, worldwide access to the S7-1200 stations.
In oil and gas pipelines, the outstations and metering stations are frequently over a thousand kilometers from the central plant or control center. A similar situation exists in the water supply and wastewater treatment sector, in power generation and distribution and in district heating supply. With our telecontrol solutions, we are offering you an innovative system for demanding monitoring and control tasks in widely spaced process plants.

**TeleControl**

**Keeping expansive plants under control**

Modular building block system with considerable advantages for plant operation

SINAUT is our telecontrol system for the extensive applications of the process industry. From SIMATIC PCS 7, SIMATIC WinCC or WinCC OA (Open Architecture) control systems or non-Siemens control systems using OPC, outstations based on SIMATIC S7-300 and S7-400 can be monitored and controlled. The outstations and substations can communicate with each other as well as with one or more control centers. SINAUT has a modular design throughout and can be used with extreme flexibility in accordance with the customer’s requirements.

**Topology: Basic types and media variants**

- **Point-to-point**
- **Multipoint**
- **Star**
- **Ring**

- **Star via dedicated line**
- **Star via wireless**
- **Dial-up network**
- **Star via Internet**

**Topology: Combinations**

- **Star + multipoint**
- **Nodes**
- **Route redundancy 1 medium**
- **Route redundancy 2 media**

- Complex network structure, example for SINAUT ST7/DNP3 communication
- Complex network structure, example for IEC 870-5-104 communication
Transmission networks to match requirements

SINAUT demonstrates its enormous versatility in the selection of the transmission network.

**Variant 1:** Communication over the classical network
- Dedicated lines (copper and fiber-optic cables)
- Private radio networks
- Analog telephone network

**Variant 2:** Communication via IP-based networks
- Ethernet radio
- Industrial Wireless LAN
- Fiber-optic cable
- Public networks and Internet by means of DSL, GPRS, EGPRS, UMTS

The security of tried-and-tested transmission protocols

The well-proven SINAUT ST7 protocol or the standardized DNP3 or IEC 60870-5 protocol can be used for transmission.

Any combination of networks in the same project

Our system enables star, line and node topologies or any combination of these to be configured. One station can be linked to the service center via two networks to permit redundant data transmission. These can be of the same or different types.

Fast and versatile data communication

Communication is event-controlled. If an event occurs, the operating personnel are informed immediately and can then intervene in the process quickly (e.g. using commands or setpoint inputs). Parallel to this, important events can be sent to a mobile phone by SMS – if required also with a direct acknowledgment to the sending station.

Maximum data security

In our telecontrol solution, comprehensive measures to prevent data falsification and loss are important components of the system. Each transmission module has a large memory for several thousand data frames. Down-times in the transmission link can then be bridged. Special IP-based networks are protected through dedicated VPN solutions.

Fully automatic time stamp

To enable subsequent and correct archiving of process data in the control system, all data frames are assigned with a time stamp at their place of origin. The entire network is synchronized automatically – including daylight saving time changes.
Using the SIMATIC PCS 7 or SIMATIC WinCC control systems, automation of centralized plants and monitoring of decentralized, distributed subsystems can be combined in a single system. In this way, machines and plants can be operated and monitored from a single control desk, and they can be configured using a single engineering system. Integration in Totally Integrated Automation also facilitates extensive savings in investment, operating and service costs.

Operator control and monitoring with SIMATIC WinCC: SINAUT ST7cc
For the data archiving which is essential in many sectors, the SINAUT ST7cc program package supplies the archive made available in WinCC with process data in accordance with the time stamp supplied by the outstations – and is also able to interface with sector-typical logging systems. The configuring tool of SINAUT ST7cc uses the same communication blocks as the underlying telecontrol system. The resulting object-based communication, from the sensors in the process through to the screen contents and databases of the control system, saves time and costs.

Interfacing to SIMATIC PCS 7 TeleControl and SIMATIC WinCC TeleControl
SIMATIC PCS 7 TeleControl and SIMATIC WinCC TeleControl use the SINAUT ST7, DNP3 or IEC 60870-5 protocols for communication with the outstations. The engineering system is based on DBA technology (Data Base Automation) and is equipped with an extensive function block library which also supports interfacing to telecontrol stations from other vendors.

... with ST7sc over OPC interface
Using the SINAUT ST7sc program package with the OPC interface, the SINAUT ST7 stations can also be linked to control systems from other vendors. ST7sc has complex buffer mechanisms which prevent a data loss even upon failure of the OPC client. All process data are delivered with a time stamp, and configuration of the OPC interface is extremely user-friendly.

... with DNP3 or IEC protocol
Telecontrol stations with DNP3 can be connected to any control systems, provided that they are equipped with a standard-compliant DNP3 master interface. Telecontrol stations based on the SIPLUS RIC (Remote Interface Control) telecontrol system can be connected to any control systems equipped with interfaces that comply with the IEC 60870-5 standard.
Our innovative engineering system builds on SIMATIC tools and supports the graphical configuration of complete communication networks. The system automatically provides the configuration engineer with all possibilities for linking in data from individual PLCs. Multiple addressing of process data is also possible – for example to several service centers or stations. Plausibility checks and address comparisons help when configuring complex networks.

Programming can be performed remotely

Both in the commissioning phase and during operation, program modifications or remote diagnostics are easy to carry out in the distant stations by remote access via the communication network – without interrupting ongoing process data communication. This saves traveling time and site maintenance visits and also creates the requirements for completely new service concepts.
Teleservice not only allows distant machines and plants to be maintained economically, the overall maintenance and servicing requirements can be established in advance, preventing plant downtime. Should a fault occur despite this preventative action, teleservice will support localization and rapid troubleshooting of the fault. Further advantages: the ability to exchange status information and, where necessary, to optimize processes.
Simply respond more quickly

Teleservice can be used to diagnose and maintain systems over the telephone lines from any point in the world. This reduces on-site service visits considerably – by up to 60%. So the associated travel costs and personal expenditure can be ignored. It is possible to respond to an incident much more quickly. These highlights demonstrate why teleservice has long been a standard tool in automation technology. Teleservice is also easy and economical to configure and use.

The new trend: teleservice over the Internet

If the teleservice function requires enhanced availability of the remote connection or if the data volumes to be transmitted require a higher bandwidth, with the appropriate components, IP-based networks can be used. The use of these networks, however, requires the implementation of enhanced security measures (firewall, VPN). This is because company-internal Intranet connections cannot be used exclusively. Connections via DSL, GPRS, EGPRS or UMTS must also be used. In comparison with less expensive applications, such as GPRS, UMTS has a much larger bandwidth – which allows mass data or pictures to be transmitted. It also enables several data terminals to be accessed and addressed in parallel.

Siemens offers a complete product spectrum for your secure teleservice solution over the Internet.

SIMATIC TeleService: perfectly matched components...

- TeleService adapter can be combined with different types of modem, e.g. ISDN, GSM.
- TeleService software with access data management, enabling user-friendly establishment of the connection to the automation components.

...and a wide range of function blocks

- Remote maintenance
  Dialing up a system over the telephone network to read out status information and make corrections to the user program.

- Remote link
  Data transmission over the telephone network. SIMATIC TeleService supports program-controlled connection buildup between the PG or PC and the automation system. Process data exchange between several automation systems can also be coordinated.

- Sending an SMS or e-mail from the plant
  This function can be used to send SMS messages from a plant to a mobile phone. SIMATIC TeleService can also send the text message to a provider which then forwards the message as a fax or e-mail.
Further information

More on SIMATIC NET:
www.siemens.com/simatic-net

Information and ordering platform:
www.siemens.com/automation/mall

All about remote access for industry:
www.siemens.com/industrial-remote-access

Service & Support

Whether you need a service specialist or a spare part, a product expert for advice, or just an answer to a question, contact Customer Support – the team dedicated to your success. For support with planning and designing your project: covering detailed analysis of the current situation and definition of objectives, advice on products and systems, and design of the automation solution. Online support has all the technical information you need. Our online support offers fast, effective support – round-the-clock, worldwide and in five languages. This comprehensive information system which is accessible over the Internet at any time is available at

www.siemens.com/automation/service&support

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