Success starts in the control room

SPPA-T3000 – raising performance in power plant operation
Control is the core for high-performance plant operation

Conditions in today’s power generation industry are getting tougher. Now more than ever, power generators have to rely on top plant performance, which is ultimately powered by dependable and predictable operation.

Power plant control and automation solutions can help reach those goals. More specifically, the Human Machine Interface (HMI) – the focal point for the operator’s management of the plant – is where critical advancements can be made. This is our focus: The operator-centric approach of SPPA-T3000 Cue includes an intuitive design, smooth handling, faster response to disturbances, and a reduced chance for unwanted operation. The system supports operators with the right tools, targeted cues, and guided procedures. This improves operator effectiveness and efficiency. As a result, you can increase the availability of your entire plant’s operations.

More than 3,000 system installations worldwide demonstrate how the stability of proven technology combined with continuous innovation provides the platform for improved power plant performance.
Get the most out of your plant
Comprehensive expertise for future-proof automation

We gained a great deal of experience on the design of a vast power plant fleet across the globe. And we have translated this knowledge into beneficial control system technology.

At Siemens, we have handled power plant engineering, design, and construction in-house for decades; so we are intimately familiar with all the tasks surrounding power plant automation. Having automated more than 3,000 units worldwide, over the past 50 years, with great success, we have the most extensive automation experience in the power plant market.

Plant automation – the brain of the power plant
The SPPA-T3000 design is tailored to power generation – with specific electronic technology, control algorithms, function libraries, and concepts developed on our deep plant expertise, and focused on time-proven standards. You can build on this strong foundation over the long term because our expertise flows into continuous advances. Benefit from long-term support, when and where you need it.

Resilience – ready for future requirements
Developed by power plant experts for power plant experts, the SPPA-T3000 is kept up to date throughout your power plant’s lifetime. You can always count on our control system to support the resiliency of your plant and business. Be better equipped to flexibly handle challenges and welcome opportunities – at any time.

Valuable know-how: Siemens boasts 150 years of experience in power generation.

Market-leading technology: Siemens’ equipment automates power plants worldwide.
The power plant’s output is formed by thousands of sensors and signals, motors and pumps, drives and fans. The daily responsibility of the operator is to monitor and control, readjust, and correct all of these components. Smooth periods spent working through the various required tasks can suddenly be interrupted by periods of hectic activity to counter disturbances in the plant’s operation or failures of the plant equipment.

**Less is more**
In these situations, operators need to focus on what really matters. They need less raw, unfiltered information. Information floods, unfiltered messages, alerts, or inappropriate analysis reporting simply complicate the ability to adequately respond to a plant disturbance.

The operator’s ability to function in an appropriate manner is supported by a control system which delivers the right information, in the right manner, at the right time. Clear instructions are the ideal assistance when speed and precision are required to keep the plant running.

**Efficient and effective operation thanks to a clever HMI**

Capable operators work efficiently during daily routines and keep a cool head during critical situations. It is perfect when the control technology supports them in every manner.

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Focus on what really matters
SPPA-T3000 Cue HMI highlights for optimized workflows

Control the plant reliably and predictively. Recognize discrepancies early. And manage disturbances. With SPPA-T3000 Cue, operators can increase plant availability and reduce the risk of unplanned downtimes.

Efficiency in daily operation
Analyses, diagnoses, shift handovers, logs and report documentation – the right HMI makes it fast and easy to handle all of this. SPPA-T3000 Cue features an ergonomic design and offers sophisticated support.

• Information at the touch of a button – for fewer clicks
• Intuitive, icon-based navigation and customizable user interfaces – for self-explanatory operation
• Intelligent help functions – to answer questions quickly
• One-click access to important functions on integrated and third-party applications – for less information loss
• Accurate real-time data and reliable component and process forecasts – for greater availability and easier maintenance planning
• Integrated operations management – for smooth and reliable shift planning and handover

Effective support in the event of an alarm
Daily routines are sometimes interrupted by unavoidable incidents. Pumps fail or motors stop. Even if safety mechanisms ensure that personnel, machines, and the environment are safe, operators have to react quickly and prudently to keep the unit up and running. SPPA-T3000 Cue provides the right cues and decision-making support:

• Enclosed: Alarms and warnings are accompanied by detailed information and guidance for rapid resolution.
• Comprehensive help: In the event of an alarm, the operator is guided through root cause analyses, gains one-click access to relevant data, such as automatic first-value searching, and gets precise handling instructions to be able to act, and react, quickly.
• Message flood under control: The inventive alarm handling simplifies operation in the event of a fault.
3 Key Performance Indicators (KPI) are customizable in order to provide optimum support to operators and may include production data, output, emissions values, trend reports on pressures and temperatures, and other values where needed.

3 Alarm Counts provide transparency about the plant’s situation and allow for quick and targeted reaction. Each alarm class is shown with the numbers of raising, unacknowledged, and pending alarms; double clicking opens the alarm class-specific ASD.

3 Special alarm classes provide targeted cues. “Trip Warning” makes it possible to avoid a plant failure by clear guided procedures for predefined scenarios. “Diagnostic Recommended” (DR) is available as an option and reports subtle changes before DCS limit values are reached.

3 Group Alarm Indicators reduce reaction time in critical situations: When an alarm is shown in a Plant Display, it will be indicated in the Group Alarm Indicator. By clicking the alarm class of the Group Alarm Indicators, the operator has direct access to the corresponding Plant Display.

5 Wake-up Alarms

4 Scroll-down Side bar

6 Buttons to integrated and third-party applications
Cues and tools for smooth operation

When supported electronically, the shift handover can be performed very efficiently. SPPA-T3000 Cue guides operators through all the relevant information, including important generation parameters and events during the last shift, the current task status, and general data regarding plant operation. This approach ensures that no information is lost and that the handover is well documented.

The SPPA-T3000 HMI makes the daily operations and maintenance routine simple, facilitating preparation for component repair. One mouse click takes the user directly to the status display for the damaged equipment; at which point the operator can open the associated Faceplate, deactivate the component and quickly apply the lockout-tagout protocol. Any necessary work can then be easily confirmed with the integrated shift logging, and the appropriate time stamp.

This exemplary message might appear at any time: Warning – the level in the lube oil tank for a feedwater pump has fallen to "minimum". At the click of a mouse, the operator can access information about the disturbance. The status display reveals: The feedwater pumps are intact, but the disturbance relates to the oil level. A quick check shows a fault in the inlet valve. Problem solved? With just a click, operators can make an entry in the integrated shift log. A convenient way to deal with smaller interruptions.
In the example, a feedwater pump is now threatening to fail, which could result in a plant shutdown. The response time is limited. The alarm class “Trip Warning” of SPPA-T3000 Cue crucially channels the operators’ attention and their scope of action. It triggers visual and acoustic alarms. The operator can quickly request context-relevant information on predefined scenarios containing specific details of the cause and precise guidance about what to do. Consequently, they can take fast action to avert a trip.

“Trip Warning” with guided procedures

Next in the example scenario: Alarm! The oil level has decreased again – now below “minimum”. Just one click and the system status display shows the protection-off function of the lube oil pump for feed-water pump #1. The indication: The feedwater is still running, but the lube oil pump is expected to fail shortly. The loss of a main unit is critical. Normally, the operator would now reach for the telephone and send service an alarm message.

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“Diagnostic Recommended” (DR) – attention is advised. This alarm class detects the status of components by using model-based condition monitoring. The alarm reports unexpected deviations before limit values are reached. With one click, the “DR” simplifies root-cause analysis by showing plain text messages and opening all relevant displays. This integrated condition monitoring makes a substantial contribution to increased availability.

Preventive condition monitoring
Connect your systems seamlessly
Flexible connectivity for integrated operations

A control system that is easy to operate should be just as easy to integrate. Openness for variable communication standards is the basis for efficient control of the entire plant.

Secure communication into internal and external networks, access to third-party systems using a specially qualified terminal server, the integration of internal and external systems – SPPA-T3000 is designed for the highest demands on communication security and openness. It supports common standards in industry communication, as well as future-oriented IEC standards. Traditional control systems based on proprietary protocols can be connected to the HMI, and individual HTML or RDP applications can be accessed within the operator’s work environment. SPPA-T3000 opens up a world of communication opportunities. End-to-end data flows and central operability make your plant easier and more efficient to operate.

Secured cloud connection
To use new digital lifecycle services, it might be useful to send plant data into a cloud platform. A Data Agent collects all relevant data. The Data & Security Gateway uses a secure one-way VPN connection to route the data. Passing the Siemens owned security managed remote service access platform via the existing secure connection, the data from site then reach the chosen cloud platform and can be analyzed. Thus, you can take advantage of digital services without giving up security.

Uncompromisingly flexible: SPPA-T3000 communicates with internal and external systems via a vast variety of protocols.
Calculate for the long term
Long-term stability with a future-proof system

The objective is to reliably safeguard power plant operation for years to come. You can trust in a system that offers your plant stability.

During the life of a power plant, power producers can benefit from control system migrations and upgrades. These investments pay dividends and are readily accepted, providing the system is designed to accommodate such updates — by keeping a maximum of the existing hardware, by maintaining the engineering data, and by minimizing outage time.

**Evolving progress**
Siemens designs systems for the entire lifetime of a power plant. Upgrades, migrations and concepts for the transition to new technologies are an integral part of our system development from day one. The possibility to run different generations of control systems in parallel provides the flexibility to tailor lifecycle concepts to your requirements. Our innovations and technical advances are designed to be integrated without system interruption providing operation benefits from gradual transitions.

**Durable investment**
Longevity is a question of adaptability. SPPA-T3000 can be updated online, which means that updates and security patches can be installed and features can be added without having to shut down the plant. You are able to react flexibly, and at any time, to unexpected risks or leverage market opportunities and keep your plant’s performance at its best in the long run. It’s a system that always stays state of the art. It is a secure investment.

One HMI for everything: Vintage and recent control systems are seamlessly united under the SPPA-T3000 HMI.

Uninterruptible availability: The redundancy concept ensures full operation and control during patching and update processes.
Be prepared for unknown risks
Uncompromising cybersecurity at all times

Rely on integrated security. And count on a partner who will support you over the long term to keep your plant’s security level high.

Control technology supports you to keep your power plant running and resilient throughout its entire life. To avoid downtimes, it has to be capable of resisting external attacks while remaining adaptable to future requirements. And this is exactly what SPPA-T3000 is designed for. From the beginning, this system was designed to enable your plant to comply with all relevant security standards. Siemens can keep it up to date for you with long-term support. You can choose the level of security that meets your requirements – and we will deliver the necessary features and services.

Secure architecture and communications
The comprehensive security zone architecture of SPPA-T3000 is based on the relevant cyber security standards from NERC CIP V5 and VGB-S-175. In addition, the clearly structured DMZ*, firewalls, terminal servers, VPN* encryption, and the Data & Security Gateway secure communication within the plant and beyond. Hardening and protocol changes between the application, the automation, and the field level speak volumes for the security of SPPA-T3000.

Ever-evolving security features
Siemens is continuously developing security features for SPPA-T3000 to protect the system and power plant against attacks. For example, current developments are:

• New malware protection solution
• Centralized security patch management
• Network intrusion detection system
• Application whitelisting
• Security event monitoring
• Configuration change monitoring

Patching during operation
We are constantly refining the development of the system and its features to ensure that you have current, as well as future, risks under control and can operate your plant in the long run. Current hardware is supported on a long-term basis and provided with security patches that have been tried and tested. Deployed from a central security server, installation of patches is possible at any time during operation. This minimizes downtime costs and enables you to maintain the chosen level of security for your plant.

* DMZ = Demilitarized Zone
VPN = Virtual Private Network

Security zone architecture: SPPA-T3000 meets the most stringent security requirements.
Prescribed availability by our 24/7 service for life

Siemens’ system specialists support you – resolving your specific problems before they become serious. So your on-site personnel can keep a cool head – at any time.

Of course, problems sometimes arise at the least convenient time: for example, at night when engineering and maintenance personnel are not available. To support your on-site staff, we have Remote Expert Centers (RECs) on four continents available around the clock, 365 days a year. And with an average problem-solving time of less than 60 minutes, Siemens experts are the best in their field.

System specialists for full service
Remote Expert Centers provide direct access to qualified system specialists: project managers, developers and experienced engineers who have an in-depth knowledge of the system and the plant in question. When necessary, they can hook up to the plants – over specially secured lines – to diagnose and rectify a fault. They organize spare parts, provide engineering support, and install updates. But above all – and this service is growing in popularity – they take preventive action to reduce the likelihood that the need for traditional emergency service will arise.

Contracts for your individual needs
Regardless of how you use our services – to promote availability, as a leverage for minimizing maintenance costs, or as a task force that augments your staff when most needed – Siemens’ in-depth service is exceptional in every way.
Get the care your business deserves
Get more information
Comprehensive information concerning the control system for power generation:
www.siemens.com/sppa-t3000
E-mail: sppa-t3000.energy@siemens.com

Siemens AG
Process Industries and Drives
Automation and Engineering
Östliche Rheinbrückenstr. 50
76181 Karlsruhe
Germany
© Siemens AG 2018
Subject to change without prior notice
Article no.: PDPA-B10400-00-7600
Printed in Germany

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

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

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

Additionally, Siemens’ guidance on appropriate security measures should be taken into account. For more information about industrial security with regard to SPPA-T3000, please visit the Siemens Customer Portal. Due to the character of the information provided, the Customer Portal is exclusive to registered Siemens customers using SPPA-T3000. If you are a SPPA-T3000 user, but not registered yet, please approach your local Siemens partner or apply for registration by using the “Register” function on the Customer Portal website:
http://www.siemens.com/cp4ic

If you are also using other Siemens systems in addition to SPPA-T3000, please make sure to check this website, which includes all of the information and the procedures recommended by Siemens: http://www.siemens.com/industrialsecurity.

Siemens’ products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer’s exposure to cyber threats.

To stay informed about product updates with regard to SPPA-T3000, please refer to the above mentioned Customer Portal, with regard to other Siemens systems please subscribe to the Siemens Industrial Security RSS Feed under http://www.siemens.com/industrialsecurity.

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