

Symphony Plus

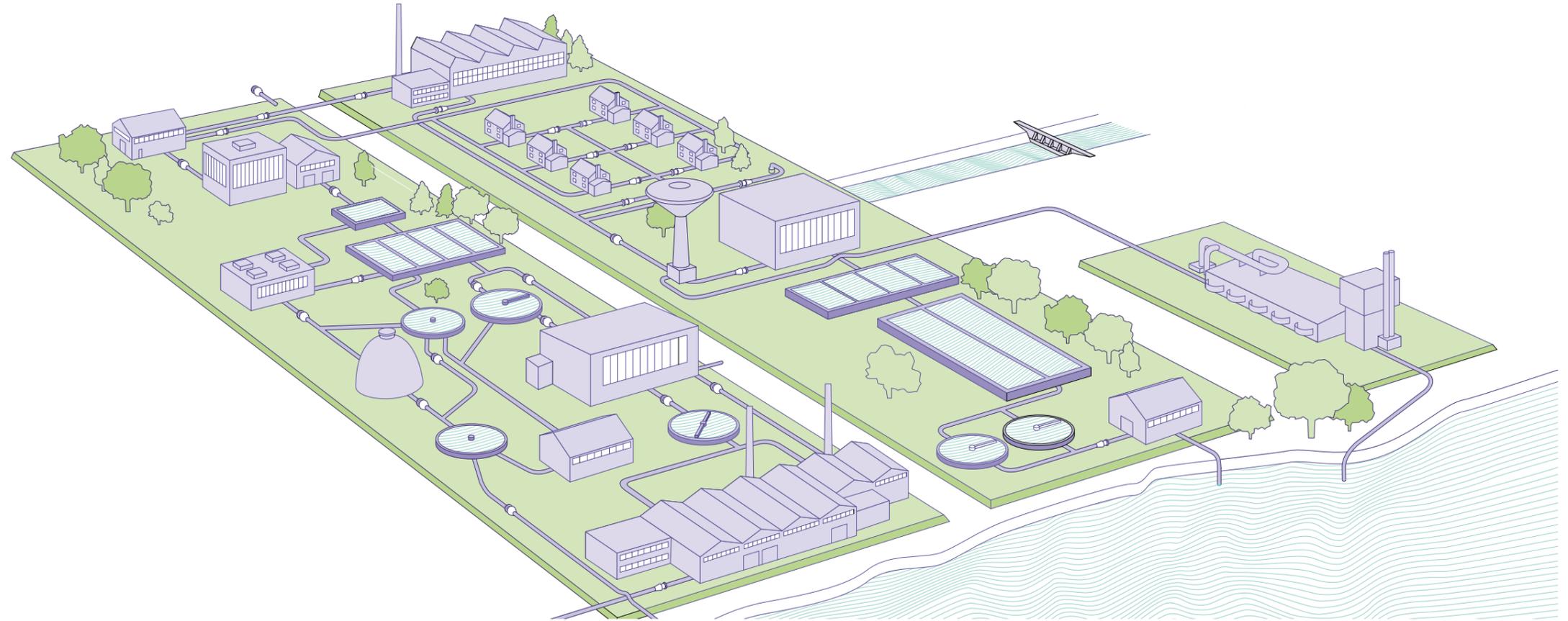
The total automation solution for
water and wastewater

Power and productivity
for a better world™



The total automation solution for water and wastewater

Population growth, rapid urbanization and increases in industrial production, all demand for more water. How can we manage this precious resource?



Clean water for everyone

As the population continues to grow, the world is facing a crisis of water resources: we need to ensure that drinking water continuously meets the needs of population growth. At the same time sewage treatment capacity needs to be improved to prevent pollution on the ecological environment.

Under the premise to provide users with high-quality drinking water and effective wastewater treatment, we also face many challenges, such as high energy consumption, changing climate conditions and restrictions of various laws and regulations. In addition to that, aging water supply facilities and systems are now unable to meet growing consumer demand.

ABB fully understands your needs. With our successful implementation of global water projects, we can help improve and upgrade your local supply, collection, treatment and distribution efficiency and protect your investment. Jointly, we can tackle the many challenges of your daily water plant and network operation.

ABB's technologies are supporting the supply and demand of water, ensuring that water can be obtained and used more efficiently while reducing environmental impact. For nearly 50 years, ABB has equipped thousands of water plants and networks, providing products, systems and services in over 100 countries worldwide.

ABB provides expertise and solutions for all activities related to the water life cycle, from water intake to water recycling.

Distribution networks

Using automation systems, instrumentation and network management solutions for real-time monitoring and control of distributed water systems, including leakage detection, asset management applications and optimization.

Industrial treatment and recycling

Providing electrical and automation products and systems, and turnkey projects with an electrical and mechanical scope for industrial water, wastewater treatment and re-use/recycling applications.

Water transmission systems and pumping stations

Providing wide range of electrical, automation and instrumentation equipment for all pump types and manufacturers. ABB's solutions result in increased energy efficiency and reliability while keeping life cycle costs low. Hydraulic simulation, leakage detection and condition monitoring applications complement ABB's vast array of in-house expertise and complete solutions offering in this domain.

Irrigation networks

Using integrated solutions, from hydrant control to network automation, to completely manage water and energy resources in agricultural applications. ABB delivers a full range of products, systems and services including network control solutions using wireless control.

Municipal water and wastewater treatment

Providing a wide range of products covering electrical, automation and instrumentation equipment for municipal water and wastewater treatment and re-use/recycling applications. ABB also provides engineered systems for aforementioned product ranges including plant optimization as well as comprehensive services, ranging from energy efficiency services to life cycle support.

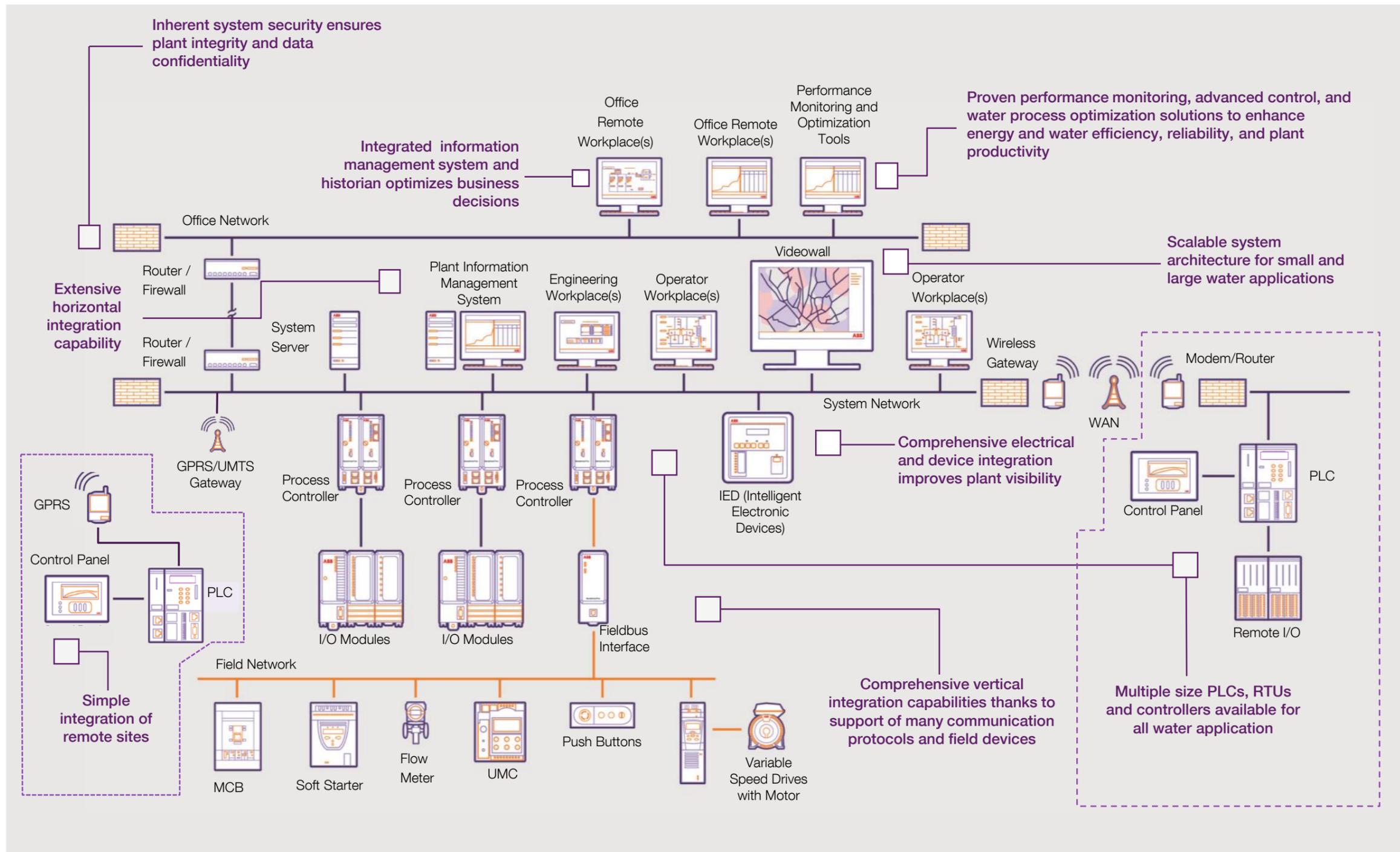
Desalination plants

Providing a wide range of products, stand alone automation and optimization systems and Integrated Instrumentation, Controls, and Electrical (ICE) solutions covering both electrical and automation for RO (Reverse Osmosis), MSF (Multi-Stage Flash) and MED (Multiple-Effect-Distillation) plants, and engineered systems.

To better meet the global demand of water, ABB introduces Symphony™ Plus, its total automation system for the water industry that makes every drop of water count, through the exploitation of solutions to manage the water cycle and finding ways for increasing performance of desalination and treatment plants as well as distribution and transfer networks. Our total automation platform improves productivity and energy efficiency as well as enhances operational security, safety and lowers the cost of ownership.

Symphony Plus's proven system architecture has been specifically designed to match the more distributed automation required for water applications, in some cases being characterized by a much larger number of smaller, modular units thus providing plant and network operators with an essential tool for achieving sustainable and profitable growth.

Defining great performance: Symphony Plus



No other automation platform has such a long field record and large installed base in water and power applications as Symphony. For more than 30 years, ABB has evolved the Symphony family, ensuring that each new generation enhances its predecessors and is backwardly compatible with them – all in accordance with ABB’s long-held policy of ‘Evolution without obsolescence’. With Symphony Plus ABB opens a new era of total plant automation that is simple, scalable, seamless and secure.

Simple

Symphony Plus is easily adapted to meet the broad spectrum of water applications such as desalination, pumping stations, water distribution and water and wastewater treatment.

Scalable

Symphony Plus unique system architecture provides flexible and scalable configurations, from the small and server-less to large, multi-site multi-server distributed SCADA architectures.

Seamless

Symphony Plus enables the seamless integration of field devices, process and PLC automation, electrical and SCADA, business and maintenance systems.

Secure

Symphony Plus provides users with a secure and reliable control environment with built-in security features that prevent unauthorized control system access.

Symphony Plus is the new generation of ABB’s widely acclaimed Symphony family of control systems – the world’s most widely used automation system in the water and power industries.

In all, there are more than 6,500 Symphony and Symphony Plus installations in operation all over the world, more than 4,500 of which are in water and power applications.

Scalable operations for both small and large water applications

Operator effectiveness is fundamental to a water utility's overall performance. With fewer operators, a generational shift in the operator workforce, and increasing complexity of water operations and networks, this is becoming ever more challenging, but not insurmountable. Symphony Plus, with its intuitive, easy-to-use human machine interface (HMI), leads operators to greater awareness, faster response, and ultimately to better decisions.

Integrated operations

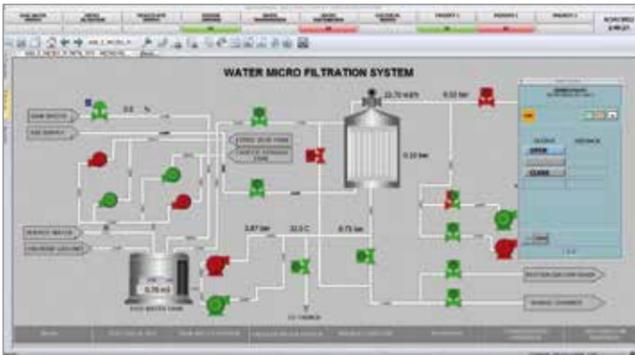
Symphony Plus's secure and powerful ergonomic HMI, S+ Operations, provides users with a broad view of the water system operation by integrating the complete water utility into one system – all plants and at all levels. The system's scalable and flexible architecture and functions allows Symphony Plus to easily adapt to a range of requirements – ranging from small applications to large, decentralized and distributed architectures with multiple control hierarchies. This allows water utilities to incorporate both a central control system and several local control systems within the same framework.

Through integration of standard communication protocols such as OPC, Modbus TCP, DNP 3.0, IEC 870-5-101/103/104, and IEC 61850, S+ Operations can easily integrate both locally and geographically distributed devices including Process Control Units, Remote Terminal Units (RTU), Programmable Logic Controllers (PLC), and Intelligent Electronic Devices (IED).

Designed for high performance

S+ Operations is a window-based, web enabled HMI providing outstanding information integration and user navigation within a standard Microsoft Windows™ environment. Based on industry standards, S+ Operations provides users with detailed, well-arranged process overview displays to present better situation awareness and recognition of abnormal conditions anywhere throughout the water facility. Context-sensitive aspect menus allow operators and engineers to share information and navigate intuitively.

S+ Operations workplace



With user-specific information presentation, easy navigation to data, and alarm management, S+ Operations delivers reliable and consistent operations.

To support monitoring and control directly on site, Symphony Plus includes a variety of touch screen or keypad graphical display based control panels.

Advanced alarm management

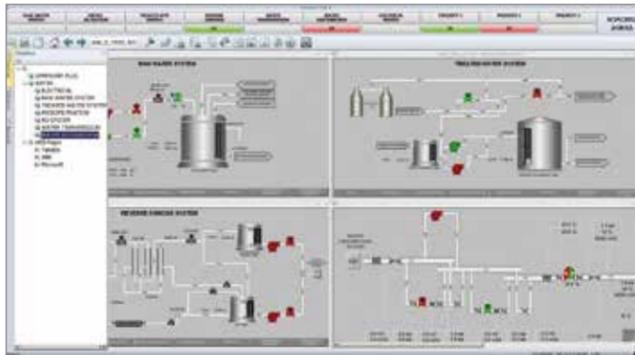
S+ Operations' advanced integrated alarm management system improves the operators' capability to detect and respond to abnormal situations, increasing their success rate in returning to a normal mode of operations and identifying the root cause of the alarm. Based on S+ Operations' integrated information management module, the EEMUA 191 and ISA SP 18.2-compliant alarm analysis and alarm management module can be used to analyze trends or abnormal situations based on process messages. The system offers an extensive array of analysis possibilities such as message filters in alarm/event list and frequency statistics for defined time ranges. This has in many cases proven to increase the awareness and understanding of control room operators to detect abnormal situations - in some cases prior to alarms even occurring.

S+ Operations supports the implementation of high performance alarm management strategies offering features such as alarm grouping, filtering, shelving, hiding and suppressing (inhibiting). Color identification of different message priorities gives the operator a clear condition-based overview. Groups are organized and viewed in hierarchical structures.

Field-proven libraries

Symphony Plus includes field-proven application libraries that provide system function specifically designed for water applications. Libraries include pre-configured AC500 logic controller faceplates and symbols for standard connection to S+ Operations and CP600 local panels.

Simple, one click navigation to water plant and network details



By using "out-of-the-box" field-tested functionalities, the time required to engineer and start up Symphony Plus water applications is greatly reduced.

Reaching new levels of information management

S+ Operations' integrated information management collects and processes information from multiple sources and locations as well as different information systems and databases throughout the entire utility. Real-time, historical and statistical data help operators and operational managers gain a better understanding of the utility's operational status and performance. This supports the operator's or manager's ability to make well-founded operational and business decisions and leads to improved process efficiency and business profitability.

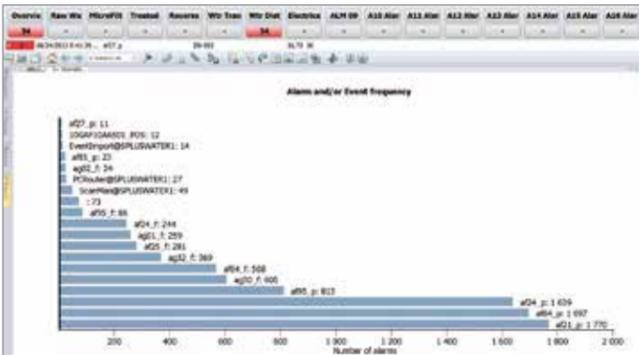
Standard report templates easily adapted to the utility's specific operational needs include:

- Instantaneous value reports
- Alarm and status messages (filtered by priority, area, etc.)
- Operator interventions reports
- Operation reports (shift, daily, monthly, year)
- Status reports (snapshots)
- Maintenance reports

Geographical information system

To meet the needs of distributed automation and improve the performance of water distribution systems, S+ Operations offers an integrated Geographical Information System (GIS) for easy, interactive exploration of spatial and process information of the entire utility's network. Customizable pre-configured GIS layers present relevant information, while seamless association with the automation system's devices and alarms allows for simple "one-click" navigation between the automation system and the GIS. With geographic and process information at your fingertips, the time required for spatial investigations is significantly reduced and the overall process supervision and control is improved.

S+ Operations Alarm Portal



The HMI's GIS is not bound to any specific GIS platform vendor and can be used stand-alone or as part of an existing GIS infrastructure. It can work with utility's own background maps such as street maps, satellite imagery, etc. and can also support background maps from popular providers such as Google Maps™ and Microsoft Bing™ Maps. The offered flexibility makes S+ Operations GIS an ideal choice for large as well as small installations with or without existing GIS infrastructures.

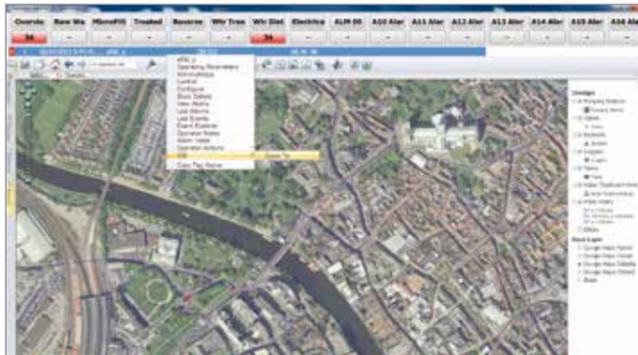
Paperless maintenance and operations management

The integration of a Computerized Maintenance Management System (CMMS), such as SAP PM, into S+ Operations allows for easy communication with and navigation to asset-specific maintenance activities. Through the operation environment, operators can easily submit or review work orders logged in the CMMS system. Additionally, S+ Operations provides alternatives to "paper" shift logs with its ShiftBook and electronic shift log options. Using these functions, shift changes are automatically noted in the operator shift log with shift ending open work actions passed on to the next shift "To Do" list (covers all shifts). All together, these features reduce maintenance costs by moving toward condition-based maintenance and streamlining operation and maintenance work interactions.

Pump efficiency monitoring and control

Continuously monitoring and optimizing the operation of pumps and pump groups in pumping stations significantly improves their global efficiency and reduces energy costs. All that is required is ABB's patented Pump Efficiency Monitoring System (PEMS) and pump group control solution, PumpFit. These expand the usual automation of variable speed pump groups to run the optimal number of pumps to reduce energy consumption while still meeting the required flow and pressure constraints.

S+ Operations seamless integration of GIS



Smart solutions to make every drop count

Reverse osmosis: OPTIMAX® membrane performance

Membrane-based technologies such as reverse osmosis (RO) are increasingly used in desalination, water and wastewater treatment applications. Improved membrane designs contribute to decreased operational costs and thus drive the use of membrane technology. In order to achieve optimal operation, membrane units have to operate at the highest efficiency point to keep productivity levels and performance at their maximum. One of the key operating problems in membrane-based systems is fouling and other types of membrane blockage. Fouling and blockage lead to a reduction in productivity and performance and potentially increases energy consumption since pumps need to operate at higher speed - where applicable - to compensate the production loss. In order to improve energy efficient operation of RO systems and to ensure maximum productivity, Symphony Plus includes an online tool that supports:

- Online performance monitoring by estimating current membrane fouling status, by predicting future membrane fouling status and by displaying the due date for next membrane chemical cleaning or flushing with product water
- Optimization of RO process operation by not only displaying the current optimal process conditions (flow and pressure set-points) but also predicting future optimal process conditions
- Simulation of the RO process by running what-if scenarios, capturing the fouling phenomena; therefore, it uses optimizer results, forming a key element to achieve optimal operation of RO systems
- Scheduling of loads across all trains.

OPTIMAX® Membrane Performance



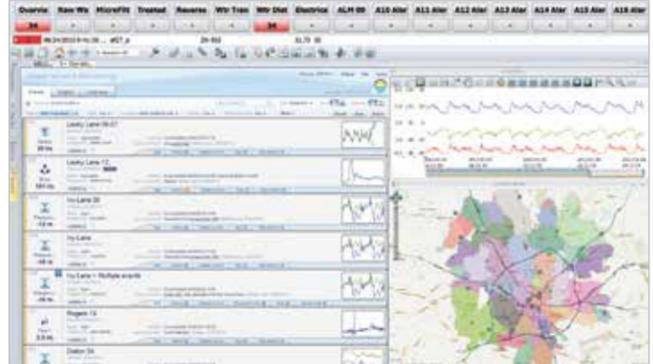
Solutions for smart water networks

Water networks worldwide are aging, their maintenance costs are increasing and achieving operational efficiency is becoming more and more difficult. To help water utilities deal with these challenges, Symphony Plus provides an integrated Water Infrastructure Monitoring System. Based on the TaKaDu Software-as-a-Service solution, the system can detect and locate in real-time water leakages, pipe bursts, zone breaches, faulty meters, equipment faults, and other faults or inefficiencies.

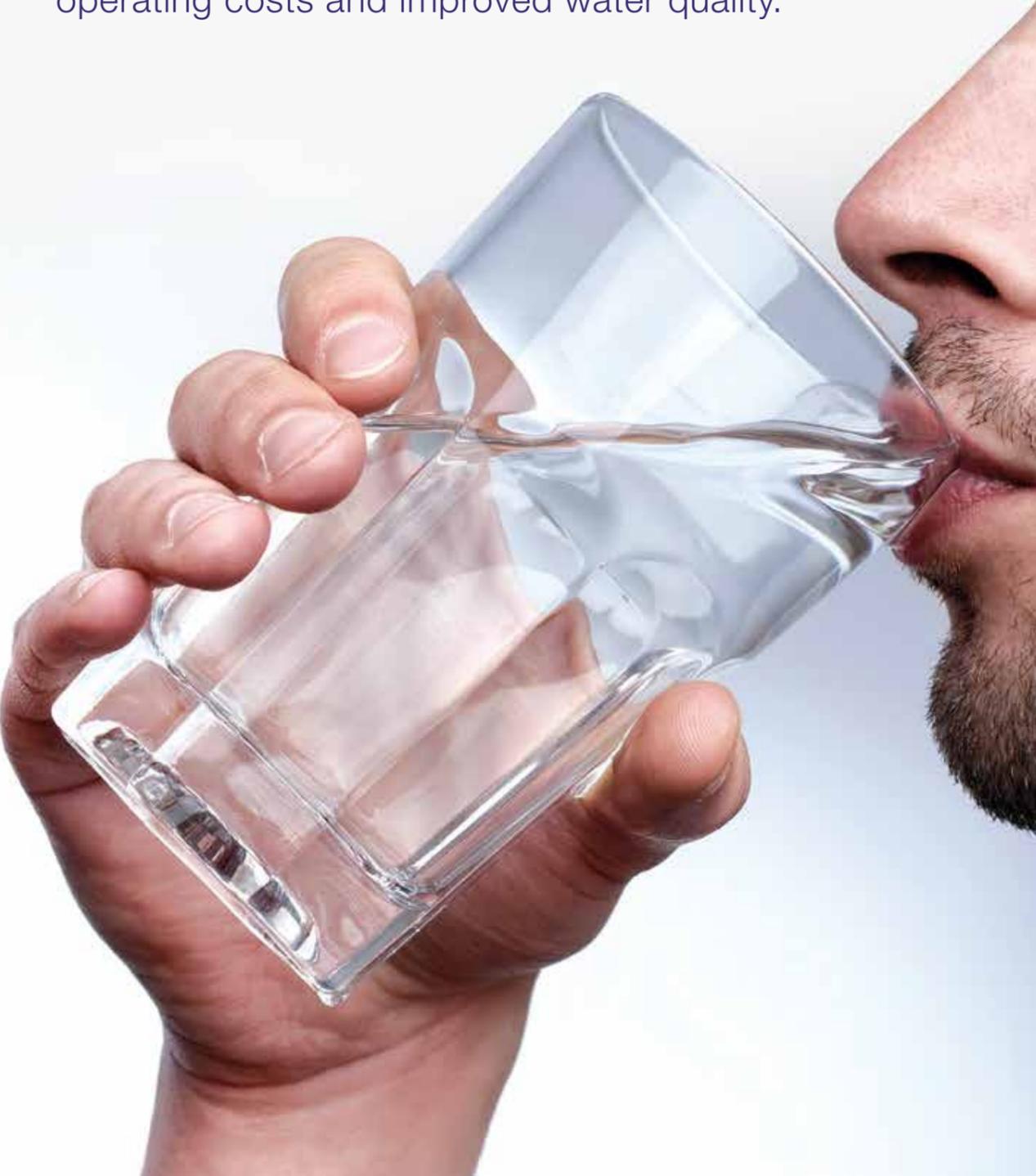
The Water Infrastructure Monitoring System leverages multiple data sources including inputs from network operations, pressure and flow sensors with other external influencers such as weather and calendar events. A sophisticated analysis of the input data is carried out in the cloud to get the necessary computing power and eliminate infrastructure investments on the customer's side. Accurate real-time alerts and online reports are securely accessed over the Internet through user friendly dashboards and provide an overview of the system's state to operators and managers.

Symphony Plus secure Internet data access interface with industry leading alarming concepts guarantee seamless compatibility and integration with TaKaDu's solution. This combination builds upon Symphony Plus information management capabilities and offers a new dimension to the understanding of the network data and operations.

Water infrastructure performance displays



Demand for water is rising at three times the rate of population growth. ABB's Symphony Plus automation solutions help provide more flexibility, reliability, and efficiency producing clean water while ABB's electrical equipment reduces energy consumption. ABB's instruments facilitate detection of leaks and minimize chemical usage, leading to reduced operating costs and improved water quality.



Control of the entire water cycle

Symphony Plus includes a comprehensive suite of standards-based control hardware and software targeting the entire water cycle. The scalable platform meets your total automation needs with a range of controller options from distributed process control to supervisory control and data acquisition (SCADA) and logic control functions. Use of PROFIBUS, Modbus, and Ethernet device networks facilitate the integration of a water plant's and network's various PLCs, IEDs, and intelligent field devices which tend to be distributed throughout the facility or network (eg, integrating remote RTU devices with Symphony Plus controllers, utility's operations, and higher level applications).

Process control

S+ Control's HPC800 controller is the system's high-performance, high-capacity process controller that is used to execute demanding process control applications that are both data and program intensive. Redundancy options are available at all levels of control, I/O, and communication, resulting in maximum flexibility and availability.

Logic control

The AC500 provides you with a powerful logic control offering with more memory than most competing products. More memory allows more functionality, more precise algorithms, more meaningful visualization, and more operating comfort – for even better individual customer solutions. For extreme conditions, the AC500-XC provides for mounting in remote harsh environments – even if installed in plain cabinets. AC500 controllers offer functions for storage or buffer of data local to the controller and integration into S+ Operations historian using different communication protocols.

HPC800 Process Controller



Flexible fast Ethernet IT and communication network

The system features a high-performance, Fast Ethernet-based IT and communication network that makes it particularly suitable for geographically distributed control applications required in water networks. Together with its scalable controller platform, Symphony Plus meets the water industry's need for the integration of a large or high number of small and modular units (eg, geographically distributed RTU applications). Communications with remote control nodes can be realized in a variety of differing ways including use of WAN, LAN, GPRS, or SMS. Through these communication options, Symphony Plus provides for the controlling, monitoring, and troubleshooting of remote applications, irrespective of where the equipment is located by simple means of secure, remote connections.

Modular packaging

Symphony Plus controllers utilize DIN-rail form factor, standard 24 VDC power inputs, and a standard Ethernet network to make installation simple and flexible. This reduces the limits on cabinet space, size or layout, and provides a broader selection of commercial power supplies and network peripherals, thus lowering both installation and maintenance costs.

Together, the HPC800 and AC500 controller options combine for a formidable solution to meet the total automation needs of the water industry.

AC500 Logic Controller



Motors and drives: choices for increased efficiency

Symphony Plus is supported by a wide range of ABB industrial motors and drives required for water industry applications. Motors and drives can drastically affect the long-term operational management of water facilities. This is especially true, considering the fact that pumping and aeration require larger amounts of electrical energy with the electrical energy being a major component of operational expenditures.

ABB is a world leading supplier of highly energy efficient motors with a full range of premium efficiency as well as super premium efficiency motors which will substantially contribute to make your operation more energy efficient.

ABB variable speed drives (VSDs) are used to control the motor speed of pumps with a typical 30 to 60 percent savings in energy consumption. The use of drives also reduces mechanical and electrical stress on pumps and aeration equipment components. Even pumps that operate at constant flow benefit from the soft-start and soft-stop functionality of a VSD, thereby placing less stress on the motor and pump.

VSDs in combination with high efficiency motors does not only make water processes in all parts of the water cycle more efficient, but also help reduce maintenance costs.

ABB industrial drive modules include everything needed for reliable and efficient pump control in water and wastewater applications.



Instrumentation: measurements reliability

Symphony Plus integrates ABB's broad portfolio of instrumentation to monitor the system, detect leaks and minimize chemical usage, reduce waste, and improve quality at every step of the water cycle. To control water, it is essential to adequately monitor all physical, chemical-physical and microbiological parameters. ABB meets these requirements with a wide range of instrumentation, including flow, pressure, level and temperature meters, recorders, controllers and on-line analyzers for parameters like pH, conductivity, turbidity, dissolved oxygen, residual chlorine, ammonia, nitrate, fluoride, phosphate, chloride and silica.

Highest precision in flow measurement is available, for example when dosing chloride or other chemicals, measuring flow rate of water and wastewater or detecting leaks in drinking water infrastructure. Flow measurement products featuring self-diagnostics and process information make it easy to control any water process, increase profits and save costs.

Innovative flow measurement products to control the entire water cycle process, increase profits and save costs.



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