Value solutions for resource No. 1 ...

... with a wide portfolio
of sensor systems.

Water

Answers for industry.

SIEMENS

Contents

Water:
The source of life

Water is a riddle. Covering no less than 70 percent of the globe's surface, it may seem like it is everywhere. Yet water – freshwater, to be precise – is a rare commodity, a very precious resource. Ensuring the supply of potable and process water required by a growing world population is one of the greatest challenges of the decades to come.

Water management

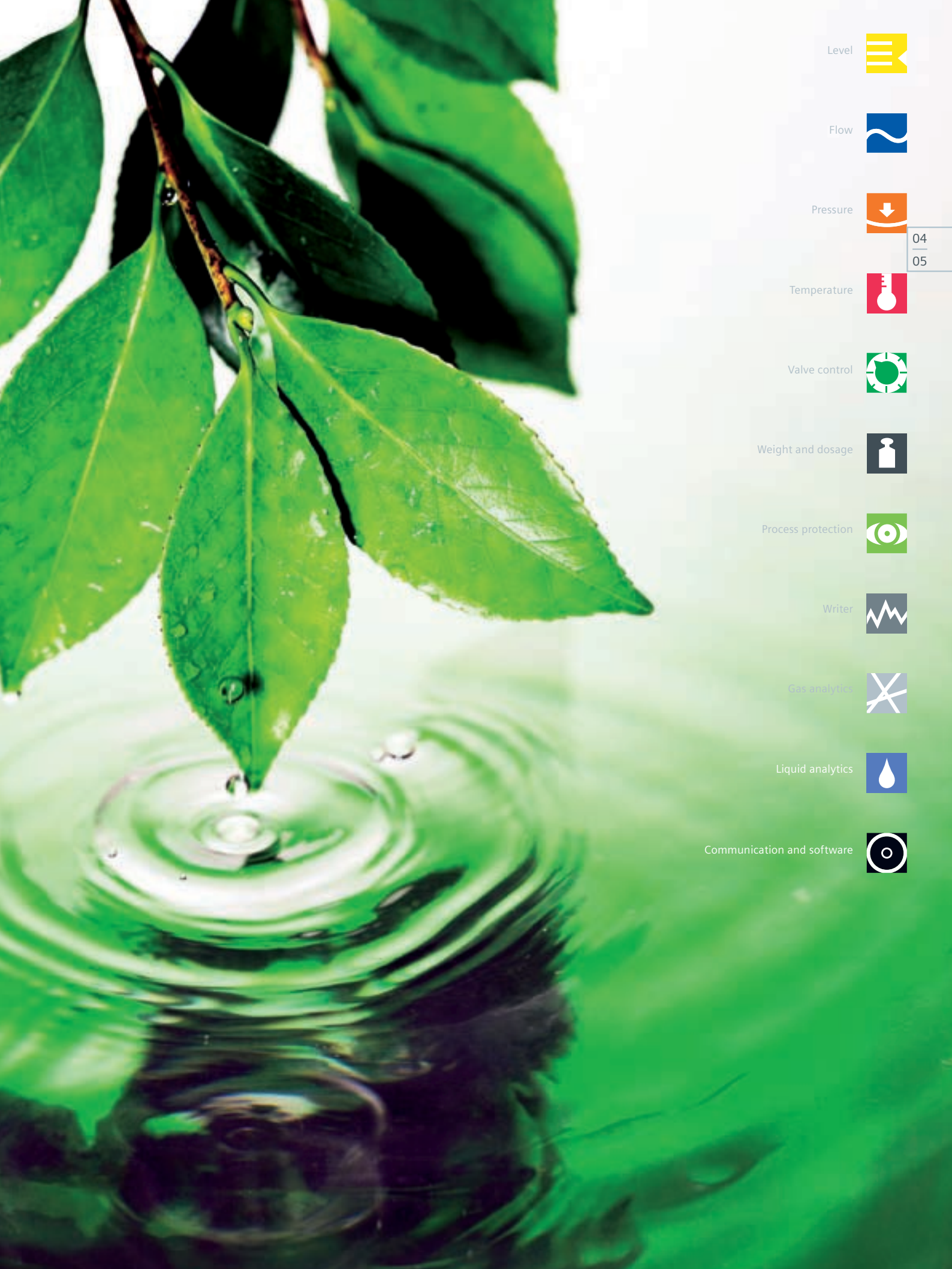
Experience and expertise make all the difference
The challenges you face in water management are as diverse as they are complex – and it takes a reliable, competent partner to get the job done. Siemens supports you with in-depth process expertise, extensive experience, and proven products, systems and solutions. Working with you, we will develop the best possible solution, both economically and environmentally. With Siemens, you have a dedicated partner at your side to help meet the challenges of global water management – today and tomorrow. Our commitment is reflected in the innovative and dependable process automation solutions for which Siemens has always been known.

Process instrumentation

The technology leader as your partner
The standards regarding the conservation and quality of water is steadily rising; regulations are becoming increasingly stringent in many countries. Our role is also to ensure your water management operations meet these requirements. Here, our single source strategy of combining process know-how with the matching instrumentation delivers the automation solution you can count on. Siemens is a world leader in level measurement and we are at the cutting edge of technology in many other areas, including instrumentation and analytics. As an industry-leading integrator, we put the best to work for you. We understand the critical measurement points throughout your processes and know which parameters are the most significant.

This applies to
- Drinking water
- Desalination
- Wastewater
- Irrigation

We invite you to find out more about our approach.



Level

Flow

Pressure

Temperature

Valve control

Weight and dosage

Process protection

Writer

Gas analytics

Liquid analytics

Communication and software

Drinking water

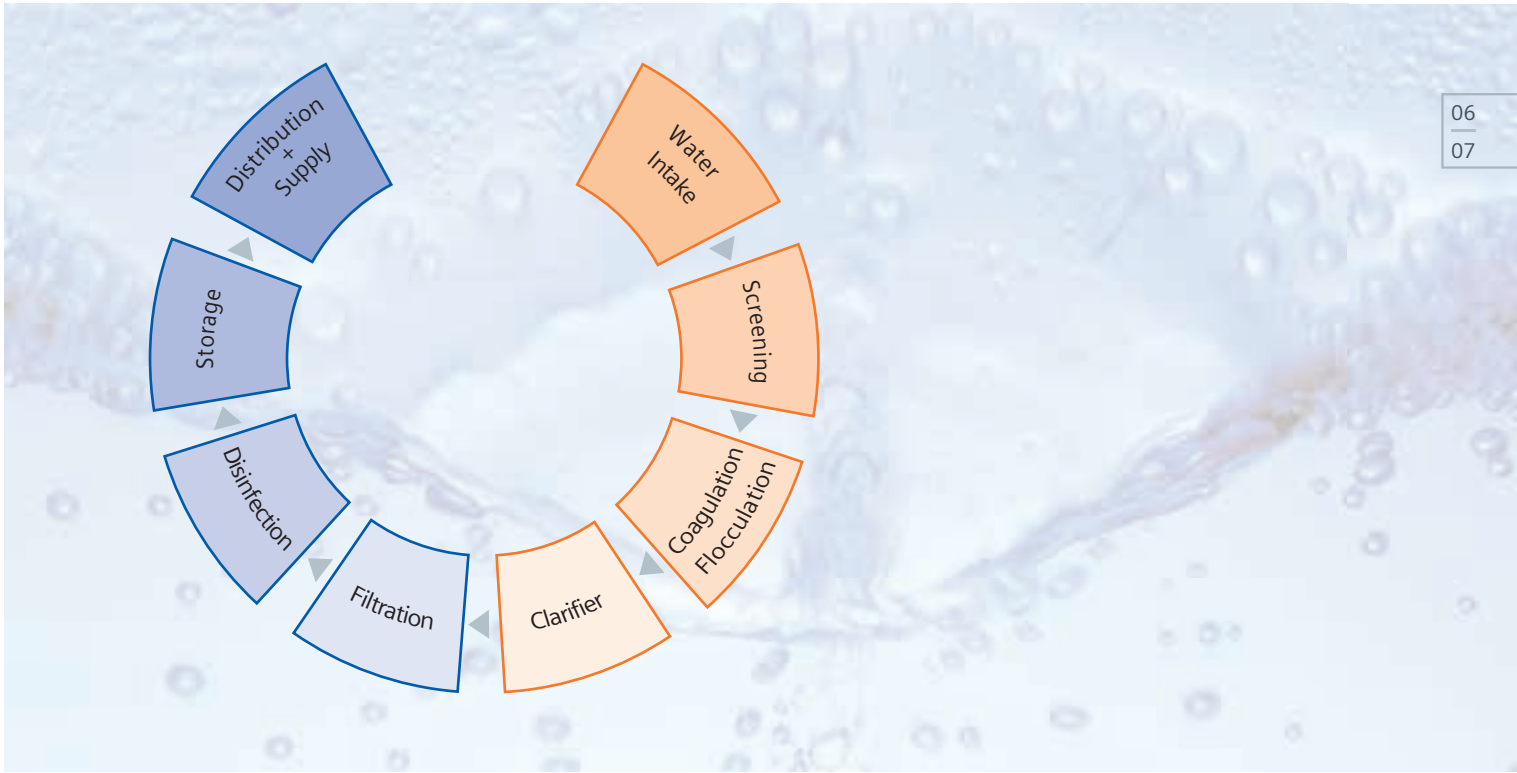
Level

Flow

Pressure

Pure water is a prerequisite for life on earth, vital to humankind and industry. The treatment methods and equipment required to meet potable and process water standards are of utmost importance, and, in countries with chronic water shortages, it's a matter of survival. We support you in satisfying regulatory requirements and achieving quality standards, as well as in keeping processes in your water treatment plants lean and efficient. Based on key measuring points throughout your process, we can identify opportunities for optimization and show you how to maximize them.

Drinking water process



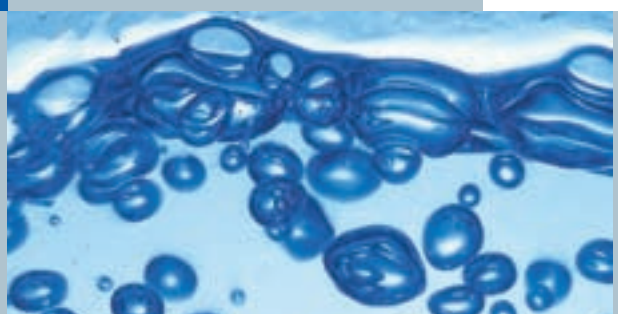
■ Water extraction and collection

65 percent of the world's drinking water is extracted from deep groundwater pockets because it is of a higher quality and purity than the water available at the surface. Surface water from rivers and lakes is categorized into three quality standards, which in turn determine the type of treatment needed. From the collection point all the way to the waterworks, flow is monitored with a SITRANS F M electromagnetic flow meter or a SITRANS F US ultrasonic flow meter.

■ Water supply

Controlled extraction using level and flow measurement at the well

Seasonal groundwater level variations have an impact on hydraulic gradient, flow and water quantity – in other words, on the quality and quantity of the water available for treatment. The combination of the SITRANS P MPS submersible pressure transmitter and the SITRANS LUC500 ultrasonic controller takes over the activation of the pump control, collects data, controls the relays and ensures remote access to all system parameters. The SITRANS F M MAG 5100W and SITRANS F M MAG 6000 electromagnetic flow meter measures flow rates and the total pumped volume for the individual well. The battery-powered SITRANS F M MAG 8000 flow meter is designed for operations without a mains power supply. Data loggers and transmission systems then save and transfer the data.



Level

Flow

Pressure

Influent flow measurement
One way to ensure smooth operations and minimize downtime is to accurately gauge the incoming water volume in the closed inlet pipe. Using the electromagnetic flow meters SITRANS F M MAG 5100W or 3100W gives you full control of the process at all times to make sure your treatment process is operating at optimum capacity with maximum uptime.

Measuring level differentials with screens
Fine screens are installed to remove solids such as sticks, sand and other debris from the raw water and help prevent damage to the treatment facility. Exact timing for cleaning the screen is key to ensuring a smooth process. Here, the Echomax ultrasonic sensors with the HydroRanger 200 ultrasonic controller monitor one measurement point up-stream of the screen and one at down-stream to take a differential measurement. This ensures the rake is only cleaned when actually necessary. The system also enables remote polling of marginal values and automatically actuates all control relays and alarms.

Coagulation/Flocculation

Level and flow metering in the flocculation tank
Removing the suspended particles in the water destined for treatment requires the addition of coagulating/flocculating agents into the process. The flocculated solids then settle at the bottom of the clarifier and are collected by rotating scrappers, which in turn convey the matter into a pipe system for evacuating the sludge. The clarified water then flows on to the next purification stage where an accurate level measurement helps optimize chemical consumption and, thus, costs. The SITRANS Probe LU ultrasonic level and volume measurement system with its Auto False-Echo Suppression functionality guarantees optimum measurement reliability. In addition, integrated Sonic Intelligence signal processing combines the latest echo processing procedures with cutting-edge microprocessor and communications technology. The SITRANS F M MAG 1100 and SITRANS F M MAG 6000 electromagnetic flow meters ensure very accurate dosing of expensive chemicals for coagulation/flocculation. Their particular advantages: outstanding resistance to aggressive chemicals and optimum performance even during low flow rates.

■ Filtration

Open filter level measurement
In the initial filtration stage, chemicals, such as iron and manganese, are extracted from the water via a fixed bed filter. When the pressure drops due to build-up on the filter, the pressure above the filter rises, and this requires a backwashing to unclog the filter. The SITRANS Probe LU instrument is a 2-wire, loop powered, ultrasonic transmitter for level, volume and flow monitoring that identifies the right timing for backwashing and initiates the process.

Closed filter differential pressure measurement
Other pollutants, such as particles or micro-organisms, are eliminated during filtration stages. Filter build-up not only impairs filtration performance, but may also lead to a filter puncture and cause pollutants to seep into the clarified water. This is where monitoring pressure differentials across the filter with the SITRANS P DS III, our digital pressure differential monitoring transmitter, optimizes the timing of filter backwashing intervals.

Backwash flow monitoring
The efficiency of the back-flush process for flushing the filter bed with clean water is determined by optimum flow volume. The SITRANS F M MAG 5100W and SITRANS F M MAG 5000 electromagnetic flow sensors combine high performance with ease of use and low maintenance. The system receives a digital input from the Process Control System, enabling it to adapt the measurement range to higher or lower throughput rates. In addition, the SENSORPROM's automatic reading of the stored data significantly assists the commissioning process.

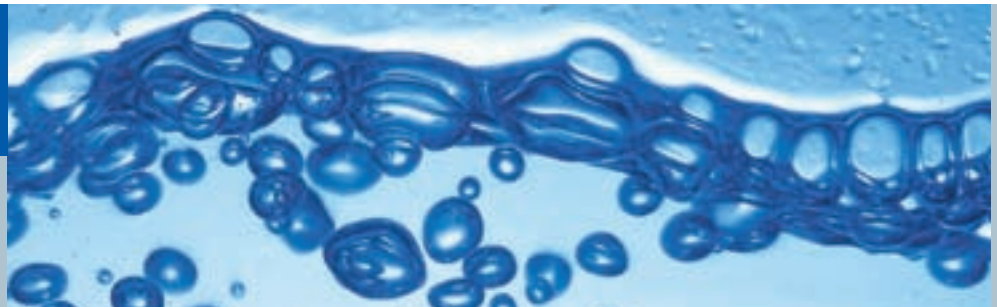
■ Disinfection

Flow monitoring for chlorine dosage
Dosing pumps continuously add a chlorine solution to prevent bacterial contamination of the drinking water. The measurement process ensures constant flow rates and shuts the system down in case of a dry run. The SITRANS F M MAG 1100 instrument's corrosion-resistant stainless steel casing makes this electromagnetic flow meter particularly suitable for dosing aggressive chemicals, such as chlorine. It also guarantees maximum accuracy even with very low flowrates.

■ Water distribution networks

Flow and pressure measurement for leakage monitoring
Intelligent pressure and volume management for water distribution zones of a particular district ensure optimum pressure at any time of day (or night) and adequate water supply in the water network. It means pipe ruptures and leakage can be immediately and accurately pinpointed. Thanks to its compact design, the battery-powered SITRANS F M MAG 8000 electromagnetic flow meter can easily be installed anywhere. It helps the network operate at optimum flow rates and alerts the operator of any leakage in the system. In addition, its battery is designed to deliver measurement performance for up to six years. The SITRANS P pressure transmitter ensures the water pressure in the pipe remains constant around the clock. The integrated, user-friendly diagnostics ensure low maintenance requirements in a continuous operation environment.

Flow measurement for billing applications
The price of water reflects its status as a precious commodity, and costs are increasing in parallel with consumption. Accurate billing of large users require specific processing of measurement data, as well as Custody Transfer certification. The SITRANS F M MAG 8000 electromagnetic flow meter meets these requirements, ensuring accurate readings and optimum data collection.



Desalination

Close to 95 percent of the planet's water contains salt and is therefore not fit for human consumption or irrigation. Desalination converts seawater into potable and process water for municipal populations, industrial users and agriculture. This type of drinking water production is already commonplace in the Middle East. In the Gulf Region, it is actually the primary source of potable and process water. One of the most commonly used technologies for desalination involves reverse osmosis.

Level

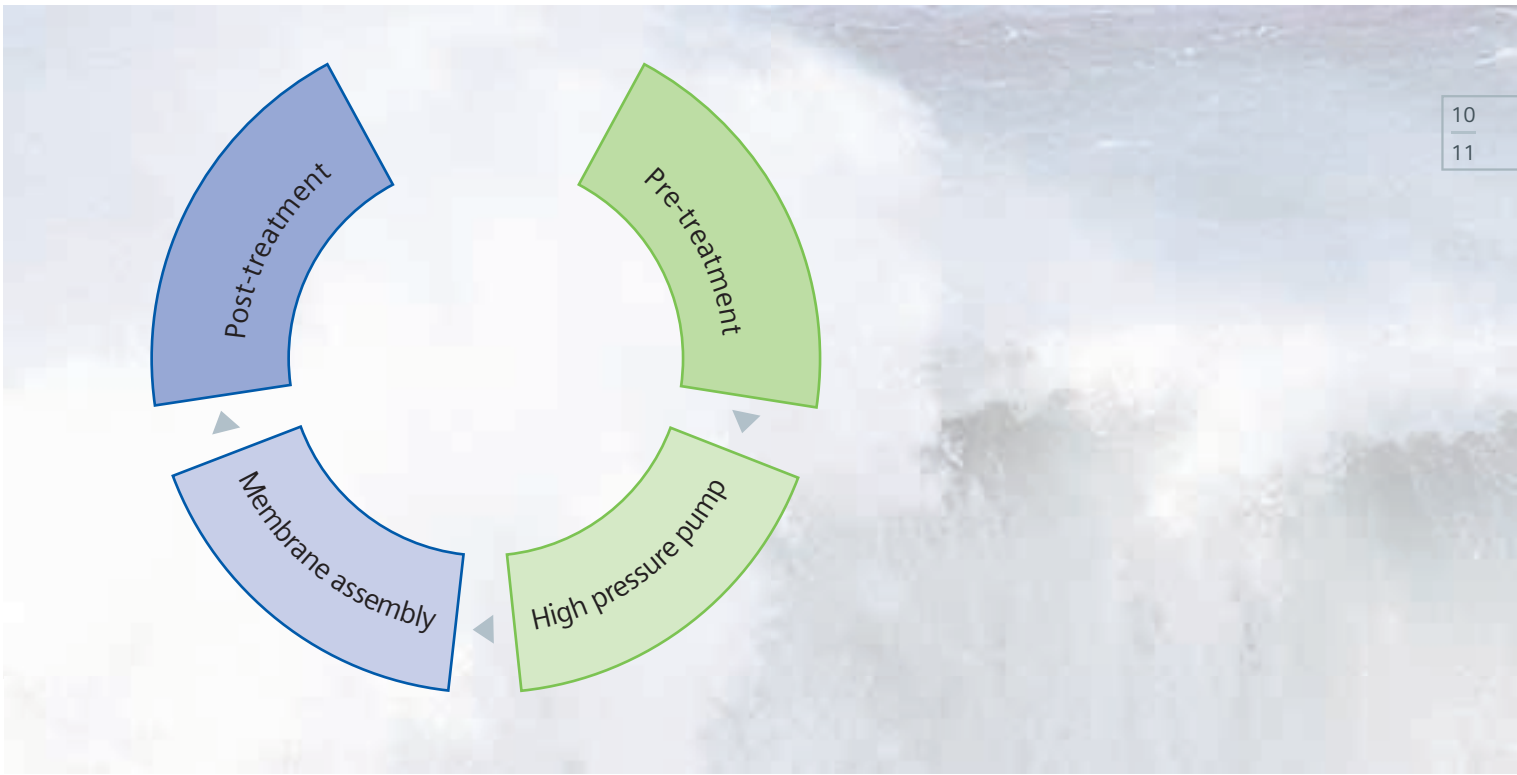
Flow

Pressure

Temperature

Valve control

Reverse osmosis process



■ Pre-treatment

Influent pressure monitoring

Close monitoring of the influent is crucial to protecting the sensitive membrane filter modules from excessive pressure. Whenever this occurs, the pressure sensor transmits a pump shut-down alarm to the operator. The SITRANS P DS III instrument, our pressure-monitoring transmitter with built-in diagnostics functions, monitors itself and sections of your facility in cyclical intervals, maximizing uptime for the entire plant. Its corrosion-resistant casing makes this transmitter particularly well suited for continuous operation in saltwater environments.

Level

Flow

Pressure

Temperature

Valve control

Temperature measurement at the inflow point
Temperature measurement at the inflow point spots any variances from specified limits to prevent any damage to the semi-permeable membranes. The SITRANS T Series offers an extensive portfolio in 2 and 4-wire loop technology, making it the preferred instrument for extreme operating conditions.

Reverse osmosis

Permeate and concentrate flow monitoring
Monitoring and controlling concentrate flow in relation to the permeate is crucial to the facility's smooth operation and optimum performance, particularly concerning permeate quality. The broad spectrum of electromagnetic flow metering solutions in the SITRANS F M Series, such as the SITRANS F M MAG 3100 or SITRANS F M MAG 5100 instruments, is specifically certified for potable water applications. In addition, the flow meters are available in a variety of finishes to make them the preferred choice for continuous saltwater operation. The SIPART PS2 electropneumatic positioner ensures optimum precision in handling the valves and actuators involved in concentrate throughput.

■ Post-treatment

Level and flow measurement for chemical dosing
Permeate post-treatment involves the continuous addition of chemicals to chlorinate and de-chlorinate the process water and adjust the pH of water with dosing lime. Level measurement takes care of storage tank monitoring, while flow metering ensures correct chemical dosing. The SITRANS Probe LU ultrasonic transmitter features a high signal-to-noise ratio and automatic false echo suppression for excellent measurement accuracy and reliability. SITRANS LVL vibratory switches and POINTEK CLS inverse frequency capacitance back-up switches prevent overfill or running dry, and are compatible with a wide range of chemicals. The SITRANS F M MAG 1100 electromagnetic flow meter is rendered in corrosion-resistant stainless steel housing, which makes it ideal for dosing chlorine and other chemicals. In addition, it ensures maximum accuracy even with very low flow rates.

Measuring level on lime bins
Lime is used in water and wastewater treatment plants to regulate the pH of the water in various stages of the treatment process. Lime is mixed with water to prepare a lime solution, and is then dosed into the process. Generally stored in powder form, it is pneumatically fed into a silo from the top and pneumatically extracted from the bottom. This can be a continuous process or done batches. For optimizing stock levels it is important to monitor the inventory of the lime in the silo. A SITRANS LR260 radar level transmitter mounted on the roof of the silo measures the level in the silo continuously, while back-up level detection devices are used to avoid overfill and running empty. Siemens offers a choice of technologies in point level detection to meet your specific needs: the inverse frequency shift capacitance Pointek CLS200, the SITRANS LVS vibratory forks, and SITRANS LPS paddle switches.

Wastewater

The bio-diversity in our waters is a visible indicator of water quality. The fact that households and industrial processes generate different types of pollution – chemical, biological and solids – only reinforces the vital role of wastewater treatment plants in recovering and recycling water. As a treatment plant operator, you are familiar with the demanding, often energy-intensive processes that water has to go through before it reaches adequate purity levels in which fish feel at home again.

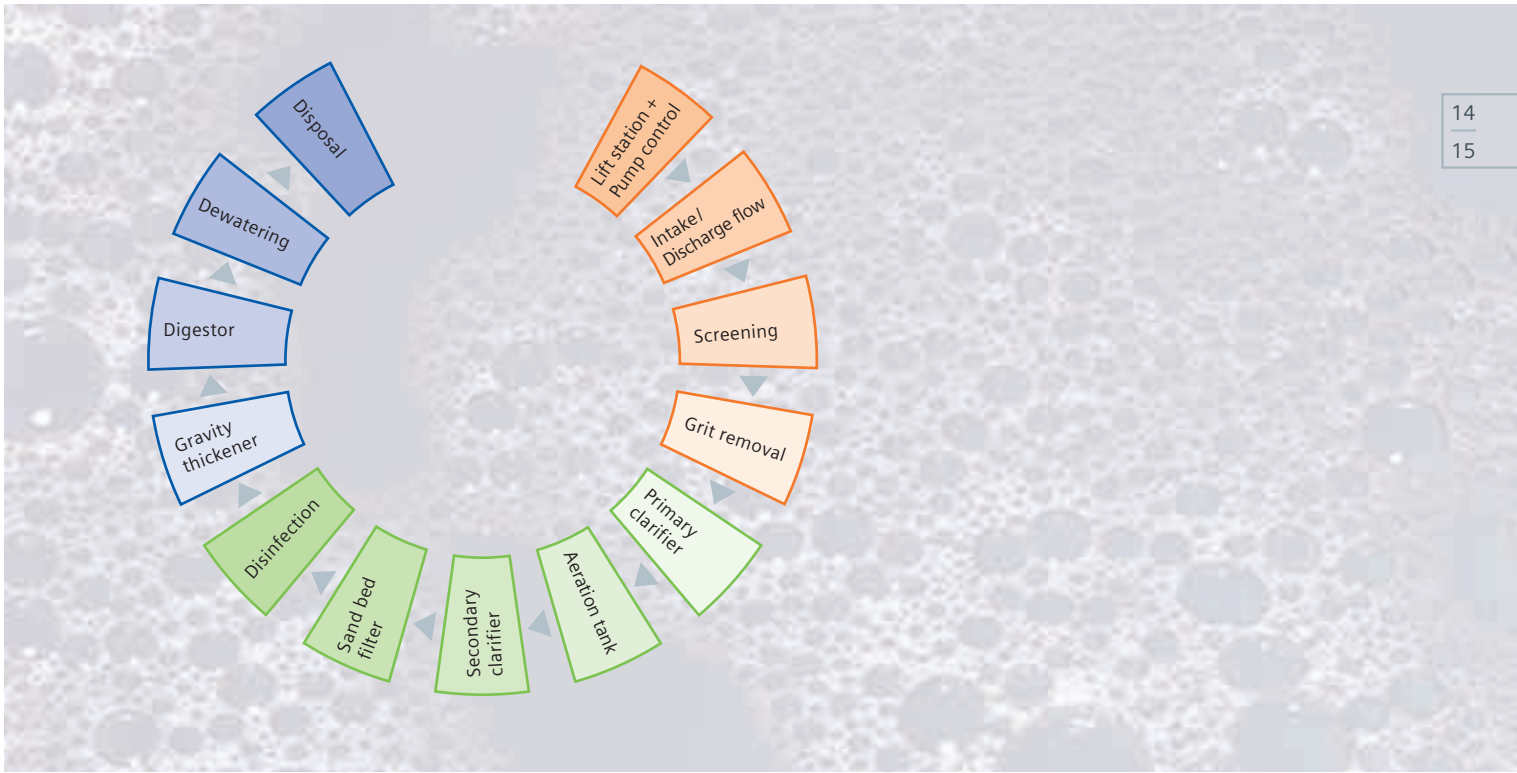
Level

Flow

Pressure

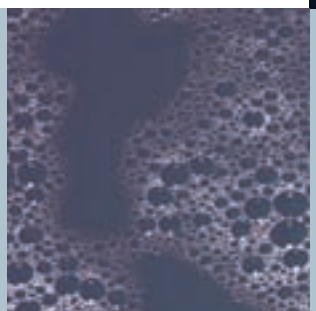
Weight and dosage

Wastewater process



■ Lift station management

Level measurement in pumping stations
Constant and continuous level monitoring is crucial for pump control and lift station management. It is also necessary to prevent flooding. The HydroRanger 200 and SITRANS LUC500 low maintenance ultrasonic controllers are specifically designed for water and wastewater monitoring. Siemens has already installed over 500,000 of these systems worldwide. These controllers have patented Sonic Intelligence and built-in advanced pump control routines to ensure reliable and long-term pump operation. They also support to the remote telemetry to transmit station data ro remote SCADA system.



Level

Flow

Pressure

Weight and dosage

Plant influent

Open channel flow monitoring
By measuring the water level in the influent channel, influent volume can then be virtually determined for almost any weirs or flumes using our ultrasonic transducer-based open channel flow measurement that utilizes the HydroRanger 200 and the OCM III controllers. Both of these controllers can monitor daily peak, average and total flow. The data can be transmitted over telemetry to remote SCADA for storage and analysis. OCM III can also log the data locally and obtain it remotely.

Closed pipe flow metering
Measuring the volume of the water to be treated is just as important when the inflow point is in a sealed system: it gives you full control of the process at all times to make sure your plant is operating at optimum capacity with maximum uptime. In this case, the SITRANS F M MAG 5100W or explosion-proof SITRANS F M MAG 3100 electromagnetic flow meters are the preferred choice.

Aeration

Compressed air flow monitoring during aeration
During the activation phase of the purification process, the microorganisms present in the water require oxygen to break down the organic matter in the wastewater. This is handled in the aeration tank, where blowers ensure the required amount of air is added into the water. The SITRANS P DS III digital differential pressure flow monitoring system precisely measures the required quantity of air to ensure optimum efficiency of the aeration process.

Flow metering for activated sludge recovery
Activated sludge is partially fed back into the aeration tanks to increase the effectiveness of the process. The robust SITRANS F M MAG 5100W and SITRANS F M MAG 5000 or SITRANS F M MAG 3100 electromagnetic flow meters combine durability and low maintenance requirements to cope with media that have a high solids content.

■ Sludge treatment

Level measurement in the digester tank
The quantity of digested sludge is essential to optimum processing. The presence of CO_2, CH_4 and H_2S preclude the use of ultrasonic measurement instruments because of the effects they have on the speed of sound. Foam build-up complicates the application. This is where the SITRANS LR200 radar level transmitter ensures accurate readings even under extreme conditions. The Hot Tap accessory allows you to inspect and clean the measured sample without any gas seepage into the environment.

Foam detecting in the digester tank
Our Pointek CLS200 capacitance point level sensor is highly resistant to chemical stress and ensures that the safety spraying system in the chamber is activated automatically in case of excess foaming to avoid overflow and save expensive cleaning.

■ Sludge disposal

Dry sludge weighing
Determining the optimum weight for transportation by truck prior to loading dry sludge for future processing is a key factor in process and cost optimization. A Milltronics MSI belt scale establishes the sludge loading quantity and records all relevant data in the Milltronics BW100 integrator.

Irrigation

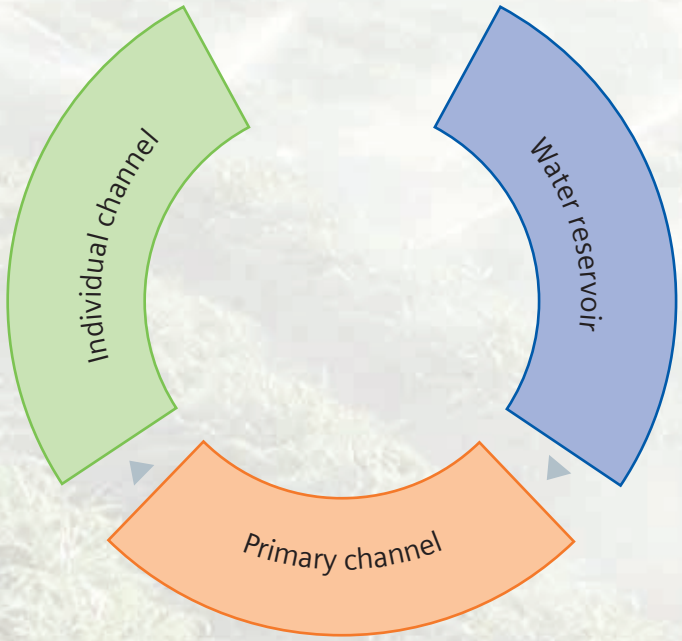
Level

Flow

Pressure

Produce needs water, and lots of it, to really thrive. Irrigation, an age-old farming technique, uses water from lakes, ponds and rivers as well as natural wells. Farmland is also irrigated with purified wastewater or collected rainwater. Because maintaining quality standards is key, the United Nations Food and Agriculture Organization (FAO) has defined a set of international guidelines. For those countries that are experiencing a steady depletion of renewable water resources, there simply is no alternative to irrigation systems. That is why it is especially important to keep a watchful eye on maintaining the ecological balance.

Irrigation



Key measurement points between the river or water reservoir, all the way to the field consist of the reservoir itself, the main piping or open channel, and the individual water supply and distribution system, including that of the final end user.

Water reservoir

Level and flow measurement at the water reservoir
Level measurement at the reservoir or in the open channel yields useful data on actual water reserves. It is also used for controlling gates and locks, maximizing water distribution efficiency. The high-precision ultrasonic level measurements are possible with the MPS hydrostatic sensor, HydroRanger 200, SITRANS LUC500 or OCM III instruments that cover virtually any possible application.

Water distribution

Flow metering for water supply and distribution
SITRANS F US SONO and SONOKIT ultrasonic flow meters perform measurements in pipe systems with diameters ranging between DN 50 – DN 4000 (2"–160"). With the correct accessories, the flow meter can be easily installed on any piping, including retrofits. This ensures easy, cost-effective maintenance and repairs. The SENSORPROM storage unit contains all the key device data, including calibration, maintenance specs and diagnostics. The SITRANS F US 380 Sonocell flow meter system also gives you the same performance in a battery-powered solution. Besides the proven portfolio of mains-powered SITRANS F M electromagnetic flow meters, we offer a battery-powered version in the SITRANS F M MAG 8000 flow meter with a battery life of more than 6 years. The especially robust casing allows for installation in the pump or installation shaft, as well as under ground.

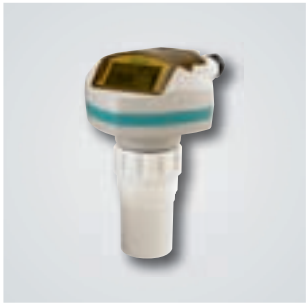
End user pressure metering
Continuous pressure monitoring with the SITRANS P DS III or SITRANS P300 transmitters also ensures consistent water pressure for the end user and protects the pumps.

Billing
The price of water reflects its status as a precious commodity, and costs are increasing in parallel with consumption. SITRANS F M MAG 8000 is widely used for billing purpose to ensure that the farmers are paying a fair price.

Made to match

The right product for any application

Siemens has worldwide experience with real-life measurements in water/ waste water. Our portfolio of products and solutions meet the special requirements of the vitally important industry.



SITRANS Probe LU

Level

Level metering and monitoring solutions from Siemens are the preferred choice in water/wastewater plants around the world. Our instruments deliver outstanding, cost-effective and continuous measurement performance for both continuous and point level measurements. Regardless of the application, we provide the optimum solution whether the technology is radar, ultrasonic, capacitance, electro-mechanical or hydrostatic pressure.

Product families: SITRANS Probe LU and LR , SITRANS LU, LV, LP and LR, SITRANS LUC500, Pointek, HydroRanger, MultiRanger, OCM III, SITRANS P MPS

MAG 8000

Flow

Our flow meters meet the toughest challenges and are available in a wide variety of chemical resistant materials. Highly accurate and reliable, they measure and monitor flow rates of liquids with varying consistencies as well as gases. Technologies include electromagnetic, ultrasonic, differential pressure, vortex or Coriolis mass.

Product families: SITRANS F M MAG, SITRANS F US SONO (SONO and SONOKIT), SITRANS F X, SITRANS F C MASS

SITRANS P300

Pressure

Siemens offers a comprehensive range of solutions for pressure measurement – relative, differential and absolute. The outstanding accuracy, robustness, ease-of-use, functionality and a comprehensive safety package make these instruments the preferred choice.

Product families: SITRANS P

Sensors

Temperature

Our measurement instrumentation delivers outstanding performance even under the toughest conditions – in hot, cold, or highly flammable environments. Our temperature transmitters for rail mounting, head mounting ore field mounting are the instruments of professionals delivering high-precision readings, maximum reliability and compatibility with various sensors.

Product families: STRANS T

SIREC DS

Process regulation, monitoring and registration

The compact design of Siemens intelligent valve positioners means they easily fit into any water management facility. Acoustic sensors reliably monitor pump function, identify even the smallest leak immediately and thus prevent process and facility failures even in dusty, grimy or humid environments. The process recorder documents and analyzes all the key measurement values, which is very important for communicating with authorities.

Product families: SIPART PS 2, SITRANS DA, SIREC D, SIPART DR

MSI

Weight and dosage

In water management, weighing systems are especially important in the area of sludge production and processing. Siemens belt scales and weighfeeders provide the optimum solution for any task.

Product families: Milltronics MSI belt scales and weigh-feeders

LDS 6

Gas analytics

Siemens gas analytics systems monitor gas composition (CH_4, H_2S) for emissions measurements at the digestion stage and during sludge incineration. This is accomplished either via extraction with infrared gas analyzers or in situ based on laser technology.

Product families: ULTRAMAT 6, LDS 6

SIMATIC PDM

Software

SIMATIC PDM (Process Device Manager) is a unified, vendor-independent software package for the operation, calibration, maintenance and diagnostics of intelligent field instrumentation based on the worldwide leading EDD standard. It can be integrated both independently of the automation system via a PC or programming devices and via the SIMATIC PCS 7 Process Control System.

Future proof and cost-effective. With standards from SIMATIC.

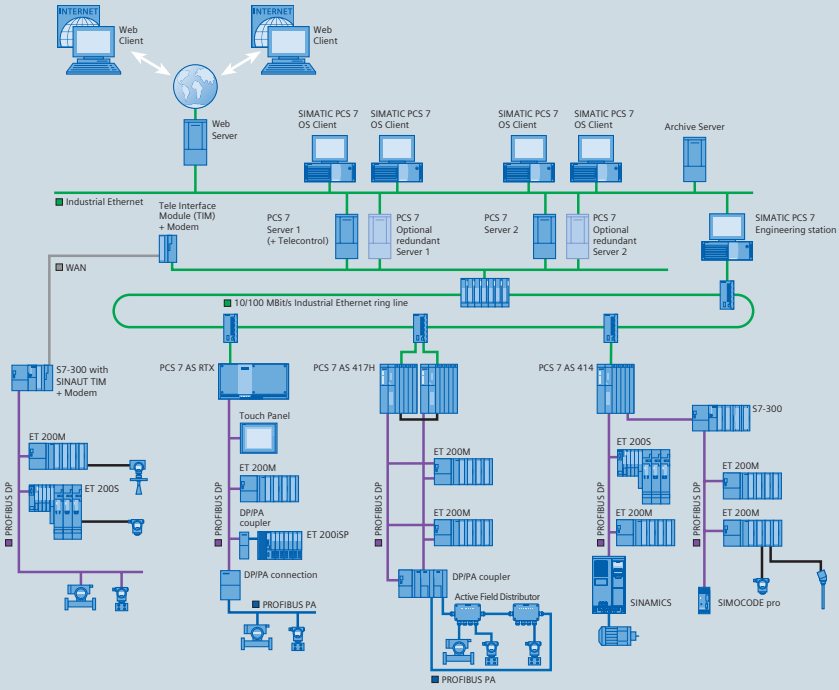
The individual plant components in the water industry are frequently wide apart – for example wells, water towers, pumping stations and storm-water tanks. Telecontrol is therefore very important, because data transfer must be carried out extremely reliably over sometimes very large distances.

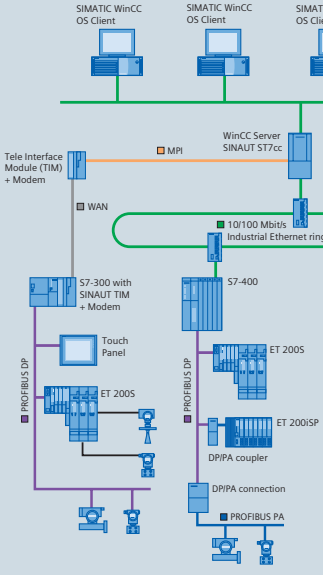
Flexible and efficient: SINAUT

SINAUT Telecontrol is based on SIMATIC, and in conjunction with the corresponding hardware and software it permits reliable and efficient networking of individual controllers and control systems over a WAN (Wide Area Network). SINAUT Telecontrol is part of Totally Integrated Automation (TIA) by Siemens and easy and fast to integrate in automation solutions. Data transmission can take place over classic networks or Internet-based networks. In order to cover different requirements, SINAUT Telecontrol comprises two independent systems: the simple SINAUT MICRO for monitoring and control in distributed plants using mobile radio communication (GPRS), and SINAUT ST7, the multi-functional telecontrol system for fully automatic monitoring and control of distributed process stations which exchange data with each other and with one or more control centers using a wide range of WAN media.

Plant automation and telecontrol together in one system: SIMATIC PCS 7 TeleControl

SIMATIC PCS 7 TeleControl is a new solution for integrating the outstations into the control system: plant automation and the monitoring of distributed process areas are joined together in one control station. The advantages: joint operator prompting, user-friendly and simple data management, and integrated engineering. The standardized GUI minimizes the risk of errors and the uniform software platform minimizes the configuration and maintenance overhead. SIMATIC PCS 7 TeleControl supports both classic and Internet-based communication links and can also be provided with a redundant design if there are increased availability demands.

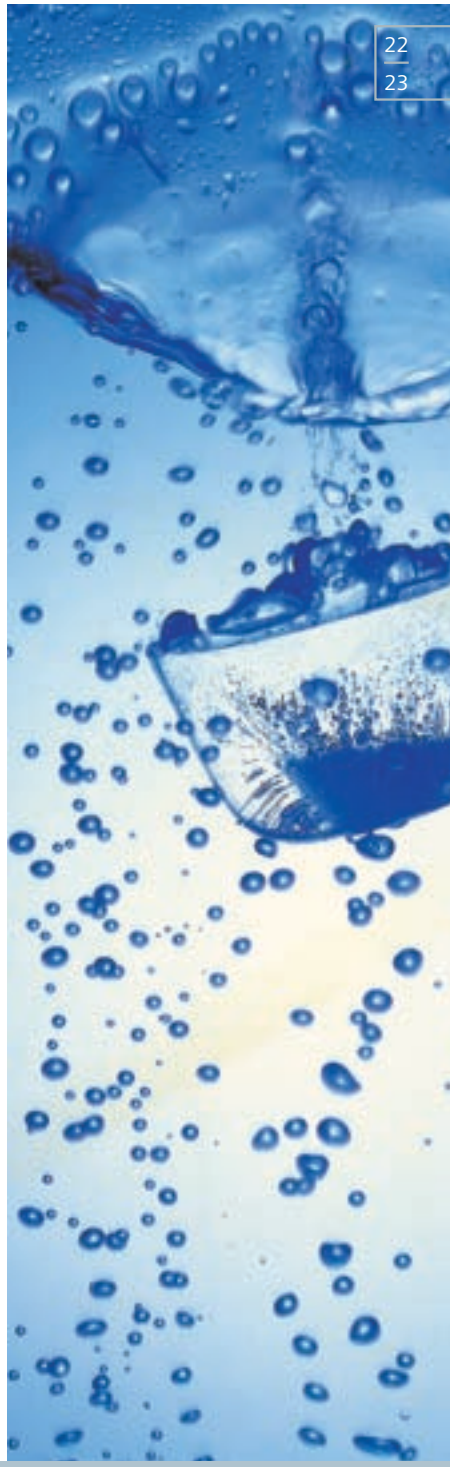




From one source

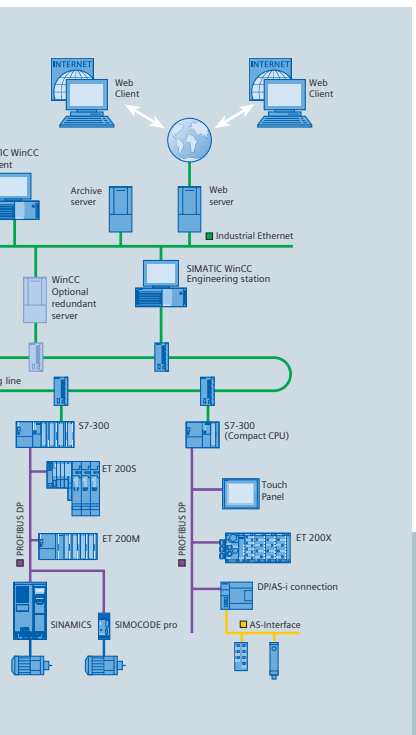
Process instrumentation and more

Is it your job to plan and maintain an entire facility, specify components, deliver and install equipment and even commission the plant? Siemens offers solutions from A to Z and for all the steps in-between – not only for process instrumentation needs, but also for the entire facility. We will ensure it all fits together and operates as expected. You get competent and professional service that covers everything from consulting to engineering and commissioning, and from installation to after-sales support.



The Siemens Team covers all bases

- Facility planning and scheduling by an experienced project management team
- Comprehensive planning/engineering at the field level – vendor-independent
- Selection and specification of process instrumentation and analysis tools by specialists
- SIPLAN C/E engineering tool for cost-aware and efficient facility planning
- Comprehensive documentation
- Installation and commissioning
- Comprehensive after sales service



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