PROCESS INSTRUMENTATION & ANALYTICS

Process Controls **for Wastewater**

usa.siemens.com/pi-water

SIEMENS

Process control for **energy-efficient operations**

Wastewater treatment process technologies continue to improve. To take advantage of their full potential, they require process measurement and control as robust and long-lasting as they are. Our cost-effective process instrumentation gives you the reliability, seamless integration and automation you need to deliver the best treatment efficiency, optimized energy consumption and safe processes, whether you are modernizing existing treatment plants or developing new ones.

Wastewater treatment plants require efficient process control to make sure that effluent is treated cost-effectively while also meeting environmental regulations. Partnering with Siemens provides the reassurance of best-in-class products, and the precision, integration and reliability in process automation to help you deliver optimum efficiency and productivity.

Our technology provides solutions to the challenges of wastewater treatment, where constant change in flow rates, rapid changes in level, chemical dosing and storage and remote locations are common place. Reliability in arduous applications is paramount, and Siemens products are designed to meet the challenge.

Higher process efficiency through

- Precise inventory and dosing of expensive chemicals
- Seamless and easy integration into various digital networks and control systems
- Better process transparency

Improved energy efficiency through

- Accurate control of energy-intensive pumping systems based on ultrasonic level monitoring technology
- Precise control of inlet, process and outlet flows to keep pumping to a minimum
- Monitoring of sludge inlet, Return Activated Sludge flow, and air flows to diffusers

Efficient asset management through

- Quick, easy installation and commissioning
- Predictive maintenance features reducing breakdown and preventative maintenance costs
- Higher availability of instrument life cycle data

Spotlight on Warsaw's Czajka wastewater treatment plant:

Integrated automation solution for a new wastewater treatment plant in Warsaw, Poland

In order to ensure that Warsaw's growth remains healthy, a new wastewater treatment plant is being built so that all of the city's wastewater can be treated. The plant is equipped entirely with Siemens automation technology. This massive construction project will not only be the largest but also the most modern wastewater treatment plant in all of Poland.

This new project will treat the wastewater of the roughly 2.1 million inhabitants and will greatly improve the water quality of the Vistula, Poland's longest river, as well as increase the quality of life for the people who live nearby.

The process automation for the whole plant is based on the SIMATIC PCS 7 process control system. A redundant architecture with highly available SIMATIC S7-400 systems and communications via PROFIBUS provides the required plant availability and offers room for functional enhancements.

In the final installation, process data will be captured by the SIMATIC PCS 7 automation system, which is networked with process instrumentation and analytic devices via PROFIBUS. More than 200 Sitrans flowmeters, more than 100 MultiRanger continuous level controllers and Pointek level switches, and numerous ULTRAMAT gas analyzers are installed in the plant. All the parameterization of these instruments was done via SIMATIC PDM (Process Device Manager) which is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components such as remote I/Os. Devices can be easily integrated into PDM by importing their EDDs (Electronic Device Descriptions). Communication is possible on HART, PROFIBUS PA / DP, Modbus, Ethernet, or FOUNDATION Fieldbus, and PCS 7 integrates the process control system's asset management. This solution from Siemens saved investment costs, training expenses and maintenance costs.

In fact, even during the plant's construction, Siemens COMOS plant engineering software was used. COMOS is a software solution for the entire plant life cycle. Siemens is the only supplier worldwide to carry out integrated plant asset management projects over the entire life cycle of an industrial plant, assimilating planning and operating environments.

Scan to watch the Czajka wastewater plant video

Solutions to **match your needs**

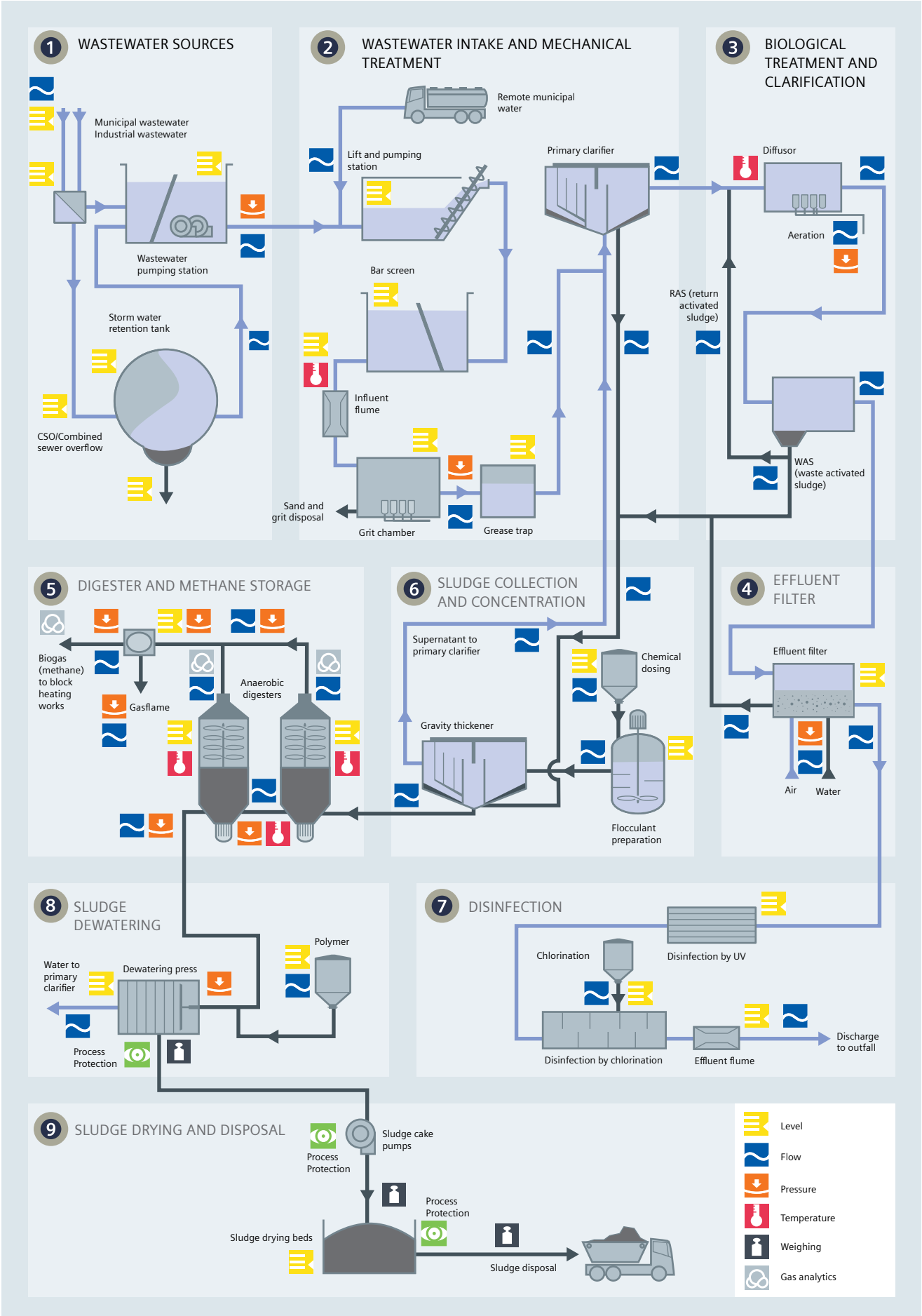
From wastewater collection to wastewater treatment and bio-solids (sludge) treatment facilities, we have process instrumentation and analytic solutions to meet your needs. The following pages will provide you with the best instrumentation solution for your application. To find more about our key products for the wastewater industry, including case studies, references and interactive process charts, please visit:

www.usa.siemens.com/pi-water

Service and support **you can count on**

Siemens offers a variety of service and support solutions for our process instrumentation products through our advantage+ programs. Broad programs such as advantage+ shipping, stock, support and extended warranty are available for a full rangeof product lines. In addition, we offer product specific programs such as the SITRANS Ultrasonic clamp-on flow meter service package which includes options such as flow surveys, flowmeter verification, equipment rentals, calibration and maintenance contracts.

www.usa.siemens.com/pi-service


1 WASTEWATER SOURCES
Municipal wastewater
Industrial wastewater
Wastewater pumping station
Storm water retention tank
CSO/Combined sewer overflow
2 WASTEWATER INTAKE AND MECHANICAL TREATMENT
Remote municipal water
Lift and pumping station
Bar screen
Influent flume
Sand and grit disposal
Grit chamber
Grease trap
Primary clarifier
3 BIOLOGICAL TREATMENT AND CLARIFICATION
Diffusor
Aeration
RAS (return activated sludge)
WAS (waste activated sludge)
5 DIGESTER AND METHANE STORAGE
Biogas (methane) to block heating works
Gasflame
Anaerobic digesters
6 SLUDGE COLLECTION AND CONCENTRATION
Supernatant to primary clarifier
Chemical dosing
Gravity thickener
Flocculant preparation
4 EFFLUENT FILTER
Effluent filter
Air
Water
8 SLUDGE DEWATERING
Water to primary clarifier
Dewatering press
Polymer
Process Protection
7 DISINFECTION
Chlorination
Disinfection by UV
Disinfection by chlorination
Effluent flume
Discharge to outfall
9 SLUDGE DRYING AND DISPOSAL
Process Protection
Sludge cake pumps
Process Protection
Sludge drying beds
Sludge disposal
Level
Flow
Pressure
Temperature
Weighing
Gas analytics

	1	2	3	4	5
	Wastewater Source	**Wastewater Intake and Mechanical Treatment**	**Biological Treatment and Clarification**	**Effluent Filter**	**Digester and Methane Storage**
PRESSURE					
SITRANS P320	X	X	X	X	X
SITRANS P200/P210/P2	X	X	X	X	X
TEMPERATURE					
SITRANS TH320/TH420		X	X		X
SITRANS TF320/TF420		X	X		X
SENSOR - SITRANS TS500		X	X		X
FLOW					
SITRANS FM MAG1100					
SITRANS FM MAG5100W	X	X	X	X	
SITRANS FM MAG3100	X	X	X	X	X
SITRANS FM MAG5000/6000	X	X	X	X	
SITRANS FM MAG6000I		X		X	X
SITRANS FC330			X		
SITRANS FS230	X	X	X	X	X
SITRANS FS220	X	X	X	X	
DP FLOW METER: SITRANS FO		X	X	X	X
LEVEL					
POINTEK CLS200	X	X			X
SITRANS PROBE LU240	X	X		X	
SITRANS LT500 HydroRanger	X	X		X	
SITRANS LR110/LR120	X	X		X	
SITRANS LUT400	X	X		X	
HYDRORANGER 200	X	X		X	
ECHOMAX XR-5/XPS	X	X		X	
SITRANS P320	X	X	X	X	X
SITRANS LH100/LH300	X	X			X
SITRANS LR100/110				X	
SITRANS LR120	X			X	
SITRANS LR200		X			X
SITRANS LR250					
PROCESS PROTECTION					
WM300 Motion Failure Alarm			X		

	6	7	8	9
	Sludge Collection and Concentration	**Disenfection**	**Sludge Dewatering**	**Sludge and Drying Disposal**
PRESSURE				
SITRANS P320			X	
SITRANS P200/P210/P2			X	
TEMPERATURE				
SITRANS TH320/TH420				
SITRANS TF320/TF420				
SENSOR - SITRANS TS500				
FLOW				
SITRANS FM MAG1100	X	X	X	
SITRANS FM MAG5100W	X	X		
SITRANS FM MAG3100	X	X		
SITRANS FM MAG5000/6000	X		X	
SITRANS FM MAG6000I	X			
SITRANS FS230	X	X	X	X
SITRANS FS220			X	X
SITRANS FC300 DN4	X	X	X	
SIFLOW FCT070	X		X	
SITRANS FC2100		X	X	
SITRANS FC330		X	X	
LEVEL				
POINTEK CLS200		X	X	X
SITRANS PROBE LU240		X	X	
SITRANS LT500 HydroRanger	X	X		X
SITRANS LR110/LR120	X	X		X
SITRANS LUT400	X	X	X	X
HYDRORANGER 200	X	X	X	X
ECHOMAX XR-5/XPS	X	X	X	X
SITRANS P320			X	
SITRANS LR100/110	X		X	X
SITRANS LR120			X	X
SITRANS LR200	X			
WEIGHING				
BW500/BW500/L			X	X
BELT SCALE MILLTRONICS MSI			X	X
SPEED SENSOR SITRANS WS300			X	X
WM300 Motion Failure Alarm			X	

A comprehensive Portfolio for all applications

Siemens process instrumentation has a comprehensive, proven product portfolio. This overview shows the entire spectrum of our process instrumentation and analytics portfolio for the wastewater industry.

Level

Whether you are measuring liquids, slurries, or bulk solids in wastewater collection, wastewater treatment, and bio-solids treatment, Siemens provides level measuring technology for both continuous and point level measurements. Siemens offers a comprehensive range of ultrasonic, radar, guided wave radar, capacitance, hydrostatic, differential pressure, and electro-mechanical type level measuring technologies.

Level Measurement | Point Level

Pointek CLS200 is a versatile inverse frequency shift capacitance level switch ideal for detection of liquids, solids, slurries, foam and interfaces.

Level Measurement | Continuous

SITRANS Probe LU240 is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels 9.8 ft. 20 ft. or 40 ft. range.

SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level, or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.

SITRANS LT500 HydroRanger: Advanced level controller for level, flow, and pumps for radar transmitters – or any 2-wire 4-20 mA device. It is the first choice for radar sensor measurements at 80 GHz.

HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control and open channel flow monitoring.

Echomax® XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/ wet wells, flumes, weirs and filter beds to a range of 26 feet.

Echomax® XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids to a range of 50 feet.

SITRANS LR100 Series featuring wireless Bluetooth Technology for continuous level measurement of liquids and solids with ranges of 26 ft., 49 ft. or 98 feet.

SITRANS LR 200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries up to a range of 66 feet.

SITRANS LR250 is a horn antenna 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 66 feet.

SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 98.4 feet.

Process Protection

Siemens Motion Sensors detect changes in the motion and speed of rotating,reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment. This versatile unit can be used on screw conveyor flights, conveyor belts pulleys, motor shafts and pumps. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations.

Flow

Siemens offers a wide range of electronic flow measuring technologies based on principles of Electromagnetic, Coriolis, In-line Ultrasonic, Clamp-on Transit time and Doppler, Differential Pressure, Vortex and Variable Area to measure liquids, slurries, gases and steam flows. Electromagnetic flow measuring technology is the most used technology to measure flow in the wastewater industry.

Flow Measurement | Electromagnetic

SITRANS F M MAG 1100 is a wafer design sensor in stainless steel with highly resistant liners and electrodes and is designed for the general industry environment. The flangeless wafer design meets all flange standards.

The SITRANS F M MAG 5100 W with its patented liners of NBR and EPDM is an ideal sensor for waste water applications.

SITRANS F M MAG 3100 is an electromagnetic flow sensor with a large variety of liners, and electrode materials ensuring a perfect fit for almost every flow application.

The SITRANS F M MAG 5000 is a microprocessor-based transmitter engineered for high performance, easy installation, commissioning and maintenance and has a measuring accuracy of ± 0.4% of the flow rate (incl. sensor).

The SITRANS F M MAG 6000 is a microprocessor-based transmitter engineered for high performance, easy installation, commissioning and maintenance, has a measuring accuracy of ± 0.2% of the flow rate and can be fitted with optional plug-in communication modules.

The SITRANS F M MAG 6000 I and the SITRANS F M MAG 6000 I Ex de transmitters have an measuring accuracy of + 0.2% of the flow rate and are designed to meet the demands of the process industry.

Flow Measurement | Coriolis

SITRANS FC300 is a compact Coriolis mass flowmeter sensor suitable for flow measurement of all kinds of liquids and gases. The sensor offers superior performance in terms of flow accuracy, turn-down range and density accuracy.

With SIFLOW FCT070 Siemens has developed the first flow transmitter designed for direct integration into SIMATIC S7 and SIMATIC PCS7 automation systems. FCT070 is a true multiparameter Coriolis mass flow transmitter.

The SITRANS FCT030 transmitter is based on the latest developments within digital signal processing technology and delivers industry leading ease of use true multi parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

The digitally based SITRANS FC330 flowmeter features market-leading compactness, very high accuracy of 0.1%, low pressure loss, extremely stable zero point and best-in class data update with 100 Hz high-speed signal transfer.

Flow Measurement | Differential Pressure

Differential pressure measurement is a universal flow measurement for liquids, gases and vapors. Primary differential pressure devices, like SITRANS F O orifice, are suitable for noncorrosive and corrosive gases, vapors and liquids.

Flow Measurement | Clamp-on

The SITRANS FS230 digital clamp-on ultrasonic flowmeter is a process-optimizing solution for measuring flow in virtually any liquid application. Designed to provide both exceptional performance and reliability.

The SITRANS FS220 performs basic flow functionalities and is an optimal and affordable alternative to more complex flow solutions. It features one-channel configuration options and a user-friendly design for quick and easy setup.

Pressure

Siemens offers a comprehensive range of pressure transmitters to measure absolute, gauge, differential and hydrostatic pressure for level, flow, pressure and head loss measuring applications in wastewater industry. The product highlight is SITRANS P320 that has outstanding accuracy, robust long-term performance and large installed base in the wastewater industry.

Pressure / Level Measurement

The SITRANS P320 series includes digital pressure transmitters for measuring gauge pressure, absolute pressure, differential pressure, flow and level.

The LH100 and LH300 are submersible pressure transmitters for hydrostatic level.

The SITRANS P200, P210 and P220 are compact single-range-transmitters for measurement of absolute and gauge pressure with a 4...20-mA- or 0...10-V output signal.

Temperature

Temperature Measurement | Head Transmitter

Siemens temperature transmitters SITRANS T covers head, rail and field transmitters. They support all common RTDs, thermocouples, resistance and millivolt-sensors and specific sensors to match all applications in the water industry.

SITRANS TH100 is designed to support all common RTDs. Setup is quick and easy with the transmitter-modem and SIPROM T software.

SITRANS TH320 single-sensor transmitter with HART- protocol is designed to support all common thermocouple, RTD and millivolt inputs. Setup is quick and easy with SIMATIC PDM or handheld communicator.

SITRANS TH420 dual-sensor transmitter with HART protocol adds support for two temperature inputs. Hot backup and drift detection functionality ensures that measurements are reliable and precise.

SITRANS TF Category: Temperature Measurement | Field Transmitter

SITRANS TF is made of rugged die-cast aluminum or long-lasting stainless steel. It transforms resistance thermometers, thermocouples, Ohm and mV signals into a load independent DC current corresponding to the sensor characteristics. The included smart display allows for local transmitter configuration. Set the measuring range, sensor type and more all from the on-board pushbuttons.

Temperature Measurement | Temperature Sensors

The industry-grade SITRANS TS500 temperature sensor supports a wide range of measuring from basic applications to solutions in harsh environment.

Weighing

The comprehensive Siemens weighing portfolio includes belt scales, weighfeeders, solids flowmeters and static weighing. Milltronics MSI belt scales are a preferred solution for continuous weighing of in-line sludge transportation for optimizing truck loading operation in sludge disposal facilities across the world.

Weighing Electronics | Stand Alone Integrators

Milltronics BW500 is a full feature integrator for use with both belt scales and weighfeeders. Milltronics BW500/L is an integrator for use in basic belt scale or weighbelt applications.

Belt Weighing | Belt Scales

Milltronics MSI is a heavy-duty, high accuracy full frame single idler belt scale used for process and load-out control. Milltronics MSI belt scale provides continuous in-line weighing on a variety of products in primary and secondary industries.

Belt Weighing | Speed Sensors

SITRANS WS300 is a compact shaft mounted belt speed sensor, ideal for use on sludge conveyors and in constricted spaces. SITRANS WS300 speed sensor operates in conjunction with a conveyor belt scale, providing signals to an integrator which computes the rate of material being conveyed.

SIWAREX weighing portfolio is a full line of weighing electronics, load cells, and load cell mounting units for medium and large hoppers. Installed using a SIWAREX load cells using a mounting unit supports optimum alignment of the load cell and protects the load cell from over loading and transverse loads.

Remote Monitoring Displays

Remote digital displays make measurement data visible and accessible from remote locations. They are easy to set up and program and can be used with all types of field instruments in varying process conditions.

Gas Analysis

Siemens offers a comprehensive range of products and systems for process analytics. It includes continuous gas analyzers for stand-alone and system solutions.

Measuring everything that matters:

usa.siemens.com/pi

Siemens Process Instrumentation offers best-in-class measurement and seamless integration into your automation system. We are the total solution provider for flow, level, pressure, temperature, weighing, positioners and more.

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