SULZER

Sulzer Pumps

ABS Pump Controller PC 441

S40872

abs

The World-Class Solution for Pump Control and/or Monitoring

Used for control, monitoring or both, the ABS pump controller PC 441 provides advanced but easy-to-use functions that can reduce service visits and increase the effectiveness of pumping stations – with benefits for the entire collection network.

The ABS pump controller PC 441 offers many ways to reduce energy consumption, troublesome peak loads, downtime and tankering costs. Simple to install and operate, it provides both control and monitoring functions that are easy to combine according to your application needs. Designed primarily for municipal pumping stations, it widens the range of ABS systems for control and/or monitoring.

Control and/or Monitoring of up to 4 Pumps and Additional Equipment

Studies have shown that 30%–50% of the energy consumed by pump systems could be saved through changes in equipment or control. Such changes are enabled by the ABS pump controller PC 441, which controls and monitors from 1 to 4 submersible pumps. It can also be used as a stand-alone monitoring unit.

The pumping controller is mainly designed for use in municipal wastewater pumping stations. Its many advanced features minimize operational costs and increase the availability of pumping stations and networks throughout their entire life cycles.

Examples of additional equipment that can be linked to the ABS pump controller PC 441 are submersible mixers and drainage pumps.

Complete Surveillance of Pumps and Station

The ABS pump controller PC 441 has a built-in calculation function for in-/outflow and pump capacity, which allows it to evaluate and compensate for pump curves, system curve and rpm variation. It can even calculate overflows. The unit also allows analog and event history logging:

Analog signals:
15 days, 16 channels and 1-minute sample interval

Digital signals and alarms:
4096 time-stamped events

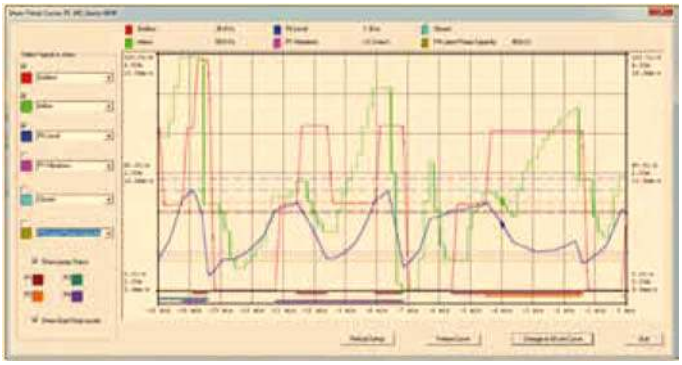
Unique Control Functions Reduce Energy Consumption and Servicing

Many advanced features of the ABS pump controller PC 441 can be used alone or in combination to minimize energy consumption and maximize station availability. Good examples and their benefits include:

- Tariff control that can pump down and shift start/stop levels depending on energy cost and required sump volume at estimated high load.
- Random start/stop levels that reduce fat build-up and production of sulfuric acid.
- Asymmetric alternation that increases the security of available pump capacity. This can also be used to address problems with pump clogging caused by debris/sludge build-up in problem stations.

Greater Functionality Increases Pump, Station and Network Efficiency

Some well-known problems in stations and networks can be solved without using advanced remote control and decision-making software. A good example of such problem-solving is the built-in Delta-level start function in the ABS pump controller PC 441. During heavy rainfall, several stations may fill up more or less simultaneously. This results in high hydraulic loads, as well as peaks in energy consumption and large fluctuations in the inflow to the treatment plant.



Online trend view of PC 441 values in ABS AquaProg

Upon detecting a quick change in wastewater level, the ABS pump controller PC 441 can start and/or stop pumps before preset start/stop levels are reached.

The total amount of sewage pumped will be the same (if not overflowing), but it will be spread out over a longer period of time.

Future-Proof Technology, Easily Accessed Remotely via ABS AquaProg

When using the ABS AquaProg software, all settings, status and logged values can be viewed/collected and restored, either locally or remotely. If new functions are added or improved, the software (firmware) can be downloaded via a PC using ABS AquaProg software.

All modules in the PC 441 concept communicate via the CAN bus and any suitable additional units will also support this bus. The ABS pump controller PC 441 communicates with other telemetry or SCADA systems via the widely used and supported ModBus (RTU/TCP) protocol, and the unit has I/O and register cross-reference tables for efficient communication setup. These important features ensure a smart, future-proof investment.

Part of the ABS EffeX Revolution

The ABS EffeX revolution is an ongoing effort from Sulzer Pumps to push the boundaries of wastewater technology, especially in the area of energy efficiency. Encompassing the whole chain from design to manufacturing, it has resulted in the most innovative and resource-conserving solutions on the market.

The revolution began in 2009 with the launch of the ABS submersible sewage pump XFP. Since then, it has expanded to comprise a complete range of world-class wastewater products. Their energy savings, reduced carbon footprint and high reliability contribute to efficient processes and satisfy the growing demands placed on the wastewater industry.

The ABS EffeX Revolution continues

Stockholm Water Keeps Hundreds of Pumping Stations Under Tight Control

Already in 1996, Stockholm Water began upgrading its sewage pumping stations with “intelligent” controllers. The drivers were maximal environmental protection and station availability, as well as reduced energy consumption. The experience highlighted common problems and key areas for improvement.

Today, over 100 sewage pumping stations in Stockholm use smarter control logic from Sulzer Pumps. All that we have learned from this project and others worldwide is built into just one device, the ABS pump controller PC 441.

Monitoring and Recording Data

One of Stockholm Water’s key requirements was to secure reliable data recording that could handle periods of communication loss. Another request was monitoring parameters not strictly connected to operational processes, such as logging hydrogen sulfide gas levels in a station for safety reasons.

Personal Safety

Yet another demand was a personnel safety routine. The resulting function is activated, for example, when someone switches on a light in the station, starting a pre-set timer. If any key on the panel is touched the timer is reset, and when the light is switched off the function is deactivated. If neither occurs within the pre-set time, an internal alarm is tripped as a reminder, and shortly thereafter a central alarm is generated.

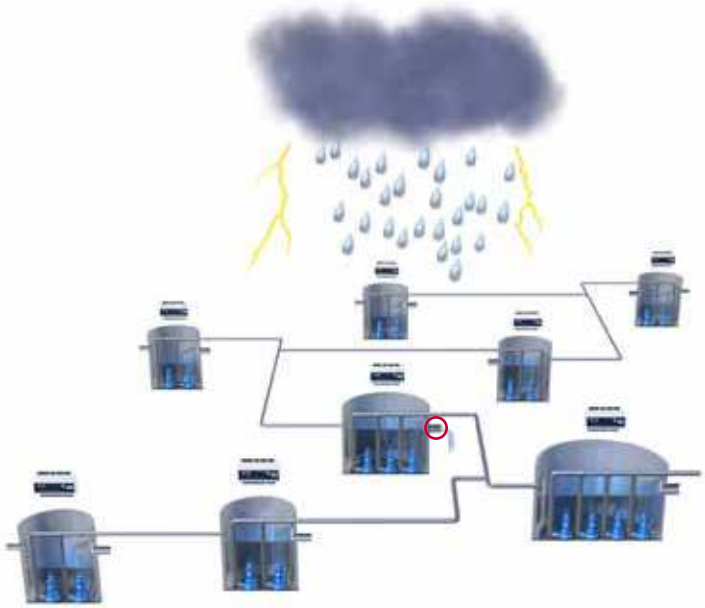
Another desired safeguard was that no remote start of pumps would be possible with function above in effect. The function also blocks all alarm transmissions apart from the personal safety and overflow alarms.

Good Communication

One firm demand was that the controllers should use an open protocol supported by a majority of SCADA and telemetry suppliers. The ABS pump controller PC 441 supports both the Comli and ModBus communication protocols.

A Unique Range of Functions for Control and/or Monitorintoring to Make Your Life Easier

The wide range of pumps and mixer functions in the new ABS pump controller PC441 is truly impressive. With a combination of the functions illustrated below - just a few of those available - you can save energy and costs, avoid damaging water hammer and reduce pressere on the hydraulic and electrical network, in addition to numerous other benefits.

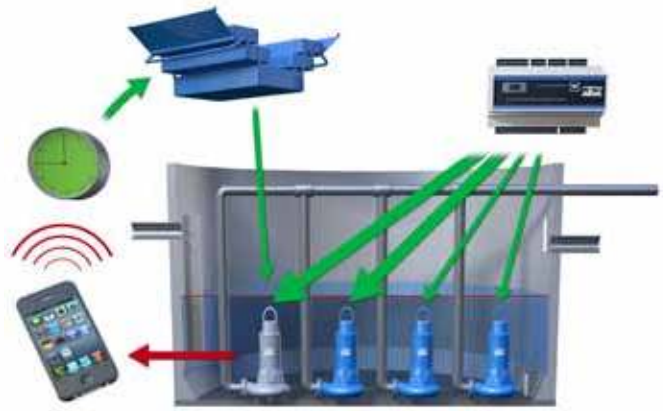


Heavy Rainfall Threatens City

Preventing flooding through intelligent level control

The smart level derivate change function of the ABS pump controller PC 441 detects a quicker than normal rise in water level and begins pumping before the set start level, thereby preventing flooding. If the water level drops faster than normal, it stops the pump before the stop level is reached.

This innovative function has a tremendous positive impact, not only on the pumping station but on the entire collection network as well.

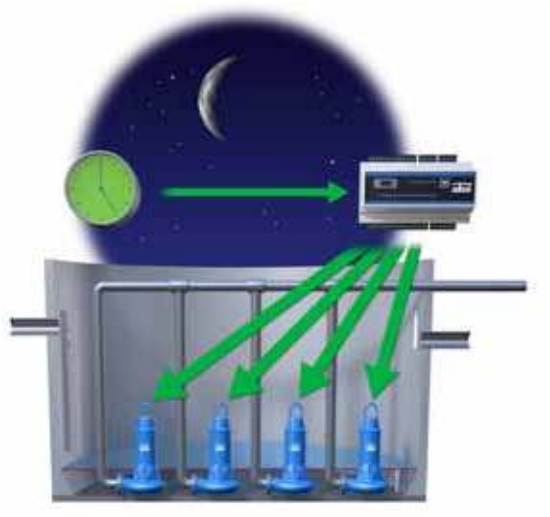


Breakdown of Pump 1 After 5000 Running Hours

Lowering risk of total stop and flooding due to a second pump breakdown

The clever asymmetric start function of the ABS pump controller PC 441 keeps one pump running with far fewer running hours, thereby minimizing the risk of an immediate breakdown.

The system sends an SMS alert for the pump to be changed at the earliest possible convenience.



Emptying the Station Before “Rush Hour”

Reducing energy costs by running pumps with off-peak electricity

Each pump can have different start/stop levels set per day and night, which can be used to empty the station during lower-cost energy periods. The same function can be used to temporarily lower the stop level and minimize sludge build-up, or to temporarily increase the difference between start and stop level for a pipe-flushing effect.

Preventing Clogging With Individual Exercise Runs

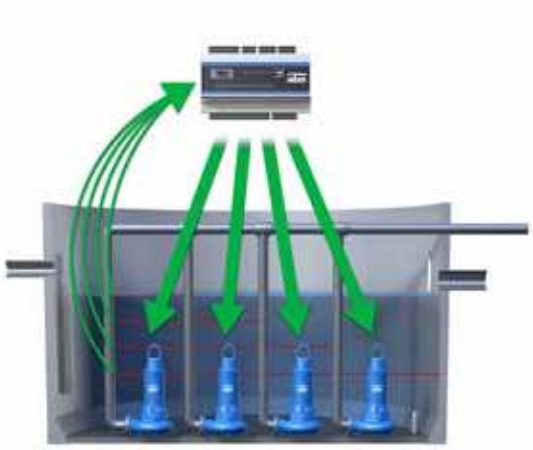
Reducing the risk of clogging with individual pump running schemes

The clever control functions of the ABS pump controller PC 441 allow different pumps in a station to run independently, with different start/stop levels and different start/stop delay times. If a pump is not used for a certain amount of time, the controller can force an exercise run to prevent clogging.

Pumping Water No Higher Than Needed

Keeping start/stop levels at optimal height in order to save pumping energy

The start/stop levels can easily be changed via our ABS AquaProg remote control software, e.g. to raise the start/stop levels in periods with less rain. Higher start/stop levels mean that less energy is needed for pumping.



Avoiding Network Choking and Raised Energy Bills

Preventing water hammer and peak pressure on a network

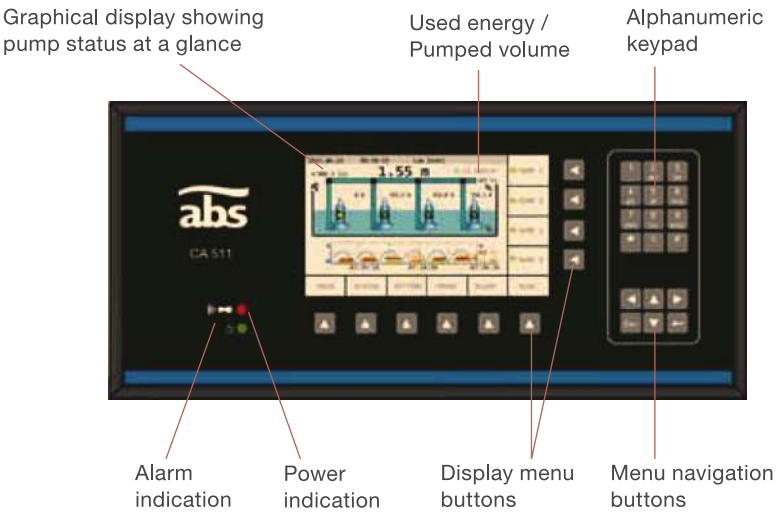
The intelligent setting of individual start and stop levels for pumps and stations allows you to avoid water hammer and put less pressure on hydraulic and electrical networks. Each pump starts at the optimal time to help prevent flooding in the most efficient way. The system sends an SMS alert in the event of flooding risk.

A Modular System to Suit Your Particular Applications

The ABS pump controller PC 441 forms the core of a modular system that can be used to control and/or monitor up to 4 pumps as best suited to your particular applications. CAN bus is used for internal communication between the central controller and various monitoring modules.

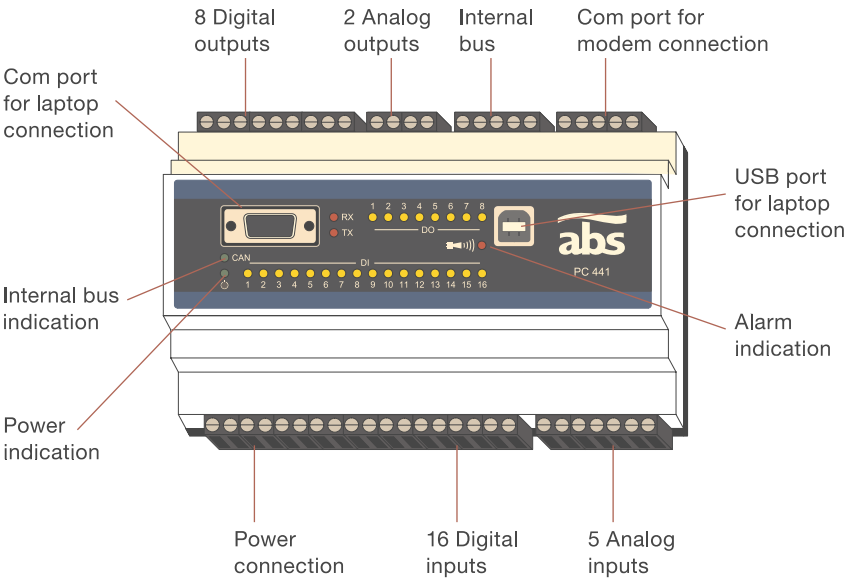
The selected system can be mounted in an electrical cabinet to protect the modules from dirt and dust.

Typical modules and configurations of the ABS pump controller PC 441 are presented here.



ABS Operator Panel

This panel is used to allow easy operation and configuration of the ABS pump controller PC 441. Data can be viewed or accessed in several formats: alphanumeric characters, animated graphical symbols and trend curves.



ABS Pump Controller PC 441

The ABS pump controller PC 441 can control and/or monitor up to 4 pumps and additional equipment in municipal pumping stations. It provides many advanced features to minimize operational costs and increase the availability of a pumping station.

ABS Temperature Monitoring Module

This module allows temperature monitoring of up to 4 pumps with combined alarms (one alarm per pump) or up to 4 separate alarms using one module per pump. It has an extra mA input for connection of a vibration sensor.

ABS Electrical Property Measuring Module

This module measures electrical properties for an entire pumping station and/or one pump.

ABS Leakage Monitoring Module

The four signal inputs of this leakage monitoring module can be used in various ways to provide an alarm in the event of moisture detection (Di) in a range of submersible sewage pumps. As with the ABS temperature monitoring module, combined or separate alarms are possible.

Wall-Mounted Electrical Cabinet

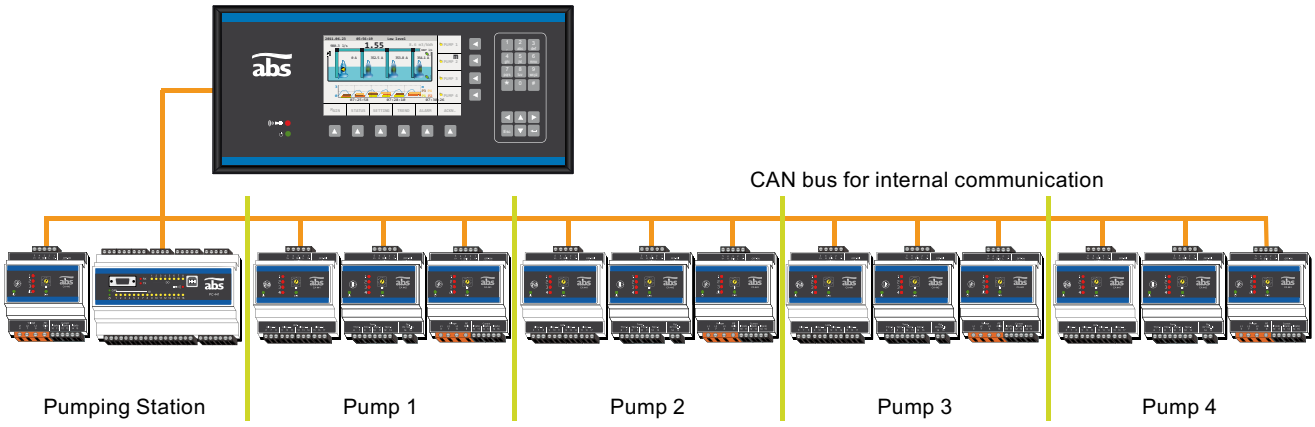
An ABS pump controller PC 441 system can be protected in a compact wall-mounted electrical cabinet, tailored to the particular controller system selected.

Major Features of the ABS Pump Controller PC 441

- Control and monitoring in one system – use one function or both
- Pump control based on:
  - Level set-point, incl. time delays
  - Speed of level change
  - Random start levels
  - Tariff control
  - Maximum runtime
  - VFD control logic, incl. flow calculation
- Pump alternation, normal or asymmetrical
- Cyclic motion timer
- Emergency pump run timer and level sensor check on high float
- Advanced level-based in-/outflow and pump capacity calculation
- Log capabilities:
  - 15 days with 16 channels and 1-minute interval
  - 4096 time-stamped events
- Control logic for sump mixer and drain pump
- Powerful PC tool for set-up, maintenance and backup
- Comli and ModBus data communication support
- Local and/or remote firmware upgrade support

System Overview of Advanced Monitoring of Electrical Properties, Temperature and Leakage per Pump

The ABS operator panel and the three modules described above are connected to the ABS pump controller PC 441 via CAN bus interface.



Combined Strength for Unmatched Expertise

ABS, associated with innovation and well proven solutions for wastewater handling and dewatering, is a product brand of Sulzer. Strong customer service combined with extensive application expertise in solving wastewater and dewatering challenges is the foundation of this strong global brand. For more information, visit www.sulzer.com

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