

Remote Ground and Surface Water Level Monitoring



The impacts of global climate change are especially striking when talking about “water” in general. On the one hand, ground water has become a diminishing resource – on the other hand, we are facing more and more extreme weather events, such as severe flooding and storm surges. These issues bring great challenges to us.

APPLICATION

In order to face global responsibility in this regard, global networks for level monitoring of ground and surface water are established.

These will help to guarantee flood protection for waterways and in coastal regions and will furthermore ensure drinking water sourcing for private homes, for industry and for agricultural purposes.

Network operators are private and public water service providers as well as government authorities and municipal administrations. Since the places of installation are numerous and far apart from one another, an independent power supply as well as wireless data transfer (e.g. via LoRaWAN®) are necessities.

The technical requirements to level sensors are quite wide-ranged:

- Precise hydrostatic level measurement
- High long-term stability
- Integrated temperature measurement
- Low power consumption
- Compact design

IMPLEMENTATION

BD|SENSORS' solution is a hydrostatic level probe with the following characteristics:



- Highly accurate piezoresistive stainless-steel pressure sensor
- I²C interface providing pressure and temperature
- Min. power supply voltage 2.7 V
- Housing diameter only 19 mm
- Current consumption < 1 mA during measurement / < 50 μ A in sleep mode

With this level probe, BD|SENSORS makes a significant contribution to the long service life and reliability of battery-powered data acquisition systems.

CNC processing: permanent monitoring of the storage temperature of cooling lubricants



To ensure that production processes can be monitored and controlled, information about the current status of the process is essential. It's irrelevant whether the product is a gas or a liquid. Not knowing the temperature and pressure process parameters makes it extremely difficult to control processes.

APPLICATION

Not only do modern CNC processing centres have to ensure that products can be produced efficiently and at a high quality, they also have to be designed in such a way that they do not expose employees to any potential hazards whilst complying with energy-orientated and environmental aspects at the same time.

Cooling lubricants are used to reduce the friction between the tool and the work piece on the one hand, and to dissipate heat and splinters on the other. The storage of cooling lubricants is very important to maintain their long service life. This means the optimal concentrate temperature lies between 15°C and 20°C.



IMPLEMENTATION

The storage temperature of cooling lubricants and other lubricants must be monitored on a permanent basis to ensure they can be used optimally in the production process. The **TS 300 temperature switch** performs this task perfectly and supports users with its versatile functions.

The temperature value can easily and clearly be read from the 4-digit LED display. The display can be pivoted on several axes so that it can easily be seen even in unconventional mounting locations. The TS 300 also has a multifunctional signal output. This means that users can decide whether they want to use the TS 300 with a switching output (PNP, NPN), an analogue signal (mA, V) or a digital output signal (IO link). All of these options can quickly and easily be established for the temperature switch by using the operating menu and contribute towards the optimum use of the cooling lubricant.

Test stands: High pressure monitoring – safe and reliable



The requirements on modern machines and equipment are constantly rising. Diverse sensors, actuators, electrical and mechanical components ensure reliable functionality and safe operation. The focus isn't always on rotating or sharp-edged parts. Protection against high surface temperatures and pressures is equally important.

APPLICATION

For lifting units or hydraulic test stands it is important that safety devices only permit access to the system if these are in a virtually depressurised state and so the system pressure needs to be continuously monitored to release doors, covers etc.

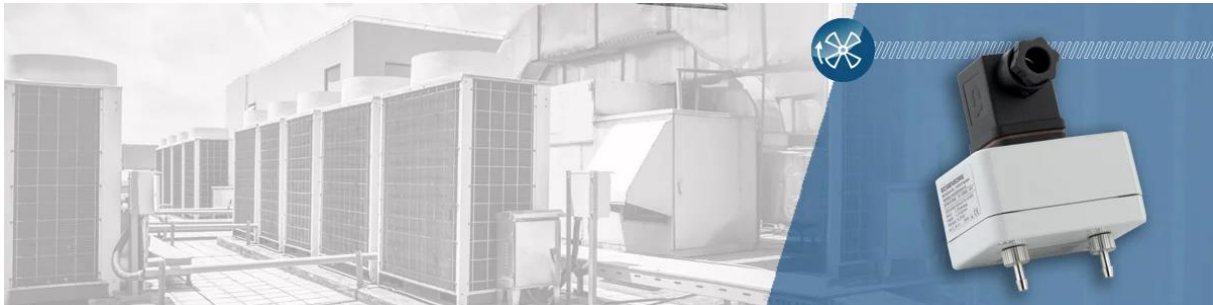
The electronic pressure switch DS 114EM was devised to perform this critical task safely and reliably. It is designed in the customer application for monitoring a process pressure of 1,700 bar.

IMPLEMENTATION

Its precision switching electronics enables safe switching functionality even at low switching thresholds. This is where the advantages of this pressure switch are particularly apparent because besides the conventional hysteresis mode in which the switching hysteresis defines the switch-on and switch-off point, it is also possible to specify a switching range to carry out pass/fail monitoring. Which means, for example, that all pressure values within the switching thresholds e.g. are acceptable and the system emits an error signal if the pressure value goes outside of these thresholds.

Another key feature is the integrated potential-free switching contact as electronic pressure switches generally have a PNP or NPN switching output with a galvanic reference to the supply voltage. The lack of potential makes it possible to directly use the switching signal to control other switching components or signal transmitters without having to consider the potential ratios.

Heating, ventilation, air conditioning: Designing more efficient extraction systems using differential pressure measurement



When optimising CO₂ emissions, people in industry mainly consider heating, cooling, and compressed air systems. Extraction equipment along with dedusting and waste gas purification units are critical systems in production sites that generate high levels of emissions as they offer dual protection: they protect people from emissions that are harmful to health and also protect machines and equipment from premature wear and failure.

APPLICATION

The most appropriate separator or filter design demands an understanding of the particulate composition, its intensity and the facilities. These systems frequently operate in a three-shift operation and need to deliver a consistently high level of cleaning, for which there are a range of different approaches.

Conventional systems run constantly without taking into account the current load situation. This results in an extremely high energy consumption and no awareness of the system conditions. Reducing energy usage is vital, especially with regard to DIN EN ISO 50001 (Energy Management). For this reason, modern cleaning systems are equipped with the relevant sensor technology, intelligent process control and performance-related ventilation control, which not only maintains the optimal filter quality, it also reduces the energy costs to a minimum.

IMPLEMENTATION

Monitoring the filter and volume flow is one of the fundamental system tasks.

The **81.600G differential pressure transmitter**, developed specifically for customers, is perfectly suited to this task. Thanks to its compact design and versatile installation options it can be integrated seamlessly in new systems and retrofitted without any problem in existing systems. It is available in a variety of unidirectional or bidirectional measurement ranges and gives a standardised output signal that is easily processed by a PLC/DDC.

In all aspects, the 81.600G therefore contributes significantly to system efficiency and to improving the climate.

Propulsion technology: regulation of working pressure in tunnel boring machines



London, Shanghai, New York City – what do all these metropolises have in common? More and more people move to megacities to comply with job requirements and to fulfill their personal dreams of a perfect work/life balance. As the horizontal usage of land quickly finds its natural limits, new buildings need to be designed as tower blocks, and new infrastructure for traffic and supply purposes must run underground.

APPLICATION

Tunnel boring machines (TBM) are the basic equipment here. A TBM consists in principle of a pressurized excavation chamber, which is used for the actual boring process, and of a separation plant for the excavated material, which is under atmospheric pressure. A bulkhead separates both chambers and controls the pressure in between using pressure sensors.

Excavation tools remove the soil, whereas bigger rocks need to be cut into smaller stones first. This mixture of water and solid material creates a support pressure in the excavation chamber, controlled by either a screw conveyor or a slurry circuit:

- The screw conveyor transports the removed soil to the back of the unit. The rotation speed of the screw conveyor controls the support pressure.
- The slurry circuit is a hydraulic support that transports the slurry suspension (with an adjustable air cushion) to the excavation chamber and the mixture of suspension and removed soil back to the separation plant.

Hydraulic cylinders push the machine forward for the segmental lining of the tunnel. This lining method provides a high degree of security for the tunneling team as well as for the future tunnel stability.

IMPLEMENTATION

Industrial pressure measurement is faced with the following challenges here:

+ During the boring process, many solid particles (sand/clay/gravel) mixed with water come into contact with the transmitters, and can easily destroy standard stainless steel and ceramic diaphragms by local overpressure and abrasion.

OUR SOLUTION

We use a ceramic sensor element in combination with an elastomer diaphragm.

+ Sedimentation in front of the diaphragm can cause imprecise measurement results and damage.

OUR SOLUTION

The totally front-flush diaphragm is fixed inside a tube; the transmitter is mounted on the backside of the bulkhead to eliminate dead spaces.

+ The very close proximity to the driving and cutting part of the TBM causes strong and permanent vibrations.

OUR SOLUTION

The entire construction of the pressure transmitter unit is extremely robust.

The housing walls are considerably reinforced, and an exchangeable “cage” is installed around the electrical connection as an extra protection.

Commercial Fishery: Locating fishing zones with combined pressure and temperature sensors



Commercial fishery nowadays seeks not only to realize best possible business results, but also feels obliged to comply with “Green Deal” aspects.

APPLICATION

The situation is quite critical – our seas are threatened to be depleted of fish, so vessels are compelled to penetrate more and more remote places in search of high-quality fish. However, we all want to keep our ecological footprint at a minimum.

Purse and Danish Seines are nets that encircle and catch large schools of fish. Different fish species are located at different sea depths and temperature areas. This makes it vital to

locate the species in question as precisely as possible, so as to save energy and time resources and to keep the oceans' biodiversity.

State-of-the-art fish-finding and fishery systems are one of the essential instruments in achieving these goals.

IMPLEMENTATION

BD|SENSORS has developed a seawater-resistant and corrosion-free pressure and temperature transmitter, which is used in a so-called **"Catch Monitoring System"**:

- This system combines depth and temperature measurement in one device and is watertight down to 1,400 m.
- The depth sensor can tell the position of the fishing net down to 1,000 m.
- The temperature sensor can tell the sea water temperature with high accuracy between -5 and +35 °C.

All data are transmitted wirelessly to the vessel. The fish vessel can then monitor the sink rate and depth of the seine and decide, when to start and stop hauling and which speed to use.