# TECHNOLOGY BROCHURE
# HYDROSTATIC
# LEVEL MEASUREMENT

BD|SENSORS
pressure measurement

# PRESSURE
## at the highest level

**"Successful medium-size companies haven't achieved what they have by operating in a wide variety of different areas, but because they have more in-depth expertise in a sub-area t**han anyone else." We are sure of this. We at **BD|SENSORS** have therefore concentrated on electronic pressure measurement technology right from the very outset. Our consistent product and quality strategy has made it possible for us to become a major player on the world market for electronic pressure measurement devices within a few years. With more than 300 employees, **BD|SENSORS** provides solutions ranging from 0.1 mbar to 8000 bar in 4 different locations (Germany, Czech Republic, Russia and China):

### HYDROSTATIC LEVEL MEASUREMENT PAR EXCELLENCE

From drinking water management to fuel storage to fishing: The usage areas of hydrostatic level measurement are just as diverse as the demands that are made of the measuring technology that is used. BD | SENSORS fulfils this requirement with an extremely wide range of high-quality, reliable solutions, and provides the right solution for every application or installation – usually from our standard range of products.

Our portfolio includes a wide range of submersible probes and screw-in transmitters. We set standards with a combination of different sensor technologies, housing materials, cable and sealing materials, including stainless steel, extremely hard-wearing ceramics and robust plastics. This is how we ensure that measurement always takes place in a reliable and precise way, whatever the conditions.

The product range includes variants with integrated surge protection, temperature sensors or data loggers as well as models that are capable of communication with an RS-485 interface or using the HART protocol.


### LEVEL MEASUREMENT IN CRITICAL MEDIA? OUR DAY-TO-DAY BUSINESS.

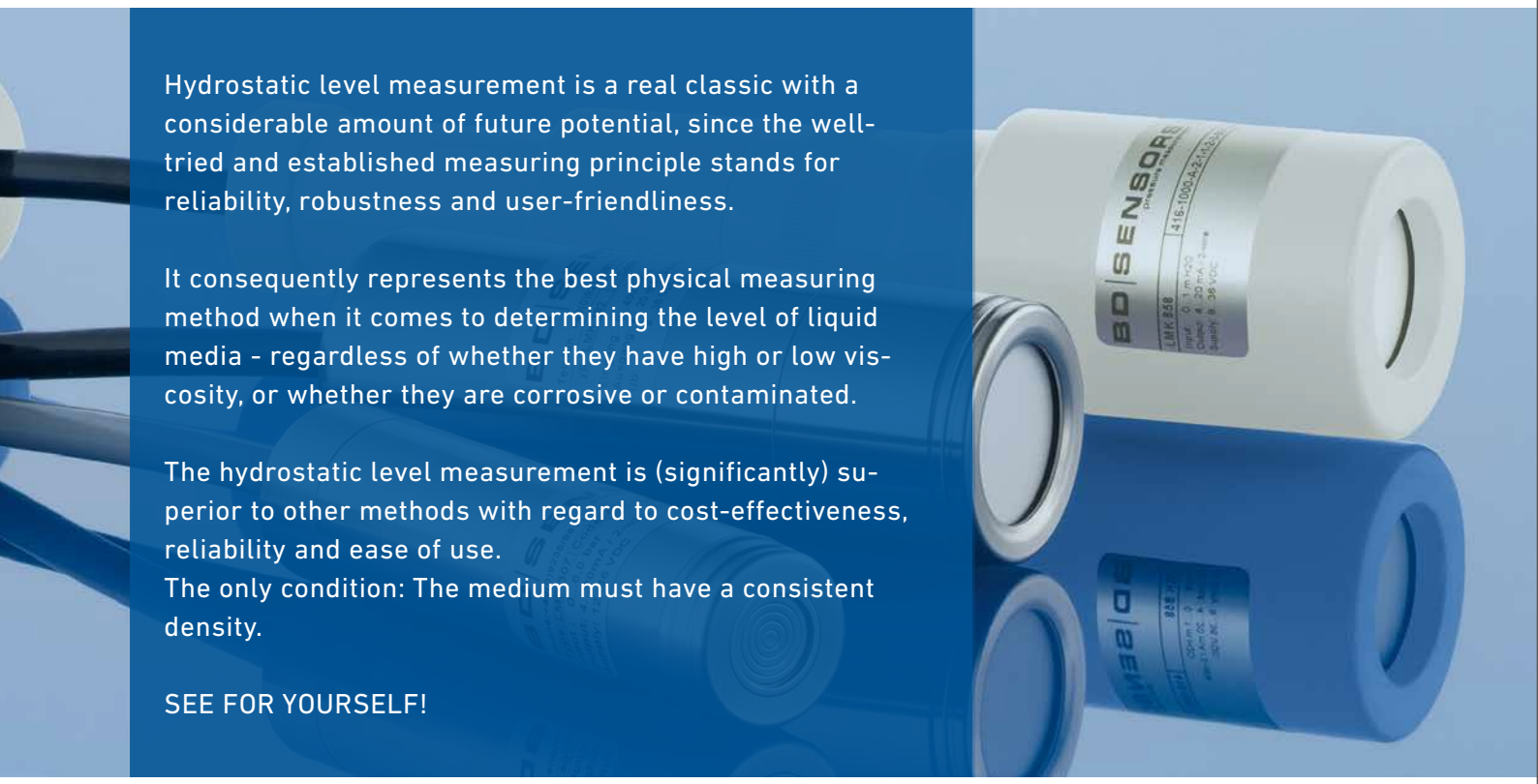
# INDEX



01

# HYDROSTATIC LEVEL MEASUREMENT

functionality & strengths



Hydrostatic level measurement is a real classic with a considerable amount of future potential, since the well-tried and established measuring principle stands for reliability, robustness and user-friendliness.

It consequently represents the best physical measuring method when it comes to determining the level of liquid media - regardless of whether they have high or low viscosity, or whether they are corrosive or contaminated.

The hydrostatic level measurement is (significantly) superior to other methods with regard to cost-effectiveness, reliability and ease of use.
The only condition: The medium must have a consistent density.

SEE FOR YOURSELF!

## THE MEASURING PRINCIPLE - IN A NUTSHELL.

**The functionality of the hydrostatic level principle is just as simple as it is ingenious, and is based on the following principle:** Every liquid has an individual weight force based on its centre of gravity and density, which exerts an increasing amount of pressure on the bottom of a container as the level increases. This hydrostatic pressure behaves directly proportional to the level of the liquid, and is recorded by a pressure sensor.

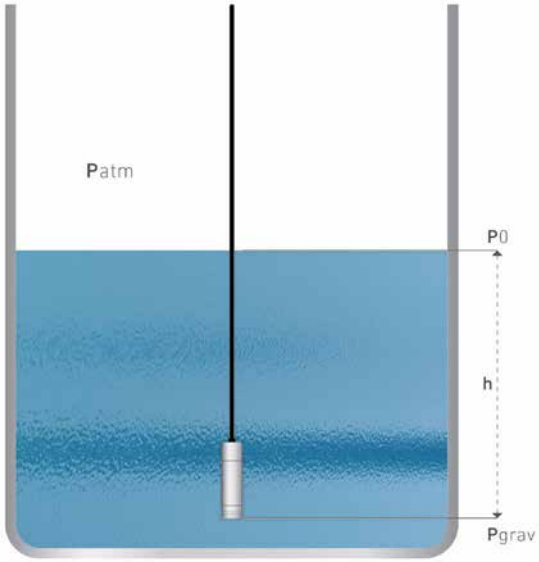
The pressure sensor sits at the bottom end of a level probe and converts the pressure acting upon it into an electronic signal. The electronics in the device transform this into an analogue or digital output signal. The level sensors are calibrated to the specification of the liquids to be measured in the factory, in order to convert the recorded pressure or pressure changes into correct measuring results.

The measurement is influenced by neither impurities in the medium nor foam on the surface, turbulence or installations. However, the design of the container must be taken into consideration: With open systems, measurement takes place relative to the so-called barometric ambient pressure in order to prevent measuring errors caused by air pressure fluctuations. In closed containers, the difference between the pressure of the liquid column at the bottom and the pressure inside the tank is measured via the liquid.

## MEASURING PRINCIPLE - OPEN BODY OF WATER OR CONTAINER

### THE HYDROSTATIC PRESSURE IS DEPENDENT ON:

- the level of the liquid,
- the density of the liquid
- the air pressure or ambient pressure acting upon the liquid (this is eliminated by the integrated relative reference with hydrostatic level probes)




### EXAMPLE

| Medium | Density kg/m³ | Pressure change with level change of 1m |
|---|---|---|
| Water | 998 / 20°C | 97,9 mbar |
| Heating oil | 860 / 15°C | 84,4 mbar |
| Sulphuric acid | 1831 / 20°C | 179,6 mbar |

The output signal of the level probe is adapted to the respective liquid, e.g. in mbar/bar, $mH_20$ or m liquid column with known density.

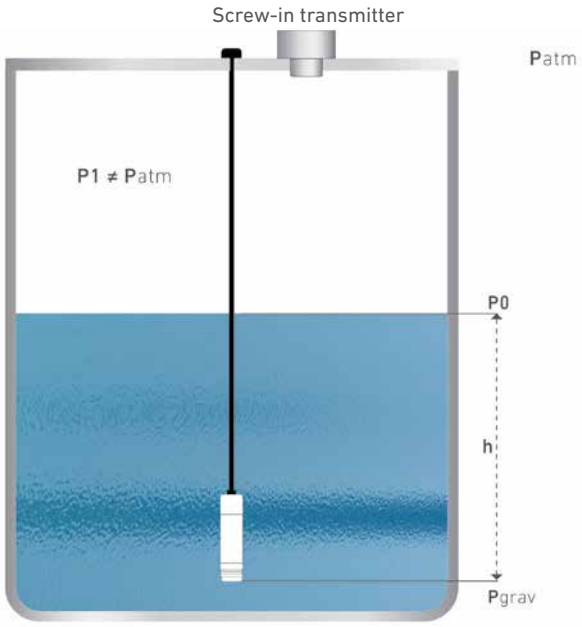
### APPLICATION AREAS

- Water
- Sewage water, sludge
- Aggressive media
- Fuels & oils

## MEASURING PRINCIPLE - CLOSED CONTAINER

### THE HYDROSTATIC PRESSURE IS DEPENDENT ON:

- the level of the liquid,
- the density of the liquid
- the prevailing pressure above the liquid that differs from the ambient pressure




Result: Two measurements must take place – once in the liquid and also in the space above it. In practice, this is realised using a differential pressure measurement during which an submersible probe and a screw-in transmitter are used.

### APPLICATION AREAS

- Tank management
- Biogas facilities
- Filling tanks

## STRENGTHS OF HYDROSTATIC LEVEL MEASUREMENT

### 1 VERY RELIABLE

Hydrostatic level measurement is an established measuring principle which has proven itself thousands of times and undergone continuous development because of the design of the device and the continuous further development of the sensor, meaning that it operates very reliably.

### 2 ROBUST MEASURING PROCEDURE

By using resistant components, but also because of the general design of the products, it is a tremendously robust procedure which is not influenced by foam or contamination in the liquid.

### 3 UNINFLUENCED MEASUREMENT

An exact measuring result is obtained without being influenced by other physical properties of the media such as conductivity, the dielectric constant or the viscosity.

### 4 VERSATILITY

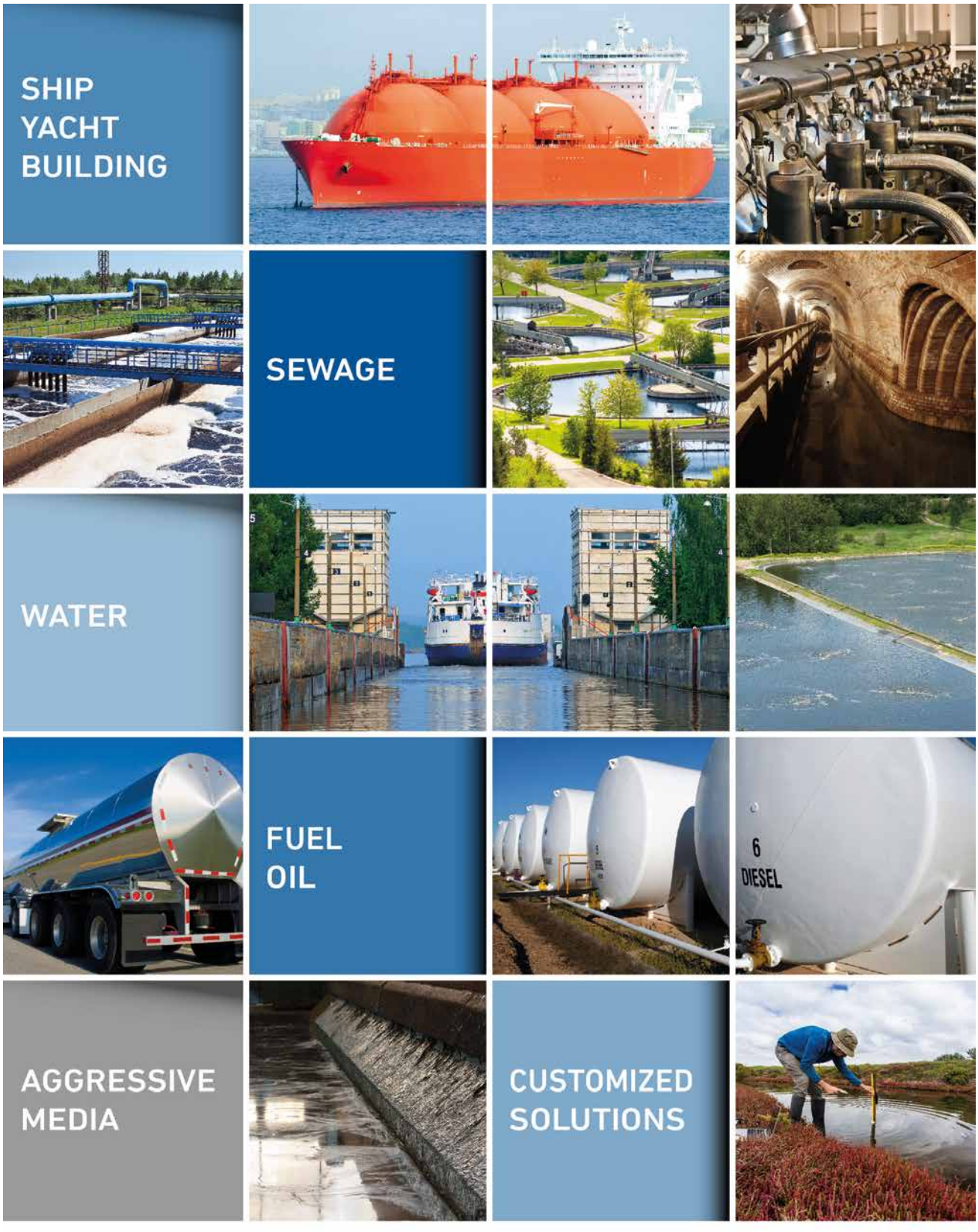
Numerous constructive solutions combined with the wide range of materials for the housing, the cable and above all the sensor make it possible to use hydrostatic level sensors in almost any liquid media - regardless of whether they are corrosive, aggressive, viscous or contaminated.

### 5 RESISTANT IN CRITICAL MEDIA

Level probes with capacitive-ceramic sensors are particularly suitable for measuring in critical media. Because the diaphragm made from high-purity $Al_2O_3$ is resistant to almost all liquid chemical and pharmaceutical media. The sensor is almost mechanically indestructible. The high-purity, polished membrane which is used in some product variants prevents adhesions and deposits.

### 6 COMBINED MEASUREMENTS

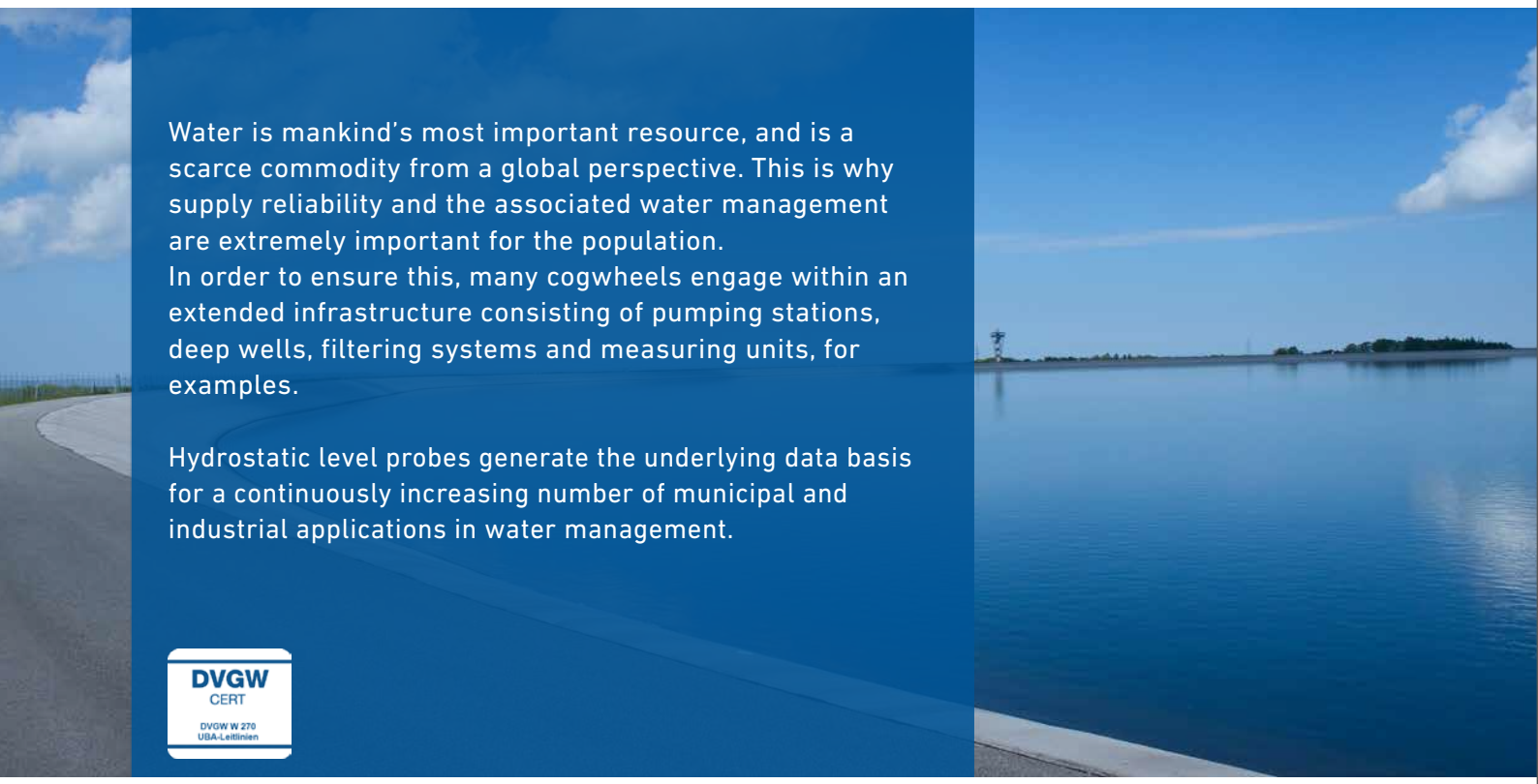
As well as pressure recording, our current product concepts make it possible to also measure additional physical parameters such as the temperature using a 2 in 1 procedure.


SHIP
YACHT
BUILDING
SEWAGE
WATER
FUEL
OIL
6
DIESEL
AGGRESSIVE
MEDIA
CUSTOMIZED
SOLUTIONS

02

# LEVEL MEASUREMENT IN WATER

the basis for a reliable supply



Water is mankind's most important resource, and is a scarce commodity from a global perspective. This is why supply reliability and the associated water management are extremely important for the population.
In order to ensure this, many cogwheels engage within an extended infrastructure consisting of pumping stations, deep wells, filtering systems and measuring units, for examples.

Hydrostatic level probes generate the underlying data basis for a continuously increasing number of municipal and industrial applications in water management.

DVGW CERT
DVGW W 270
UBA-Leitlinien

## OUR PRODUCT RECOMMENDATIONS

During the monitoring of the groundwater or surface water in rivers and seas, as far as measuring technology is concerned it is primarily about reliability and accuracy in order to guarantee fail-safe operation and low maintenance cost at all times.
In other words: A long service life, precise and continuous measuring results and non-sensitivity to the changing weather conditions are basic expectations of the products that are used.

**SLIMLINE**

### LMP 305

For installation in 1" casing pipes

**DETACHABLE**

### LMK 808

lightning / surge protection

**ALL-ROUNDER**

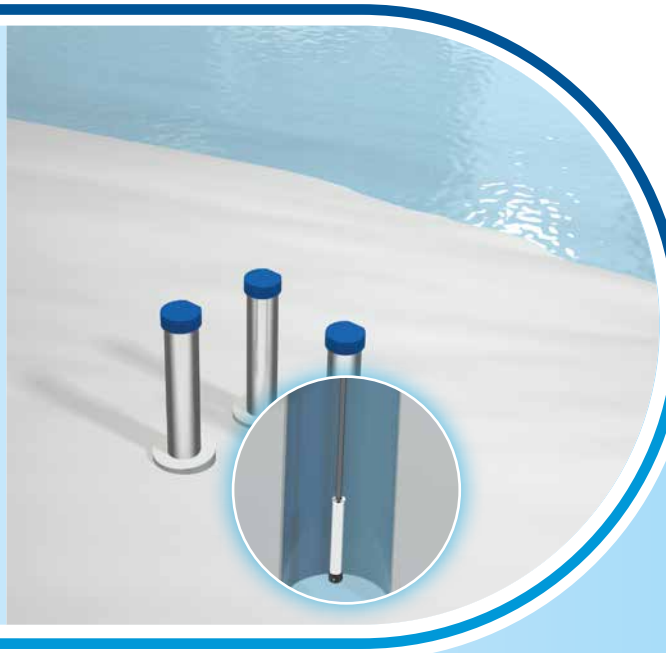
### LMP 307

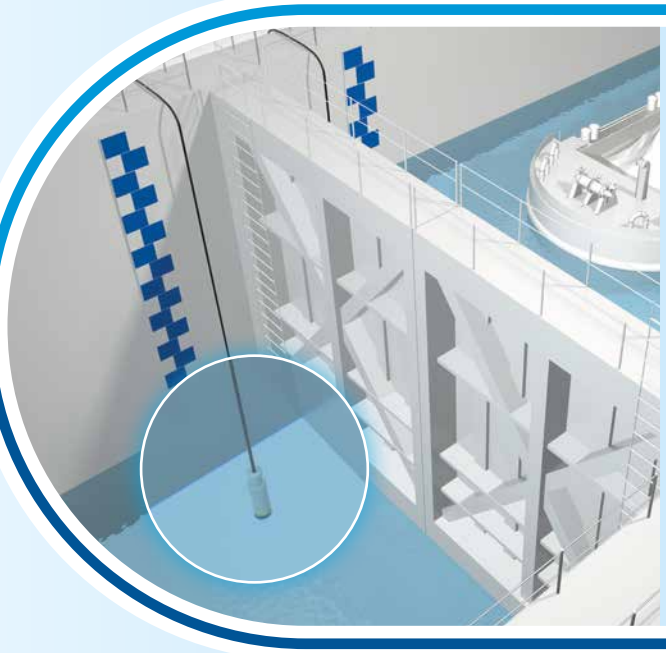
Universally deployable

## GROUNDWATER LEVEL MEASUREMENT

- Groundwater level monitoring is needed to ensure that a supply of drinking water is available at all times
- Hydrostatic level probes in combination with data loggers provide continuous and reliable measurement data logging
- The systems are designed to be durable and have long-term stability
- The compact versions such as the ones used in standardised, narrow monitoring wells are popular

**PRODUCT RECOMMENDATION: LMP 305**





## LOCK GATE CONTROL

- Locks are used to overcome level differences within a waterway
- The process is controlled by centres, which measure and process the water levels of a river using hydrostatic level probes
- The measuring technology must provide reliable results, but also operate with manageable service costs
- Detachable level probes with integrated lightning protection provide minimum maintenance cost with a high degree of system protection

**PRODUCT RECOMMENDATION: LMK 808**

## SWIMMING POOL SURGE WATER

- Surge water containers act as a buffer for water flowing out of the swimming pool
- The surge water is pumped on to the filtering and preparation system
- Monitoring of the level in the surge water tank to protect it from overflowing and the upstream pumping system from dry running
- Level probes have to provide exact measuring information and be protected from chlorinated water at all times

**PRODUCT RECOMMENDATION: LMP 307**

03

# LEVEL MEASUREMENT IN SEWAGE WATER

armed against dirt and abrasion

Be it in industrial, municipal or private areas:
People require clean drinking water and produce waste water at the same time. This is why technically sophisticated systems are important in environmentally friendly water preparation and disposal.

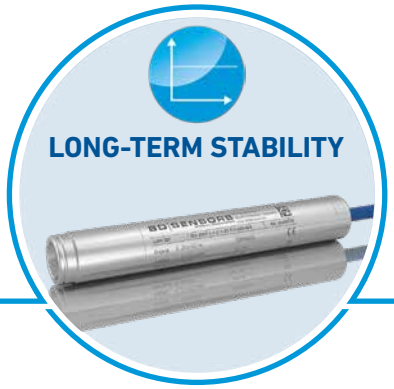
It is only possible to have a functioning drinking water/ waste water cycle if you have a large number of faultlessly operating facilities and optimally interacting components. Reliable measurements with hydrostatic level sensors play an important part in this respect for monitoring and control in different processes.

## OUR PRODUCT RECOMMENDATIONS

The level measuring technology in the water circuit is subject to different requirements. On the one hand, the filling quantities in the waste water or chemically contaminated compositions are recorded, and on the other hand also in purified water. Against this background, BD|SENSORS provides solutions which are resistant to contaminated and aggressive media because of the housing and sensor materials that are used. Detachable variants reduce the amount of work involved in maintenance tremendously.


### LMK 358

High overloading capability




### LMK 387

Flush-mounted ceramic sensor

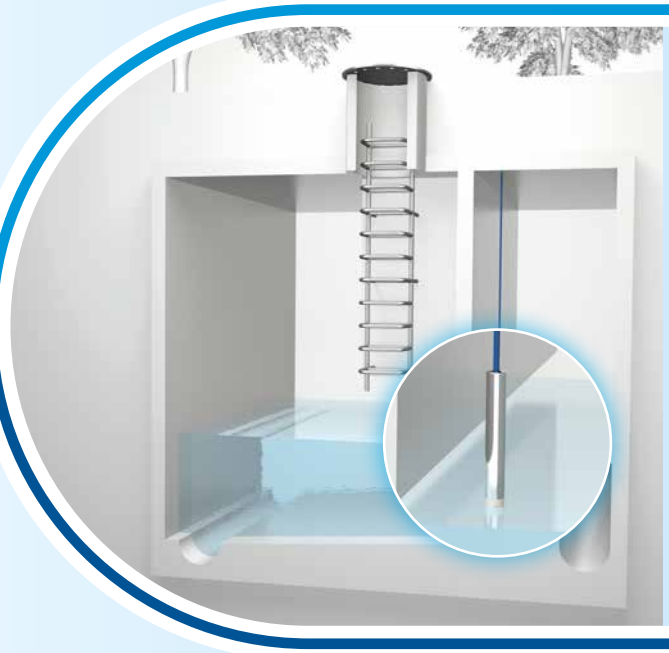

### LMK 382

Explosion-proof version

## PUMPING STATIONS

- Functional facilities for transferring the waste water - these are needed to overcome inclines during transfer
- Automatically operating systems which are dependent on the water level
- Control of the pump on/off switching procedures using hydrostatic level sensors (dry running and overflow protection) which are installed in the collecting tank

**PRODUCT RECOMMENDATION:**
**LMK 358 | LMK 382**



## RAIN OVERFLOW TANKS

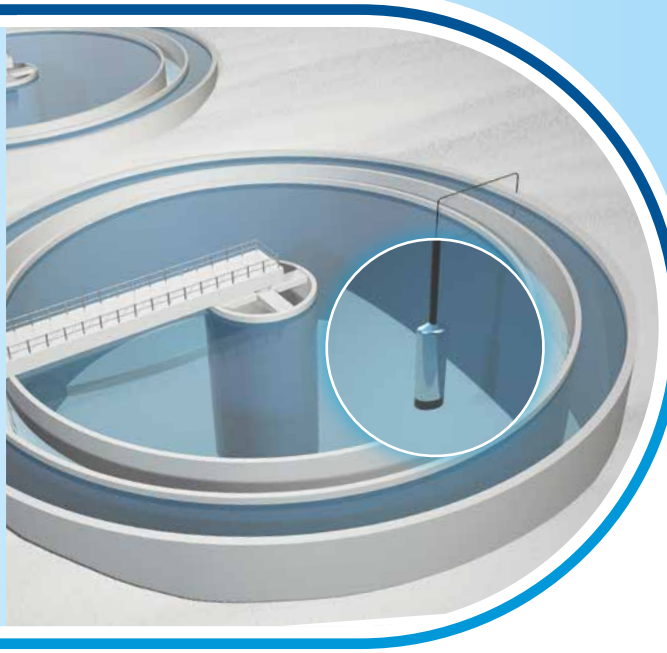
- For the prevention of sewage treatment plant overloading in the event of heavy rain
- Intermediate storage of the mixed water (precipitation and waste water) in the rain overflow tank for subsequent regulated transfer
- Continuous water level measurement in the rain overflow tank for monitoring and documentation

**PRODUCT RECOMMENDATION: LMK 387**

## SEDIMENTATION TANK

- Waste water is processed in various cleaning stages, with the goal of obtaining reusable drinking water
- Mechanical, physical and biological procedures provide optimum cleaning performance
- Among other things, applicable explosion protection regulations have to be observed during the various processing stages
- The level of the different tanks is monitored with submersible probes for monitoring and controlling the system

**PRODUCT RECOMMENDATION: LMK 382**



04

# LEVEL MEASUREMENT IN AGGRESSIVE MEDIA

chemically resistant and robust

The processes in this environment are mainly marked by dynamic framework conditions such as changing temperatures, contamination or explosive or toxic substances. Operating safety is therefore top priority.

Measuring and monitoring take place in a wide range of different media, which have one thing in common: They damage conventional materials in the event of continuous contact. The level measuring technology is therefore designed with a focus on “durability” and proves its resilience by means of years of fault-free deployment.

## OUR PRODUCT RECOMMENDATIONS

Robust plastic submersible probes with a hard-wearing ceramic diaphragm are the material of choice for level recording in aggressive media, since all parts which come into contact with the media have to be resistant to the liquids that are used. They are available in different designs to suit the relevant application, and are also characterised by precise measuring results and a high degree of overloading capability.


### LMK 809

Polished
ceramic diaphragm


### LMK 858

Maintenance-friendly

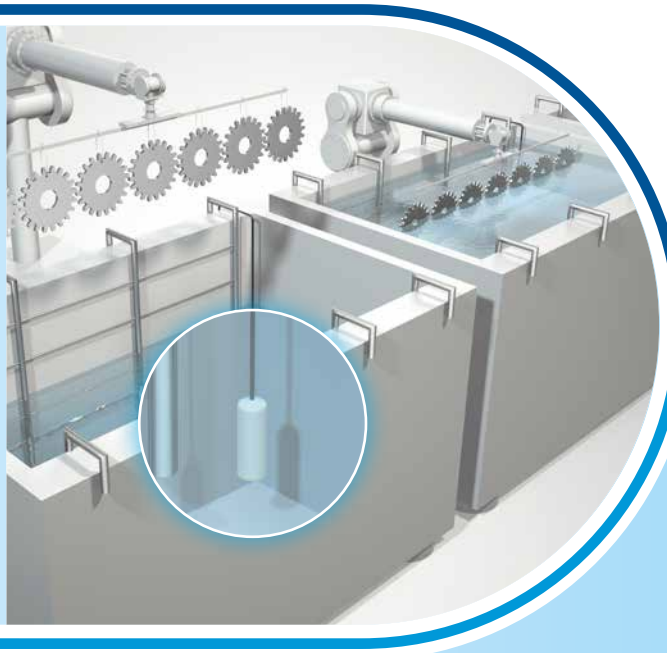

### LMK 808

Universally deployable

## ELECTROPLATING SYSTEMS

- Electroplating tanks are filled with aggressive media such as acids and alkalis which can cause injuries to persons
- In order to have a safely functioning system, the level in the electroplating tank must neither exceed nor undershoot predefined limits
- The level measuring technology that is used must be extremely reliable and provide exact measuring results
- It must also be non-sensitive to the liquids that are used and the fumes that are produced

**PRODUCT RECOMMENDATION: LMK 809**



## SEMICONDUCTOR INDUSTRY

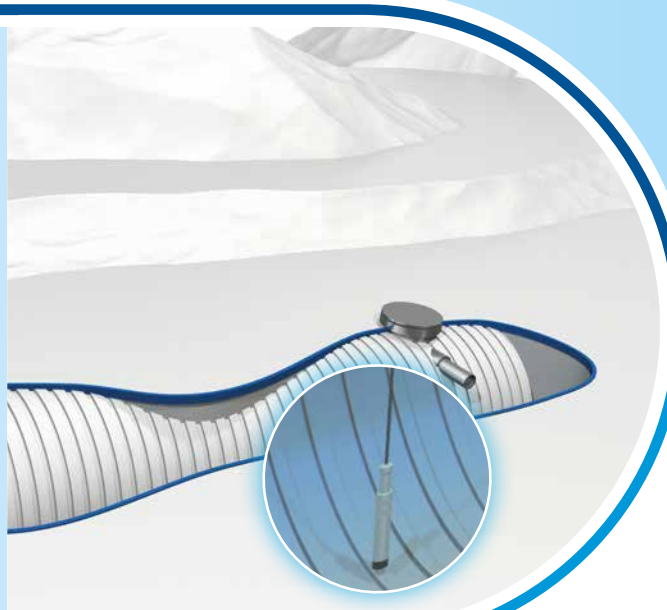
- Immersion tanks with low levels are used in the semiconductor industry, through which the conveyor belts transporting the PCBs run
- The liquid in the immersion tank must be at a constant level in order to guarantee process reliability
- The measuring technology that is used to safeguard the level must measure precisely at low levels and be insensitive to the surrounding liquid

**PRODUCT RECOMMENDATION: LMK 858**

## LANDFILL LEACHATE

- Seepage from landfills is an environmentally hazardous mixture of substances which have been released from waste
- A system consisting of seals and drains prevents escape into the groundwater
- Collection of waste water with heavy concentrations of chemical and organic contamination in containers with subsequent disposal in tank trucks
- Level monitoring of the containers using submersible probes which are characterised by having high resistance to aggressive media

**PRODUCT RECOMMENDATION: LMK 808**



05

# LEVEL MEASUREMENT IN FUELS AND OILS

focus on safety

Operating and supply safety is a particularly important topic during the storage and transfer of fuel, oil and solvents. The environment is dominated by networked but also autonomous containers with different dimensions which are filled with potentially explosive substances (amongst others).

A basic prerequisite in these areas are systems which function perfectly and an uninterrupted supply. Hydrostatic level probes are used to monitor the containers which provide reliable results and are tailored to the special environmental conditions.

## OUR PRODUCT RECOMMENDATIONS

The main focus is on exact and reliable measurements in the level monitoring of fuels and oils. The measuring technology concentrates on precision and long-term stability accordingly, and is available in explosion-proof variants if required. A welded version of the versatile LMP 307 probe does not use elastomers for sealing the housing, and is recommended for measuring in solvents and fuels mixed with additives.


### LMP 308

Precise and long-term stable


### DCL 531

RS485 / Modbus RTU


### LMP 307

Petrol version

## REFINERIES

- The manufacture, storage and distribution of sensitive and potentially explosive substances is subject to extremely stringent safety requirements
- An eye is kept on having correct filling quantities in storage tanks and avoiding leaks, which is monitored using submersible probes
- The measuring technology is also subject to explosion protection and functional safety requirements
- The level probes which are used must consist of an intrinsically safe explosion-proof version with SIL2 certification, and have a high degree of accuracy and long-term stability.

**PRODUCT RECOMMENDATION: LMP 308**

## DIGITAL TANK LEVEL INDICATION

- Approximately 5 million oil heating systems. including appropriate storage tanks, are in operation in public buildings and private households in Germany
- Various level measuring methods are used to monitor the levels for the operation of the heating systems and calculate the top-up deliveries that are required
- A modern alternative to mechanical solutions are hydrostatic level sensors combined with digital displays

**PRODUCT RECOMMENDATION: DCL 531**

## FILLING STATION MANAGEMENT

- Level monitoring of the different fuel containers using compact / welded submersible probes
- The measuring results are transmitted to a central control centre by remote data transfer
- The results serve as the basis for flexible requirement and logistical planning
- Monitoring of containers using submersible probes which are insensitive to the elastomers in the media

**PRODUCT RECOMMENDATION: LMP 307**

06

# LEVEL MEASUREMENT IN SHIP AND YACHT BUILDING

resilient under the most extreme conditions

Marine and offshore applications are characterized by extreme effects on all of the systems that are used because of harsh climatic conditions, salt water and extreme mechanical loads.

Particularly in shipping, where the safety of people and valuable goods is at stake, the reliability of the infrastructure plays a major part. A key aspect that contributes to this is level recording.

## OUR PRODUCT RECOMMENDATIONS

The extreme ambient conditions in maritime applications represent a major challenge for level measuring technology, which BD|SENSORS counters with product types that are characterized by their resistance to salt water and chemicals in housings, connections and diaphragms. High purity, polished ceramic sensors restrict or prevent deposits, whereas metal alloys such as titanium or copper-nickel-iron provide a high degree of media resistance.

**MEDIA RESISTANT**

### LMK 458

Temperature use up to 125°C

**LONG-TERM STABILITY**

### LMK 487

Titanium version

**FLANGE VERSION**

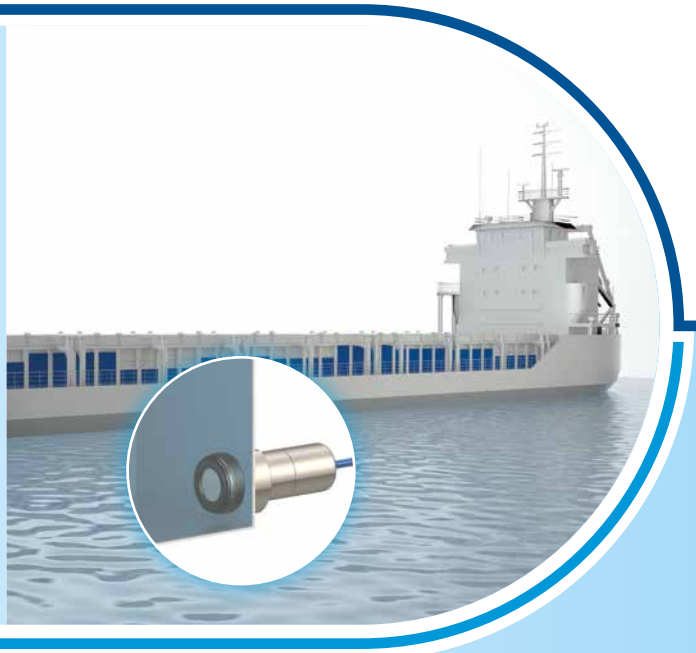
### LMK 458H

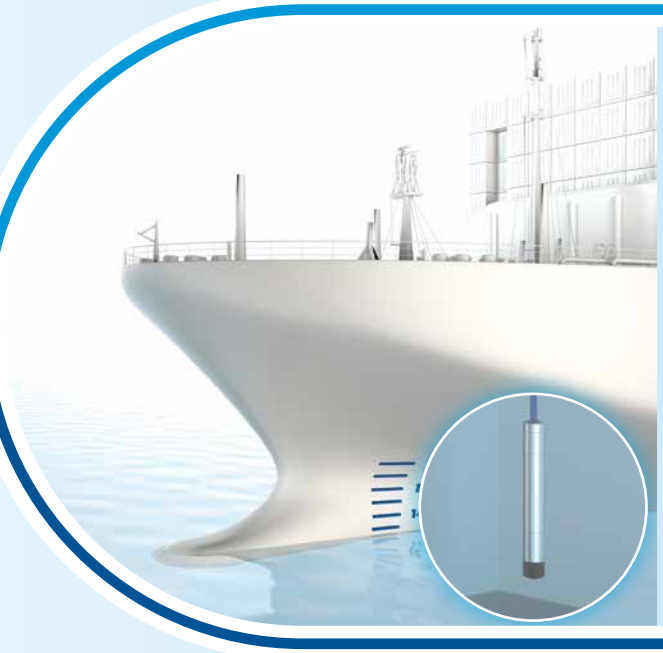
HART communication

## TANK CONTENT MANAGEMENT

- Tankers and cargo ships have several tanks in which fuel is stored and the level is monitored
- The fuel required to drive the engines consists of several components including heavy oil, which can only be pumped from a temperature of >50 ° C
- In other words, level measurement takes place under extreme conditions, and the relevant measuring technology must be extremely robust and capable of overloading

**PRODUCT RECOMMENDATION: LMK 458**





## DRAUGHT MEASUREMENT

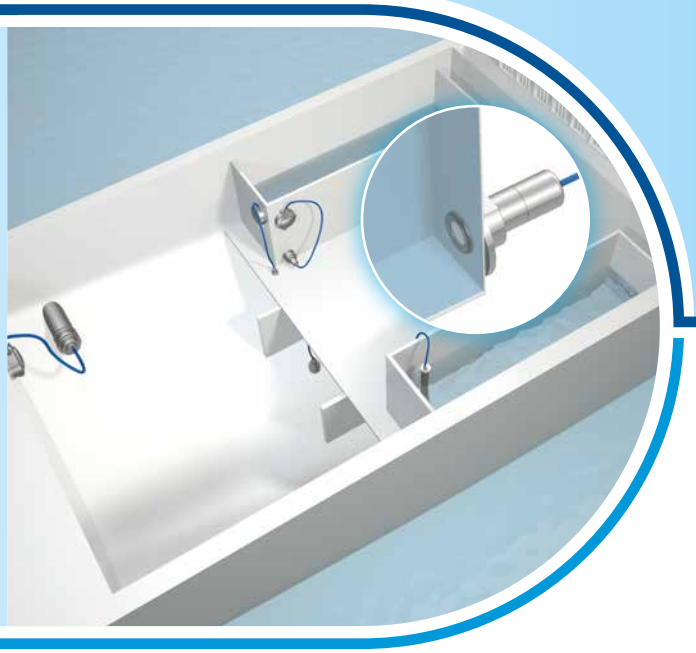
- In order for a ship to travel safely, it is important to know how low the ship is in the water
- For this purpose, different levels are measured at various points outside and inside the ship in order to monitor the draught and the position
- The level measuring technology must therefore provide exact results, be securely mounted and also be resistant to salt water

**PRODUCT RECOMMENDATION: LMK 487**

## ANTI-HEELING SYSTEM

- So-called anti-heeling systems are installed to prevent ships from tilting when manoeuvring and in the event of one-sided loading or storms
- These systems compensate for the extreme positions by pumping liquids around in laterally mounted tank containers
- The levels in the tanks are permanently monitored, and control the pumping systems
- The measuring technology must be designed to be appropriately robust, and have international shipping approvals

**PRODUCT RECOMMENDATION: LMK 458H**



07

# SPECIAL SOLUTIONS

tailored to individual requirements

**IT IS NOT POSSIBLE TO MONITOR EVERY APPLICATION WITH A PRODUCT FROM THE STANDARD PRODUCT RANGE.**

The strengths of BD|SENSORS particularly come to the fore for non-everyday applications which require adaptations to the on-site situation:
**Customized solutions** which are designed and implemented together with the customer with regard to design, technical implementation, measuring range, material characteristics and also the installation options.

While doing this, our services range from product modifications to customized models, and also private label versions.

**SPEAK TO US!**

## EXAMPLES OF CUSTOMER-SPECIFIC SOLUTIONS

A wide range of adaptation options are available for the level-measuring products - we would be glad to deal with your individual challenge and work out a suitable solution together.
We are presenting three level measuring solutions on the subjects of groundwater monitoring, container monitoring and combined level and temperature measurement which represent a large number of previously implemented projects:


### 18.632

I²C interface


### LT 107 / LT 802

For small containers

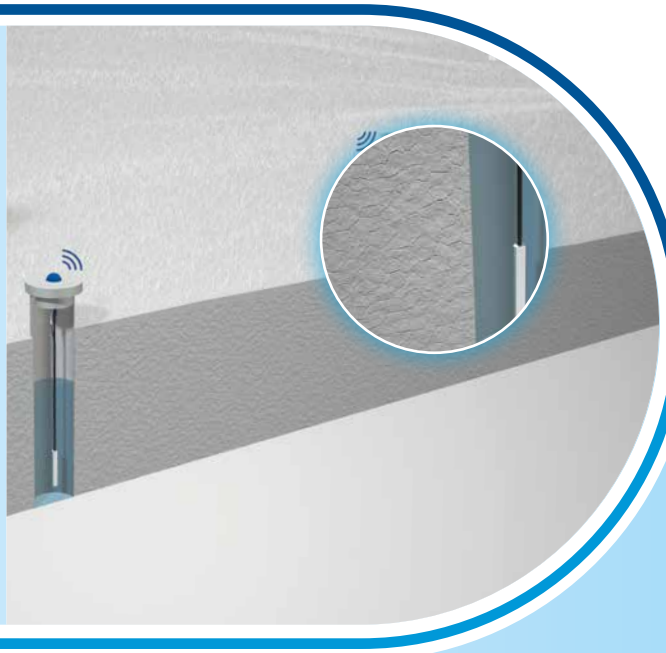

### LMP 307T

Multipurpose

## GROUNDWATER REMOTE MONITORING

- Groundwater and surface water monitoring in coastal regions, and also in agriculture and water management
- The battery-operated systems have a long service life thanks to level and temperature value transmission using the $i^2C$ digital interface
- High precision and long-term stability of the measuring technology, as well as standardized dimensions
- Installation in standard 1" monitoring well

**PRODUCT RECOMMENDATION: 18,632**



## TANK LEVEL

- Level monitoring in fixed or changing containers
- Suitable for liquid or high-viscosity media such as adhesives, lubricants or coolants etc.
- Quick start-up of the rod probe when replacing the container by screwing in or hooking in
- Various analogue or digital output signals available (4 ... 20 mA, IO-Link etc.)

**PRODUCT RECOMMENDATION: LT 107 / LT 802**

## DAM / WATER TOWER

- Level monitoring in bodies of water or level monitoring in water towers with integrated temperature recording
- Reduces the installation effort, since recording and transmission of the level and temperature values take place using one device
- Simple signal processing by means of two separate, interference-insensitive signal circuits

**PRODUCT RECOMMENDATION: LMP 307T**

# THE RIGHT PRODUCT

What is important during probe selection?

When it comes to selecting the version that is the most suitable for the application, certain criteria must be taken into consideration in order to obtain optimum measuring results and ensure that the probe has a long service life.

The aspects mentioned in the following are important when selecting the appropriate ranges and for the technical properties of the individual components when the desired product is being configured.

The wide range of selection options for technical characteristics can also be overwhelming - which is why we are glad to help you to configure the right product for you.

PLEASE CONTACT US!


## IMPORTANT CRITERIA WHEN CHOOSING A PRODUCT

In order to give you the best possible advice on choosing the right version for you, we need some information about the usage conditions.

### MEDIUM

In which liquid/ mixture does measuring take place, and which chemical characteristics and temperatures are present?

### RANGE

What is the maximum level to be measured, and what is the density of the medium to be measured?

### OUTPUT SIGNAL

Is an analogue or digital output signal required?

### CERTIFICATIONS / APPROVALS

Are special certificates / approvals required, e.g. for drinking water, SIL, explosion protection or maritime applications?

### INSTALLATION

How much room is available, which mounting options are available, and what is the maximum cable length that is required?

# MATERIAL OPTIONS FOR SELECTED COMPONENTS

Depending on the application, different ambient conditions prevail, which are reacted to by having appropriately configured individual components.

## PRESSURE SENSOR

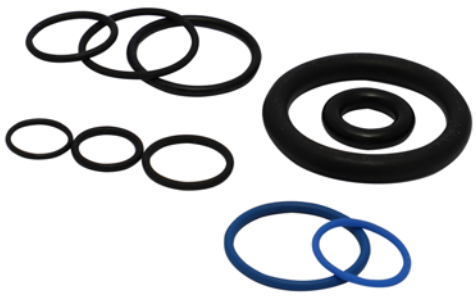
The heart of a level probe is the respective pressure sensor that is used. This can basically be classified within the group of stainless steel or ceramic sensors.
Stainless steel sensors are mainly used for measurements in clean to slightly dirty liquids, whereas the much more robust ceramic sensors come to the fore in dirty, corrosive and viscous media.

## HOUSING

The classification shown continues with the housing materials, which are available in metallic and plastic versions.
Stainless steel is by far the most versatile material. Titanium and CuNiFe come into play in corrosive or salty media. As far as plastic housings are concerned, PP-HT and PVDF versions are available, both of which are used for measurement in acids, alkalis and corrosive liquids.

## CABLES

Depending on the intended use, it is also important to choose the correct cable sheath material. Variants made from PVC, PUR, FEP and TPE are generally available. The maximum length of the cable installation, the temperature range and above all the resistance to the medium must be taken into consideration when you are making your selection. Suitable cables with appropriate approvals are available for use in potentially explosive zones, drinking water applications and maritime applications.



## SEALS

Seals are a small but important component, since they prevent the medium from penetrating into the device. This is why they have to be chemically resistant to the medium that is being measured. The product range includes variants made from FKM and EPDM, which cover the majority of level applications. FFKM is used if a high degree of chemical resistance is required. When measurements are being taken in drinking water, the use of a certified EPDM seal is mandatory, since it does not give off any harmful substances into the water.

CuNiFe (copper-nickel-iron) | PP-HT (polypropylene high temperature) | PVDF (polyvinylidene fluoride) | PVC (polyvinyl chloride) | FEP (perfluoroethylene propylene) | PUR (polyurethane) | TPE-U (thermoplastic elastomer) FKM (fluorocarbon rubber) | EPDM (ethylene propylene diene rubber) | FFKM (fluoroelastomers)

09

# WHAT YOU CAN EXPECT FROM US

tailored to the application

Each level application has its own circumstances because of its individual infrastructure and environmental conditions.

This is exactly what BD | SENSORS reacts to with an unbeatably wide product range that is ideally positioned to meet the challenges of the respective measuring situation.

The combination of different materials for housings, cables and seals with different sensor types leads to made-to-measure solutions which are available in the following designs:

- Submersible probes
- Detachable submersible probes
- Screw-in transmitters

## NOMENCLATURE - GET TO KNOW THE PRODUCT

The type designation of the respective product variant consists of a combination of letters and numbers which provides information about the basic design of the device. A distinction is made with regard to the pressure sensor that is used, the housing material and design and the functionality of the electronics.

### SENSOR

| | |
|---|---|
| **LMK** | Submersible probe / screw-in probe with ceramic sensor |
| **LMP** | Submersible probe / screw-in probe with piezoresistive stainless steel sensor |

### HOUSING

| | |
|---|---|
| **(LMP/K) 3xx** | Stainless steel housing |
| **(LMP/K) 8xx** | Plastic housing |
| **(LMP/K) xx8** | Detachable version |

### ELECTRONICS

| | |
|---|---|
| **(LMK) xxH** | Version with HART communication |
| **(LMP) xxT** | Version with additional temperature sensor |
| **(LMP) xxi** | Precision version with high accuracy |

## SUBMERSIBLE PROBES

These product variants always come with a cable, and are completely immersed in the liquid. In general, they must be leak-proof and insensitive to the measuring medium in order to ensure that results are provided over the long term. In order to obtain a correct measurement result, it is important for the probe to be as close to the bottom of the body of water or container in which measurement is taking place. To protect the sensor diaphragm when it comes into contact with the bottom, a removable protective cap is fitted to the probes.

Basically, the BD|SENSORS submersible probes are available with housing variants made from plastic and stainless steel - combined with different pressure sensor types, cable and seal versions and also different designs, they become the perfect solution for the prevailing installation situations.

- Use — suspend the product in the container / body of water<br>complete submersion in the medium
- Range — 0 ... 40 cm to 0 ... 250 m filling height
- Accuracy — 0.1 % FSO / 0.25% FSO / 0.35 % FSO / 0.50 % FSO
- Diameter — 17 - 45 mm
- Sensor — stainless steel / ceramic
- Housing — plastic / stainless steel / alloys
- Output signal — analogue / digital

## RESISTANCE PAR EXCELLENCE - THE CAPACITIVE-CERAMIC SENSOR

Robust measuring equipment is required wherever level measurement is taking place under demanding framework conditions, e.g. in sewage, contaminated, aggressive or corrosive media, with extreme temperature changes or with extremely low levels.

All product variants with a capacitive-ceramic sensor which respond to the above-mentioned challenges with the characteristics of resistance, long-term stability and versatility are predestined for applications of this nature. This type of sensor is used in the LMK 458 or LMK 351 probes, for example, and impresses when it comes to measurements in environmental engineering or the chemical industry.

# WHAT YOU CAN EXPECT FROM US

tailored to the application

## SERVICE IN NEXT TO NO TIME - DETACHABLE VARIANTS

The detachable submersible probes are a special case. With these variants, the probe part can be effortlessly detached from the cable without tools – a decisive advantage during servicing, since only part of the submersible probe is unscrewed, and the entire installation is not interfered with.

All detachable product types have one thing in common - a two-stage surge protection facility which protects the sensor signal, the signal processing and the signal transmission. Whereas the primary protection ensures that the overvoltage is limited to 90 V and a pulse current up to 8,000 A (8 kA) is dissipated, the subsequent secondary protection reduces the voltage that occurs to 36V, has a bipolar effect and can record pulsed power of 1,500 W.


## SCREW-IN TRANSMITTERS

Unlike the submersible probes, these variants are brought into contact with the medium to be monitored by screwing them into the walls of the container. In order to avoid liquid leakage, the leadthrough is sealed accordingly. This product family is also designed in such a way that a wide range of applications with high process stability is made possible.

- Usage: fitted to containers without being completely submerged
  Contact with the medium through the surface of a membrane or a sensor / seal
- Measuring range 0 ... 40 cm to 0 ... 60 m filling height
- Accuracy 0.1 % FSO / 0.25% FSO / 0.35 % FSO / 0.50 % FSO
- Sensor stainless steel / ceramic
- Housing plastic / stainless steel
- Thread metric / inch
- Output signal analogue / digital

# APPROVALS
## and certificates

In order to make problem-free use of our products on an international level possible, we at BD|SENSORS attach great importance to conformity with the currently applicable directives and regulations. We can fulfil the associated formal requirements for individual industries and applications with appropriate certifications. In this way, products that can be integrated immediately are available which can be used directly, without the need for time-consuming external assessments or testing.


### SAFETY
All of our products comply with the European and international guidelines regarding safety requirements.

### Hazardous substances
We fulfil all of the obligations stipulated by the REACH chemicals regulation and the EU RoHS directive.



### EXPLOSION PROTECTION
Our measuring technology is certiefied for explosion protection in accordance with the European and international guidelines.

### SHIPPING
Our portfolio includes measurement devices that are approved as official components by the most important shipping classification organisations.



### HYGIENE / DRINKING WATER
We fulfil the stringent demands of the food and pharmaceutical industries with products and components with a certified, hygienic and drinking water-compatible design.

# OVERVIEW MATRIX

submersible probes and screw-in transmitters

| PRODUCT | PREFERRED APPLICATION | | | | | | Ø mm | TYPE | HOUSING | | SENSOR | | LOWEST RANGE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | water / drinking water | waste water / viscous | sea water / salty water | fuel / oil | petrol / solvents | acid / lye | mm / inch | cable assembly / sensor head | metal | plastic | stainless steel | ceramic | meter $H_2O$ |
| **SUBMERSIBLE PROBE** | | | | | | | | | | | | | |
| DCL 551 | ● | ● | | | | | 40 | | ● | | | ● | 0.4 |
| DCL 571 | ● | ● | | | | | 22 | | ● | | | ● | 1 |
| LMK 307 | ● | ● | | | | | 27 | | ● | | | ● | 4 |
| LMK 307T | ● | ● | | | | | 27 | | ● | | | ● | 4 |
| LMK 358 | ● | ● | | | | | 40 | detachable | ● | | | ● | 0.4 |
| LMK 358H | ● | ● | | | | | 40 | detachable | ● | | | ● | 0.2 |
| LMK 382 | ● | ● | | | | | 40 | | ● | | | ● | 0.4 |
| LMK 382H | ● | ● | | | | | 40 | | ● | | | ● | 0.2 |
| LMK 387 | ● | ● | | | | | 22 | | ● | | | ● | 1 |
| LMK 387H | ● | ● | | | | | 22 | | ● | | | ● | 1 |
| DCL 531 | ● | | | ● | | | 27 | | ● | | ● | | 1 |
| LMK 306 | ● | | | ● | | | 17 | | ● | | ● | | 6 |
| LMP 305 | ● | | | ● | | | 19 | | ● | | ● | | 1 |
| LMP 307 | ● | | | ● | ● | | 22 | | ● | | ● | | 1 |
| LMP 307i | ● | | | ● | | | 27 | | ● | | ● | | 0.4 |
| LMP 307T | ● | | | ● | | | 27 | | ● | | ● | | 1 |
| LMP 308 | ● | | | ● | | | 35 | detachable | ● | | ● | | 1 |
| LMP 308i | ● | | | ● | | | 35 | detachable | ● | | ● | | 4 |
| LMP 808 | ● | | | ● | | | 35 | detachable | | ● | ● | | 1 |
| LMK 806 | | ● | | | | ● | 21 | | | ● | | ● | 6 |
| LMK 807 | | ● | | | | ● | 35 | | | ● | | ● | 4 |
| LMK 808 | | ● | | | | ● | 35 | detachable | | ● | | ● | 1 |
| LMK 809 | | ● | | | | ● | 45 | | | ● | | ● | 0.4 |
| LMK 858 | | ● | | | | ● | 45 | detachable | | ● | | ● | 0.4 |
| LMK 458 | | | ● | ● | | | 40 | | ● | | | ● | 0.4 |
| LMK 458H | | | ● | ● | | | 40 | | ● | | | ● | 0.2 |
| LMK 487 | | | ● | ● | | | 22 | | ● | | | ● | 1 |
| **SCREW-IN TRANSMITTER** | | | | | | | | | | | | | |
| LMP 331 | ● | | | ● | | | 3/4" | | ● | | ● | | 1 |
| LMP 331i | ● | | | ● | | | 3/4" | | ● | | ● | | 0.4 |
| LMK 331 | ● | ● | | | | ● | 3/4" | | ● | | | ● | 4 |
| LMK 351 | ● | ● | | | | ● | 1 1/2" | | ● | | | ● | 0.4 |

| OUTPUT | | APPROVAL | | | |
|---|---|---|---|---|---|
| analogue | digital | drinking water | nautic | EX / IS | SIL |
| | ● | | | | |
| | ● | ● | | | |
| ● | | | | ● | ● |
| ● | | | | | |
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| ● | | | ● | ● | |
| ● | | | | ● | ● |
| ● | | | | ● | |
| ● | | | | ● | ● |
| ● | | | | ● | |


## OUTPUT
analogue and digital output signals

## CABLE
different lengths and materials

## HOUSING
different plastics, stainless steels and special alloys

## TYPES
one-piece and detachable versions

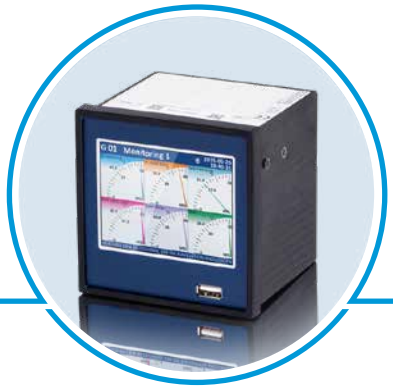
## SENSOR
stainless steel and ceramic sensor

# ACCESSORIES

displays and attachments

## Single-channel visualization

Different display variants with switching outputs are available for visualising individual measurement results, which are available in explosion-proof versions if required.



## Multi-channel visualization

Multi-channel displays provide a wide range of signal acquisition and processing options. The results obtained are visualised and saved using different display modes.

## Terminal box

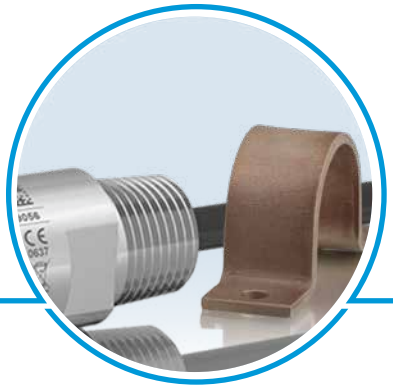
The two versions made from aluminium or plastic have a pressure compensation element, and are used for professional electrical connection of the submersible probes.

## On-tank installation

Flanges with different standard sizes and product variants with a thread are available for attaching submersible probes to the side of the tank wall.

## Installation using cables

The mounting flange and terminal clamp options provide secure attachment to the top of the container. Both enclose the cable and secure the probe at a predefined height.

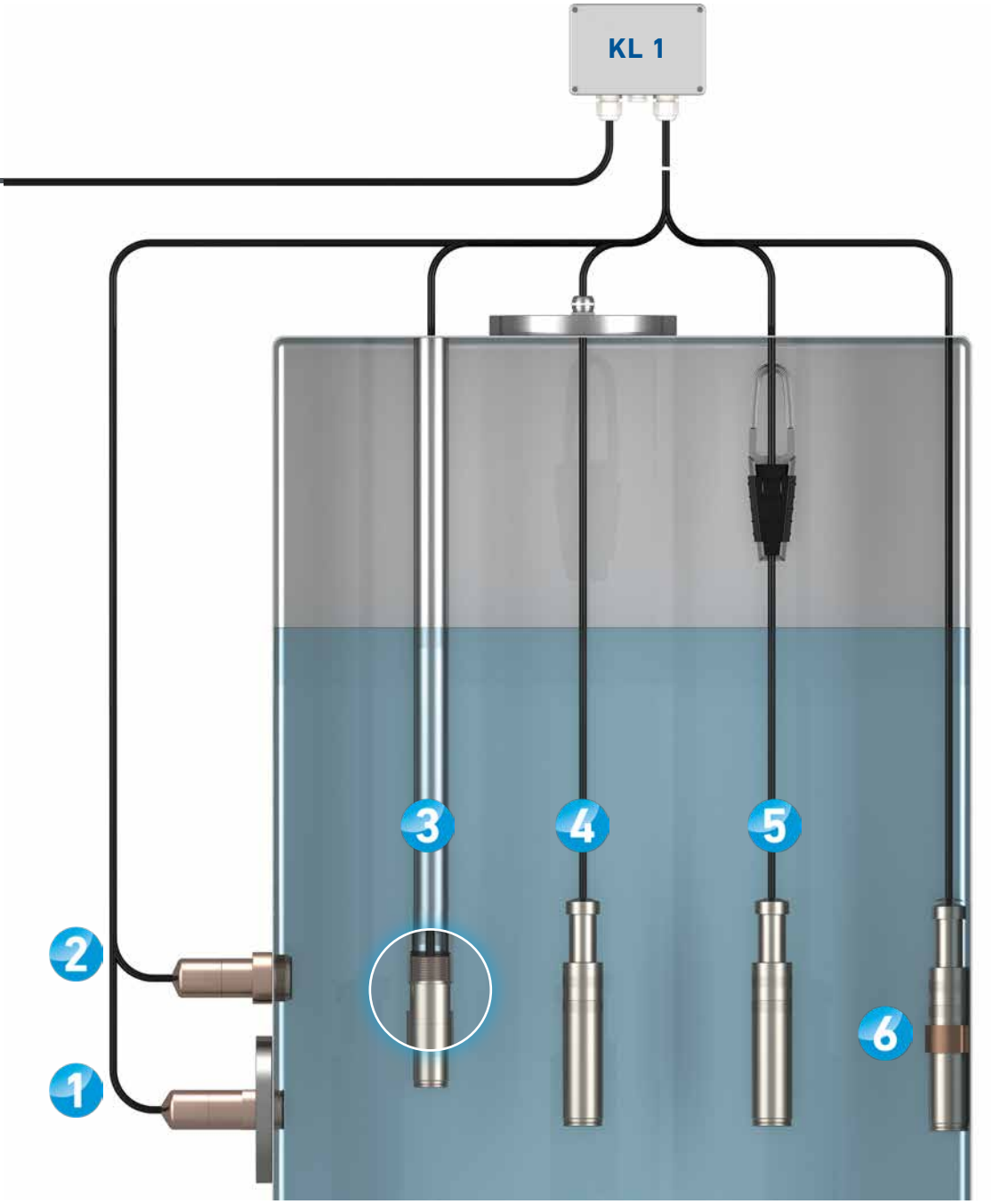


## In-tank installation

The level probes are optionally available with a thread for pipe mounting, or they can be securely attached to a solid surface using a mounting clamp.

## MOUNTING OPTIONS

We provide application-specific mounting options for the selected submersible probes. These ensure that the probe is fixed in the medium and protect the cable from the medium if necessary.




1. Attachment to the tank using a probe flange
2. Attachment to the tank via a thread
3. In-tank installation via a pipe
4. In-tank installation - suspension via mounting flange
5. In-tank installation - suspension via terminal clamp
6. In-tank installation using a clamp

# NOTES

**PHOTO CREDITS**
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# 4 ARGUMENTS
in favour of BD|SENSORS

## COMPETENCE

**Industrial measuring technology from 0.1 mbar to 8,000 bar**

- Be it pressure transmitters, electronic pressure switches or hydrostatic level probes
- Be it an OEM or high-end product
- Be it a standard product or a customized solution,

**BD|SENSORS** we have the right pressure measurement device both technically and in terms of price.

## RELIABILITY

**Plannable delivery times and strict adherence to deadlines**

Short delivery times and binding delivery dates, even with special designs, make **BD|SENSORS** a plannable partner to its customers.

**BD|SENSORS** Their stock levels are therefore reduced, and their value creation is increased.

## PRICE/PERFORMANCE RATIO

**Pressure measurement at the highest level**

Concentrating on the "electronic pressure transmitter" component has led to extraordinary efficiency and economical pricing.

**BD|SENSORS** We are convinced that we are one of the most economical suppliers on the world market, given equal technical and commercial conditions.

## FLEXIBILITY

**Solutions for your individual requirements**

We solve your tasks in industrial pressure measurement quickly and economically, not only for large-scale production lines, but also for small requirements.

The flexibility of **BD|SENSORS** is particularly evident when technical support and quick assistance are required for service cases as well as for rush orders.

BD|SENSORS
pressure measurement

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**Status 08/2021**
Subject to technical changes.