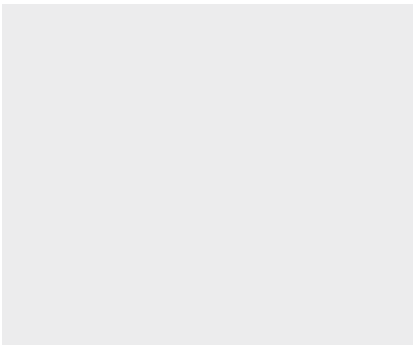




Level measurement

Universal technology for liquids, bulk materials and sediments

SICK
Sensor Intelligence.



You decide

when production processes need to be faster and more reliable. You are responsible for a cost-efficient solution of your measuring task and you select the best technology for your company. However, you rely not only on technical factors and commercial arguments. But you also evaluate product and technological competence?

We attach great importance

to providing qualified advice and optimum product solutions – even for difficult measuring tasks. We show you efficient options and interesting perspectives so that you can safely decide what is expedient and economically suitable for your application. So that you are fully satisfied.

A complex range of various measuring principles is not decisive – it shows instead a variety of application options. The reliability of the level measuring devices in use, the precision of the measuring results and solid, simple handling are what counts. Precision for many years – is this also an important criterion for you? We provide it.

What's in it for you?

You benefit from measurable performance for your level measurement.

Application and industry know-how

Liquid measurement

continuous and up-to-date just like liquid levels.

For stocking, tank content, storage capacities or automated disposal. You know yourself: Realtime inventory reports provide reliability for all production and fiscal necessities. We offer modern technology for this purpose, with good application advice.

Bulk material measurement

simply fascinating, fascinatingly simple.

Varying fill levels, very different product characteristics, changing pyramid peaks in bulk materials, high dust generation or ignitable ambient conditions. You know best: Bulk materials make complex demands on level measurement. And not just in silos or bunkers. The bulk material transport on conveyor belts also needs to be monitored. We provide this too.

Sediment measurement

getting to the bottom of things.

Knowing what has collected below the surface. Whether in the sewage treatment plant, in salt production or in sand processing. You are looking for transparency in the murky waters. We have the appropriate measuring technology.



Liquids

. . . knowing what is flowing.

Your logistics have to be correct: In storing and in individual process sections. Production and disposal processes have to function reliably. Precise level measurement is a guarantor for you.

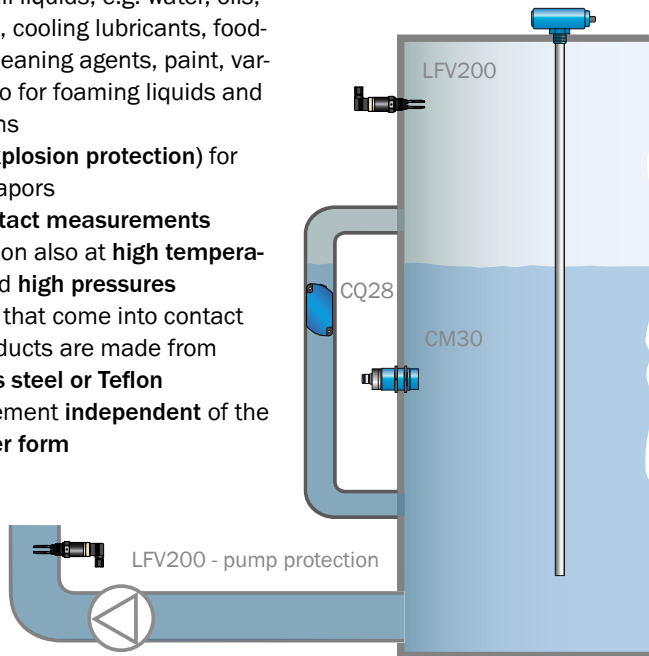
Reliable, in small and large containers

Modern technology for small and large measuring tasks. Laser, radar, guided microwave (TDR), ultra sound, capacitive measurement up to the electromechanical option: Measure liquid levels reliably with our measuring devices.

- **Modern sensor technology** for almost all liquids, e.g. water, oils, coolants, cooling lubricants, food-stuffs, cleaning agents, paint, varnish. Also for foaming liquids and emulsions
- **ATEX (explosion protection)** for gases/vapors
- **Non-contact measurements**
- Application also at **high temperatures** and **high pressures**
- All parts that come into contact with products are made from **stainless steel or Teflon**
- Measurement **independent** of the **container form**

Level measurement

- **High level detection**
- **Demand level detection**
- **Low detection**



Continuous measurement



Typical applications

- | | |
|--|---|
| <ul style="list-style-type: none"> • Water, waste water, sewage plants • Petrochemical and pharmaceutical industry • Woodworking, wood processing • Paper manufacture and processing | <ul style="list-style-type: none"> • Printing industry • Food, tobacco, beverages • Automotive engineering and vehicle manufacturing • Machine tools and manufacturing systems • Agriculture |
|--|---|

Bulk materials



. . . controlling what is feasible.

Reordering bulk material is automated to a high extent. More and more often, the current fill level in the silo is monitored in addition to the limit level. We have the suitable measuring devices for both tasks.

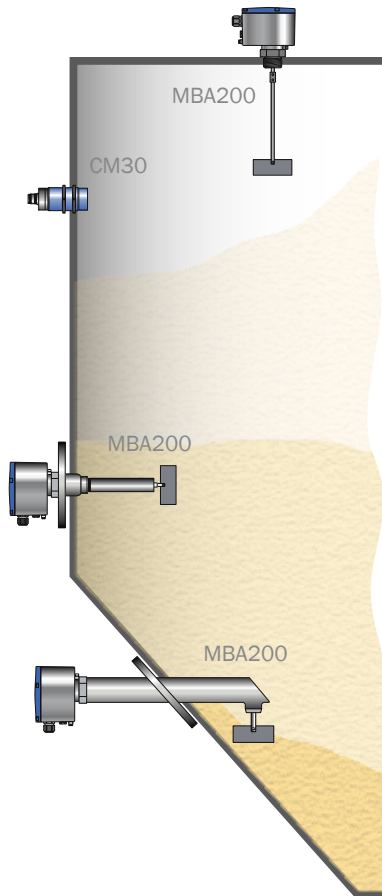
Powerful, also for complex measuring tasks

Used universally: level measurement tasks, which makes the selection for you simple for we have the right solution even for very complex level measurement tasks.

- **Modern sensor technology:** Radar, laser, ultra sound, electro-mechanical
- Universal for **all bulk materials**, e.g. stones, sand, wood chips, flue ashes, cement, flour, grain
- Explosion protection according to: **ATEX (zone 0/1, 0/ 0), CSA c/us or GOST**
- Silo level for limit level measurement: **unlimited**
- Silo level for continuous measurement: **to 70 m**
- **Non-contact** measurements
- Application also in **strong vibrations**
- All parts that come into contact with products are made from **stainless steel**
- Product temperatures **up to 800 °C**
- Process pressure **up to 10 bar**

Level measurement

- **High level detection**
- **Demand level detection**
- **Low detection**



Continuous measurement



Typical applications

- | | |
|-------------------------------------|--|
| • Waste treatment | • Foodstuffs, animal feed |
| • Rubber, plastics processing | • Paper manufacture, printing industry |
| • Glass, ceramics, china | • Wood processing |
| • Building materials, stones, earth | • Bottling plants |
| • Cement works, | • Mining industry |
| • Power plants | • Conveyor systems |
| • Metal and steel processing | |

Sediments

A large, white, layered rock formation with natural sea arches over turquoise water. The rock shows clear sedimentary layering and some weathering. The water is a vibrant turquoise color, and the sky is a clear blue. A solid blue rectangle is in the top right corner.

. . . acquiring what is important.

We get to the bottom of things. Every measuring task is individual, however, a new measuring principle is not always needed. The correct solution for your application is relevant, both under measuring and economical aspects.

Very special, yet routine for our measuring devices

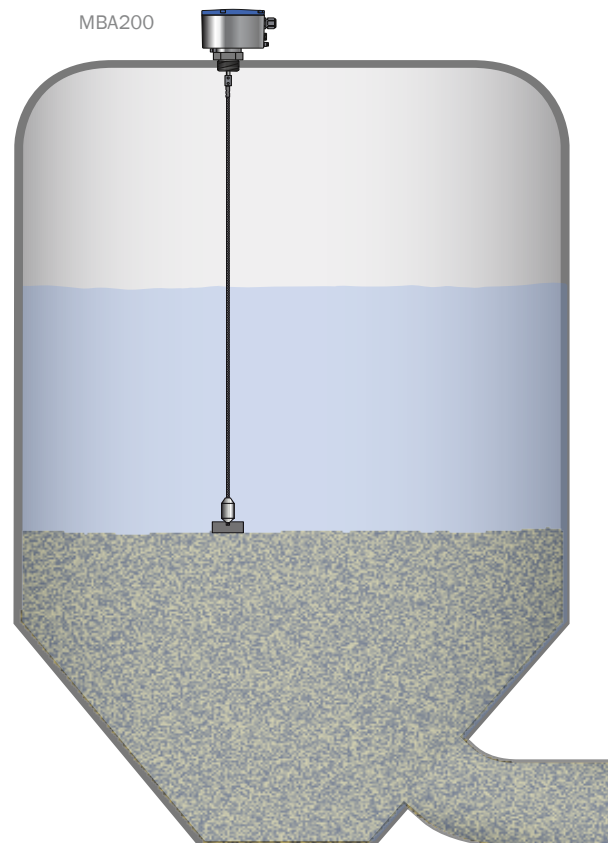
The level of solids below the liquid surface (sediments) can only be measured with a few special methods. Our measuring devices fascinate here as well: Precise measuring reliability, sturdy mechanical components, long service life, fast installation and start-up, acceptable price.

- Measurement of **sediments below liquids**, e.g. salt in brine, sludge in water, gravel and sand in water
- In **small and large containers**
- **Non-contact measurements**
- **Limit level measurements** also at temperatures **up to 800 °C**
- All parts that come into contact with products are made from **stainless steel**



Level measurement

- **High level detection**
- **Demand level detection**
- **Low detection**



Typical applications

- Salt production
- Building materials, stones, earth
- Gravel and sand quarrying
- Sewage plants

Volume quantities on conveyor belts

... measuring what comes out

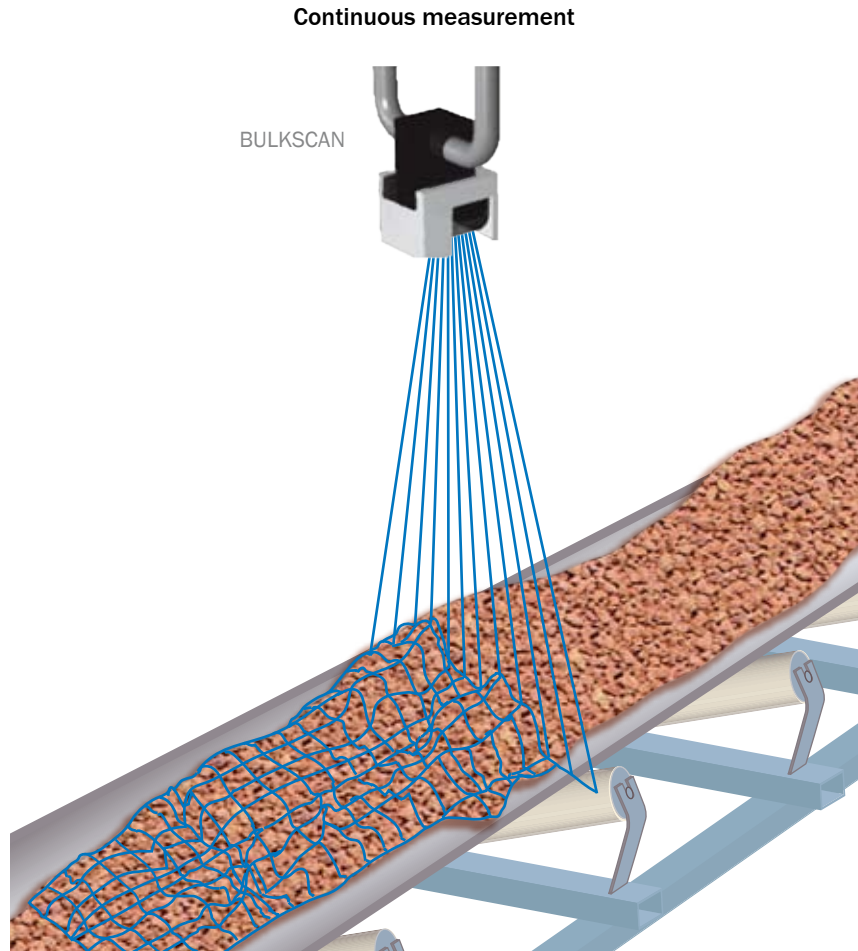
Conveying bulk material and continuously measuring the transport volume at the same time. Monitoring of conveyor load and center of gravity position on the conveyor belt to prevent malfunctions: We can provide this complete package.

Non-contact, exact and proven a thousand times

Scanning and measuring volume quantities with the sturdy BULKSCAN laser scanner wherever bulk material is transported via conveyor belts. The belt load is monitored and optimized, and energy and load time also saved.

The system performs additional functions: Early indication of center of gravity position of bulk material, warning when limit values are exceeded (overload), minimizing of malfunctions, minimizing of roller wear.

- Laser scanner for **maximum measuring precision**
- Volume measurement of bulk materials on conveyor belts, **continuously and non-contact**
- For example coal, ore, cement, foodstuffs, sand, wood chips, stones, waste materials
- Measured value output as **volume and weight per hour**
- **Low-maintenance technology**
- **Simple installation** above the conveyor belt, later installation possible
- **With additional and warning functions**



Typical applications

- Power plant industry
- Waste incineration
- Landfills
- Building materials, stones, earth, glass, ceramics
- Conveyor systems
- Food, beverages and tobacco
- Woodworking and processing

Continuous fill level measuring devices



	MP400	UM30
Measuring principle	Radar	Ultrassound
Application	Bulk materials, liquids	Bulk materials, liquids
Measuring method also suitable for	Dust	Dust
Maximum measuring range	70 m	6 m
Maximum measuring accuracy	15 mm	1 mm, 2% GTW
Signal output	4 ... 20 mA HART	4 ... 20 mA or 0 ... 10 V DC
Typical installation position	Vertical	Vertical
Approvals	ATEX	-
Dust explosion zones	20/21	-
Gas explosion zones	0 oder 1/0	-
Maximum temperature in container	200 °C	-
Maximum pressure in container	40 bar	-
Protection class (IP)	IP 68	IP 65
Parts that come into contact with products (foodstuff)	Non-contact	Non-contact
Measuement through container wall	Radar window	-

Extremely short microwave pulses are beamed by the antenna system to the product to be measured, reflected by the filled material surface and received by sensitive electronics. The container fill level is proportional to the time between sending and receiving the signal. A special time expansion process enables the safe and exact measurement of the extremely short times. State-of-the-art microprocessor technology reliably filters the correct fill level echo out of a multitude of interference reflections.

Ultrasonic sensors of this series detect the fill level independent from the product. The analog outlet switches over automatically between current and voltage. With its 4 ... 20 mA or 0 ... 10 V DC it fits into any measuring environment. Measurement is not affected by suspended matter in the air. Temperature compensation automatically compensates for temperature variations of the air. Specific metric design makes installation easy.



LFT	DMT	BULKSCAN
Guided microwave, TDR	Laser	Laser travel time meas.
Liquids	Bulk materials, liquids	Bulk materials
Foam	Dust	Dust
2 m	155 m	15 m
3 mm	10 mm	3 ... 5 %
4 ... 20 mA, 1,2 switch points	4 ... 20 mA, RS422	4 ... 20 mA, RS422, PROFIBUS
Vertical	Vertical	Vertical
-	-	-
-	-	-
-	-	-
80 °C	1200 °C	50 °C
1 bar rel.	-	Atmosphere
IP 67	IP 65	IP 65
Stainless steel	Non-contact	Non-contact
-	Optical window	Optical window

Microwave pulses are generated in the HF electronics, coupled to a coaxial probe and guided along the probe. When a microwave pulse hits the product surface, the pulse is reflected to the evaluation electronics. The fill level is determined based on the microwave travel time.

The pulse travel time measures with tiny laser light flashes of only four nanoseconds each. This sensor has very large scanning widths. The measured values are simply transmitted by means of different interfaces – analog/RS422 and RS232 or PROFIBUS.

A pulsed laser beam is emitted as „measuring sensor“. When it hits an object (bulk material), it is reflected and registered in the receiver of the scanner. The time between emitting and receiving the pulse is proportionate to the distance between the scanner and the object (light travel time). A rotating mirror moves the pulsed laser beam and scans the environment fan-shaped (laser radar). The two-dimensional contour data are sent via an RS422 interface to the LMI evaluation unit.

Limit level measuring devices



	MBA200	LFV200
Measuring principle	Rotor shaft, electromechanical	Vibrating fork
Application	Bulk materials, sediments	Liquids
Measuring method also suitable for	Dust	-
Maximum measuring range	-	-
Maximum measuring accuracy	-	-
Signal output	Relay (changeover contact)	Digital
Typical installation position	Vertical,/horizontal	Vertical/horizontal
Approvals	ATEX, CSA us/c, GOST	WHG, 3A, EHEDG, FDA-conformity
Dust explosion zones	20/20	-
Gas explosion zones	1	-
Maximum temperature in container	800 °C	100 °C, optional 150 °C
Maximum pressure in container	10 bar	64 bar
Protection class (IP)	IP 65	IP 67
Parts that come into contact with products (foodstuff)	Stainless steel	Stainless steel
Measurement through container wall	-	-

A synchronous motor rotates the rotor shaft slowly. Rotary movement is blocked when the bulk material reaches the rotor. The reaction torque is used to rotate the motor mechanism against a switch that switches the motor off. This condition is reported electronically via a relay switch contact. When the bulk material releases the rotor again, the motor mechanism is pulled back to the working position by a spring. The switch is unlocked and the rotor starts rotating again.

The sturdy stainless steel tuning fork is piezoelectrically energized and vibrates at its resonant frequency. If the tuning fork is covered with liquid, the vibration frequency changes. This change is reliably detected by the integrated electronic circuitry and converted into a switch signal. The switching status is visible on the outside by a two-colored LED. No adjustments are required to put the LFV200 into operation.



CM30	CQ28	LFT
Capacitive	Capacitive	Guided microwave, TDR
Liquids, bulk materials	Liquids, bulk materials	Liquids
Dust, foam	Dust, foam	Dust, foam
-	Switching distance up to 10 m	2 m
-	-	3 mm
Digital	Digital	Digital, 1 ... 4 switch points
Vertical/horizontal	Vertical/horizontal	Vertical
-	-	-
-	-	-
-	-	-
80 °C	85 °C	80 °C
Atmosphere	Atmosphere	1 bar rel.
IP 67	IP 68	IP 67
-	-	Stainless steel
Yes	Yes	-

Bulk material and container, together with a measuring probe, form an electrical capacitor. The fill level is acquired by measuring the capacitor capacity.

Bulk material and container, together with a measuring probe, form an electrical capacitor. The fill level is acquired by measuring the capacitor capacity.

The CQ28 enables the reliable acquisition of liquids and bulk materials through nonmetal walls. The sensitivity is set by means of the potentiometer on the sensor. The two LEDs of the CQ28 indicate the current switching state as well as the detection quality. PNP or NPN are optionally available as switching outputs.

Microwave pulses are generated in the HF electronics, coupled to a coaxial probe and guided along the probe. When a microwave pulse hits the product surface, the pulse is reflected to the evaluation electronics. The fill level is determined based on the microwave travel time.

FACTORY AUTOMATION

With its intelligent sensors, safety systems, and auto idet applications, SICK realises comprehensive solutions for factory automation.

- Non-contact detecting, counting, classifying, and positioning of any types of object
- Accident protection and personal safety using sensors, as well as safety software and services



LOGISTICS AUTOMATION

Sensors made by SICK form the basis for automating material flows and the optimisation of sorting and warehousing processes.

- Automated identification with bar code and RFID reading devices for the purpose of sorting and target control in industrial material flow
- Detecting volume, position, and contours of objects and surroundings with laser measurement systems



PROCESS AUTOMATION

Analyzers and Process Instrumentation by SICK MAIHAK provides for the best possible acquisition of environmental and process data.

- Complete systems solutions for gas analysis, dust measurement, flow rate measurement, water analysis or, respectively, liquid analysis, and level measurement as well as other tasks



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