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## A winning team!

### Level Control Measurement in Water and Wastewater treatment

Pepperl+Fuchs provide a various range of level control sensors for the limit detection and the continuous measurement for applications in water and wastewater industry.

#### Float switches LFL

Float switches are used for simple limit value recording in liquids. The greater density of the liquid means that the switch floats on the surface of the medium. The float switch is fixed with its cable securing element at a level adapted to suit the process. Tilting motion during rising and falling of the float triggers the switching procedure. Proximity sensors and micro switches are used as switching elements.

The LFL float switch series is used as limit value switches in the form of a sphere or sleeve. LFL thus represents an inexpensive solution for detecting limit levels and signaling leaks to the connected monitoring system.

#### Vibration limit switch LVL

The piezoelectric-agitated oscillation of a vibrating fork is dampened if it comes into contact with the filling medium. Electronics generate the switching signal on the basis of these changes. The function is independent of changing physical properties of the medium and is not influenced by currents, turbulence, air bubbles, foam, vibration, solid particles or deposits.

The Vibracon LVL limit value switch is a universal filling level limit switch designed for use in all liquid media. Areas of use range from leak detection, pump protection and minimum/maximum monitoring of the medium in the tank to applications at high pressures up to 64 bar and high temperatures up to 150 °C. Its compact construction enables utilization in confined spaces. A special hygienic construction allows its use in food and pharmaceutical applications.

The variety of electronic inserts (relay, NAMUR, thyristor signal output) enables connection to every process control. EEx ia and EEx d combustion protection mean it can be used in potentially-explosive environments.

## **Conductive probes LKL-P**

The conductivity of the liquid filling medium may vary across a broad range. The rising liquid makes the AC circuit (DC current-free) between two electrodes (or electrodes and the metal container) when the fixed filling level limit governed by the installation height is reached. The switching signal is generated from the abrupt increase in current. Acids, Bases and watery solutions are conductive and are therefore detected effectively.

The LKL-P conductive measurement recorder is utilized in liquids from 10  $\mu\text{S}/\text{cm}$  onwards for limit level recording and leak detection. Measuring tasks such as overfilling protection, dry running protection, two-point control of pumps or multi-point detection with an existing process connection can be realized, depending on the number of measuring points (up to five rods or cables). The LKL-P probe thus provides flexible instrumentation with integrated electronic inserts (PNP, NAMUR, relay output) for system monitoring as leak indicators.

## **Hydrostatic measurement principle - LGC probe**

The pressure in a liquid increases constantly in relation to the filling height. This hydrostatic pressure is transmitted to the measuring cells via a membrane (ceramic or stainless steel). Foam, the formation of deposits, changing electrical characteristics of a medium and the shape of the container have no influence whatsoever here on measurement value recording. LGC probe series provide a measuring range of up to 200 m in deep well applications.

## **Ultrasonic sensors for filling level recording**

The filling height is calculated from the time between transmission by an ultrasonic sensor and reception of the echo reflected on the filling medium surface. Chemical and physical properties of the medium do not influence the measurement result. This means that aggressive, abrasive, sluggish and adhesive media can also be measured without any problem. The measuring ranges of LUC-T ultrasonic sensors cover an extremely broad and user-friendly range up to 15 m height difference.

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Fig. 1: float switch LFL



Fig. 2: Vibration tuning fork LVL-M



Fig. 3: Conductive probe LKL-P



Fig. 4: Level probe LGC



Fig. 5: Ultrasonic sensor LUC-M