



Fill level switch

Multi-dimensional capacitive sensor system
for fill level measurement

capaTEC⁺

EBE

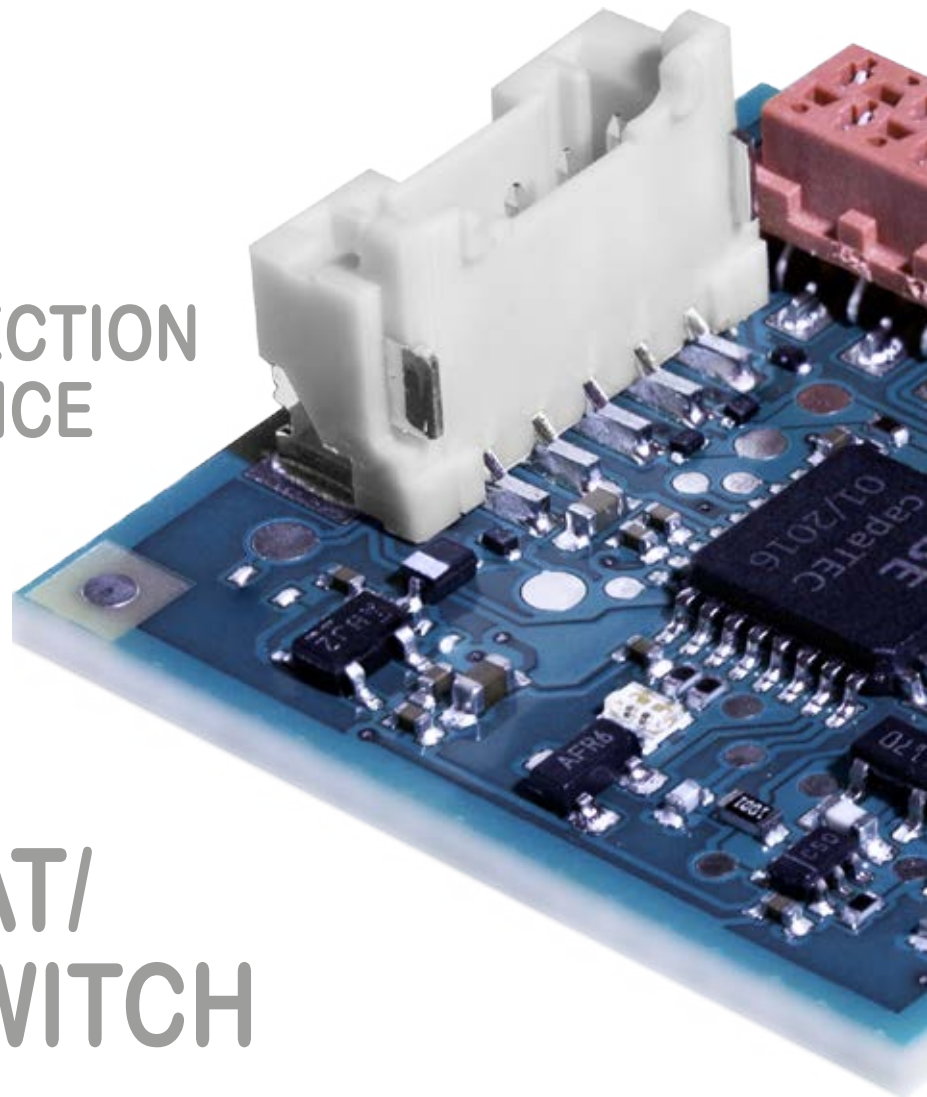
sensors and motion



MEASUREMENT THROUGH THE CONTAINER WALL

BIO-FILM DETECTION
AND RESISTANCE

NO FLOAT/
REED SWITCH



EBE

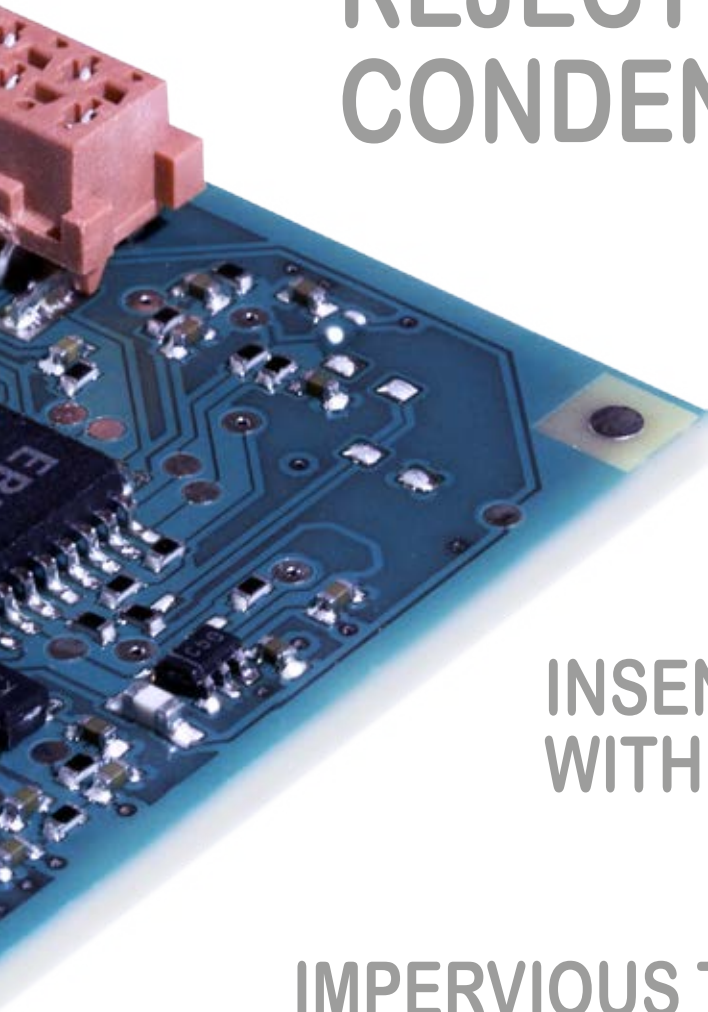
sensors and motion

RELIABLE PRESENCE
DETECTION OF EMPTY
CONTAINERS

REJECTION OF DROPS/
CONDENSATE

INSENSITIVE TO CONTACT
WITH THE CONTAINER

IMPERVIOUS TO TEMPERATURE
AND MOISTURE INFLUENCES



Multi-dimensional sensor system for fill level measurement

MEASUREMENT THROUGH THE CONTAINER WALL

The fill level switch detects the surface of the liquid without contact, through the container wall and the machine housing. Any air gaps between these components have no influence on the measurement results.



IMPERVIOUS TO TEMPERATURE AND MOISTURE INFLUENCES

The basic measurement principle is independent of temperature and humidity. These often lead to malfunctions with conventional capacitive sensors.



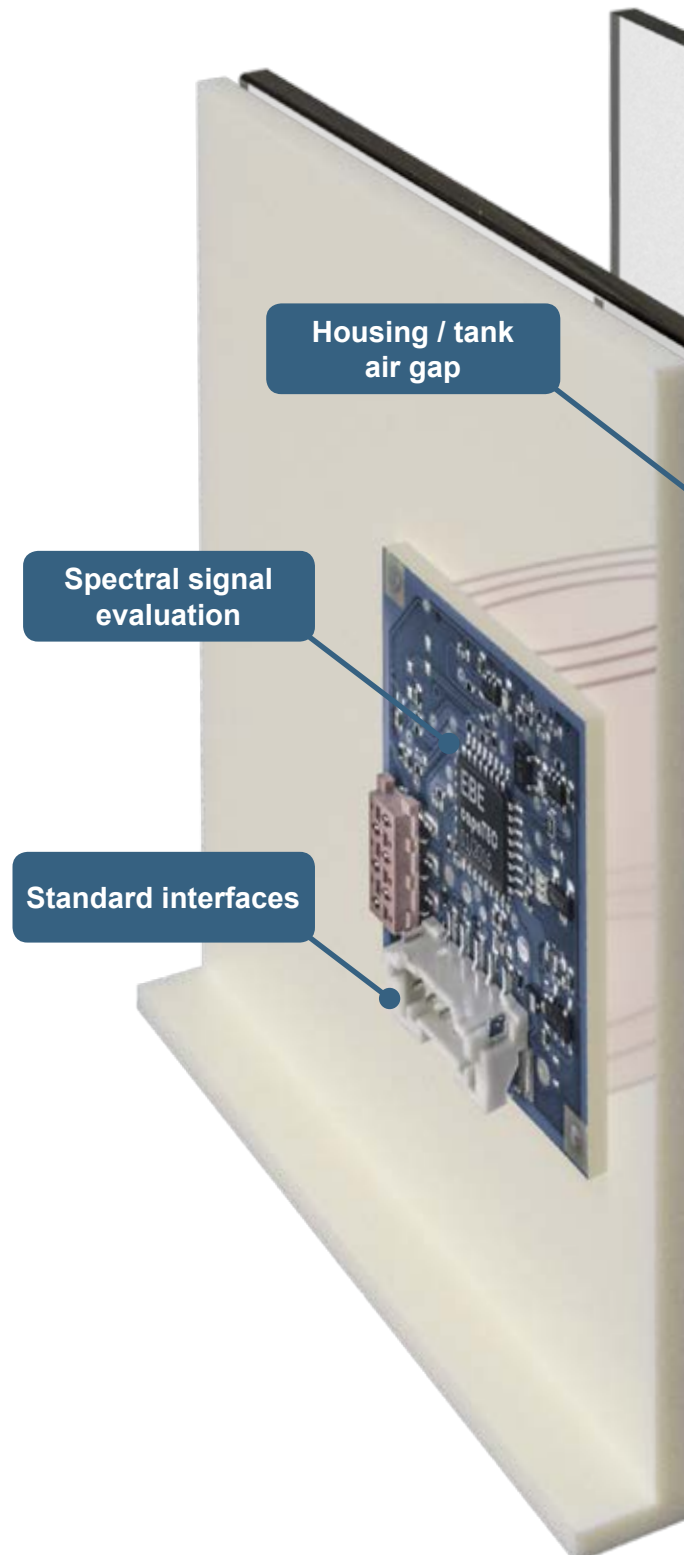
REJECTION OF DROPS/ CONDENSATE

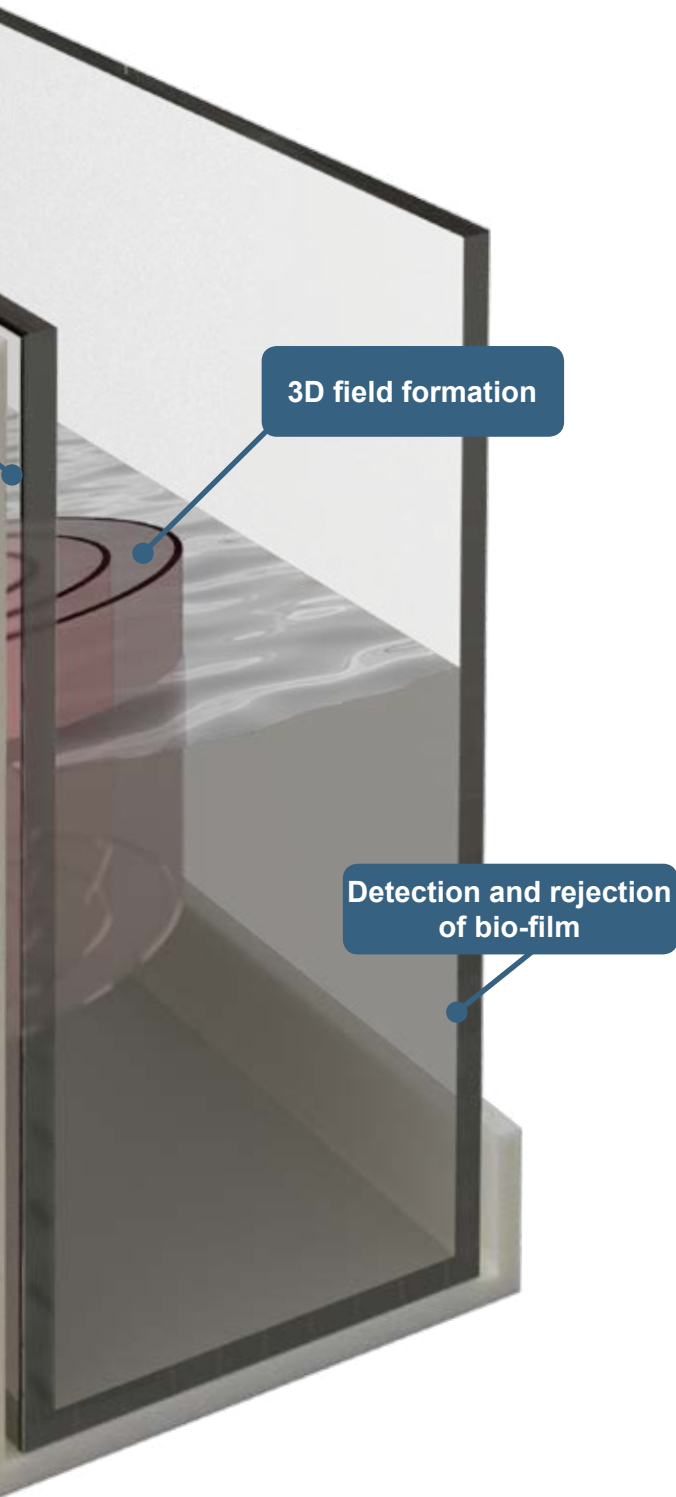
The special assessment algorithms of the EBE fill level switch enable differentiation between a solid liquid column and drops or condensate adhering to the container. Even drops on the interior of the container will not lead to an erroneous measurement.



BIO-FILM DETECTION

If a container has become contaminated with bio-film due to inadequate cleaning, the effects of this will be rejected through the innovative algorithms and will not lead to erroneous measurement results. The presence of bio-film can be reported back to the device controller.





NO FLOAT

The capacitive measurement principle uses no moving parts and in particular avoids having to use problematic floats. As a result the tank can be designed in a more visually attractive manner without any disruptive float shafts. Malfunctions due to floats that have become jammed as a result of chalk deposits can therefore be completely eliminated.



PRESENCE DETECTION - EMPTY CONTAINER

The new type of 3D measurement principle enables reliable detection and signalling of the empty container without additional elements.



INSENSITIVE TO CONTACT WITH THE CONTAINER

The fill level switch does not react to hands touching the container. This often led to a malfunction with conventional capacitive sensors.



4-channel capacitive
measurement process



Spectroscopic signal
evaluation



3D field formation

Our fill level sensor portfolio

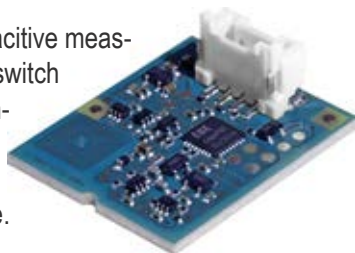
Various measurement processes are used for the different requirements for fill level measurement. They record and monitor the level continuously or by means of limit values, depending on the application - and also depending on the medium and container. Our sensors are employed in the fields of white goods, automotive, medical equipment, foodstuffs industry, beverages industry and in the chemicals industry.

FILL LEVEL SWITCHES

Contactless, capacitive measurement fill level switch with capacitive container detection and rejection of drops/condensate as well as bio-film.



Contactless, capacitive measurement fill level switch with inductive container detection and rejection of drops/condensate.

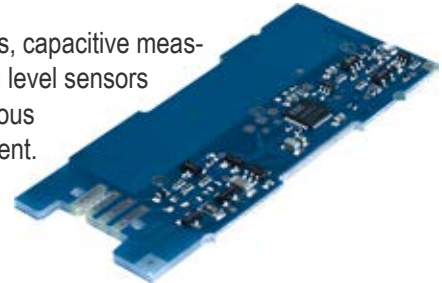


Contactless, capacitive measurement fill level switch in hot-melt housing with sealed, kink-protected connection cable.



FILL LEVEL SENSORS

Contactless, capacitive measurement fill level sensors for continuous measurement.



Capacitive measurement fill level sensor for conductive and non-conductive media. With non-conductive media, the electrodes are arranged coaxially. With conductive media a single insulated electrode suffices.



Inductive measurement fill level switch with float. Contactless and wear-free measurement. Suitable for conductive and non-conductive media.



Other fill level measurement technologies from EBE:

- Time-of-Flight sensors
- Radar sensors

Possible applications in the field of household appliances

COFFEE MACHINES

In the fresh water tank, the capacitive sensor technology permits dispensing with the magnetic float and therefore enables significantly greater design freedom with the tank. Because no float shaft is required, no costs arise for the plastic injection moulding tools. When determining the minimum fill level in the fresh water tank, the ability of the **capaTEC+** level switch to mask out the bio-film layer is the key to assured functionality without erroneous measurements, also in the case of tanks with greater bio-film contamination.

Through the use of **capaTEC+** in the drip water tray, it is possible to dispense with the resistive sensor technology. This is frequently prone to malfunctions, due to the constant contamination of the drip tray with coffee residues and coffee oil. **capaTEC+** determines the maximum level in the drip tray without direct contact with the medium. The measurement takes place through the walls of the drip tray and the machine housing, and therefore ensures a high level of functional safety.



The capacitive measurement of the level of coffee beans in the supply tank is heavily dependent on the geometric conditions, although it can offer a real alternative to optical measurement in many cases.

BAKING / COOKING

In the case of ovens with a steam function and steam cookers, the measurement of the water supply required for steam generation is essential for the faultless operation of the appliance.

At the start of a lengthy baking / steaming process, it is necessary to determine whether the water supply is sufficient for this program, because topping up during the program sequence is often impossible.

The **capaTEC+** technology facilitates measurement of the water supply through the tank wall of the removable water supply tank without contact with the media.



Possible applications in the field of household appliances

BAKING / COOKING

Furthermore, **capaTEC+** also facilitates the reliable detection of an empty tank. This is particularly important if water should be pumped back out of the steam generator into the supply tank, initiated by the central controller of the oven / steam cooker. This return pumping must only take place if the empty tank is actually inside the appliance.

The ability of **capaTEC+** to safely determine the actual level - also with the presence of droplets or condensation on the supply tank - facilitates faultless operation even under difficult ambient conditions.



WASHING / DRYING

In washing machines, **capaTEC+** is suitable for use in the area of the Aquastop safety system, and it also saves valuable installation space in comparison to conventional float / microswitch solutions.

Because **capaTEC+** does not contain any moving components, there is also no danger of sticking after an extended time without actuation, which can be the case with Aquastop systems depending on the application.

In the case of tumble dryers, **capaTEC+** detects the liquid level in the condensate tank and thereby avoids the disadvantages of the conventional resistive sensor systems. The capacitive level switch has no direct contact with the liquid and its function is not impeded by any fluff present in the condensate.



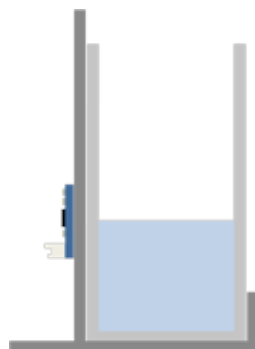
SMALL APPLIANCES

In all areas where conventional reed switches with magnetic float solutions are used for fill level detection in small appliances, cost-neutral replacement with level switches based on **capaTEC+** technology is a favourable option. This facilitates a significant simplification of the tank geometry and completely avoids the frequently occurring problem of calcification-related sticking with float-based systems.



Positioning variants of the level switch

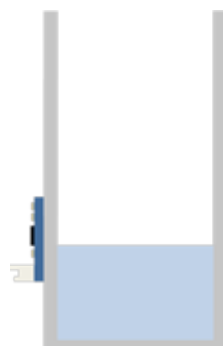
Measurement through the machine housing with a removable tank



Measurement at the drip tray through the machine housing



Measurement directly at the water tank with a fixed tank installation



Fastening options

ADHESIVE TAPE



SCREW CONNECTION



HOT CAULKING



HOT MELT OVER-MOULDING



PLASTIC RETAINER



Development

We want to know and understand your desires and expectations precisely in order to present you with an optimised solution. With their enthusiasm for technology and constant endeavours to optimise our technologies, our development engineers will convert your individual requirements into impressive technical solutions for your application. In doing so, we use our innovative underlying technologies with supplementary modules. You receive an innovative product with its unique selling point, which strengthens your competitive position. We are already thinking about the solutions for tomorrow and often suggest completely new approaches as early as in the planning stage so that ideas can evolve into innovative products. We use SCRUM-based project management to develop your application with a high level of efficiency.

Quality

The latest statistical methods for process monitoring during the manufacturing of our fill level switches ensure consistently high quality in your application.

For this reason, high quality in the cycle from new development or problem solving through to production and sales, in accordance with DIN ISO 9001 is more than just a procedure, it is an inherent part of our company philosophy – and is certificated! Our site in Friedrichshafen is also certified in accordance with the medical equipment standard DIN EN ISO 13485 as well as the standard for the automotive industry - ISO TS 16949. This guarantees high product and service quality.

Serial production

From rapid prototype production through to serial production of high quantities, we produce your sensors in accordance with the highest quality standards.





INNOVATIVE COMPETENT CUSTOMER-ORIENTED

Your requirements - our application-specific sensor systems!

Sensors play an increasingly important role in making applications simpler and more convenient. They are critical components for the quality and reliability of your products and solutions.

Our high quality fill level switches, based on the most innovative technologies, are specially adapted to your application and are designed specifically for use in price-sensitive markets. We can offer you a tailor-made sensor solution for your product.

Technology is moving quickly. Our qualified and motivated staff are always right at the forefront. Our know-how should be your competitive advantage!

We stand for

- Innovative Technologies
- Highest Quality
- Customer Focus
- Consistency and Reliability
- Experience, Foresight and Commitment to Success

Contact:

EBE Elektro-Bau-Elemente GmbH
Sales
Sielminger Strasse 63
70771 Leinfelden-Echterdingen
Tel: +49 711 79986-0
Fax: +49 711 79986-250
email: vertrieb@ebe-gmbh.de
www.ebe-gmbh.de