

Turck offers the new capacitive sensors with teach buttons or teach cable in M18 and M30



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Quick Taught Sensors

Turck's new capacitive sensors of the BCT series offer maximum user-friendliness with teach buttons and LED indication

When it comes to the monitoring of tank levels, there seems almost no limit to the sensor technologies available. Ultrasonic sensors, photoelectric sensors, radar or microwave technology, as well as various mechanical level measuring systems that operate with floats, paddle switches or vibration sensors can be selected. It is also possible to use systems that control levels by measuring pressure differences, conductivity or electrical capacitance. Some of these measuring processes can provide information on the actual fill level in a tank. Other tech-

niques are used as limit switches and protect tanks from fill levels that are too low or too high. Capacitive sensor technology can perform both tasks.

Operation of capacitive sensors

A capacitive sensor is similar in design to a capacitor: two plates (electrodes), between which an electric charge can be stored. The charge level or capacitance of the "capacitor" changes according to the medium between the two plates. This change is interpreted as a

The robust capacitive sensors are also suitable for use in mobile building and agricultural machinery



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signal. This principle can be implemented so that both electrodes are submerged into the measured medium and fill levels can also be determined precisely. Capacitive sensors are normally in fully enclosed housings. They are fitted on the outside of the tank to be measured and detect whether there is a medium behind the tank wall or not.

Fill level measuring from outside

The major benefit of capacitive level measuring is the simple mounting on the outside wall. The tanks, however, must not be made of metal. The medium must have a higher dielectric constant than air in order to be able to detect a difference between full and empty, which is always the case – apart from gases.

All capacitive sensors that detect levels in this way must be taught for the medium to be measured. For this the sensor is fitted to the tank and “taught” for the medium present or the medium not present level. Many sensors are provided with a potentiometer at the sensor end for carrying out the setting. However, this requires some experience or at least precise instruction. The sensor must be taught the switch threshold but with an amount of reserve. Otherwise it could misinterpret deposits stuck to the sensor cap or the inside of the tank as a full tank.

Capacitive sensors have to be reset if the fill medium has changed. Previously, technicians had to reset the sensor in the field with a screwdriver. This was a particularly laborious task if it involved the removal of covers, or if for other reasons the sensor was very difficult to access.

Single-click teach: experience built in

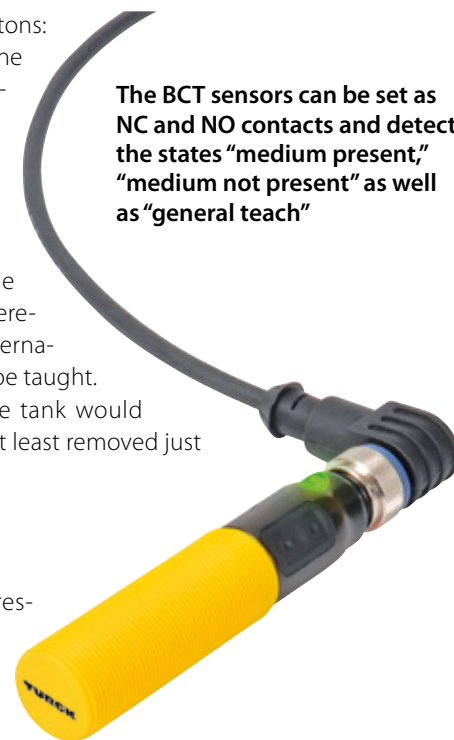
Instead of using a screwdriver as before, Turck's new BCT series can be taught easily with a single press of the button. The sensor version with an integrated teach

function is provided with two buttons: one for setting the full level and one for setting the medium not present level. The user can teach the sensor at any time regardless of whether the tank is empty or full. The BCT automatically sets a buffer area around the actual switch threshold. The experience of the technician and Turck Support is therefore built into the sensor. With alternative products both states have to be taught. If the sensor is already fitted, the tank would have to be drained or the sensor at least removed just to set it to a new medium.

LED visible from all sides

With the BCT, both “medium present” and “medium not present” states only have to be taught if the medium is particularly difficult to detect. The fast flashing of the LED indicates to the user when teaching was not successful. The sensor also checks whether the logic of the selected

The BCT sensors can be set as NC and NO contacts and detect the states “medium present,” “medium not present” as well as “general teach”



▶ Quick read

In factory automation, level control is largely implemented with capacitive sensors. The benefit: You can measure tank levels through plastic and glass walls. The new device generation requires just one press of a button to teach the sensors for the particular medium. In order to reliably protect sensors from manipulation, Turck also offers a variant that can only be taught via a cable.



Capacitive sensors are not only suitable for level measuring on plastic containers but also for "flow detection" on plastic pipes

setting is correct. If, for example, the "medium not present" state of a tank is taught as medium present or the "medium present" state as medium not present, the sensor does not accept the teach operation and indicates this via the LED display.

Another benefit: The on-board teach on the rear of the sensor has a dark plexiglass cover. If the LEDs are lit, the entire back end of the sensor lights up. This visibility can be very useful, particularly if the area directly behind the sensor is blocked with covers or mounting brackets.

Remote teach version

Turck is also putting a version on the market without pushbuttons, for teaching via a cable. Switch points can be defined with the teach adapter from Turck. The adapter can also be fitted in the control center or on the control console away from the sensor. A manufacturer of agricultural machinery, for example, can use this BCT version to fit the pipes of its combine harvester so that the teaching of new media can be carried out with a single click from the driver cabin. If the type of grain changes, the driver can set a new switch threshold with a single push of the button. The programming logic of the remote teach variant is the same as the on-board teach. This is also useful for other purposes: Programming via a cable is useful if the BCT is mounted in hard to access locations. This variant also offers reliable protection from unauthorized manipulations in the field.

► Overfill protection made easy

If a tank also has to be protected from overflowing even in the event of a potential cable break, the upper full level sensor has to be programmed as an NC contact. For this the user just has to press pushbutton 1 for ten seconds. The sensor is factory set as an NO contact.



The Teach buttons and LEDs makes teaching the sensor in the field child's play

Sensor variants

By combining NC and NO contacts in a single device, Turck was able to reduce the number of variants in the BCT series. The new device generation is available as an M18 and M30 variant in the cylindrical plastic housing with a male thread – with or without on-board teach. All four devices are available as NPN or PNP versions.

Typical applications

All fill level controls for tanks made of non-conductive material are typical applications for the BCT series. The tanks can contain liquid, fine particle, granular or also course material fillings. The coloration or turbidity of liquids does not play a role with capacitive sensors. Foams likewise do not present a problem. They are detected as medium present or medium not present depending on how the switch point is set. ■

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