

Complete guide to level transmitters

A level transmitter is an instrument that provides constant level measurement. Level transmitters are used to determine the level of a certain bulk-solid or liquid at any specified time. Level transmitters are different to level switches, which only sound an alarm when the level of material reaches a predetermined level.

This PDF explains how level transmitters work and showcases several different level transmitter types.

Level transmitter types

There are six main types of level transmitters. Each of these transmitters work in different ways, making them useful for a number of different processes.

Radar fill level transmitters

Radar fill level transmitters use radio wave emissions just like radars. Usually, these devices are mounted at or near the top of a tank filled with a liquid. The transmitter itself sends a radar signal into the liquid in the tank and receives a reflection of that signal. The transmitters will then accurately calculate the current fill level of the tank based on how long it takes the transmitted signal to return.

Ultrasonic level transmitter

Ultrasonic level transmitters act in a manner similar to the non-contact radar fill level transmitters. With this transmitter, an ultrasonic transducer mounted to or near the top of the container sends out an ultrasonic pulse. When the pulse hits the surface of the liquid, it is reflected and the sensor calculates the fill level based on the time between the pulse and the return signal.

Guided microwave level transmitters

Guided microwave level transmitters work by sending a microwave or electromagnetic pulse through a sensor rod/cable. When the signal hits the surface of the liquid, it travels back up the sensor rod and back to the transmitter housing. The electronics are integrated into the transmitter housing, which determines the filling level from the time taken for the signal to travel down the sensor rod and back up again. The value is then shown in the display of the transmitter. This type of level transmitter is suitable for liquids and is used in industrial applications in all areas of process technology.

Magnetic level transmitters

Magnetic level transmitters use a small, magnetic object suspended in a buoyant float. This is normally inside a narrow auxiliary column, in order to restrict any lateral movement of the float. While the float sits on top of the liquid, a different magnetic device measures the movement of the float. This allows an accurate, consistent fill level to be transmitted. This method is useful for continuous measurement, due to the float's tendency to rise or sink in harmony with the level of liquid.

Capacitance level transmitters

Capacitance level transmitters take their name from capacitors. The electrical circuit element that temporarily stores energy for a circuit to use. Capacitors store energy between two insulated electrodes. A non-conductive medium is placed between the two electrodes to help store electrical charge. The more dielectric the medium, the more energy can be stored. Therefore, capacitance level transmitters use the liquid in a tank as a dielectric medium between two or more electrodes.

Hydrostatic level transmitters

Hydrostatic level transmitters, also known as pressure level transmitters, determine a container's fluid contents by measuring the pressure of the resting body of fluid within it. The bigger the force of the liquid, the bigger the volume of fluid inside the container. This is one of the most common types of fill level detection devices. It is crucial that the liquid's density remains constant to ensure accurate measurement. As the liquid's gravity increases, the pressure per cubic inch exerted on the transmitter also rises.

Burkert level transmitters

Bürkert is one of the world's leading manufacturers of level transmitters; here we take a look at two of their most popular level transmitters:

Type 8188 - Guided microwave level measurement device

The [type 8188](#) is a level measurement device with cable, rod, both interchangeable probe or with coax probe, designed for continuous level measurement. The unit is suitable for liquids, for industrial use in all areas of process technology.

Features and benefits:

- Universal level measurement device for liquids
- Liquid interface measurement
- Insensitive to dust and steam
- 4... 20 mA/HART – 2 wires
- ATEX/IECEX approvals

Type 8177 – Ultrasonic level transmitter

The [Bürkert](#) type 8177 is a non-contact ultrasonic level transmitter designed for continuous level measurement in open or closed vessels. Suitable for liquids and solids in virtually all industries and applications, it is particularly suitable for water and wastewater management systems.

Features and benefits

- Compact design for level measurement up to 8 m
- 4...20 mA/Hart – 2 wires Output
- Suitable for solids or liquids
- ATEX approvals for use in hazardous Areas.