What's the point?

Choosing the point level sensor for your application

Maintenance and plant management use point level sensors as an important component in controlling the production process. Used as high, low, or mid-level sensor, they can assure a continuous supply of material into a production process and prevent downtime. When used in conjunction with an alarm, such as a horn or light, they make the workplace safer by eliminating the need to climb vessels. Point level sensors are easy to install through an existing mounting connection, and many offer varied power supplies, making them convenient to wire to the existing electrical system.

Affordably priced with most at a few hundred dollars, they may fall into a company's MRO budget. This is unlike a complete inventory management system that could require the approval of a capital expense. Compact and light, they can be installed incrementally in a few vessels at a time, without a huge investment in either time or money. An MRO purchase can often be done on a credit card or on a purchase order without corporate approval.

An often-overlooked advantage is that point level sensors play an important role in redundancy in an inventory management system. Used as a fail-safe, high-level indicator, point level sensors can alert to potential overfills. Working in tandem with continuous contact or non-contact sensors, these highly reliable devices may detect a potential issue that could cause material waste or damage to the structure, expensive equipment, or other sensors in the vessel.

Rotary Level Indicators

Rotaries are a familiar and common device used for high or low-level point level indication in bins, tanks, and silos. Rotaries are versatile enough to use in nearly any material from powders and granules with a minimum bulk density of 2 lb/cu ft3 to coarse, lump materials with bulk densities up to 150 lb/cu ft3.

The principle of operation for rotaries is quite simple. When the rotary is used to alert that material has reached a high level while the tank is filling, the paddle rotates continually until material reaches the paddle. When the paddle meets resistance due to the presence of material, it stops rotating and sends an alert via a control room, horn, light, or an alarm panel. Conversely, as a low-level indicator, the paddle will begin turning when material drops below the level of the paddle and will send an alert or can be wired to shut off a process system. When tied to process control, it is important to use a rotary with a fail-safe feature to ensure you are alerted in the event of a rotary failure.

A glass recycler using BinMaster rotaries for low, medium and high-level detection on silos containing glass.

With advancements in product design, most vibrating rods do not require calibration and easily adjust to the desired sensitivity level.

Rotaries are increasingly applied in new and innovative ways. For high level detection at the interior of a vessel, a vertical extension on a rotary can allow it to be extended as far as 12 feet down into the bin, tank, or silo. This configuration is recommended for a center-fill vessel when the operation requires a specific amount of headroom. Mounted on the top of the vessel, a vertically-extended rotary can alert when material is higher toward the center of the container versus simply detecting the level of material near the sidewall which could be at a lower level when filling (cone up) and at a higher level when emptying (cone down). For thick tank walls, such as those in cement silos, a horizontal extension allows a rotary to be used to detect material levels through the sidewall. When a horizontal extension is combined with a collapsible paddle, the rotary can be installed through a 1-1/4″ or 1-1/2″ NPT opening without entering the vessel.

Capacitance Probes

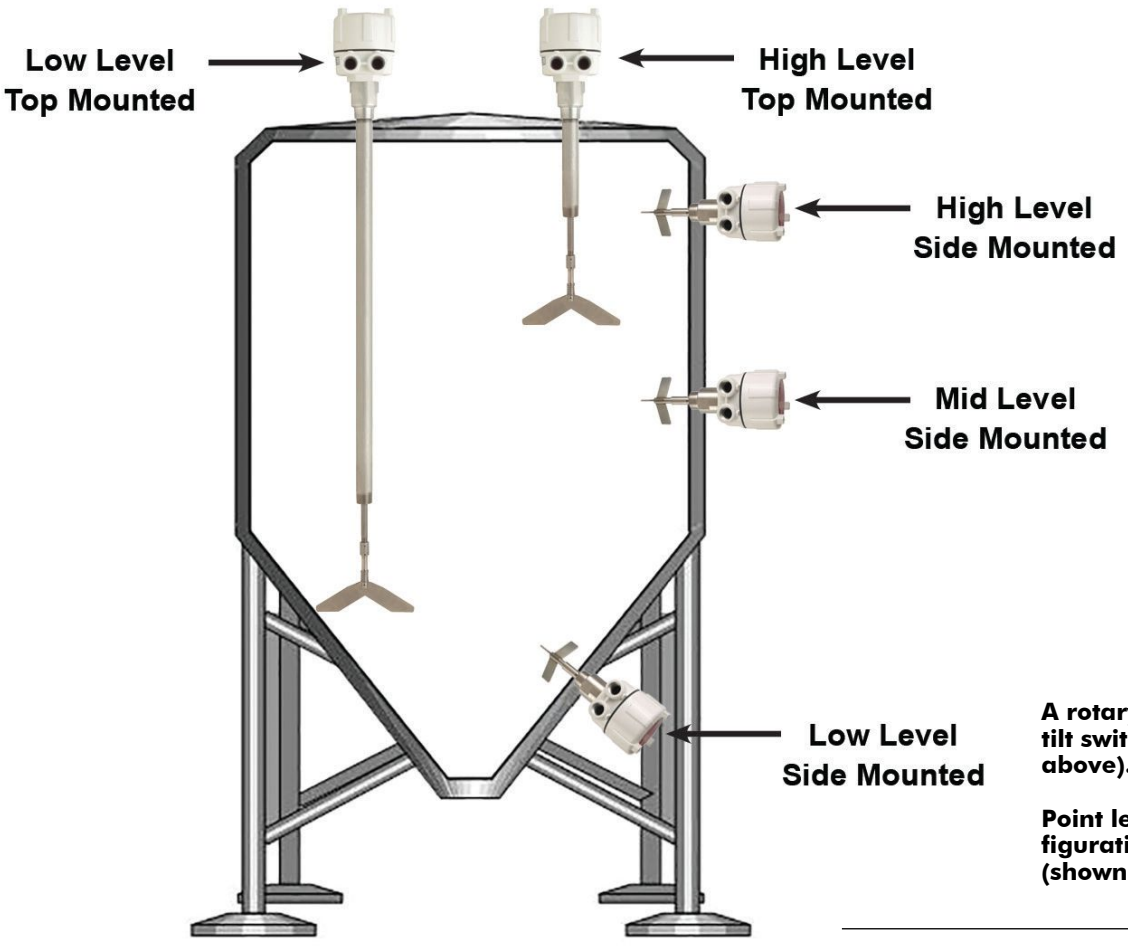
Capacitance sensors are designed for a wide array of applications and can easily be customized with different type of probes, lengths or extensions. These sensors may be used for high, mid-and low-level detection in bins, silos, tanks, hoppers, chutes, and other types of vessels where materials are stored, processed, or flowing. Capacitance sensors operate by detecting the presence or absence of material in contact with the probe by sensing minute changes (as low as 0.5 picofarad) in capacitance caused by the difference in the dielectric constant of the material versus the air.

Capacitance probes are also available with a wide range of options. If your facility has an explosion proof requirement, you will need a capacitance sensor designed and certified for hazardous location applications. If the application is in a high temperature environment or in an area where there is excessive vibration, it is appropriate to install a capacitance probe that houses the electronics and probe in separate enclosures. An extended, flexible cable extension can be attached to a capacitance probe in instances when the sensor is mounted on top of the tank and will be used for high, mid or low-level detection. Or, a flush mounted probe can be used in narrow or space-constrained areas or in applications where material flow or bridging may damage a standard probe. When the vessel is small or has internal obstructions, a bendable probe can be used to avoid obstructions while still allowing adequate probe surface area to detect the presence or absence of material.

Vibrating Level Sensors

The vibrating level sensor or vibrating rod is a piezoelectric driven vibration type level switch that can be used for level detection in bins, silos, and hoppers filled with dry bulk solid materials. A vibrating level sensor can detect extremely light, fluffy materials as light as 1.25 lb/cu ft3 such as powders and flakes or can be used for heavy materials such as granules or pellets. Vibrating rod level sensors vibrate when there is no material covering the active rod. When the rod is covered with material, the vibration is dampened, and an electronic circuit causes a relay to switch and sends an alert. When the rod becomes uncovered, the vibration restarts, and the relay will switch back.

With advancements in product design, most vibrating rods do not require calibration and easily adjust to the desired sensitivity level. For process-critical applications, be sure to look for features such as a fail-safe alert that provide notification when power is interrupted to the unit to avoid overfills and empty tank situations that could shut down operations. Increasingly versatile,



A rotary, capacitance probe, vibrating rod, and the tilt switch are common point level indicators (shown above).

Point level indicators offer many options and configurations adaptable to many silo applications (shown left).

A tilt switch is an affordable, reliable high-level indicator that is easy to install and requires no routine maintenance.

available features may include models for high temperatures or with remote electronics. Some vibrating rods can be extended to a custom length, allowing the vibrating sensor to be used in a top-mounted application for high level detection.

Tilt Switch

A tilt switch is an affordable, reliable high-level indicator that is easy to install and requires no routine maintenance. A hanging tilt switch is installed by suspending it from a flexible cable over a control point. Its principle of operation is quite simple: as material rises below the switch, it will tilt and activate a microswitch when the tilt reaches 15 degrees. Tilt switches are routinely used in bins or silos or over a conveyor belt or open pit. A hanging tilt switch can also be used for plugged chute detection.

Alternatively, a fixed-mount tilt switch mounts from the outside on the top of a vessel though a process connection. It operates by utilizing an angular motion transferred into linear motion to activate an electrical microswitch that can be used for a direct input to a control system or activate an external alarm. A fixed mount tilt switch can be custom-made in lengths from one to eight feet, depending on the distance from the top of the bin an alert should be activated. Newer, patented models are available tin a mercury-free design for applications that prohibit the presence of the substance in their operations.

Mounting Options

Flexibility is a key attribute of point level sensors. While commonly used for high level indication, they can trigger an alarm anywhere along the vessel wall — alerting to low levels for timely refills and adjusting for variances in seasonal high-level inventory fluctuations.

BinMaster Level Controls
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