

Level Sensor Technologies

... AND WHICH ONES ARE RIGHT FOR ME?

From the outside in, choosing between a point or continuous level sensor can be pretty daunting. Not to mention the process of narrowing down sensors in either category! Leave it to us at BinMaster to help you learn the ins and outs of level measurement sensor options.

Plugin BinMaster.com

KEYWORDS

Point level sensors, continuous level, bulk inventory, bins, silos, tanks

OBJECTIVE

Discover advantages & differences of point & continuous level sensors

CONSIDER

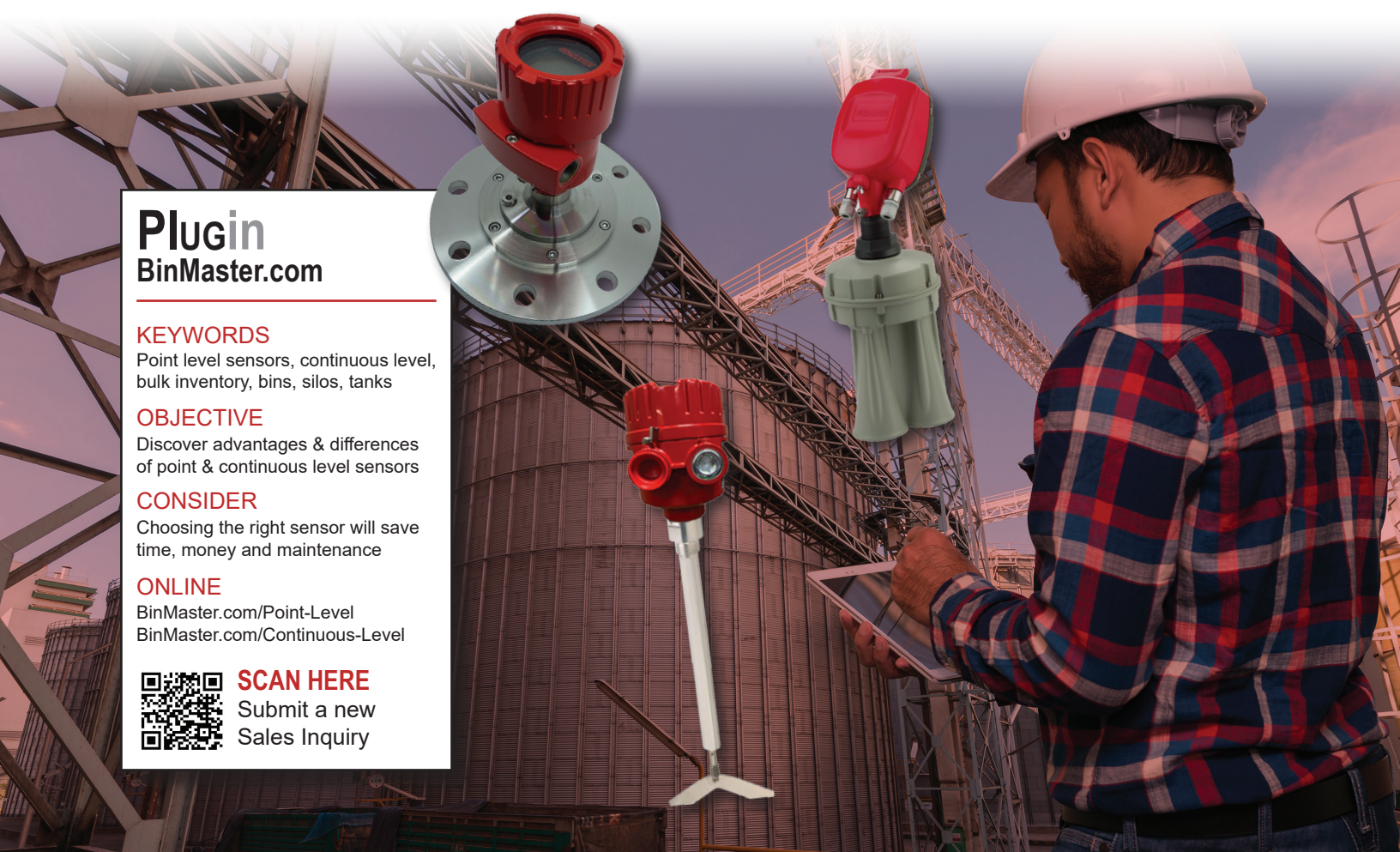
Choosing the right sensor will save time, money and maintenance

ONLINE

BinMaster.com/Point-Level
BinMaster.com/Continuous-Level

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Sales Inquiry



Point Level Sensors



A BMRX-100 rotary set to indicate at high material levels

Life would be so much simpler if you had a way to automate alerts when the milk in the fridge starts to run low.

Behold an industrial solution to predicaments like these: **the point level sensor!** Offering a simple-but-effective way to help your ROI thrive, point level sensors can save you from major messes like overflowing grain bins or delays in production. There's a point level sensor for any solid, liquid or powder setup, but finding the perfect fit takes time, thought and research.

First: **think of the size, position and layout of your vessel.** This will help determine the mounting position of the sensor(s) you'll install.

High level indicators help maximize efficiency by allowing you to fill a vessel to capacity, while **low level indicators** make sure you'll never be left in the dark when a material is running low.

Point level sensors can also be wired to start or stop a process based on material levels. Choosing fail-safe models give you an extra layer of protection in the case of outages.

Rotaries are among the most popular sensors. When hooked up to a horn, alarm or light panel, they inform you when material interacts with—or falls away from—the rotary's paddle. Rotaries can be mounted in a plethora of ways to provide you with convenient high-, mid- and low-level indications.

Capacitance probes are another highly customizable choice. They measure the difference between the dielectric constant of your material versus the surrounding air, resulting in a super-accurate and fail-safe alert system that can be wired to a light, horn, or point level alarm panel.

Vibrating rods harness piezoelectric energy to measure high- and low-level values by the vibration of a blade. When material covers the vibrating blade, a relay switch is triggered to stop the vibration and sound an alert. Then, when the material falls away, the blade will begin to vibrate once more.

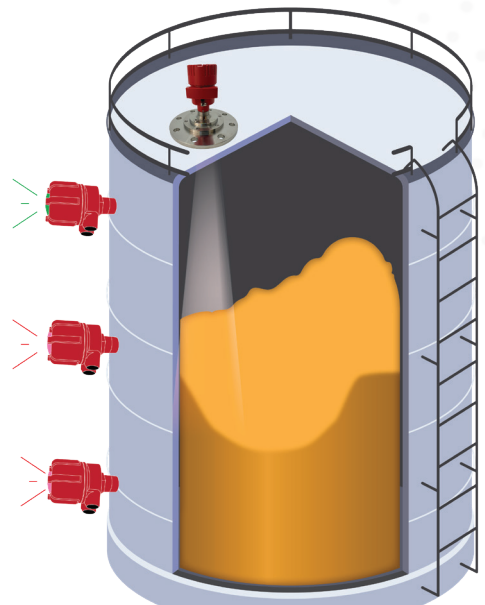
Seeking affordability? Count on a **diaphragm switch** for hyper-sensitive, mechanically operated level measurements. When material reaches the switch, an alarm will activate. Or go for the classic **tilt switch sensor**, which alerts to status changes when tilted 15° or more.

Each of these sensors offer great benefits, but it's important to consider your vessels and the right price point for your setup. If you need assistance in making the right selection, BinMaster sales experts are here for you.

Optimized production processes are just a sensor away!

Point Level Perks:

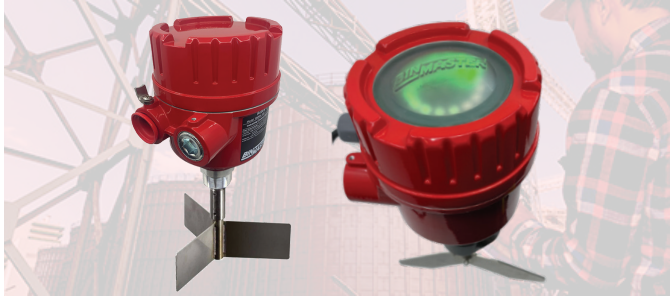
- Affordable, often falling within MRO budgets
- Proven dependability in agricultural, plastics, cement, food processing, and aggregate and mining environments
- Long-lasting, easy to wire, customizable to best fit your vessel



Combined use of point & continuous sensors grants peak efficiency

Point Level SENSORS

Low-, Mid- and High-Level
Affordable • Easy to Wire •
Provide Protection & Redundancy



Rotaries

Use for level detection in powders, pellets and granular materials. Choose from BinMaster's most-economical, mechanical **BMRX-100**, the popular fail-safe **BMRX-200**, or our latest premium model with a LED light alert, the **BMRX-300** (previously the MAXIMA+).

Don't forget about mini rotaries for tight squeezes, plus custom rotary extensions for extra-large bins or silos.



Vibrating Rods

The **VRX-21** is a great choice for low-dielectric or light powders and flakes weighing as little as 1.25 lb/ft³. Standard, extended and compact options—plus flexible and rigid extensions—make BinMaster's models some of the most personalizable and effective.

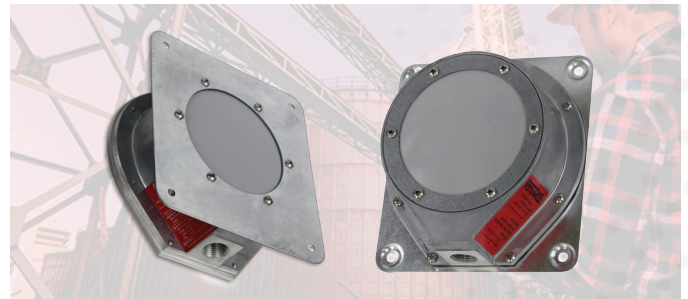
Add remote electronics or special probes for high-temperature applications up to 482°F.



Capacitance Probes

BinMaster's **PROCAP sensors** can be customized, configured and assembled to best fit your operation needs. Fail-safe and incredibly responsive, PROCAP senses changes in capacitance at differences as little as one picofarad (pF).

Available in standard and compact sizes with countless mounting options.



Diaphragm Switch

Say goodbye to plugged chutes and bin overfills thanks to the **BM-45's** ability to start or stop processes.

Or pick the **BM-65** for an explosion-proof switch, best utilized for free-flowing solids in temps from -40°F to 300°F.

Mount internally or externally according to your needs.

Tilt Switch

Custom built for each bin, the **BM-TSM** can be configured for fixed or hanging mounting in silos and pits, or over conveyor belts and piles.

A safe, mercury free, non-powered, pendulum-type design makes tilt switches incredibly straightforward and highly versatile.

Rotary



PROS

- Most common—and very widely used—point level indicator
- High or low level alerts
- Allows for process control (i.e.: Filling stops when material triggers alert)
- Fail-safe features available
- Myriad mounting and extension options to fit most any vessel
- Compact mini-rotary models available for further flexibility

CONS

- LED Light functionality only available with BMRX-300
- Fail-safe features are highly recommended in the case of sensor or power failure
- Variety of paddle options can cause confusion, but sales experts can help narrow down the best choices for a tricky vessel or installation process

Capacitance Probe



PROS

- Even more customizable to needs with low, mid and high level alerts
- Variety of probes: heavy duty, bendable, food safe, hazardous location, remote electronics
- Easy "Quick-Set" calibration
- Ideal for several industries, with uses in powder, solid and liquid applications
- Detects changes in capacitance in as little as one picofarad (pF)

CONS

- Recalibration required if frequently changing materials in the vessel where probe is in use
- Can cause obstructions in a vessel if positioned in output path; use of bendable probes are recommended in these instances

Vibrating Rod



PROS

- Proven top performer with challenging materials, like fluffy powders and flakes
- Three sensitivity settings, configurable to the user's needs and weight/consistency of material being measured
- Reliable through changes in dielectric constant, humidity or material density
- Many rods/probes to choose from

CONS

- Not suited for sticky conditions or viscous/clingy materials
- When mounted horizontally or diagonally, a protective shield is suggested to prevent material from damaging the rod

Diaphragm Switch



PROS

- Staple of the grain industry—and many others—thanks to proven effectiveness and simplicity
- Capable with a wide variety of free-flowing dry bulk material; very versatile for many industries
- Internal and external mounting options
- Select from nylon, neoprene or silicon models based on potential chemical exposure or corrosion
- Cost effective

CONS

- Only compatible with granular materials, no liquids or powders
- Extremely basic-level monitoring compared to other point level designs
- Internal mount installation typically requires emptying of vessel—or vessel to already be empty—before switch can be installed

Tilt Switch



PROS

- Versatile measurements for light powders, bulk solids, rocks and aggregate with a bulk density of at least 15 lb/cu. ft.
- Custom lengths (1–8 ft.) available, with choice in sphere or paddle
- Straightforward and low-maintenance high level sensor
- Reliable, well-tested design
- Suspended tilt switch model (BM-T) offers installation over conveyor belts, piles or pits, or in chutes

CONS

- Switch must be tilted by a full 15° or more to activate alarm, will not alert if tilted any less
- Cannot perform in conditions with materials lighter than 15 lb/cu. ft.
- Unable to provide specific data such as precise degree of tilt, direction of tilting movement, etc.

PRODUCT SELECTION CHART

Point Level Indicators



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PROCAP I & II Cap Probe

PRO Remote Cap Probe

PROCAP I & II FL Cap Probe

PRO HTRC 20 Cap Probe

CompactPRO Cap Probe

BMRX-100 Rotary

BMRX-200 Rotary

BMRX-300 Rotary

VR-21 Vibrating Rod

VR-41 Vibrating Rod

CVR-600 Vibrating Rod

SHT-120 Vibrating Rod

Diaphragm Switch

Tilt Switch

Material

Powder	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
Granular	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Slurry	✓	✓	✓	✓	*	*	*	*						
Liquid	✓	✓	✓	✓	✓				*	*				

Material Density

Low	*	*	*	*	*	✓	✓	✓	✓	✓		✓		✓
High	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Material Moisture

Low	*	*	*	*	*	✓	✓	✓	✓	✓	✓	✓	✓	✓
High	✓	✓	✓	✓	✓	✓	✓	✓						✓

Temperature

High		✓		✓		✓	✓					✓		
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Pressure

Atmospheric	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Medium	✓	✓	✓	✓					✓	✓	✓	✓		✓

Vibration

Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
High		✓		✓		✓							✓	✓

Material Coating

Minimal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓
Heavy Build Up		✓		✓										✓

Corrosive

Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
High	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	

Installation

Top Mounted	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Side Mounted	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	

Atmosphere

Dust	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Steam									✓		✓	✓		✓
Vapor	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

✓ – Applicable

* – Consult Factory

Continuous Level Sensors

SmartBob in action, installed on a bin roof for level measurement



Point level sensors are cool and all, but what if you want to consistently be informed of the levels in your bin, tank, silo or other vessel?

Meet **continuous level** 3D scanners, guided-wave and open-air radar, and weight-and-cable, laser and ultrasonic sensors. These serve as a twenty-first-century-oriented answer to inventory management by utilizing digital display consoles and/or software accessible by PC or phone.

You'll need to take many values into account while exploring continuous level options. **How accurate** and **how often** are you anticipating measurements? Are you seeking to measure **solid, powders or liquids**? Will your sensor be exposed to **corrosive ingredients or chemicals**?

The "gold standard" for continuous level measurement is the **non-contact radar**. Its highly focused beam—an 80 GHz radar signal—cuts through dust, turbulence or foam to measure the distance between the sensor and the material surface. The information is sent directly to a configured display or to BinCloud PC or mobile software. Adjusting to angled roofs or aiming the radar beam is simple with the right mounting equipment.

Or you might opt to step into the future with a **3D Level Scanner**, the only level sensor on the market that can measure and map out multiple points on the material surface. Got peaks? Sidewalls? Buildup? These solid or powder problems are no match for the 3D scanner's acoustic-based technology. Soundwaves are sent to the material's surface, returned back to the transducers, and converted to distance measurements and on-demand 3D imaging.

SmartBob works as an automated tape measure. Mounted at the top of your vessel, the sensor drops a weighted cable to the material. Upon striking the surface, the cable then begins to retract, counting each pulse until it reaches the top. These pulses are converted to level measurements and are delivered directly to your fingertips.

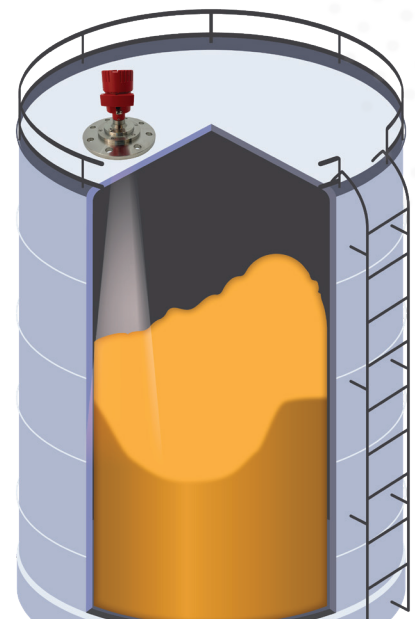
Other choices include **ultrasonic non-contact sensors**, which provide reliable liquid level measurements at distances up to 50 feet in indoor, outdoor or environmental conditions.

For cost, labor and power efficiency, choose a battery-powered **laser** with minimal wiring and compatibility with BinCloud applications. Or try the tried-and-true **guided wave radar**, which uses time domain reflectometry (TDR) to measure distance, level and volume of solids or liquids.

No matter your budget, material, or workforce, a continuous level sensor will surely save time, energy and grief. No more climbing bins to take measurements—**let our sensors do the hard work.**

Continuous Level Benefits:

- Connects to software or display consoles for convenient monitoring
- Configuration is made simple with Bluetooth & BinDisc setup options
- Ruggedized sensor designs thrive in a variety of industrial settings



Radar sensors send real-time levels right to your BinCloud® software

Top-to-Bottom Reporting
Monitor Levels Over Time •
Measure a Multitude of Materials

Continuous Level SENSORS



Non-Contact Radar

Unaffected by a vessel's fluctuating temperature, pressure, humidity, noise, condensation or buildup, the **NCR-86's** versatile radar is the gold standard for non-contact sensors.

Look to the **CNCR** for the same amount of power in a more compact model: try the 100, 200 or 300 series.



3D Level Scanner

For 3D images of the material's topography, accurate reporting on cone up or down conditions, and volumetric accuracy that surpasses any other device on the market, choose the **3D Level Scanner**.

Also available in high-temperature variants, or consider implementing a multi-scanner system for large bins.



SmartBob®

A dual-compartment design protects the **SmartBob's** mechanical and electronic components for longevity and maintenance-free measurements up to 150 feet.

Among the smartest and strongest cable-based inventory measurement tools available. Accurate from a variety of angles, materials and in several industries.



Ultrasonic

The **ToughSonic®-100** excels in harsh factory environments to accurately measure liquid levels. For even more rugged conditions, go with the **ToughSonic®-200**, which is made with chemical-resistant polyvinylidene fluoride (PVDF, or Kynar®).

Choose from several cable lengths to fit your vessel.



Laser

Battery powered, affordable and low-maintenance. Proven and accurate technology.

BinMaster's single point (**SPL-200**), FeedView (**FVL-200**), and level transmitter (**LL-100**) lasers each serve consistent and convenient measurements that transmit directly to BinCloud software.

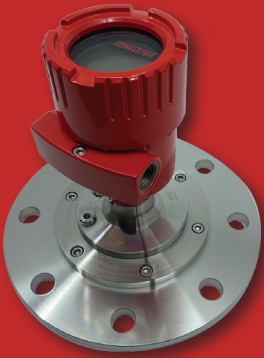


Guided-Wave Radar

Select the **GWR-2000** for vessels up to 100 feet tall containing powders or solids, or the **GWR-3000** for liquid tanks or standpipes up to 75 feet. Both provide pinpoint accuracy within 0.08 inches (2 mm).

Simple setup with Bluetooth and/or the BinDisc interface is another perk of choosing the GWR.

Non-Contact Radar



PROS

- Excels in dusty, noisy and environmental conditions for solid and liquid measurements
- Encased antenna system protects electronics; is maintenance free
- Elite standard for material measurement; ≤ 1 mm accuracy
- Myriad mounting options and swivel mounts for a perfect fit
- Configuration can be performed via Bluetooth on a cell phone

CONS

- Continuously measures only a single point

3D Level Scanner



PROS

- Non-intrusive, non-contact tech
- Measures uneven powder or solid material surfaces
- Detects cone up, cone down and sidewall buildup conditions
- Highly accurate vessel volume calculations
- Equipped with self-cleaning for minimal maintenance
- Unaffected by low dielectric constants, material characteristics

CONS

- Due to its acoustic functions, elevated background noise can impact performance
- Setup requires care in mounting sensor in the correct location to map the vessel properly
- Not recommended for liquid level applications
- Not recommended for materials with a bulk density under 11lb/cu. ft., as acoustics are absorbed

Weight & Cable



PROS

- Great for extremely light, signal-absorbing materials
- Remote sensor requires no hands-on calibration
- High-temperature models available up to 1000°F
- Hazardous location approvals
- Not affected by dust or adverse processing conditions
- Budget friendly; low purchase cost (\$900 to \$1,600)

CONS

- On-demand system
- Does not provide an instantaneous response to any changes that happen in the material levels
- In very dusty vessels, seasonal maintenance may be required to clean out its mechanical cavity
- Not recommended for use in high-pressure conditions

Ultrasonic Sensor



PROS

- Highly durable; many uses in a variety of industries and factories
- Includes SensorView™ for smart configuring, testing and cloning
- Distance proportional outputs adjust automatically
- Sensors "see" by reflecting sound waves; light, color, transparency or reflectivity don't impact measurements
- NEMA-4X, NEMA-6P, IP68-rated

CONS

- Requires a wired interface to send data to SensorView or BinCloud
- For object detection uses, sensor needs to be positioned closer to small objects (as compared to larger) for accuracy
- Sensor models with rear "TEACH" button require manual configuration, but can also be set up through SensorView

Laser



PROS

- Wireless design
- Visible red laser is safer than invisible laser
- Includes a long-range LoRa transceiver, compatible with many data management softwares
- Self-reports energy consumption to project battery life
- Battery replacement is as easy as changing out a flashlight battery
- Mount one in virtually any vessel

CONS

- Cannot provide accurate measurements in overly dusty, hazy or vapor-filled environments
- Upping the frequency of measurements can impact battery life (averages 3-5 years)
- Requires BinCloud gateway for optimized inventory readings and data management

Guided Wave Radar



PROS

- Capable of measuring an array of powders, granules, bulk solids and liquids
- Endures through dust, humidity, temperature, pressure, and bulk density changes
- Suitable for vessels of most any shape or diameter
- High-temperature range
- Accuracy of ± 0.2 inches (5 mm)
- Performs in high pressure

CONS

- Sensing probe is in constant contact with material being measured
- Material's dielectric constant must be above 2.2, at minimum
- Maximum range is limited to 78 feet
- Range may be further limited for heavier materials (such as large rock) due to tensile load

PRODUCT SELECTION CHART

Continuous Level Indicators

Flow Detection

BINMASTER

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SmartBob 2
GWR-2000 Guided Wave Radar
GWR-3000 Guided Wave Radar
3D Level Scanner
NCR-86
CNCR-100
CNCR-200
CNCR-300
LL-100 Laser
SPL-200
TS-100 Ultrasonic Sensor
TS-200 Ultrasonic Sensor
Flow Detect 2000

Material

Powder	✓	✓		✓	✓	✓	✓	✓		✓			✓
Granular	✓	✓		✓	✓	✓	✓	✓	✓	✓			✓
Slurry	*	✓	✓		✓	✓	✓	✓	✓		✓	✓	
Liquid	*	✓	✓		✓	✓	✓	✓			✓	✓	

Material Density

Low	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	
High	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓

Material Moisture

Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
High	✓	✓	✓	✓	✓				*	*	✓	✓	*

Temperature

High	✓	✓	✓		✓								
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Pressure

Atmospheric	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

Vibration

Low	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
High	✓	✓	✓		✓	✓	✓	✓			✓	✓	

Material Coating

Minimal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Heavy Build Up	*		*	✓	✓				✓				*

Corrosive

Low	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
High	*			✓	✓	✓	✓	✓	✓			✓	✓

Installation

Top Mounted	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Side Mounted						✓	✓	✓			✓	✓	✓

Atmosphere

Dust	✓	✓	✓	✓	✓	*	*	✓			*	*	✓
Steam	✓	✓	✓		*	*	*	*			✓	✓	
Vapor	✓	✓	✓		*	*	*	*			✓	✓	

✓ – Applicable * – Consult Factory

"Which Sensor Do I Choose?"

Hopefully the provided information has offered some important insight into what sensor category is ideal for your operations, workforce, and industry.

Need more pointers? Read below for some meaningful comparisons.

Point Level <i>Rotaries • Probes • Switches</i>	Continuous Level <i>Radars • Scanners • SmartBob</i>
Standard powders, solids, or liquids	Standard AND sticky or corrosive materials, or rugged environments
Some fail-safe models, even through power loss or total failure	Typically dependent on technology, electricity, or Internet connection
ONLY alerts at high-, mid- or low-level material conditions	Continuously delivers measurements, no matter the current material condition
Advance alerts of dry runs or overfills, but no total material measurements	Comprehensive volumetric accuracy
Recommended for single-input and single-output vessels, unless employing multiple sensors	Still accurate when material levels are largely uneven or are being drawn from more than one output
Automate processes with little power or labor involvement	Advanced software and console accessibility allows for remote monitoring
Tried-and-true, traditional models that stand the test of time	Smart sensors on the cutting-edge of inventory management

Sales and Service/Ventes et Service



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