

# 3D Level Scanner

Multiple-Point Measurement for Accurate Volume



Get connected to your inventory with the only level sensor that measures and maps multiple points on the material surface. A 3D image representing the topography inside the silo indicates buildup, cone up or down conditions. 3DVision software accounts for irregular material surfaces when calculating volume.

The 3D Level Scanner's acoustics-based technology penetrates dust ensuring reliable measurements. This non-contact technology accurately measures solids and powders, including low dielectric materials.

And you can get it only from BinMaster.

# How 3D Level Scanning Works

The 3D Level Scanner uses acoustics-based technology. Three transducers send very low frequency sound waves to the material surface. The sensor receives echoes back from multiple points on the surface which are converted to distance measurements.

Advanced algorithms in the software assign each measurement an XYZ coordinate that is mapped into a 3D image. The software generates a graphical representation of the material topography in the bin. Surface variations are accounted for in volume calculations.

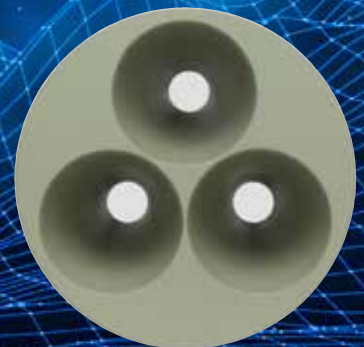
## What Makes the 3D Level Scanner Unique

- Measures multiple points on the material surface
- Generates a 3D image of the material topography
- Volume accuracy surpasses any single-point device
- Reports minimum, maximum, and average distances
- Detects cone up or down conditions
- Sees sidewall buildup that could cause structural damage
- Measures topography in segmented silos
- Accurate volume in large bins using multiple scanners

## 3D Level Scanner Anatomy



**3 independent transducers ensure accuracy**





# Industries and Applications



## Grain, Seed, & Feed

Corn, soybeans, wheat, rice, or milo used in human and animal food production.

## 3D Excels in Many Industries and Materials



## Chemical Processing

Materials used in the making of paints, fertilizers, or detergents.



## Mining & Metals

Fine powders such as bauxite, bentonite, alumina, potash, talc, or calcium carbonate.



## Ethanol & Bioenergy

Accurate volume for corn storage and measuring dried distiller's grains.



## Pulp, Paper & Wood

Pellets, biomass, wood chips, or sawdust used in making paper, furniture, or biofuels.



## Cement & Concrete

Measuring limestone, aggregates, clinker, and finished cement.



## Food or Beverage Processing

Non-contact measurement of ingredients like flour, salt, sugar, or cocoa.



## Plastics Manufacturing

Resins of all types including pellets, flakes, and powders, or powders with a low dielectric.



## Coal Power Plants

A popular sensor for measuring coal and fly ash silos at power plants.



## Sand & Aggregates

Glass manufacturing and measuring sand and rock, excelling in frac or silica sand.



## Construction Materials

Silos containing roofing granules and gypsum for making drywall.



# 3D Makes a Difference



*Fully operational sensor on cement silo despite aggressive dust.*



*Exterior of the sensor is coated with dust, while self-cleaning properties keep the transducers clean and functional.*

Dust Penetrating

Reliable operation and level measurement in suspended dust.

Multiple Measurements

The only level sensor to detect surface variations.

Volume Accuracy

Considers irregular material topography in calculating volume.

Non-Contact

No risk of contamination or interference with equipment inside the bin.

Detects Silo Buildup

Detects and alerts to excessive piling that could stress silo walls.

Low Maintenance

No air purge needed for self-cleaning transducers that resist dusty buildup.



*Detects irregular topography and reflects it in the 3D image.*

# 3D Model Selection Guide

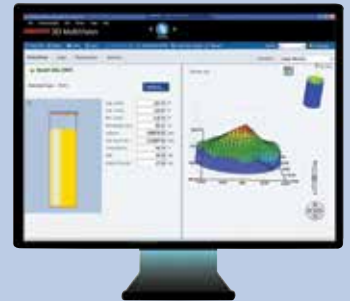


## M Maps and Measures

The M model takes measurements within in a 70° beam angle. It reports the highest, lowest, and average level. 3DVision software provides highly accurate level and volume data.

## MV Adds 3D Image

The MV has all the capabilities of the M model, but also generates a 3D representation of the material surface. Plants that work with materials that bridge, rat hole, or build up along bin walls may prefer to add 3D imagery.



## MVL Measures Big Bins

The MVL provides volume accuracy in large diameter bins. Multiple scanners are mounted in strategic locations to account for surface variations across the material surface. The software synchronizes the level data from all sensors to create a single 3D image and calculate bin volume.



## RL Single-Point Measurement

The RL model measures in a 15° beam angle and reports a single distance. It excels in harsh, high dust environments and problematic low dielectric materials. It provides highly reliable level data and is often used in narrow silos or silos with structure.



# 3D Use Guidelines

## Selecting the Best Model for Your Application

Model	M	MV	MVL
Bin Height	Up to 200' tall	Up to 200' tall	Up to 200' tall
Bin Diameter	10' diameter is the minimum	10' diameter is the minimum	10' diameter is the minimum
Beam Angle	70°	70°	70°
3D Visualization	No	Yes	Yes
Output Data	Volume plus minimum, maximum, and average distance	3D visualization, volume plus minimum, maximum, and average distance	Volume plus minimum, maximum, and average distance
Best Application	Wide bins, taller than they are wide	Wide bins, taller than they are wide	Very wide bins, bins with multiple filling or discharge points

The M and MV can be used on larger diameter bins than specified, but with decreased accuracy since the beam angle will not span the entire surface. The MVL is used on large diameter bins to increase volume accuracy.

## HT High Temperature Applications

With an operating temperature up to 356°F (180°C), the HT model of the 3D Level Scanner accommodates high temperatures often caused by material which is heated during processing and is conveyed to storage silos and bins. This model is ideal for industries that deal with dust, high humidity, and massive silos where material surfaces are uneven and difficult to measure. This is a great scanner if you store and measure clinker, alumina oxide, silica sand, fly ash, frac sand, and more.



## View Multiple Bins in a Single Screen

Installed on a local network, easy-to-use MultiVision software gives plants the ability to view multiple bins in a single window. Automated high or low-level alerts simplify inventory oversight. With one click, users can zoom into detailed information and the 3D profile for a single bin.

### Why Plants Like MultiVision

- All users view the same inventory data
- Inventory is updated automatically
- Each user can customize their screen
- Compatible with all 3DLevelScanner models
- Reporting for purchasing, finance, and logistics



# Mounting and Accessories

## 0° Mounting Flange

The 3D Level Scanner mounts through an 8-1/2" or larger opening in the bin roof. To secure and stabilize the sensor on flat bin roofs, a 0° mounting flange is used to suspend the transducer into the bin while keeping the sensor head outside of bin for programming access.



## Angled Mounting Flange

It is essential the 3D Level Scanner is mounted vertically and perpendicular to the ground. To ensure the sensor is mounted properly on angled bin roofs, BinMaster offers mounting flanges for 5°, 10°, 15°, 20° and 30° angles.



## Neck Extensions

The 3D Level Scanner optional neck extensions are used to lower the transducer assembly below structure or obstacles that may interfere with operation. Neck extensions also are used for mounting on thick cement bin roofs or on a raised socket where distancing the head from the transducer is necessary. Neck extensions come in 1', 2', 4', 6', and 10' lengths.

# 3D Level Scanner Specifications

Measurement Characteristics	
Frequency	2 to 10 kHz
Beam angle	15 to 70 degrees
Materials, Non-Wetted Parts	
Housing	Painted aluminum die casting
Inspection Window in Housing Cover	Polycarbonate
Antenna	Painted aluminum die casting
Flange	Steel
Weight	
12.3 lb (5.6 kg)	
Output Variable	
Output Signal	4 - 20 mA/HART, Modbus, RS-485
Resolution	10 µA
Fault Signal	Current output unchanged, 22 mA > 3.6 mA (adjustable)
Current Limitation	22 mA
Load	
4-wire sensor	Max. 500 Ohm
Ambient Conditions	
Ambient, storage and transport temperature	-40° to +185°F (-40° to 85°C) Standard, -40° to +356°F (-40° to 180°C) High Temperature
Relative humidity	20% to 85%
Altitude	16,400 ft (5,000 m)
Process Conditions	
Vessel Pressure	-0.2 to 3 bar (-2.9 to 41.5 psi or -20 to 100 kPa)
Process Temperature	
Measured on the Process Fitting	-40° to +185°F (-40° to 85°C) Standard, -40° to +356°F (-40° to 180°C) High Temperature
Vibration Resistance	Mechanical vibrations with 2 g and 5 to 200 Hz
Electromechanical Data	
Cable Entry/Plug	1 x cable entry M20x1.5 (cable-Ø 8 to 12mm) 1 x blind stopper M20x1.5 OR 2 x cable entry 1/2 NPT
Display Panel	
LCD	4 lines x 20 characters
Adjustment Elements	4 keys
Protection	IP67
Power supply - 4-wire instrument (Active) 4 - 20 mA / HART	
Supply Voltage	20 to 32 VDC
Power Consumption	Max. 1.5 W @ 24 VDC
Electrical Protective Measures	
Protection	IP67 according to IEC 60529
Approvals	
Hazardous Locations	CFM Intrinsically Safe Class I, II, Division I, Groups C, D, E, F, G (US & Canada) IECEX/ATEX (European Union, global use)
CE	
EMC	
Emission	EN 61326:1997 (Class B)
Susceptibility	IEC / EN 61326:1997 + A1:1998 + A2:2001 + A3:2003
NSR (73/23/EWG)	EN 61010-1:2001
FCC	
Conformity	To part 15 of the FCC regulations FCC 47 CFR part 15:2007, subpart B, class A

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