**GL BAL**
TECHNOLOGY SYSTEMS

APM

*Changing the market
from level to volume*

True Process Level and
Volume Measurements
of Bulk Solids

APM's 3DLevelScanner incorporates advanced technology for accurately measuring bulk solids and powders stored in silos and open bins of all types, shapes and sizes allowing production managers to make informed decisions about inventory control and usage.

www.onthelevel.com
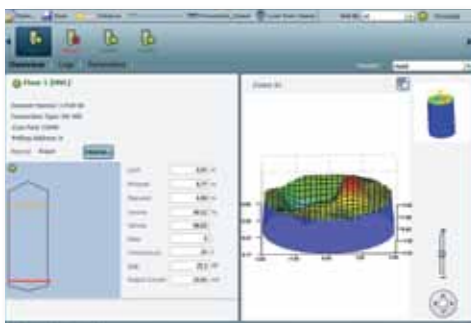
3DLevelScanner Visualization Print Screen

APM Automation Solutions Ltd. is a leading manufacturer and expert in level and volume measurement instrumentation. Its flagship product, the 3DLevelScanner™, represents a new family of devices that takes the guesswork out of measuring the level, volume and mass of materials stored inside a silo or open bin.

APM Technology and the 3DLevelScanner

The APM 3DLevelScanner II is the only device presently available that delivers accurate measurement of bulk solids and powders regardless of the type of material or product characteristics, type and size of storage silo, bin or container, and harshness of the storage environment. It incorporates APM's unique dust-penetrating technology to achieve an unrivaled degree of process measurement and inventory control.

The 3DLevelScanner employs an array of three antennas to transmit low frequency pulses and to receive echoes of the pulses from the contents of the silo, bin or other container. Using three antennas the unit measures not only the time/distance of each echo but also its direction. The device's Digital Signal Processor samples and analyzes the received signals to provide very accurate measurements of the level, volume and mass of the stored contents and generates a 3D representation of actual allocation of product within the container for display on remote computer screens. This unique device measures practically any kind of material stored in a large variety of containers, including silos, large open bins, bulk solid storage rooms, stockpiles and warehouses. It maps build-up loads and other irregularities that randomly form over time, offering solutions for this and many other previously inaccessible challenging applications.

Informed decision-making means better production management and improved operational efficiency

3D MultiVision Software Print Screen

Markets

APM products enable efficient process measurement and true inventory management of bulk solid materials used in a broad range of industrial applications, including:

- **Food Processing**
- **Grain, Seed & Feed**
- **Cement & Aggregates**
- **Chemical Processing**
- **Bioenergy**
- **Plastics Manufacturing**
- **Power – Coal, Fly Ash**
- **Pulp & Paper**
- **Petrochemicals**
- **Mining**
- **Metals**

3DLevelScanner

The 3DLevelScanner II product line currently includes three models:

Model S
Determines the average volume of the stored contents. Based on a 30-degree beam angle, Model S is ideal for small silos up to 4 meters in diameter, and for tall (up to 70 meters) and narrow silos.

Model M
Yields highly accurate readings of level and volume. It is appropriate for large silos. It is based on a 70-degree beam angle.

Model MV
Identical to Model M, with the addition of a special software tool that allows 3D representation of the stored contents for display on a remote computer screen. This feature is useful for mapping build-up loads that form randomly over time and other irregularities.

APM's technology offers industrial manufacturers an incomparable range of process level and volume measurement solutions, with unprecedented accuracy, ability to operate with all kinds of materials stored in a great variety of silos, bins, stockpiles and warehouses, ease of operation and connectivity to existing customer ERP systems.

Volume Accuracy

Volume Accuracy- 3DLevelScanner M/MV
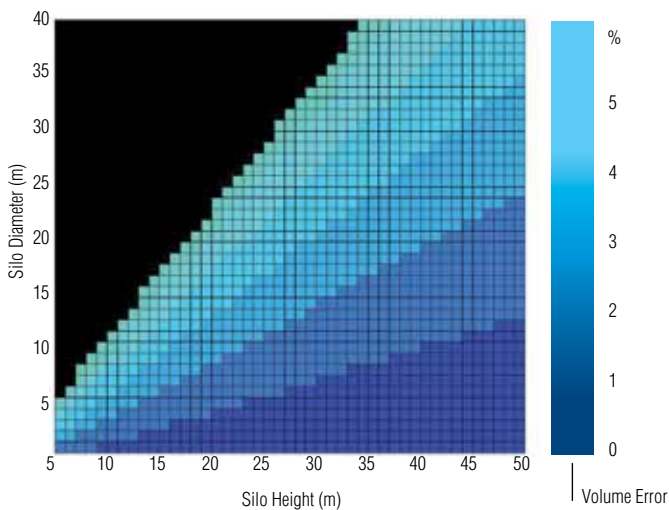
Volume Accuracy of a single point device
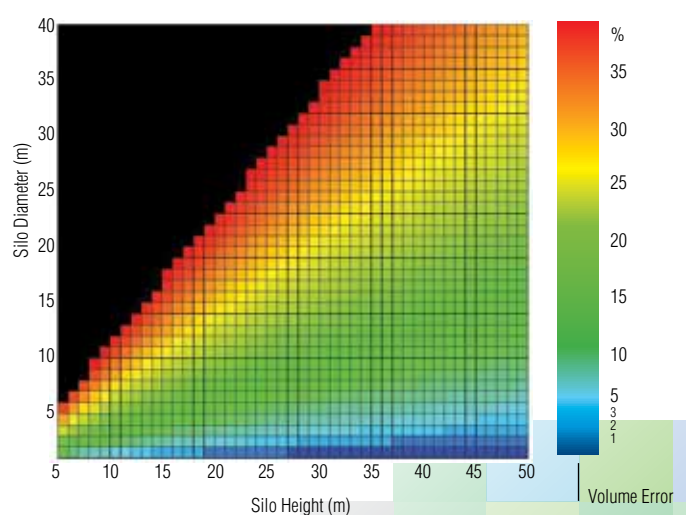
APM's advanced technology beats the competition – hands-down

It enables measurements of previously inaccessible applications. Seamlessly communicating with a plant's existing ERP system, APM 3DLevelScanners II give production managers greater control over inventories and the entire manufacturing process, optimizing the potential for greater overall efficiency and profitability.

Comparison of APM Models and Competing Technologies

Feature	3DLevelScanner Models			Competing Technologies		
	S	M	MV	non-contact radar	ultrasonic	guided microwave
True volume measurement		●	●			
3D surface visualization			●			
Reliable and accurate in very wide silos		●	●			
Suitable for open bins, warehouses, bunkers and open areas		●	●			
Measures volume as well as minimum and maximum levels		●	●			
Non-contact continuous level measurement	●	●	●	●	●	
Unaffected by dust generation	●	●	●	●		●
Works with practically all solid materials including those with low dielectric constants	●	●	●		●	
Free of mechanical loads	●	●	●	●	●	
Consistently accurate measurements in narrow silos	●	●	●	●		●
Maintenance-free	●	●	●	●	●	
Computer display showing material build-up on walls of silos / containers			●			
Self cleaning	●	●	●			
High measuring range	●	●	●	●	●	
Reliability - built-in system redundancy with 3 independent transmitters / receivers	●	●	●			

Accurate • Reliable • Robust • Safe

The Vision of 3D Level Measurement

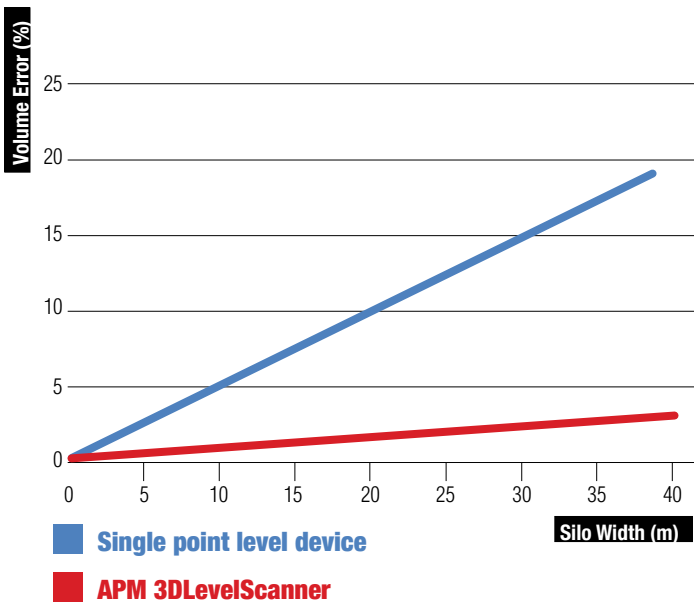| Feature	Benefit
Multiple-point accuracy	Taking measurements from multiple points rather than only a single point takes into account variations that occur on material surfaces
Dust-penetrating, acoustic-based low-frequency technology	Measurements are unaffected or distorted by dust, yielding accurate results where ultrasonic and radar have failed
Non-contact measurement	Appropriate for foods, chemicals and pharmaceuticals because there is no risk of contamination due to moving parts
Unaffected by material type	Measures powders, granulates, pellets and other solids with no requirement for special calibration
Long measurement range	Applicable to tall silos - measurement ranges of up to 70 m / 230 ft
Low power consumption	Cost-effective
Built-in system redundancy	Three independent transducers insure reliability
Remote configuration	Remote link directly to customer support engineers during initial installation enables custom configuration of scanner for optimum performance at specific sites

The 3DLevelScanner uses a very low frequency acoustical signal to penetrate dust and take measurements based on how long the signal takes to "travel to" solid or powder material and "return to" the device. These very low frequency acoustical signals are able to penetrate suspended dust, unlike other technologies whose signals become "confused" when attempting to take measurements in dusty environments. The acoustical signals combined with proprietary self-cleaning capabilities prevent material from adhering to the internal workings of the APM device, ensuring long-term reliable performance with very low maintenance requirements regardless of harsh dusty conditions.
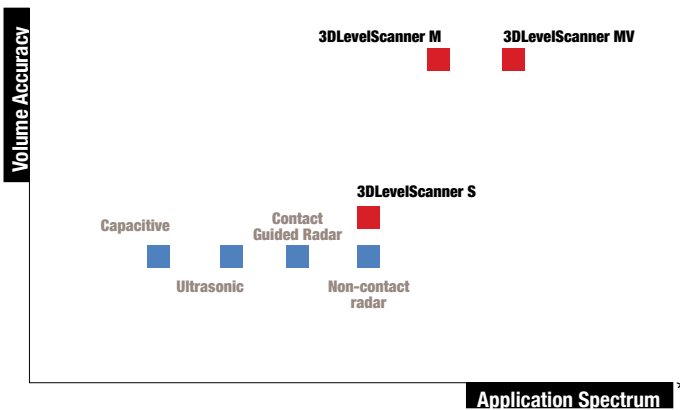
Multiple point measurement technology

APM - Changing The Market From Level To Volume

Volume Error (%) vs Silo Width (m)

- **Single point level device** (blue)
- **APM 3DLevelScanner** (red)

Y-axis: Volume Error (%): 0, 5, 10, 15, 20, 25
X-axis: Silo Width (m): 0, 5, 10, 15, 20, 25, 30, 35, 40

Volume Accuracy vs Application Spectrum*

- 3DLevelScanner M
- 3DLevelScanner MV
- 3DLevelScanner S
- Capacitive
- Ultrasonic
- Contact Guided Radar
- Non-contact radar

*Application Spectrum - application range in silos, open bins, warehouses and stockpiles under harsh conditions (dust, moisture, etc.)

APM 3DLevelScanner offers uncompromising win-win strategies for both technical and business managers: day-in, day-out it provides accurate measures of inventory, allowing production to proceed reliably as planned while delivering essential real-time data that enables financial and other managers to make true estimates of actual costs. APM 3DLevelScanners incorporate best-of-class solutions for previously inaccessible process measurement applications in many manufacturing sectors. Customers get much more than meets the eye: an easily installed and operated maintenance-free device that offers major cost savings that can improve overall performance and profitability. And the greater the volume of inventory stored, the greater the added value of APM scanners and their impact on the balance sheet. (See graph, lower left).

APM Gets It Right

Safety

Steel grain bins have been susceptible to collapse, resulting in catastrophic failures attributed to uneven sidewall loading. This can be caused by hanging grain from spoilage or asymmetric filling and emptying. The 3DLevelScanner MV provides early visual detection of all such conditions long before they threaten the structural integrity of the container. This enables the production manager to intervene with appropriate maintenance, avoiding costly damage or loss of storage facilities as well as unexpected interruptions of production.

**Operational Efficiency –
Volume and Level Measurement**

APM 3DLevelScanner measures the volume as well as the minimum and maximum levels of stored materials. This represents great added-value since alternative solutions for measuring low-point levels are difficult to install and maintain.

Knowledge is Power: Optimized Inventory Control

Truly accurate material measurement dramatically improves operational efficiency and management capabilities and translates into major cost savings and a fast return on investment.

Accurate measurements for production tracking

Process control, inventory management, tracking, and usage forecasting are easily and accurately supported by the APM 3DLevelScanner II. As efficiency is enhanced and waste is reduced, production is streamlined, deliveries can be optimized, and costly emergency fills are eliminated.

**Remote communications blend with
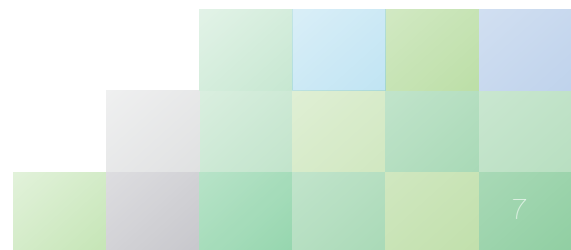ERP and other control systems**

Interfacing with most automated control, the 3DLevelScanner enables remote measurement and data delivery. Access to rapidly changing real-life inventory conditions gives production and business managers the opportunity to make informed timely decisions that go right to the bottom line.
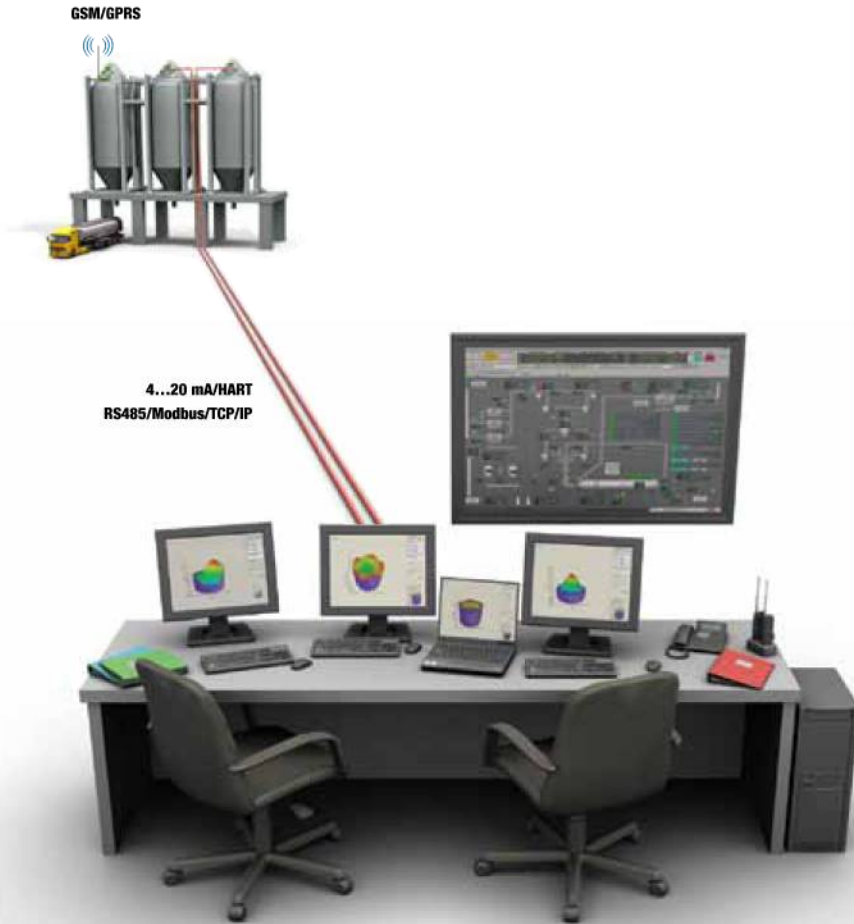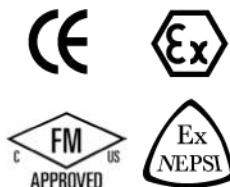

Outer unit is coated with build-up from dust.

Inside the unit is clean and fully operational.

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APM - Get Accurate

GSM/GPRS

4...20 mA/HART
RS485/Modbus/TCP/IP

GLOBAL
TECHNOLOGY SYSTEMS

R e p r e s e n t e d   b y

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