Level Measurement using Laser Technology
Level and volume measurement solutions for process and utility applications
Expertise in technology for more than a century of experience

To operate any process efficiently, it is essential to measure, actuate, record and control. In selecting ABB you are choosing a partner who is offering the best measurement solution for your needs, enabling maximum return on your investment. When investing in ABB’s measurement products and solutions you are receiving the best technology, reliability and service in the business.

Research and development is a vital source of ABB’s technology leadership. ABB constantly builds on the foundation of existing technologies for new applications, and continues to develop the breakthrough technologies needed to meet the challenges of the future. ABB and its heritage companies have been leaders in innovation and technology for more than 100 years.

Comprehensive measurement solutions serving any industry
ABB measurement products provide world-class measurement solutions for any industry, utility or municipality for more than a century.

Latest innovations deliver technological solutions to make it easier for you to run your plant. ABB’s measurement products are based on common technology, providing a common look and feel and method of operation.

This results in products that are easy to configure, to integrate, and to maintain.

**ABB’s measurement products portfolio:**
- Analytical measurements
- Flow measurement
- Natural gas measurement
- Valve automation
- Pressure measurement
- Temperature measurement
- Recorders and controllers
- Level measurement
- Device management
- Force measurement
- Service
With more than 15,000 installations around the world, the ABB family of non-contact laser volume and level products, LM80, LM200 and VM3D, provide solutions for accurate measurement in the following applications: inventory in bunkers, blending hoppers, reactor vessels, level control, volumetric measurement, and various dry bulk solids and opaque liquids in silos.

**Industries served:**
- Mining and construction
- Aggregates
- Fertilizers
- Chemical processing
- Power generation
- Food and beverage
- Pulp and paper processing
- Upstream oil & gas
- Downstream oil & gas

**Customer benefits:**
- Non-contact, maintenance free
- Measures any surface at any angle
- Narrow beam
- Measures great distances
- Very accurate
- Rapid response

The on-board microprocessor calculates distance by multiplying the speed of light by the time it takes for a laser pulse to travel from the instrument to a target and back. The measuring laser uses invisible, infrared light. There is a second, visible aiming laser to help with the alignment of the measuring laser. The laser beams have very little divergence so that accurate targeting is easy even in silos or vessels that have internal structures.

**Level measurement with laser technology**
Using a time-of-flight calculation, and knowing the height of the vessel, the LM80 accurately measures the distance to the target surface using the equation below:

\[
\text{Level} = \text{height} - \frac{\text{speed of light} \times \text{time-of-flight}}{2}
\]

Using a time-of-flight calculation the VM3D accurately measures the distance to the target surface using the equation below:

\[
\text{Distance} = \frac{\text{speed of light} \times \text{time-of-flight}}{2}
\]
The laser level transmitter (LM80) is a non-contact, level measuring instrument designed for granular solid materials and opaque liquids. Based on pulsed laser technology, the LM80 embodies speed and accuracy in a single, easy to use and install product.

The characteristic narrow beam divergence of the laser permits direct aiming to the target surface without interference from structure or falling material.

With both continuous 4-20 mA and single point relay outputs, the LM80 can operate as a process control sensor while simultaneously providing high and low alarms.

Whether measuring a few meters into the confined space of a crusher, or to the bottom of the tallest silo, the LM80 with its laser pointer and long range is the plug-and-play solution to level measurement.

Options
- Many mounting options
- Configuration device (LCD2)
- Non-condensing optics (heated lens)
- Stainless steel housing
- Tri-clover interface
The LM200 Laser is a laser-based distance measuring instrument used in process applications. It can be applied to level measurements of low reflectivity materials such as coal, carbon, mining ores and rocks.

The LM200 laser is ideal for long distance positioning applications up to 400 meters. It is a maintenance free, non-contact continuous level transmitter that is easy to install.

Options:
- Many mounting options
- Configuration device (LCD2)
- Non-condensing optics (heated lens)
The NEW VM3D is a laser volume product used for inventory management. This 3D scanner system measures the volume of material stockpiles stored out in the open or in large structures like silos, bunkers, domes and sheds.

By integrating accurate laser technology into a network of scanning instruments, complex surfaces can be mapped accurately. The system makes use of remote monitoring and data processing services to guarantee data integrity to the level needed for confident stock management and precise auditing.

The Laser Scanner (VM3D) is a non-contact, volume measuring instrument designed for granular solid materials. Based on pulsed laser technology, the VM3D embodies speed and accuracy in a single, easy to use and install product. The characteristic narrow beam divergence of the laser coupled with a precise mechanical scanning system that covers a complete hemisphere permits direct aiming to the target surface and building a tight point cloud from which to derive a surface map. Because the VM3D system computes the shape and volume of stockpiles from a point cloud it is possible to merge the data from any number of scanners to obtain the shape and volume of even the largest stockpiles. Whether measuring a few meters into the confined space of a small silo, or to the bottom of the largest warehouse, the VM3D with its long range, wide angular sweep and ability to function as a scanner network is the plug-and-play solution to stockpile volume measurement.

Many different materials
- Measures all clearly visible surfaces irrespective of texture, granularity, slope and / or color
- Accurately measures to the surface of mineral ores, grains, and synthetic materials
- Examples include: gold and metal ores, sugar, fertilizers, coal, corn, rice, coffee and plastic pellets

Many different structures
- Works in all types of storage buildings including silos, tanks, bunkers, sheds and domes
- Can provide volume estimation for open air stockpiles
- Provides volume estimates with less than 2% error for volumes greater than 100 m³
The solutions meeting your industry needs

A rugged design adapted to your industry

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<thead>
<tr>
<th></th>
<th>LM80</th>
<th>LM200</th>
<th>VM3D</th>
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<tbody>
<tr>
<td><strong>Product category</strong></td>
<td><strong>Level</strong></td>
<td><strong>Volume</strong></td>
<td><strong>Level</strong></td>
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<tr>
<td><strong>Range</strong></td>
<td>Level up to 100 m (330 ft)</td>
<td>Level up to 190 m (623 ft)</td>
<td>93 m (305 ft)</td>
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<tr>
<td></td>
<td>Positionning up to 150 m (500 ft)</td>
<td>Positionning up to 400 m (1312 ft)</td>
<td>Complete hemisphere coverage</td>
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<td><strong>Laser</strong></td>
<td>Measuring 905 nm Infrared Laser Class 1M</td>
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<td>Pointer 635 nm Red Laser Class 3R</td>
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<tr>
<td><strong>Resolution</strong></td>
<td>± 10 mm (0.4 inch)</td>
<td>± 10 mm (0.4 inch)</td>
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<td><strong>Accuracy</strong></td>
<td>± 30 mm</td>
<td>± 40 mm</td>
<td>± 30 mm</td>
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<td><strong>Temperature</strong></td>
<td>-40°C to +60°C (-40°F to +140°F)</td>
<td>-20°C to +60°C (-4°F to +140°F)</td>
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<td><strong>Power</strong></td>
<td>24 VDC</td>
<td>115 - 230 VAC</td>
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<td><strong>Outputs</strong></td>
<td>4-20 mA</td>
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<td>2 relays</td>
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<td>RS232 for configuration</td>
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<td>Aluminum enclosure - 1.6 kg (3.53 lbs)</td>
<td>Aluminum enclosure - 2.2 kg (4.85 lbs)</td>
<td>Aluminum enclosure - 3.86 kg (8.5 lbs)</td>
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<td>Aluminum enclosure with triclover - 2.2 kg (4.85 lbs)</td>
<td>316 Stainless steel enclosure - 4.2 kg (9.26 lbs)</td>
<td>12 kg scanner (26.5 lb)</td>
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<td><strong>Enclosure rating</strong></td>
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