

# Laser and ultrasonic level products

## Crushers

Crushers are key process components in several industries dealing with materials such as minerals, chemicals or agro based products. Whatever the material to be processed, productivity is of the essence and monitoring the material level is mandatory to optimize crushers operation.

### Measurement made easy

### Optimization

Feed control is crucial as crushers must be fed continuously to prevent serious damages to the equipment and to optimize productivity. It is imperative to maintain a 'choke' level and to avoid running the crusher empty. One must drop 'rock on rock' and not 'rock on metal'. Throughput must also be maximized hence the plant must quickly react to the inconsistent inflow or any clogging or other problems. A rapid and accurate feedback on material's level in the crusher is a key parameter in feed control optimization to maintain this 'choke' condition.

Industries will often use huge surge bins to help maintain a controlled and / or consistent flow for the crusher. Although surge bins are often bigger than needed, they will still be subject to overfilling which in turn, if not addressed rapidly, may block the whole inflow line and spill on the ground below creating a manual labor intensive clean-up. A proper feedback loop on the surge bin using level transmitters is therefore as important as on the crusher itself. In addition to the impact on productivity, preparing for a proper control of the level can permit a significant initial cost reduction when establishing the requirements for the surge bin.



### Reliability and safety

Using efficient level measurement as a feedback for feed control permits to either assist an often overburdened operator or better, completely remove the need for human supervision. This mitigates the risk for accidents while improving reliability of the level monitoring.

### Versatility

The LM80 is an ideal solution for this measurement as it can be installed at different stages on the crushing line whether it is composed of fixed or mobile crushing units. Each crusher can be of a different type, each design having its particular specifications and limitations. The narrow beam can be easily directed between the crusher mantle and the side wall of the crusher. The integral pointer allows precise aiming of the laser. The payback associated with the LM80 is increased production and reduced maintenance expenditures on rebuilding the crusher (due to continual rock damage).

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## Crushers

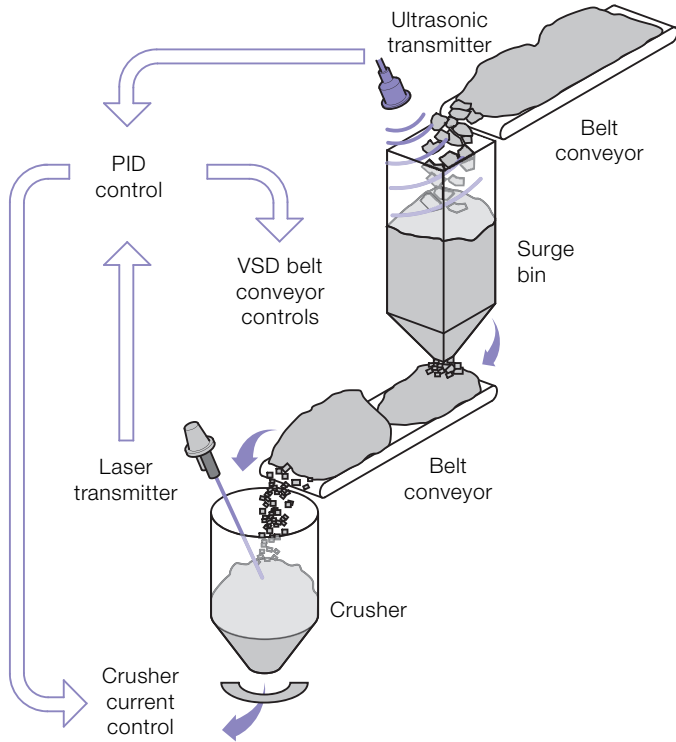


Fig. 1: Control loop feedback with laser and ultrasonic transmitters

The same applies for surge bin. The feedstock can be measured in various spaces, independently of the design shape and material. It can also provide accurate feedback on an empty or near-empty vessel and under challenging conditions such as acoustic noise, electric noise and physical hindrance.

However, the bins above the crusher are occasionally too dusty for a laser level transmitter. LST400 has an advanced algorithm automatically adjusting the instrument to work in the most difficult conditions. LST400 can vary pulse size for optimal performance at short and long distances, pulse length can be adapted to ensure pulses can travel through the air even in the presence of dust. At the receiver, the input gain can be increased to make sure the smallest of echoes can be detected easily. The LST400 automatically adjusts these settings, ensuring the best performance can be achieved in all conditions. No other ultrasonic level sensor has this technology, allowing unparalleled performance in dusty environments.

## Complete solution

This combined solution offers accurate single point measurement where it is required at the crusher and excellent dust penetration in the bins. By combining these two technologies' strengths, ABB provides the ideal solution. The LM80 allows for increased production and reduced maintenance, while the ultrasonic ensures the crusher has adequate feed while preventing overfill resulting in a labor intensive cleanup and potentially dangerous work conditions.

## Performance example

Martin Marietta is a leading aggregate supplier with locations in 36 States, Canada, and the Caribbean. Their Red Hills Quarry in central Virginia crushes granite into three products used in the construction trades and for highway use. They are #8 stone (3/8 to 1/2 in.), 'B' Sand (for ice control on roadways), and Rip Rap (large diameter stone for erosion control and ornamental uses).

<b>Application:</b>	Surge bins
<b>Solution:</b>	ABB LST400

Challenges:

- Dusty environment
- Requires uninterrupted measurement
- Instrument needs to work well in the vicinity of large drives

Goals achieved:

- Uninterrupted, reliable measurements even during conditions of heavy dust
- No interference from large drives
- Trouble-free service since installation in early 2014

<b>Application:</b>	Crushers
<b>Solution:</b>	ABB LM80

Challenges:

- Fast changing levels
- Important vibrations
- Dusty environment

Goals achieved:

- Uninterrupted, reliable measurements even with vibrations
- Maintenance routine reduced to minimum and crusher equipment lifetime increased
- Quick feedback loop for conveyor speed control
- The Laser went into operation in 2008 and has been maintenance-free since its installation

## Laser level transmitter (LM80)



Fig. 2: LM80 laser level transmitter

### Features

Robust construction
Non-condensing optics (heated lens)
Narrow beam
Low beam divergence
Multi-mounting options
Non-contact pulsed laser technique
No moving parts
Fast electronics
4 – 20 mA current loop and relays
Configuration device

### Benefits

Maintenance free
High precision to get around infrastructures
Measures great distances
Easy to install and use
Measures any surface at any angle
Insensitive to: solids size, vessel construction, angle of repose, gas and high humidity, condensation, vibrations at surfaces, moving and falling material, material's dielectric constant
Rapid response

## Ultrasonic level transmitter (LST400)



Fig. 3: LST400 ultrasonic level transmitter

### Features

Range to 50 ft. / 15 m
Isolated 4 – 20 mA output with HART 7
Graphic LCD Display
Integrated Analytical Software
5 Configurable relays / 8 Amp
GAP dynamic gain, amplitude and power technology

### Benefits

Works on dusty environments, clear or dirty liquids and even when the face is dirty
Transducer face cleans itself
Works through smoke and vapors
Works in narrow vessels unlike most other ultrasonic suppliers due to GAP dynamic gain, amplitude and power technology
Bin mapping using Dynamic 21 point linearizer
Integral analytical surface provides a unique view into the process for easy installation

# Contact us

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