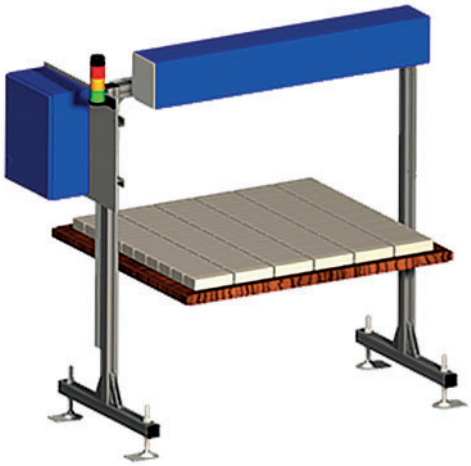
Frima GmbH & Co. KG, 26723 Emden, Germany

Laser-based block height measurement

Since its foundation in 2004, Frima GmbH & Co. KG has specialised in concrete block-making systems for slab sizes from 1,200 x 550 up to 1,400 x 1,400 mm (E 500, P 650, HP 800, HP 1000, HP 1200 and HP 1400). The company has been engaged right from the outset in modifying and modernising machines and systems of all common makes with their relevant components including mixing plants, finger car systems, dry sides and post-processing lines. Alongside such core components, Frima deals with sensor technology, control units, visualisation systems, networking and product data analytics, all flowing from developing new systems into retrofitting and renovating existing systems as well.

New ideas and their implementation have become a particular Frima hallmark especially in view of the growing digitisation and networking in the context of Industry 4.0. This includes developing its own data analytics with databank and graphic display. The system enables operators to analyse production data precisely to a cycle. All relevant states in the system are recorded for each individual machine cycle using sensors such as pressure, temperature and position transmitters. Each change in parameters is logged by the operator. Graphic analytics are employed to evaluate this data. Operator errors or system problems can be registered and localised quickly and effectively by this means.



Laser-based block height measurement device from Frima

The site for the block measurement device should be as near as possible to the block-making machine to allow it to work most effectively in the production process

The laser-based block height measurement device can be a crucial element in quality assurance. Products from 30 up to 500 mm irrespective of shape, colour, moisture and surface can be measured. The results can be displayed visually both for the operator and transferred to the data analytics described above.

Unvarying block heights

The demands placed on manufacturers of concrete block products are steadily growing as regards the unvarying quality of their products. Due to Industry 4.0, an increasing amount of data is collected for products in order to simplify tracking. Besides this product tracing, its stated objective is to reduce complaints and thus lower the number of expensive returns.

The block height measurement device from Frima offers customers a system that allows both quality control and product tracking at the same time. And yet, the system can be integrated or retrofitted into both new and existing machines regardless of make. The block height measurements can be stored in the Frima databank and recalled if needed.

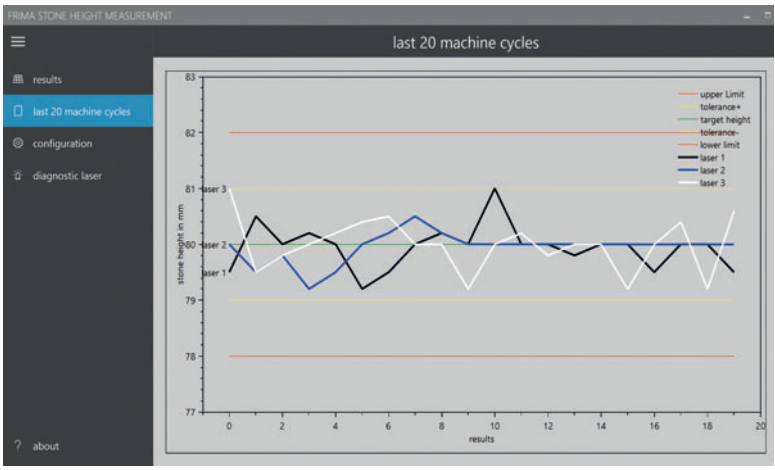
Technical characteristics

- Accuracy: +/- 1mm
- Product heights: 30 up to 500 mm
- Number of lasers: 1 to 5
- Irrespective of:
  - Shape
  - Colour
  - Moisture
  - Surface
  - Slab quality
- Visual display: Traffic light
- Databank connection: Optional
- Double slab analysis: Yes
- Visualisation:
  Touch panel and/or Frima standard visualisation.
  Also possible as an add-on in existing Frima visualisation
- Contact exchange:
  1 potential free contact exchange as standard

Production boards are divided lengthways into three areas in order to classify values precisely. Finer division takes place across their width, depending on the number of lasers. Colour changes on the display rapidly show whether the heights are inside the tolerances.

Measurement principle

The measurement works on a differential principle. The values measured by the high-performance lasers are categorised according to block and board surface and the difference is the actual block height. According to Frima, it does not matter if burrs or crumbs are on top of the blocks or if the production boards have been slightly damaged. Boards with many blocks and not much free slab surface are not a problem either. It is these characteristics that give rise to the great accuracy in



The PC display's operator interface is clearly and intuitively arranged

measurement. Frima recommends using at least three lasers to be able to measure the critical points: outside left and right, plus middle.

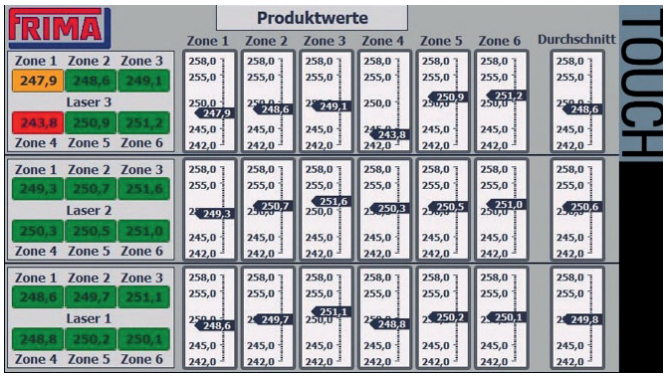
An empty production board only has to travel under the block measurement device when it is first commissioned to be able to measure the boards precisely. The lasers' horizontal position can be easily shifted using a rapid clamping device to accommodate the most varied types of products.

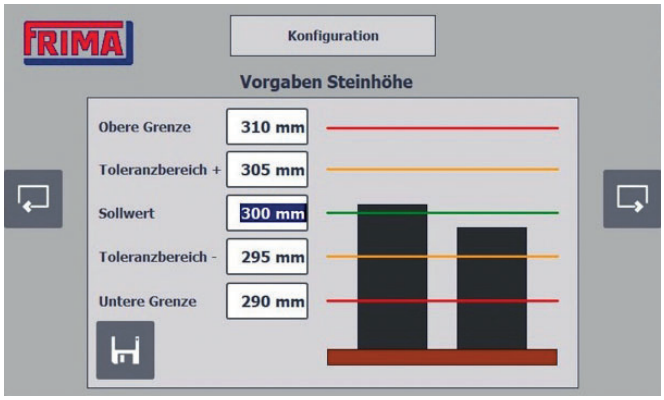
PC visualisation

The block height measurement device can be implemented in an existing control unit or built as a stand-alone solution into systems with external control units using contact exchange. With existing newer displays from Frima, parameterisation and output can take place directly at the PC on the wet side. A window is created that can be displayed on a second screen. With external systems without a Frima control unit, output takes place either using a touch panel installed directly on the outside of the switching cabinet or via an extra PC display.

The PC display's operator interface is clearly and intuitively arranged. Alongside inputs for block height and specified tolerances, a traffic light can be configured to show the quality individually of differing product qualities. The same applies to activating potential free contacts for conducting products back to the manufacturing system.

Visualisation of measurement results





All values can be displayed directly at the block height measurement switching cabinet using a touch panel that can also be utilised for configuration

On top of the current values, the average values of the last 20 measurements can be displayed. This makes it possible for the machine operator to analyse trends and react accordingly.

Touch panel operator interface

As a customised solution, all values can be displayed directly at the block height measurement switching cabinet using a touch panel. A combination of PC visualisation and touch panel is also possible.

Extensions and combinations

The block height measurement device can be combined with a weight measurement system, thus allowing product tracking to be enhanced by another characteristic. There is also the possibility of displaying block heights at the sorting station on the dry side to sort out defective products. The boards have to be additionally equipped with RFID tags for this purpose.
The potential free contact exchange supplied as standard allows board tippers or colour markers to be controlled for marking defective concrete blocks or removing them from circulation. Further possibilities can be implemented according to customer specifications.

FURTHER INFORMATION

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