SHV500

RULER OF HEIGHTS

precise. strategic. efficient.

SHV500

HEIGHT CONTROL SYSTEM

for measuring concrete blocks

The highest-quality machine in its class impresses with its precision and long life.

EQUIPMENT

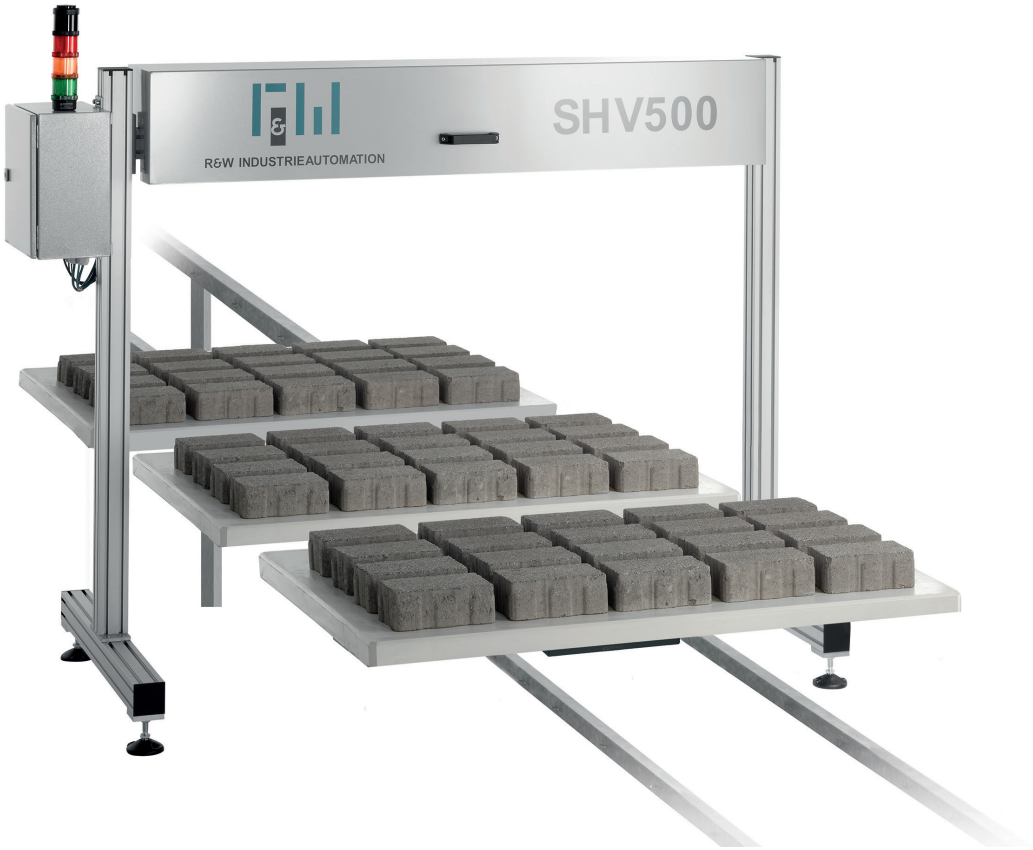
- SHV500 height control system
- HCS500 height control sensor
- Positioning slides
- Frame made of aluminium profile tubes
- Switch cabinet

OPTIONAL EQUIPMENT

- SHV-VISU software from R&W
- PC enclosure system
- Printer
- Industrial PC
- Colour marker
- Board weighing unit
- Production Data Management System PAVE-IT from R&W

SHV500 HEIGHT CONTROL SYSTEM

The SHV500 height control system allows contact-free measuring of concrete products on production boards passing underneath in a height range of 30 to 480 mm. The height of the blocks is measured using up to three independently functioning laser sensors. The lasers can be affixed to the frame above the conveyor using a clamping system and shifted by hand to suit the respective product. Each laser measures a row of block (e.g., left, centre and right in the direction the boards are being conveyed).



HCS500 HEIGHT CONTROL SENSOR

The installed sensor consists of a laser distance sensor with a measuring range of 500 mm, a measuring frequency of 2,500 measurements per second and an integrated microcontroller for measuring and displaying the block heights. The product heights are displayed with a resolution of 0.1 mm. The exactitude of the measuring is +/- 0.5 mm. The sensor's degree of protection is IP65.
Included in the delivery are an Ethernet cable and an I/O cable with pre-assembled plugs (length approx. 3 m, other lengths available on request). The HCS500 sensor is equipped with a web server making it possible to display the measurement data on a PC. For displaying the measured data, the HCS500 sensor can be connected to a standard PC with Internet browser.

The height control system with the HCS500 sensor boasts a modular construction. The minimum system configuration simply contains one HCS500 sensor, a power supply and a network connection. In the largest configuration level, three sensors scan different rows of blocks on the production board.
The results are merged in the master sensor and evaluated. Up to five partners can communicate with the sensors and receive the results via the network. Connections to PLC systems, Windows PCs and marking systems are also conceivable. In addition, it is also possible to establish up to 22 connections with the integrated web server in order to view the web visualisation in an Internet browser. Communication via a wireless connection and the transmission of the web visualisation over the Internet are also conceivable.

Expansions such as additional sensors, interfaces and signalling systems can be installed without any problems including without technical training.

ADDED FUNCTIONALITY WITH THE SHV-VISU SOFTWARE BY R&W

- Filing of measured data
- Viewing of filed results
- Statistical evaluation

COMMUNICATION

Integration of the web visualisation in the machine visualisation

Viewing of the web visualisation on a PC with low system requirements (only a web browser such as IE or Firefox is required for the visualisation). It is therefore not necessary to purchase a new display device.

Viewing the web visualisation on PCs:
- in the machine operating room
- in the office
- on the go via the Internet

Communication with a Siemens PLC system, complete operation and evaluation (automatic recipe change, feedback of measured data to block maker, stoppage of the system or separation of rejected materials).

Integration of a colour marker in the system in order to mark rejected materials.

The SHV-VISU software from R&W is also available for our more discerning customers.

POSITIONING SLIDES

The positioning slides comprise the following components:

- Carriage with adjustable rollers for fixation to a frame made of aluminium profile tubes.
- Setting screw for fixing in position
- Adjusting plate for directing the sensor

FRAME MADE OF ALUMINIUM PROFILE TUBES

Frame for receiving up to three laser sensors mounted on a carriage. The cross beam is height-adjustable in order to adapt to the local conditions and equipped with a protective cover for the sensors.

The frame is installed above the transport path for the production boards. In addition, there are also frames made of profile tubes available for wall installation (scale drawings enclosed).

SWITCH CABINET

Switch cabinet with network electronics, signal lights, horn and potential-free relays for exchanging signals with external control systems. The HCS500 sensor generates the signals on the right, which can be forwarded to the concrete block maker's control system via potential-free relays.

The scope of delivery also includes operating instructions and a complete wiring diagram of the measuring system in both German and English.

COMMUNICATION

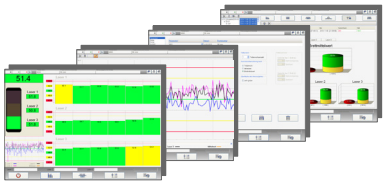
Possible signals
from the SHV500 to the block maker:

- OK (green signal light)
- Warning (yellow signal light)
- Rejected (red signal light)

Possible signals
from the block maker to the SHV500:

- Board stopped
  under SHV500 measuring system
- Conveyor advances
  (position of colour marker)

SHV-VISU SOFTWARE FROM R&W



In order to integrate the SHV500 seamlessly in a modern production environment, we have developed a complete Windows-based software solution which offers user-friendly operation, effective data storage and high-performance analysis. The proprietary software from R&W is available in both a Server and a Client version. The laser sensors are connected to the server PC via Ethernet. The PC collates the data and saves them in a database either locally or on a central computer in the network.
The SHV-VISU Client version can be installed on as many PCs in the company network as desired and offers a reduced range of functions compared with the Server version: It only allows read access to the data saved on the server.

INDUSTRIAL PC

Siemens industrial PC (Rack PC 347D) with keyboard, mouse and 19” monitor. The SHV-VISU visualisation software from R&W can also be installed on the PC.

The HCS500 sensors are connected to the integrated Ethernet interface.

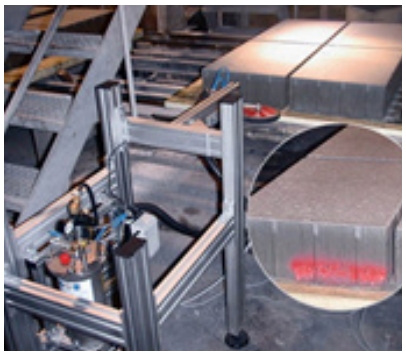
PC ENCLOSURE SYSTEM

Self-contained PC enclosure system (Rittal type “TS 8”) for housing the 19” industrial PC, monitor and keyboard, dimensions 600 x 1,600 x 600 mm.

PRINTER

HP LASERJET P2035 incl. USB connection cable (or a comparable model). Print speeds of up to 30 ppm, output quality of up to 1,200 dpi. Easy to set up, use and maintain. The intelligent print cartridge optimises print quality and provides alerts when supplies are low (toner ordered separately).

COLOUR MARKER



The colour marker is used to mark layers of blocks with heights outside of the specified tolerances. The system is installed on the side of the conveyor. The layer of blocks is marked on one side in the direction of transport.

COMPONENTS

Paint gun with nozzle and needle made of stainless steel. The adjustable gun is attached to a aluminium profile tube, which in turn is flexibly mounted on a frame to the side of the conveyor.

In addition to the pistol, there is also a wheel mounted on the articulated arm. This wheel prevents protruding blocks from damaging the paint gun. Should the situation present itself, the articulated arm with the wheel and paint gun are displaced to the side and need to be repositioned by the operator.

The instrument panel with a directional control valve, shut-off valve, pressure limitation valve, filter pressure regulator and paint container made of stainless steel (3 litres) is mounted on a solid frame made of aluminium profiles.

Connection lines are bundled in a flexible hose approx. 2 m in length.

Control system for colour marker (switch cabinet on frame) with warning light (red)

1 litre of red marking paint and 1 litre of marking paint thinner

FUNCTIONS

Marking of products measured and rejected

Visualisation of status and error messages for the SHV-VISU visualisation software

Visualisation of error messages with the aid of a signal light (attached to the marker's switch cabinet) as composite error

COMMUNICATION

Possible marker statuses:
- Ready
- Marking in progress
- Off

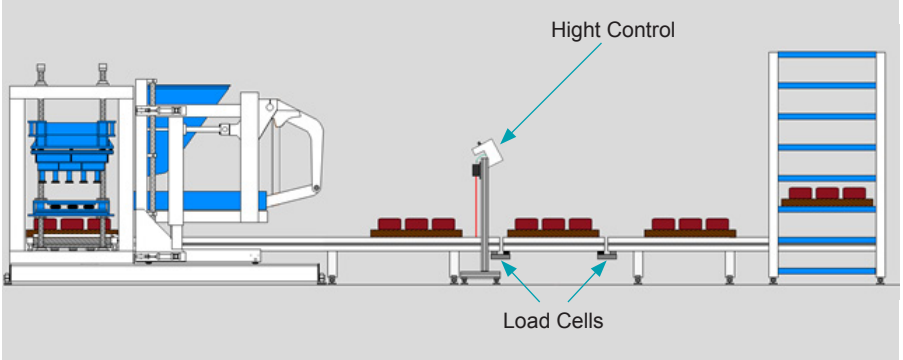
Possible marker error messages:
- Arm not in position
- Nozzle monitoring (no jet)

BOARD WEIGHING UNIT

Next to the height, weight is an essential quality feature for freshly produced concrete blocks as well.

In addition to the height control system, R&W delivers components for the board weighing unit:

- Load cells and accessory equipment
- Weighing electronics
- Update of the SHV-Visu software for the weighing unit



The system for weighing boards with concrete blocks is installed directly behind the Heigt Control System. The conveyor drops the board on a frame with load cells behind the Height Control System.

The weight for an empty board can be edited in the SHV-Visu software, or can be read out of a RFID Chip in the board.

The control of the weighing unit measures the weight of a board with products and calculates the concrete weight by computing the difference between the full and empty board. This weight is sent to the SHV-Visu software on the computer where it is displayed and stored in the database. The control unit of the weighing system is based on Siemens S7-1200 PLC and communicates with the control of the block machine (signal exchange), the laser sensors of the height control and with the SHV-Visu software.

COMPONENTS

Siemens load cells of type:

- SIWAREX WL 230 load cell
- Accuracy class C3
- 3 m cable lenght, 4 wires
- Made of stainless steel, protection class IP68
- Base plate and elastomer bearing
- Material: stainless steel
- Rated load 500 kg and 1 t

Siemens junction box of type:

- Junction box SIWAREX JB DIE
- Cast aluminium quality to connect in parralel up
- 50 m cabel of type LI2Y 2X0, 75ST and 2 (2X0, 34ST) for connecting the junction box to the SIWAREX weighing electronic

Siemens S7-1200 PLC and weighing electronics:

- SIMATIC S7-1200, compact CPU
- SIWAREX WP231 electronic

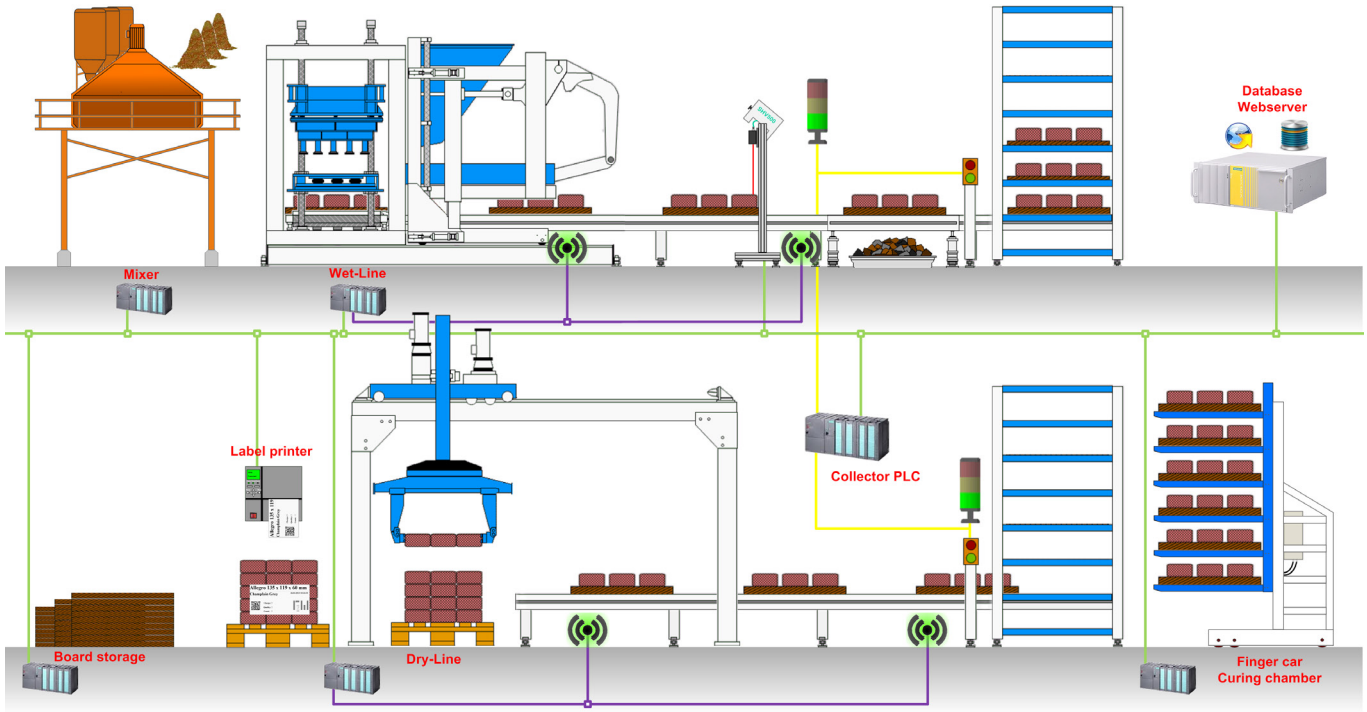
The PLC and the weighing electronic will be installed in the control box of the SHV500. The junction box for the load cells has to be installed close to the load cells.

R&W-PRODUCTION DATA MANAGEMENT SYSTEM PAVE-IT

Pave-IT records production data in the concrete factory.
In order to ensure a complete flow of information from the Wet-Line to the Dry-Line, identifiable base plates are used.

This technology is based on a RFID chip within the base plate allowing a clear identification of the plate along the production process. A PLC collects quality-relevant data from the concrete mixer, Wet- and Dry-Line, quality measurement devices, etc.

The chip number is used to allocate database information to the corresponding base plates.



Overview of a concrete block plant with indicated reading systems for RFID chips

So, it is possible to allocate different information such as production data, quality features, etc. to each base plate - and, thus, also to one of the layers of blocks produced on this base plate.

The combination with the R&W height control system allows a continuous quality management as for each layer of blocks up to the packaging all data is available and traceable at any time. Quality variations on the Dry-Line are immediately displayed and can be used there for automated sorting.
By using the R&W block height measuring systems and Pave-IT, the complaint rate can significantly be reduced.