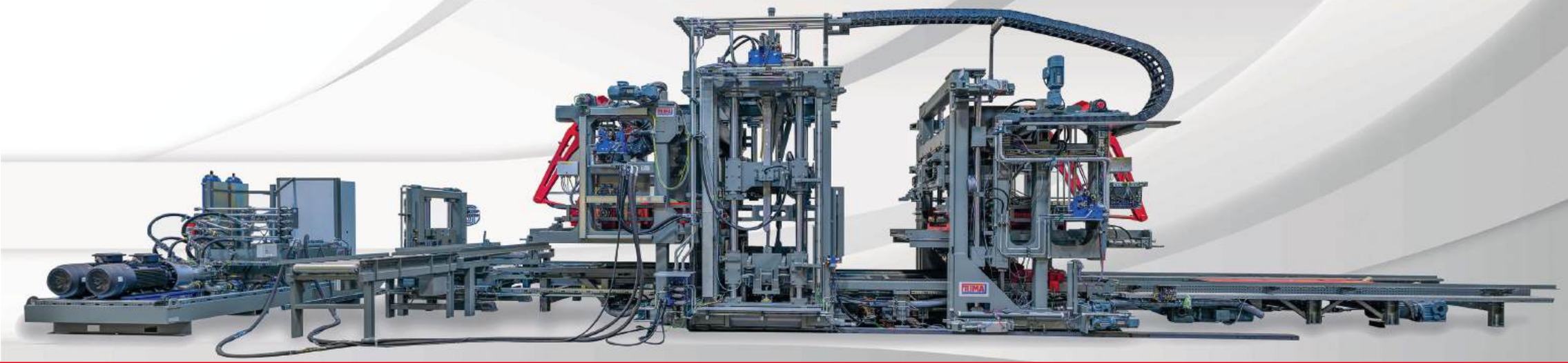
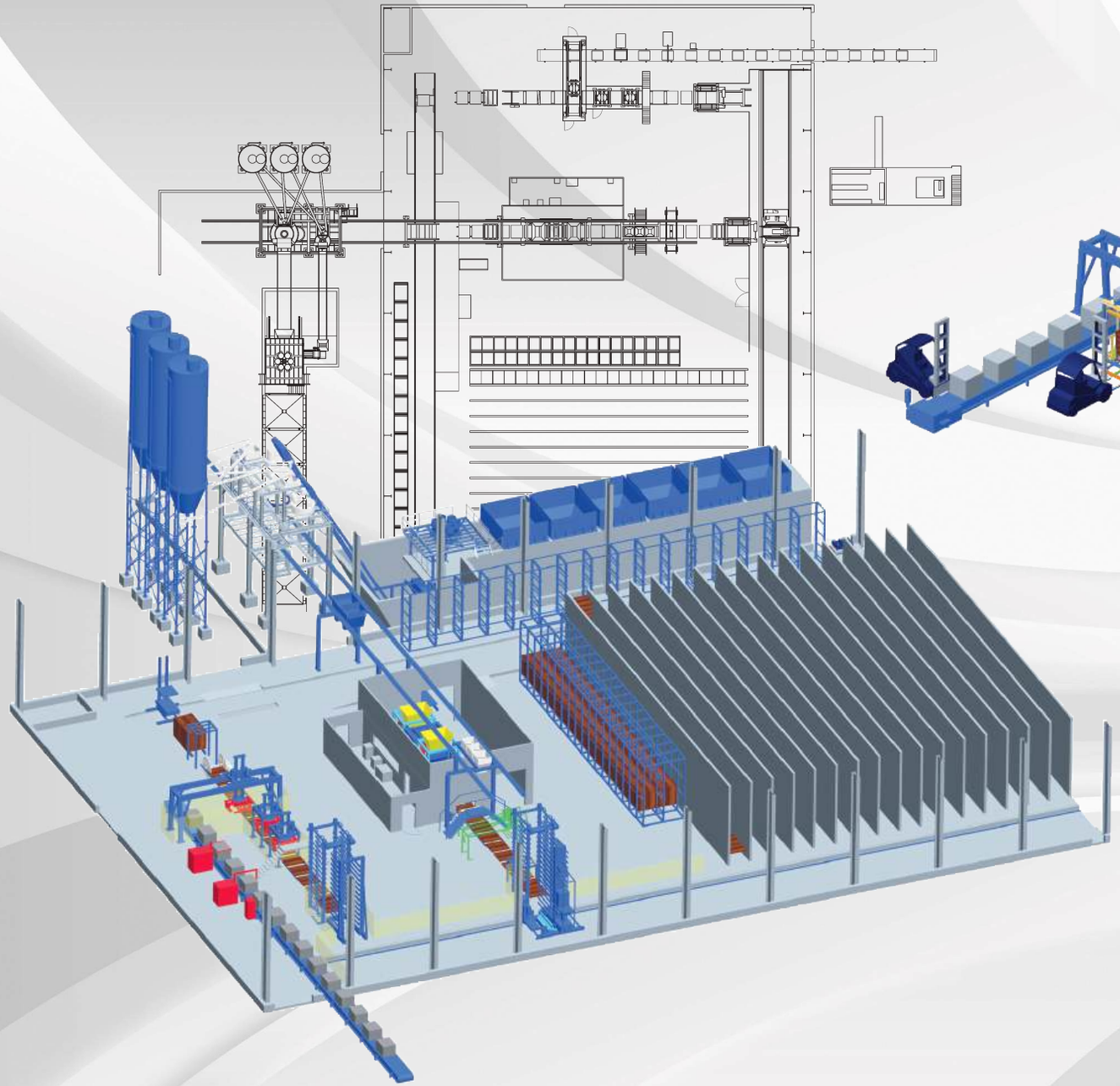
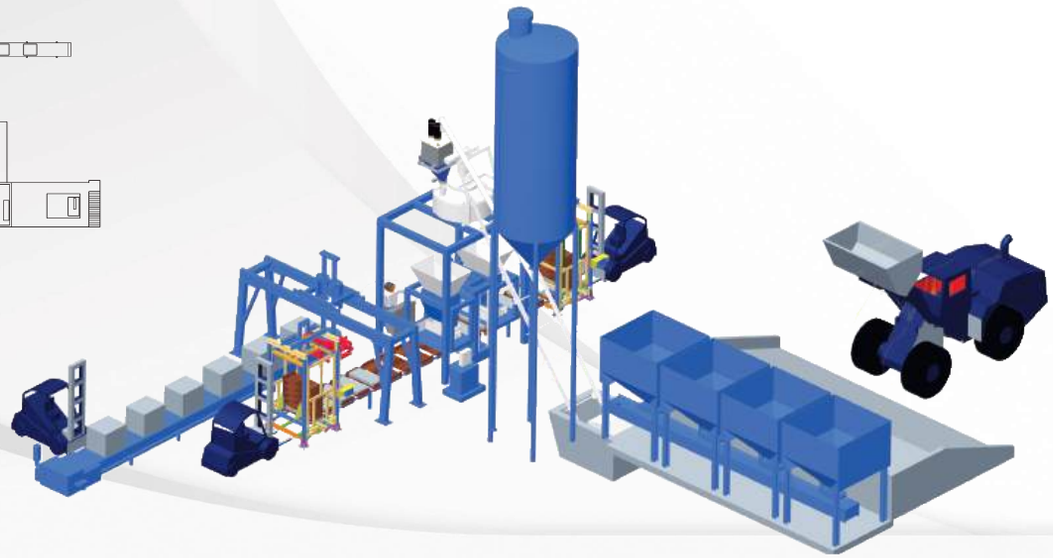
CONCRETE BLOCK PRODUCTION PLANTS

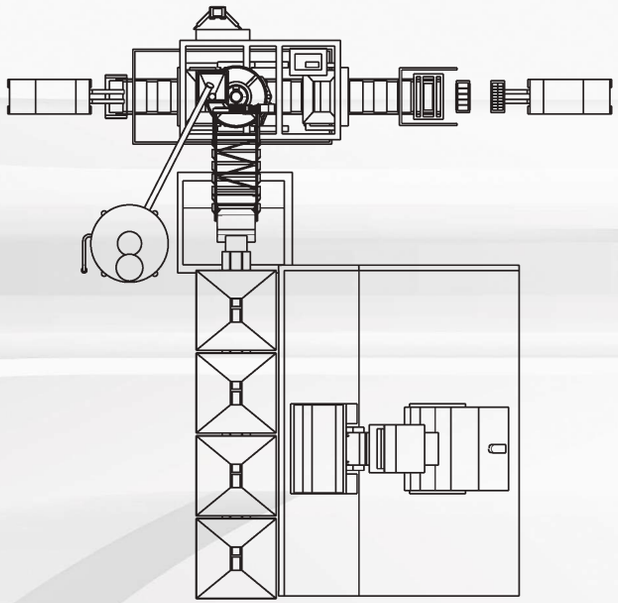


EFFICIENT · LOW-MAINTENANCE · USER-FRIENDLY

AUTOMATIC AND SEMIAUTOMATIC CONCRETE BLOCK PRODUCTION PLANTS





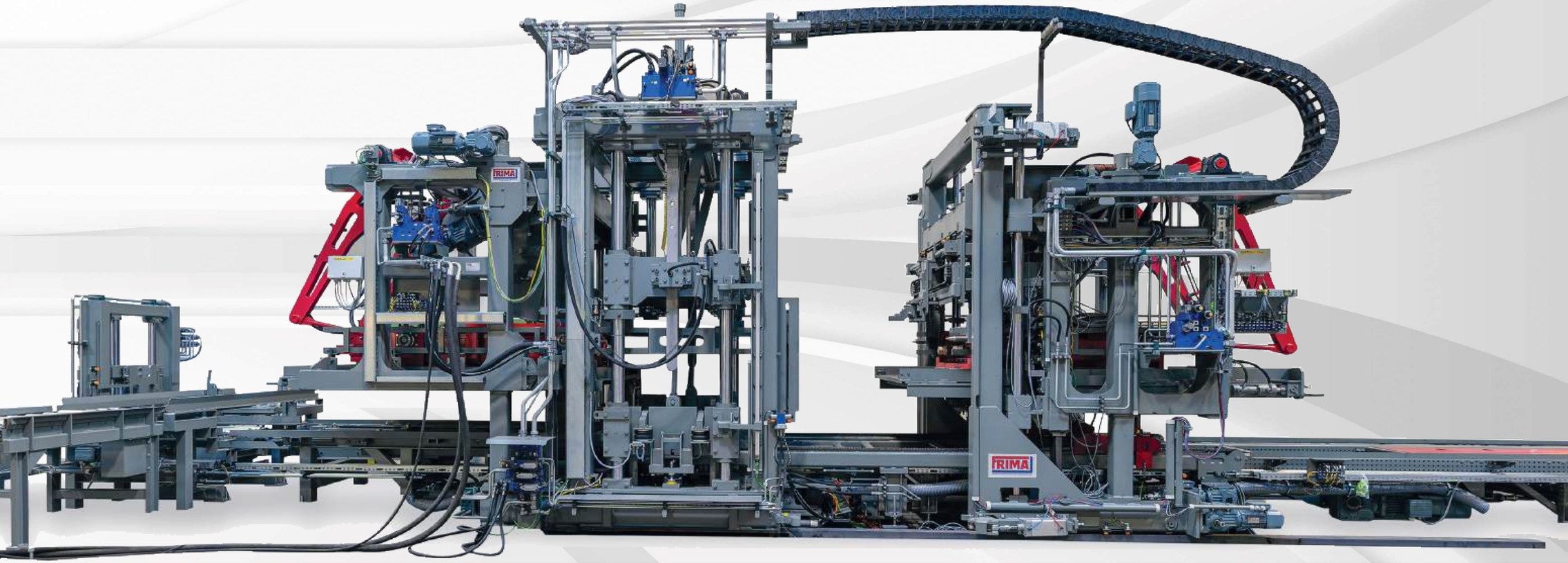


FRIMA HP1400 · HP1200 · HP1000 · HP800

FRIMA HP series concrete block machines are our high-performance machines for maximum production output and product quality in a wide range of applications.

Technical details

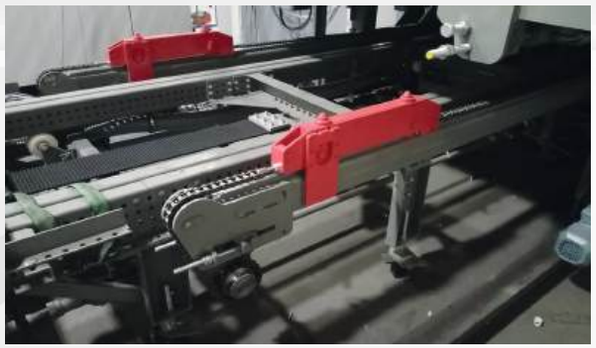
- Production Boards: 1400 x 800 mm min., 1400 x 1400 mm max.
- Production Height: 20 mm bis 500 mm
- Guide collumns ⌀100mm bis ⌀120mm
- Automatic servo vibration system
- Control technology with IO-Link proportional control valves and position measurement
- Solid design for the highest production requirements
- Automatic spindle height adjustment of the filling units
- State-of-the-art control and visualization systems and 3D user interface
- Proportional dynamic load pressure control with actual value display
- Proportional pressure adjustment of the air bellow cylinder for mould clamping
- Hopper fill level measurement via radar
- Filler box level measurement via laser



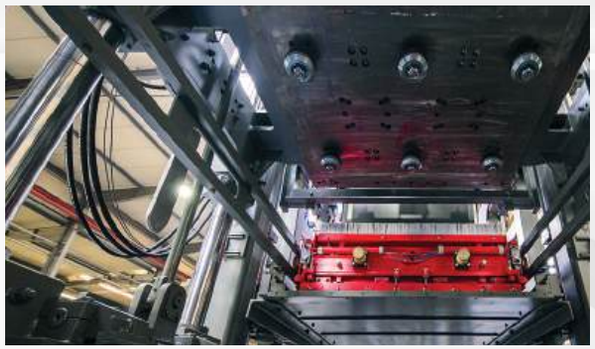
Technical details and equipment options

In addition to the features mentioned, the following options are available:

- Automatic horizontal filler box platform adjustment
- Electric driven hopper flaps
- Wear protection in various designs
- Proportional pressure adjustment of the mould clamping on both sides
- Hydraulically monitored tamper connection with tamper head shut-off
- Split / double vibrating tableFrequency-controlled top vibrator
- Board locking deviceDigital maintenance interval display
- Connection for 2-step tamper and mould flaps
- Individual mould connection



- Quick mould change device in various designs
- Tamper cross cleaning
- Colour mixing systems in various designs
- Draw plate device
- Surface smoothing device
- Core pulling device
- Device for insulating block production
- Mechanical stone height stop device (with electrical cut-off, also for draw plate)
- Electronic stone height stop device via linear encoder
- Basement emptying via lift or screw conveyor



FRIMA P650

Technical features

- Board size: 1400 x 670 mm min. or 1520 x 670 mm Max. with feet
- Production Height: 40 mm to 300 mm
- Fully automatic control and visualization systems SIEMENS S7 and Win CC Flexible
- Compact plant design
- Single unit rigid vibration table
- Frequency control vibrator drives on separate traverse
- Mold bracing by air actuators
- Filling car with hydraulically driven filling device
- Proportional control valve for board-feeding device
- Adjustable scraper

Depending on version:

- 2nd Filling device for face-mix concrete
- Cross-cleaning
- Colourmix
- Metal sheet pulling device
- Device for insulating brick production
- Mechanical height off
- Continuous level measurement in silos

FRIMA P500

Technical features

- Board size: 1200 x 550 mm min. or 1320 x 550 mm Max. with feet / support
- Production Height: up to 300mm
- Latest control and operating systems SIEMENS S7-1200 and SIMATIC Basic Panel
- Compact plant design
- Single unit rigid vibrating table
- Frequency controlled vibrating system
- Mold bracing by air bag actuators
- Proportional control valve for board-feeding device

Depending on version:

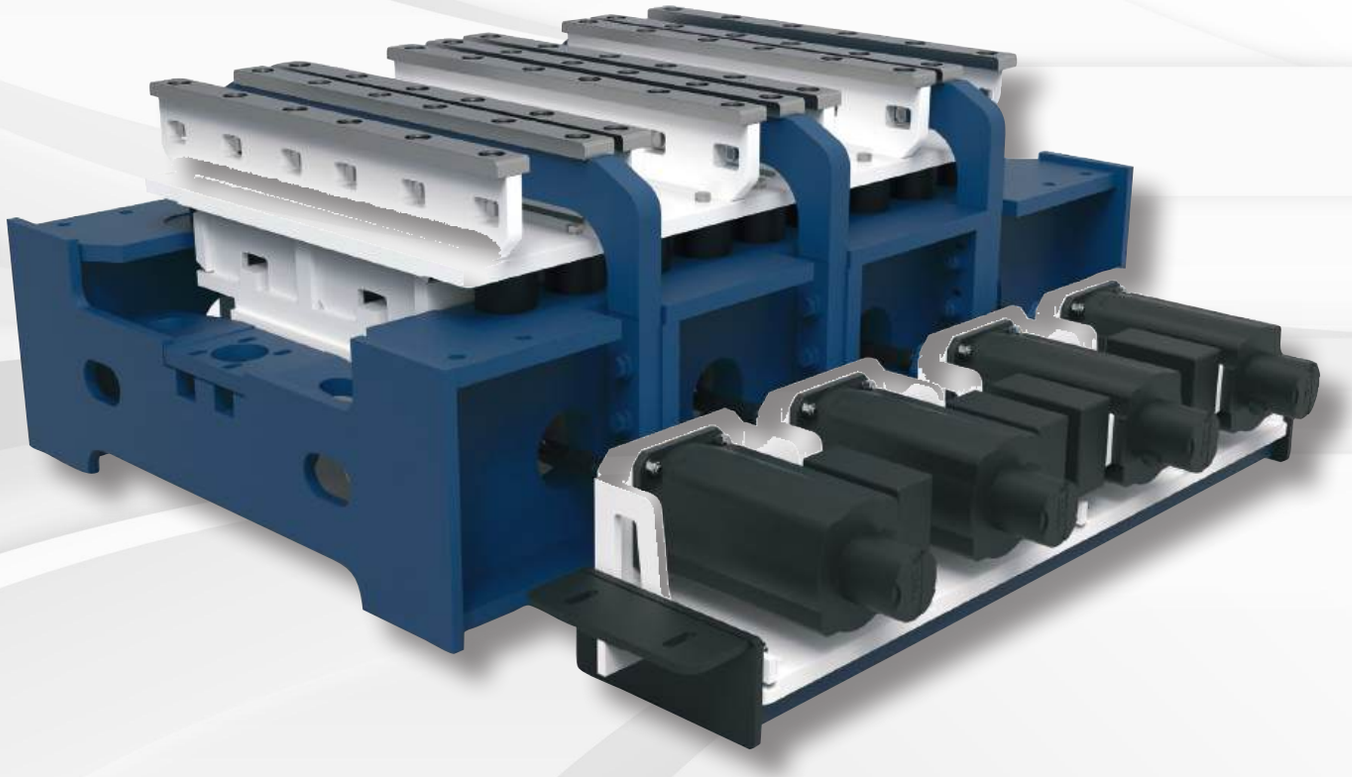
- 2nd Filling device for face-mix concrete
- Cross-cleaning
- Mechanical height control

FRIMA AXIS VIBRATION

With the **FRIMA Axis vibration system** as a single table with **4 drives** or as a double table with **8 drives**, we offer our customers one of the most innovative solutions for compacting earth-moist concrete.

The system is characterised by its simplicity. The double vibrating table offers the possibility of compensating for filling problems with demanding products thanks to the individual vibration intensity in the production direction. Through the use of highly dynamic servo drives, angle and speed can be adjusted within milliseconds. Result of this is a precisely accurate vibration. The individual requirements of frequency and amplitude make this system very flexible for any production requirements.

Precise guidelines using 3D control system ensure an effective dose of the vibrating table which can be precisely matched to the product. Optimum density and thus an excellent strength are the result. And last but not least, the system is equipped with a regenerative power supply unit. The use of power feed back improves the energy balance of the entire system significantly, from energy-efficient drive components are impressive energy savers – and conserves resources and the environment.



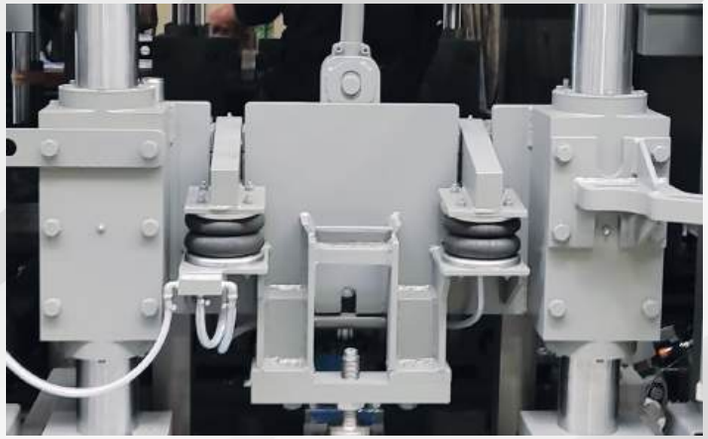
HYDRAULIC AND PNEUMATIC

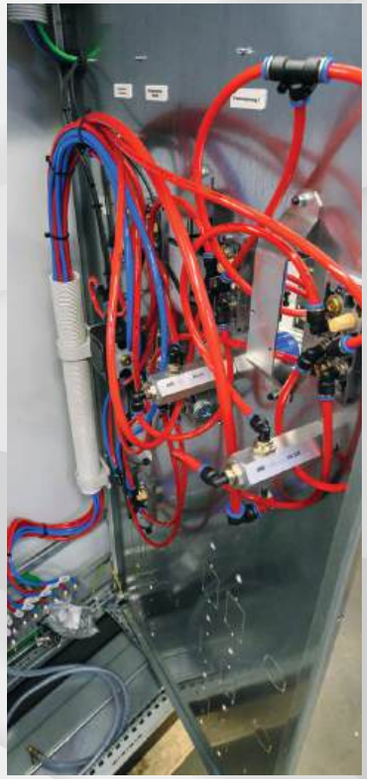
Hydraulic

- Powerful hydraulic unit for supplying the system components
- Pressure accumulator units
- Digital monitoring of the hydraulic system using IO-Link sensors for fill level, temperature and pressure
- Air-conditioned control cabinet
- Power-controlled Bosch Rexroth axial piston pumps
- Cooling circuit with 1 or 2 oil/air coolers and optional oil/water cooler
- Valve arrangement close to the consumer and not to the hydraulic unit
- Safety valves for compliance with the machine regulations

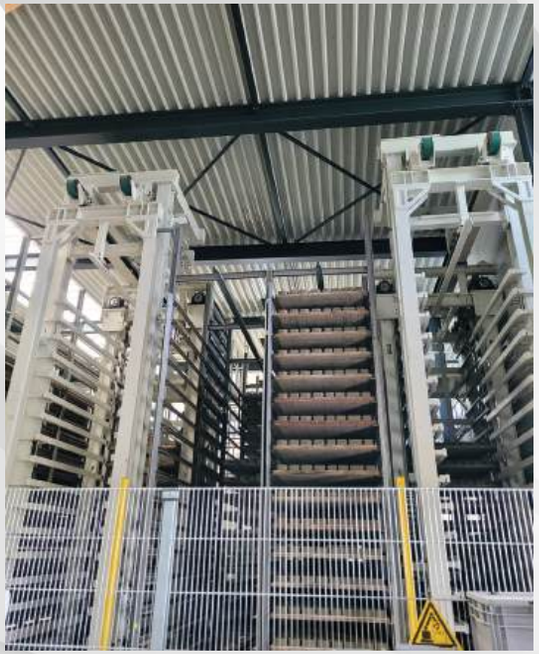
Pneumatic

- Pneumatic system in separate pneumatic cabinet with decentralised control technology
- Maintenance-friendly mounting plate
- Clear arrangement of the valves
- Digital recording of ACTUAL pressures
- Proportional IO-Link pressure valve for mould clamping, optionally separately controllable for the left and right sides
- Preparation for extensions and additional valves
- All settings can be saved per recipe and can be loaded directly when changing products





CHAMBER AREA



Technical features elevator, lowerator and intermediate finger car

- Customized level arrangement to your production requirements
- Single and double level design with head guide for the finger car group
- Load capacity up to 20 tonnes
- Drive via planetary gearbox
- Board centring with specially edged profiles
- Maintenance platform with access in various designs
- Intermediate finger car with and without load arm adjustment for optimised production processes in various designs
- Board stacking and destacking device for boards with spacers for semi-automatic and automatic systems

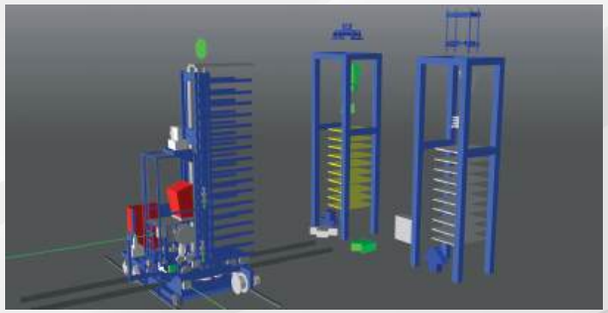
FINGER CAR GROUP

Technical features finger car group

The **FRIMA finger car group** can be set to optimize the product.
This is the stage where all the production data such as: Product name, form number, time stamp, etc. are supplied along the production network.

Equipment features:

- Automatic control concept with chamber management
- Single and double level design with head guide
- Monitoring of the board position on the support arms via laser
- Monitoring of leftover and misaligned boards via laser
- Turntable
- Automatic load arm adjustment
- Head guide also in height-adjustable version
- Laser distance measurementIndustrial
- WiFi for data transmission of the part controls
- Lifting frame with distance measurement for different chamber heights
- Product tracking
- Roller shutter control
- Suitable for climatic chambers



DRY SIDE

Technical details and equipment options

- Fully electric dry side design, optionally also with individual hydraulic components
- Conveyor technology in various designs
- Quality control in manual or automatic version
- Stone gap closer and doubler in movable or stationary design
- Stationary layer transformation table for stone layer transformation next to and above the conveyor system
- Movable layer transformation table for operation without movable gap closer or doubler
- Integration of inline product finishing systems
- Integration of horizontal strapping for individual layers on the conveyor system
- Integration of granulate dispenser or film /net dispenser for surface protection

CUBER

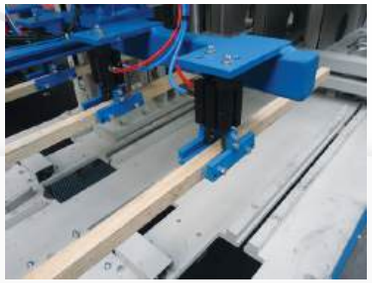
Technical features

- Fully electric with asynchronous or servo drives and electric clamp, as well as in hydraulic clamp design
- Clamp design also possible as a double clamp
- Braking energy can be fed back into the mains for regenerative / energy-efficient operation
- Highly dynamic control technology with optimised movement path
- Customised pick-up and drop-off heights
- Precise positioning
- Stone layer position offset adjustable by distance measurement
- Large clamping range for pick-up of small and large stone layers without clamp adapter
- Clamp adapter
- Manually and automatically adjustable support plate
- Holder for pneumatic vacuum plate
- Noise and wear-reduced drive wheels
- Maintenance platform with access ladder in various versions
- Layout of single or double layers

STONE CUBE CONVEYOR

FRIMA offers various solutions for stone cube conveyor systems:

- Slat conveyors with and without profiles for automatic vertical strapping
- Walking beam conveyor
- Roller conveyor
- Slat trolley conveyor
- Truck transportation
- Crane solutions
- Stone cube car
- Integration of packaging machines



In the stone cube conveyor area, shipping pallets often have to be fed in or wooden strips inserted between the stone layers for protection of the surface.

FRIMA offers various options for separating the shipping pallets. These can be designed as shipping pallet magazines or shipping pallet feeder unit with buffer conveyor.

We offer a stationary system for placing wooden strips for surface protection, as well as an integrated system in the portal frame of the cuber or as a robot.

FRIMA also works with many suppliers in the field of packaging and strapping and can either offer third-party solutions or integrate the machines into the control system.

Stone cubes can be doubled, rotated, moved or adjusted in the cycle distance for optimised removal.

BOARD CROSS TRANSPORT

Systems for returning the empty boards from the dry to the wet side with board buffer systems. This means that the wet and dry sides can produce independently of each other.

FRIMA offers board buffers with board stackers on the dry side and destackers on the wet side:

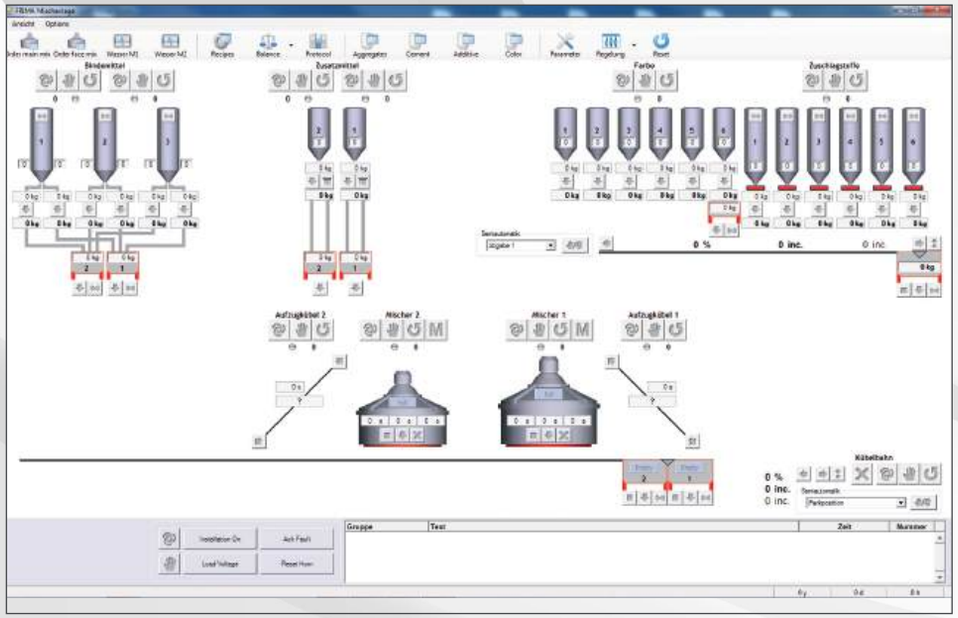
- Board stack transport as roller conveyor
- Board stack transport with roller conveyor and board stack trolley
- Board stack buffer car and racking system
- Board stack crane system

BUFFER SYSTEM FOR PRODUCTION STEEL PLATES

Buffer system with steel plate stacker, steel plate stack crane and destacker unit

The capacity of the buffer system only depends on the storage capacity of the pallet stack rack system or the storage area for the stacks. Wet side and dry side can run totally independently.
Pallet buffer system is equipped with own separate control system.
Pallet stack finger car can also be used in the mould management and mould changing system.

MIXING AND BATCHING PLANT



Individual solutions for customized systems

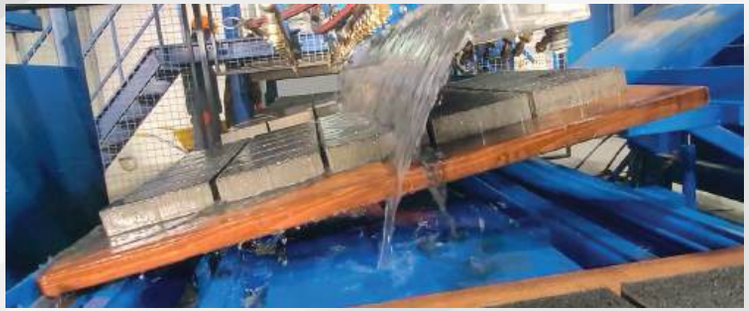
- Suitable for all FRIMA production systems
- Mixer for main concrete and mixer for face concrete
- Concrete mixer up to 2.5 m^3 outlet
- FRIMA independent control and visualisation system
- Aggregate dosing by means of flaps or belt gate
- Weighing of aggregates by means of mobile weighing bucket or weighing belt
- Cement weighing
- Concrete transport to the machine by bucket conveyor or conveyor belts
- Water dosing by microwave and electronic water meter
- Additive pumps
- Colour dosing as an option
- Mixers from various mixer manufacturers can be integrated

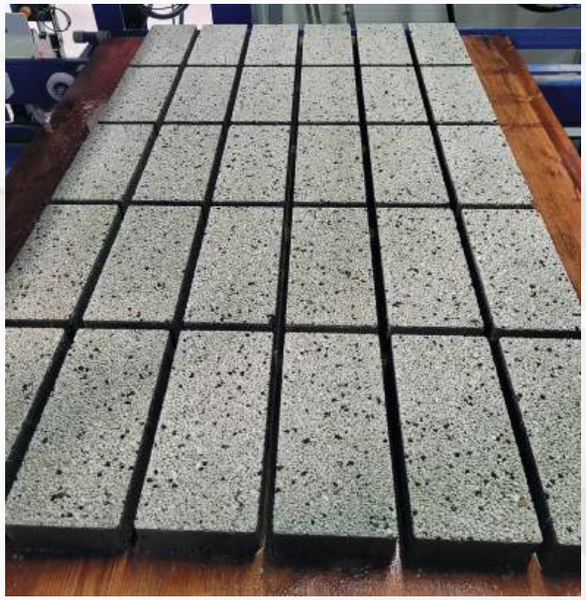
PRODUCTION OF WASHED PAVERS

The washing station has the following technical details

- Lifting device driven by electrical gear motor
- Radial pump 100l/min; max. pressure 16 bar
- Electrical gear motor driven oscillating nozzle carrier
- Drive traveller by electrical gear motor incl. frequency drive including
- Height and angle of drive individually adjustable
- One nozzle bar for drying
- Washing station for single or double pallet
- Suitable for pavers and kerbstone washing
- All parts with direct water contact are made in stainless steel
- The control system allows independent speed and regulation settings for the functions

Options:
- waterfall trough
- nozzle bars for kerbstones





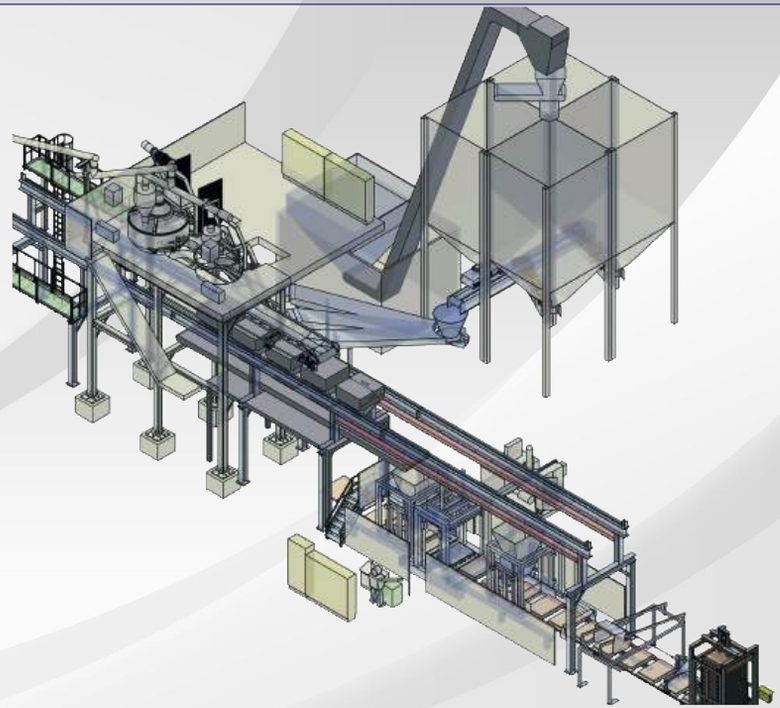
PRODUCTION OF COLOURMIX PRODUCTS

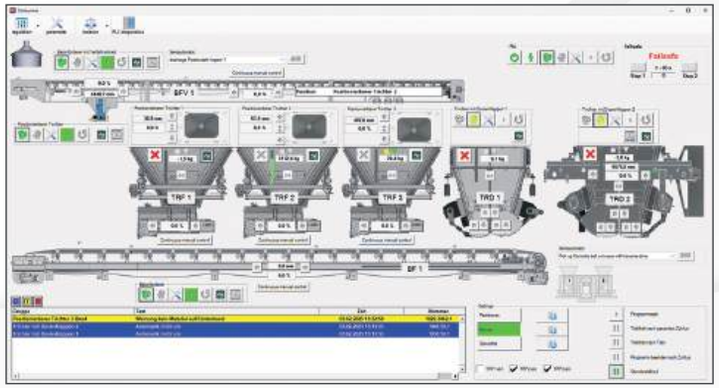
We offer the following systems for the production of coloured products, among others:

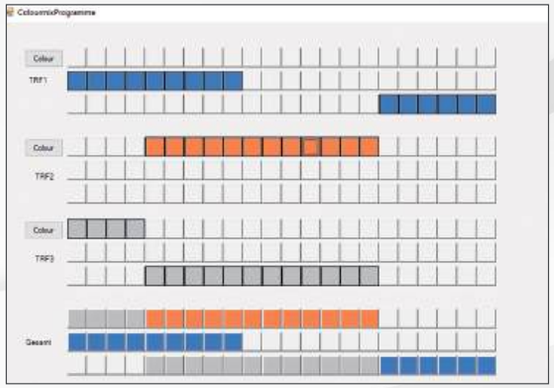
Colourmat:
The Colourmat consists of a hopper with a driven drawing plate.
The different coloured concrete batches are placed in the Colourmat in separate layers.
After the draw plate is opened the coloured concrete mixes fall into the machine hopper.

Colourmix bucket conveyor:
The COLOURMIX bucket conveyor with up to 4 buckets is filled with colour concrete mixes one after the other. Each bucket is designed as a weighing container.
The concrete is dosed into the machine hopper by the roller dosing unit.

Colour mixing hopper system:
The colour mixing hopper system consists of a movable concrete feed belt conveyor that fills the different colour mixing hoppers. The colour mixing hoppers can be moved, allowing the concrete batches to be placed on the conveyor belt below according to a preselected pattern. In this way a high repeat accuracy can be achieved.





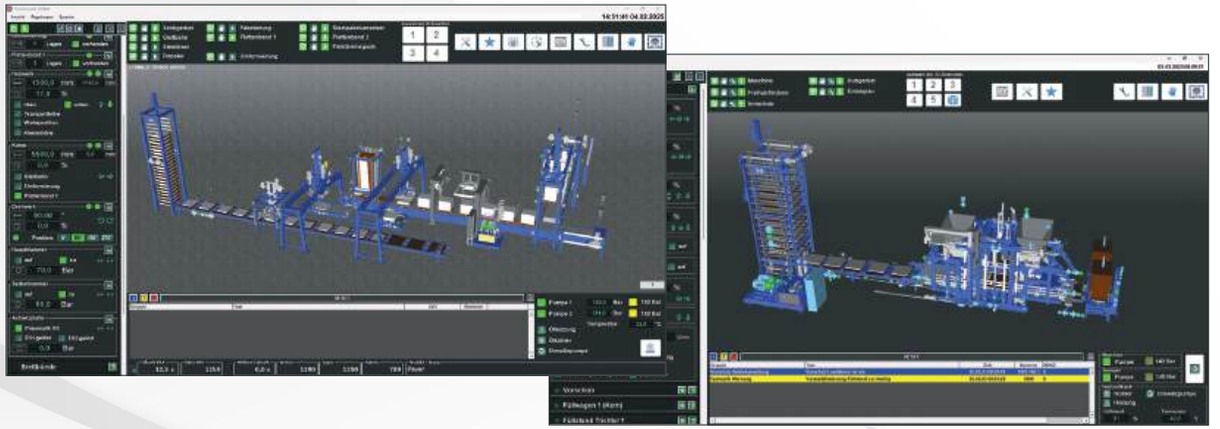


CONTROLS AND VISUALIZATION HMI SYSTEMS

The 3D visualization, specially designed for the concrete industry, shows the graphical representation of machines and complete production lines.

The system also offers:

- Display and recording of all reasons for product interruption in plain text
- Display and setting of all variable parameters
- Storage of all variable parameters as a recipe
- Output of production parameters such as cycle time and quantity produced
- Data transfer to higher-level ERP systems.



Detailed data acquisition

The detailed recording of production data is cycle-accurate. For each machine cycle, available machine data such as tamper head position, hydraulic temperature, pressure information, start and end time of the cycle are recorded.

Furthermore, all fault messages and changes made by the machine operator, such as recipe loading, parameter changes, etc., are logged for each cycle.

This data can be assigned to events in the machine and visualized using a graphical evaluation. For example, an irregularity in the cycle sequence can be used to point directly to the cycle data. This makes it easy to identify changes made by the operator or faults in the machine process.

Powerful control cabinets with high-quality components.
Our control cabinets stand for the highest quality, efficiency and reliability. Equipped with premium components from leading manufacturers such as Siemens, SEW-Eurodrive and Phoenix, they are the basis for demanding industrial applications.

Details at a glance:

- Maximum performance – thanks to modern PLC technology (Siemens S7-1500)
- Energy efficiency – thanks to intelligent energy feedback to reduce operating costs
- Flexibility & modularity – thanks to SEW-Movi-C frequency controllers for demand-oriented drive control
- Reliability & durability – only high-quality industrial components for trouble-free operation
- Individual adaptation – tailor-made solutions for specific requirements
- Actuators and sensors are consistently processed digitally via IO-Link, no interference-prone analog signals are used
- For process and conveyor technology, our control cabinets offer a future-proof solution that optimizes processes and reduces operating costs.

RFID-controlled user management enables personalized approval of machine operation.
The system operator can be clearly identified by the system using a personalized chip. In addition to access authorization to parameters, further special rights can be assigned. Furthermore, all entries, such as changes to parameters or the loading of a recipe, are logged on a personal basis.

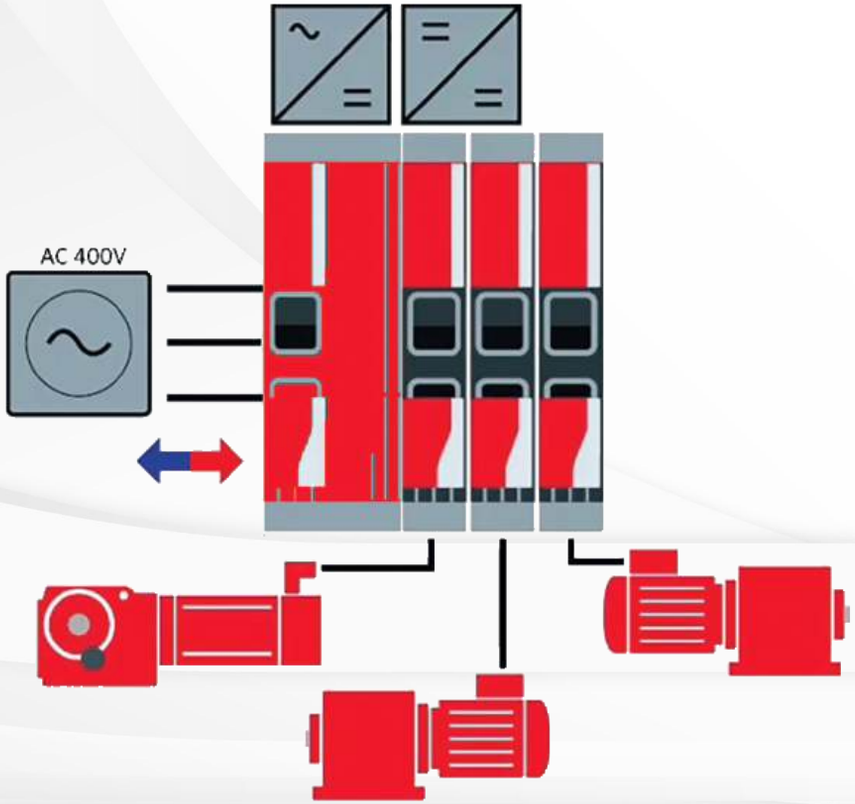
ENERGY MANAGEMENT

Energy recirculation - efficiency through recovery

Energy recovery in control cabinets is a technology that does not convert excess braking energy from electric motors into heat, but feeds it back into the power grid. This significantly increases energy efficiency and reduces operating costs.

Advantages of energy recovery in control cabinets:

- Cost savings – less energy consumption as recovered energy is utilized
- Reduced heat generation – lower cooling requirement in the control cabinet, longer component service life
- Environmentally friendly – sustainable use of energy reduces CO_2 emissions
- Optimisation of power quality & performance – reduced grid load and more stable power supply
- This technology is particularly in demand in automation systems, conveyor technology and industrial production facilities to sustainably reduce energy consumption.



Energy monitoring operational energy monitoring of low-voltage energy distribution
With energy monitoring, the energy and status data of the low-voltage energy distribution of the machines and system components can be displayed, archived and exported for energy reports via web-enabled end devices.

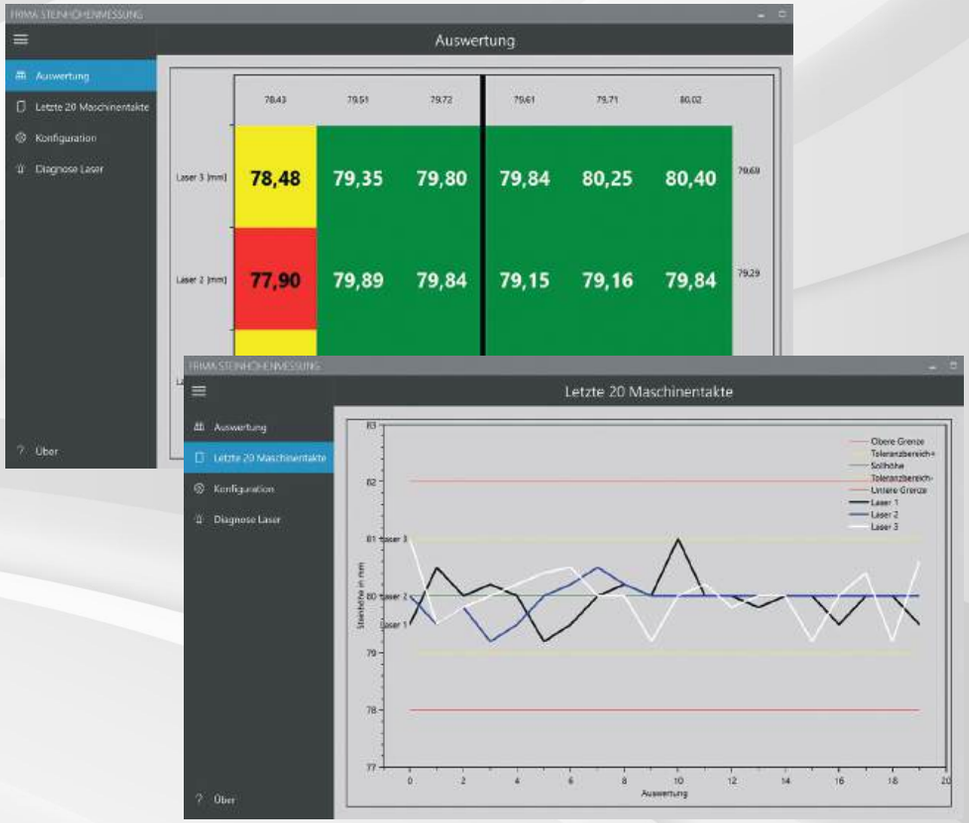
This solution therefore provides a good basis for operational energy management, e.g. in accordance with ISO 50001. The system can record up to 32 measuring points as standard and stores data for up to 14 months.
FRIMA supplies a measuring unit for each switch cabinet supply as part of the scope of delivery.
This means that the energy consumption of each part of the system (e.g. wet/dry side/finger car group etc.) can be recorded. Extended measuring points are possible, e.g. to record individual machines such as packaging or hydraulics.

STONE HEIGHT MEASUREMENT SYSTEM

Especially with regard to the increasing digitalisation and networking in the course of industry 4.0, new ideas and their implementation are a special focus of **FRIMA.**
This includes the development of a data evaluation with database and graphical representaion of itself.

The system enables the operator to analyse the production data accurately. All relevant system states are recorded for each individual machine cycle by sensors such as pressure, temperature or position sensors. Every change of the parameters by the operator is logged.
The data can then be evaluated by a graphical evaluation. In this way, operator errors or system problems can be detected and localised quickly and effectively.

A key component for quality assurance is the laser stone height measurement, which can measure products from 30 mm to 500 mm regardless of shape, colour, moisture and surface.
The results can be displayed visually for the operator as well as transferred to the data evaluation described above.



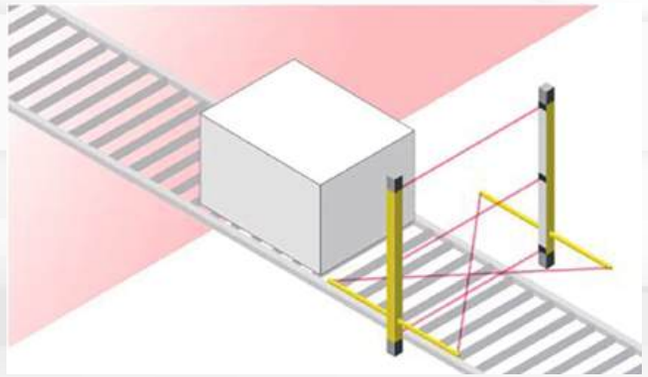
SAFETY

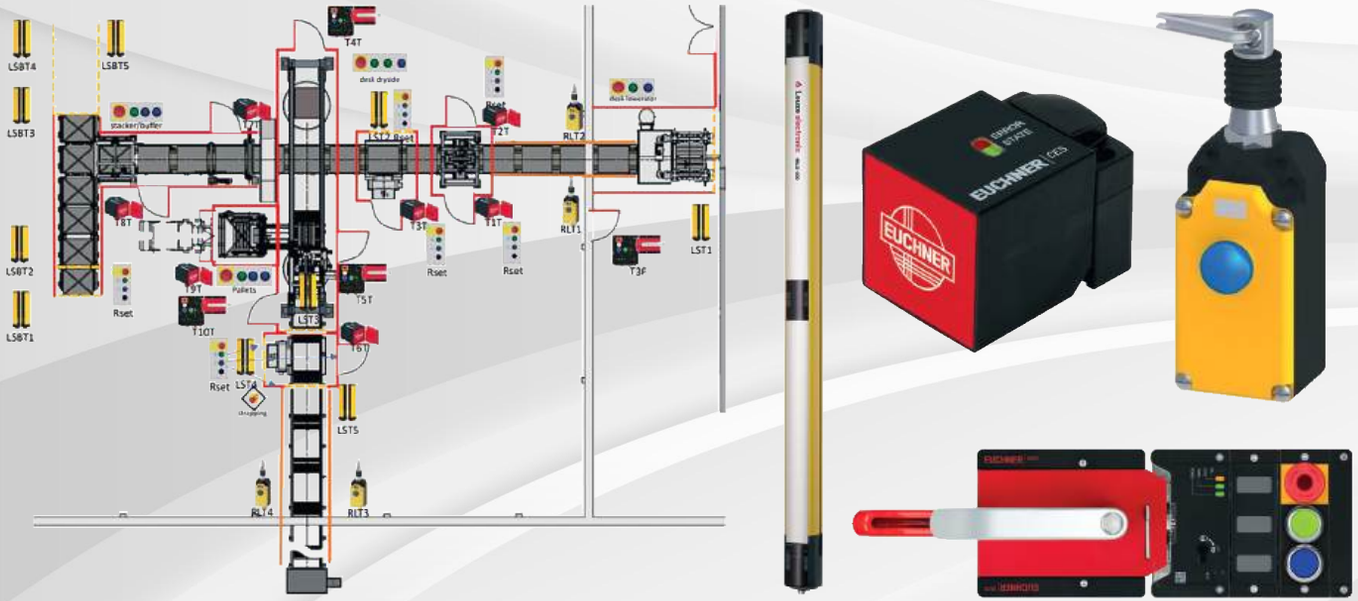
FRIMA safety fence system for concrete block machines. A customised safety concept is drawn up for each project in collaboration with the customer. In addition to safety, we also take productivity and plant operability into account. Protective devices: FRIMA offers a wide range of protective devices such as light barriers, safety gates and safety grids to prevent access to hazardous areas and minimise the risk of injury.

Emergency stop systems: The emergency stop systems are designed to stop machines immediately and therefore defuse immediate hazardous situations. They are easily accessible and simple to operate to enable a rapid response in emergencies. Emergency stop switches are illuminated to quickly locate tripped switches.

Safety controls: Safety controllers monitor and control the operation of machines to ensure they comply with applicable safety standards. They provide reliable monitoring and enable a rapid response to abnormal operating conditions. This makes it easy to expand or modify plant safety.

Labelling and signage: Safety signs, stickers and markings are provided to identify hazardous areas and draw attention to potential risks. This allows employees to be made aware of hazards at an early stage.

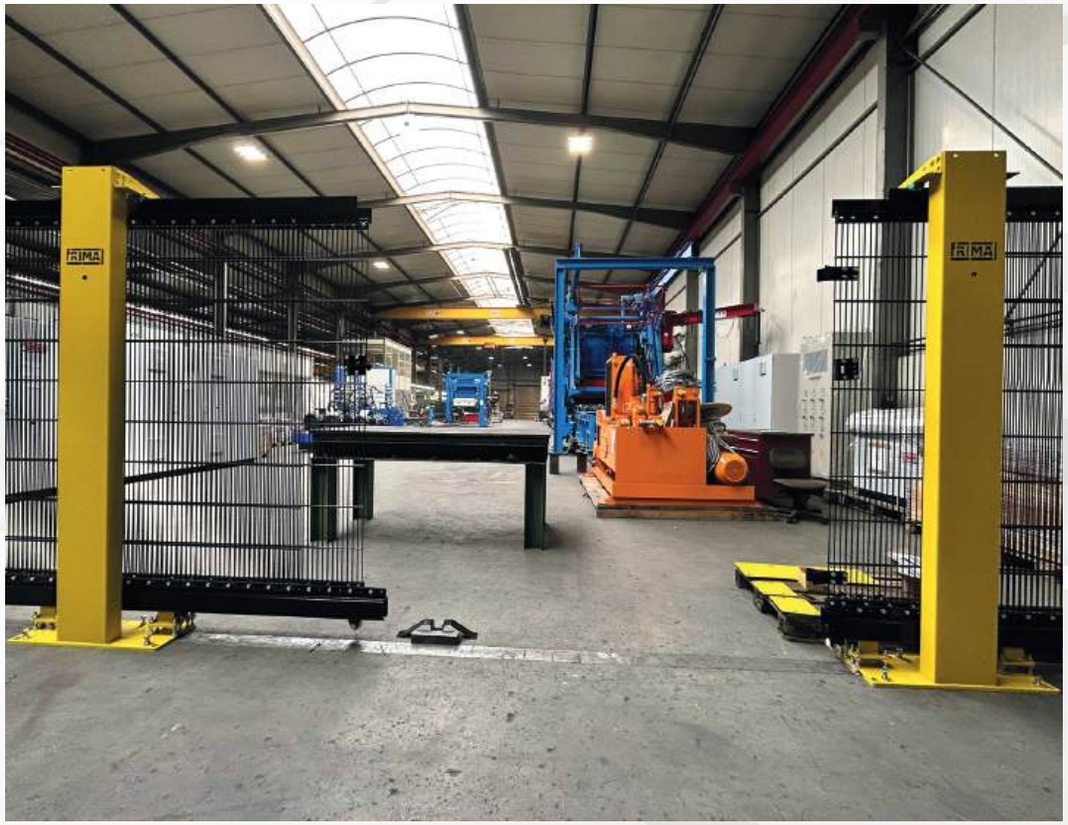




FRIMA SAFETY FENCE SYSTEM FOR CONCRETE BLOCK MACHINES

The safeguarding of concrete block machines often requires a fencing system with a large opening width in combination with high stability. We were unable to find a solution on the market that met our requirements.

We have therefore developed our own fencing system for the machine area. The system is characterised by its stable design and high-quality workmanship. It can be customised thanks to its low installation depth. The central feature is the large self-supporting sliding gate without floor guide. The system can be opened on all sides, allowing barrier-free access to the machine.



OFFLINE STONE TREATMENT SYSTEM

Process for treatment of surfaces offline

This system can be used to process both coarse-grained (single-layer), rustic and fine-grained surfaces of paving, slabs, palisades, kerbstones and bricks. The operating principle of the system is that two counter-rotating shafts equipped with special tools process the stone surface in a similar way to a milling machine. The intensity can be changed by means of various parameters. This unique process is protected by a European patent.

Process for treatment of surfaces online

Another process works online, similar to the principle of a washing plant, but not on the fresh concrete side, but on the dry side. The embossing process is directly integrated into the production line. Additional equipment and work steps, for example to form a strand, are not required. Due to the compactness of the system, not only the conventional embossing process is possible. Many other treatment techniques can be implemented very economically in a single work step.

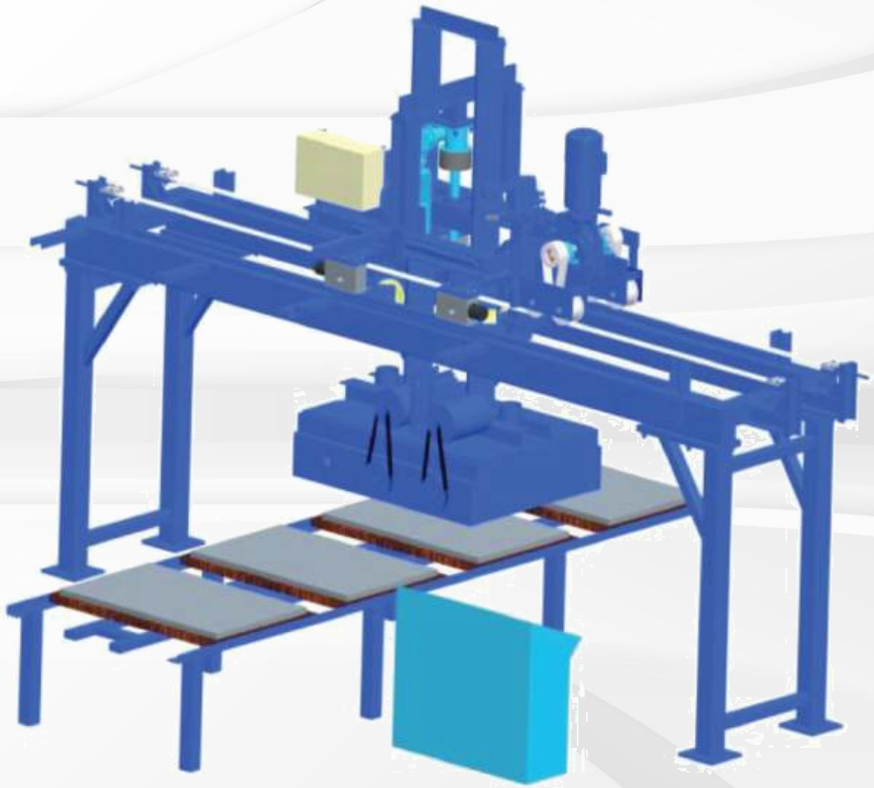
ONLINE STONE TREATMENT SYSTEM

Process for treatment of surfaces

Another technique is operating online similar to the principle of a washing machine, however not on the fresh concrete wet side but on the dry side.

The embossing is directly integrated in the production line.
The compactness of the unit makes not only conventional embossing possible.

This method allows the implementation of many other finishing techniques in a highly efficient way in one production step.



ROBOT SOLUTIONS

FRIMA robot plants

- for reformatting stone layers as board bufferas woodenstrip insert
- for the production of special products
- for inserting transport pallets
- for many other special requirements

performance data FRIMA-HP 1400

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1400 x 1400			work surface 1300 x 1350	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	18	72	72	6
cycle per minute	4	4	5	2
output in 1 hour	3.750	313 m²	400 m²	663 in linear meter
output in 8 hours	30.000	2.500 m²	3.200 m²	5.300 in linear meter

performance data FRIMA-HP 1200

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1400 x 1200			work surface 1300 x 1150	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	15	60	60	5
cycle per minute	4	4	5	2
output in 1 hour	3.125	213 m²	263 m²	552 in linear meter
output in 8 hours	25.000	2.000 m²	2.600 m²	4.416 in linear meter

performance data FRIMA-HP 1000

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1400 x 1000			work surface 1300 x 950	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	12	48	48	4
cycle per minute	4	4	5	2
output in 1 hour	2.500	213 m²	263 m²	440 in linear meter
output in 8 hours	20.000	1.700 m²	2.100 m²	3.530 in linear meter

performance data FRIMA-HP 800

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1400 x 1850			work surface 1300 x 800	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	9	42	42	3
cycle per minute	4	4	5	2
output in 1 hour	1.875	181 m²	231 m²	332 in linear meter
output in 8 hours	15.000	1.450 m²	1.850 m²	2.650 in linear meter

performance data FRIMA-P 650

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1400 x 670			work surface 1300 x 620	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	9	36	36	3
cycle per minute	3	3	4	2
output in 1 hour	1.438	119 m²	156 m²	332 in linear meter
output in 8 hours	12.000	950 m²	1.250 m²	2.650 in linear meter

performance data FRIMA-E 500

(Output in 8 h production with 92% efficiency / Data's are based on proper materials and grading curves)

size of the board 1200 x 550			work surface 1100 x 500	
product	Hollow blocks	Pavers with facemix	Pavers without facemix	Kerbstones
size	20 x 40 h x 20 cm	rectangle 10 x 20 cm	rectangle 10 x 20 cm	15 x 30 h x 100 cm
units per board	5	25	25	2
cycle per minute	3	2,5	4	1,5
output in 1 hour	788	63 m²	88 m²	148 in linear meter
output in 8 hours	6.300	500 m²	700 m²	1.180 in linear meter

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