

We are proud to be the partner of many top-tier companies

(An extract from our list of references)

- Allgair
- Audi
- Benteler
- BMW
- Chery
- Daimler
- Dr. Melegny
- FAW
- Ford
- Geely
- Gestamp
- Graepel
- Great Wall
- Hörmann Automotive
- Kirchhoff Automotive
- Leopaard
- Magna
- Rittal
- SSDT
- Tower Automotive
- Volkswagen
- Yema Auto

Strothmann Machines & Handling GmbH

Altenkamp 11
33758 Schloß Holte-Stukenbrock
Germany

Phone: +49 (0) 5207 / 9 122-0

sales@strothmann.com

A member of the Siempelkamp group.



YOUR SPECIALIST FOR AUTOMATION SOLUTIONS

PressRoomAutomation



Information about quality and application of products does not constitute a guarantee of properties, it is only intended for information purposes. The decisive factor for the scope of our delivery is the respective contract portfolio

In the past decades, *STROTHMANN* has specialised in the automation of pressing plant processes. Notable automotive manufacturers and suppliers worldwide put their trust in *STROTHMANN*.

Our motto is "Innovation in Motion". This represents the constant further development of our products and services. We are not afraid to journey down new, unconventional paths in order to ensure the competitive advantage of our customers. Years of experience, our membership in the Siempelkamp group and the down-to-earth outlook of a company from the Eastern Westphalia region are what makes us a reliable partner.

Our services include:

- Research
- Development
- Planning
- Training
- Service
- Production support
- Simulation
- Design
- Production
- Assembly
- Commissioning
- Programming

Our employees are the key to the high quality of our automation solutions. We provide our expert staff with professional training in various fields. We also ensure that our experienced employees receive continuous further education.

Since 1976, *STROTHMANN* has been building tailor-made solutions for pressing plants.

Our services include:

Service

- 24/7 replacement part service
- Remote maintenance

Front-of-Line

- Blank supply, destacker, conveyor belts
- Integration of washing machine/brush unit/oiling unit
- Optical/mechanical centring station

Press linking

- CompactTransfer
- HighSpeedTransfer
- FeederPlus6 neo

End-of-Line

- Robot shuttle solution
- Conveyor belts

Automatic destacking

- Linear robot / hinged arm robot
- Parts detection
- Container station
- Automatic quality assurance

Simulation software

Condition Monitoring (Industry 4.0)



Service

STROTHMANN supports customers throughout the entire life cycle of the machine line. This includes high-quality service. With locations in Shanghai (China) and Marietta (USA) as well as our cooperation partner Eclipse (Canada, USA, Mexico), we are available for our customers all over the world.

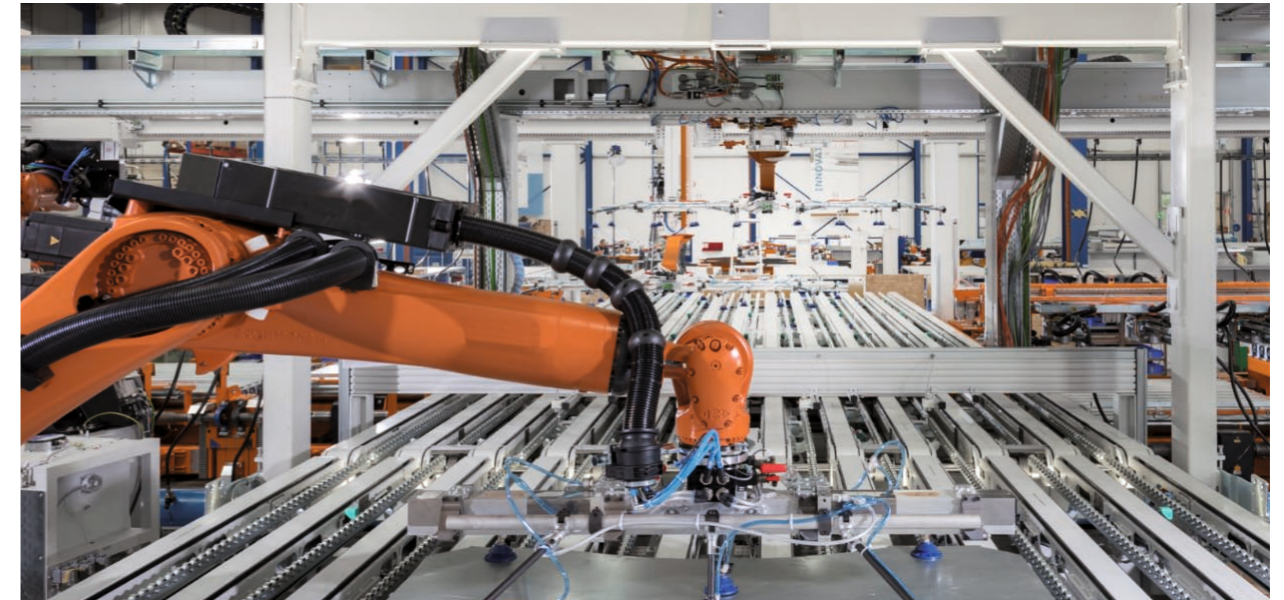
Our scope of services includes:

- Training courses
We impart well-founded expertise and supplement it with useful tips and tricks based on practical application.
- Accompanied production
During the start-up phase, particularly in the case of complex machine lines, our experts will be on site and ensure that production is launched without problems. Meanwhile, your operators have plenty of time to familiarise themselves with the details of the machine line.
- Remote diagnosis
Through a data connection, our experts can connect directly with your machine line. In many cases, machine line failures can be remedied quickly and at low cost through this method.
- Phone service
Many problems can be solved quickest and easiest by phone. Simply call us. We will help you immediately.



- Inspection incl. inspection contracts
Be it for regular inspection, required tests or process and system optimisation, our service experts know every detail of our machines and machine lines. They can detect and remedy wear earlier than anybody else.
- Modernisation
Be it the replacement of individual components or entire assembly groups - we will develop a customised concept for you and update your mechanical, hydraulic and electrical system.
- Replacement part service
Our expert team will be glad to support and advise you with regard to your spare parts order. We will supply you with original STROTHMANN spare parts for your machine - quickly and at fair prices.
- Repairs
In emergencies, there is one primary concern: To reduce your downtimes to a minimum. We, the STROTHMANN service experts, are easy to reach. Our well-developed network of partners throughout the world allows us to be present on site within barely any time at all to immediately repair any malfunctions.

Front-of-Line



Optical centring station

The blank loader has a significant impact on the speed and availability of a press or press line.

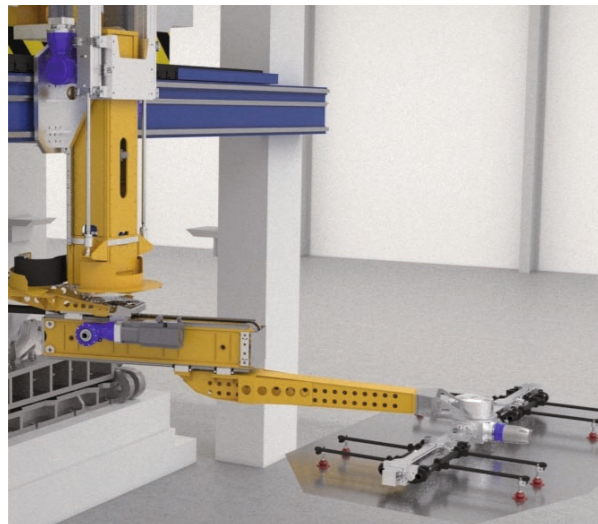
All STROTHMANN blank loaders are tailor-made for the individual requirements of our customers. Innovative solutions ensure high flexibility and low cost. These include e.g. a highly flexible automatic blank pallet centring system and an optical centring station, which requires only one centring robot, even for double parts, resulting in significantly lower costs.

The ever increasing percentage of aluminium in the automotive industry requires additional functions for the blank loader. With intelligent solutions for separating and transport of aluminium blanks, STROTHMANN offers its customers crucial added value in this area. It goes without saying that we can integrate brushing units, washing machines and oilers, irrespective of their make, as required by the customer



Blank loader with automatic pallet centring system

FeederPlus6^{neo}



FeederPlus6^{neo} in press gap

The FeederPlus6^{neo} is an innovative single-arm feeder for press lines of up to 16 SPM. Its modular design makes it suitable for press gaps between 5.200 - 12.000 mm. The system is mounted on one or two presses, depending on the press gap.

Due to its integrated rotary axes based on the working principle (C1 and C2), it can position parts in the FoL and EoL. This is an important cost-saving factor, as it permits simplification of the FoL and EoL. It also reduces the required space.

Advantages at a glance:

- Ideal for new press lines and retrofiting projects
- Excellent accessibility of press gaps
- Lower maximum accelerations than other automation devices while maintaining the same output capacity => reduced maintenance
- Only 1 tooling change carriage required per press gap => cost- and space-saving
- Reuse of existing tooling systems
- Cost reduction through function integration of FoL and EoL in FP6^{neo}
- Consistent use of Siemens technology

Number of Strokes	max. 16 spm
Net load incl. tooling	100 kg
X-axis	5.200 - 12.000 mm
Y-axis	+/- 150 mm (per side)
Z-axis	800 mm
B-axis	± 20°
C-axis	± 90°

Technical data

The FeederPlus6^{neo} is suitable for all press types (hydraulic, mechanical, servo-mechanical).

The tooling change is automatic using the tooling change carriage with a turning device, which enters the press gap.

A modern Siemens control system S7-1500 with an extensive visualisation system (TIA portal) communicates with the press controls and the higher-ranking line controls.

Transfers



CompactTransfer

The CompactTransfer is an electronic transfer system with 6 axes, developed especially for retrofitting large suction presses. It is distinguished by its extremely compact design, so that it can be integrated in the available tight space between the column and the slide.

A light-weight and highly rigid crossbar made of carbon fibres accommodates the tooling. The tooling change is automatic and involves the crossbar being deposited on swivelling transverse bars fastened to the mobile tables.

Advantages at a glance:

- Significantly higher flexibility compared to a mechanical curve-controlled transfer due to the individually programmable servo axle.
- Significantly higher output in conjunction with a phase offset of the press slide
- Noticeable reduction of press energy consumption (by approx. 20 %)
- Full compatibility with existing one-pipe or two-pipe toolings
- No need for orientation stations => fewer toolings, less make-ready work
- Siemens components available worldwide



HighSpeedTransfer

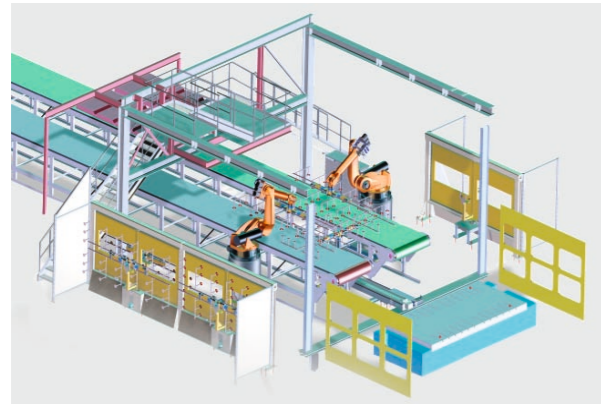
The HighSpeedTransfer is an electronic transfer system with 6 axes for the automation of press lines. It is based on the highly successful CompactTransfer. It is mounted on the front of the column of a press. Redundant timing belt drives with automatic tear detection increase the extremely high availability even further. A light-weight and highly rigid crossbar made of carbon fibres accommodates the tooling.

The tooling change is automatic using the tooling change carts on STROTHMANN Round-Track with a turning device, which enters the press gap.

Advantages at a glance:

- Very high output
- Highly compact shape through vertical utilisation of the available space, easy accessibility of all assembly groups
- Mounting only on the stands of one press => no complicated steel structure between 2 presses
- Only 1 tooling change carriage required per press gap => cost- and spacereduction

End-of-Line

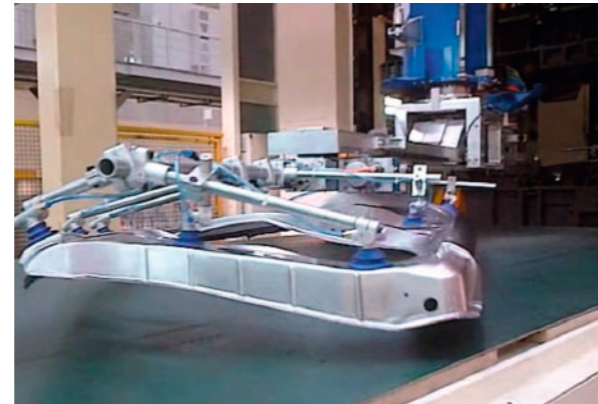


Conventional EoL with shuttle and robots

After the last press stage, the finished pieces are usually deposited on one or two parallel conveyor belts line components.

If no blankpart orientation is required, the blankparts are deposited directly on the conveyor. This applies both to individual blanks and to multiple blanks. All STROTHMANN automation devices are designed for this option.

If blankpart orientation is requested, e.g. for ergonomic reasons, STROTHMANN frequently uses a combination of a shuttle and two orientation robots.



Blankpart orientation on EoL using the FeederPlus6 (without robot and without shuttle)

The handling unit deposits the blankparts on the shuttle, which then moves toward the robots. The robots remove the blankparts from the shuttle and position them on the conveyor belts.

Our innovative FeederPlus6^{neo} permits blankpart orientation without using a shuttle-robot solution. This is a crucial cost-saving factor, as the orientation function is already part of the feeder due to its functional principle. It also decreases space requirements. Fewer toolings, less programming and less maintenance save additional costs.

Automatic destacking



Automatic destacking of hot-formed pieces

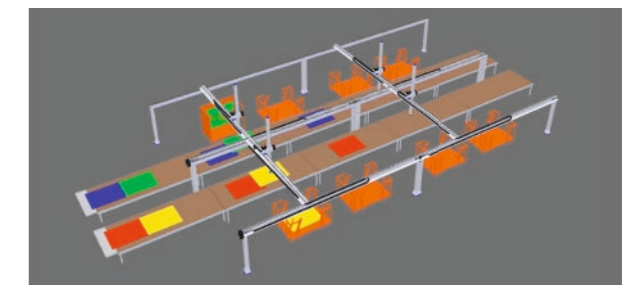
Manual destacking of finished parts into suitable containers requires a lot of staff and is therefore a high-cost process. Additional ergonomic factors need to be considered for heavy and unwieldy blankparts. Moreover, the staff may have a negative influence on sensitive components, e.g. bodyshell components. In some cases it is possible to reach a very high packing density, which cannot be achieved through manual work. For this reason, automatic destacking systems are becoming increasingly popular.

STROTHMANN offers innovative solutions for this segment. A camera system detects the position of blankparts on the conveyor belt and sends the recorded information to the handling unit (industrial robot or linear robot).

The handling unit removes the blankpart from the conveyor belt and deposits it in a suitable container (standard container or blankpart-specific container). Depending on the output, one or more destacking units are used. Two blankpart containers are used per unit, so that destacking can continue even during a container change. The destacking system is designed so that manual destacking remains possible, e.g. as an emergency strategy.

If requested, the container position can be detected by an optical system in the destacking unit.

As an option, an automatic check can be performed upstream of destacking. In this context, extensive discussions with the customer are required to define the desired quality features, the extent of monitoring, etc.



Automatic destacking of bodyshell parts with linear robots

Advantages at a glance:

- Ergonomic part deposit
- Significant reduction of costs through the FeederPlus6^{neo} with its integrated turning function

Advantages at a glance:

- Significant reduction of required personnel
- Assurance of blankpart quality
- Fewer ergonomically unfavourable movements for operators

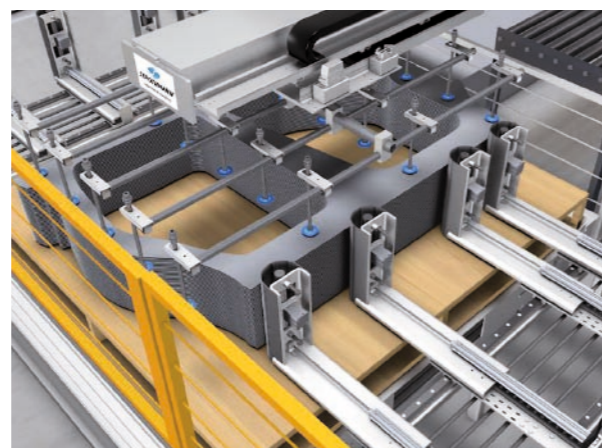
Blanks are supplied on blank carts or stationary deposit tables, depending on the customer's request. The blank carts move along the tried and tested STROTHMANN RoundTrack.

Thanks to independent safety zones in the destacking cells, the supply is continuous, even if stack changes are required. Feeders or alternatively robots can be used for blank destacking.

Depending on the selected handling device and blank provision, the blanks can be gripped as a complete batch. Alternatively, the batch can be composed of different blank carts.

The spreading magnets can either be adjusted manually or are moved automatically. If desired, the blanks are centred. In general, we use centring stations with centring mandrels.

A hydraulic marking station is used to mark the blanks. The hydraulic ram is gentle and quiet and only causes minor load on the mechanical system compared with conventional spring based marking stations.



Spreading station with pneumatically cycling magnets and manual side adjustment



Blank destacking with double feeders and 4 blank carriages



Hydraulic marking station

In the STROTHMANN servo centring station, each centring finger is located on a separate linear unit with a servo drive. This ensures that each finger reaches the desired end position during centring. The fingers can also be used for extremely fast teaching of new batches.

The stop bar installed crosswise in relation to the throughfeed direction can be adjusted to the linear guides in feed direction. If blanks are rejected, it is automatically lifted and the blanks are automatically discharged.

STROTHMANN transfers/feeders are adapted specifically to extreme ambient conditions (heat, abrasive dust) during the hot forming process and have proven successful in over 60 lines worldwide. They are available with various load-bearing capacities and strokes.



Transfer 3/80



Centring station with servo-controlled centring fingers

	3/40	3/80	3/120	3/200
X-stroke	2.500/3.300 mm	4.000/4.700 mm	6.000 mm	4.500 mm
Y-stroke	1.100 mm	1.100 mm	5.000 mm	50.00 mm
Z-stroke	700 - 1.000 mm	700 - 1.000 mm	800 mm	800 mm
Net load	40 kg	80 kg	120 kg	200 kg

Advantages at a glance:

- Significant cycle time advantage compared with robots
- Time-tested heavy-duty feeder
- Simple and precise infeed of the blank carriages on STROTHMANN round rails
- Very quiet
- Integrated double blank check
- Up to 26 letters and logos possible
- Quick adaptation to different blank sizes

Advantages at a glance:

- Centring finger driven by a servo motor, increases process reliability
- Quick, convenient teaching process
- Modular concept
- Automatic disposal of reject blanks
- Significantly lower handling time of the transfer system / feeder compared to robots
- Simple assembly on the press columns
- Small footprint
- Simplified tooling, if the blanks are gripped on the outer edge

RoundTrack in the pressing plant

For years, STROTHMANN's patented RoundTrack has proven successful in pressing plants throughout the whole world. The circular cross-section of the rail and the special shape of the wheels permit a very low rolling resistance and highly accurate system guidance. Even thermoforming tools weighing 50t can easily be moved from one factory building to another on carts designed for this purpose. This system also allows simple and reliable extension and retraction of blank carts, magnetic conveyors, washing machines, oilers, etc.



Transport carts with integrated drive for thermoforming tools



Extendible oiler on RoundTrack



Blank carts on RoundTrack

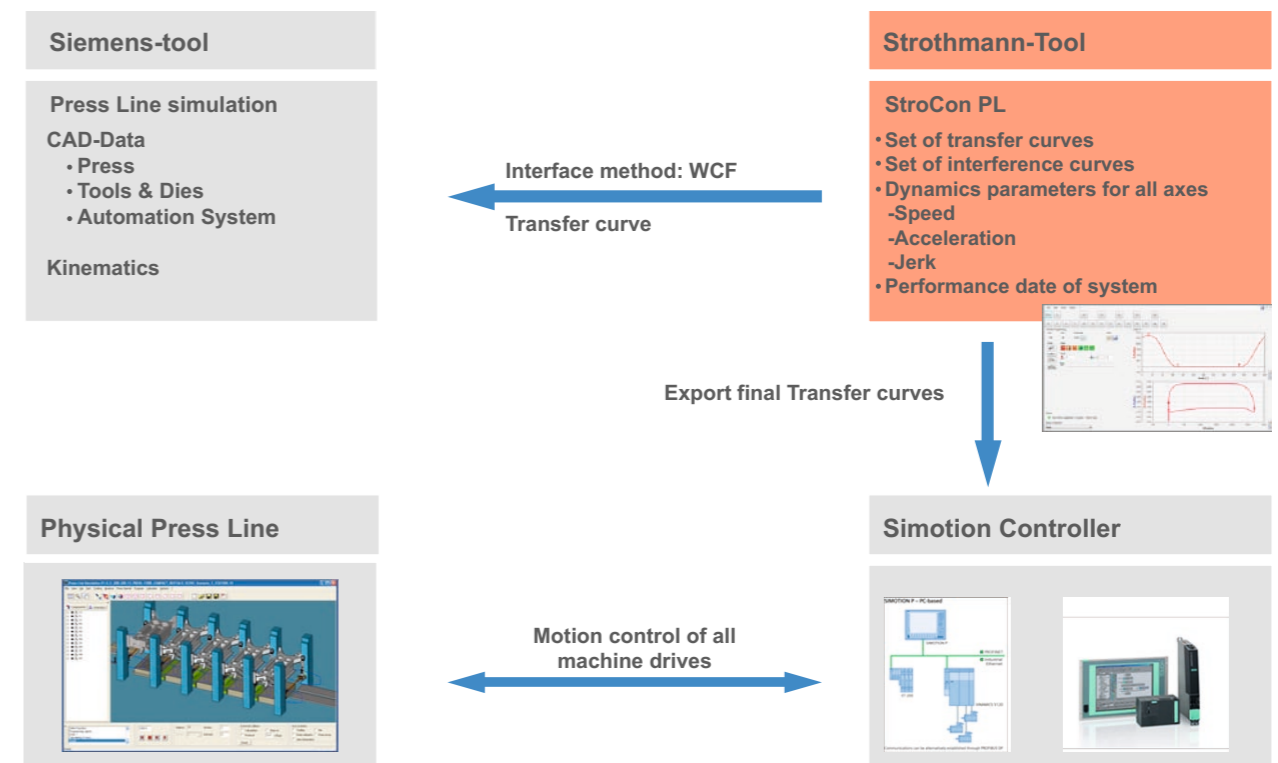
StroCon PL

StroCon PL is an innovative simulation software for optimisation of a movement curve for a specific STROTHMANN press automation system.

StroCon PL uses the "PLS" software of Siemens to visualise the course of movement and possible collisions.

Interfaces:

- An interface for data transmission to the machine line controls of the specific STROTHMANN press automation
- An interface for data transmission to the Siemens software PLS



Advantages at a glance:

- Level with the floor - the rail only protrudes from the floor by a few millimetres
- This means it can be crossed by forklift trucks and platform trucks
- Safety: No tripping hazard for walkers
- Cleanliness: No channels where dirt can accumulate, no lubrication (dry system)
- Extremely sturdy

Advantages at a glance:

- Increased output through optimised movements of the automation device
- Inspection of new tool designs
- Wear reduction of individual machine line components
- Support for determination of component cost through calculation of the output
- Calculation basis
- Optimised curves available directly in the control system
- Full compatibility with Siemens PLS

The trend toward digitalisation represents a strengthening of communication and co-operation between man and machine with the aim of optimising the entire value added chain.

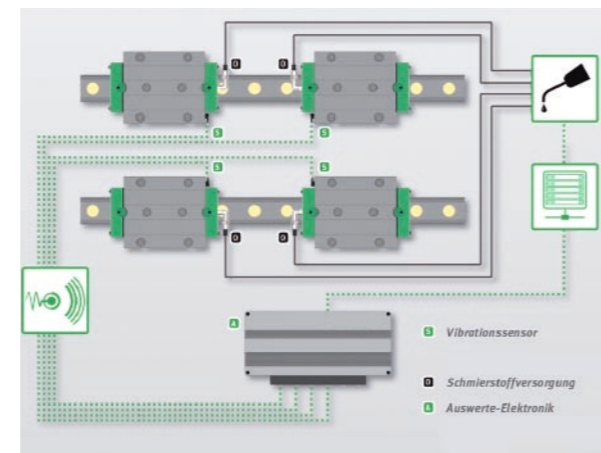
One step in this direction is permanent monitoring of critical wear parts. For this purpose, STROTHMANN has developed an extensive Condition Monitoring system. It comprises the areas of data acquisition, data evaluation and data visualisation.

These methods are used to derive predictive measures in order to avoid unplanned production downtimes. This creates the following advantages:

- Only truly necessary components are replaced, but they are replaced in time (condition-based maintenance). This leads to a significant reduction in cost compared with conventional preventative maintenance, in which components are replaced irrespective of their actual condition.
- Machine availability is increased even more.

The extent of condition monitoring can be adapted to the individual customer's requirements.

Example 1: Guide carriages of linear guides



Each guide carriage is equipped with a vibration sensor. The signals of all sensors are collected by an evaluation unit. Depending on the signal type, the system differentiates between:

1. Relubrication required (automatic process)
2. Wear limit is approaching

In case 2, a message is displayed on the operator screen, indicating the remaining service life. This allows the operator to schedule the replacement during a non-production period, thereby avoiding production downtimes.

Example 2: Energy chains

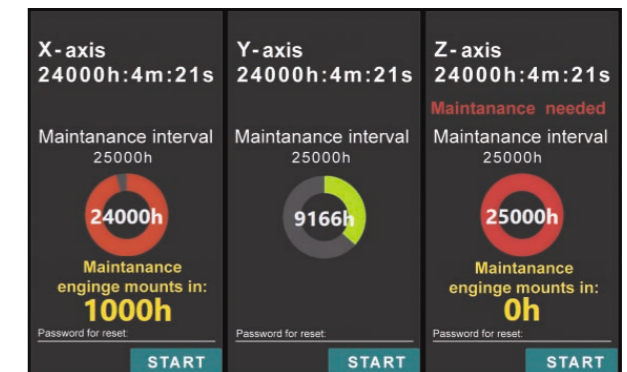
An integrated wear element slides into the chain and touches the moving upper chain strand. After a certain number of cycles, the element is worn and transmits a signal to the machine control system. The remaining service life of the chain is displayed on the screen, making it possible to schedule the replacement.

Moreover, a measuring line can be integrated in the energy chain. When the measuring line sends a signal, this indicates that the cables or hoses are starting to wear down. This also permits scheduling of replacements.

Example 3: Consumption measurements

Typical consumption values for power and air apply under defined production conditions (reference values). These reference values can be compared to the actual values. If deviations outside of a predefined tolerance range occur, an error message is displayed on the screen. By comparing these values with other parameters, e.g. vibration measurements on the roller bearings, the cause can be determined even more precisely.

Moreover, trends are visualised, meaning that a slow wear can be detected and maintenance can be planned in good time.



For electric motors, the total on-time is determined and compared with a calculated service life. When a specific value is reached, the system notifies the user accordingly, so that maintenance can be scheduled for a non-production period.

Other functions such as calculation of totals show the total consumption within any desired period. This permits precise calculation of production costs.

