

PRODUCT CATALOGUE STEIN 300



QUALITÄT
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stein[®]
AUTOMATIONSSYSTEME

‘As a special machine manufacturer, we sometimes deviate from the Stein standard when it comes to certain details. During our many years working together, Stein has always supported us in the search for special solutions.’

Jürgen Franke, development and engineering of special machinery, B. Braun Melsungen AG

‘The high degree of flexibility that STEIN offered in the planning stage helped us just as much as their punctuality and quick delivery. We were positively surprised that our systems could be commissioned in such a short time.’

Dr Carsten Marzenell, Production engineering and equipment factory maintenance manager at Vorwerk Elektrowerke GmbH & Co. KG

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ACHIEVING PERFECTION PIECE BY PIECE

All systems from STEIN have one thing in common: they guarantee our customers ‘Trademark Black Forest Quality’ for their production operations. However, given that demands can vary greatly from case to case, we provide our tried-and-tested technology in a range of formats.

This product catalogue presents the different versions of our STEIN 300 that can be supplied when you place an order.

In the section headed ‘STEIN 300 Components’, specialist mechanical engineers, designers, planners and other experienced users will find all the parts and components they need to develop highly customised systems.

All of the advantages of a fully assembled system are explained in the section ‘STEIN 300 Assembled’. To make your entire production process easy to configure and to control every aspect with precision, we recommend ordering a complete transfer system with integrated STEIN system controls. We would like to present some evidence in favour of this recommendation in the section entitled ‘STEIN 300 Controlled’.

Additional information about each product can be found by following the link in each description – this will direct you to the product information, dimensions and ordering options on our website.

If you have any questions concerning our technology or the ordering process, or if you require advice on any issues, we would be pleased to help.



Oliver Mauch, Managing Director

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WORKPIECES THAT GO DOWN WELL

We are passionate about systems that transport workpieces to where they need to be in the assembly line. Precise and safe technology, perfectly tailored to every process and workstation. We understand that a good flow of materials within a system is the lifeline of a successful process. However, in order to develop and improve such systems, continuous learning is needed as well as a wealth of experience. For us, the learning process is something we embark upon in cooperation with our customers as we discover more about their processes and products. As a result, we always know what our customers need, and we can use this knowledge to guide our approach to finding a solution.



STEIN 300 COMPONENTS

From page 6

The STEIN 300 can form the foundation of a successful production operation. In turn, every system is based on individual components. To make it possible for customers to design and realise systems following their own unique approach, STEIN supplies individual components and provides their technical CAD files. We were thinking of the needs of system engineers and designers when we had the idea for this modular 'building block' system. You can access the CAD files for each component online, giving you complete freedom in design and all the options presented by STEIN technology.

STEIN 300 ASSEMBLED

From page 40

Anyone who would like to order a ready-assembled system instead of individual components would be well advised to choose the 300 STEIN Assembled. This solution allows well-versed planners to configure their own solution, leaving STEIN to take over assembly and supply a system that is practically ready for use. In this case, customers are still responsible for organising the controls, including all software and hardware.

STEIN 300 CONTROLLED

From page 48

The supply of a complete system with controls is the ideal option for customers in cases where rapid deployment counts. You receive the STEIN 300 assembled and equipped with STEIN CONTROL, an integrated control system that functions as the nerve centre of the equipment. This allows you to manage and monitor the process and to create individual orders and entire production schedules with a few clicks of the mouse. In this way, customers can configure their processes without having to carry out any programming.

STEIN SOFTMOVE

From page 62

A production line equipped with SOFTMOVE offers many benefits for customers, especially those who process delicate products and need to rely on workpiece carriers that will not strike each other hard. SOFTMOVE is the technology from STEIN that facilitates the smoothest possible transport while minimising wear and tear, and dirt and noise in the system, thus also helping to save time, energy and money. A prerequisite for SOFTMOVE technology is the use of STEIN CONTROL system controls.

LEAN PRODUCTION

From page 66

Today, many customers are looking for opportunities to implement their processes using what is referred to as lean production in order to achieve shorter processing times and greater flexibility, among other things. STEIN's modular systems can also be used for LEAN PRODUCTION and guarantee the use of STEIN technology's tried-and-tested benefits. From a future viability perspective, it is important to us and our customers that upgrades for meeting changing and growing demands remain possible at any time.

STEIN 300 COMPONENTS

The following pages list all the essential components of the STEIN 300, including special applications that are not part of the basic system but that make it even more versatile, enabling you to adapt it to specific situations in the production process. Here you can see the most important information and advantages of the STEIN components at a glance. Additional details (dimensions, CAD files and delivery times) are available online and can be found on our website www.stein-automation.de under 'Products/Stein 300/Components' – the fastest way to access this information is to follow the link provided. If you have any questions or require advice from us in person, please feel free to contact us at any time.

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WORKPIECE CARRIERS

WORKPIECE CARRIERS

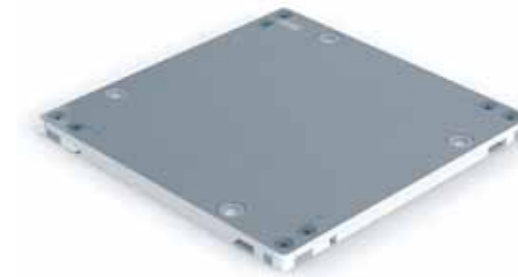
Workpiece carriers (WT) act as part of a transfer system to guide products along an optimal path through the assembly line. These components rest on the two belts of the conveyor, which propels them forward. Guide rails mounted on the side of the belt profile direct the workpiece carriers.

Galvanised and rubber stop plates (1) on each corner of the workpiece carrier serve to hold it securely at the stop latches. The stop plates also make contact with the sensors for switches, stoppers and other components mounted to the conveyor.

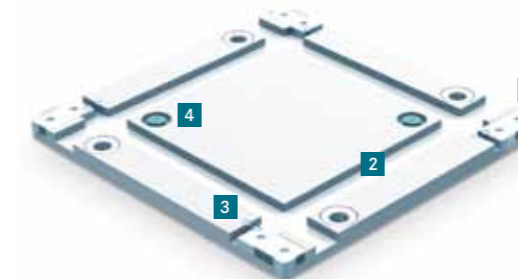
There are milled grooves in the base of the workpiece carriers (2). This allows them to be kept apart using stoppers. Additionally, when it is necessary to process the product from beneath, a frame workpiece carrier can be used upon request (see third image on left). On these components, the entire area inside the grooves is cut out.

Centring rails can be installed at the appropriate processing stations, where they engage with the centring pins (3) that are fixed as standard on the underside of the workpiece carriers. This approach achieves a centring accuracy of ± 0.2 mm. For even more precise positioning (± 0.02 mm), the workpiece carrier can optionally be fitted with a centring bush in connection with a centring device (HZE, ZED, etc.). For more details, refer to the centring devices on page 22 onwards.

The RFID system employed by STEIN uses read-only code carriers (4) and stores all workpiece-relevant data in the STEIN CONTROL database (see page 54). The great advantage of this is that all read operations can be performed on the fly and the workpiece carriers do not need to be either slowed down or stopped.



WT top



WT base



Frame WT (top)

Workpiece carrier sizes
from 160 mm without grid

Total load capacity
up to 20 kg, including product



www.stein-automation.de/en-wt

CONVEYOR

Conveyors transport the workpiece carriers, which are seated firmly on two belts driven by a motor. Stop fittings and sensors are fixed to the guide profiles of the conveyor. When positioned in sequence, conveyors are bridged using angle brackets. Conveyors that branch away at a right angle (transverse sections) are attached to the main line using transverse brackets.

The STEIN conveyor stands out not only for its versatile fields of application, but especially because it is available in a broad range of versions. Such diversity means the component can meet the demands of the most varied production scenarios.

VARIANTEN

- Conveyor (manual) ▶ page 11
- Conveyor with plastic guide rail ▶ page 11
- Conveyor with roller cassettes ▶ page 12
- Conveyor with open pulley system ▶ page 12
- Process conveyor ▶ page 13
- Conveyor with central motor ▶ page 13
- Folding element ▶ page 14
- ESD conveyor ▶ page 15

Illustration with EC motor

The following properties apply to all conveyors:

Possible track width

from 160 mm without grid

Belt speed

with an EC motor: adjustable from 2 to 25 m/min
with an AC motor: 6.9, 9.1, 13.7 or 18.3 m/min

Belt length

300 to 3,000 mm without grid (please ask about additional sizes)

CONVEYOR (MANUAL)

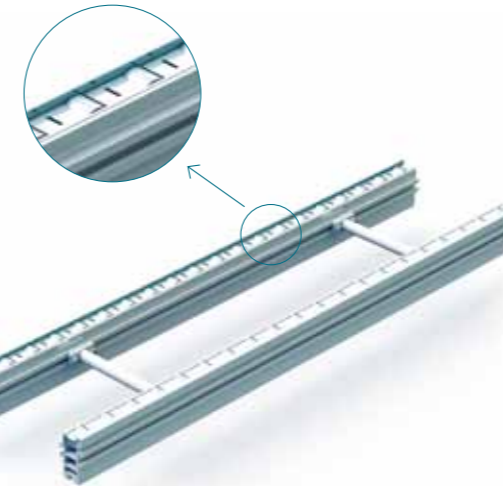
The conveyor consists of two aluminium profiles connected by distance pieces. Roller cassettes, on which the workpiece carriers slide, are fitted in the profiles. The workpiece carriers are moved by hand on the manual conveyor (see the section on lean production, page 66).

ADVANTAGES

- economical design
- energy-saving
- compatible and expandable as driven belt element



www.stein-automation.de/en-be-rs-m



CONVEYOR WITH PLASTIC GUIDE RAIL

The conveyor consists of two drive fittings, two aluminium profiles and a motor. In the basic version, plastic guide rails are located under the drive belts, supporting the weight of the workpiece carrier.

The motor assembly can be placed on any of the four corners.

ADVANTAGES

- affordable entry-level version
- robust
- long service life



www.stein-automation.de/en-be-k



Illustration with AC motor

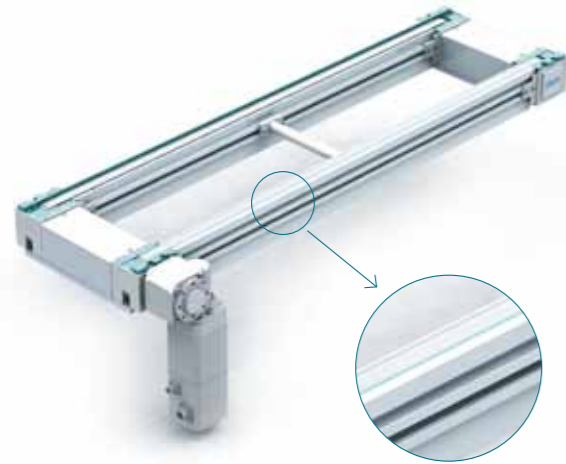


Illustration with EC motor

CONVEYOR WITH ROLLER CASSETTES

The use of roller cassettes instead of plastic guide rails beneath the drive belts increases the performance of the conveyor. Lower friction resistance leads to a significantly longer service life of the drive belt and thus to reduced service and maintenance work. Less wear from friction also means less dirt and a cleaner production environment.

ADVANTAGES

- longer service life thanks to minimal wear and tear
- less dirt
- greater possible load on the conveyor
- less maintenance required



www.stein-automation.de/en-be-rk



Illustration with EC motor

PROCESS CONVEYOR

The process conveyor has an open-ended guide profile. This allows the drive belt to run to the extreme end of the conveyor, transporting workpiece carriers to the end of the belt and achieving the smallest possible distance before hand-over to downstream processes. The process conveyor is ideal for leading workpiece carriers into processing stations.

ADVANTAGES

- one end of the guide profile is left open
- workpiece carriers are moved to the outermost end of the conveyor
- optionally with a plastic guide rail or roller cassettes



www.stein-automation.de/en-be-pb



Illustration with EC motor

CONVEYOR WITH OPEN PULLEY SYSTEM

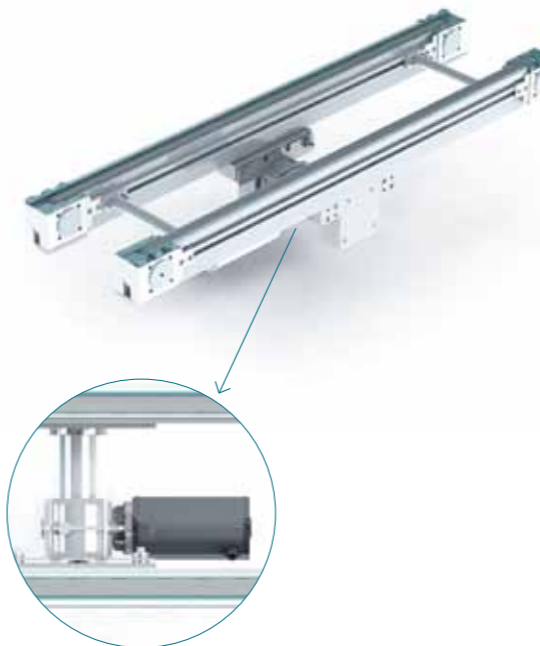
This design features a standard drive fitting at only one end of the belt. On the opposite end, the housing for the pulley systems are not connected with a drive shaft. Instead, the space between them is left open. This allows downstream processes to overlap with the belt.

ADVANTAGES

- one end of the belt is left open
- ideal for adding or removing workpiece carriers
- optionally with a plastic guide rail or roller cassettes



www.stein-automation.de/en-be-ou



CONVEYOR WITH CENTRAL MOTOR

In contrast to standard conveyors, the drive motor on this model is mounted between the belt profiles. A torque bracket can be used to fix it flush with the left or right side of the support plate. This eliminates the possibility of any protruding edges, which might result from mounting the motor on the side.

ADVANTAGES

- no protruding edges on the side
- both ends of the belt are left open
- compact design
- optionally with a plastic guide rail or roller cassettes



www.stein-automation.de/en-be-min

CONVEYORS



FOLDING ELEMENT

The folding element increases flexibility in production by making the system more accessible. It allows operators to lift up a conveyor in the system simply by hand. A change-over switch interrupts the addition of more workpiece carriers onto the folding element so that it can be raised, allowing the operator to step into the system.

ADVANTAGES

- pneumatic spring facilitates lifting – no additional force necessary
- access at offline stations for maintenance purposes or to replenish parts
- optionally with a plastic guide rail or roller cassettes



www.stein-automation.de/en-be-ke

CONVEYORS



ESD CONVEYOR

Electrostatic charges caused by movements of the conveyor can create problems when the workpieces being transported are electrostatic-sensitive components. A practical preventive measure that is easy to integrate are roller conveyor profiles that dissipate electrostatic discharge. Two bolts mounted in the belt profile create a connection between the drive belt and the earth of the equipment. This prevents the conveyor and workpiece carrier from becoming charged while protecting against a potential change when individual elements are passed.

ADVANTAGES

- safe protection of sensitive products from electrostatic charges
- meets standards DIN 22104 and ISO R284
- complies with IEC/DIN EN 61340-5-1 (Protection of electronic devices from electrostatic phenomena)



www.stein-automation.de/en-esd



Transfer units and turning units can transfer the workpiece carrier from one belt element to another. Turning units can change the product orientation by 180° (rectangular workpiece carrier) or by 90°/180° (square workpiece carrier). STEIN offers the following transfer options for a variety of situations:

- 90° transfer unit ▶ see below
- 180° transfer unit ▶ page 17
- 1.5 transfer unit ▶ page 17
- Turning unit ▶ page 21

90° TRANSFER UNIT

The 90° transfer unit serves the transport of a workpiece carrier from the main belt onto a transverse section or vice versa. Lifting and lowering operations are pneumatic.

Using appropriate sensors (not included, see page 32), the system can detect when a workpiece carrier is fully on the transfer unit and the lifting or lowering process can begin. Once the transfer unit has moved away, sensors are able to confirm its position before it handles the next workpiece carrier.

ADVANTAGES

- small footprint
- rapid transfer
- compact design
- included: drive motor and lifting device, including sheet-metal protective coating



AC-Motor
www.stein-automation.de/en-us-90-ac



EC-Motor
www.stein-automation.de/en-us-90-ec



U90 AC motor



U90 EC motor

180° TRANSFER UNIT

This transfer unit sets down the workpiece carrier on a path parallel to the initial direction of transport. For workpiece carriers with a pallet width of up to 280 mm, the transfer unit consists of a single element (see Fig. 1). For larger workpiece carriers, this central element is replaced with rollers that are not driven, and the transfer unit is divided into two parts with two motors (see Fig. 2). The clearance between the conveyors is 106 mm.

ADVANTAGES

- transfer parallel to the transport path
- included: drive motor and lifting device, including sheet-metal protective coating



www.stein-automation.de/en-us-180-ac



Fig. 1



Fig. 2

TRANSFER UNIT 1.5

This transfer unit serves to transport a workpiece carrier from the main belt onto a transverse section or vice versa and makes it possible to transport a higher volume of items via the main profile of the conveyor. This is often a great advantage when handling sensitive products. The transfer unit can offer increased speed for certain layout configurations.

ADVANTAGES

- transports the highest volume of workpiece carriers
- ideal for very sensitive products
- included: drive motor and lifting device, including sheet-metal protective coating
- reduced cycle time
- adjustable height



www.stein-automation.de/en-us-1-5



RADIAL TRACKS



90° radial track



180° radial track

Radial tracks make it possible to alter the direction of workpiece carriers between two conveyors by 90° or 180°. In contrast to conventional corner transfer units, these allow the orientation of workpiece carriers to remain the same (the outside edge remains on the outside). To avoid congestion in the curved segment, workpiece carriers are separated before they move onto the radial track. Once a workpiece carrier has left the radial track, the next workpiece carrier can enter. Workpiece carriers are driven along the radial track by rollers, which in turn are driven by a rotating disc.

The 90° radial track directs the workpiece carrier onto a belt moving in a perpendicular direction, while the 180° radial track is used to bridge the connection to a belt running in a parallel direction. The clearance between parallel belt sections is set to exactly 106 mm. If a larger distance is needed, this can be achieved using two 90° radial track sections in combination with an intermediate belt section.

As standard, radial tracks are available in the sizes 160x160/240x240/320x320 and 400/400 mm. Custom sizes upon request

ADVANTAGES

- the orientation of workpieces remains the same
- very robust and low-wear
- available with AC or EC motor



www.stein-automation.de/en-rb-90

RADIAL TRACKS (MANUAL)



The radial track consists of a base element. Soft running tapered rollers, on which the workpiece carriers can slide, are fitted in the base element. Curved guides are fitted to both the inside and the outside radius. The workpiece carriers are moved by hand (also see section on LEAN PRODUCTION, page 66).

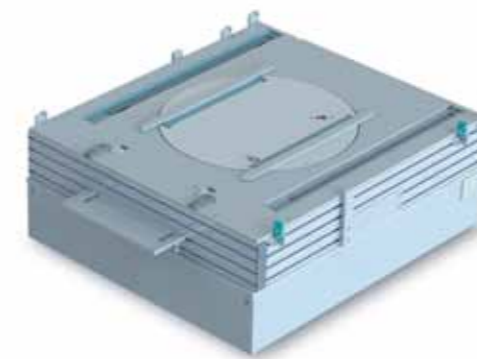
ADVANTAGES

- economical design
- user-definable curve radius
- expandable with electrical drive



www.stein-automation.de/en-rb-m

TRACK CHANGING UNIT



The track changing unit (SWE), comprising a turning unit with two drive belts and a belt element on a lifting device, serves to change the orientation of rectangular workpiece carriers by 90° between two belt elements. The workpiece carrier runs onto the turning unit, is rotated there through 90° and is then lifted from the turning unit by a belt element and transported onto the following belt element. The starting and stopping and the speed of the drive motors (EC motors) can be controlled. One motor drives the belt, another the rotation.

ADVANTAGES

- allows 90° rotation of rectangular workpiece carriers
- 90° left or right, as required
- rotation without housing possible



www.stein-automation.de/en-swe

LIFTING ROTATING UNIT



The lifting rotating unit (HWE) consists of a rotating unit with a turntable and a lifting device. It serves to change the orientation of workpiece carriers on a belt element through 90° or 180°. The workpiece carrier runs onto the turning unit and there is lifted out of the lateral guides and rotated through 90° or 180°. It is then lowered and returned to the belt element. The lifting unit and the rotating movement are pneumatically driven. A housing is necessary as a safety device on this unit.

Optionally, the lifting rotating unit is also available as a manual model without a drive. The rotating movement is performed by hand through either 90° or 180° by the operator. The rotating movement improves both the ergonomics and accessibility of the product.

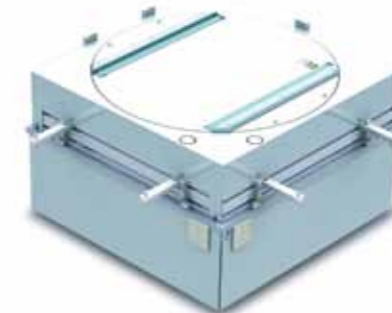
ADVANTAGES

- allows 90° / 180° rotation of square workpiece carriers
- direction of rotation either left or right
- can be retrofitted into a belt element
- position within belt element can be changed

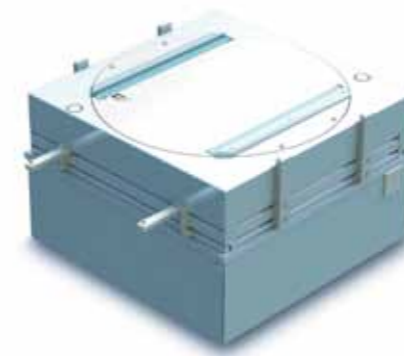


www.stein-automation.de/en-hwe

TURNING UNITS



UDM 90



UDM 180

A turning unit is used to alter the direction of workpiece carriers between two conveyors by 90° or 180°. An alternative to conventional corner transfer units, this turning unit facilitates flexible transport in the same direction: depending on the direction of rotation, the orientation of the workpiece carrier can be maintained or changed.

The workpiece carrier is transferred from a belt element to the turning unit (UDM) and is detected and monitored during transfer by an area sensor. The approach to the end position is monitored by a proximity switch and the belt drive switched off. The workpiece carrier is rotated through 90° or 180°, after which the belt drive is switched on again and the workpiece carrier is conveyed out. The entire conveying process is detected and monitored by area sensors, ensuring that only one workpiece carrier is located on the UDM at any given time.

The run-up and rundown of the drive motors (EC motors) can be controlled, as can the running speed. One motor drives the belt, while the other powers the rotary motion.

ADVANTAGES

- soft, smooth transport, as no height differences or uneven sections need to be compensated
- flexible repositioning of the product or workpiece carrier
- space-saving alternative to conventional radial tracks
- suitable as an alternative to a hub turning unit as no protective housing is required



www.stein-automation.de/en-udm

Column options

Units with base columns can be free-standing for assembly



Single column with boom
WT ≤ 400 x 400



Columns fitted in pairs
WT > 400 x 400

MOTORS



AC MOTOR

A motor is used to drive conveyors and other components of the transfer system, such as transfer units and turning units. AC motors are generally used without a switch, which means they are turned on for the entire period of operation. The various speed settings can be adjusted by selecting one of the possible gear ratios.

ADVANTAGES

- low cost
- two connection solutions (terminal board or cable with Harting connector)
- four possible gear ratio



www.stein-automation.de/en-mot-ac

Gear ratios Speed variations

40:1	6.9 m/min
30:1	9.1 m/min
20:1	13.7 m/min
15:1	18.3 m/min



EC MOTOR

When energy efficiency and positioning accuracy are just as crucial for production as speed and noise, direct current motors are an excellent alternative. Such motors are also suitable for applications in near-clean room conditions and ensure flexible control via AS-i, CANopen or (optionally) digital inputs and outputs. This offers great advantages in combination with STEIN system controls (and SOFTMOVE). For more information, refer to the section 'STEIN 300 Controlled'.

ADVANTAGES

- flexible control
- continuously variable speeds
- fan-less motor housing
- simple motor switch-off



www.stein-automation.de/en-mot-ec

Gear ratios Speed variations

30:1	3 to 25 m/min
50:1	2 to 13 m/min

Required mains unit for the EC motor



COLUMN BASES

COLUMN BASES

Column bases help to support conveyors and hold them in place. Single columns (ST) and double columns (DST) are available in every pallet and transfer width.

Double-column bases help to support two conveyors running in parallel, holding them in place with a clearance of 106 mm.

Column bases can be supplied in a range of heights. For very precise height requirements (e.g. to compensate for an uneven workshop floor), adjustable feet are available with a range of 26 mm (± 13 mm).

Power supply units and control slaves can be integrated into the column bases (see image below)

Column base colours:

STEIN 300 Components: grey

STEIN Assembled and STEIN Controlled: blue

Custom colours upon request



ST

www.stein-automation.de/en-st



DST

www.stein-automation.de/en-dst

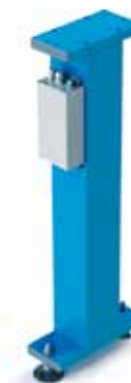
Single column (ST)



Double column (DST)



Single column with mains unit



Single column with slave control



Double column (lift design) with two conveyors



HEIGHT COMPENSATION UNIT

The new height compensation unit (HAE) assembly serves as an automatic level compensation between two different working levels.

For example, this allows a workpiece carrier within the transfer section to be automatically lifted to a manual workstation level and subsequently lowered back down to the transfer section level by a further HAE. In addition, these units can be used to bridge different height levels, such as steps in a floor in a production/assembly shed.

The HAE is available in two designs. In addition to the assembly with a fixed lifting height, a second model with variable height compensation is available, which can automatically adapt to variable working heights.

ADVANTAGES

- automatic compensation of height differences
- supports ergonomic, manual workstation design
- simple integration in transfer systems due to being autarkic
- simple control (signal up/down; belt on/off) for fixed end positions with dampers
- precise control for variable end positions



www.stein-automation.de/en-hae

SWIVELLING WORKSTATION

The swivelling workstation facilitates ergonomic working without extending cycle times. This is achieved by positioning the product at an optimal angle for the worker before it is brought into the processing station.

The swivelling workstation supports staff by relieving symptoms of fatigue. This can improve morale and significantly enhance the quality of work.

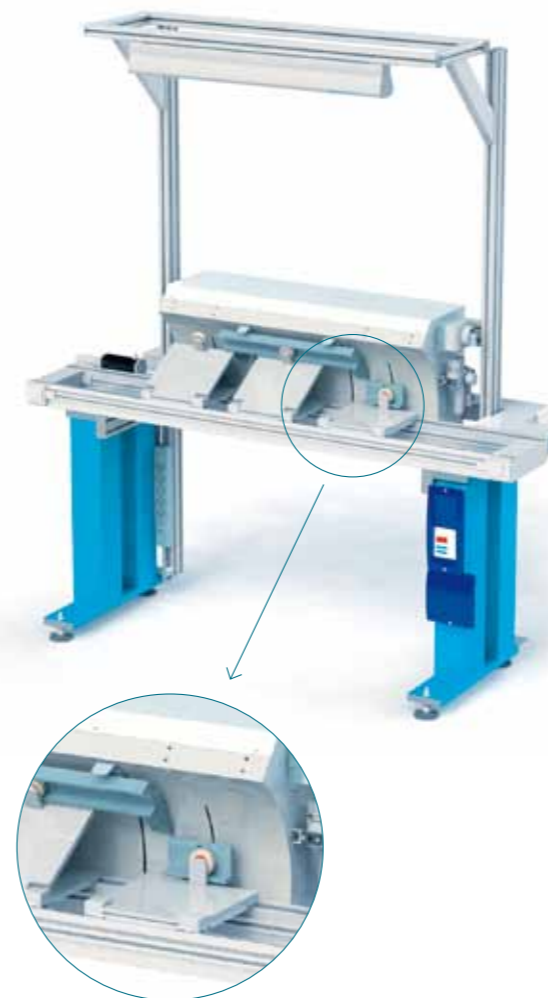
A swivelling plate is mounted to a standard workpiece carrier frame, which receives the product. When it enters the workstation, the plate is raised at a defined angle that can be adjusted for each individual. After processing, the workpiece carrier moves on to the next station, where it is returned to its standard position and transported further.

ADVANTAGES

- ergonomic work
- no extended cycle times
- good product visibility
- adjustable angle of tilt
- settings for seated and standing workstations possible
- reduced error rate and improved quality
- can be retrofitted to STEIN systems



www.stein-automation.de/en-sap



Total weight of workpiece carrier
up to 12 kg

Design based on standard DIN 33406 (Workplace dimensions in production)



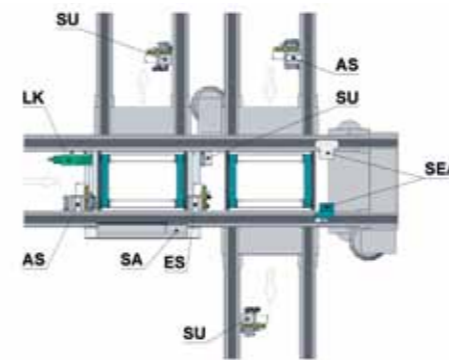


POSITIONING SETS

The function of positioning sets is to separate and position workpiece carriers when they arrive at corner transfer units, radial tracks, turning units, branches leading to and from the main belt, and at workstations. In order to offer our customers the right products as quickly as possible, at STEIN we have predefined complete solutions for all possible configurations. These already include the necessary sensors, stoppers and other components to facilitate the required positioning operations.

COMPLETE POSITIONING SETS

With a combination of stoppers, latches, sensors and other components, these complete sets can be used to realise a wide variety of scenarios where workpiece carriers branch away from the main belt and return to it. We would be pleased to advise you when it comes to finding the optimal solution for your situation. You can find detailed information about our range of positioning sets online.



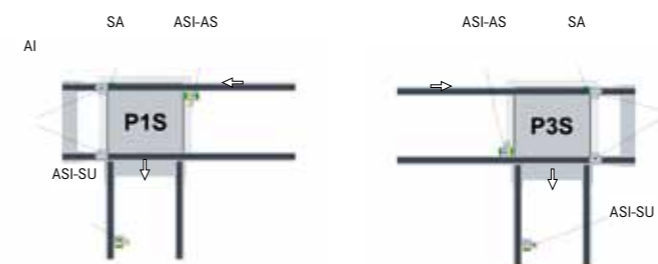
Example illustration of the individual components used in a complete positioning set



www.stein-automation.de/en-ps-k

STOPPING AND CORNER STATIONS

For all possible situations where workpiece carriers need to be stopped, turn corners or cross an intersection, STEIN also offers complete sets that are optimally preconfigured to complete the task. We would be happy to offer our advice.



Example illustration of corner stations P1 and P3

STOPPERS



Basic design of a stopping position

Stoppers are used to stop workpiece carriers in processing stations and to realise corners and intersections. Stoppers can be configured in a variety of ways to meet any possible requirement. When designing these parts, STEIN always uses standard components (stoppers, sensors and latches). If you are unsure about the right stopper to choose, please contact us.

S STOPPER

The S stopper has no sensor and is the most basic stopper design. It is usually installed in connection with an area sensor; in this configuration it acts like a conventional feed-limiting device.



www.stein-automation.de/en-st-s

VS PRE-STOPPER

The VS pre-stopper has one sensor and is used in connection with a workstation. It prevents workpiece carriers from entering a station when one is already being processed or when approval for entry has not been given.



www.stein-automation.de/en-vst-vs

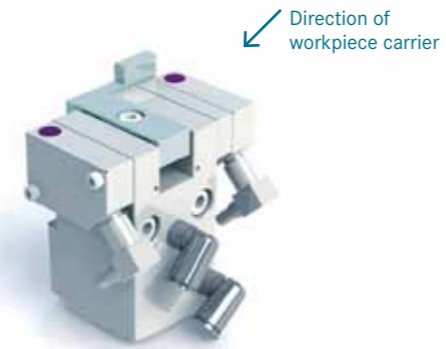
AS PRE-STOPPER

The AS workstation pre-stopper has two sensors and is the conventional pre-stopper before a processing station. It serves the same function as the VS pre-stopper but also signals that the workpiece carrier is in the waiting position. For short workpiece carrier changeover times (synchronous exchange), workpiece carriers are pulled to a stop in the pre-stop position.



www.stein-automation.de/en-vst-as

STOPPERS

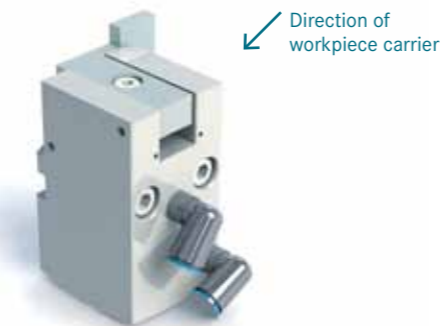


ASA WORKSTATION STOPPER WITH OFFSET LATCH

The ASA workstation stopper is equipped with two sensors and is used as the main stopper in stations. The offset latch also enables it to stop workpiece carriers in combination with a positioning device (e.g. HZE). The first sensor in the running direction signals that the workpiece carrier is in processing position. The sensor after the latch reports that the workpiece carrier has left the station or has been released, and in some cases it can be used to query queues.



www.stein-automation.de/en-ast-asa



ES INLET STOPPER WITH OFFSET LOCKING LATCH

This inlet stopper has no sensor. The workpiece carriers are stopped using an offset latch before the transfer unit transports them onto a transverse belt section or a separate workstation belt.



www.stein-automation.de/en-est-es

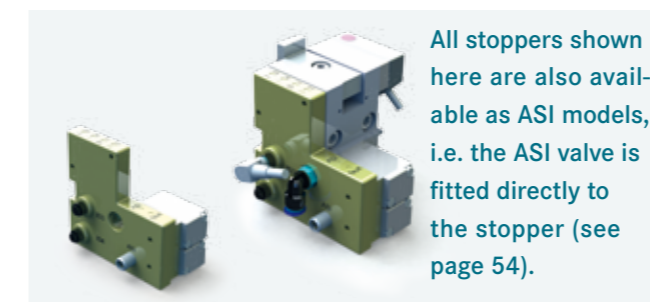


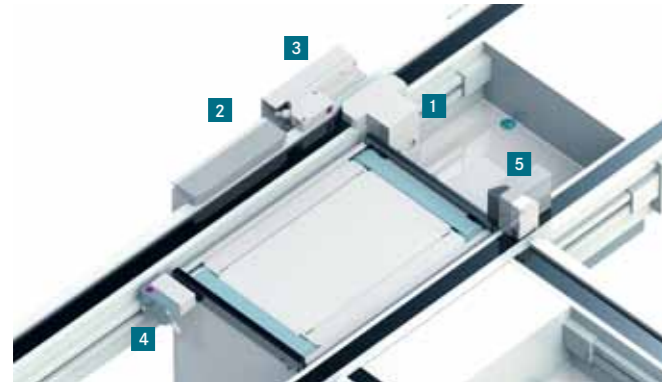
SEAE STOP FITTINGS

The SEAE, also called a transverse belt stop, is used when a workpiece carrier is required to make a turn at an intersection.



www.stein-automation.de/en-st-seae





Stops and sensors are important components for positioning workpiece carriers and querying their position.

1



INSIDE STOP (AI)

The inside stop is mounted to the inside of the belt profile at the end of the belt in corner situations. The workpiece carrier travels into the stop (up to the limit), which brings it into position before it is transported to a transverse section or a parallel main belt by a 90° or 180° transfer unit. The position of the workpiece carrier is not queried. For this to happen, a separate sensor is required (see page 32).

2



OUTSIDE STOP (AA)

The outside stop is also mounted at the end of the belt in corner situations, but to the outside of the belt profile. The workpiece carrier travels into the stop (up to the limit), which brings it into position before a 90° transfer unit transports it from a transverse section back to a main belt moving in a perpendicular direction. The position of the workpiece carrier is not queried. For this to happen, a separate sensor is required (see page 32).



www.stein-automation.de/en-ans

3



PROXIMITY SENSOR (NS)

The proximity sensor is used to query the position of the workpiece carrier. Such sensors are mounted directly onto the stoppers (left or right) and can also be used as outside sensors or lower sensors.

4



OUTSIDE SENSOR (SA)

The outside sensor is mounted to the outside of the belt profile and is used to query the lateral position of the workpiece carrier.

LOWER SENSOR (SU)

The lower sensor is mounted to the inside of the belt profile and is used to query the position of the workpiece carrier from below.

5



CORNER WORKSTATION SENSOR (SEA)

This sensor is used in corner stations where workpiece carriers can be transferred to the transverse belt or directed along a branch to or from a workstation in another corner. The sensor is used to query whether the workpiece carrier is in the correct position for the transfer unit.



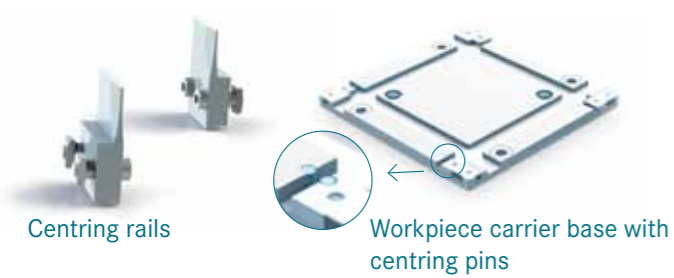
COMPLETE AREA SENSOR (FLSK)

The area sensor is used to query the entire area occupied by a workpiece carrier. If the workpiece carrier is above the sensor, for example, the downstream stopper can issue a signal to prevent additional units from entering the area, preventing a queue from forming.



www.stein-automation.de/en-schalt

CENTRING DEVICES



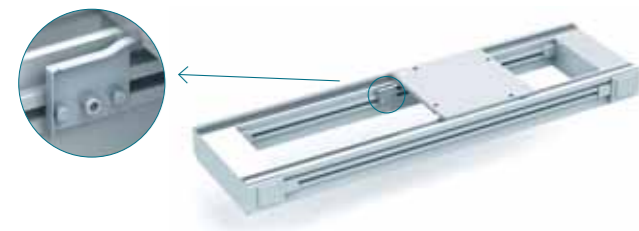
Centring devices are responsible for the precise positioning of workpiece carriers and thus the products they hold. With the exception of centring rails, they can also be used to deflect forces where operations on the workpiece transfer forces in the Z-axis (e.g. riveting, pressing and crimping).

CENTRING RAILS (ZS)

On centring rails (ZS), centring pins engage with the centring bushes of the workpiece carrier and position the workpiece carrier transverse to the direction of travel (pallet width). The centring accuracy is ± 0.2 mm.



www.stein-automation.de/en-zs



NON-RETURN DEVICE

The non-return device (RS) consists of a spring element which the workpiece carrier passes across and which then returns to its original position. It serves to secure the workpiece carrier against unintended movement against the running direction.

CENTRING DEVICE (ZE/ZED)

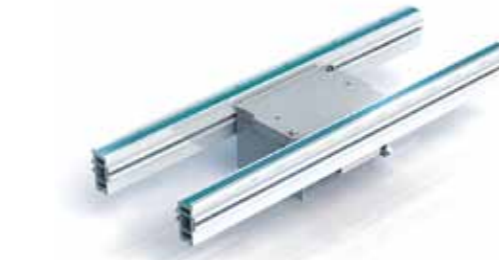
The ZE centring device uses a centring rail to position the workpiece carrier transverse to the transport direction with a minimum accuracy of 0.2 mm. Spring guide rails are mounted on the conveyor for the workpiece carriers to travel along instead of roller cassettes. This means that when a force is exerted from above, the structure can give while the workpiece carrier remains firmly seated on the integrated anvil plate. The anvil plate serves to absorb forces in the Z-axis in cases where the customer has installed an appropriate substructure. The ZED centring device achieves even greater positioning accuracy (0.02 mm) by using centring bushes to position the workpiece carrier instead of centring rails (see picture). Max. load 30,000 N.



www.stein-automation.de/en-ze-zed

ZED

CENTRING DEVICES



LIFT-CENTRING DEVICE (HZE)

In the classical lift-centring device, centring pins engage in the centring bushes of the workpiece carrier and this is lifted slightly from the belt (lift 1 mm, precision ± 0.02 mm). Max. load 800 N.



www.stein-automation.de/en-hze



LIFT-CENTRING DEVICE WITH EXTENDED STROKE (HZEV)

The lift-centring device with extended stroke (HZEV) makes it possible to lift the workpiece carrier even further in the Z-axis (up to 300 mm). Max. load 400 N.



www.stein-automation.de/en-hzev

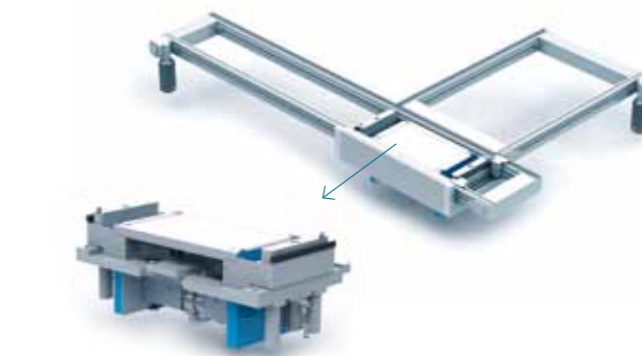


OPEN LIFT-CENTRING DEVICE (HZE0)

Open lift-centring devices (HZE0) are a useful option for guaranteeing additional accessibility to the workpiece carrier from below. The workpiece carrier is also positioned using centring bushes. Max. load 800 N.



www.stein-automation.de/en-hze0



TRANSFER-CENTRING UNIT (UZE)

The transfer-centring unit (UZE) is a combination of 90° transfer unit and HZE (see above). This means that workpiece carriers can be exactly positioned for processing even in the corners of the transfer unit.



www.stein-automation.de/en-uze



LIFTING STATIONS

Lifting stations are used to transport items on two or more levels of a conveyor system. Possible applications for a lifting station are to compensate for different transport levels or to save space when transporting workpiece carriers. For example, the first level might serve as a processing level with a second level above or below ground for the return transport of workpiece carriers.

Lifting stations also allow passages for people or vehicles to move through, and they can be used to create a space-saving reserve of workpiece carriers on two or more levels.

The inlet and outlet sections of the lifting station can be designed with different features: an inlet and outlet compartment, or a protective tunnel to cover the inlet and outlet. The lifting stations meet the highest safety requirements and can be supplied to accommodate a number of entry and exit directions. A maximum of three directions are possible at any one time in a lifting station.

ADVANTAGES

- transport on several levels
- passageways through production paths
- ideal for space-saving system solutions
- compliant with the highest safety requirements



www.stein-automation.de/en-ls

Find the right column feet for your needs on page 23.



STANDARD LIFT S

The lift is used in underfloor returns. Workpiece carriers are lowered to a level below the transfer section and returned. This can be solved with the aid of an economical pneumatic unit or with a suitably precise and variable motorised linear axis.

The dimensions and inlet/outlet heights are always the same, which is beneficial in the planning process. The transit options, in contrast, are variable. See the matrix on page 38 for details and options.



www.stein-automation.de/en-ls-st-s



STANDARD LIFT L

The lift is used in above-floor returns. Workpiece carriers are raised to a level above the transfer section and then returned or transferred on to a different level. A precise and variable motorised linear axis is used in this lift.

The dimensions and inlet/outlet heights are always the same, which is beneficial in the planning process. The transit options, in contrast, are variable.

Range of use of PB 160 to PB 400/transfer width up to 590 maximum. See the matrix on page 38 for details and options.



www.stein-automation.de/en-ls-st-l



STANDARD LIFT XL

The lift is used in above-floor returns. The workpiece carriers are raised to a level above the transfer section and then returned or transferred on to a different level. A precise and variable motorised linear axis is used in this lift.

The dimensions and inlet/outlet heights are always the same, which is beneficial in the planning process. The transit options, in contrast, are variable.

Range of use from PB 400 to PB 700/transfer width up to 590 maximum. See the matrix on page 38 for details and options.



www.stein-automation.de/en-ls-st-xl

INCLINED LIFT

The lift is used in underfloor returns. The workpiece carriers are lowered to a level below the transfer section and returned. For example, if a direct belt return beneath the transfer section itself is not possible due to obstructions (machine bed or seated manual workstation), this lift has the advantage that the lower transport belt level is offset to the front or the rear.

This lift is not one of the standard lifts and is individually adapted by STEIN to suit the customer's needs.



www.stein-automation.de/en-ls-sl

BUFFER SOLUTION OPTION 1



- transfer section runs through the lift
- buffer rotated through 90° to transfer section
- Where necessary, workpiece carriers are transferred from the transfer section to the buffer and vice versa with the aid of the lift axis and the transfer unit

BUFFER SOLUTION OPTION 2



- The transfer section runs through both lifts and the buffer
- The buffer is located parallel to and above the transfer section
- Where necessary, workpiece carriers are transferred from the transfer section to the buffer with the aid of the lift axis in the feed-in lift and from the buffer to the transfer section with the aid of the lift axis in the feed-out lift

BUFFER SOLUTION OPTION 3



- The transfer section runs upstream of both lifts and the buffer
- The buffer is located parallel to and downstream of the transfer section
- Where necessary, workpiece carriers are transferred from the transfer section to the buffer with the aid of a transfer unit, or from the buffer to the transfer section with the aid of a transfer unit
- The buffering process is performed in parallel by a lift axis with transfer unit in the feed-in lift and a lift axis with transfer unit in the feed-out lift.



www.stein-automation.de/en-puf-ls

BUFFER CAPACITY EXAMPLES

SYSTEM HEIGHT 2,430 MM

	Option 1	Option 2	Option 3
Number of belt units	6 (at 2,200 mm)	5 (at 2,580 mm)	6 (at 2,580 mm)
No. of buffered workpiece carriers*	30	30	36

SYSTEM HEIGHT 3,140 MM

Number of belt units	9 (at 2,200 mm)	8 (at 2,580 mm)	9 (at 2,580 mm)
No. of buffered workpiece carriers*	45	48	54

The feed-in height of the workpiece carriers is 110 mm

*assuming a pallet width of 400

STANDARD MATRIX FOR LIFT CONFIGURATIONS

LIFT S (underfloor/U) **LIFT L** (above floor/UE) **LIFT XL** (above floor, large/UEG)



Part number	913 000 001	912 000 001	911 000 001
Unit size			
Pallet width PB	PB 160 to 400	PB 160 bis 400	PB 400 to 700
Transfer width UB	UB 160 to 700	UB 160 bis 590	UB 160 to 590
Workpiece width	< PB	< PB	< PB
Workpiece length	< UB	< UB	< UB
Workpiece height	Max. 300 mm	Max. 300 mm	Max. 300 mm
Max. mass (WT centre)	15 kg	42 kg	38 kg
Units			
Overall width	1775 mm	2450 mm	2450 mm
Total width w/o tunnel	1125 mm	1125 mm	1125 mm
Overall depth	1125 mm	1125 mm	1425 mm
Overall depth w/o control cabinet	825 mm	825 mm	1125 mm
Overall height	1670 mm	3150 mm	3150 mm
Lower feed-in/-out height	400 mm	980 mm	980 mm
Upper feed-in/-out height	980 mm	2530 mm	2530 mm
Transit height (bridge)	–	2400 mm	2400 mm
Input/output belt projection	200 mm each	200 mm each	200 mm each
Adjusting range of feet	+/- 30 mm	+/- 30 mm	+/- 30 mm
Weight	Ca. 290 kg	Ca. 540 kg	Ca. 600 kg
Direction of running			
Additional running directions	LIFT S	LIFT L	LIFT XL
Drive			
	Pneumatic	Linear axis (radial bearing)	Linear axis (radial bearing)
Max. velocity	tbd	0.8m/s	0.8m/s
Acceleration	tbd	3m/s ²	3m/s ²
Brakes	tbd	3m/s ²	3m/s ²
Compressed air	6bar	4(6)bar	4(6)bar
Options			
Servicing doors/access doors	300 852 001	300 852 001	300 852 001
Bulkhead	Assembly 2	Assembly 3	Assembly 4
Glass facing (complete lift)	Assembly 5	Assembly 6	Assembly 7
Slideway, motorised	Assembly 8	–	–
Linear axis, Festo	Assembly 9 (axial bearing)	Assembly 10 (axial bearing)	Assembly 10 (axial bearing)
Linear axis, BAHR	Assembly 11 (radial bearing)	–	–
Corner transfer unit, 90°	–	Possible up to UB 450 / 300 004 001	Possible up to UB 450 / 300 004 001
Transfer-turning unit, motorised	–	Assembly 13	Assembly 13
Bridge 1500 – 3000	–	Assembly 14	Assembly 14
Bridge 3000 – 6000	–	Assembly 15	Assembly 15
Tunnel ESD (makrolon-coated)	Assembly 16	Assembly 16	Assembly 16

Naturally, STEIN also provides all the accessories needed to install or connect individual components. If parts are not included with an item or are required as replacement parts, they can be ordered separately.

ANGLE BRACKET (VW)



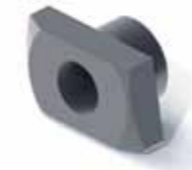
- connects conveyors to each other with an angle bracket fixed to the left and right side of the belt frame (includes 2 brackets, 8 screws)

TRANSVERSE-SECTION BRACKET (OSH)



- to fix transverse sections to the main belt (includes 2 transverse section brackets, 2 screws, 4 x M6 slotted nuts, 4 bolts)

SLOTTED NUT



- available in sizes M6 or M5
- also available: M8 T-slot nut

ADJUSTABLE FOOT



- allows precise height-adjustment of the column or double column

SPACER PLATE (ZP) FOR STOPPER



- includes screws (25 x M3)

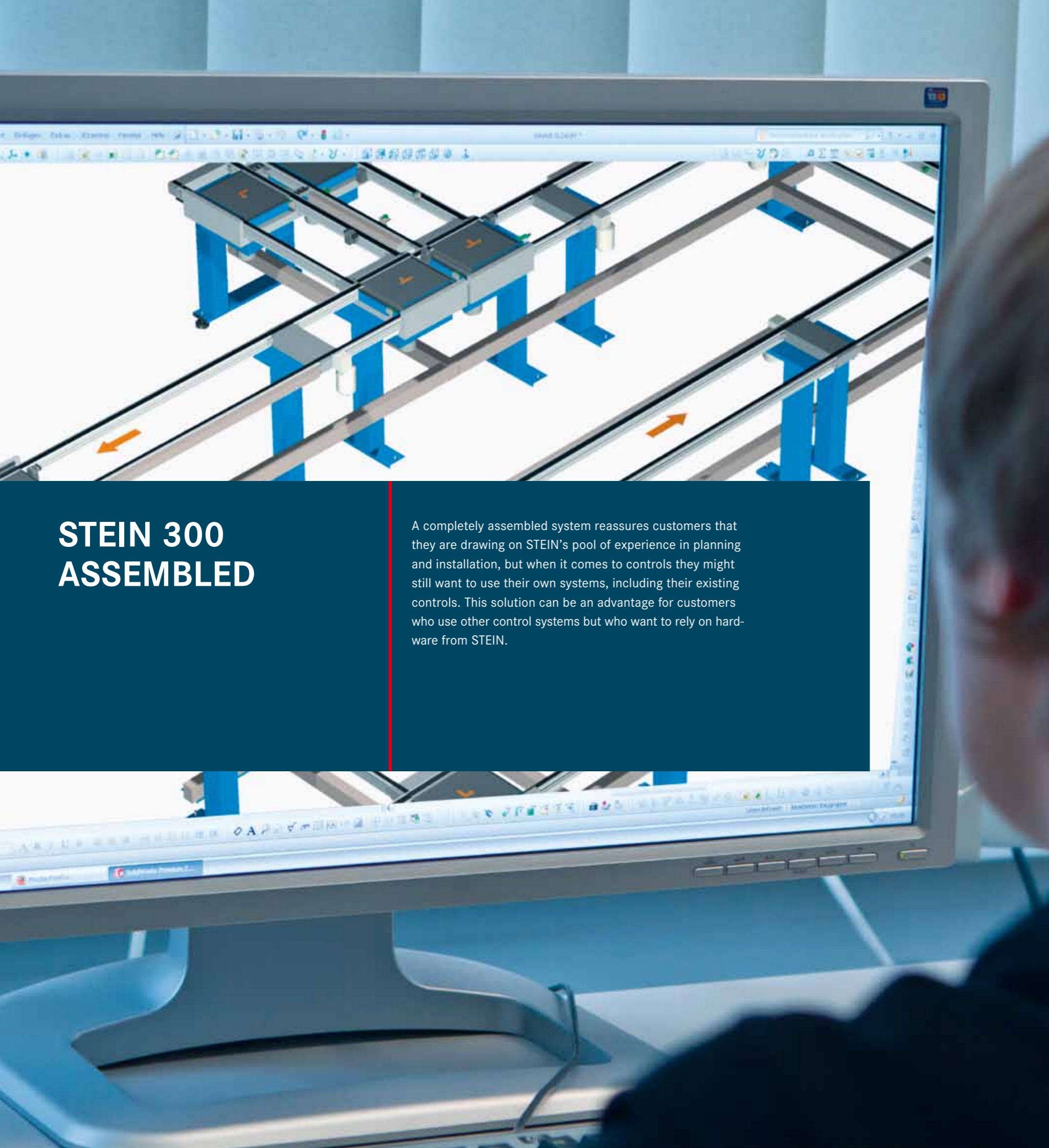
PROXIMITY SENSOR CABLE (KNS)



- 1 x 5 m cable (24 V DC), 1 connector, 1 open end



www.stein-automation.de/en-zb



STEIN 300 ASSEMBLED

A completely assembled system reassures customers that they are drawing on STEIN's pool of experience in planning and installation, but when it comes to controls they might still want to use their own systems, including their existing controls. This solution can be an advantage for customers who use other control systems but who want to rely on hardware from STEIN.

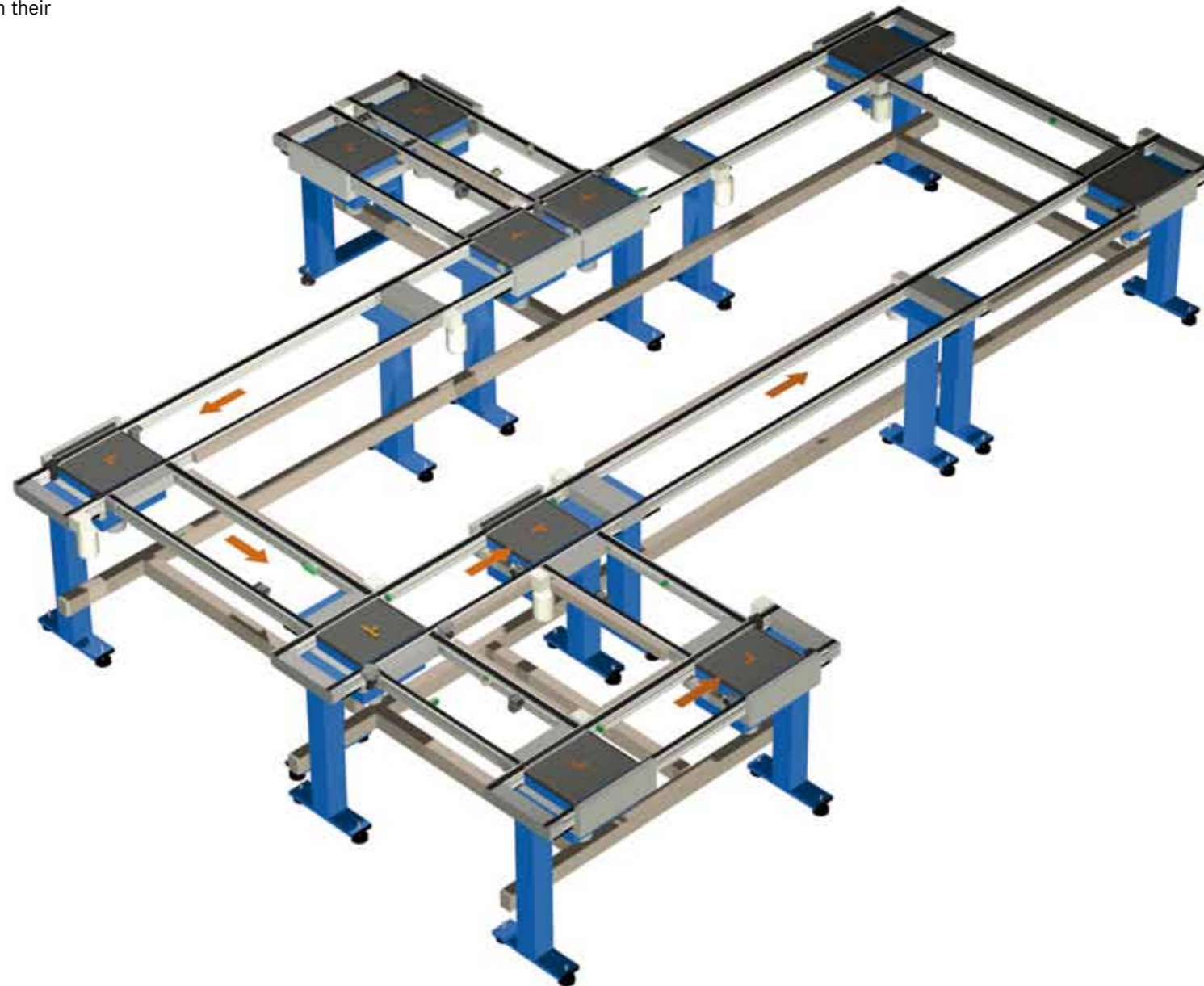
42	RELIABLY WELL PREPARED
42	From parts to the whole
42	Everything is ready
46	BASIC MODULES
46	Double corner A
46	Double corner B
46	Double corner F
46	Corner A
46	Double corner E
46	Corner F
47	WORKSTATIONS
47	Workstation A
47	Workstation B
47	Workstation C
47	Corner workstation A
47	Corner workstation B
47	Corner workstation C

FROM PARTS TO THE WHOLE

The advantages offered by the modular design of the STEIN system are clear to see: it can be configured easily, it allows the combination of manual and automatic workstations, and if necessary it can be redesigned in very little time. With a 'building block' system of components (see pages 6–35), each customer is able to plan in detail just how the system should look. The final STEIN system is always based on the production operation in question and the processes entailed – not the other way round. Based on our years of experience, we can assist customers in the planning and design stage, offering advice to support and build on their ideas.

EVERYTHING IS READY

However, as soon as it is clear which components the system must include, timely commissioning is a key factor. In order that the advantages of the STEIN 300 benefit production as soon as possible, STEIN supplies transfer systems to the customer's production facilities and assembles the mechanical parts on-site. The customer is then able to integrate automated and manual workstations, and to implement all of the controls for processes and logistics.



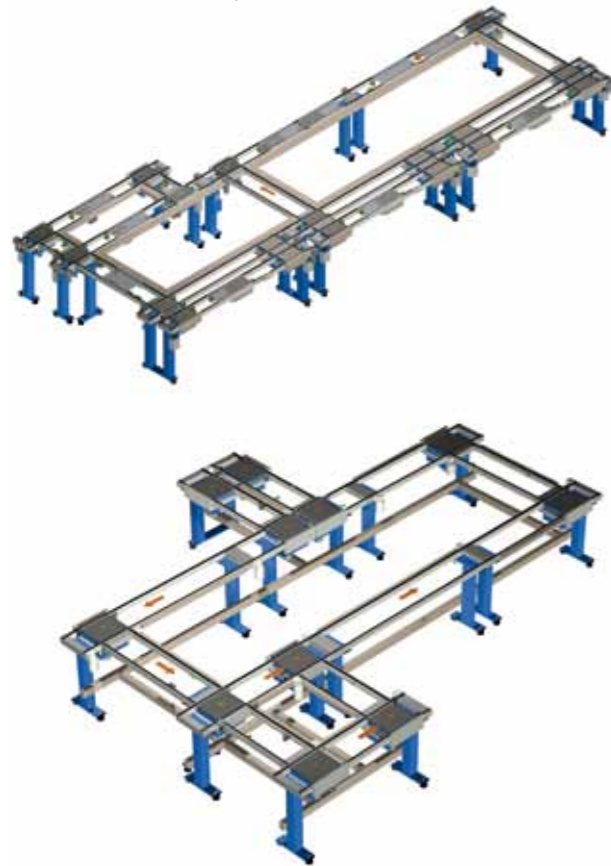
FACTS AND FIGURES

- dimensions for workpiece carriers: from 160 mm without grid
- total load capacity (workpiece + holding fixture + workpiece carrier): up to 20 kg

ADVANTAGES

- modular design means components are consistent and can be reused
- time-saving system assembly from STEIN
- integrated cable channels upon request
- step-less workpiece carrier dimensions can be selected (special sizes upon request)
- custom colours are also possible

Example of two fully assembled STEIN 300 transfer systems



On the following pages we would like to present the basic versions of the STEIN 300. On the one hand, there are the basic systems that can be created. On the other hand, there are basic modules that can be configured.

To determine which systems and configurations are most suitable for particular tasks, we would be pleased to advise you in person.

BASIC SYSTEMS (see right)

BASIC SYSTEM A

Basic system A is equipped with 90° transfer units and transverse sections that are at least 300 mm in length. The floor space between the conveyor belts provides room for assembly or processing stations.

BASIC SYSTEM B

Basic system B features 180° transfer units and therefore needs no transverse sections. The distance (clearance) between the conveyors is always 106 mm.

BASIC SYSTEM E

For basic system E, 180° radial tracks are used. Unlike transfer units, these retain the same orientation of the workpiece carrier after it has been turned (the outside edge remains on the outside). The distance (clearance) between the conveyors is always 106 mm.

BASIC SYSTEM F

For basic system F, 90° radial tracks are used. The floor space between the conveyor belts provides room for assembly or processing stations. With this configuration of basic system, the outside edge of the workpiece carrier remains on the outside.



www.stein-automation.de/en-ga

BASIC SYSTEM A



BASIC SYSTEM B



BASIC SYSTEM E



BASIC SYSTEM F



BASIC MODULES

DOUBLE CORNER A



CORNER A



DOUBLE CORNER B



DOUBLE CORNER E



DOUBLE CORNER F



CORNER F



WORKSTATIONS

WORKSTATION A



CORNER WORKSTATION A



WORKSTATION B



CORNER WORKSTATION B



WORKSTATION C



CORNER WORKSTATION C





STEIN 300 CONTROLLED

The STEIN 300 Controlled embodies the expertise of STEIN in the area of system controls. When used in combination with the tried-and-tested STEIN CONTROL, the perfectly matched components can unleash their full potential. This solution combines our years of experience in systems software and makes it easier than ever before to manage and control the entire production process, as it no longer has to be programmed, but merely configured. When purchasing a STEIN 300 Controlled, customers can rely on our advice as well as our extensive experience in developing interfaces.

50	OUR CONTROL PHILOSOPHY
51	Why choose a STEIN 300 Controlled?
52	WHAT IF ...
52	Questions to ask about a production line
53	The answers from STEIN
54	OVERVIEW
54	The sum of all parts
56	INTELLIGENT TRANSPORT
56	Is your transport logistics in good hands?
57	With intelligent conveyor belts from STEIN, the answer is definitely 'yes'
58	ON SCHEDULE TO SUCCEED
58	Many products – complex processes
59	STEIN can manage every order precisely according to schedule
60	DIAGNOSIS
60	Diagnosis – troubleshooting made easy
61	STATISTICS AND TRACEABILITY
61	Statistics – an overview of all information
61	Traceability – identification of all process
62	SOFTMOVE
62	Extremely soft transport. With the greatest efficiency.
64	Velvet gloves for production
64	Workpiece transport the gentle way
65	How SOFTMOVE works
65	The five strengths of SOFTMOVE at a glance
66	LEAN PRODUCTION
67	Lean production in practice
68	LEAN PRODUCTION in action
70	GOOD EXPERIENCE
70	Keeping trust under control



EVERY MOMENT COUNTS IN PRODUCTS – WHICH IS EXACTLY WHY A GOOD CONTROL SYSTEM ALSO NEEDS TO BE PREPARED FOR FUTURE EVENTS.

OUR CONTROL PHILOSOPHY

WHY CHOOSE A STEIN 300 CONTROLLED?

The flow of materials made possible by an efficient system is the lifeline of a successful production operation. However, a system can only be as efficient as its controls.

For this reason, there is more than just a clever design and good software behind the STEIN 300 system controls – they are the product of a philosophy that STEIN applies to all of its systems: to make work easier for customers and go the crucial extra mile in development.

As a result, STEIN controls are prepared for almost any change, conversion or expansion that may take place in a production process over the years. Thanks to our many years of experience in developing interfaces with mechanical engineering companies, our customers can rest assured that choosing STEIN is the right decision when it comes to controls as well as components.

Every transfer system we supply is commissioned for testing at STEIN and accepted by the customer on our premises. This means that every system is tested and delivered in working order.

Clever customers think ahead – with controls that are prepared for any eventuality and are extremely straightforward to operate.

QUESTIONS TO ASK ABOUT A PRODUCTION LINE

Many questions may arise during the life cycle of a production facility that require the control system to find the right answer for production to continue running successfully.

Regardless of what is produced and required today, it is worth thinking about the following situations before they occur.

WHAT IF ...

- a new station has to be integrated?
- a new product has to be added to the production line?
- the change is made one day from order-independent production to order-related production?
- the number of pieces decreases or increases?
- a station is offline but production has to continue?
- production or process data have to be collected?
- the condition of components is not known and investigations are necessary?
- a periodic station inspection is due?
- a manual workstation has to be converted into an automated station?
- one-piece flow is required?

THE ANSWERS FROM STEIN

At STEIN, we cannot see the future. However, given our extensive experience, our perspective is influenced by a number of situations that our customers might not consider at all.

Our STEIN CONTROL system controls are able to respond in a flexible way to most changes, modifications, expansions and production situations.

STEIN CONTROL

- adds intelligence to conveyor belt systems all the way to workstation interfaces
- is a centralised control system that uses the master-slave principle to support the modular design of the system
- ensures maximum flexibility for modifications and expansions and the straightforward integration of new stations and processes
- receives data required for logistics and can optionally compile this information and make it available in simple statistics for optimisation and traceability
- offers simple operation, configuration and maintenance rather than complex programming requirements
- facilitates the straightforward creation of product groups, schedules and production orders

For additional information about the precise system requirements of the STEIN CONTROL software, please visit:



www.stein-automation.de/en-weit



PLANNED WITH FORESIGHT.



THE SUM OF ALL PARTS

The STEIN control system is decentralised and perfectly suited to the modular design of the mechanical system. Based on approved standards, the controls allow maximum versatility and offer optimal logistics. They are also extremely compact given the installation of slaves into the column bases.

The slaves are linked together and connected to the central master by fibre-optic cables. Workpiece carriers are stopped in the processing stations. All of the data required for the processing operations are transmitted by STEIN CONTROL to the external process controller when the workpiece carrier enters the station. Once processing is complete, the station controller sends feedback on the result to STEIN CONTROL. The onward path of the workpiece carrier is then managed by STEIN. In this way, workstations can focus on their individual tasks while STEIN assumes responsibility for optimised logistics.

The sophisticated control concept allows flexible partial commissioning. Individual modules can be supplied to special-purpose machine builders before they are integrated. This achieves the greatest possible degree of flexibility.

The image to the right shows an overview of some key control elements and explains them in detail.

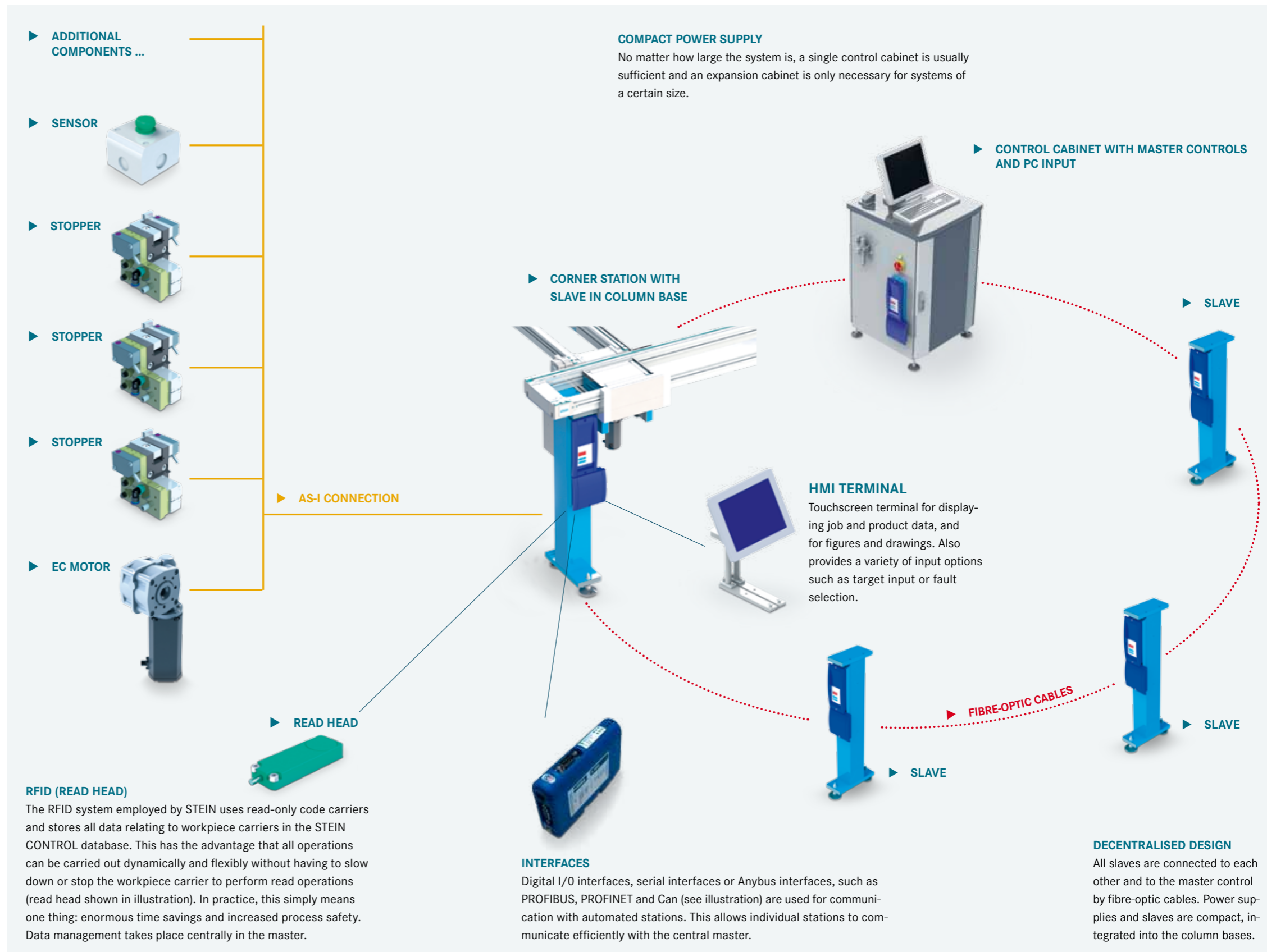
ADVANTAGES OF STEIN CONTROLS

- straightforward central management of the entire logistics process
- lean wiring
- highly modular with plug-in connections
- fast commissioning and modification
- flexible commissioning options
- small footprint with plenty of open space for workstations
- tested ex-works (checked and commissioned by STEIN) and pre-accepted by the customer

For further information about the control components, please visit:



www.stein-automation.de/en-steu-ko



IS YOUR TRANSPORT LOGISTICS IN GOOD HANDS?

The basic task of a conveyor belt is to transport workpieces to wherever they need to be in a production line. Many transfer systems do this and nothing more.

As a result, transport logistics is often relegated to the domain of individual station controls in conventional double-belt systems.

THIS MEANS:

- the failure of a station could threaten to bring the entire production line to a standstill
- there is no central station with overall responsibility for controlling logistics
- when integrating the processes of different suppliers, it is very hard work to coordinate communication and interfaces. At STEIN, we take care of these issues
- modifications, expansions and other work is complicated because the controls are not flexible
- the potential benefits of an intelligent logistics function are not fully utilised

WHAT DOES AN INTELLIGENT CONVEYOR BELT LOOK LIKE?



WITH INTELLIGENT CONVEYOR BELTS FROM STEIN, THE ANSWER IS DEFINITELY 'YES'

The thought behind the intelligent conveyor belt corresponds in every way with a simple philosophy: work is most successful when everyone can focus on their actual job. For STEIN, this approach has held sway for many years. It follows that the workstation is responsible for what it does best: carrying out a process on the workpiece carrier.

In this sense, STEIN CONTROL places transport logistics at the centre of everything. After all, the options required by a truly flexible production operation can only be created when conveyor belt logistics has overriding importance.

The conveyor belt and workstation are able to communicate via an interface. The task of monitoring the overall logistics process and all data falls to STEIN CONTROL.

ADVANTAGES

- problem-free integration of new stations and ideal in the case of station failure or expansion thanks to flexible interfaces
- intelligent distribution of workpiece carriers depending on the capacity of individual workstations
- the entire route of the workpiece carrier can be defined in a simple schedule with a large number of branches
- processing stations can be limited to their particular area of speciality
- central access to all workpiece carrier-related data is possible (workpiece carrier logbook, approval of workpiece carriers, etc.)



MANY PRODUCTS – COMPLEX PROCESSES

When only one product is produced in a system, the process is usually relatively straightforward. But even then, a variety of steps with many branches may be necessary if the product exists in a number of versions or if partial production processes are required.

If entirely new products are then added to a line, for example, or there is a need for dummy test runs, many systems and control systems quickly reach their limits.

The reprogramming of processes, even if it is just a matter of small details, can often become a difficult, lengthy and expensive task that ties up resources.

THINGS TO CONSIDER

- new products and new product types can only be integrated with difficulty if schedules have to be laboriously programmed
- it takes time to programme schedules, and in some cases this must be done by external specialists, which entails additional costs
- the more complex and varied the orders of the production facility are, the clearer the contract management system needs to be

STEIN CAN MANAGE EVERY ORDER PRECISELY ACCORDING TO SCHEDULE

The STEIN control system works with clear and simple schedules for the entire process. These guide workpiece carriers from station to station and can be created intuitively step by step without any programming skills. It is straightforward to allocate and document the steps entailed in each process, and they can be easily traced.

Different order numbers, product types, product groups and schedules can be defined for workpiece carriers. Configuration and scheduling is very simple and can be done at the click of a mouse. Programming skills are not required, and customers can configure their process completely by themselves. The software is also provided with the schedules needed for commissioning.

ADVANTAGES OF THE STEIN CONTROL SYSTEM

- schedules are easy to create
- flexible allocation of all kinds of products to workpiece carriers and individual schedules
- even diverse production operations are easy to manage

For further information about order management, please visit:



www.stein-automation.de/en-sys-v

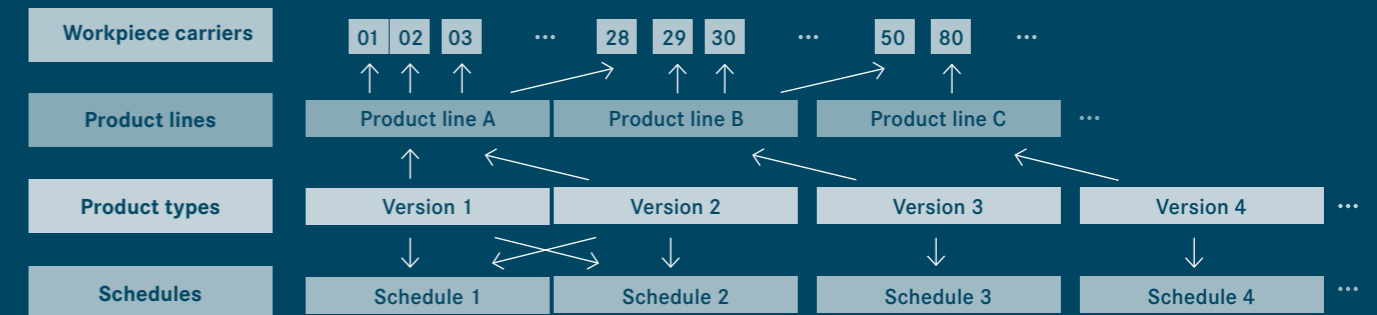


An example of order management

Step	Step Name	Order	Order No.	Order Qty	Order Status
1	Handelstapler	Handelstapler_001_L1	1	1	Produktion
2	Handelstapler	Handelstapler_002_L1	2	1	Produktion
3	Handelstapler	Handelstapler_003_L1	3	1	Produktion
4	Handelstapler	Handelstapler_004_L1	4	1	Produktion
5	Handelstapler	Handelstapler_005_L1	5	1	Produktion
6	Handelstapler	Handelstapler_006_L1	6	1	Produktion
7	Handelstapler	Handelstapler_007_L1	7	1	Produktion
8	Handelstapler	Handelstapler_008_L1	8	1	Produktion
9	Handelstapler	Handelstapler_009_L1	9	1	Produktion
10	Handelstapler	Handelstapler_010_L1	10	1	Produktion
11	Handelstapler	Handelstapler_011_L1	11	1	Produktion
12	Handelstapler	Handelstapler_012_L1	12	1	Produktion
13	Handelstapler	Handelstapler_013_L1	13	1	Produktion
14	Handelstapler	Handelstapler_014_L1	14	1	Produktion
15	Handelstapler	Handelstapler_015_L1	15	1	Produktion
16	Handelstapler	Handelstapler_016_L1	16	1	Produktion
17	Handelstapler	Handelstapler_017_L1	17	1	Produktion
18	Handelstapler	Handelstapler_018_L1	18	1	Produktion
19	Handelstapler	Handelstapler_019_L1	19	1	Produktion
20	Handelstapler	Handelstapler_020_L1	20	1	Produktion

Example of a schedule with many branches

HOW CAN A PROCESS BE CONFIGURED WITHOUT PROGRAMMING?



The controls always know which workpiece carriers hold which products – and what group and schedule these products belong to.

DIAGNOSIS – TROUBLESHOOTING MADE EASY

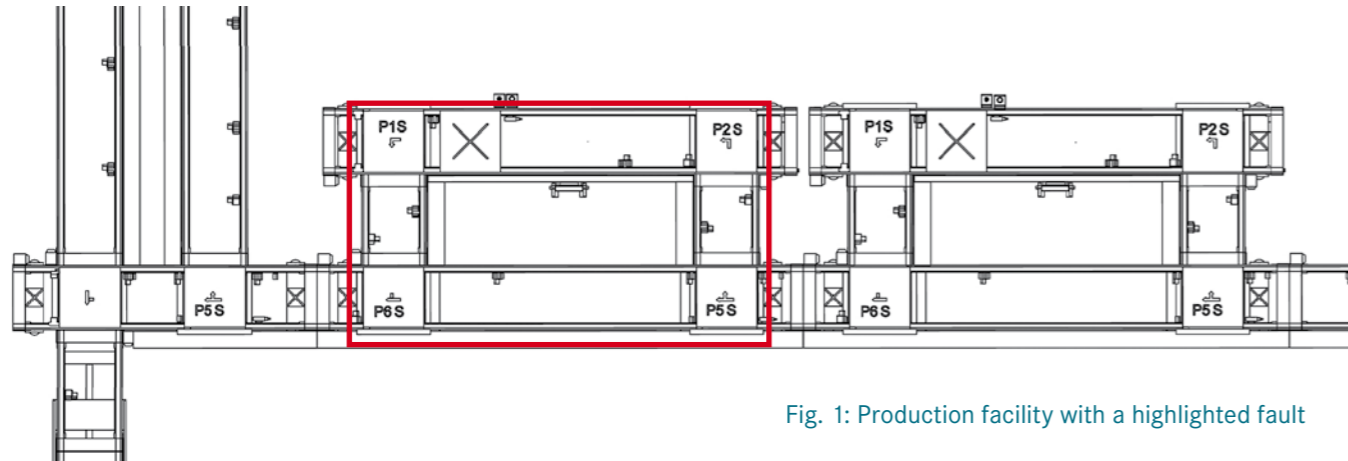


Fig. 1: Production facility with a highlighted fault

Of course, we hope that our customers never experience faults in their production processes. If such events do occur, however, the diagnostic tool of STEIN CONTROL helps to resolve problems quickly.

A graphical representation of the entire system (see Fig. 1) means that faults can be located rapidly. In an enlarged view of the slave concerned (Fig. 2), the area affected by the fault can be shown in more detail. The actual fault is already highlighted in a different colour by the program. In the detailed view of troubleshooting mode (Fig. 3), the fault is finally processed without further complications. Remote maintenance is a matter of course for us and included as standard with every new system.

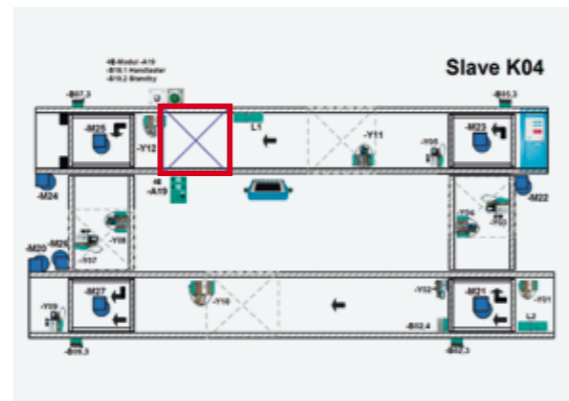


Fig. 2: Enlarged view of the slave



Fig. 3: Detailed view of the faulty part

STATISTICS – AN OVERVIEW OF ALL INFORMATION

The STEIN system controller has central access to all production data and manages this information. Additionally, the same data can be used for analysis and the compilation of statistics without difficulty.

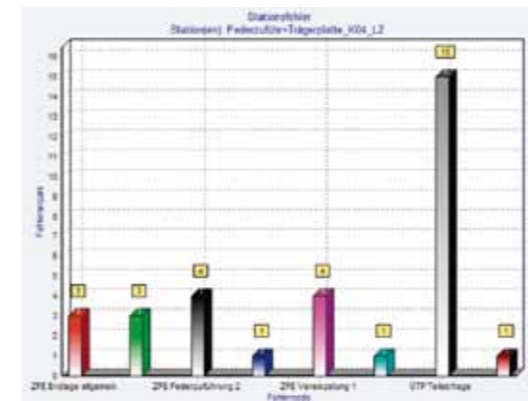
The (optional) statistics tool of STEIN CONTROL presents customers with a variety of options to evaluate and display data so that every aspect of production is easy to visualise.

For further information about statistics, please visit:

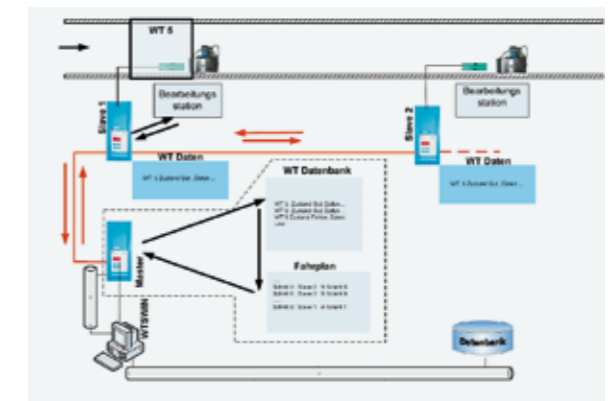


www.stein-automation.de/en-stat

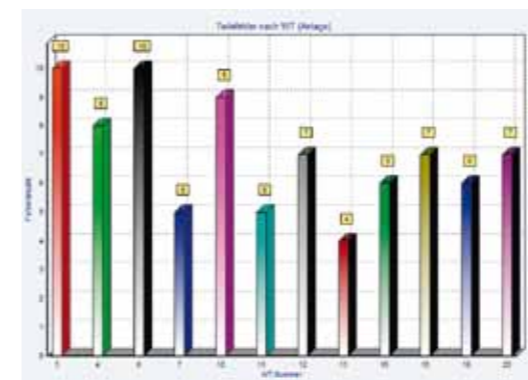
Some screen shots of the statistics tool:



Visualisation of station faults



Schematic diagram of the data flow



Visualisation of faulty parts by workpiece carrier

EXTREMELY SOFT TRANSPORT. WITH THE GREATEST EFFICIENCY.

WELL CALCULATED

Using SOFTMOVE, thanks to the automatic switching on and off of transport belts as required, unnecessary motor running can be avoided – this allows power consumption to be reduced by up to 80%.

CLEANLY TRANSFERRED

SOFTMOVE improves working conditions in production and leads to lower servicing costs because machine soiling is considerably reduced.

LONG-TERM CONSIDERATIONS

Machine maintenance costs are also reduced by using SOFTMOVE. But primarily, their life as a whole is extended – which is of special long-term value.

See SOFTMOVE live now.

This way to the film: ► www.stein-automation.de



SOFTMOVE ●
TRANSPORT MARKE STEIN

► TRANSPORT WITH CARE

► SAVE ENERGY

► REDUCE WEAR



VELVET GLOVES FOR PRODUCTION

In production operations, speed is of the essence. To ensure that workpiece carriers never collide hard despite travelling at high speeds and in large volumes, STEIN has developed SOFTMOVE technology. This enables the extremely gentle transport of sensitive products while reducing wear, dirt and system noise, helping to save time, energy and money.

In production operations, all of these benefits are worth a great deal, and we are proud to say that only STEIN has combined them so successfully with SOFTMOVE.

With SOFTMOVE, STEIN has set the benchmark for the handling of sensitive workpieces – much further afield than the Black Forest.

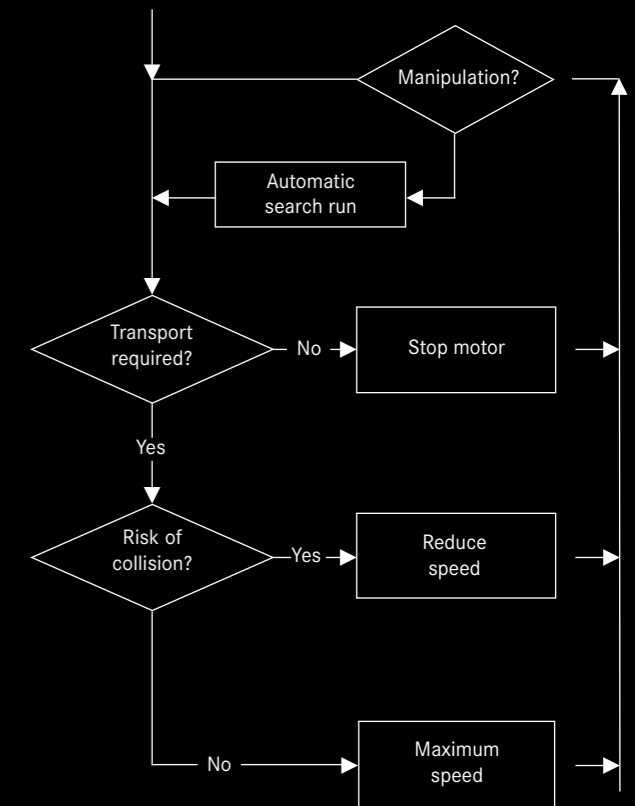
WORKPIECE TRANSPORT THE GENTLE WAY

The intelligent technology of SOFTMOVE allows the automatic control of motors (so long as the drive belts are equipped with EC motors) based on the STEIN SOFTMOVE algorithm.

The resulting strengths of SOFTMOVE and the specific benefits these offer are outlined below. Which of these advantages are most important in production is something our customers know best – but of course we are always happy to offer advice about the possible applications of SOFTMOVE.

HOW SOFTMOVE WORKS

Since STEIN CONTROL is able to identify the exact position of every workpiece carrier, the belt drive motors can be regulated to ensure that there are no hard collisions and to prevent them from running when it is not necessary. The workpiece carrier makes contact with a stopper latch before striking a stopper, at which point the intelligent system reduces the speed to stop the component softly. If the belt is informed that there is no further need for transportation, it is automatically switched off. As it happens, this results in a potential saving of up to 80% in energy consumption.



STEIN SOFTMOVE algorithm

For further information about SOFTMOVE, please visit:

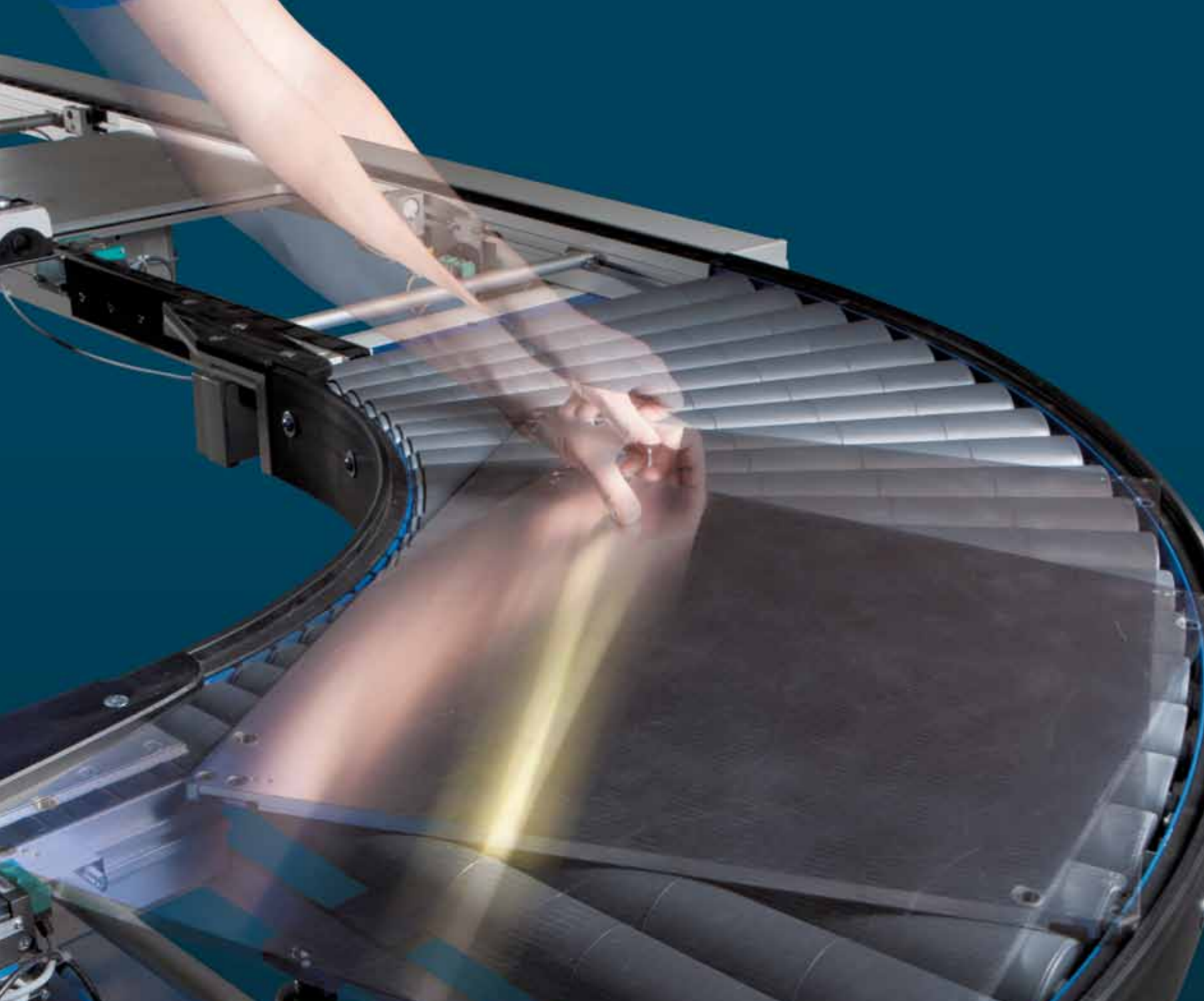


www.stein-automation.de/en-softm



THE FIVE STRENGTHS OF SOFTMOVE AT A GLANCE

- reduces energy consumption
- prevents workpiece carriers from colliding hard
- reduces wear and tear
- less dirt
- reduces system noise
- enormous cost savings in the long term
- gentle on your product (greater efficiency, more good parts)
- longer system service life, lower maintenance costs and greater output
- improved work conditions, less maintenance
- quieter production, fewer employees on sick leave, improved quality at manual workstations



LEAN PRODUCTION

LEAN PRODUCTION is used where material is to be processed, as far as possible, in a single flux from the beginning of a production process until the end. In the case of faults it is possible to react flexibly and thus prevent any additional reject parts being produced.

Benefits at a glance

- no buffer quantities
- shorter lead time
- greater flexibility, constant quality control possible
- greater productivity per unit area
- less wastage through transport of material

LEAN PRODUCTION IN PRACTICE

STEIN has not only already gathered experience with lean production, but also contributed to success stories: As early as 2009 one of our customers won the Automotive Lean Production award in the 'international SME' category.

THE RIGHT MODULES

All STEIN 300 components can be employed in a lean production system option. The commonest components, providing the basic blocks of lean production, are:

- manual conveyor or driven belt element
- manual workstation
- curved track
- transfer unit
- transfer rotating unit
- manual rotating unit

A variety of different automation concepts are available, allowing the ideal process to be implemented with the maximum economic efficiency, based on your own situation.



Using this manual rotating unit, the workpiece carrier can be rotated by hand.



This module can automatically feed out the workpiece carrier at a 90° angle or rotate it by 180°.

LEAN PRODUCTION IN ACTION

In line with all STEIN's systems, the needs of the customer are catered for even in the lean production system option – with the modular adaptability that characterises the STEIN 300 components. In the system presented here it was important to the customer to maintain lean production flexibility, but to not have to dispense with automated process elements (see points 2 and 4, in particular). In addition, it must be possible to change from manual movement to a motorised drive in case of a future increase in production numbers.

THE STEIN CONTROL UNIT

The higher-level control unit allows the perfect symbiosis of manual tasks with an automated system. This in turn allows employees to utilise the benefits of control logic, making job management and (optionally) traceability possible.

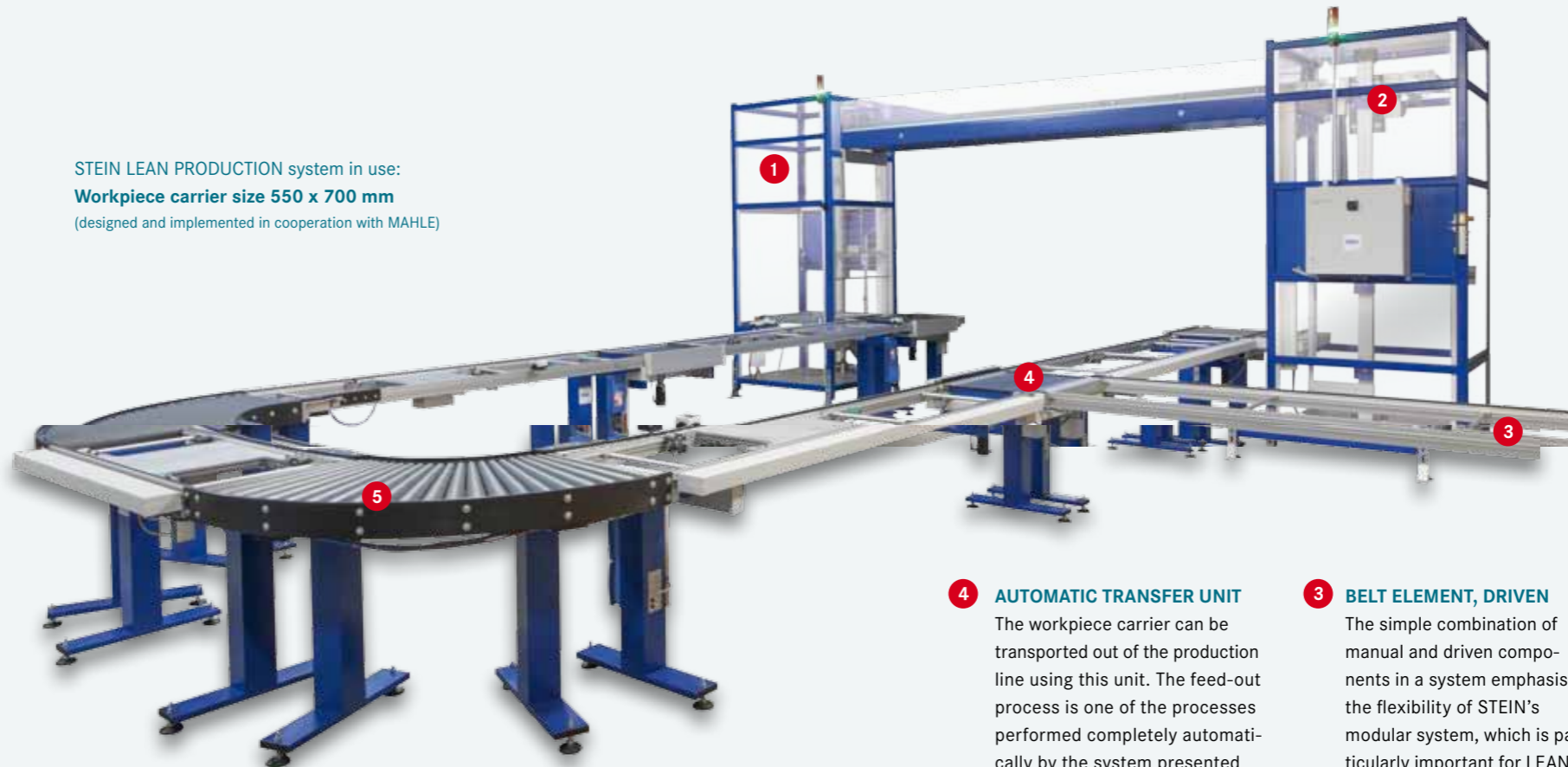


MANUAL WORKSTATION

As an important system component the manual workstation can be optimally adapted to the employee's needs and the process step, both in terms of ergonomics and equipment (a control unit is integrated in the adjacent option, for example).



STEIN LEAN PRODUCTION system in use:
Workpiece carrier size 550 x 700 mm
(designed and implemented in cooperation with MAHLE)



1 LIFT (ABOVE FLOOR)

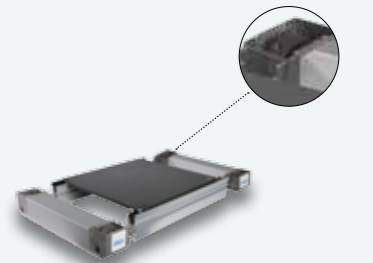
The lift makes transport on different levels possible, saves space and creates simple access and transit routes within the production line. This provides for a job rotation option within the system.

2 RETURN SOLUTION WITH LIFT

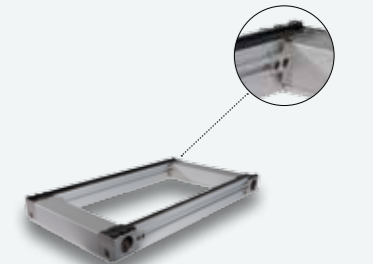
In this system the empty workpiece carrier goes into the lift, is lifted and transported across the production line to the other side, and thus returned – completely automatically.

CLEVER UPGRADES: UPGRADE OPTIONS

The step from manual movement to an automatic system is only a short one.



For example, the conveyor can be easily fitted with two belts ...



... and a motor. It is then ...



... an automatic belt element and is SOFTMOVE-capable for extremely gentle workpiece transport.

4 AUTOMATIC TRANSFER UNIT

The workpiece carrier can be transported out of the production line using this unit. The feed-out process is one of the processes performed completely automatically by the system presented here.

3 BELT ELEMENT, DRIVEN

The simple combination of manual and driven components in a system emphasises the flexibility of STEIN's modular system, which is particularly important for LEAN PRODUCTION.

5 RADIUSBAHN MANUELL

Even during manual operation, a fluid process and – above all – the highest reliability are guaranteed at all times.



GOOD EXPERIENCE

KEEPING TRUST UNDER CONTROL

There is one thing that interests us at STEIN even more than technical finesse and the perfection of conveyor systems, and that is the satisfaction of our customers.

Many of them have worked successfully with the STEIN control system for decades. We are pleased by every satisfied customer – and we are also grateful when customers decide to contact us with any problems, questions, suggestions or comments. After all, everything they say helps us to make our controls even better.

We have listed below a small selection of the customers who have placed their trust in us and our STEIN control system for many years.



AUTOMOTIVE
KIEKERT
BÖCO
WITTE
CONTINENTAL

TOYS, LEISURE
ATOMIC
PLAYMOBIL
EHEIM

DOMESTIC APPLIANCES
VORWERK
IMPERIAL
E.G.O.

MEDICINE
B | BRAUN
CERAMTEC

DRIVE TECHNOLOGY
EBM-PAPST
AMK
SEW

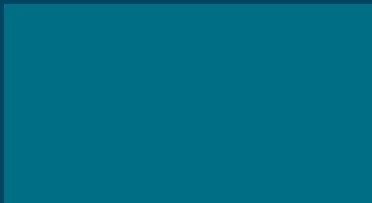
SOLAR
SOLARWORLD
JONAS + REDMANN
CENTROTHERM

ELECTRICAL ENGINEERING
FESTO
WERMA
HILTI

‘Many things can only be developed during production itself. STEIN always has an open ear for optimisation needs, and their expertise in software issues is especially valuable for us. The close personal contact we enjoy with STEIN is the icing on the cake.’

Bernhard Bamberger, Niederstetten site production manager, ebm-papst





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