Technology that inspires

PRODUCT RANGE

Mechanics | Software | Electronics

Excerpt of the WEISS Product Range

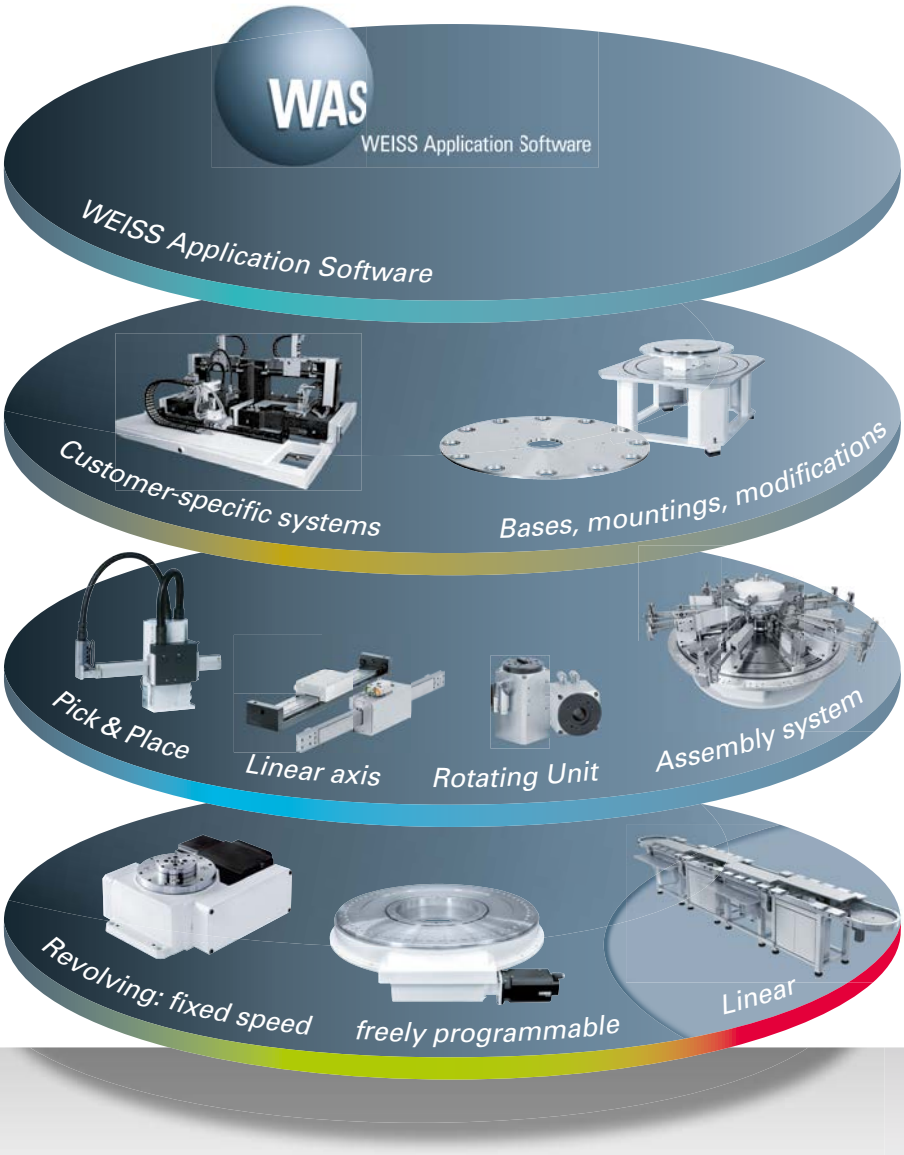
LINEAR ASSEMBLY SYSTEM LS 280

4 I would like to commission my installation quickly and efficiently

3 I require machine frames, mounting bases or custom equipment

2 I require handling components

1 My transport is...



Four steps to perfect automation


TC


TR

Fixed position rotary indexing tables

TC rotary indexing table
TR rotary indexing ring


NC


NR


CR


TO


TW

User-programmable rotary indexing tables

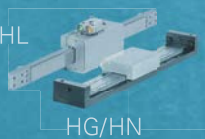
NC rotary indexing table NR rotary indexing ring
CR/TH heavy duty ring TO torque rotary indexing table
TW rotary indexing table


LS

Linear assembly system

LS 280

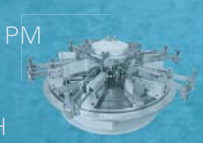

HP


HL

HG/HN


ST/SW


SH


PM

Handling modules

HP Pick&Place HL Linear axis
HG/HN Linear axes ST/SW rotary unit
SH Lifting-rotating unit PM Pick-o-Mat


Plates


SK

Customer specific solutions

SR/SK indexing machine bases
Additional indexing plates

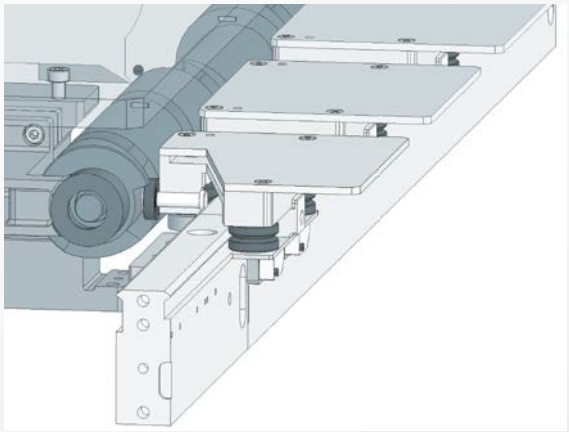
WAS-Software

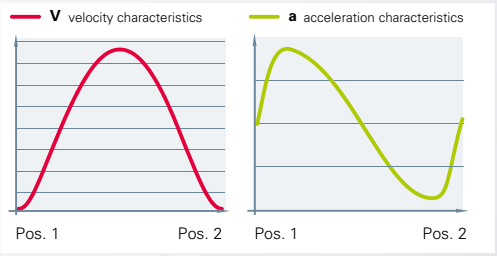
WEISS Application Software (WAS)

Linear Assembly System LS 280 consisting of four assembly cells with locking station and base frame, as well as of belt sections, corner units and workpiece carriers.

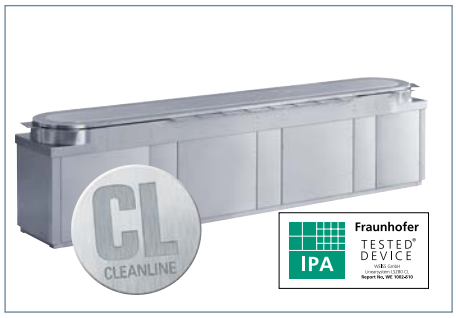
Linear Assembly System LS: sophisticated, modular cell design

The advantages of the LS 280 result from a completely new, elegant drive principle. It combines a rotary indexing table with a transfer system, thus a cam drive with a belt system. This results in a radical reduction of the transport times as well as in an enormous high productivity. The modular designed cell concept allows in addition a flexible and extendable system design.

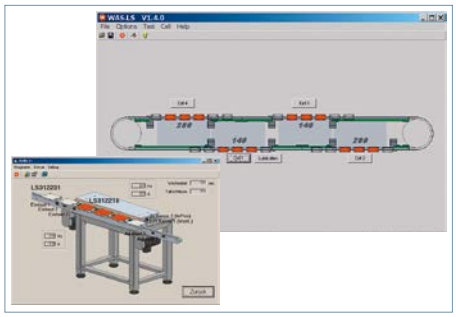




The cam profile with modified sine curve provides a very smooth and harmonic motion sequence at the workpiece carrier. This is the precondition for minimum exchange times and a long service life.



LS 280 CL – The solution for the cleanroom: The Linear Assembly System LS 280 CL in a cleanroom suitable design is certified for the Air Cleanliness Class 6 in accordance with ISO 14644-1.

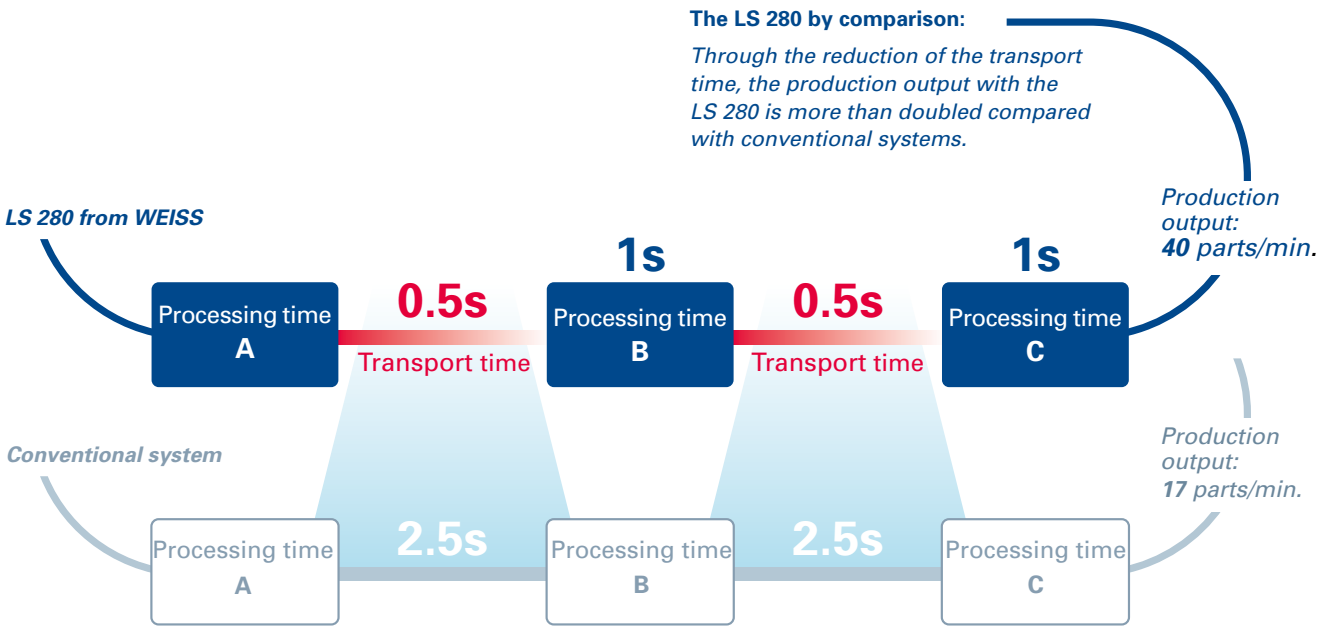


WAS – WEISS Application Software: Fast and safe start-up through unique operator software Visualisation – Monitoring functions – Diagnostic functions.

The key advantages at a glance:

- *Proven cam drive*
- *Smooth, impact free motion sequence*
- *Short workpiece exchange times*
- *High positioning precision without additional stopping or indexing modules*
- *High level of availability*
- *Modular system design*
- *Independently functional assembly cells*
- *Adjustment of varying processing times*
- *High degree of reusability*
- *Stable basic structure made of steel*
- *High reliability*
- *Maintenance free*
- *Complete functional and quality inspection*
- *Short implementation time*
- *Fast build-up assembly*
- *WAS – WEISS Application Software for easy and fast start-up*
- *Convincing price / quality ratio*
- *ESD-capability*

The LS 280 – Production in the fast lane



Comparison of workpiece exchange times

Higher number of cycles – More output

The LS 280 achieves – due to the reduction of the transport times – a number of cycles, from which others are far away. The conventional workpiece carrier exchange – transporting, stopping, lifting and positioning – is replaced by one smooth and fast motion sequence – absolutely jerk and impact-free with up to 60 cycles per minute.
With this exclusive drive principle the LS 280 combine the speed, precision and reliability of a rotary indexing table with the flexibility of a transfer system.

Simple motion principle – High level of availability

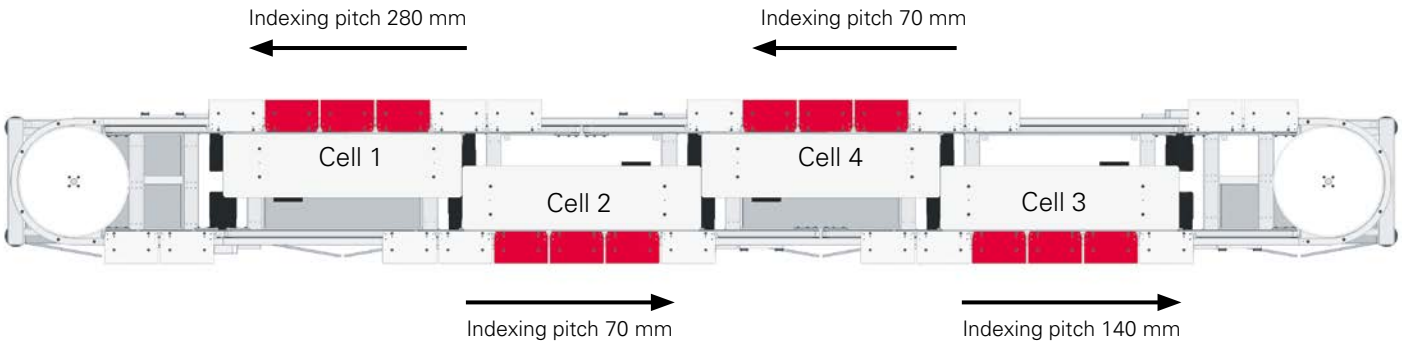
What does not exist cannot break down. The simple and precise motion principle of the transport cam and the modular cell design considerable reduce the number of mechanical and electrical components. In the same rate the availability of the LS 280 is increasing.
The single cells are uncoupled through "intelligent" belt sections. Short idle times between these assembly cells can be compensated by small buffers.

Jerk and impact-free carrier transportation – No vibrations at the customer product

The modified sinusoidal motion sequence within the transport cam together with the speed controlled belt sections in front of a cell provide a transport through the system that is continuously smooth and impact-free. The frequency controlled belt drive unit reduce the transport energy of the workpiece carrier prior to the approach to the cam intake to one-hundredth in comparison with the normal transport. This ensures that vibrations are avoided at the customer product.

Modular system design – Lower investment costs

The LS 280 is based on a clear modular cell design. The elaborate design with a low number of components offers solutions of great simplicity and elegance – tailored for individual requirements. Additional components for stopping and indexing of the carriers are not required. The clear defined cell modules keep labour costs low for build-up and start-up. Stability and reliability allow a three-shift operation with a minimum on service staff.



Indexing pitch of the cell (mm)	Workpiece exchange time (sec.)	Processing time customer (sec.)	Cycle time of a cell (sec.)	Resulting cycle time per part (sec.)
70	0.4	0.8	1.2 (1)	1.2
140	0.5	1.9	2.4 (2)	1.2
280	0.6	4.2	4.8 (3)	1.2

Time and layout example of a LS 280 with different customer processing times at the individually assembly cells

(1) sequential processing per part
(2) parallel processing at 2 parts
(3) parallel processing at 4 parts

Adjustment of varying processing times – Increase of productivity

On a rotary indexing table, the longest processing time determine the cycle time of the system. The LS 280 however, allows the combination of different indexing pitches within one system through the simultaneous transfer of several workpiece carriers to execute time consuming operations parallel in line. Without elaborate lock out different processing times can be decoupled integrated to achieve a higher production output. The fast total frequency of the system remain conserved.

Maintenance-free operation – High reliability

The LS 280 allows a fully automatic and maintenance-free three shift operation due to hardened and ground motion tracks in touch with an integrated central lubrication system as well as ball bearing rollers at the workpiece carrier. The monitoring functions integrated in the control guarantee the maximum degree of operation reliability.

ESD-capability – Antistatic transport

There is no electrostatic charging due to the continuous steel design of the system which ensure that every workpiece carrier is earthed.

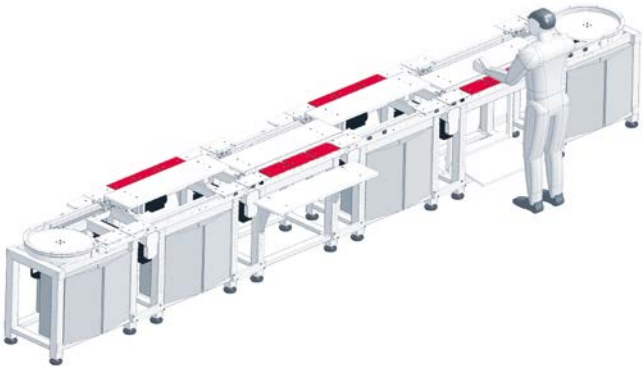
Independently functional assembly cells – Flexible and extendable system design

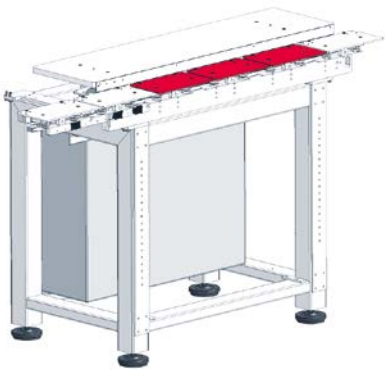
The LS 280 is designed mechanically as well as from the control side as a cell concept. The single assembly cells contains decentralised control packages, which communicate with the PLC by a system bus. This ensures that subsequent extensions to a system or a division of a total system into separate sub-systems are possible without any problems. The stable basic design of the cells also ensures that no adjustments are required after the re-assembly.

Short realisation times – Time to Market

Complete base machines can be set up with just a few stockable standard components in a very short time. Each system is performance tested and quality controlled prior to delivery. The parameter set of the system is therefore already individual adjusted and optimised.
We manufacture the mechanical interfaces such as mounting plates, workpiece carrier plates etc. according to customer drawings. The autonomous working assembly cells even allow the split-up of the work content to several suppliers. The above issues result in a time saving of several weeks for the customer.

Cell with locking station





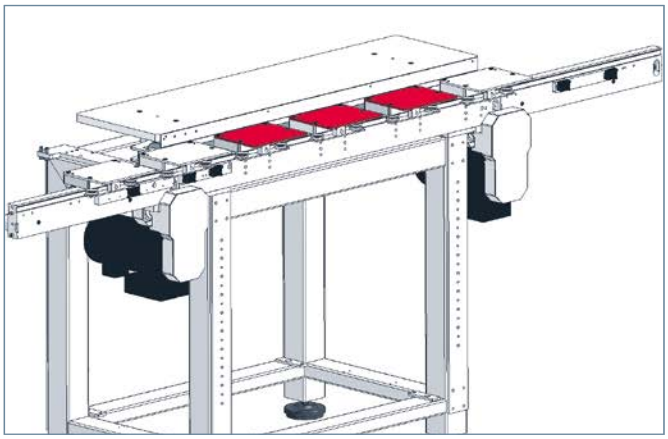
The locking stations serve primarily for simultaneous transport and positioning of a number of workpiece carriers. Depending on the indexing pitch and station type, the user has a varying number of locked processing positions at his disposal. Along with stable steel base frames and top support plates the locking stations form the basis for an assembly cell of the Linear Assembly System LS 280.

The main item of the stations is formed by a cylindrical cam with which the workpiece carriers are engaged, transported and mechanically locked in a single motion sequence.

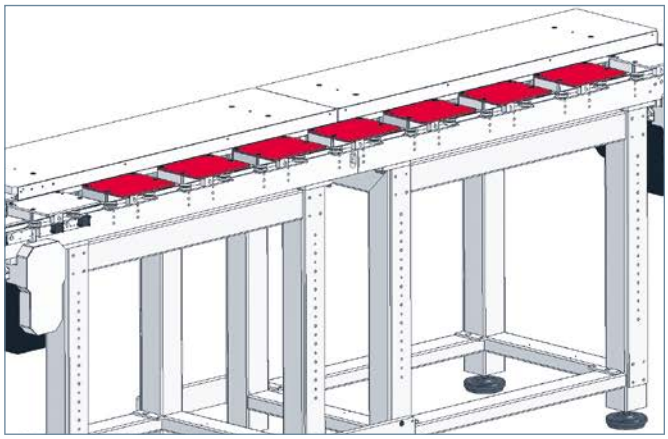
This reliable drive principle enables shortest workpiece exchange times combined with a high positioning accuracy. Despite working at high speed, the sinusoidal motion curve within the cylindrical cam guarantees a smooth, impact-free transportation of the workpiece carriers and avoid therefore vibrations at the transported product.

Two versions of the locking stations are available, single and double locking station. Both modules have the same drive concept, but differ through the number of available locked positions and the module length of 1200 mm or 2400 mm.

A twin cell configuration provides two independent working locking stations mounted back to back on one base frame. A common bigger top support plate is used in this case.



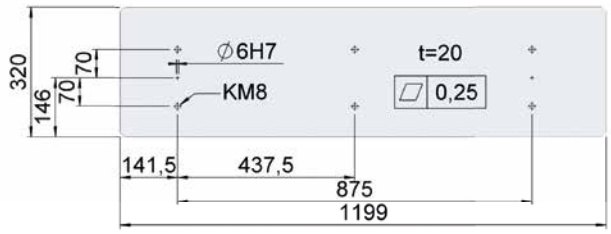
Single locking station



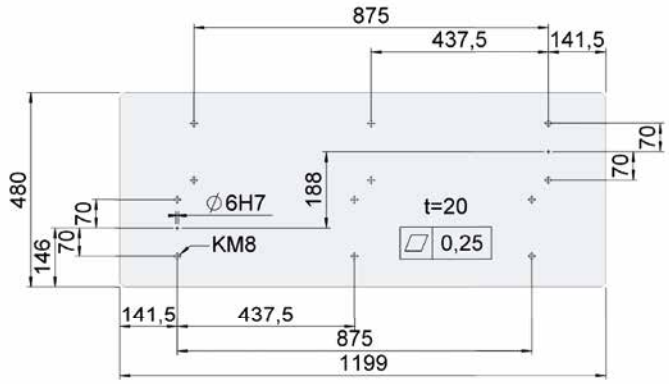
Double locking station

The locking stations are also designed to provide a mounting surface for handling modules, which are directly mounted on top of the assembly cell.

The top support plates are made of anodised aluminium or nickel-plated steel in the standard version. They can also be manufactured in accordance to customer specifications.



"One-sided" top support plate with standard hole pattern



"Twin" top support plate with standard hole pattern

Technical data of the locking stations

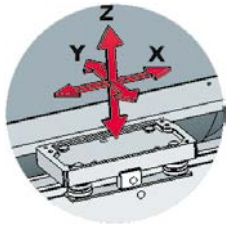
Indexing pitch of the cell (mm)	Workpiece exchange time (sec.)	Number of available locked positions at each indexing pitch:	
		Single locking station	Double locking station
70	0.4*	10 positions	28 positions
140	0.5*	5 positions	14 positions
280	0.6*	3 positions	7 positions
560	1.2*	2 positions(1 x 2 pos. parallel)	6 positions (3 x 2 pos. parallel)

* Time from input of the start signal in the control of the cell to the output of the position signal from the control.

Positioning precision: X / Y axis +/- 0.03 mm
Z axis: +/- 0.06 mm

Transport direction: counter-clockwise

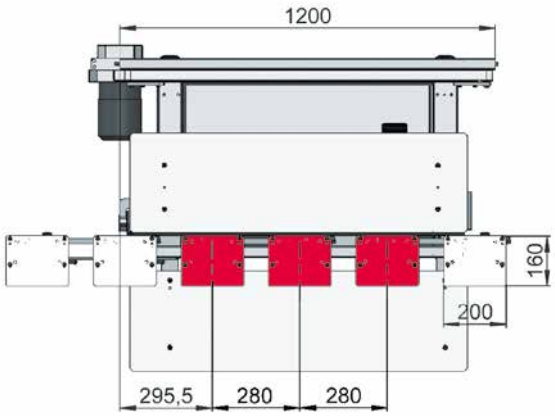
Type of drive: Three-phase motor



Cell with locking station

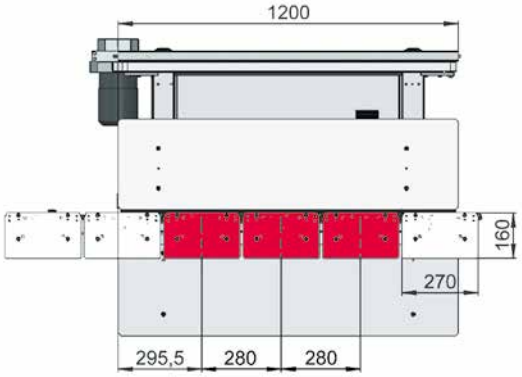
Cell with single locking station – available locked positions

Workpiece carriers in colour are locked in the single locking station.



Transport Direction

Indexing pitch = 280	1 2 3	Number of available locked positions at each cycle
Indexing pitch = 140	1 2 3 4 5	
Indexing pitch = 560	1 2 parallel only	

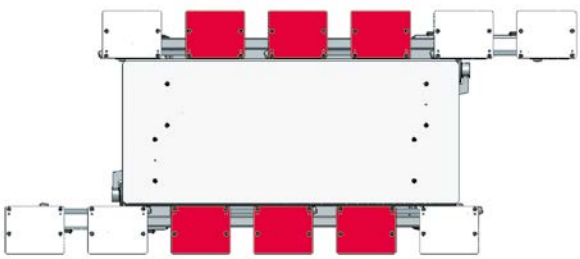


Transport Direction

Indexing pitch = 70	1 3 5 7 9 2 4 6 8 10	Number of available locked positions at each cycle

Cell with two single locking stations – twin arrangement

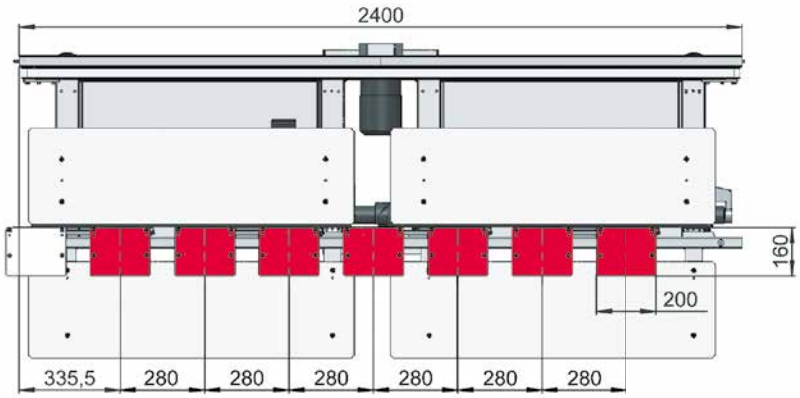
Workpiece carriers in colour are locked in both single locking stations.



Transport Direction

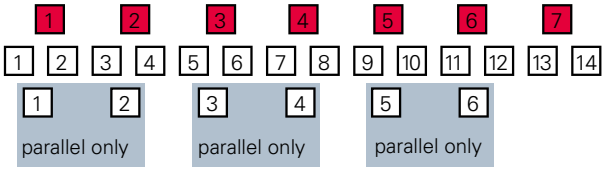
Cell with double locking station – available locked positions

Workpiece carriers in colour are locked in the double locking station.

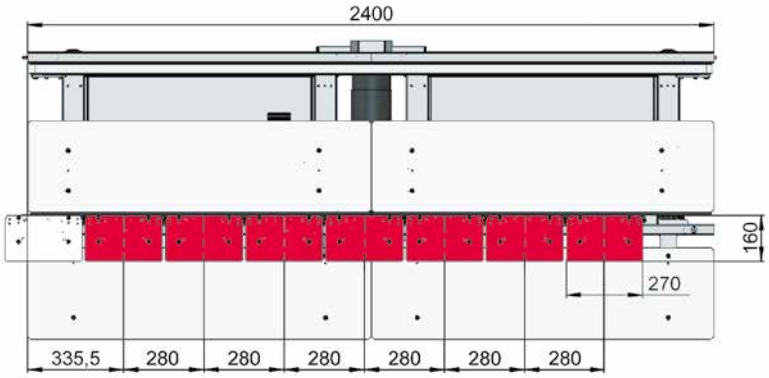


Transport Direction

Indexing pitch = 280
Indexing pitch = 140
Indexing pitch = 560

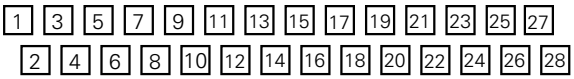


Number of the available locked positions at each cycle



Transport Direction

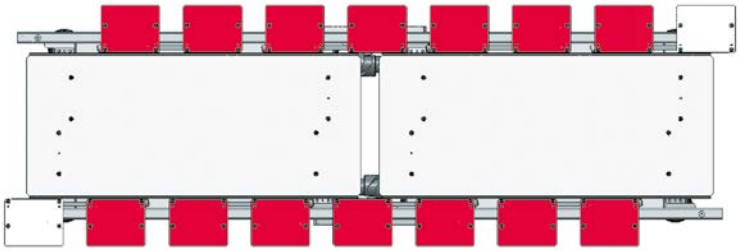
Indexing pitch = 70



Number of the available locked positions at each cycle

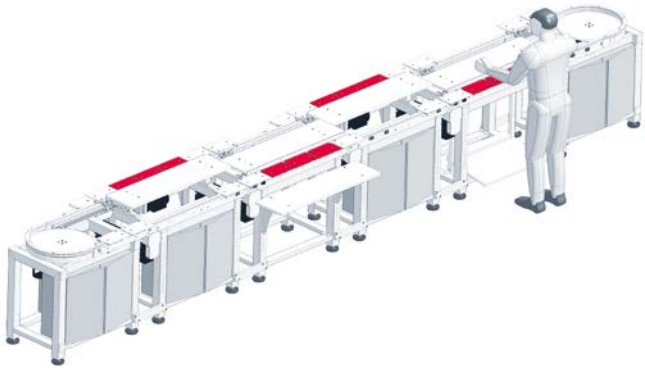
Cell with two double locking stations – twin arrangement

Workpiece carriers in colour are locked in both double locking stations.



Transport Direction

Belt section



The belt sections are used for the transport of the workpiece carriers between locking stations. This ensures a decoupling of the individual cell modules and also serves as a small buffer between the processing stations. The workpiece carriers are friction driven on a transport belt. The belt sections are available in different lengths for individual layouts.

The outgoing belt section after a locking station runs with constant high speed while the ingoing belt section before a locking station is always speed controlled. This provides a rapid and impact-free transportation of the workpiece carriers between stations. The high transport speeds also ensure a reduced number of required workpiece carriers on the free belt sections.

The integrated control functions to regulate the transport speed as well as the weight independant pressing force of the carrier to the toothed transport belt, guarantees that the wear is kept to a minimum.

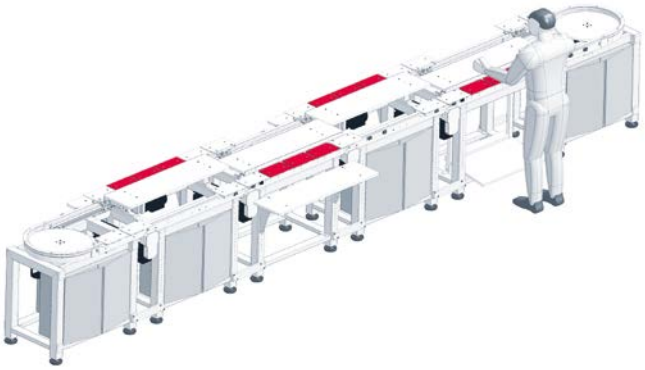
Belt section with toothed transport belt

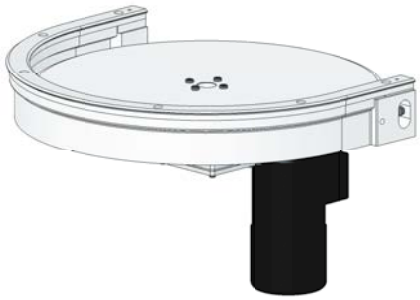
Driving unit with motor

Technical data of the belt section

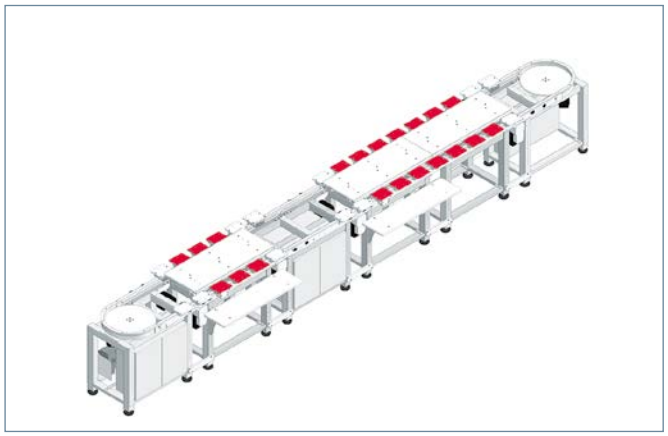
Belt section lengths:	600, 1200, 1500, 1800, 2400 mm
Min. length between two cells:	1200 mm
Transport speeds:	19 m/min; 26 m/min; 41 m/min (at 50 Hz) (reduced speeds possible by additional feed rate reduction)
Toothed transport belt:	PU-belt, Nylon coated
Type of drive:	Three-phase motor

Corner unit

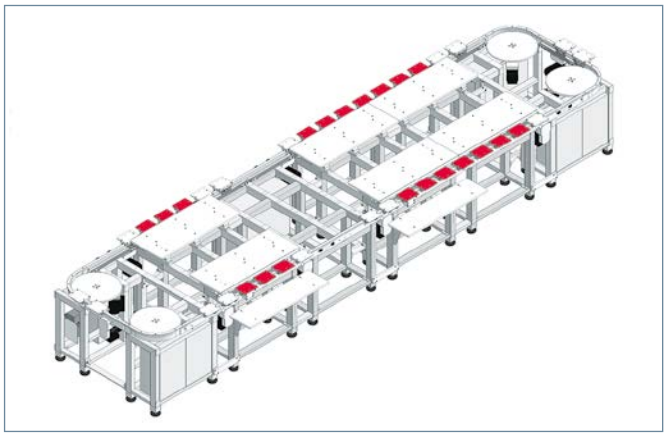




180° and 90° corner units are available for the design of the system layout. They determine the geometric execution of the two possible layout types. The workpiece carriers are friction driven on the anodised aluminium disk.



Example of 180° system layout

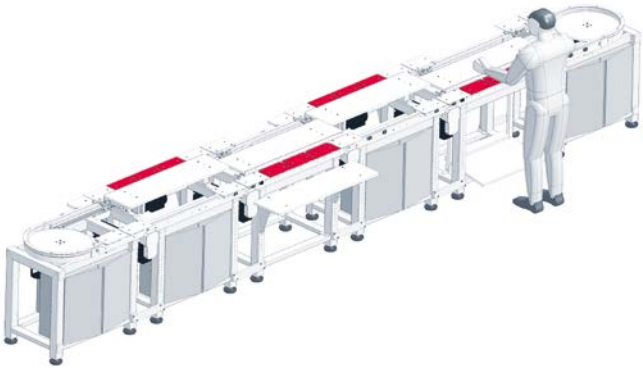


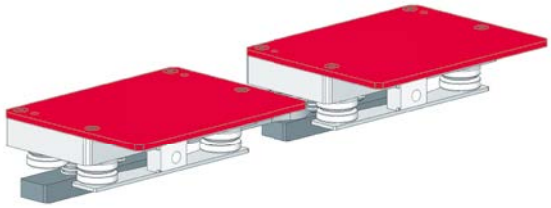
Example of 90° system layout

Technical data of the corner units

Transport speeds: 15 m/min; 21 m/min; 34 m/min (at 50 Hz)
Type of drive: Three-phase motor

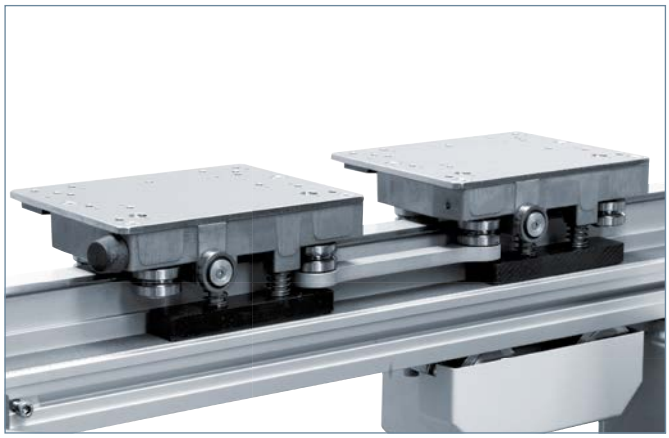
Workpiece carrier



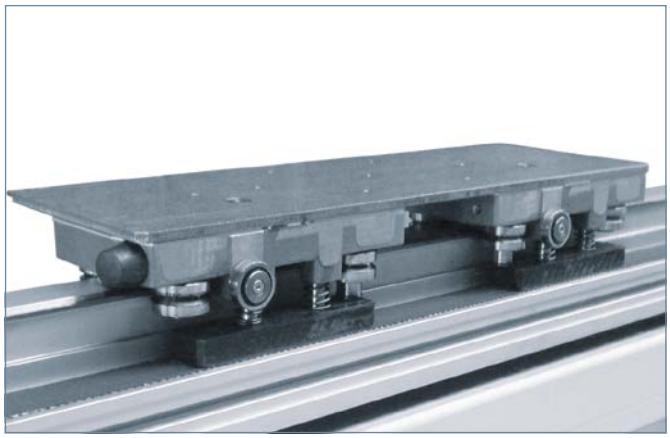


The workpiece carrier train consists of two workpiece carriers linked together by a connection rod. This forms the basis for the fixture of the workpiece. With longer workpieces the two carriers are linked together by a common carrier plate.

The workpieces are guided on a continuous hardened and ground steel guide rail. On belt sections and corner units the transport is provided by friction via a spring loaded plastic shoe which is fitted to the underside of the workpiece carrier. This shoe exerts a constant pressure on the transport belts and corner units. Within the locking station the workpiece carriers are moved and precisely positioned with the transport cam by the engangement of a cam roller.

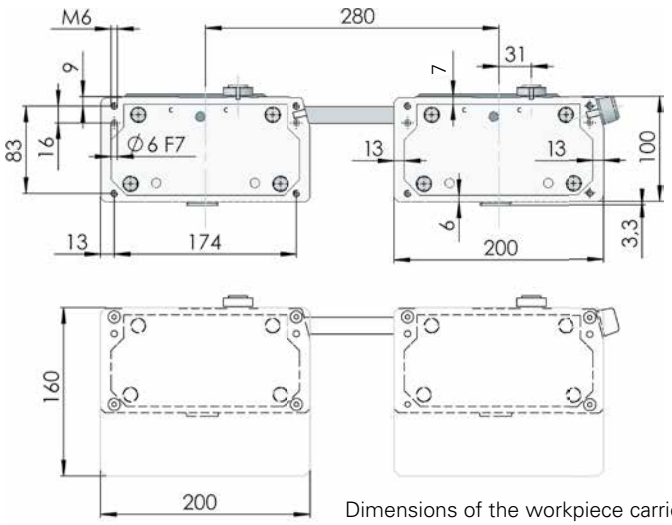


Workpiece carrier train with two single carrier plates



Workpiece carrier train with one common carrier plate

Dimensions



Dimensions of the workpiece carrier train

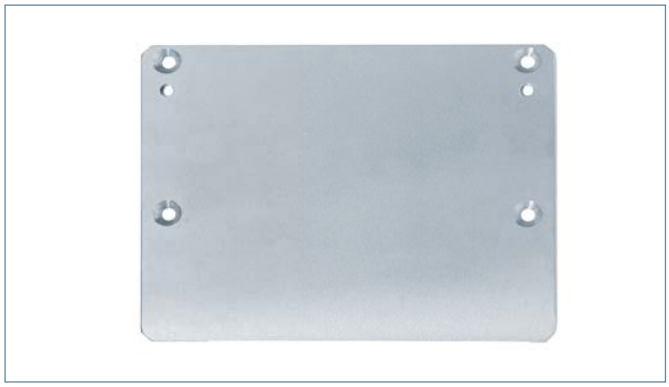
Note

The design of the workpiece carrier pin holes enables the manual fitting of the carrier plate or the fixture. The mounting pins have a press fit in the carrier plate and a sliding fit in the workpiece carrier.

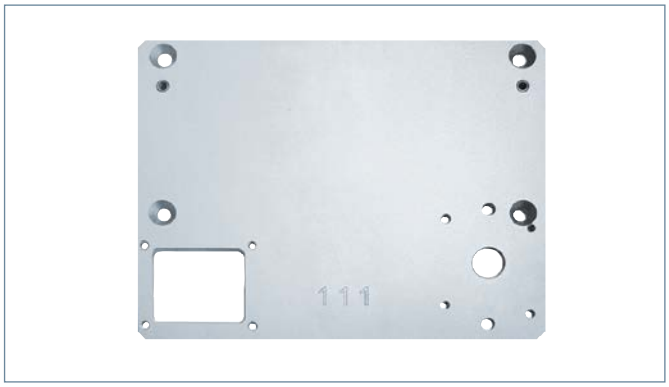
Carrier plate

The carrier plates are designed to carry the product fixture of the customer. They project outwards over the carrier basic body and form the outermost contour of the system.

This design allows the accessibility to the product from underneath as well as the possibility to support by vertical process forces. Components can also be suspended outside or through the carrier plates.



Carrier plate with standard hole pattern



Carrier plate with customer-specific hole pattern

Technical data of the carrier plates

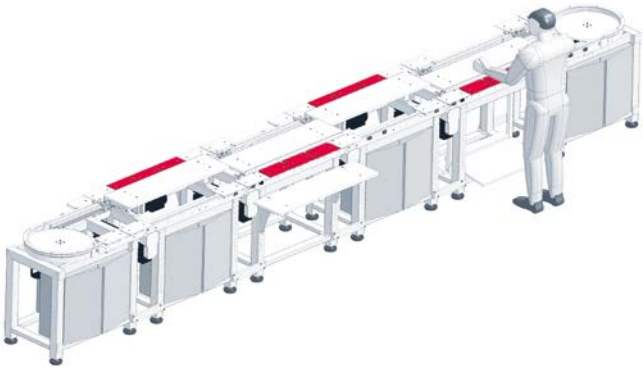
Material:	Steel, chemically nickel-plated
Standard-dimensions (L x W x H):	200 x 160 x 5 mm (for pitch 140, 280, 560) 270 x 160 x 5 mm (for pitch 70, 140, 280, 560) 480 x 160 x 6 mm (for pitch 560 / common carrier plate) (other dimensions and designs on request)
Payload:	The maximum payload depends on the location of the customer fixture on the carrier plate and the cycle time of the system. The maximum payload is 4 kg.

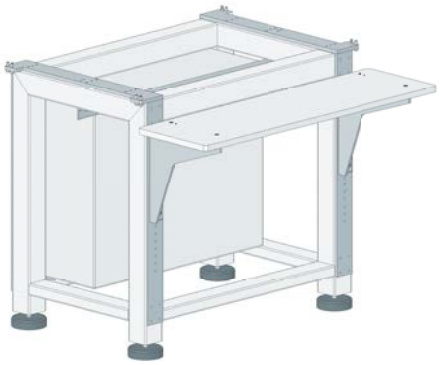
Support in the case of vertical process forces

If vertical process forces occur in an application, for example when joining components, the carrier plates must be relieved by a stationary support from below. The carrier plates, which have an additional hardened rail underneath are driven to the stationary cam rollers in the required positions. This type of support can take vertical process forces of up to approx. 3000 N. Depending on the point of force transmission, the supports in the outer area can be individually designed.

Stationary support

Base frame with accessories

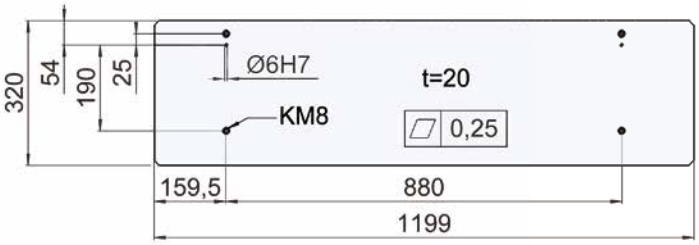




The stable steel base frames from the basis for the locking stations of the linear Assembly System LS 280. Handling modules can be installed directly on the locking stations and require no further supporting structure.

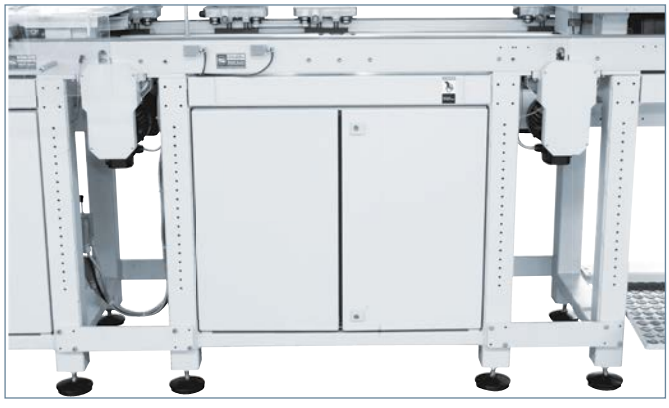
The working height of the assembly cell is 1020 mm. The frame height can also be adapted in accordance with customer specifications. If the locking station is integrated into an existing customer machine frame, the frame feet can be dispensed with and the station is supplied on a flat base frame.

The base frame legs are machined flat on the front and rear sides complete with a standard fixing hole pattern. This allows for the fixing of optionally available aluminium side assembly plates. The fixing holes are precisely machined in steps of 50 mm to provide height adjustment.



"Side" assembly plate with standard hole pattern

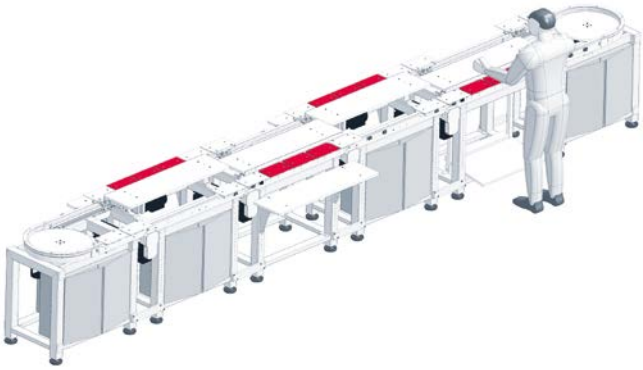
For the cells is a high quality switch cabinet available, which is precisely integrated at the front or rear side of the base frames. The cabinet has the dimensions of 788 x 630 x 300 mm (W x H x D).

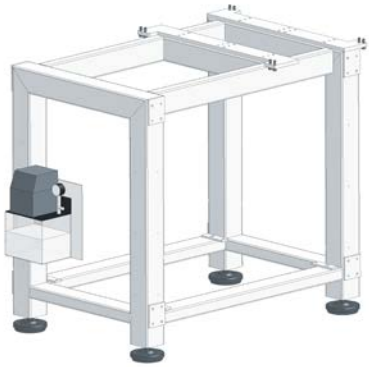


When using a side assembly plate it must be noted that the switch cabinet can only be opened if the plate is mounted in the uppermost position (dimension X = 200 mm between upper edge of the mounting plate and upper edge of the carrier plate).

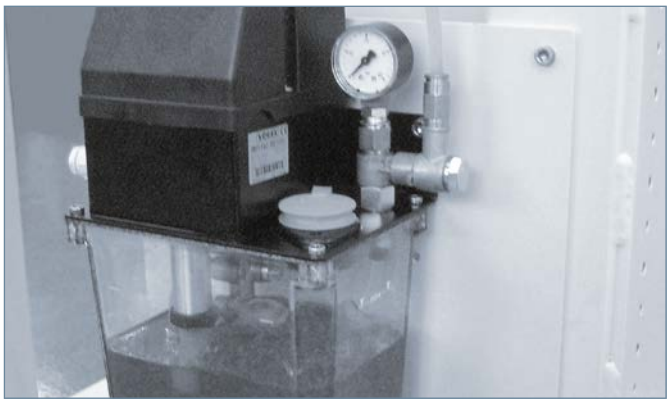
Integrated switch cabinet on base frame

Central lubrication system





In order to ensure reliable, wear-free operation of the system, the guide rail tracks and transport cams are automatically lubricated by the integrated central lubrication unit. The lubrication quantity and intervals are prior to delivery preset.



Central lubrication unit

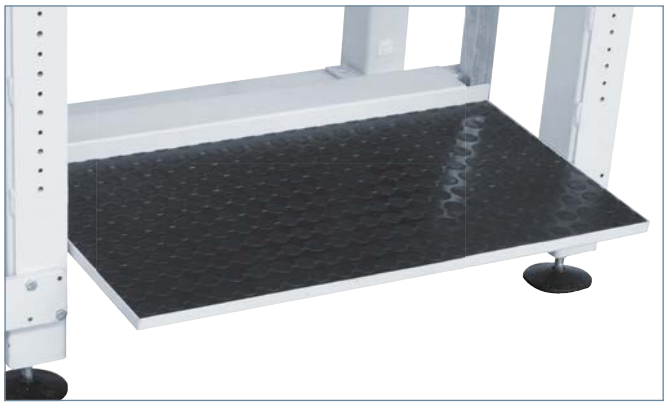
Lubrication point in guide rail

Manual operations

With processes, that are difficult to automate, with fluctuating or uncertain production quantities, the user has the possibility to execute manual operations at a cell module.

With increasing production quantities, the manual operations can be replaced by automated process stations, without mechanical modifications at the cell module.

Optionally, a height-adjustable footboard can be integrated into the base frame of this cell module.



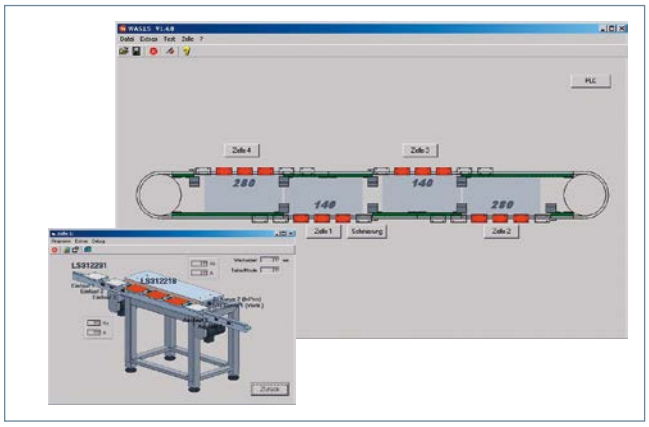
Footboard integrated in the base frame (optionally available)

Control of the LS 280 – WAS

The Windows program WAS – WEISS Application Software serve for the control of the Linear Assembly System and present at the same time the interface to the superior main control system of the customer. In addition to the basic functionality for the start-up the software provide many further functions.

Software WAS.LS

- Visualisation
- Language selection
- Status bar for the single cells
- Display of alarm messages
- Easy access to parameter of the cells
- Inputs and outputs can be forced
- Monitoring functions
- Alarm history
- Diagnostic functions
- Ethernet connection to the control
- Load and display a parameter set “offline“



Operator software WAS.LS

Hardware

Control concepts

- B&R
- Rockwell

Communication

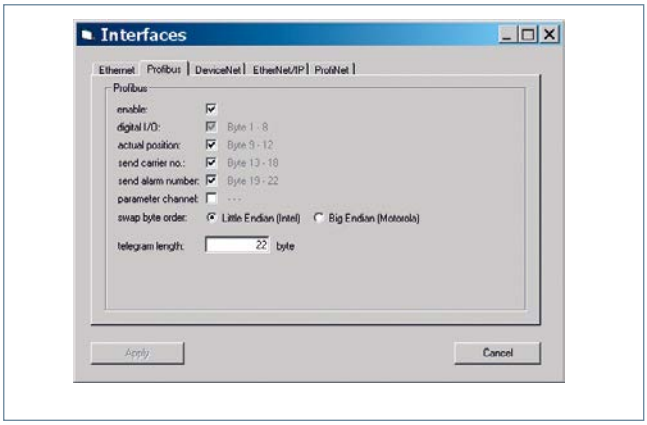
At the master PLC of the base machine LS 280 are selectively the following interfaces available to the superior main control system of the customer:

B&R control concept

- Profibus-DP
- ProfiNet
- EtherNet/IP
- DeviceNet-CAN

Rockwell control concept

- EtherNet/IP



Interfaces

Design and Connection

- One master PLC per base machine LS 280
- Decentralised control packages per assembly cell
- Communication of the cells via system bus
- Standardised design with plugable system
- Fieldbus interfaces for customer interface

Service

- Comprehensive monitoring functions
- Remote maintenance
- Worldwide service

Safety

B&R control concept

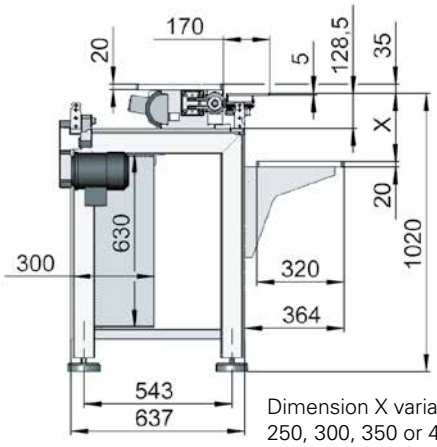
- Frequency inverter with integrated restart protection Save Torque Off (SIL 2, PL “d”)
- Depending on brand, configuration and wiring of the frequency inverter, a Save Torque Off (SIL 3, PL “e”) can be reached.

Rockwell control concept

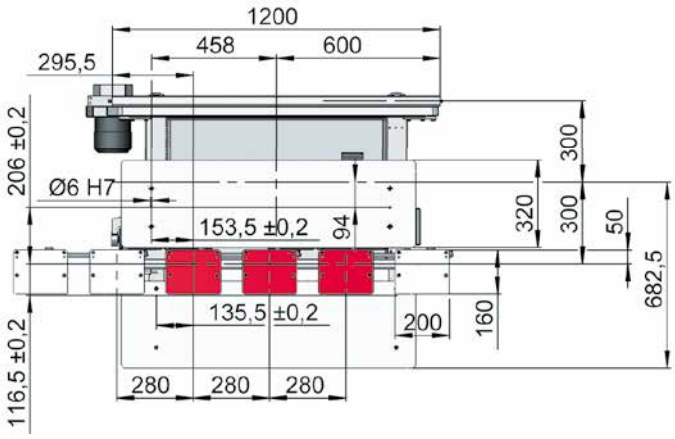
- Frequency inverter with integrated restart protection Save Torque Off (SIL 2, PL “d”)

Dimensions of the LS 280 assembly cell

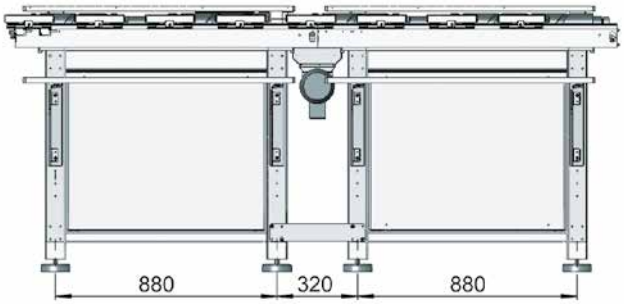
Cell with single locking station

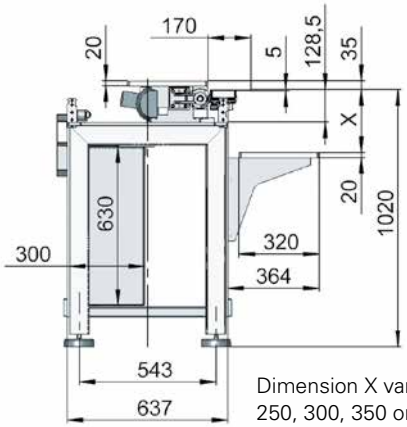


Dimension X variable: 200, 250, 300, 350 or 400 mm

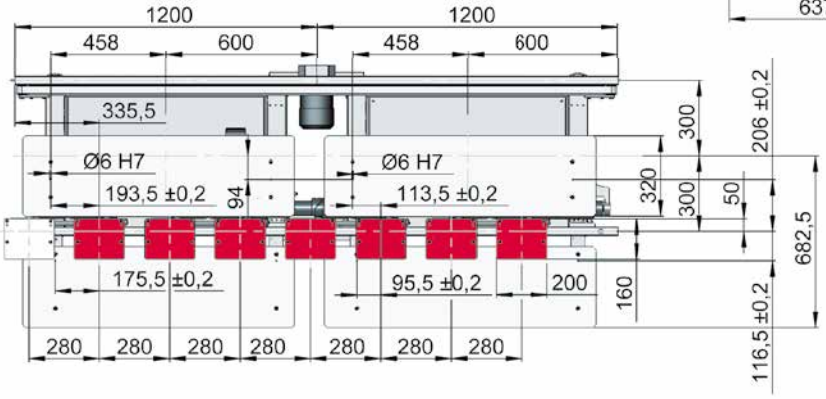


Cell with double locking station



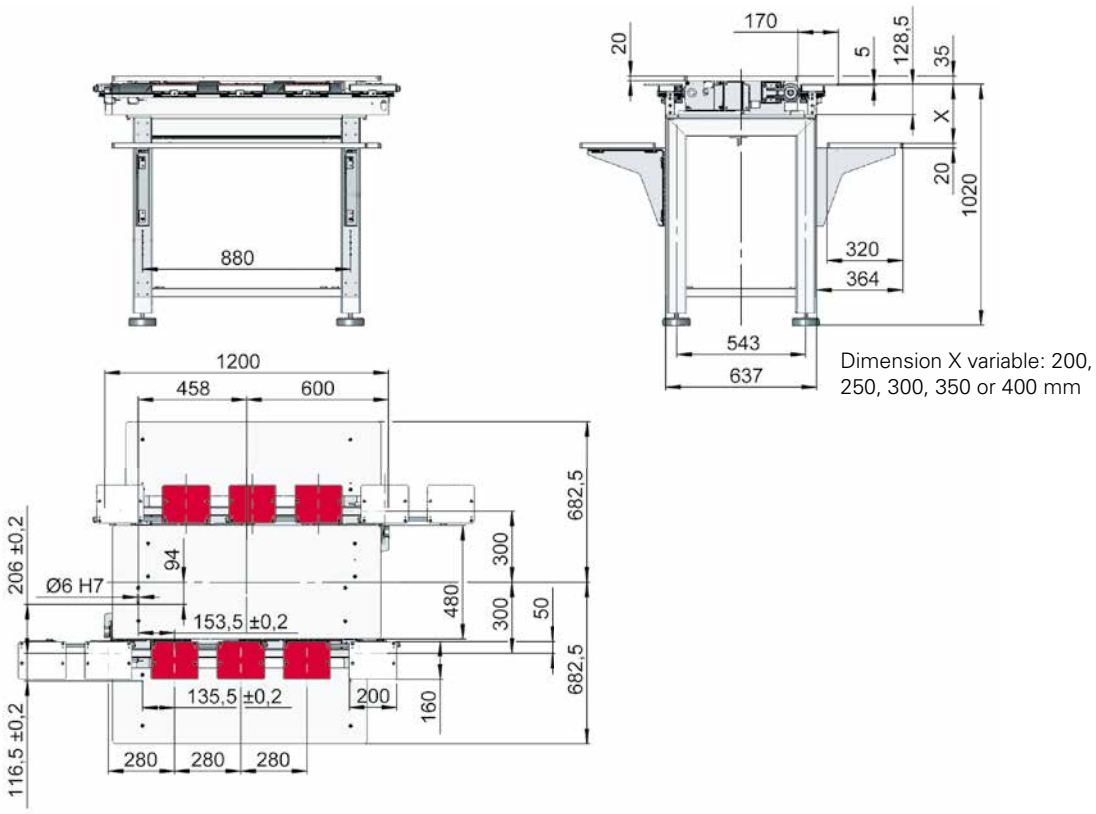


Dimension X variable: 200, 250, 300, 350 or 400 mm



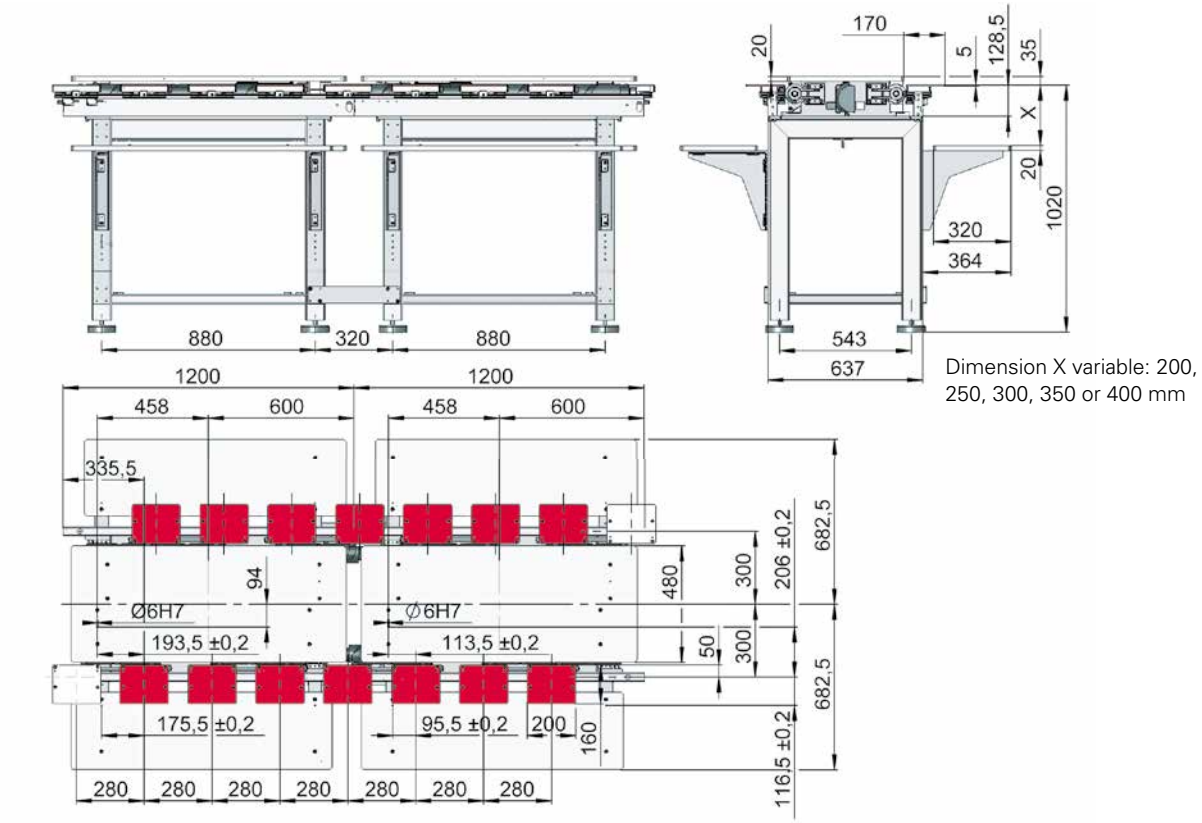
Dimensions of the LS 280 twin assembly cell

Cell with two single locking stations in twin arrangement



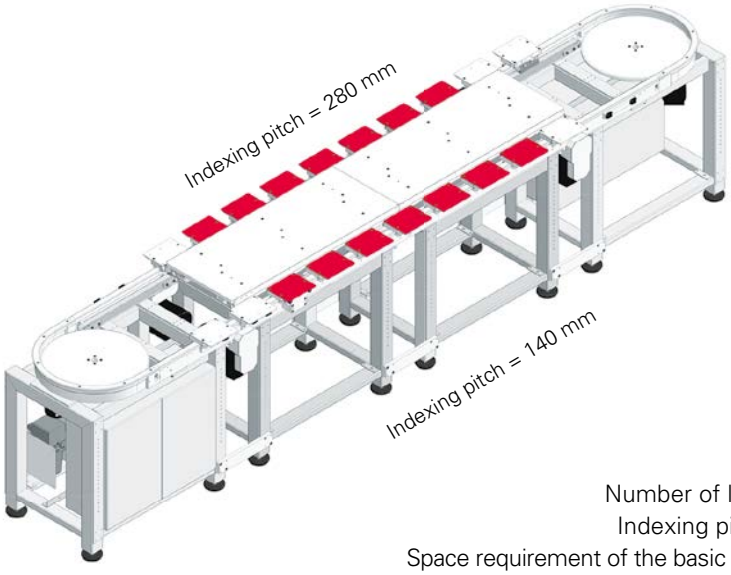
Dimension X variable: 200, 250, 300, 350 or 400 mm

Cell with two double locking stations in twin arrangement

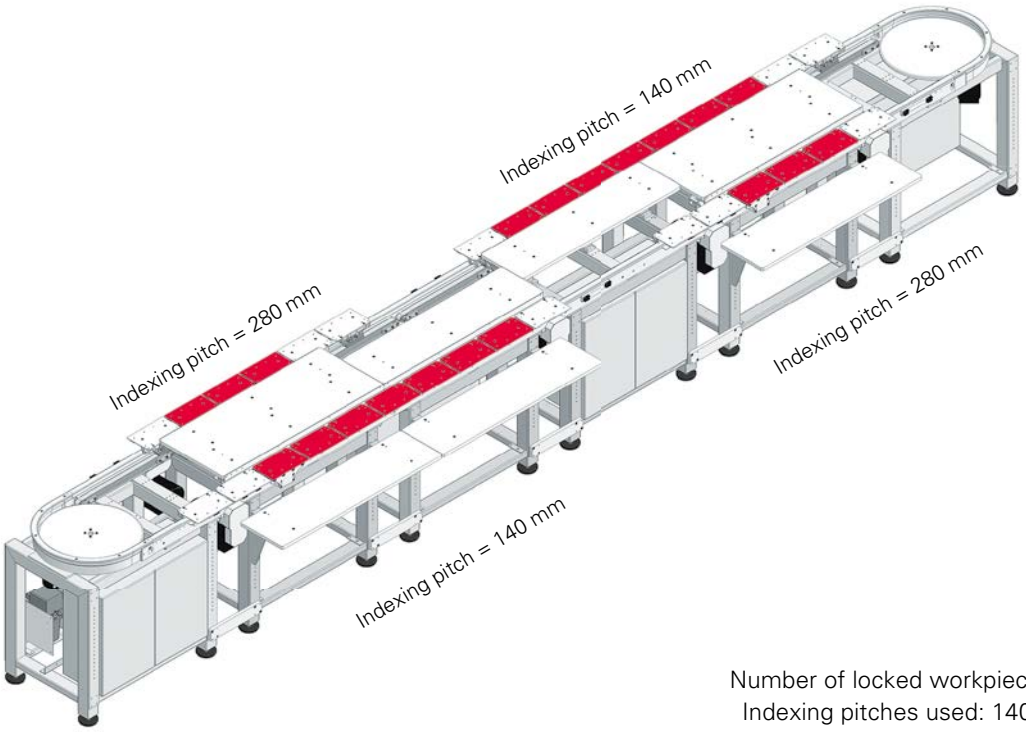


Dimension X variable: 200, 250, 300, 350 or 400 mm

Layout examples for 180° system



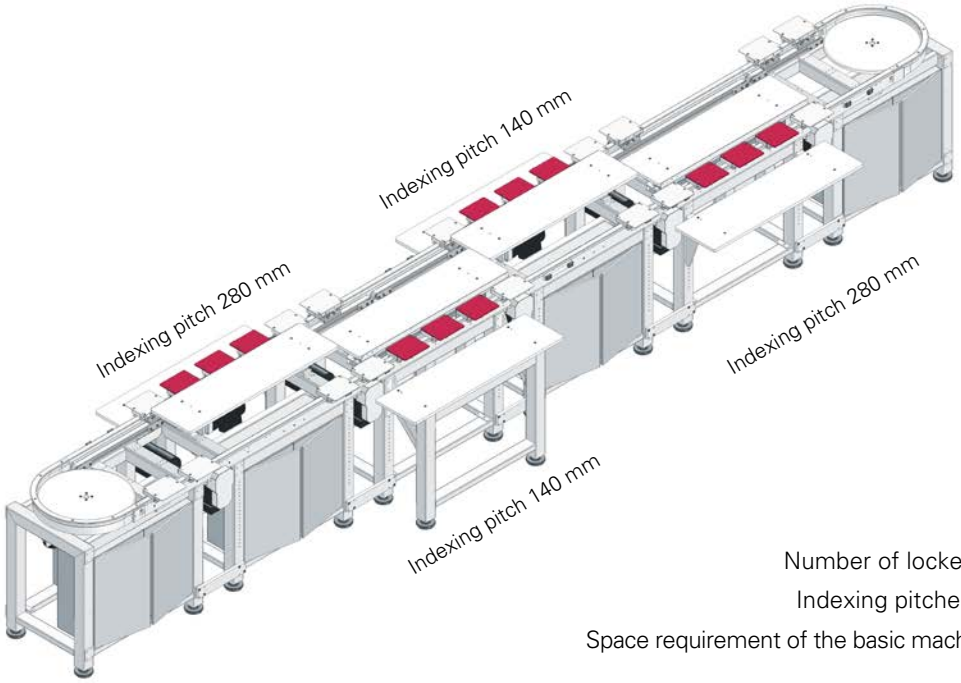
Number of locked workpiece positions: 21
Indexing pitches used: 140 mm, 280 mm
Space requirement of the basic machine (L x W): 4.8 m x 0.9 m



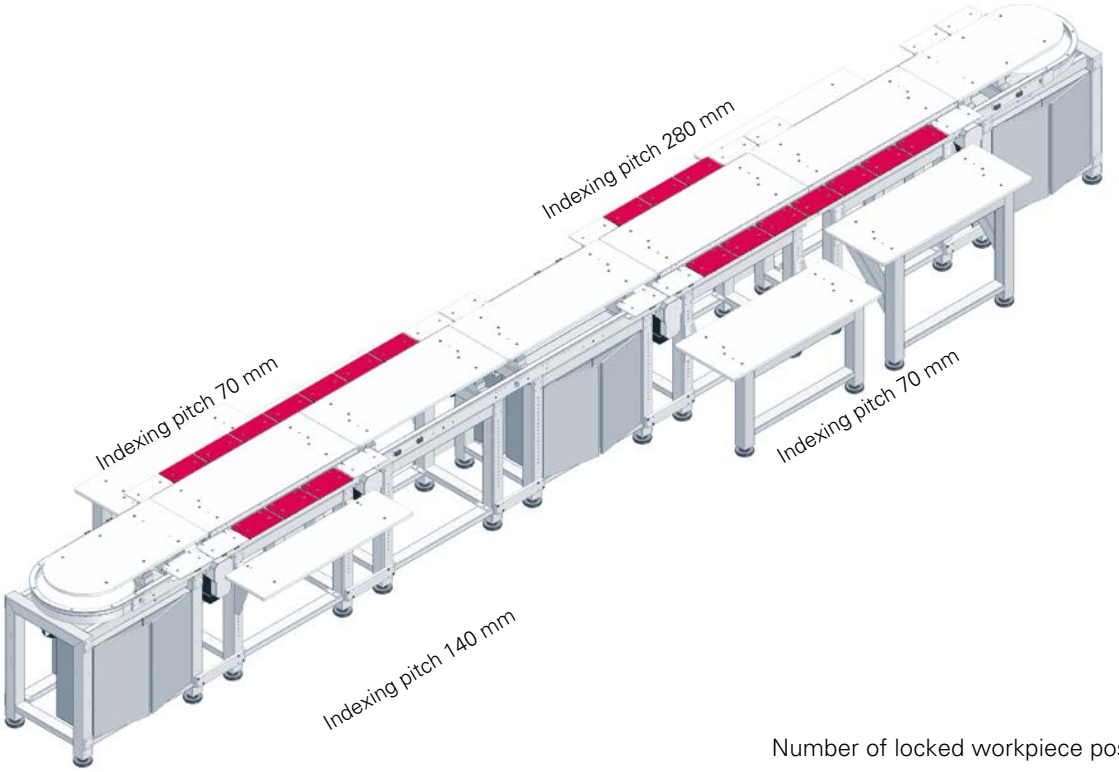
Number of locked workpiece positions: 34
Indexing pitches used: 140 mm, 280 mm
Space requirement of the basic machine (L x W): 7.2 m x 1.1 m

A selection of layout examples of the LS 280 linear assembly system is available as a CAD file at www.weiss-international.com.

Layout examples 180° system



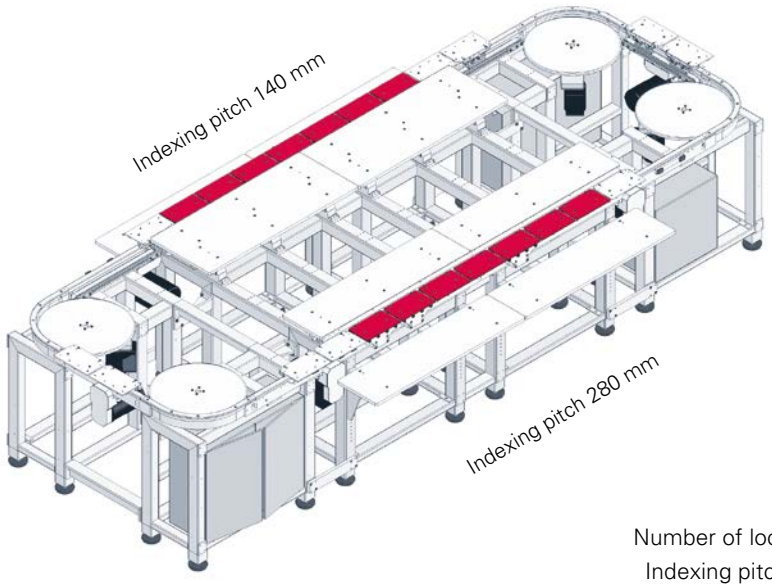
Number of locked workpiece positions: 16
Indexing pitches used: 140 mm, 280 mm
Space requirement of the basic machine (L x W): 7.2 m x 1.4 m



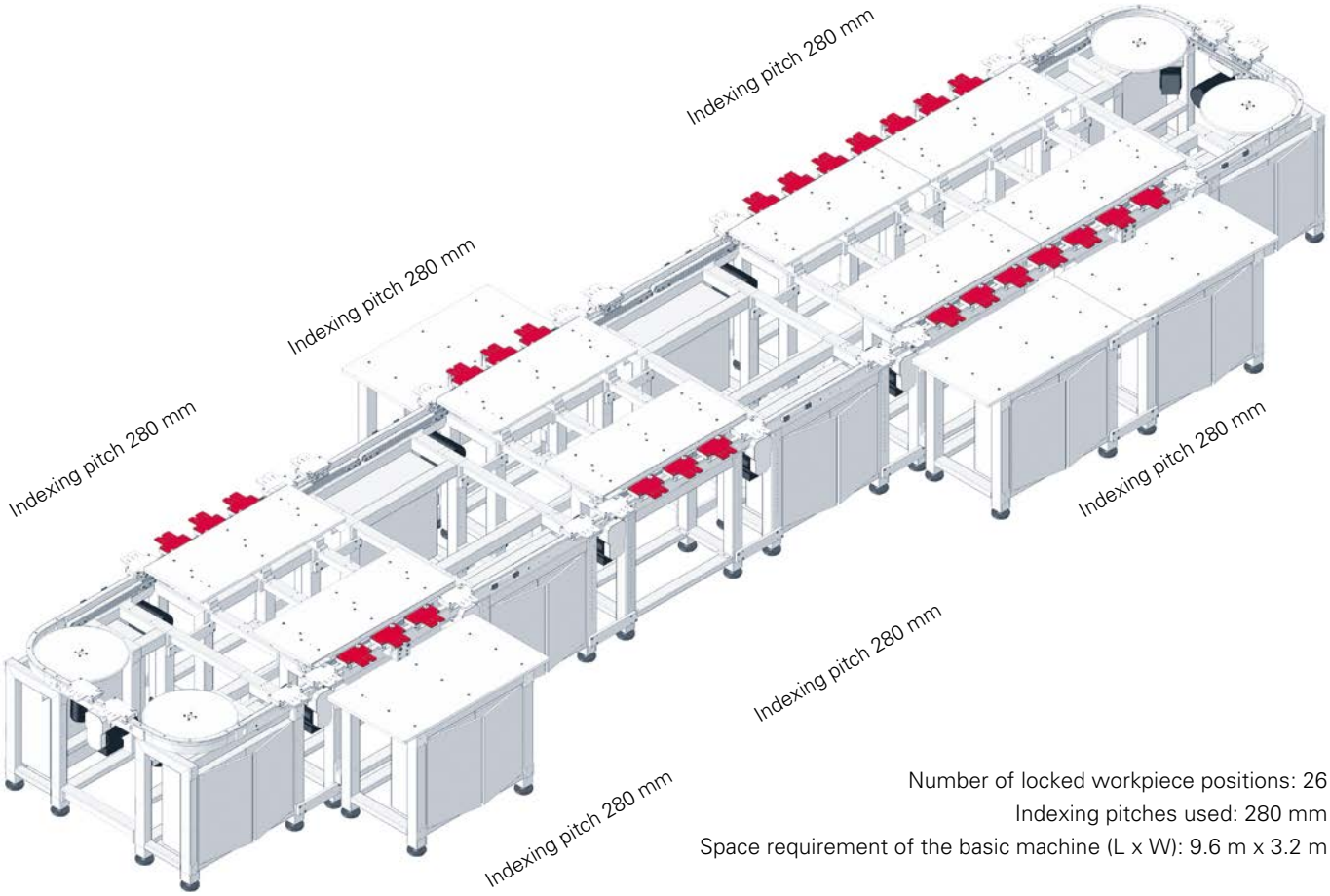
Number of locked workpiece positions: 64
Indexing pitches used: 70 mm, 140 mm, 280 mm
Space requirement of the basic machine (L x W): 8.4 m x 1.4 m

A selection of layout examples of the LS 280 linear assembly system is available as a CAD file at www.weiss-international.com.

Layout examples 90° system



Number of locked workpiece positions: 21
Indexing pitches used: 140 mm, 280 mm
Space requirement of the basic machine (L x W): 4.8 m x 2.3 m

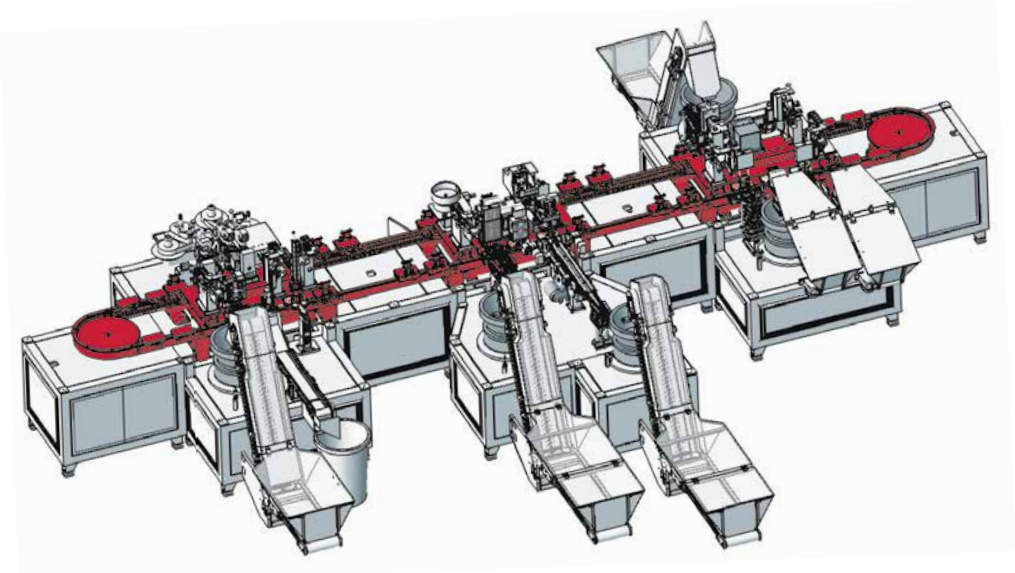


Number of locked workpiece positions: 26
Indexing pitches used: 280 mm
Space requirement of the basic machine (L x W): 9.6 m x 3.2 m

A selection of layout examples of the LS 280 linear assembly system is available as a CAD file at www.weiss-international.com.

The LS 280 in practice

Our Linear Assembly System LS 280 has passed the practice test – with distinction!



More than half of our customers who opted for an LS 280 in recent years, today own two or more systems.
The system is used as a base machine for assembly systems in the following industry sectors:
Automotive, electronics, telecommunication, medical, cosmetics, consumer goods, printing, plumbing and household fittings.

Would you like to see the LS 280 in action?

Then order the LS 280 DVD by fax:

+49(0)6281 - 5208 - 99

or just online:
www.weiss-international.com

☐ Yes! Please send me the LS 280 DVD.

_____
Company

_____
Name, first name

_____
Telephone number

_____
E-Mail

_____
Address (Street, Zip + City)

_____

Fax to: +49(0)6281 5208-99
or just fill in the form online:
www.weiss-international.com

System design LS 280

☐ **Enquiry** ☐ **Enclosure with order**

Dear Customer,

Thank you for your interest in our Linear Assembly System. To design the system to the exact requirements of your application, we kindly ask you to answer the following questions:
Please note! Our LS 280 system runs only **counter-clockwise.**

Information about customer application

Branch: ☐ Automotive ☐ Electrical Industry ☐ Medical Technology ☐ Cosmetics ☐ Consumer Goods
☐ Plumbing Trade ☐ Fitting Industry ☐ Pad or Screen Printing ☐ _____

Product description: _____

Length of the product (in transport direction) [mm]: _____ Width [mm]:_____ Height [mm]: _____

Single weight of the product [kg]: _____ Total payload (incl. customer fixture) per carrier [kg]: _____

Length of the customer fixture on top of the carrier (maximum interference in transport direction) [mm]: _____

Length of the carrier plate (in transport direction) [mm]: ☐ 200 ☐ 270 ☐ 480

Description of customer processes: _____

_____

_____

Total cycles of the system: _____

Max. processing time per indexing pitch at the assembly cells of the LS 280

Indexing pitch [mm]:	70	140	280	560
Max. processing time [s]:	_____	_____	_____	_____

Are cells needed for manual operations? ☐ No ☐ Yes No.: _____ Processing time [s]:_____

Layout design ☐ 180° system ☐ 90° system *(please attach a sketch with arrangement of cells)*

Cell with locking station

☐ Single locking station (module length 1200 mm)
Indexing pitch [mm]: ☐ 70 ☐ 140 ☐ 280 ☐ 560
Cell modules no.: ____ ____ ____ ____

☐ Double locking station (module length 2400 mm)
Indexing pitch [mm]: ☐ 70 ☐ 140 ☐ 280 ☐ 560
Cell modules no.: ____ ____ ____ ____

Stationary support ☐ Yes ☐ No Vertical force transmission [N]: _____ No.: _____

Top support plate

Material: ☐ Aluminium, anodized No.: _____ ☐ Steel, nickel-plated No.: _____

Colour ☐ Standard (RAL 7035, light grey) ☐ Special colour RAL: _____

Options

☐ Side assembly plate No.: _____
☐ Base frame on the side No.: _____
☐ Footboard No.: _____
☐ _____
☐ _____
☐ _____

Control concept

☐ B&R – Interface ☐ Profibus-DP ☐ _____
☐ Rockwell – Interface EtherNet-IP

Power supply of the machine at the customer location

☐ 3x400 V, 50 Hz ☐ 3x208 V, 60 Hz
☐ 3x480 V, 60 Hz ☐ 3x220 V, 60 Hz ☐ _____

For technical enquiries

Name: _____ Desired delivery date: _____
Company: _____ Phone: _____ Fax: _____
Postal code, city_____ eMail: _____
Country: _____

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