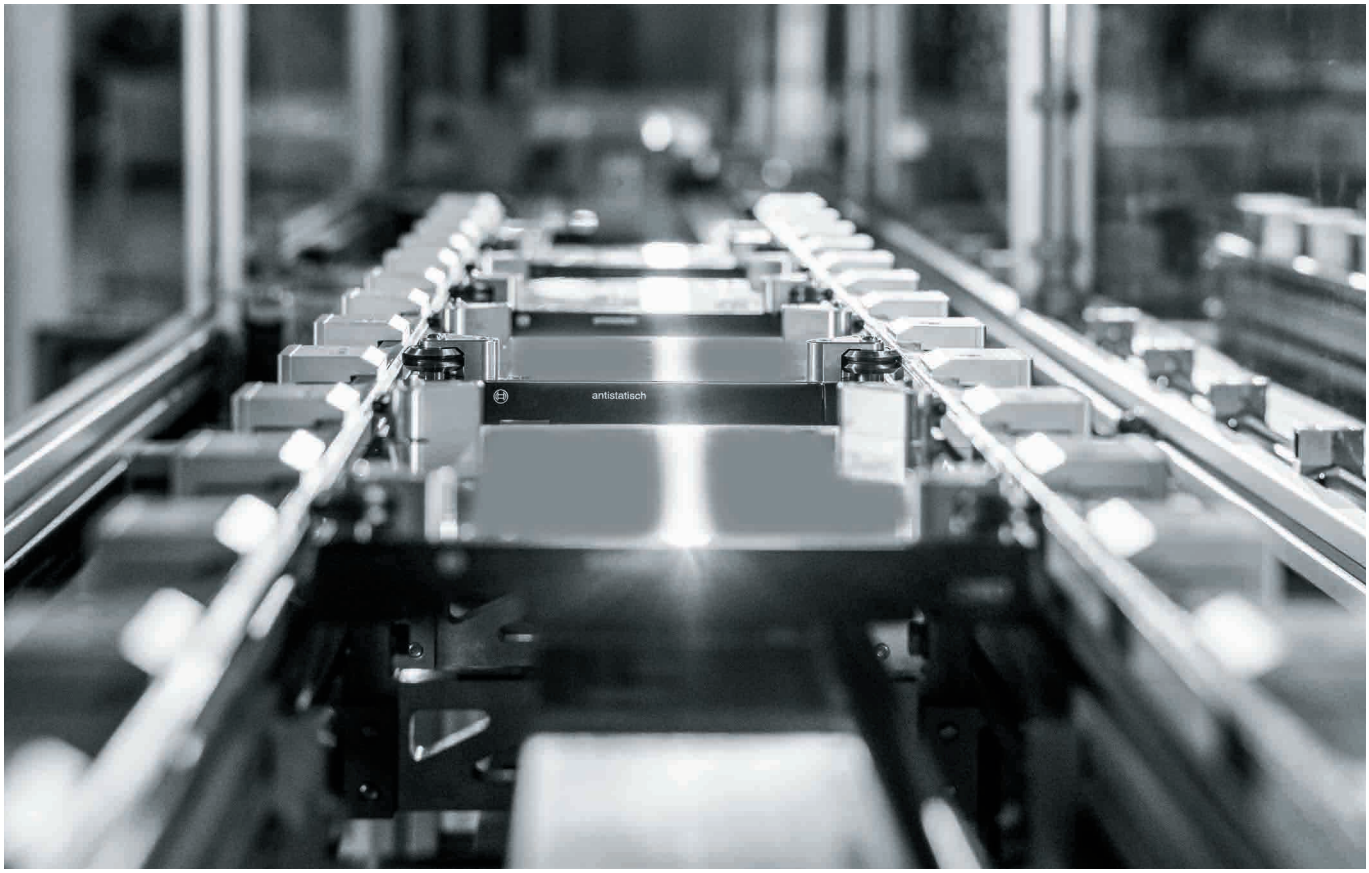
Multi-Carrier-System MCS®

FESTO

Maximum flexibility in the machine



→ WE ARE THE ENGINEERS OF PRODUCTIVITY.

How do you keep pace with markets that are developing at an ever faster pace? How do you meet increasingly individual customer needs? And how do you adapt to product life-cycles that are becoming ever shorter? To master these challenges, you need solutions that provide maximum flexibility and efficiency in production processes.

With the innovative Multi-Carrier-System MCS®, a joint development by Festo and Siemens, you are on the right track. Thanks to the modular design of the transport system, it can be combined with conventional transport solutions, adding the functionality of the MCS® where needed in the process.

The carriers can be freely transferred in and out of the transport system. They offer smooth acceleration and extremely precise positioning. The high dynamic response minimises changeover times during the process, while virtually seamless format changeovers and shorter retooling times significantly increase productivity and thus market success. The powerful motion control systems from Siemens integrate controller and motion control tasks for the entire system.

The system is quick and easy to configure. Adaptations can be made flexibly in the digital model, while reconfigurations and format changeovers are carried out at the push of a button.

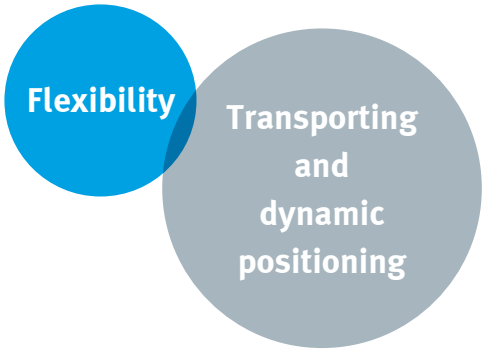
Highlights

Flexible
- Custom control of each individual carrier
- Control of position, speed, acceleration and force

Dynamic
- Acceleration of up to 50 m/s²
- Speeds of up to 4 m/s
- Very short transport times due to maximum dynamic response

Modular
- Modular configuration of the MCS® section
- Selection of guide and carriers based on application requirements
- Payloads from 50 g to 50 kg

Economical
- MCS® only at the stations relevant to the process
- Hybrid solution: combination with conventional transport systems



Experience the Multi-Carrier-System MCS® at
→ **www.festo.com/mcs**

MCS® – the technology at a glance

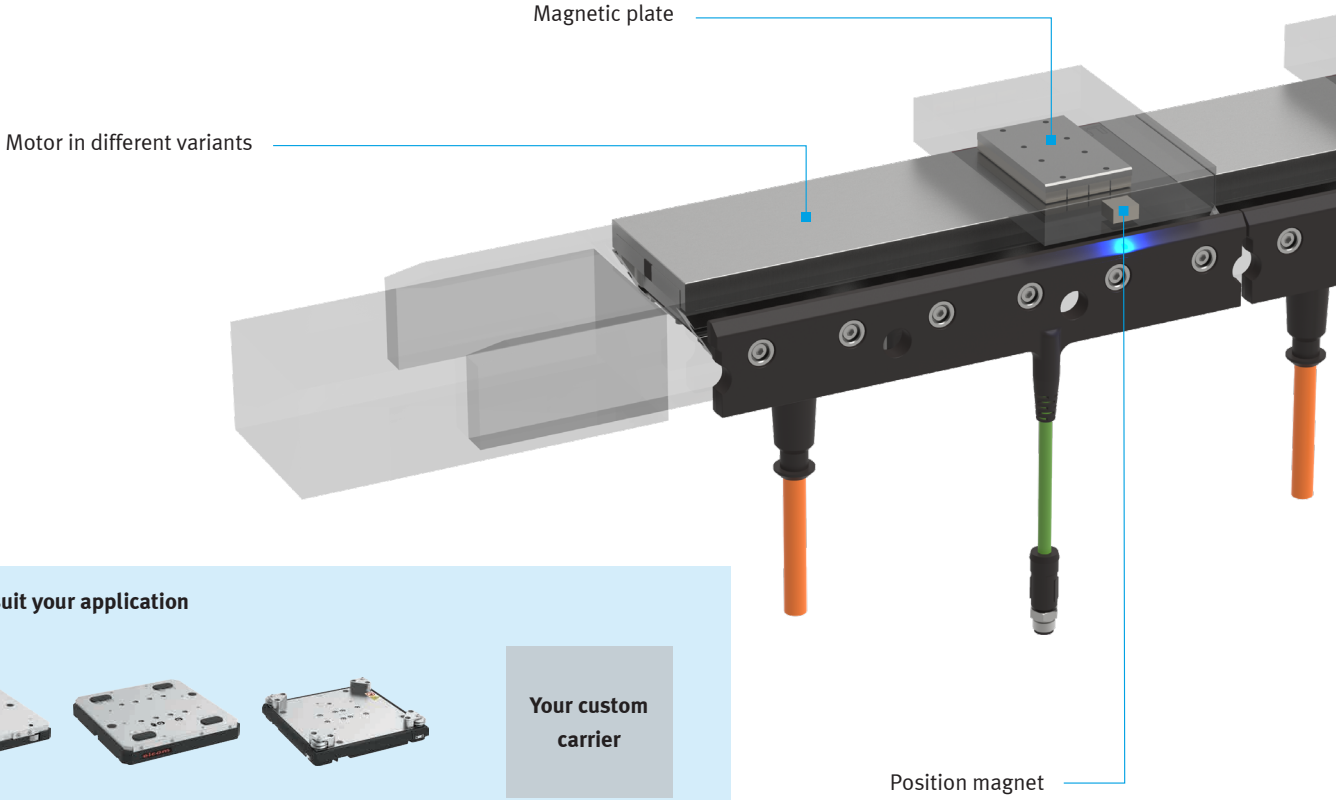
Freely configurable for your requirements

The Multi-Carrier-System MCS® is an innovative and flexible transport system based on linear motors. Its modular design means it can be freely configured to suit your specific requirements. What makes the MCS® unique is how perfectly it can be combined with transfer systems and conveyors from well-known manufacturers. The modules, standardised carriers and matching guide systems have been precisely developed with this in mind. However, you can also design your own custom carriers and guides using the versatile magnetic plate and combine transport solutions of your choice. The Siemens control technology also fits seamlessly into your system concept. You can choose from different drive system and controller options.

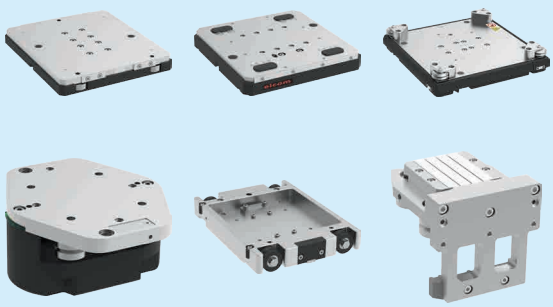
Your application-specific solution

- Standardised carriers for flexible and dynamic movements
- Modular configuration of the MCS® sections to suit your application
- Combination of the MCS® with transfer systems and conveyors from well-known manufacturers
- Perfectly integrated into the Siemens control environment

We have the solution for your product transport needs – contact us for inspiration and advice!



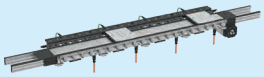
Carriers to suit your application



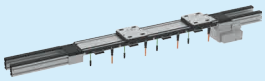
Your custom carrier

Customisable carrier with magnetic plate

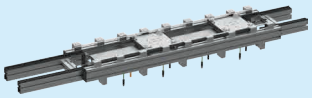
Combination with different transport solutions



TLM 1500 from elcom
(→ page 14)



TLM 2000 from elcom
(→ page 18)

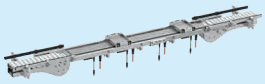


TS 2*plus* from Bosch Rexroth
(→ page 22)

Your custom solution

Freely configurable system

X85P from FlexLink
(→ page 26)



XH from FlexLink
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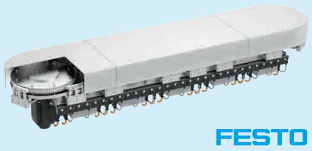

Closed recirculating conveyor system
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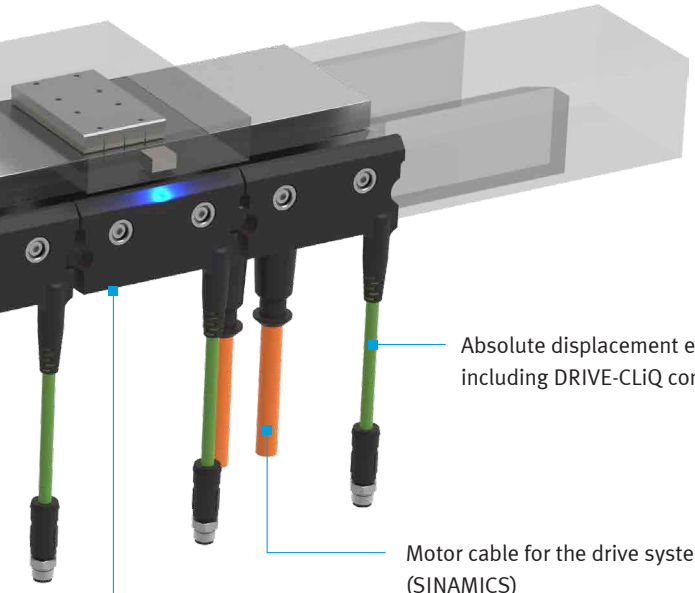


Absolute displacement encoder including DRIVE-CLiQ connection

Motor cable for the drive system (SINAMICS)

Cooling system in different variants (not shown)

You will find detailed information about the MCS® basic components from → page 38 onwards

MCS(r) drive system and controller

- SINAMICS: modular drive system for single-axis and multi-axis applications
- SIMATIC: scalable and modular motion control system for highly dynamic applications

Engineering software from Siemens

- Virtual Commissioning Toolbox for MCS®
- MCS® Creator for TIA Portal
- TIA Portal for SIMATIC

You will find detailed information about the control technology from → **page** 40 onwards

SIEMENS

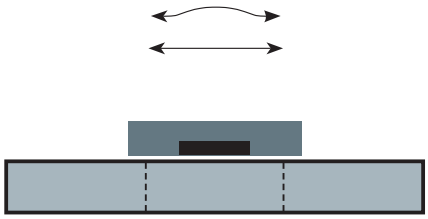
Carrier movement and section configuration

Flexible and dynamic movement – individually or as a group

The movement of the carriers on the MCS® motor section enables a wide range of functions in the production process. Depending on the task, the carriers can move individually or freely as a group on the section and synchronously with the process. All kinds of movements can be integrated on a section. You can combine the Multi-Carrier-System MCS® with conventional intralogistics solutions. This allows you to create new approaches for highly flexible and economical solutions for your transport and positioning needs.

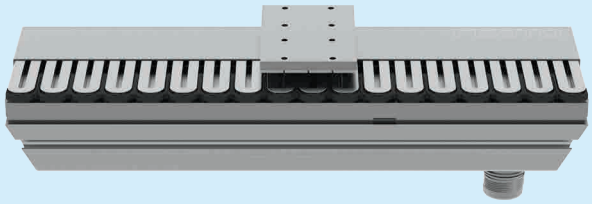
Highlights

- Freely definable carrier motion profiles: forwards and backwards
- Synchronous movement of multiple carriers
- Synchronisation with processes, e.g. with robots
- Jerk-free movement
- Minimal positioning steps



Drive principle of the MCS®: linear motor technology

When energised, the electric windings of the motor (stator) generate a moving magnetic field that drives the carrier (rotor of the motor) with its magnetic plate. There is a direct relationship between current intensity, magnetic field and the feed force generated here.



Completely flexible and individual movement

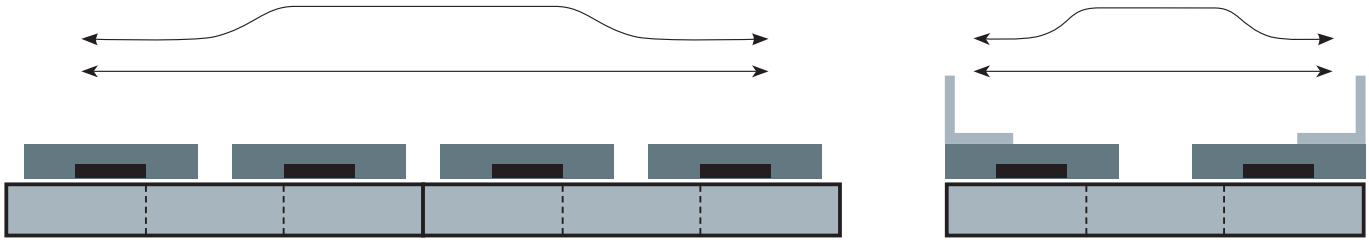
The movement of each individual carrier on the MCS® motor section is completely flexible. Definable motion profiles permit customised forwards and backwards movements, acceleration or braking. The carriers can be precisely positioned and moved synchronously with individual process steps or the overall process. The carriers make all the functions of an electric axis available to you.

Independent movements, collision monitoring

The carriers are moved and positioned completely independently of each other for maximum process flexibility. At the same time, integrated collision monitoring simplifies the programming of the custom application.

Fewer interfaces by synchronising the carriers with other drives in the system

The SIMATIC motion control system from Siemens controls not only the movements of the individual carriers, but also other servo drives in the system; e.g.: belt drives or even handling systems. This greatly reduces the number of interfaces you need.

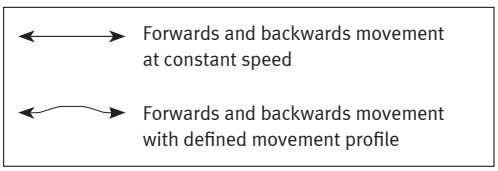


Groups of carriers can also be freely moved

With the MCS®, the individual carriers can be combined into a group of any size. A group of carriers can be freely moved in the same way as individual carriers, i.e. accelerated, decelerated, stopped, reversed, precisely positioned.

The group can be dynamically changed on the conveyor at any time in line with the process requirements: individual carriers can be coupled or uncoupled, small groups can be merged into one large group or large groups can be separated into smaller groups.

By linking two carriers with a specific gap between them and using force control, group movement also enables flexible format change-overs, for example.



Carrier movement and section configuration

Section configuration of the MCS®

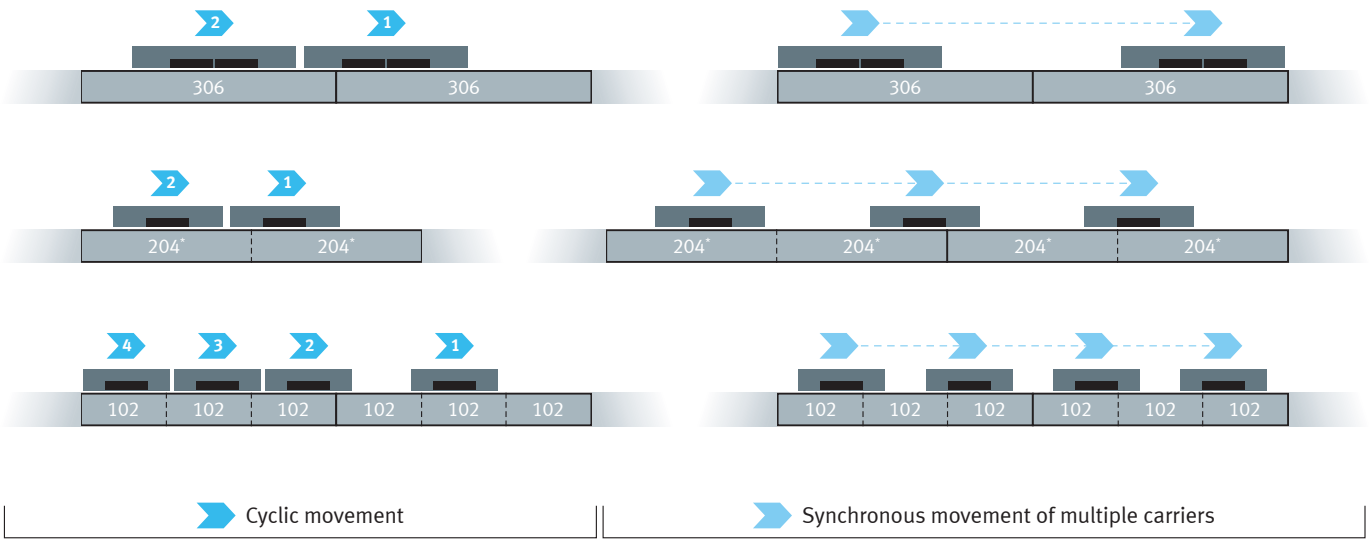
The Multi-Carrier-System MCS® is extremely versatile and can be used for many applications. You can flexibly and dynamically move all types of components, whether small and lightweight or large and heavy ones. The freely configurable MCS® section has a modular design using individual motors. To ensure it can meet many requirements, the modular motor system EMLX includes two motor widths with different feed force. In addition, each motor comes in several variants that have different motor segment lengths.

You will find more details on pages 38 and 39.

The benefits to you

Thanks to the choice of motor widths and lengths, you get the perfect technical and economical solution for your application.

We will be happy to advise you.



Cyclic movement

Synchronous movement of multiple carriers

The right mix of flexibility and cost efficiency thanks to different motor segments

Each individual carrier can be moved and positioned with complete flexibility (see pages 6 and 7). The only proviso is that just one carrier can be controlled at the same time on each motor segment. The magnetic plates integrated in the carrier are the only relevant factor here. The outer dimensions of the carrier are irrelevant.

Several motor segment lengths are available depending on the different carrier sizes, the different requirements for the distances between the individual carriers and the motion profiles of the individual carriers in cyclic and synchronous movement.

Various motor segment lengths can be combined to form one custom section to suit your application. This gives you the flexibility you need exactly where you need it while also ensuring cost efficiency.

Motor segment length

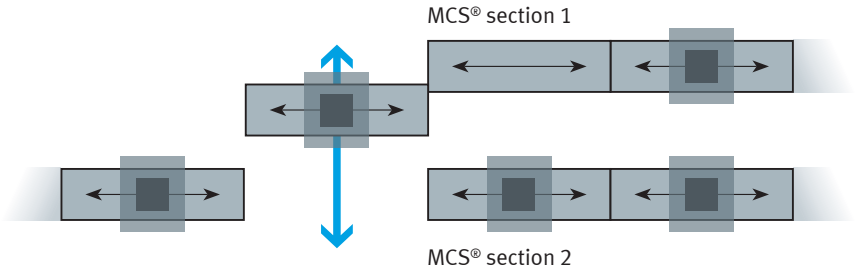
- 306 mm: perfect for long sections, low component density or larger carriers
  → maximum cost efficiency
- 204 mm*: perfect for moderate component density or medium-sized carriers
  → optimum balance between flexibility and cost efficiency
- 102 mm: perfect for high component density or small carriers
  → maximum flexibility

* Available from the end of 2021

Extended options for section layout

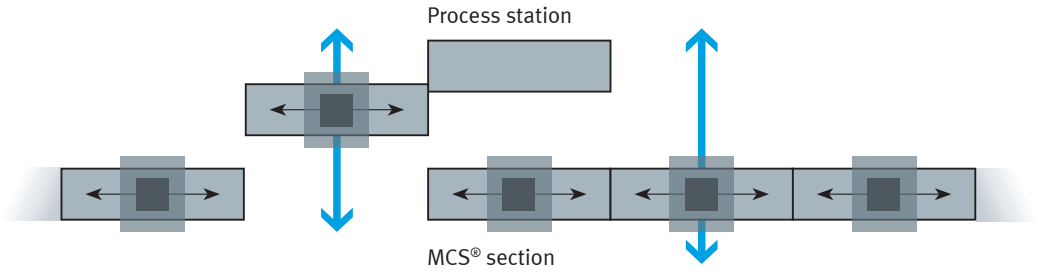
Distribution through lateral movement
The carriers can be distributed over multiple sections through a lateral movement of the MCS® motors.

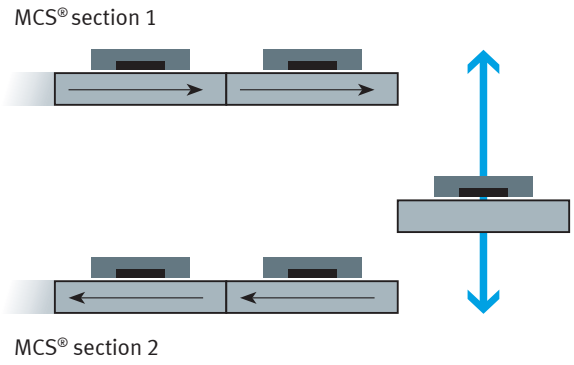
Application: e.g. sorting different products



Outward transfer through lateral movement
The lateral movement of MCS® motors enables individual carriers to be transferred outwards.

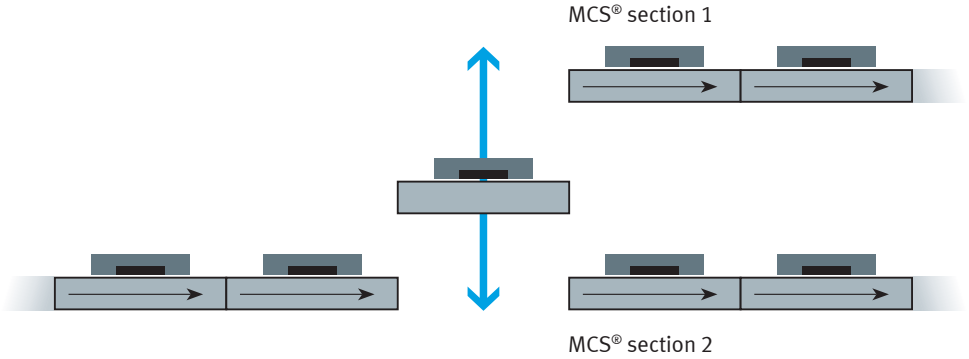
Application: e.g. reworking at a process station





Return with lift
A vertical movement of the MCS® motors at the end of the process section brings the carriers to another transport level.

Application:
e.g. return transport of the carriers below the process level in the machine bed



Distribution with lift
The carriers can be distributed over multiple sections through a vertical movement of the MCS® motors.

Application: e.g. distribution over several levels

Applications in assembly automation and battery production

Optimised system layout and minimal changeover times for maximum productivity

A production system with different assembly stations is particularly challenging for material transport. Different processing times require a combination of single and double cycles, continuous movement, high-precision positioning in screwing and testing stations or 3D movement to a gluing station – all on one line. This is easy to achieve with the Multi-Carrier-System MCS® while installation space and retooling times can be kept to a minimum. MCS® offers you an optimal process sequence with maximum productivity, while simultaneously reducing by reducing downtime and changeover times.

Our standard solutions for applications in assembly automation and battery production

elcom FREE TO DESIGN

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TLM 2000 → page 18

rexroth A Bosch Company

TS 2*plus* → page 22

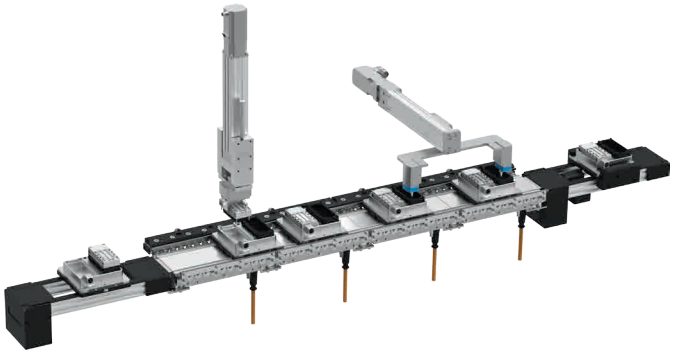
FLEXLINK a coesia company

X85P → page 26

Highlights

- Maximum productivity by reducing changeover times by up to 80%
- Cost-optimised concept thanks to the unrestricted use of conventional transport systems, supplemented by the MCS® functionality
- Optimal system layout through reduced section length
- Elimination of parallel workstations and associated mechanics
- Multi-stop function with optimised cycle time
- Highly flexible MCS® section precisely where needed by the process

Synchronisation of stations with different cycle rates on one line



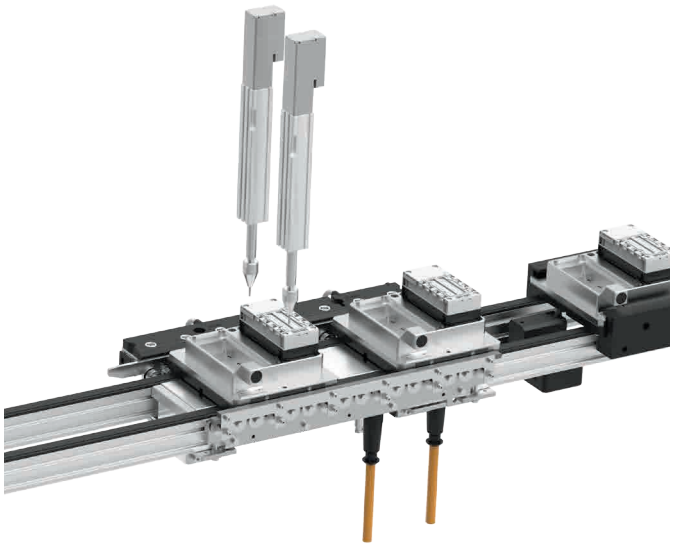
The application
In this system example, a specific amount of sealant is dispensed and applied first. This is followed by partial assembly. Dispensing takes twice as long as assembly. Two dispensing stations are therefore required upstream of the assembly station so line cycle times are consistent and there are no waiting times.

The challenge
Ensuring a continuous flow of material, an optimal supply and full utilisation of the maximum cycle rate of each individual station.

The solution
With the MCS®, production can take place on one line without any mechanical segmentation or separation of the sections. The optimised mechanical design saves space in the system as there are no parallel sections with deflectors. A wait position module is integrated into the end-to-end transport section with a minimum distance. Very short distances and the high dynamic response of the carriers ensure extremely short changeover times and downtimes. The movement of the carriers – individually and as a group – can be freely configured as appropriate for the station. Other advantages are the reduced programming effort and the easy commissioning.

MCS®: perfect for battery production

Easily realised and cycle time-optimised multi-stop function

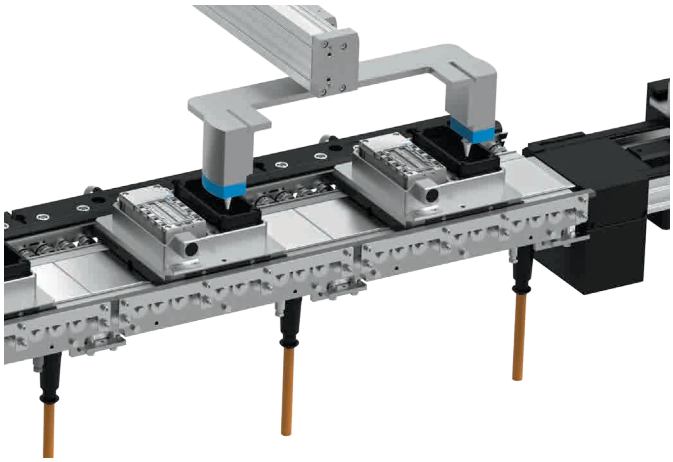


The application
In the screwing station, screws have to be inserted in the workpiece at different positions at short intervals.

The challenge
Approaching several closely spaced screwing positions with minimal mechanical effort and taking up as little space as possible, while doing so at a screwing station for changing workpieces with different screwing-in positions.

The solution
With the MCS®, several stop positions can be reached in a very small installation space and with a very short travel distance, without the need for mechanical indexing of the stop position. Even minute distances between the screwing positions (‹1 mm) can be realised without complicated screwdriver solutions using a third axis or additional screwing stations. The high dynamic response of the carriers and minimised downtimes ensure a faster cycle rate. Products are changed over at the push of a button via software, without any mechanical retooling.

One less process axis for 3D path movements



The application
A sealant is applied to a workpiece by moving the dispense head horizontally over the workpiece along a specified path.

The challenge
Cost-effective and compact installation of three axes in the system, combined with path-accurate movement of the dispense head.

The solution
The precise forwards and backwards movement (reversing) of the carrier allows the MCS® to assume the function of an axis. Having one less axis makes the dispensing/handling system more compact and cost-effective. The required path movement of the dispense head is achieved by synchronising the movement of the handling axes and the carrier. The required path accuracy is guaranteed by the combined control of the MCS® and the dispensing/handling system.

Applications in filling and packaging technology

Maximum flexibility for continuous production processes and maximum productivity

Filling and packaging processes require a combination of continuous movement and cyclic operation on one line. The Multi-Carrier-System MCS® moves both individual carriers as well as carrier groups of any size synchronously with the process, whereby acceleration and speed plus positioning and direction of movement can be freely defined at any point along the section. Positioning at the processing stations, e.g. during packaging, is carried out extremely precisely. All this leads to an optimal production process with maximum productivity and output. At the same time, wear of the production modules and the noise level are minimised.

The benefits to you

Increasing your output and flexability: the freely flexible movement and grouping of the carriers provides you with cyclic and continuous operation on one line.

You simply change over formats and batch sizes greater than 1 at the push of a button. The software-based solution ensures minimal downtimes, maximum productivity and optimal machine utilisation.

Our standard solutions for applications in filling and packaging technology

FLEXLINK a coesia company

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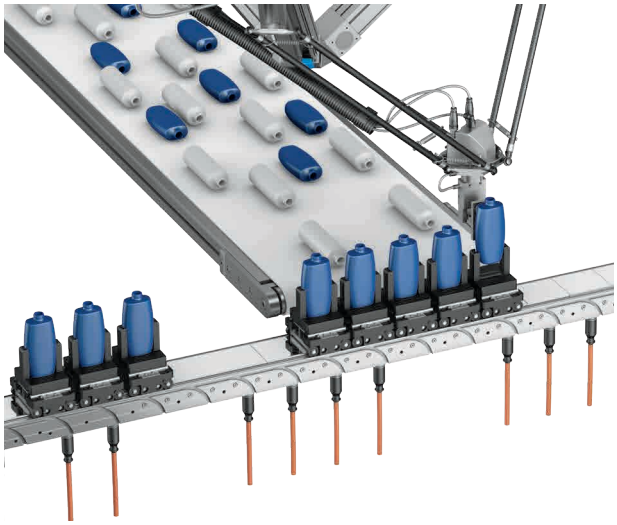
FESTO

Closed recirculating conveyor system → page 34

Combination of continuous operation and cyclic operation on one line



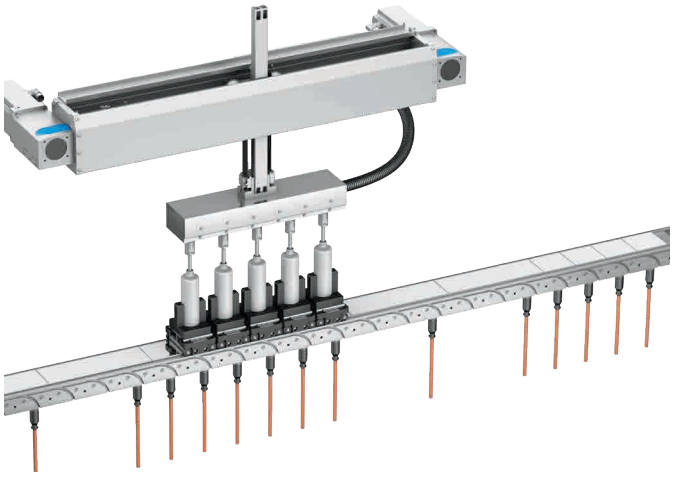
The application
The bottles are loaded on the MCS® while the carriers are continuously moving and then flexibly grouped for the subsequent filling process. Capping takes place later in cyclic operating mode, since the bottles are stationary during this process step.

The challenge
The combination of continuous and cyclic operation in one system without separating the sections into different zones and without additional queuing sections and transfer functions.

The solution
The MCS® combines cyclic operation and continuous movement on one line. The movement and grouping of the carriers on the section are freely configurable, as appropriate to the station. This optimises the system design and process sequence.

MCS® makes your packaging system more flexible

Carriers move synchronously with the process

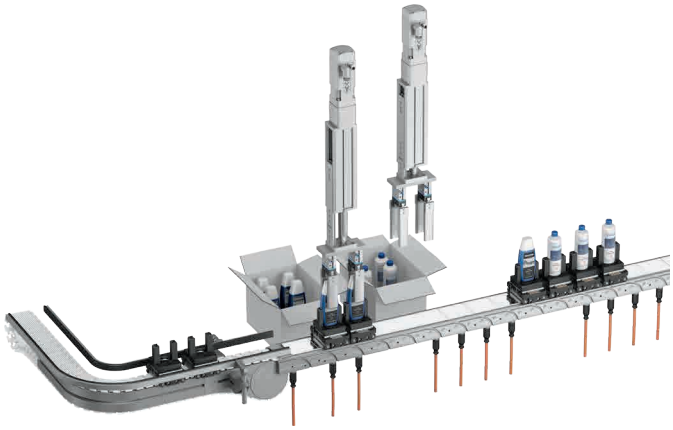


The application
During the filling process, the carriers holding the bottles move continuously and synchronously with the filling bridge. The bottles are filled with a specific amount in an uninterrupted and time-optimised movement.

The challenge
Adapting the transport system's movement to the different filling quantities and therefore changing the transport speeds. For example, the filling process takes longer for a seasonal product with 25% more content and therefore the movement of the bottles is slower. This has a direct effect on the upstream and downstream lines.

The solution
The MCS® enables completely free and versatile adaptation of the travel speed in line with the product requirement and filling quantity. This has no effect on upstream and downstream processes, since the time differences caused by the carriers speeding up and slowing down are balanced out between the modules. The combined control of the transport system and the individual modules in the overall filling system ensures that the carrier runs completely synchronised.

Flexible mixing and packaging



The application
Different products are packaged on one line, either one type at a time at multiple stations or mixed in one box. The container sizes and the mixtures can be varied.

The challenge
Flexible grouping for packaging different container sizes and changing the variety of different products in one container. Reducing the number of packaging stations in order to shorten the belt length and cut back on the number of handling systems or robots.

The solution
With the MCS®, the packing positions of different products and the group sizes or combinations can be adapted as appropriate to the process using software. The carrier is always ready at the next free packing position and will not pass through. This results in the maximum utilisation of each packaging station, thus enabling a more compact machine layout with a shorter belt length and fewer stations.

Combination of the MCS® with the transfer system TLM 1500 from elcom

The system at a glance

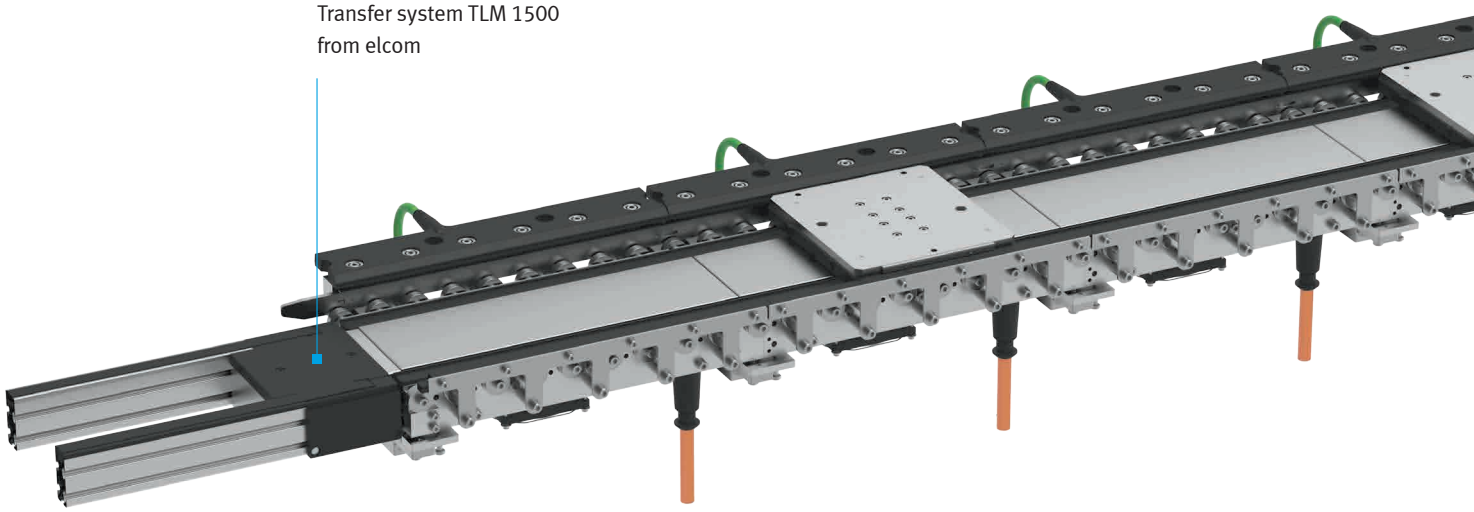
Transfer systems based on double belt conveyors are standard in a wide range of industries. They transport products to the individual processing stations on (workpiece) carriers. The workpieces remain on the carriers and can be processed directly in-situ in most cases. The transfer system TLM 1500 from elcom has a modular design and offers a large number of standardised modules for different functions. These include stoppers and indexing units, curves and deflectors as well as lifts and other modules. The Multi-Carrier-System MCS® is the perfect addition to the transfer system. It can be used precisely in those places where it adds the most value – for more flexible process sequences, reduced changeover times and thus significantly higher productivity. Inward and outward transfer between the transfer system and MCS® is always seamless and does not require any transfer points.

Highlights

- Reducing changeover times by up to 80%
- Highly flexible MCS® section
- Perfect for short-cycle applications
- Eliminates the need for parallel processing stations
- Cost-optimised concept by using standard elcom system modules, supplemented by the MCS® functionality

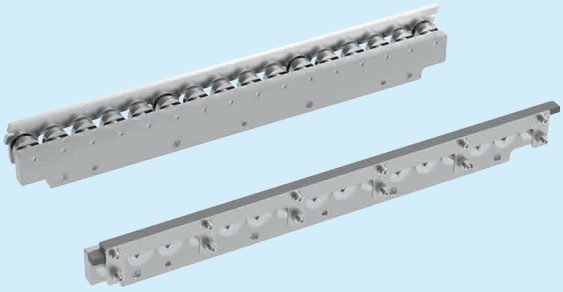
→ Small carriers for payloads of up to 4 kg

Transfer system TLM 1500
from elcom



Guide system

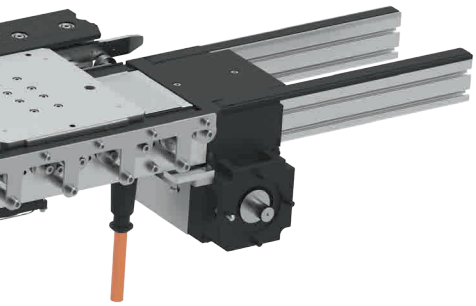
Basic profile with roller track and lateral guide for precise and low-wear guidance of the carriers on the MCS® including mounting interfaces for motors and displacement encoder, for direct installation in the machine or system.

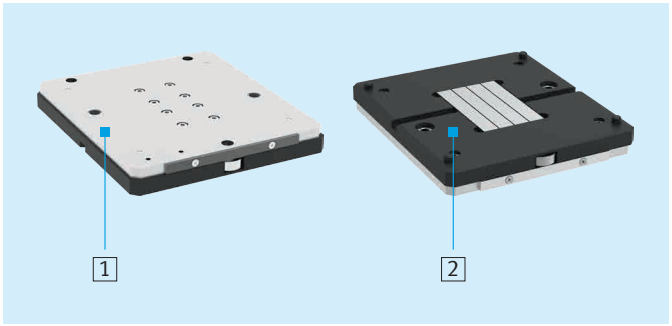


Tried-and-tested workpiece carrier for product transport

The standard carrier from elcom is designed for conveying and positioning the workpieces during the process. Integration of the permanent magnets into the carrier means you can take advantage of all the benefits of the MCS®.

The top plate is made of aluminium to guarantee the precise attachment of product-specific holders. The polyamide base plate is characterised by a low friction coefficient. It simultaneously holds the four pins for guiding the carriers on the transfer system.





1
- Top plate made of aluminium for mounting the workpiece holders
- Integrated track rollers for precise lateral guidance on the MCS® section
- Optional: RFID tag on the carrier for identification outside the MCS® section
- Optional: cushioning for reducing the impact between two carriers on the transfer system in queue mode

2
- Base plate made of highly wear-resistant polyamide with very low friction coefficients
- Holds the guide pins for controlling the carrier on the transfer system
- Optional base plate made of conductive polymer for ESD applications

Note
A special feature of the carrier is the product-specific adaptation of the length (default 155 mm).

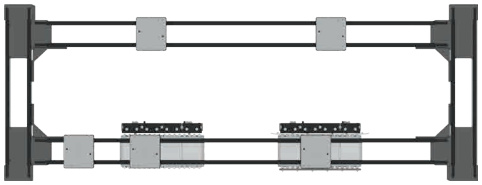
Seamless transition of the carriers

- Easy to combine both systems
- Without mechanical coupling at the interface
- Seamless transition between the transfer system and MCS® section
- Optional stopper at the inlet on the MCS® section for stopping or queuing the carriers

Combination of the MCS® with the transfer system TLM 1500 from elcom

Section layout

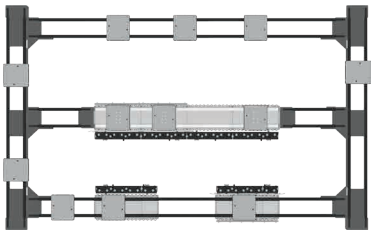
Individual section integrated into an end-to-end transfer system



The MCS® section is installed between two transfer system conveyor sections. Longer MCS® sections are ideal when flexible and dynamic chains of process stations need to be realised. The transfer system for the recirculating motion can be easily and seamlessly integrated in this process.

- MCS® section of any length
- Free configuration of the transfer system sections
- Used in longer MCS® sections

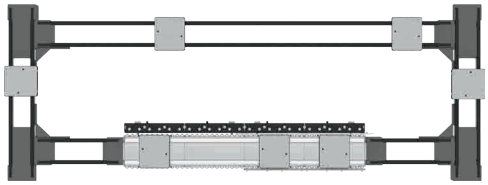
Individual section combined with transfer system



The MCS® section is integrated into an end-to-end transfer line, with seamless transition of the carriers. Short MCS® sections are perfect for making individual process stations flexible and optimising the cycle time. The transport section between the stations is realised using the transfer system.

- Short MCS® sections
- Free configuration of the transfer system sections
- Free movement of the carrier on the MCS® section independently of the continuous belt

Sample system layout: individual section with horizontal recirculating conveyor system



The MCS® section is used in a horizontal recirculating conveyor system to make the processes more flexible and dynamic:

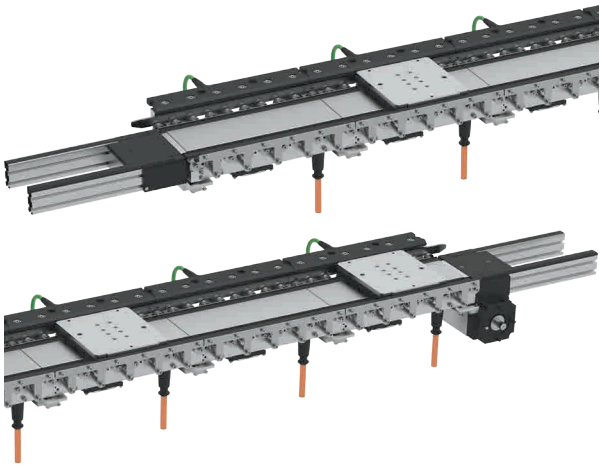
- MCS® section of any length
- Free configuration of the transfer system sections
- Uses standard components like stoppers, indexing stations or curves

Sample system layout: individual section with transfer system and lift

Lifts are added to the MCS® section and the transfer system combination. This is done for the return transport of the carriers below the process in the machine bed. This enables a compact system layout with unrestricted access from all sides, which is ideal for freestanding machines or production modules and standardised cell concepts.

- MCS® section of any length
- Free configuration of the transfer system sections including the two lifts
- Easy return transport of the carriers below the process section using a standardised transfer system and lift

Transfer system TLM 1500 from elcom



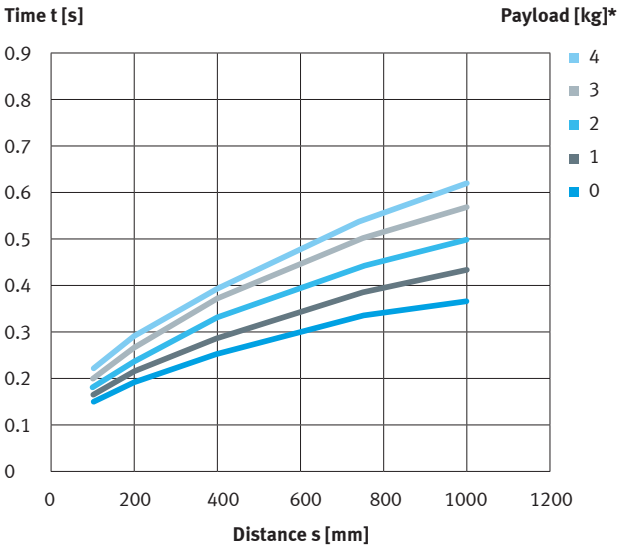
Transfer systems based on double belt conveyors transport carriers and join assembly, processing and testing stations. The TLM 1500 system from elcom enables products to be transported horizontally. In addition, an extensive range of special modules is available for positioning the workpiece or distributing it to other or secondary transfer lines using a deflector.

- Standard transfer lines for realising simple to complex section guides and functions
- Conveyor section units of the transfer system powered by motors for continuous belt speeds
- Stoppers, indexing stations, curves, deflectors, intersections, lifts, etc.

You can find more information at
→ **www.elcom-automation.com**

Technical data

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, carrier with one magnetic plate



MCS® section/ carrier variants	One magnetic plate	Two magnetic plates
Carrier dimensions [mm]	155 x 170 x 20	200 x 170 x 20
Carrier weight [kg]	1.3	1.9
Max. payload* [kg]	4	4
Max. speed [m/s]	4	4
Max. acceleration [m/s²]	40	50
Max. feed force [N]	91	182
Repetition accuracy 1 carrier [mm]	±0.05	±0.05
Repetition accuracy n carriers** [mm]	±0.1	±0.1
Transfer system TLM 1500		
Max. speed [m/s]	0.25	0.25

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request
** With RFID compensation, better repetition accuracies on request

Combination of the MCS® with the transfer system TLM 2000 from elcom

The system at a glance

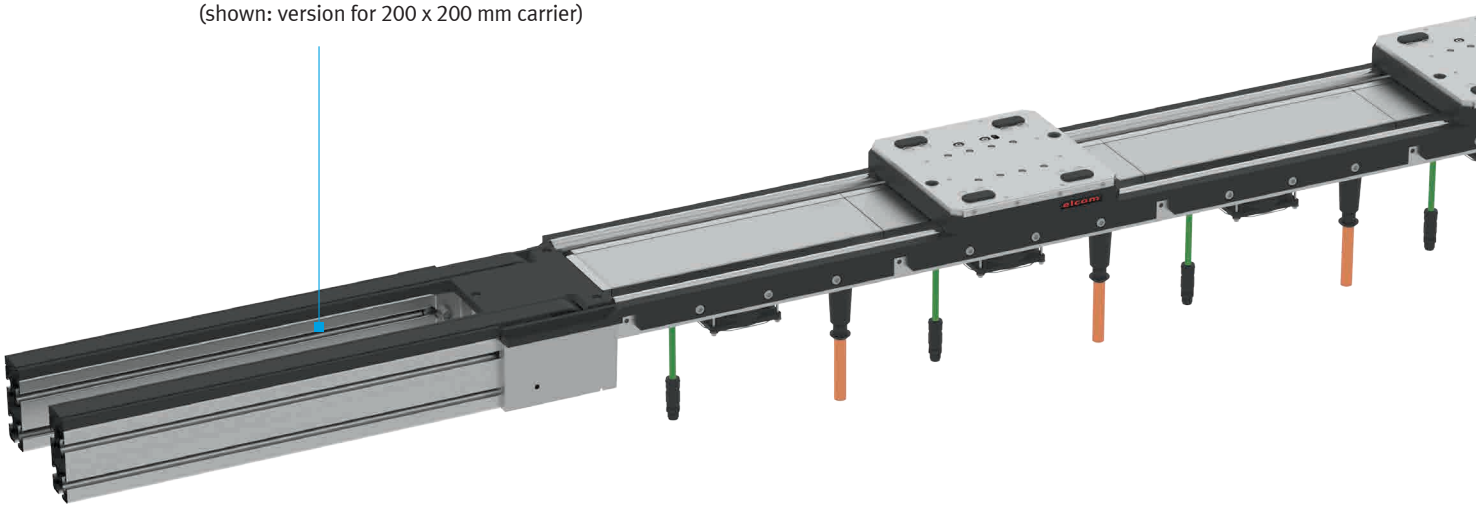
Transfer systems based on double belt conveyors are standard in a wide range of industries. They transport products to the individual processing stations on (workpiece) carriers. The workpieces remain on the carrier and can be processed directly on them in most cases. The transfer system TLM 2000 from elcom has a modular design and offers a large number of standardised modules for different functions. These include stoppers and indexing units, curves and deflectors as well as lifts and other modules. The Multi-Carrier-System MCS® is the perfect complement to the transfer system. It can be used precisely in those places where it adds the most value – for more flexible process sequences, reduced changeover times and thus significantly higher productivity. Inward and outward transfer between the transfer system and MCS® is always seamless and does not require any transfer points.

Highlights

- Reducing changeover times by up to 80%
- Highly flexible MCS® section
- Perfect for short-cycle applications
- Eliminates the need for parallel processing stations
- Cost-optimised concept by using all the elcom system modules, supplemented by the MCS® functionality

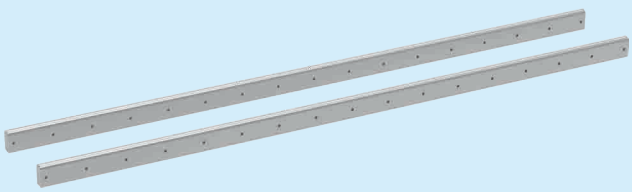
→ Two different carrier sizes for payloads of up to 10 kg

Transfer system TLM 2000 from elcom
(shown: version for 200 x 200 mm carrier)



Guide system

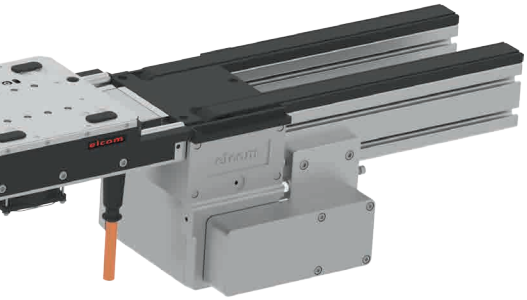
Mounting rail guide for smooth carrier movement and good carrier positioning accuracy. When combined with the polymer track rollers, the end result is a lubricant-free system that is robust and requires little maintenance.

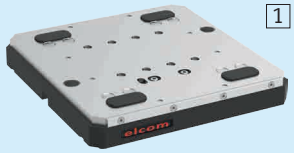


Tried-and-tested workpiece carrier for product transport

The standard carrier from elcom is designed for conveying and positioning the workpieces during the process. Integration of the permanent magnets into the carrier means you can take advantage of all the benefits of the MCS®.

The top plate is made of aluminium to guarantee the precise attachment of product-specific holders. The polyamide base plate is characterised by a low friction coefficient. It simultaneously holds the four pins for guiding the carriers on the transfer system.





200 x 200 mm carrier

300 x 300 mm carrier

1
- Top plate made of aluminium for mounting the workpiece holders
- Integrated track rollers for precise lateral guidance on the MCS® section
- Optional: RFID tag on the carrier for identification outside the MCS® section
- Optional: cushioning for reducing the impact between two carriers on the transfer system in queue mode

2
- Base plate made of highly wear-resistant polyamide with very low friction coefficients
- Holds the guide pins for controlling the carrier on the transfer system
- Optional base plate made of conductive polymer for ESD applications

Note
A special feature of the carrier is the product-specific adaptation of the length (default 200 or 300 mm).

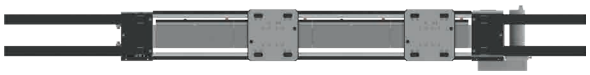
Seamless transition of the carriers

- Easy to combine both systems without a mechanical coupling at the interface
- Seamless transition between the transfer system and MCS® section
- Optional stopper at the inlet on the MCS® section for stopping or queuing the carriers

Combination of the MCS® with the transfer system TLM 2000 from elcom

Section layout

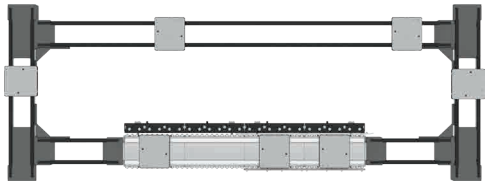
Individual section combined with transfer system



The MCS® section is installed between two transfer system conveyor sections to make process stations more dynamic and flexible. The transfer system for the recirculating motion can be easily and seamlessly integrated in this process.

- MCS® section of any length
- Seamless integration of the transfer system
- Free configuration of the transfer system sections

Sample system layout: individual section with horizontal recirculating conveyor system



The MCS® section is used in a horizontal recirculating conveyor system to make the processes more flexible and dynamic:

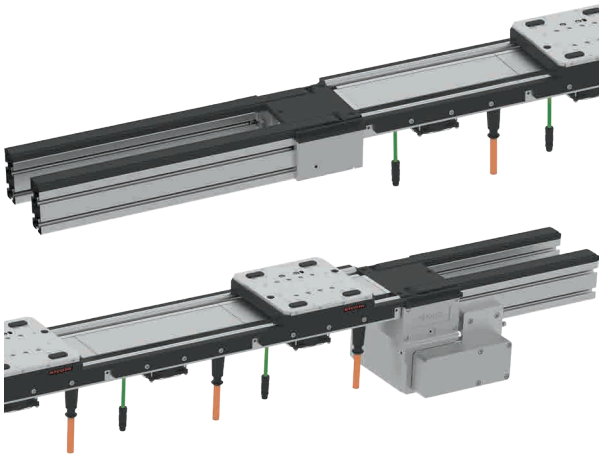
- MCS® section of any length
- Free configuration of the transfer system sections
- Uses standard components like stoppers, indexing stations or curves

Individual section with transfer system and lift

Lifts are added to the MCS® section and the transfer system combination. This is done to realise the return transport of the carriers below the process in the machine bed. This enables a compact system layout with unrestricted access from all sides, which is ideal for free-standing machines or production modules and standardised cell concepts.

- MCS® section of any length
- Free configuration of the transfer system sections including the two lifts
- Easy return transport of the carriers below the process section using a standardised transfer system and lift

Transfer system TLM 2000 from elcom



elcom
FREE TO DESIGN

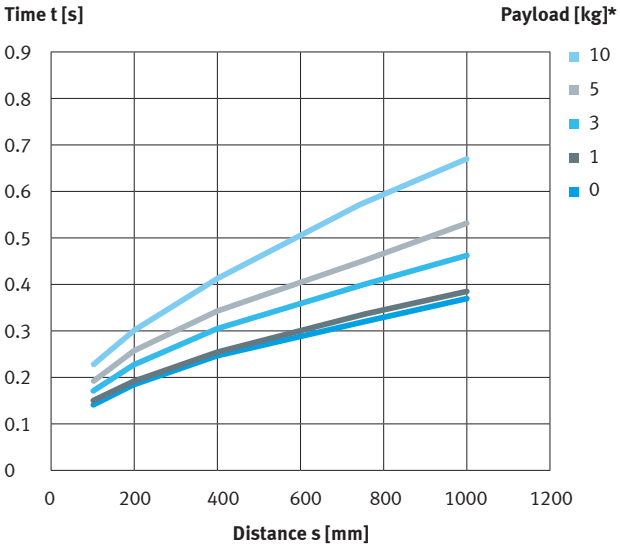
Transfer systems based on double belt conveyors transport carriers and join assembly, processing and testing stations. The TLM 2000 system from elcom enables products to be transported horizontally. In addition, an extensive range of special modules is available for positioning the workpiece or distributing it to other or secondary transfer lines using a deflector.

- Standard transfer lines for realising simple to complex section guides and functions
- Conveyor section units of the transfer system powered by motors for continuous belt speeds
- Modules: stoppers, indexing stations, deflectors, junctions, lifts, etc.

You can find more information at
→ **www.elcom-automation.com**

Technical data

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, 200 x 200 mm carrier with two magnetic plates



MCS® section/ carrier variants	Two magnetic plates	Three magnetic plates
Carrier dimensions [mm]	200 x 200 x 30	300 x 300 x 30
Carrier weight [kg]	2.4	4.3
Max. payload* [kg]	10	10
Max. speed [m/s]	4	4
Max. acceleration [m/s²]	45	40
Max. feed force [N]	182	273
Repetition accuracy 1 carrier [mm]	±0.05	±0.05
Repetition accuracy n carriers** [mm]	±0.1	±0.1
Transfer system TLM 2000		
Max. speed [m/s]	0.3	0.3

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request
** With RFID compensation, better repetition accuracies on request

Combination of the MCS® with the transfer system TS 2*plus* from Bosch Rexroth

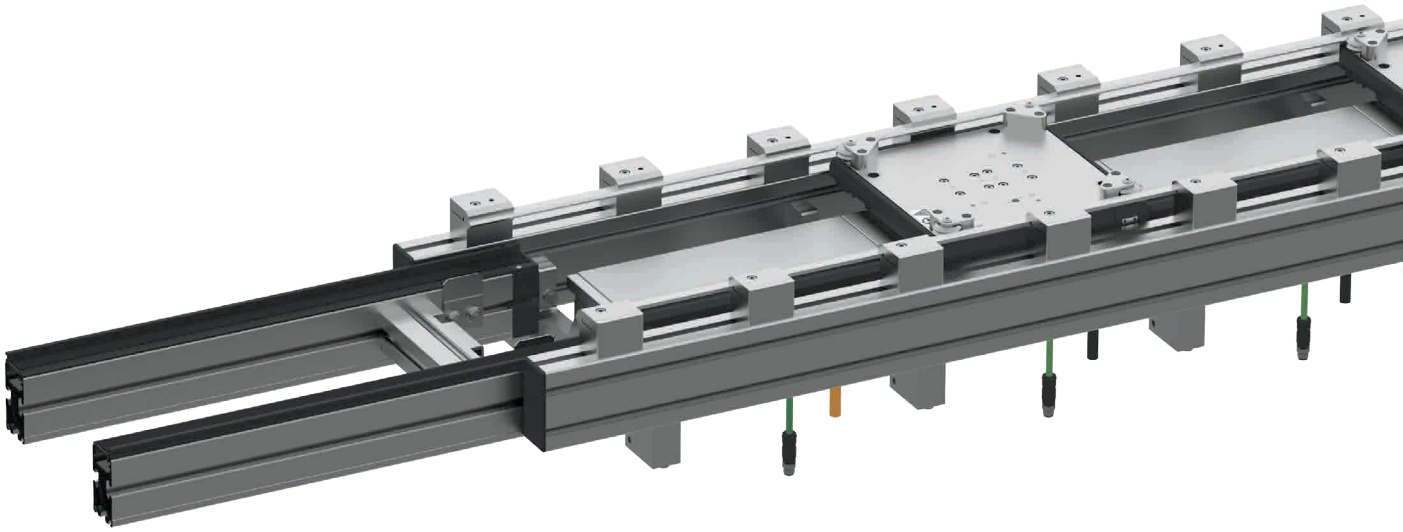
The system at a glance

Transfer systems based on double belt conveyors are standard in a wide range of industries. They transport products to the individual processing stations in a production or assembly system on carriers. The workpieces can be processed directly on the carrier in most cases. The transfer systems from Bosch Rexroth have a modular design and offer a large number of standardised modules for different functions. These include separators and positioning units, curves as well as lifts and other modules. You can integrate the Multi-Carrier-System MCS® into individual TS 2*plus* section zones. The TS 2*plus* modular system is thus extended with the TS 2 Booster modules. The MCS® can be used precisely in those places where it adds the most value for more flexible process sequences, reduced changeover times and thus significantly higher productivity. The transition between conventional conveyor sections and the TS 2 Booster with integrated MCS® is always seamless and does not require any transfer points.

Highlights

- Reducing changeover times by up to 80%
- Highly flexible section unit, e.g. free positioning, custom speeds and acceleration
- Perfect for short-cycle applications
- Eliminates the need for parallel processing stations
- Cost-optimised concept by using the system module from Bosch Rexroth, supplemented by the MCS® functionality

→ Large number of carrier sizes for applications with payloads of up to 35 kg or 50 kg total weight



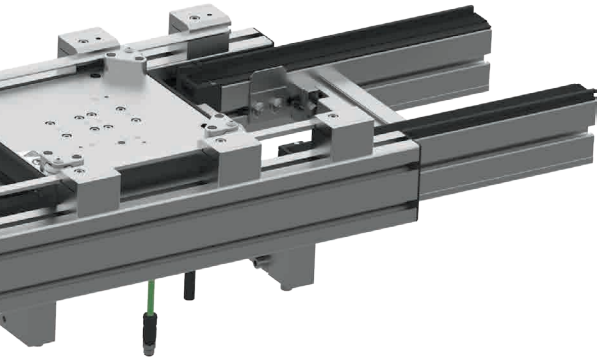
Guide system

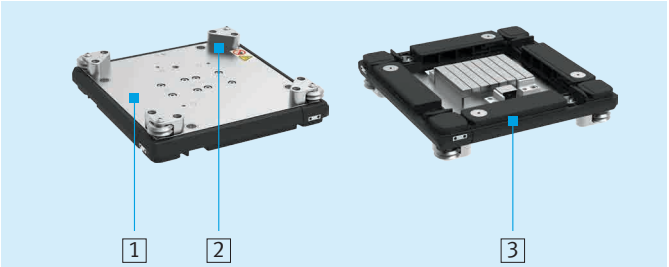
Base support with precision-ground V-guide system for low-wear operation and high positioning accuracy of the carrier. The guide can absorb lateral forces and torques generated in the process.

Standard carrier for direct product transport

Guide rollers and a magnetic plate have been added to the tried-and-tested standard carriers from the Bosch Rexroth modular system for the TS 2 Booster. This allows you to precisely position the workpiece carriers on the TS 2 Booster without additional indexing.

From small carriers (160 x 160 mm) to large carriers (400 x 640 mm) and with payloads of up to 35 kg, the system offers maximum variation and design freedom for the particular application.





1
- Support plate: mechanical interface for application-specific workpiece holder
- Material: Aluminium

2
- High-quality guide system for backlash-free movement of the carriers

3
- Frame module
- Material: Polymer PA
- Permanently mounted and wear-free magnetic plate for feed motion
- Standard positioning bushings for positioning units

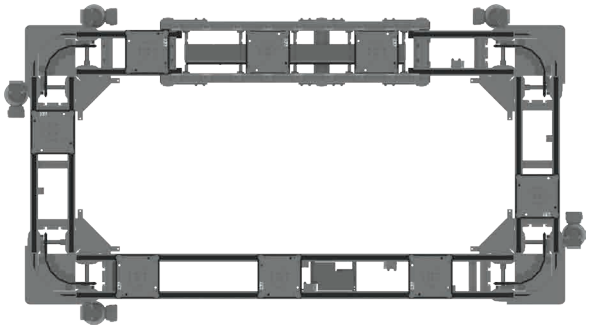
Seamless transition of the carriers

- Easy to combine both systems without a mechanical coupling at the interface
- Continuous infeed and outfeed of the carriers on the transfer system
- Transfer of the carriers from the transfer system to the high-precision linear guide
- Optional stopper at the inlet on the MCS® section for stopping or queuing the carriers

Combination of the MCS® with the transfer system TS 2*plus* from Bosch Rexroth

Section layout

Sample system layout: individual section with horizontal recirculating conveyor system



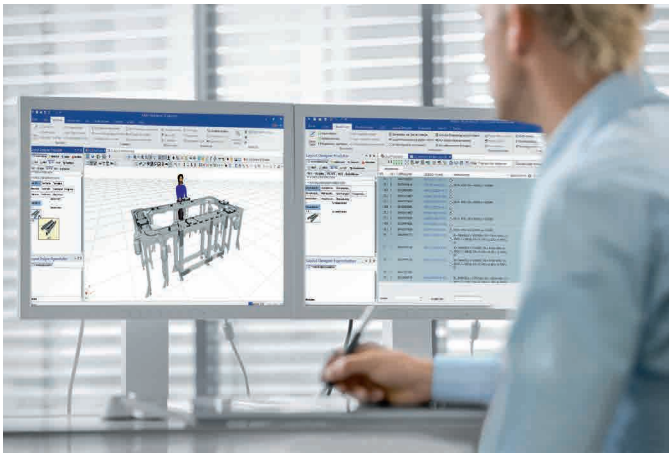
The TS 2 Booster modules are used in a horizontal recirculating conveyor system to make processes more dynamic and flexible:

- TS 2 Booster modules in different lengths
- Free configuration of the transfer system sections
- Uses standard components like separators, positioning units and curves

MTpro – fast and reliable planning of line layouts

MTpro Layout Designer makes it quick and easy for you to design your custom system layout thanks to the TS 2 Booster, compatible modules and components from the TS 2*plus* transfer system. You will get a complete CAD model including bill of materials and ordering information.

→ **www.boschrexroth.com/mtpro**

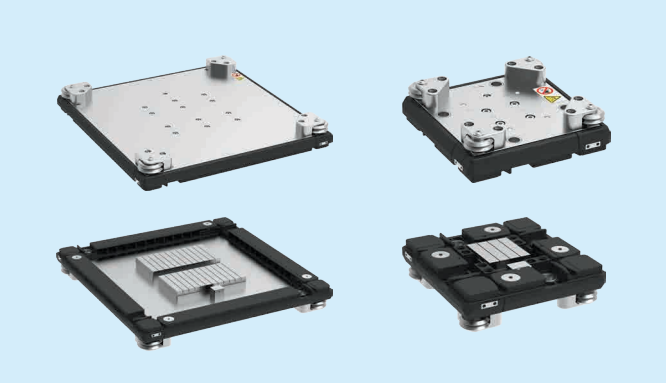


Carriers

L [mm]	160	240	320	400	480	640
W [mm]						
160	X	X	X			
240	X	X	X	X		
320		X	X	X	X	
400			X	X	X	X

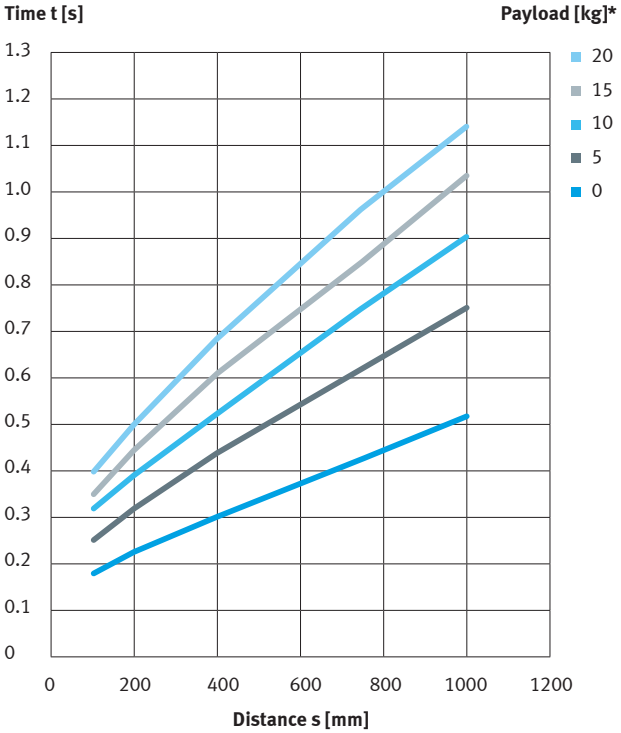
rexroth
A Bosch Company

You can find more information at
→ **www.boschrexroth.com**



Technical data
(using the example of the 240 x 240 carrier)

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, 240 x 240 mm carrier with two magnetic plates



TS 2 Booster section with 240 x 240 carrier	Two magnetic plates
Carrier dimensions [mm]	240 x 240
Carrier weight [kg]	3.01
Max. payload* [kg]	20
Max. speed [m/s]	4
Max. acceleration [m/s²]	33.9
Max. feed force [N]	102
Repetition accuracy 1 carrier [mm]	±0.015

You can find more technical data at → **www.boschrexroth.com**

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request

Combination of the MCS® with the pallet conveyor X85P from FlexLink

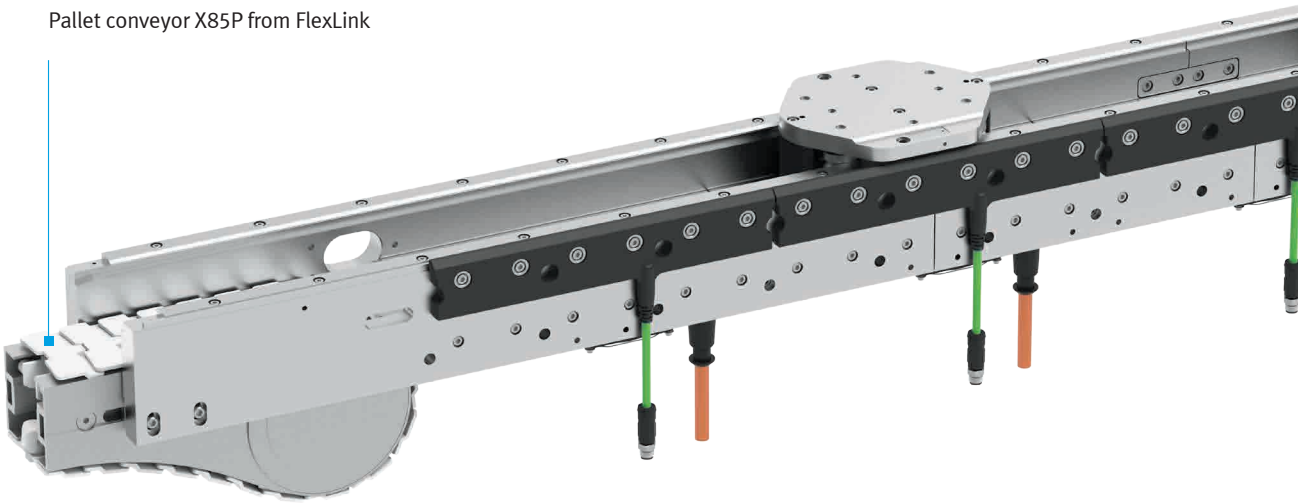
The system at a glance

Pallet conveyors can be used in many different applications, whether assembly systems in battery production, in packaging technology, production plants or systems for machine components. The Multi-Carrier-System MCS® can be combined with the pallet conveyor X85P from FlexLink precisely in those places where it adds the most value – for more flexible process sequences or reduced retooling times, e.g. for season-specific changes. This enables you to achieve greater productivity. It is also possible to have either individual sections or a branched system on the basis of the pallet conveyor with multiple combined MCS® partial sections. The carriers can be equipped with a specific product holder. The infeed and outfeed transfer between the pallet conveyor and MCS® is seamless.

Highlights

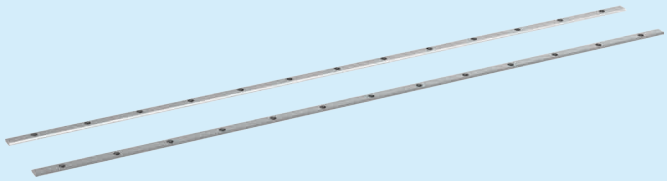
- Highly flexible MCS® section precisely where needed in the process
- Uses a low-cost conventional pallet conveyor
- Carriers compatible with standard pallet conveyor modules (e.g. deflectors, stoppers, indexing stations)
- Seamless inward and outward transfer of the carriers

Pallet conveyor X85P from FlexLink



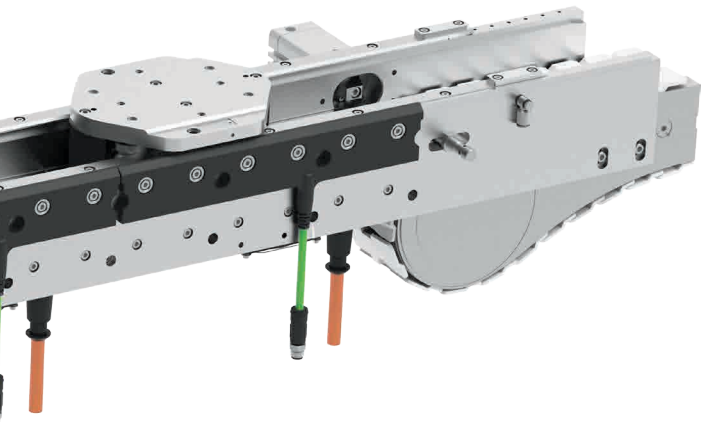
Guide system

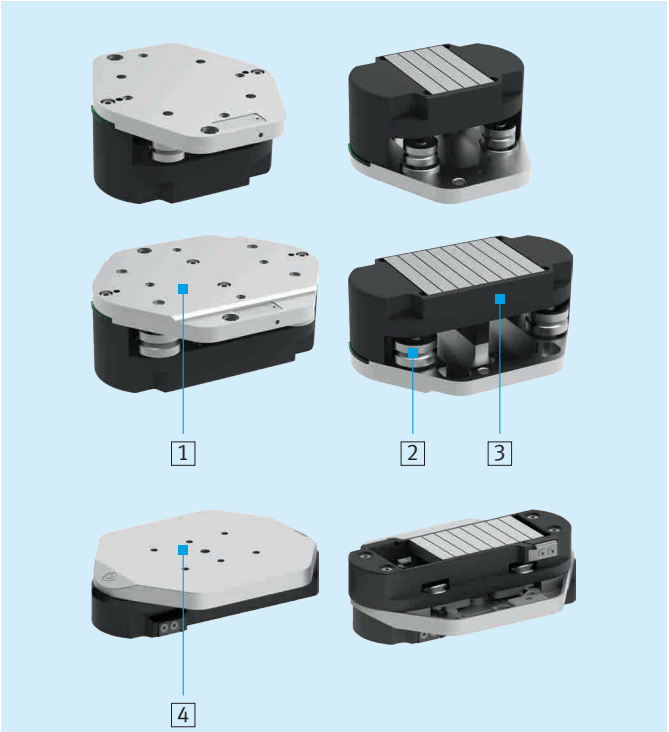
Base support with precision-ground V-guide system including permanent lubrication for low-wear operation and high carrier positioning accuracy. The guide can absorb lateral forces and torques generated in the process.



Precise and sturdy carriers for product transport

The design of the carriers is based on the pallet conveyor X85P from FlexLink. The carriers can be queued in the curves. The low-wear carriers with integrated, high-quality track rollers allow backlash-free product transport. Each carrier can carry loads of up to 15 kg. You can choose from three variants, depending on the dynamic response, product weight and product dimensions.
An RFID tag is optionally available, e.g. for product tracking.
The flat top of the carriers is equipped with mounting and centring holes for attaching your customised workpiece holder.





Three carrier versions, depending on payload, workpiece size and required dynamic response

1
- Mechanical interface for application-specific workpiece holder
- Material: Aluminium

2
- High-quality track rollers for backlash-free movement of the carriers

3
- Base body with shaped elements for curves and stoppers Material: Polymer POM
- Bushings for indexing on the conveyor chain
- Permanently mounted and wear-free magnetic plate (1-2 pieces)

4
- Other carrier variants are available, although they require a different section design
- You can find more information at
→ **www.flexlink.com**
→ **info@flexlink.com**

Seamless transition of the carriers

- Easy to combine both systems without a mechanical coupling at the interface
- Continuous infeed and outfeed of the carriers on the pallet conveyor
- Carrier transfer from the unguided conveyor chain to the high-precision linear guide
- Optional stopper at the inlet on the MCS® section for stopping or queuing the carriers

Combination of the MCS® with the pallet conveyor X85P from FlexLink

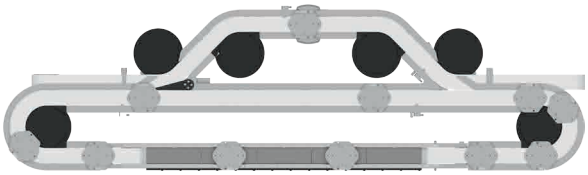
Section layout

Individual section between two pallet conveyors

The linear MCS® sections are used at stations or system modules where needed by the process. You can use simple and low-cost pallet conveyors as usual for feeding the carriers in and out or for linking systems.

- Seamless transition between the MCS® section and pallet conveyor
- Linear MCS® section of any length
- Free configuration of the pallet conveyor sections

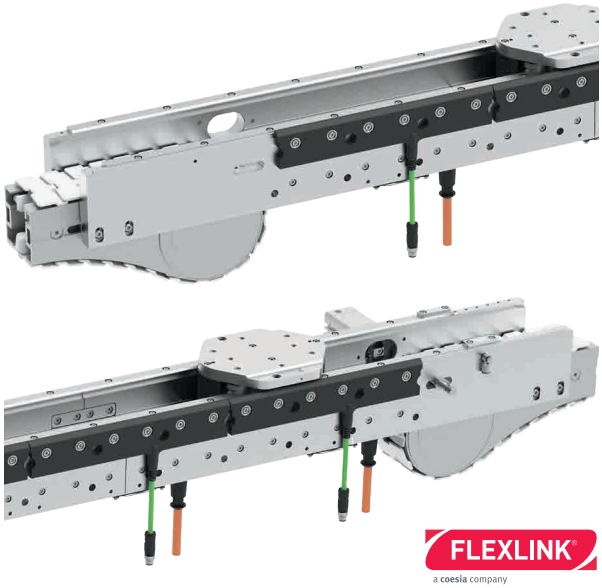
Sample system layout: branched conveyor system with MCS® section



Linear MCS® sections can be combined with several pallet conveyor sections into one system. The carriers are designed so that you can use the standard pallet conveyor modules. Deflectors let you transfer carriers inwards and outwards, while processing steps relevant to the process take place at indexing stations. The MCS® sections are only used in those places where they are really required by the application. This ensures maximum productivity in the process.

- Linear MCS® sections of any length – as appropriate for the application
- Free configuration of the pallet conveyor sections
- Uses standard modules like deflectors, indexing stations, stoppers

Pallet conveyor X85P from FlexLink



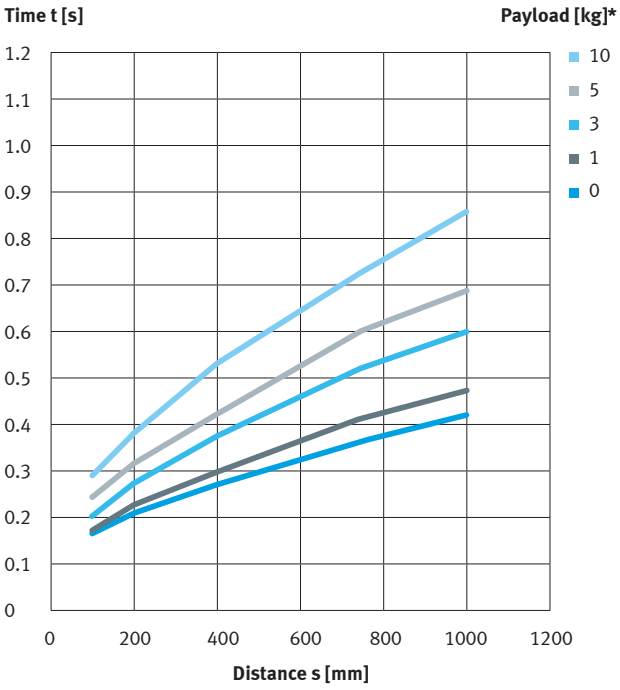
Pallet conveyors can be used to build automatic material flow systems for the processing, assembly and testing process of single items. The standard conveyors from FlexLink consist of a polymer chain that runs on low-wear slide rails in an aluminium guide profile. This enables horizontal and space-optimised transport of the products and carriers.

- Standard conveyor modules for designing simple to complex layouts for section guidance, smooth distribution, storage and positioning of carriers
- Modules for deflectors (X-curve), curves, bridges, redirection and inward transfer of carriers
- Conveyor chain for jerk-free operation, minimal wear and low noise level

You can find more information at
→ **www.flexlink.com**

Technical data

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, carrier with one magnetic plate



MCS® section/ carrier variants	One magnetic plate	Two magnetic plates
Carrier dimensions [mm]	136 x 160 x 67	188 x 160 x 70.5
Carrier weight [kg]	1.3	2.1
Max. payload* [kg]	10	15
Max. speed [m/s]	4	4
Max. acceleration [m/s²]	30	30
Max. feed force [N]	91	182
Repetition accuracy 1 carrier [mm]	±0.02	±0.02
Repetition accuracy n carriers** [mm]	±0.1	±0.1
Pallet conveyor X85P		
Max. speed [m/s]	1	1

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request
** With RFID compensation, better repetition accuracies on request

Combination of the MCS® with the conveyor system XH from FlexLink

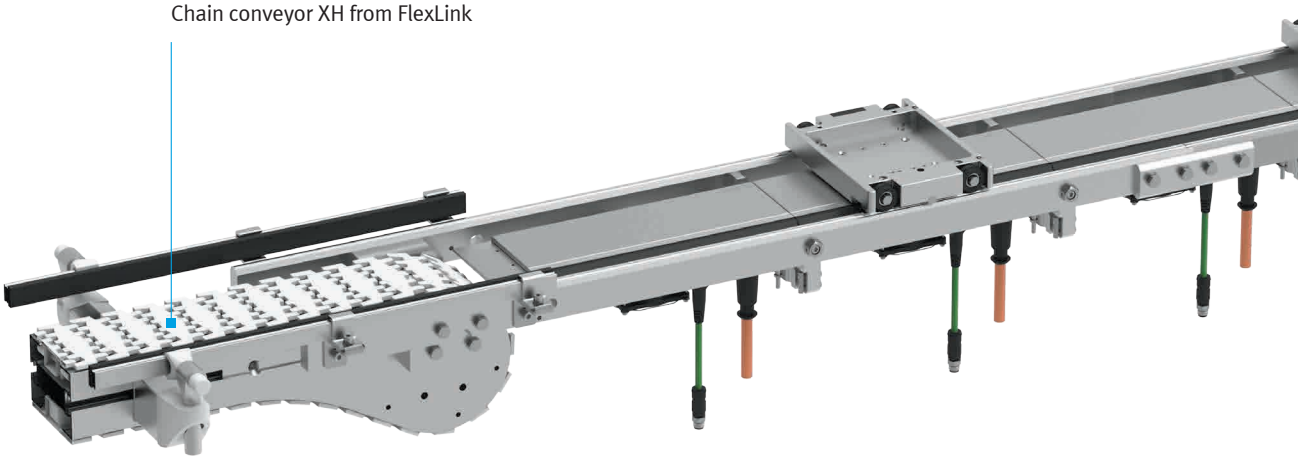
The system at a glance

Polymer chain conveyor systems are used in various industries and are designed to transport all types of products. The conveyors connect machine or system sections and offer many options, e.g. horizontal and vertical distribution of products. The Multi-Carrier-System MCS® is the perfect complement to the conveyor system XH from FlexLink. You can combine the MCS® and the conveyor system where needed in the process to enable higher throughput, e.g. through fast carrier changeover times. You can equip the carriers themselves with customised product holders. Infeed and outfeed transfer between the chain conveyor and MCS® is seamless.

Highlights

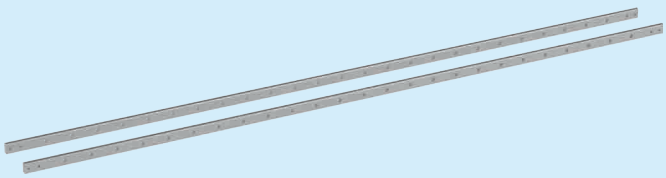
- Highly flexible MCS® section where needed in the process
- Uses a low-cost polymer chain conveyor
- Seamless inward and outward transfer of the carriers
- Simple and low-maintenance guide system
- Free removal of the individual carriers

Chain conveyor XH from FlexLink



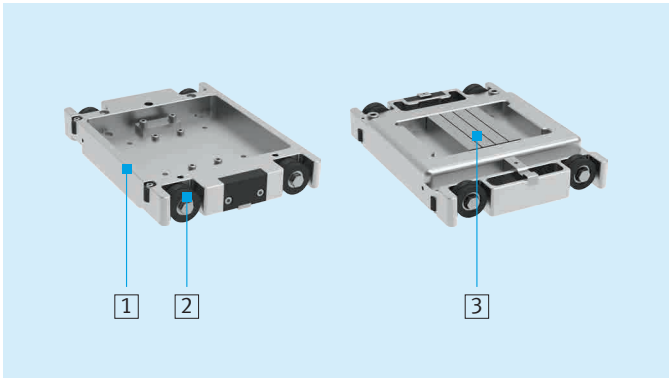
Guide system

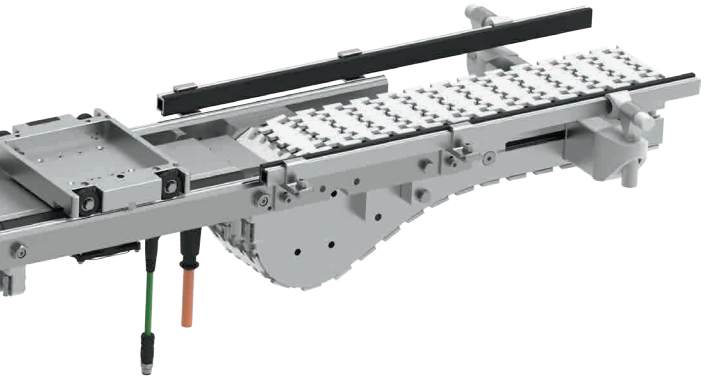
Mounting rail guide for smooth carrier movement and good carrier positioning accuracy. When combined with the polymer track rollers, the end result is a lubricant-free system that is robust and requires little maintenance.



Carriers with tried-and-tested technology for product transport

The carrier with the simple guide principle can be used for a variety of applications. The polymer track rollers with integrated ball bearings ensure silent operation and absorb vertical forces with ease. The fixed/floating bearing ensures that the carrier movement is precise and backlash-free. The carriers can be freely removed throughout the entire system. An RFID tag for assigning the carriers is available as an option.





1
- Mechanical interface for application-specific workpiece holder
- Material: Aluminium
- Integrated polymer buffer for queue mode

2
- Polymer track rollers with integrated ball bearings

3
- Permanently mounted and wear-free magnetic plate (1-2 pieces)
- Bushings for indexing on the conveyor chain

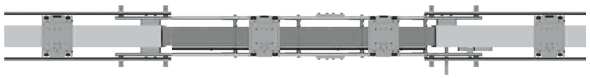
Seamless transition of the carriers

- Easy to combine both systems without a mechanical coupling at the interface
- Continuous infeed and outfeed of the carriers on the polymer chain conveyor
- Carrier transfer from the unguided conveyor chain to the precision linear guide
- Optional stopper at the inlet on the MCS® section for stopping or queuing the carriers

Combination of the MCS® with the conveyor system XH from FlexLink

Section layout

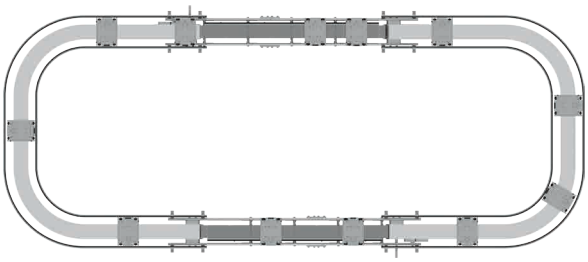
Individual section between two polymer chain conveyors



The linear MCS® sections are used at stations or system modules where they are needed by the process. You use simple and low-cost polymer chain conveyors as usual for feeding the carriers in or out or for linking systems.

- Seamless transition between the MCS® section and polymer chain conveyor
- Linear MCS® section of any length
- Free configuration of the polymer chain conveyor sections

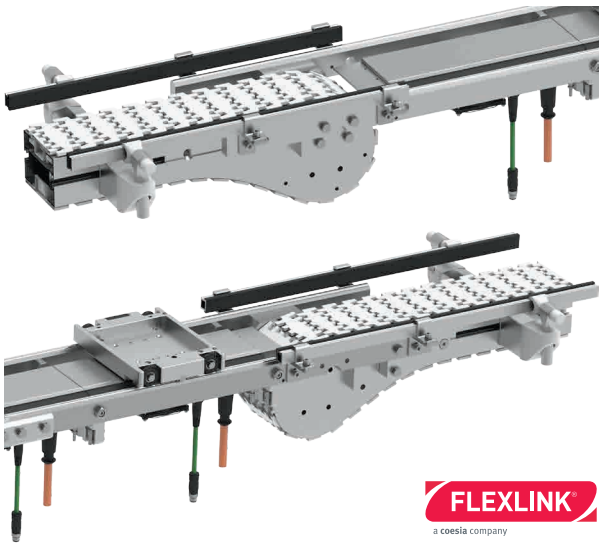
Sample system layout: horizontal recirculation with two MCS® sections



Linear MCS® sections can be combined with multiple polymer chain conveyors and their standard modules. The MCS® sections are only used in those places where they are really required by the application. This ensures maximum productivity in the process.

- Linear MCS® sections of any length – as appropriate for the application
- Free configuration of the polymer chain conveyor sections
- Uses standard modules such as indexing stations, stoppers

Polymer chain conveyor XH from FlexLink



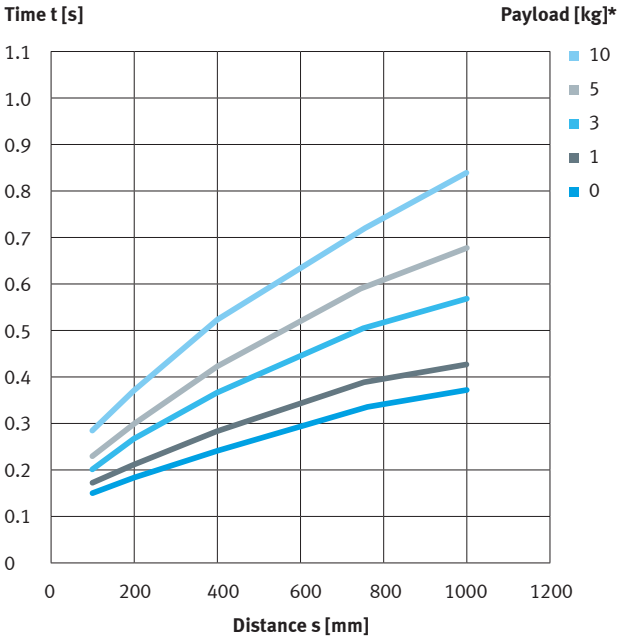
Polymer chain conveyors can be used to create automatic material flow systems for the processing, assembly and testing process of single items. The standard conveyors from FlexLink consist of a polymer chain that runs on low-wear slide rails in an aluminium guide profile. This enables horizontal and space-optimised transport of the products and carriers.

- Standard conveyor modules for designing simple layouts for section guidance, smooth distribution, storage and positioning of carriers
- Modules for curves, bridges and redirection
- Conveyor chain for jerk-free operation, minimal wear and low noise level
- Available worldwide

You can find more information at
→ **www.flexlink.com**

Technical data

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, carrier with one magnetic plate



MCS® section/ carrier variants	One magnetic plate	Two magnetic plates
Carrier dimensions [mm]	152 x 198 x 31	152 x 198 x 31
Carrier weight [kg]	1.4	1.7
Max. payload* [kg]	10	15
Max. speed [m/s]	4	4
Max. acceleration [m/s²]	40	50
Max. feed force [N]	91	182
Repetition accuracy 1 carrier [mm]	±0.05	±0.05
Repetition accuracy n carriers** [mm]	±0.1	±0.1
Conveyor system XH		
Max. speed [m/s]	0.8	0.8

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request
** With RFID compensation, better repetition accuracies on request

The MCS® as a closed recirculating conveyor system

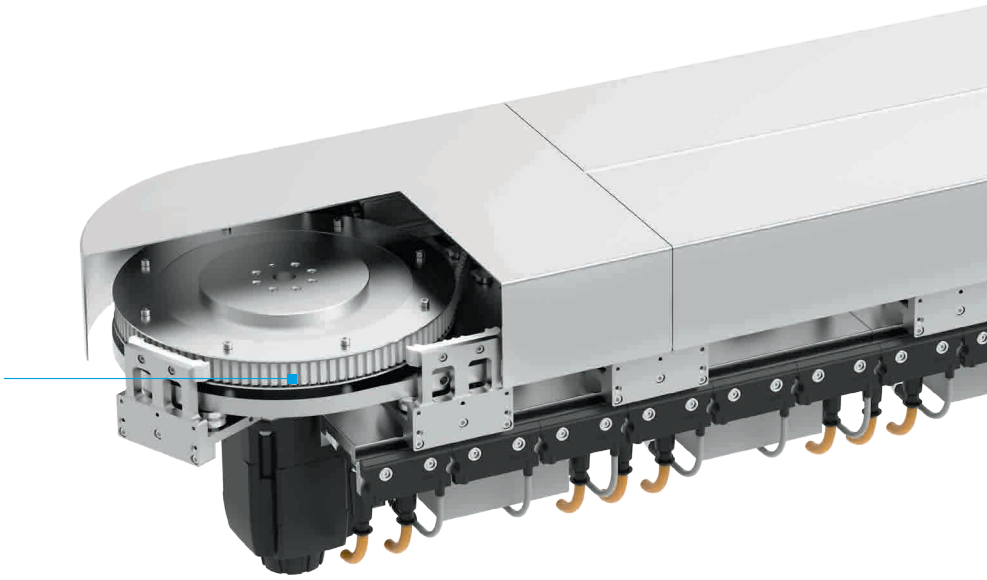
The system at a glance

The Multi-Carrier-System MCS® as a closed recirculating conveyor system is ideal as a standalone transport solution in highly dynamic machines such as in packaging systems. This configuration enables a compact system layout and at the same time cost-effective return transport of the carriers.

This concept, already well tried and tested, can be used in all mounting positions. A special V-guide system ensures backlash-free guidance of the carriers at all times, so that the system can be used horizontally, vertically or installed at any angle. Thanks to a cost-effective toothed belt the carrier is returned quickly. MCS® is only used where required by the process. In system concepts with process stations on both sides of the recirculating conveyor system, a second MCS® section can take the place of the toothed belt.

Highlights

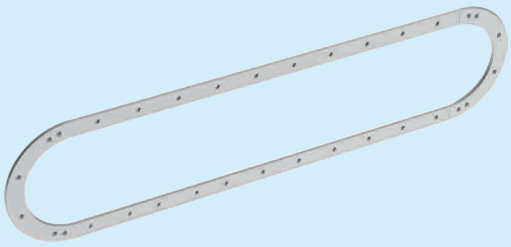
- Highly flexible MCS® section with cost-effective toothed belt return transport
- Extremely high dynamic response through MCS® in combination with precision V-guide system
- Compact design with freely definable, custom mounting position
- Access to the product from underneath too
- Jerk-free movement of the carriers throughout the entire recirculating conveyor system



Fabric-reinforced high-performance toothed belt for high dynamic response when negotiating curves and return transport of the carriers

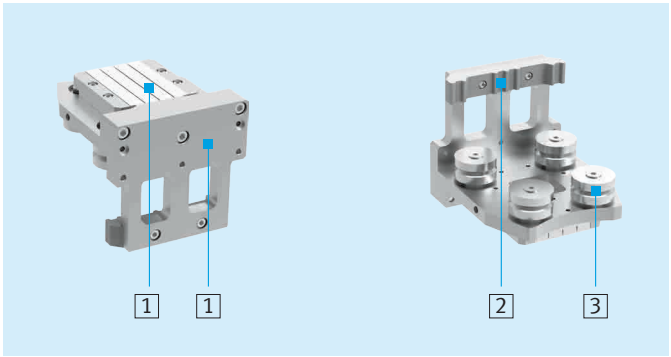
Guide system

The precision-ground V-guide system with permanent lubrication guarantees low-wear operation, low friction and high precision. The carriers are guided throughout the entire movement, including during their return transport via the toothed belt. The guide absorbs the forces and torques during the dynamic movement of the carriers.



Standard carriers

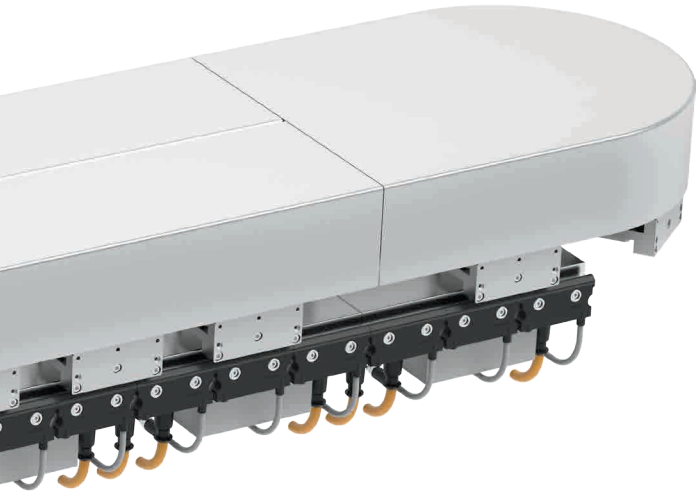
The carriers are guided all the way around the recirculating conveyor system using a precision V-guide system, and can perform various functions: product transport directly on a carrier, flexible format changeover using two carriers or basic pusher functions for pushing and sorting products. The low-wear track rollers enable backlash-free and precise carrier movement. The three magnetic plates in the carrier permit flexible and highly dynamic movement and positioning of the carrier on the linear motor section. The carrier's precisely interlocking teeth create a positive engagement with the toothed belt during return transport. An RFID tag for assigning the carriers is available as an option.

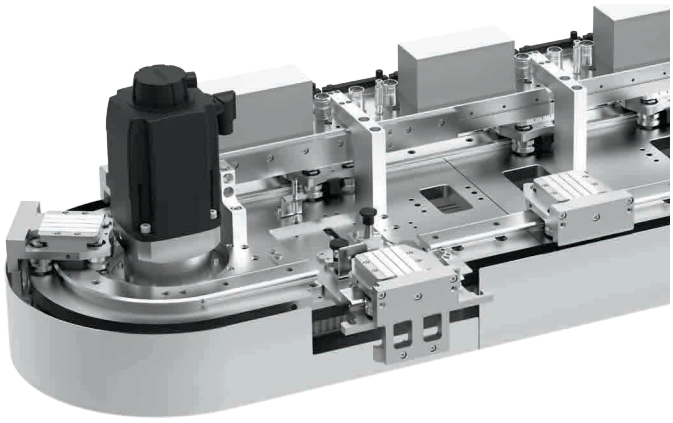


1
- Permanently mounted and wear-free magnetic plate(s)
- Integrated position magnet for control
- Mechanical interface for application-specific and product-specific holders and adapters
- Material: Aluminium

2
- Wear-free and precisely interlocking teeth for a positive engagement with the toothed belt
- Material: PTFE

3
- Preloaded rollers for backlash-free movement of the carriers on the V-guide





Integrated lock in the V-guide for easily inserting and removing carriers without the need for tools.

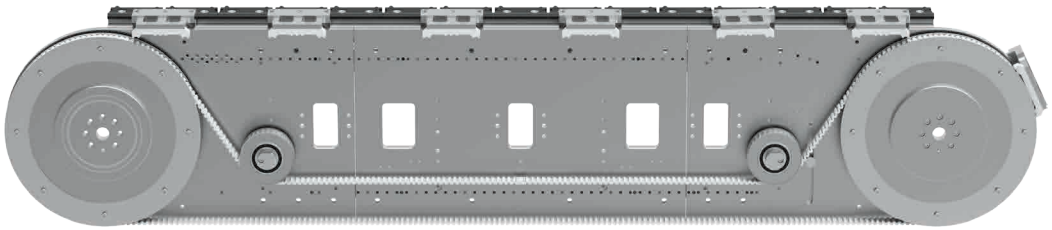
The MCS® as a closed recirculating conveyor system

Section layout

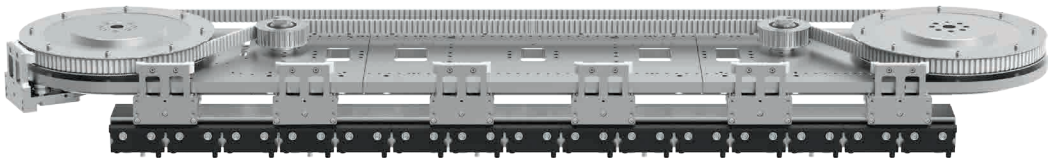
MCS® individual section in any mounting position

The closed MCS® section with toothed belt return transport can be mounted in any position and is very compact in all three dimensions. Cost-effective and positive-locking return transport of the carriers takes place via the toothed belt.

- With vertical recirculation, the product can be transported directly on the carrier
- With horizontal recirculation, the product can be attached laterally. This permits access from underneath
- Seamlessly synchronised transition of the carriers from the linear motor section to the servo-controlled toothed belt
- Return transport takes place through positive locking on the toothed belt



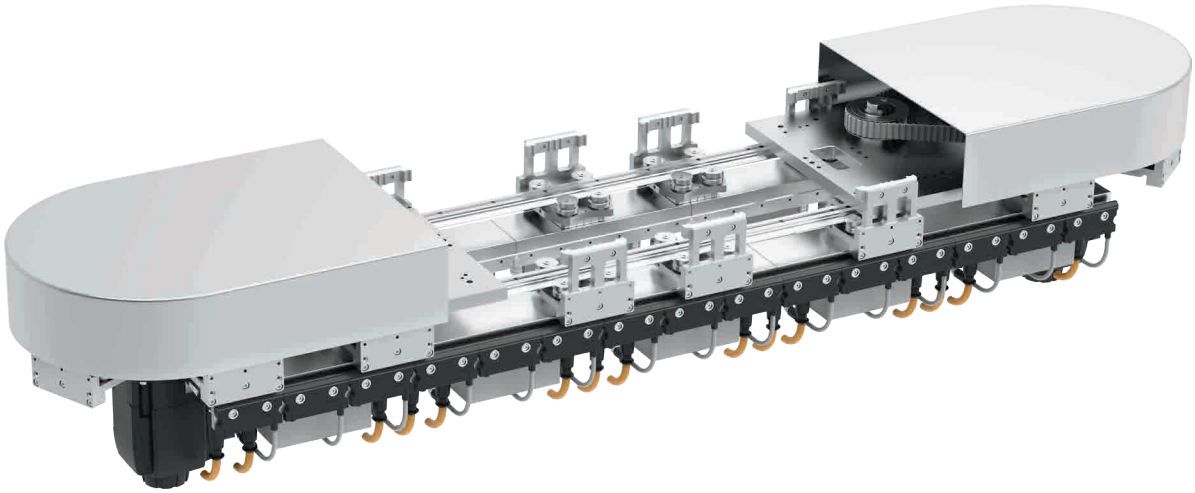
Vertical recirculation of carriers



Horizontal recirculation of carriers

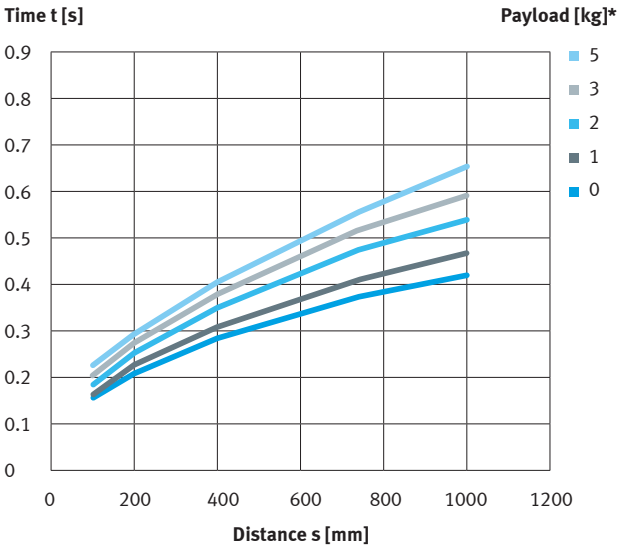
MCS® double section in any mounting position

- Extremely compact system design with maximum flexibility: two linear motor sections are available for processing on both sides at the process stations
- Two independent servo-controlled toothed belts ensure trouble-free transport around curves
- Free mounting position



Technical data

Achievable positioning times on the MCS® section
Guide values determined at maximum dynamic response, carrier with one magnetic plate



MCS® section/ carrier variants	One magnetic plate	Two magnetic plates
Carrier dimensions [mm]	117 x 109 x 14	120 x 109 x 14
Carrier weight [kg]	1.8	2.1
Max. payload* [kg]	5	8
Max. speed [m/s]	4	4
Max. acceleration [m/s²]	30	30
Max. feed force [N]	91	182
Repetition accuracy 1 carrier [mm]	±0.02	±0.02
Repetition accuracy n carriers** [mm]	±0.1	±0.1
Return transport		
Max. speed [m/s]	2	2

* Recommended payload (product holder and product) for optimum service life of the guide system, higher payloads on request
** With RFID compensation, better repetition accuracies on request

Linear motors and displacement encoder

Linear motors EMLX

At the heart of the Multi-Carrier-System MCS® are the powerful, three-phase linear motors that are combined into a continuous MCS® section. These provide the feed force for moving the individual carriers. Various mounting options enable the motors to be installed in any position. The motors are characterised by a sturdy, fully encapsulated design and a stainless steel surface. Thanks to IP65 protection they are easy to clean and can also be used in harsh environments. There are several motor versions with different cooling concepts to ensure an optimised machine layout.

Modular motor system EMLX: different variants in two widths
You will find details about the section configuration on page 8 and 9.

Highlights

- Modular motor system with various options
- MCS® section configuration tailored to your requirements
- Protection to IP65
- Sturdy thanks to full encapsulation and stainless steel surface
- Free mounting position
- Different cooling concepts (air/water)
- Two widths and different motor segment lengths

EMLX - AS - 90 - 102 - 1 B - W - S

Motor type
[AS] AC synchronous

Width
[90] 90
[160] 160

Length
[306] 306
[408] 408

Number of motor segments
[1] 1
[2] 2
[3] 3
[4] 4

Electrical interconnection
[] Motor with neutral point
[B] Motor without neutral point

Cooling
[] Via convection
[L] Via axial fan
[W] Via water cooling

Electrical connection
[A] Angled plug
[S] Straight plug

You will find more details in the technical data sheet for the Multi-Carrier-System MCS®
→ Support Portal

Certified to UL and CSA

EMLX-AS-90-XX (width 90 mm)

EMLX-AS-90-**306-3**
Length: 306 mm
Motor segments: 3 x 102 mm

EMLX-AS-90-**306-1**
Length: 306 mm
Motor segments: 1 x 306 mm

EMLX-AS-160-XX (width 160 mm)

EMLX-AS-160-**306-3**
Length: 306 mm
Motor segments: 3 x 102 mm

EMLX-AS-160-**306-1**
Length: 306 mm
Motor segments: 1 x 306 mm

Absolute displacement encoder SDAT

The contactless and contamination-resistant absolute displacement encoder with Hall sensor technology enables closed-loop operation for maximum dynamic response and precision of the carriers.

Technical data
- Displacement encoder resolution: 1 µm
- Protection to IP65
- DRIVE-CLiQ interface

Different variants in line with the motor segment lengths of the MCS®
- SDAT 102 mm
- SDAT 204 mm (available from the end of 2021)
- SDAT 306 mm
- Dimensions: 102/204/306 x 11 x 51 mm (L x W x H)

SDAT-MCS-HS-102
SDAT-MCS-HS-204
SDAT-MCS-HS-306

Motor and sensor cables

- Available in the standard lengths 5 m, 10 m, 15 m
  Other lengths on request
- Connection technology on motor and displacement encoder side in IP65
- Motor cables with TwiLock plug and reduced diameter for minimum component density and small bending radii
- Sensor cables according to the DRIVE-CLiQ standard

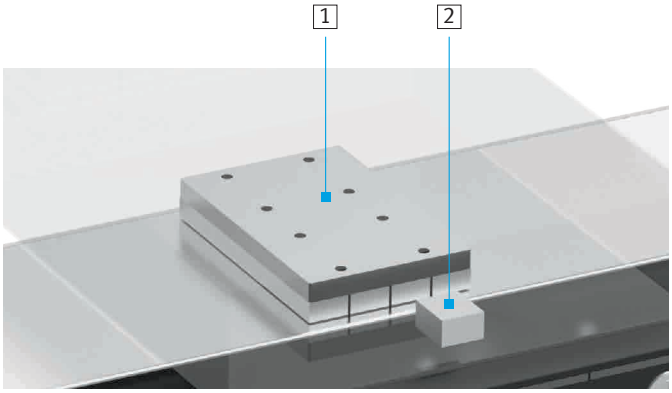
NEBM-M23FG8-E-X-CS
Cable lengths: 5, 10, 15 m
Other lengths on request

NEBC-M12G8-E-X-NS-R3G8-DQ-CS
Cable lengths: 5, 10, 15 m
Other lengths on request

Magnetic plate and position magnet

1 Magnetic plate
- Four high-energy NdFeBr magnets on a steel plate with threads
- For integration in custom carriers
- Several magnetic plates can be installed in one carrier to multiply the feed force
- Dimensions: 51 x 78 x 10.5 mm (L x W x H)

2 Position magnet
- Integrated in the carrier for position sensing by the displacement encoder
- Dimensions: 15 x 13 x 8 mm (L x W x H)



Your competitive edge – one precisely fitting hardware and software solution for optimum performance

From a simple standard application to a high-end application, the modular Multi-Carrier-System MCS® is your custom-fit system solution with scalable software – no matter whether you prefer a ready-to-apply solution or need an open software open software solution with precise simulation.

The MCS® uses standard components from the modular system of the SINAMICS S120 with additional Technology Extension RAILCTRL for controlling the MCS® section.

At controller level, there is a free choice between several SIMATIC hardware and software solutions with Step7 Professional in the TIA Portal. For high-end applications a toolkit for creating a digital twin for SIMATIC is available. With its help, you can virtually commission your machine with NX MCD, SIMIT and PLCSIM Advanced.

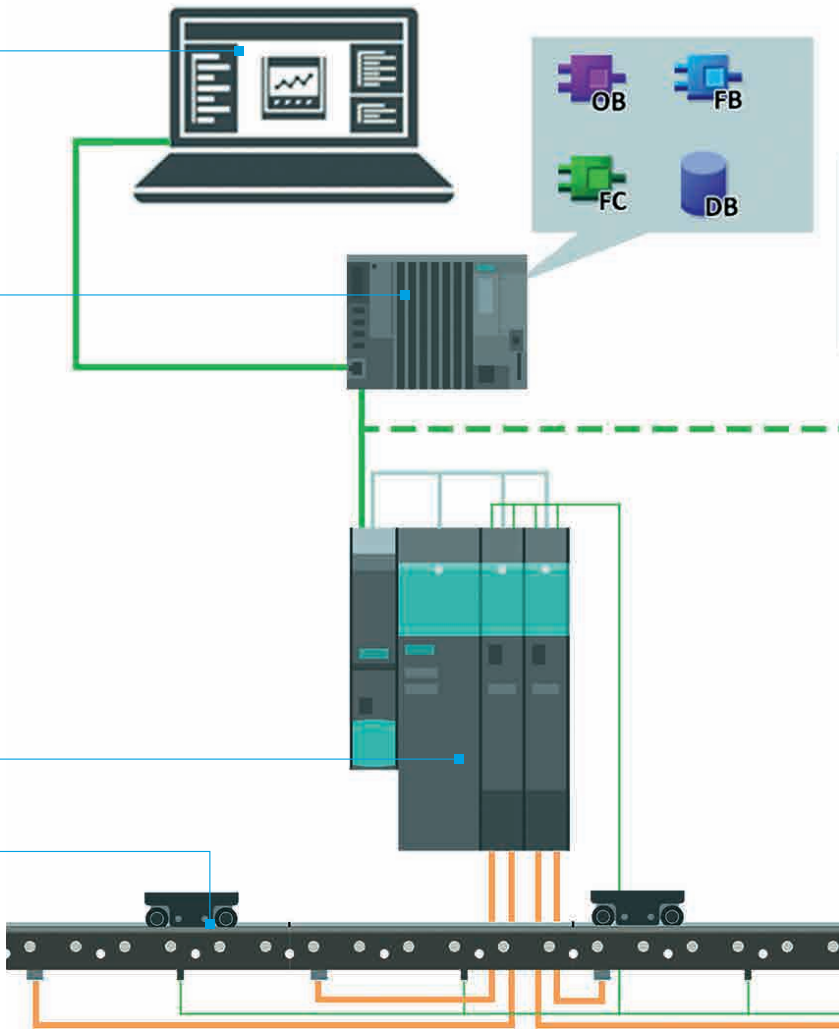
The system at a glance

Easy to program
e.g. with the TIA Portal

Controller
e.g. ET 200SP
open controller

Drive
SINAMICS S120:
- CU320-2 PN
- Line modules
- Motor modules

Carrier



Highlights

- Scalable motion control systems for all applications
- Easy programming through full functional scope of PLCopen commands for motion control
- Fully integrated in the TIA Portal
- Open software structure for controlling additional machine modules in the PLC
- Support for basic safety functions STO and SS1E
- Ready-to-install software solutions for fast commissioning
- Worldwide availability and high penetration rate thanks to Siemens standard products

Choice of controller

You can choose from several controllers depending on your requirements and the complexity of your system:

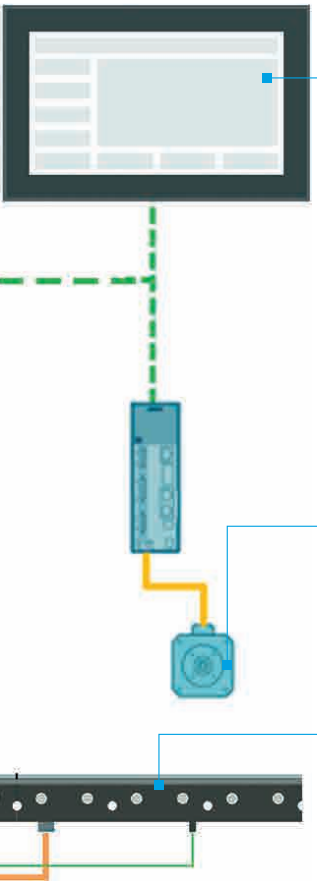
SIMATIC S7-1500 T-CPU with TIA Portal

Hardware controller

Software controller/ open controller

Drive controller

SIEMENS



Optional extension
e.g. HMI for central diagnostics and operation

Optional extension
e.g. additional drive for a conveyor

Modular MCS® section
Choice of motor types, see page 38

Easy programming – with innovative software solutions from Siemens

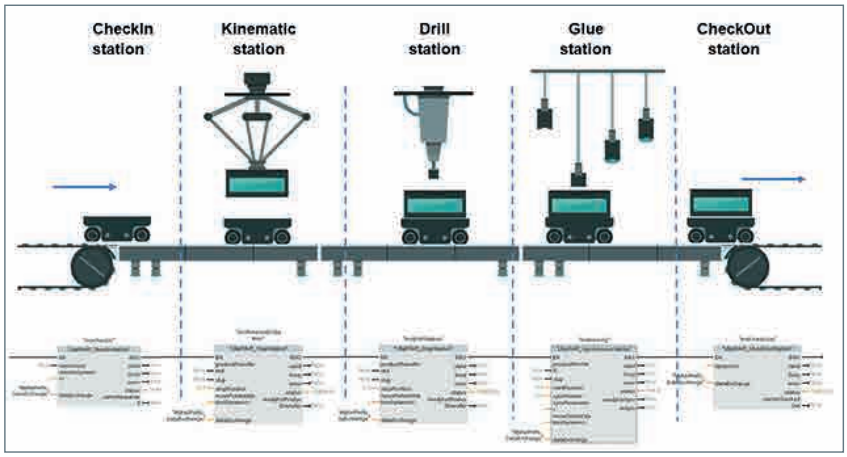
SIMATIC and the TIA Portal

Perfect for your applications. The library LRailCtrl contains all the relevant functionalities for controlling your Multi-Carrier-System MCS®:

- Free library download in SIOS including documentation
- All motion control functions in a kinematic system can be used - from positioning to synchronisation to integration
- Standardised PLCopen V2.0 interface for motion control functions
- Visualisation of each carrier as a separate technology object in the TIA Portal
- Monitoring functions for following error and autonomous collision avoidance
- Ability to control additional machine modules through an open software structure
- Freely expandable through the use of standard system components and functions
- The station concept is perfect for the quick creation of simple sequences and assembly applications

Highlights

- Support for modular machine concepts
- TIA Portal library with ready-made function blocks
- Easy programming via drag & drop
- Fast commissioning and diagnostics using parameterisation in the TIA Portal
- The standard for a greater overview



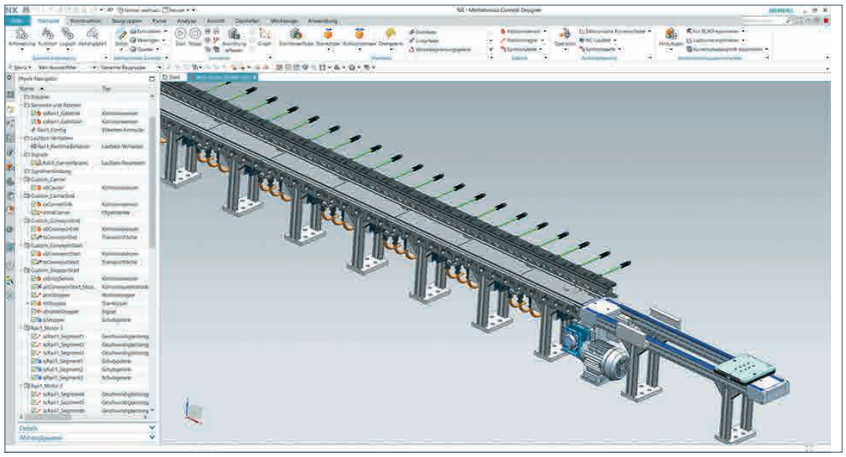
Accelerated engineering and faster commissioning – with digital twin and the Virtual Commissioning Toolbox

Create your digital twin in next to no time with the VC Toolbox for MCS®:

- Virtually commission the MCS® section quickly and easily with SIMIT, NX MCD (Mechatronics Concept Designer), S7-PLCSIM Advanced and the MCS® VC Toolbox
- Effortlessly integrate an MCS® in your system – with the digital twin, you can see the improvements compared with conventional conveyor technology in advance
- Review the functionality of the PLC program on the digital twin – changes are immediately visible in the NX MCD
- Plug and work – after your program has been put through its paces on the digital twin, it is transferred to your system
- Subsequent requirements or new product variants and formats are not a problem, test them first on the digital twin
- A demo case of a digital twin is available to download for testing

Highlights

- Continuous user guidance up to generation of an executable MCS® project
- Intuitive, graphical user interface
- Project engineering with just a few clicks
- The TIA Portal as the central unit for parameterisation and diagnostics
- Time-saving and convenient software solutions from Siemens



An executable MCS® without any programming – the MCS Creator for TIA Portal shortens your time to market

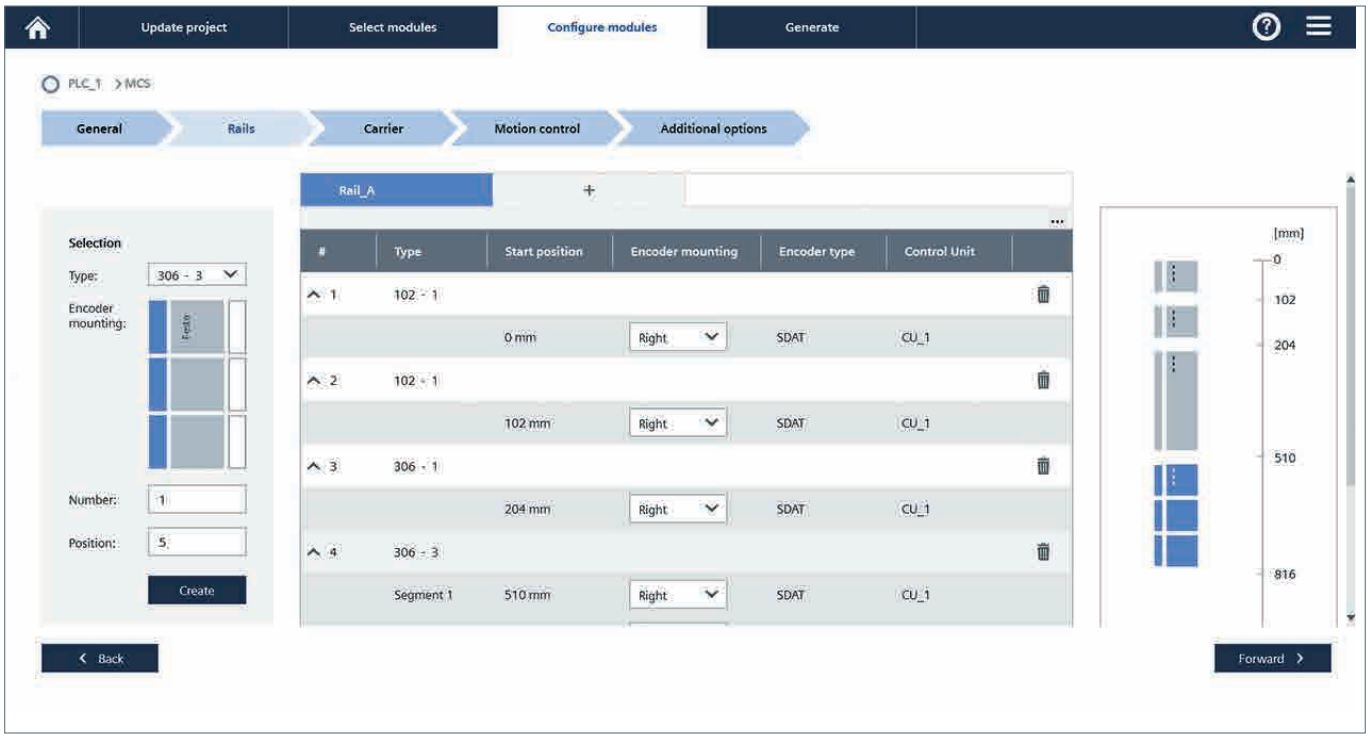
Plan your MCS® section graphically in just a few steps and then the Modular Application Creator automatically generates the executable project with the Equipment Module MCS® – it doesn't get any easier.

In the Modular Application Creator, the MCS® can simply be added to an existing TIA Portal project or a template project with an appropriate controller as a basis.

The subsequent parameterisation of the system takes place entirely in the TIA Portal – no additional drive engineering tool is necessary. This tool delivers ready-to-install software solutions for fast commissioning.

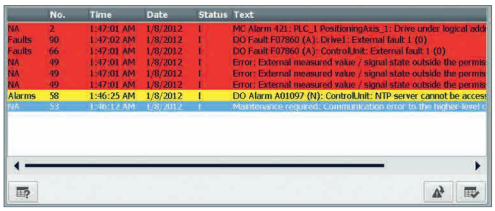
Highlights

- Selection of the motor variants in line with the process requirements
- Parameterisation of the carriers based on geometry and dynamic response
- Executable project with same programs and graphical simulation
- Advanced settings for custom configuration of the MCS® section are available in addition to the default basic settings
- Flexible section configuration
- Basic integrated safety functions STO/SS1E are easy to select
- Simple multi-rail functionality
- Enhanced diagnostics (alarm handling)



Greater safety and availability – through pre-integrated additional functions

With SINAMICS Safety Integrated and the convenient diagnostic functions for the MCS®, we provide you with a safe machine with greater availability – and thus generate added value for you and your customers.

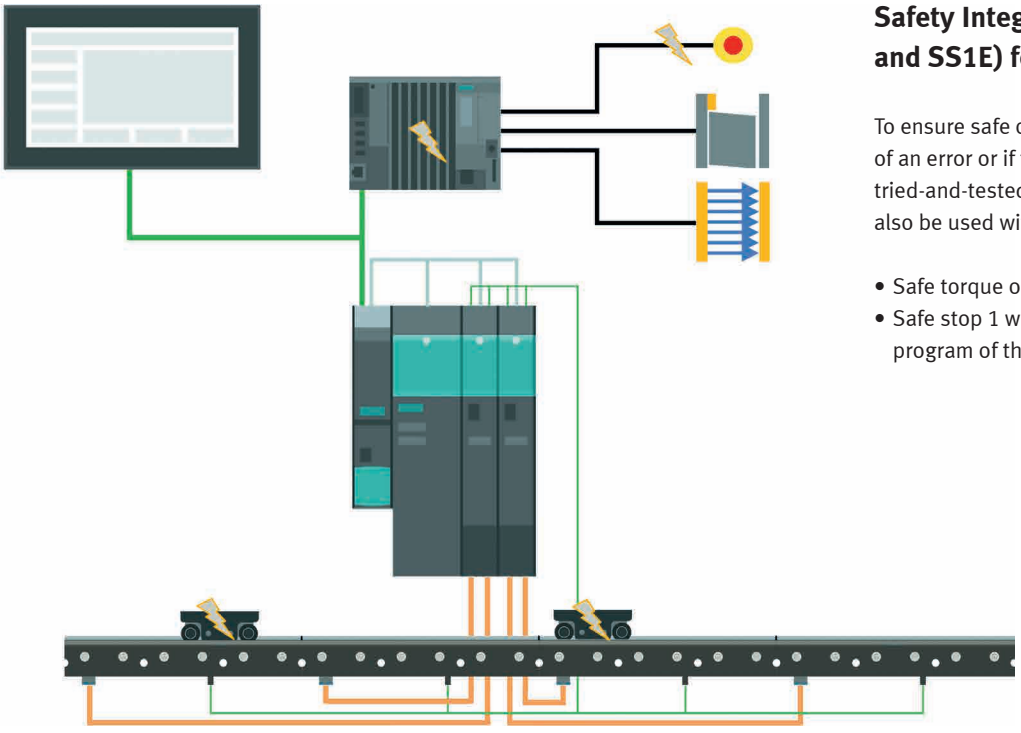


Diagnostics in the controller:

- Display of the section, segment and carrier status
- Fast pinpointing of errors and reaction directly in the user program

Diagnostics for the operator:

- Gathering all messages from the drives, PLC and software of the MCS®
- Message display in the TIA Portal, on the HMI and on the web server
- Support for initial error evaluation on the machine



Safety Integrated Basic Functions (STO and SS1E) for the SINAMICS S120

To ensure safe operation of the system in the case of an error or if the emergency stop is pressed, the tried-and-tested basic functions STO and SS1E can also be used with the MCS®:

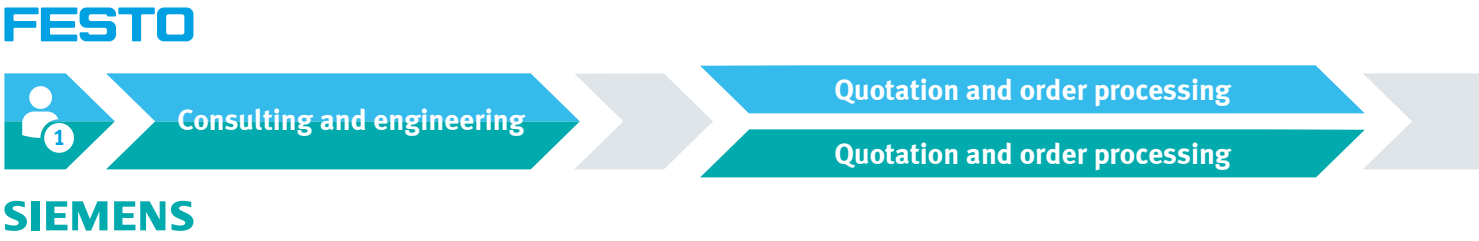
- Safe torque off (STO) directly in the drive
- Safe stop 1 with external stop (SS1E) via the user program of the PLC

MCS® – a joint development by Festo and Siemens

One central contact person, from the initial consultation through to service*

The Multi-Carrier-System MCS® was developed jointly by Festo and Siemens. Both partners bring their own core competencies to the project because your advantage is what motivates us. That is why you will receive advice from two specialists for your project: Festo looks after all the questions related to the mechatronics, while Siemens integrates the MCS® into your system control. Despite this, you have one central contact partner for your project over the entire lifecycle of the machine, from engineering to service.

This person handles all the coordination and activities between the two partners.
Festo and Siemens: two strong partners – working together for your success!



Consulting and engineering
We offer you an expert consulting service both on site by experienced sales consultants and by our project engineers in the specialist departments.

You get support with engineering the complete transport system, from the mechatronics to the drive and control technology. We work with you to choose the optimal solution for your application from our extensive modular system.

Our consulting services include:
- Designing the complete transport system
- Selecting the standard modules or customised solutions
- Linking with other machine modules, robots or handling systems
- Carrying out individual application tests with our test systems (see pages 48 and 49) – at Festo, Siemens or on site

Quotation and order processing
Once the best solution for your requirements has been worked out, you will receive two perfectly matching quotations: one from Festo for the mechatronics and one from Siemens for the appropriate drive and control technology.

This means that your specific terms with both partners can be taken into account, and you receive an economical overall package.

Of course you can also integrate other components and systems from Festos and Siemens wider product ranges into your project – simply talk to us!

We offer you:
- Fast quotation and order processing thanks to coordinated processes
- Perfect integration of our complete product range into your application solution

*For your MCS® project, you are assigned a central contact partner.
This person handles all the necessary coordination between Festo and Siemens for the duration of the project.

Benefit from our experience

Commissioning

Commissioning
Commissioning the MCS® is quick and easy.
If you wish, we can fully assemble and test the mechanical system before delivery. This means that immediately after the installation you can start with the software commissioning by using our tools and software tools.

We will be happy to support you on site with our expertise for the mechatronic integration into your system and with developing the application software.

We provide the following optional services:
- Commissioning support for mechatronics
- Software development support

Service

Service
If servicing is required, simply get in touch with the central contact partner for your MCS® project.

They will arrange all the necessary steps with both partners, from fault isolation to on-site service.

Our global network of service technicians for mechanical systems, electronics and software guarantees the ability to respond as quickly as possible for maximum productivity.

Our range of services for you:
- Global availability of spare parts through the use of standard components
- Global support expertise
- Straightforward service delivery through standardised service processes

Test the MCS® with your applications!

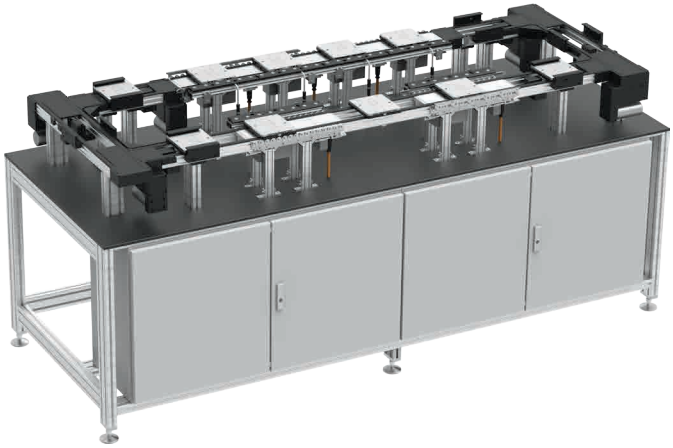
Starter kits for every application

We offer you test systems to get you up and running quickly and easily. The various starter kits provide an insight into a specific aspect of the Multi-Carrier-System MCS®. All test systems offer you the full range of functions and are ready to use straight away. In addition to this, we offer you personal instruction and support.

Try it out for yourself
Just try it out for yourself and see how you can optimise your system with the Multi-Carrier-System®. With our systems, you can check all the important parameters such as dynamic response, cycle time, synchronous movement, process sequence or positioning accuracy under real conditions – while using your workpieces or products.

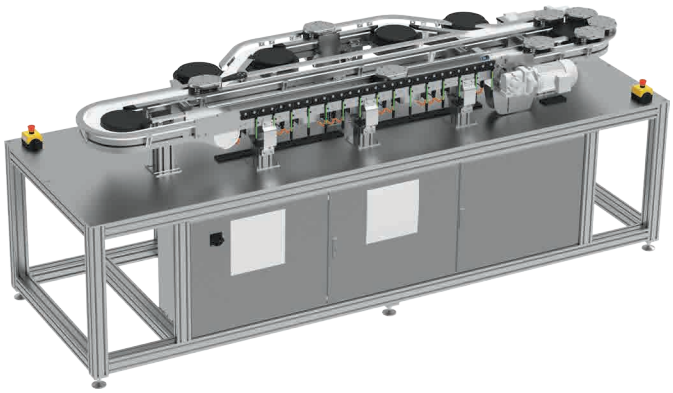
Highlights

- Fully functioning test systems
- Different variants for different transport solutions
- Fully assembled and ready to use straight away – plug and work



MCS® in combination with the elcom transfer system TLM 1500

- Complete recirculating conveyor system
- One MCS® section combined with two transfer lines:
  - Section length: 1224 mm
  - Configuration: 4x motor 306-1
- Two MCS® sections with two motors each integrated in an end-to-end transfer line:
  - Section length: 408 mm each
  - Configuration: 1x motor 102-1 and 1x motor 306-1 each
- Electrical energy supply: 400 V/16 A
- Dimensions: 2.6 x 1 x 1.2 m (L x W x H)
- Weight: approx. 600 kg



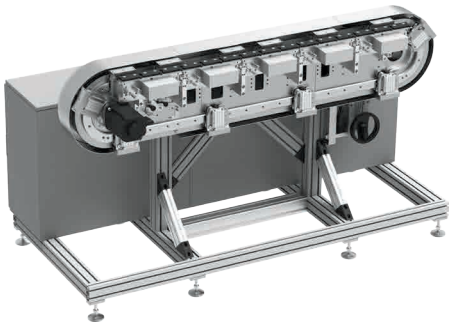
MCS® in combination with the FlexLink pallet conveyor X85P

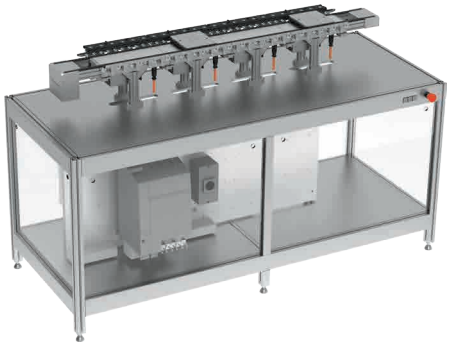
- Complete recirculating conveyor system
- One MCS® section:
  - Section length: 1536 mm
  - Configuration: 5x motor 306-3
- With deflectors for outward transfers and indexing on the FlexLink system
- Energy supply
  - Electrical: 400 V/16 A
  - Pneumatic: 6 bar
- Dimensions: 3.5 x 1.2 x 1.4 m (L x W x H)
- Weight: approx. 600 kg

MCS® with closed recirculation

MCS® with carriers in a closed loop and return transport via servo-controlled toothed belt. Swivelling oreintation allows operation in horizontal, vertical or any intermediate position.

- Section length: 1536 mm
- Configuration: 5x motor 306-1
- Electrical energy supply: 400 V/16 A
- Dimensions: 2 x 1 x 1.5 m (L x W x H)
- Weight: approx. 600 kg



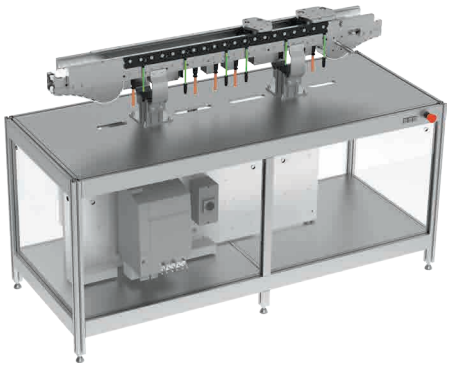


MCS® in combination with the elcom transfer system TLM 1500

- MCS® section with 2 carriers (without recirculation)
  - Section length: 1224 mm
  - Configuration: 4x motor 306-1
- Electrical energy supply: 400 V/16 A
- Dimensions: 1.9 x 0.8 x 1.3 m (L x W x H)
- Weight: approx. 350 kg

MCS® in combination with the Rexroth transfer system TS 2*plus*

- MCS® section with 2 carriers (without recirculation)
  - Section length: 1224 mm
  - Configuration: 4x motor 306-1
- Version: 240 x 240 mm carriers
- Electrical energy supply: 400 V/16 A
- Dimensions: 1.9 x 0.8 x 1.3 m (L x W x H)
- Weight: approx. 350 kg

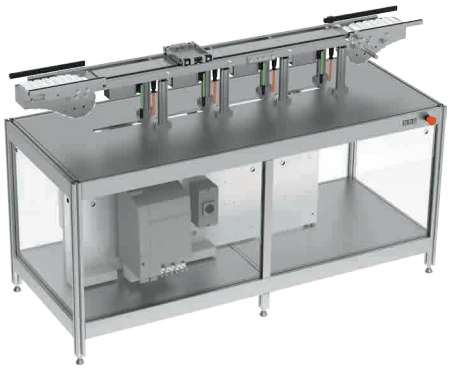


MCS® in combination with the FlexLink pallet conveyor X85P

- MCS® section with 2 carriers (without recirculation)
  - Section length: 1020 mm
  - Configuration: 2x motor 306-1, 4x motor 102-1
- Electrical energy supply: 400 V/16 A
- Dimensions: 1.9 x 0.8 x 1.3 m (L x W x H)
- Weight: approx. 350 kg

MCS® in combination with the FlexLink XH polymer chain conveyor

- MCS® section with 2 carriers (without recirculation)
  - Section length: 1224 mm
  - Configuration: 4x motor 306-1
- Electrical energy supply: 400 V/16 A
- Dimensions: 1.9 x 0.8 x 1.3 m (L x W x H)
- Weight: approx. 350 kg



Your notes on the Multi-Carrier-System MCS®

Productivity

Maximum productivity is a question of ambition
Do you share this attitude? We will be glad to help you achieve this goal – through our four outstanding qualities:
• Security • Efficiency • Simplicity • Competency

We are the engineers of productivity.

Discover new dimensions for your company:
→ **www.festo.com/whyfesto**

135844 en 2021/08 – Errors and omissions excepted