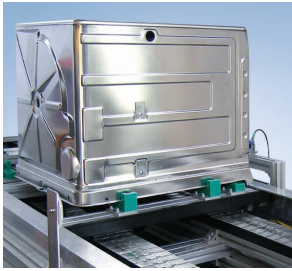
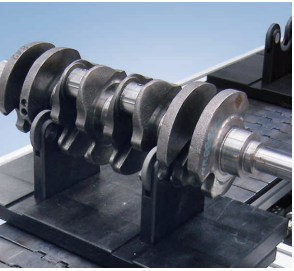
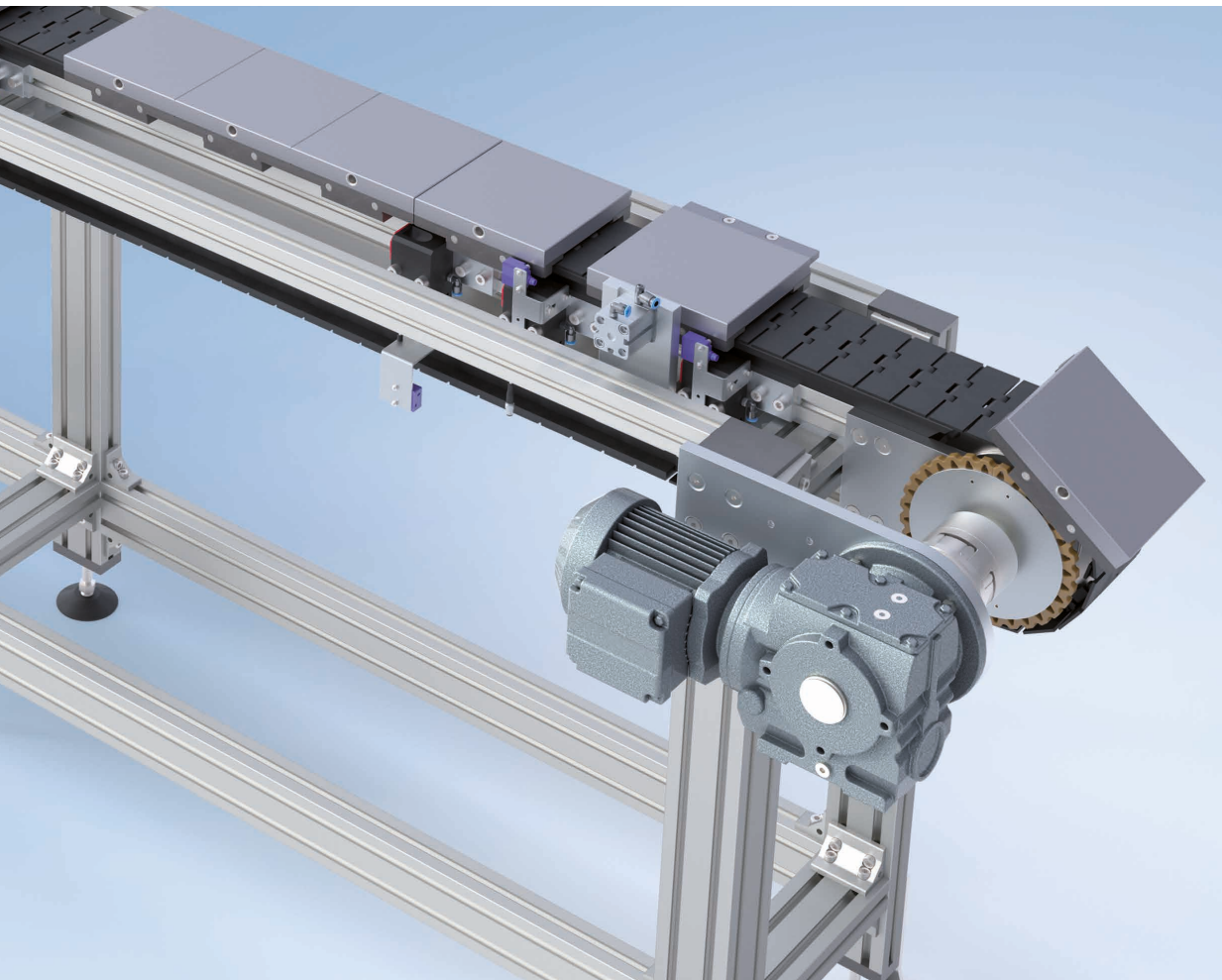




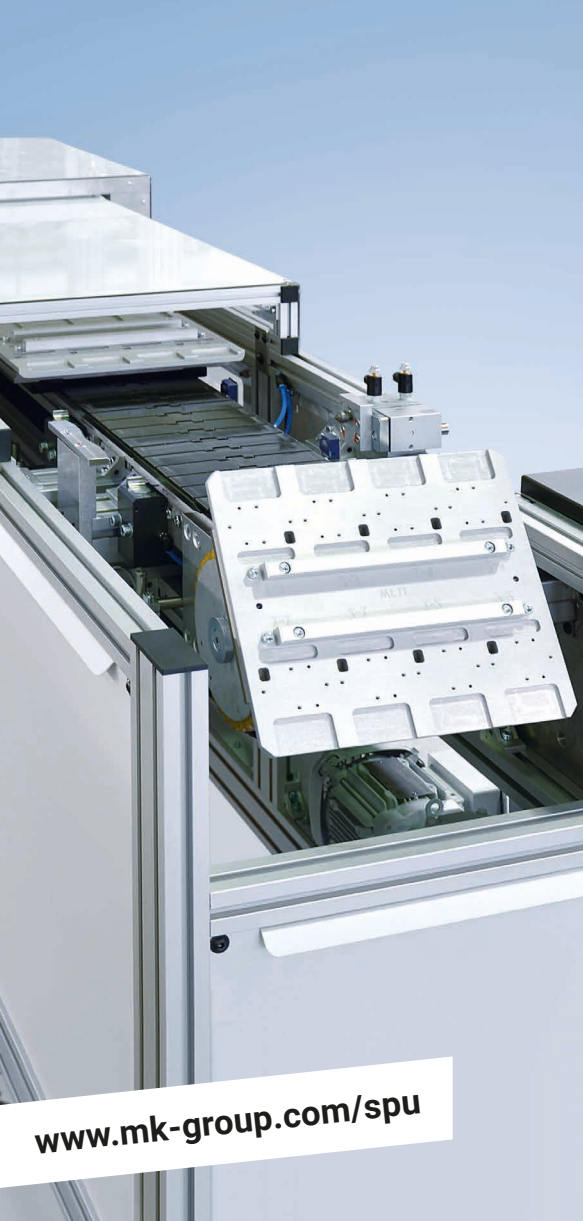
Accumulating Pallet Recirculation Systems SPU 2040



... with space-saving pallet return in the lower run



Accumulating Pallet Recirculation Systems SPU 2040



» Feeding and Buffering
Workpieces in the
Tightest Spaces. «

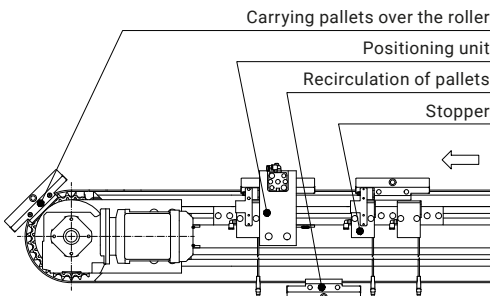
The SPU 2040 is an accumulating pallet recirculation system for cost-effective inter-linking, feeding, buffering, positioning and separation of workpieces in the tightest of spaces with automatic workpiece carrier recirculation. The system's sturdiness and wide range of variants makes it suitable for virtually all automation and material flow applications.

The SPU 2040 allows for acyclic operation (i.e. independent of the infeed cycle) with automatic recirculation of the workpiece carriers. The workpieces on the workpiece carriers are transported by the flat top chain along the upper transport level. They are then available at the start of the belt to be loaded with new workpieces. This eliminates the need for a second conveyor level or lift-and-lower units with complex control elements. It also eliminates the need to load the workpiece carriers on the belt, whether manually or automatically.

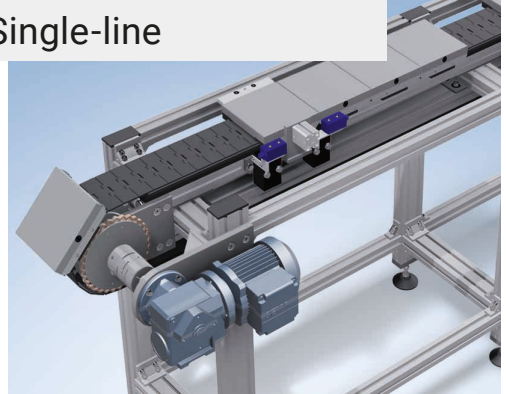
www.mk-group.com/spu

Benefits of the SPU 2040

- Cost-effective and very compact interlinking of two machining stations
- Reliable and dynamic feeding, buffering, positioning and separating
- Compact design with space-saving recirculation of workpiece carriers below the transport level
- Buffering capability compensates for different cycle times within the production line
- Built from proven mk modules and a variety of workpiece carriers for outstanding flexibility
- Transfer lines from 2 to 10 m in length
- Speeds from 4 to 15 m/min
- Low maintenance and wear



Single-line



Dual-line



Double-line



Accumulating Pallet Recirculation Systems SPU 2040

Properties

- ✓ Cost-effective and very compact interlinking of two machining stations
- ✓ Reliable and dynamic feeding, buffering, positioning and separating
- ✓ Automatic, space-saving pallet return below the conveyor level
- ✓ Variable pallets can be adapted to customer requirements

Loading and unloading station for processing parts with positioning unit and separation

Unloading station with positioning unit and separation

Flat top chain
114 mm

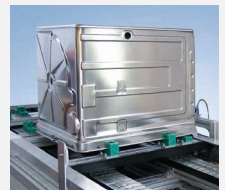
Automatic
pallet transfer

Direct drive AF



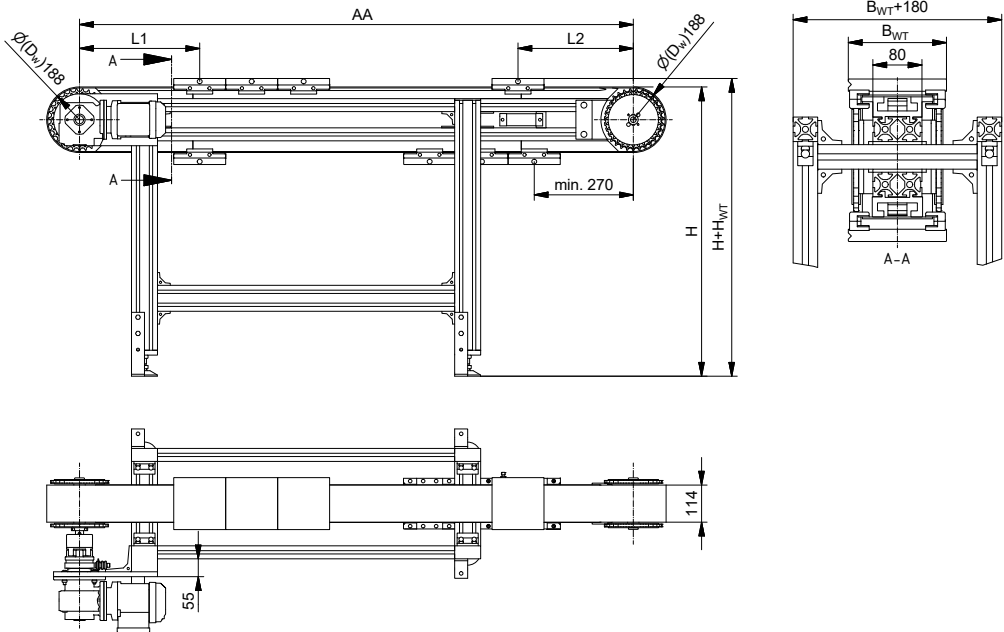
Applications

Automotive, mechanical engineering, appliances, electrical technology, ...



Accumulating Pallet Recirculation Systems SPU 2040

Single line – 114 chain width

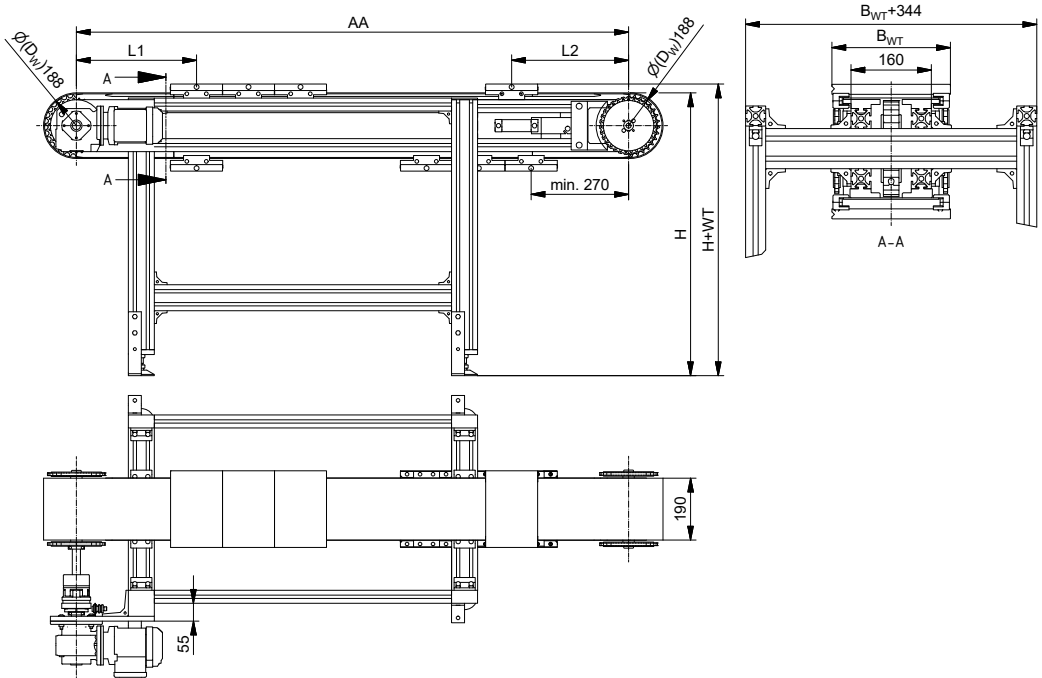


Drawing shows example AF drive

Technical data

Axis distance AA	1.700 - 10.000 mm
Pallet width B_{WT}	160 mm
Chain width	114 mm
Length L1 min.	AC drive: 300 mm, AF drive: 365 mm
Length L2 min.	495 mm
Conveyor height H min.	AC drive: 800 mm depending on motor orientation and motor size AF drive: 465 mm
Speed	4 up to 15 m/min
Total load max.	300 kg, depending on the speed

Single line – 190 chain width



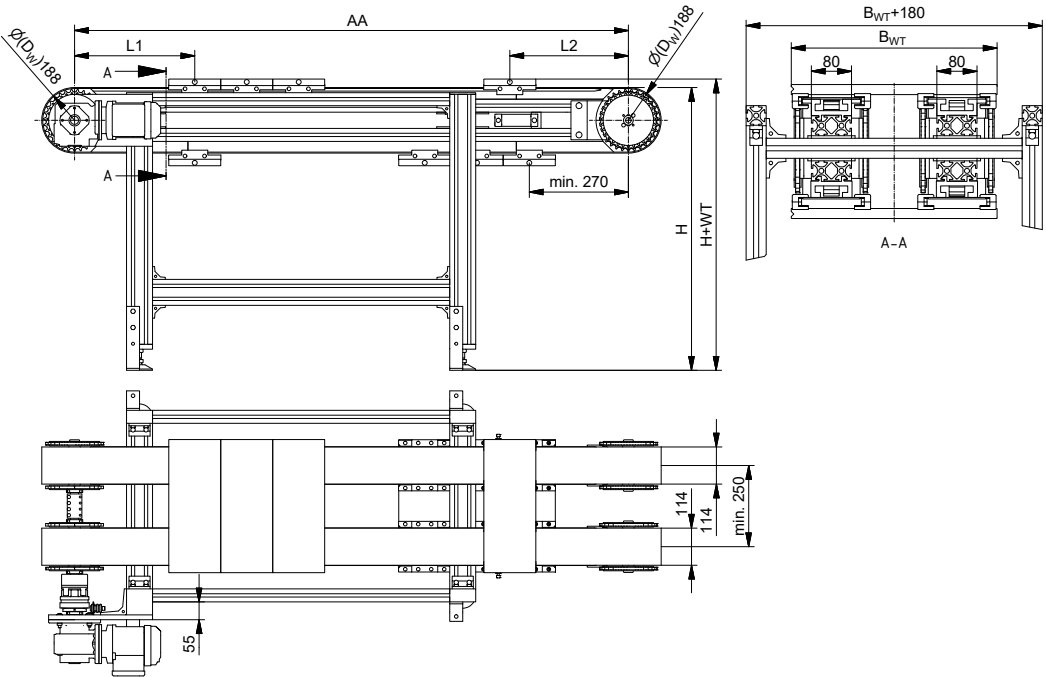
Drawing shows example AF drive

Technical data

Axis distance AA	1.700 - 10.000 mm
Pallet width B_{WT}	min. 236 mm, others on request
Chain width	190 mm
Length L1 min.	AC drive: 300 mm, AF drive: 365 mm
Length L2 min.	495 mm
Conveyor height H min.	AC drive: 800 mm depending on motor orientation and motor size AF drive: 465 mm
Speed	4 up to 15 m/min
Total load max.	300 kg, depending on the speed

Accumulating Pallet Recirculation Systems SPU 2040

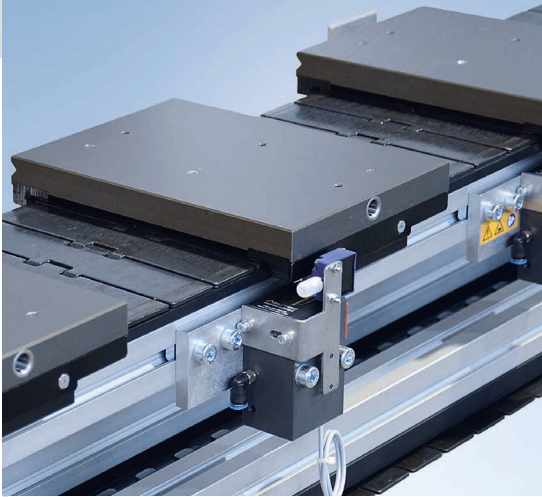
Dual-line or double-line



Drawing shows example double-line

Technical data

Axis distance AA	1.700 - 10.000 mm
Pallet width B_{WT}	Dual-line: per line 160 mm / double-line: min. 410 mm
Line spacing	min. 250 mm, max. depending on the product and pallet
Chain width	114 mm
Length L1 min.	AC drive: 300 mm, AF drive: 365 mm
Length L2 min.	495 mm
Conveyor height H min.	AC drive: 800 mm depending on motor orientation and motor size AF drive: 465 mm
Speed	4 up to 15 m/min
Total load max.	Dual-line for independent, asynchronous operation: 600 kg (300 kg/line), depending on the speed Double-line for coupled, synchronous operation: 450 kg, depending on the speed



Pallet

Different versions of the pallet are available for different requirements. In double-line systems, the pallet width depends on the conveyor width. The workpiece fixture must be known in advance to determine the centre of gravity.

Technical data

- Support plates made from aluminium plates or Series 40 aluminium profiles
- Lateral positioning slot and positioning socket ensure high positioning precision
- POM wear strip
- Permitted max. tare weight = unladen weight (pallet and workpiece fixture)

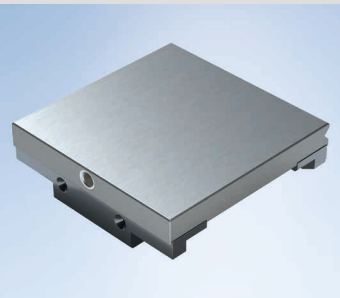
Single-line and dual-line conveyor

Fixture height	Perm. max. tare weight
up to 75 mm	12 kg
up to 100 mm	10 kg
up to 125 mm	8 kg
> 125 mm	6 kg

Double-line conveyor

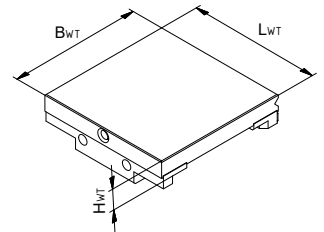
Fixture height	Perm. max. tare weight
up to 75 mm	20 kg
up to 100 mm	16 kg
up to 125 mm	12 kg
> 125 mm	10 kg

Pallet (WT) aluminium plate



Aluminium support plate with hard plate coating

for single-line and dual-line



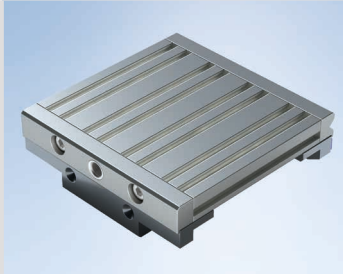
Chain width	Width B_{WT}	Length L_{WT}	Height H_{WT}
114 mm	160 mm	160 mm	26 mm
190 mm	236 mm	160 mm	26 mm

Larger pallet widths and additional pallet lengths are available upon request

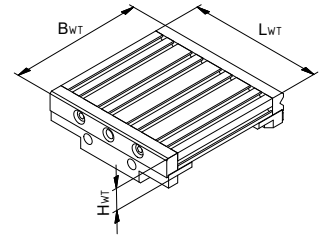
SPU 2040 Components

Pallet (WT) 25/40

for single-line and dual-line



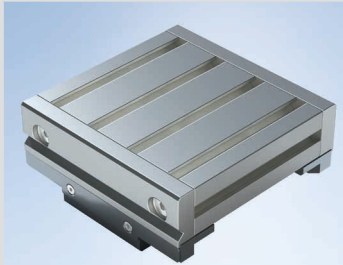
Series 25/40 aluminium support plate



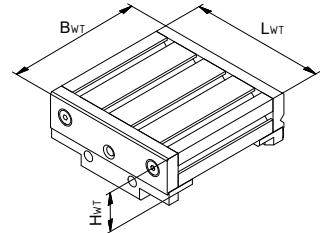
Chain width	Width B_{WT}	Length L_{WT}	Height H_{WT}
114 mm	160 mm	160 mm	28 mm
190 mm	236 mm	160 mm	28 mm

Pallet (WT) 40

for single-line and dual-line



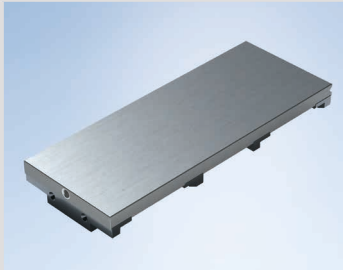
Series 40 aluminium support plate



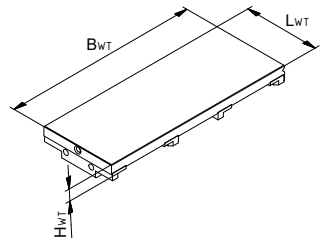
Chain width	Width B_{WT}	Length L_{WT}	Height H_{WT}
114 mm	160 mm	160 mm	48 mm
190 mm	236 mm	160 mm	48 mm

Pallet (WT) aluminium plate „Heavy Load“

for double-line

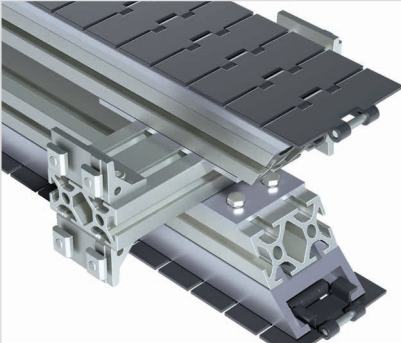
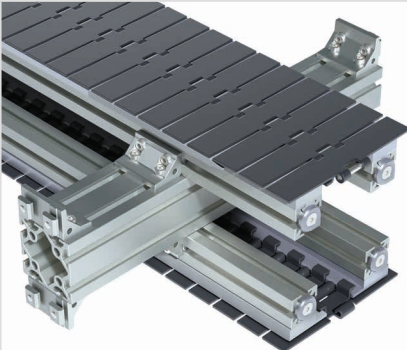


Aluminium support plate with hard plate coating

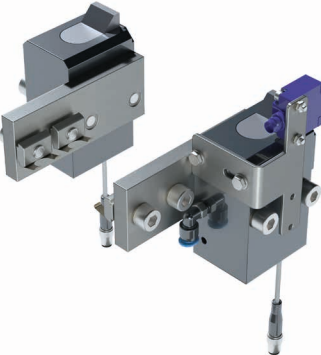
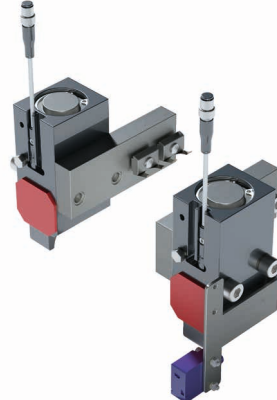


Chain width	Width B_{WT}	Length L_{WT}	Height H_{WT}
114 mm	min. 410 mm	160 mm	26 mm

Transfer lines

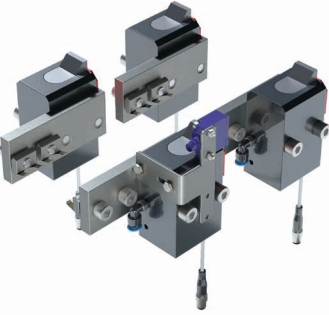
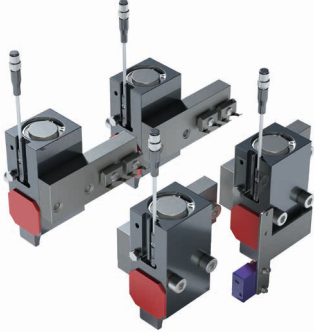
<p>Chain width 114 mm</p> 	<p>Properties</p> <ul style="list-style-type: none"> ■ Flat top chain made of wear-resistant carbon steel
<p>Chain width 190 mm</p> 	<p>Properties</p> <ul style="list-style-type: none"> ■ Flat top chain made of wear-resistant carbon steel ■ Dual-line and double-line are not available

Stoppers

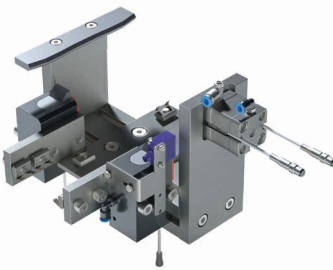
<p>SU 400 top</p> <ul style="list-style-type: none"> ■ Stroke 9 mm 	<p>SU 400 bottom</p> <ul style="list-style-type: none"> ■ Stroke 15 mm 	<p>Properties</p> <ul style="list-style-type: none"> ■ Undamped stopping ■ Permitted total load at 6 bar <ul style="list-style-type: none"> up to $v = 6$ m/min: 100 kg up to $v = 9$ m/min: 75 kg up to $v = 12$ m/min: 60 kg up to $v = 15$ m/min: 50 kg ■ Electrical cylinder detection (inductive optionally available) ■ Equipment options: detection of one or both switch settings of the stopper cylinder plus detection of one or two pallets
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SPU 2040 Components

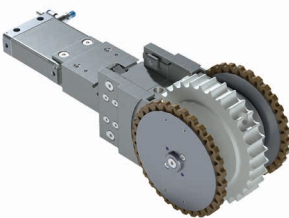
Separators

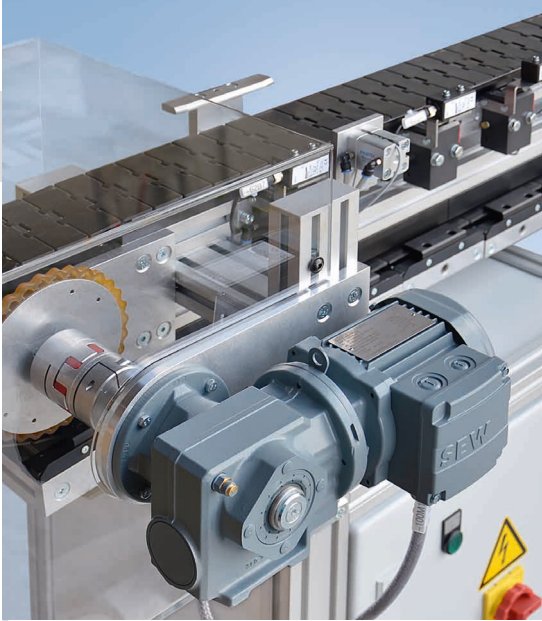
Separator top	Separator bottom	Properties
<ul style="list-style-type: none">Stroke 9 mm 	<ul style="list-style-type: none">Stroke 15 mm 	<ul style="list-style-type: none">Undamped stopping/separatingElectrical cylinder detection (inductive optionally available)Equipment options: detection of one or both switch settings of the stopper cylinder plus detection of one or two palletsPermitted total load at 6 bar<ul style="list-style-type: none">up to v = 6 m/min: 100 kgup to v = 9 m/min: 75 kgup to v = 12 m/min: 60 kgup to v = 15 m/min: 50 kg

Positioning unit with separation

	Properties
<ul style="list-style-type: none">Stroke stopper 9 mm 	<ul style="list-style-type: none">Undamped stopping/separatingElectrical cylinder detection (inductive optionally available)Equipment options: detection of one or both switch settings of the stopper cylinderLifting force (pallet + fixture + product + counterpressure processing):<ul style="list-style-type: none">- max. 140 N at 4 bar- max. 210 N at 6 barGreater lifting force available depending on customer requirementsPrecise positioning of ± 0.2 mm

Tail with automatic tensioning device

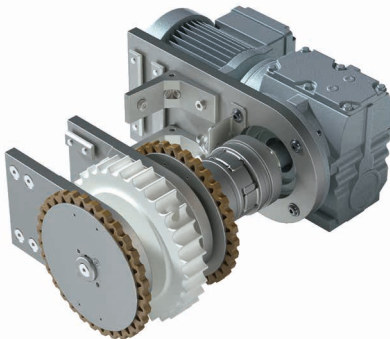
	Properties
	<ul style="list-style-type: none">Pneumatic operationTensioning device guided by linear roller bearings and guide rodsVulkolan cleat pads ensure secure transferring (prevents contamination of the discs by liquid or dulling media)40 mm tensioning distanceMin. 4 bar requiredOptimal tensioning pressure at 6 bar



Drive versions

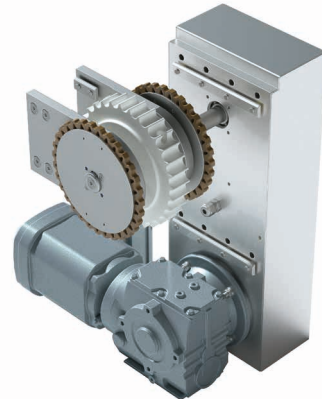
Vulkolan cleat pads ensure secure transfer of pallets over the tail. The pallets are then automatically recirculated below the conveyor level to save space. Divided cleat pads allow for easy replacement.

AF - Direct head drive



- Flange-mounted hollow shaft motor
- Conveyor speeds between 4 to 15 m/min depending on the required cycle time of the pallets
- Location: left or right of the conveyor line
- The drive sprocket wheel is connected to the motor via an adjustable safety ratchet clutch
- Vulkolan cleat pads ensure secure pallet transfer
- The motors and safety clutches are individually configured depending on the system requirements

AC - Indirect head drive

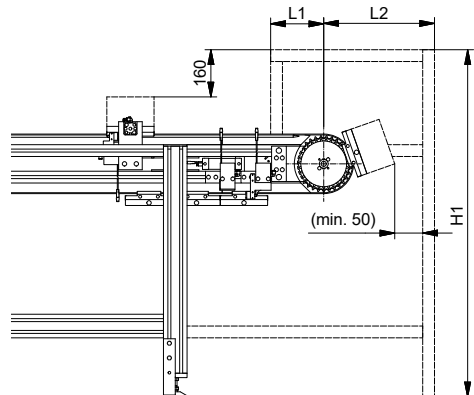
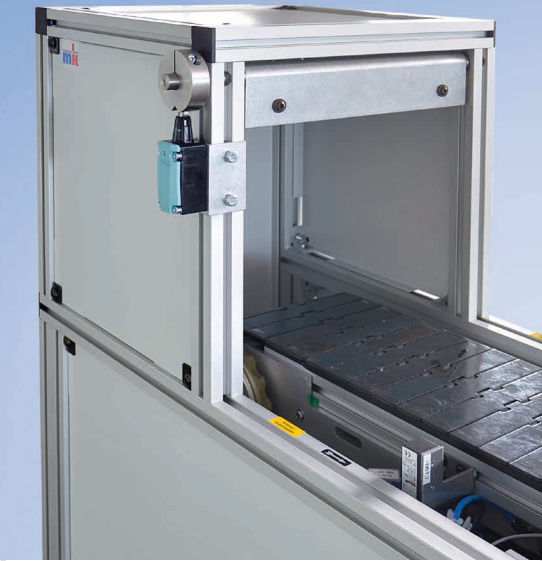


- Gearmotor with shaft journal
- Conveyor speeds between 4 to 15 m/min depending on the required cycle time of the pallets
- Location: left or right of the conveyor line
- The drive sprocket wheel is connected to the motor via an adjustable safety ratchet clutch
- Vulkolan cleat pads ensure secure pallet transfer
- The motors and safety clutches are individually configured depending on the system requirements

SPU 2040 Components

Protective device guard with pendulum flap

The protective device guard at the tails minimises the risk of injury for the operator. A pendulum flap is triggered when touched and stops the entire system. A cover between the flat top chain and the frame is available on request. A protective device guard without a pendulum flap in profile design or as a sheet metal hood is also optionally available.



Technical data

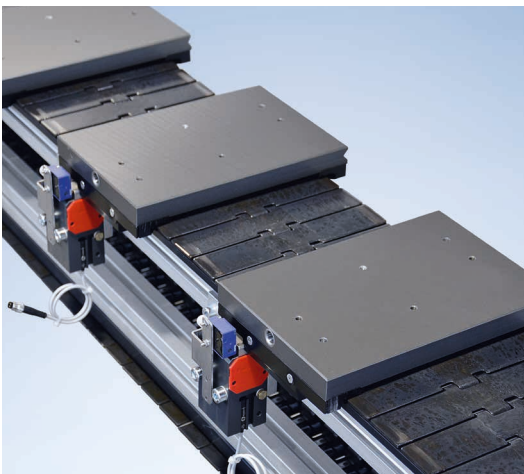
Length L1 min.	$1/2 \times L_{WT} + 100 \text{ mm}$
Length L2	individual depending on the pallet and workpiece fixture
Height H1 min.	conveyor height $H + H_{WT} + H_{WA} + 160$
Width	114 chain width: $B_{WT} + 180 \text{ mm}$ / 190 chain width: $B_{WT} + 344 \text{ mm}$

H_{WA} = workpiece fixture height

Application Examples



SPU 2040, dual-line, 114 chain width with positioning unit



SPU 2040, single line, 190 chain width with pallet, pallet aluminium plate and SU 400 top stopper

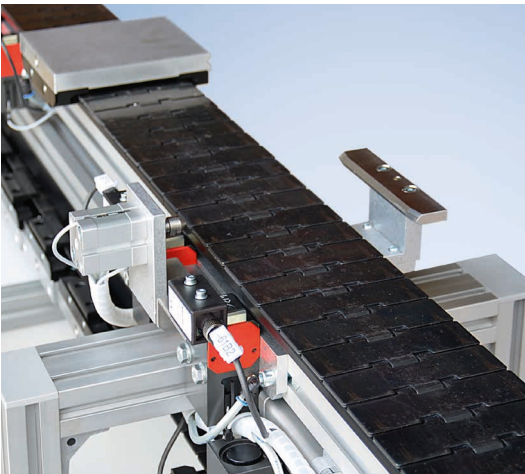


SPU 2040, single line with 25/40 pallet and customer-specific workpiece fixture

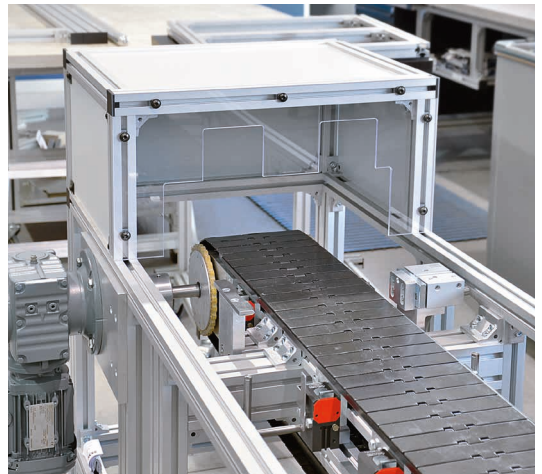
Application Examples



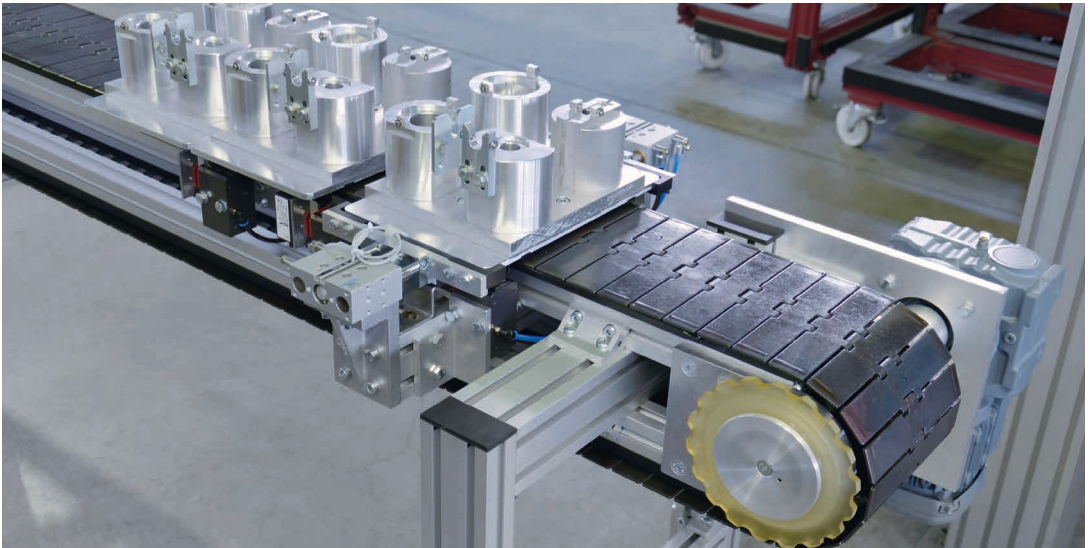
SPU 2040, single line, 190 chain width with wide pallet, pallet aluminium plate and separation



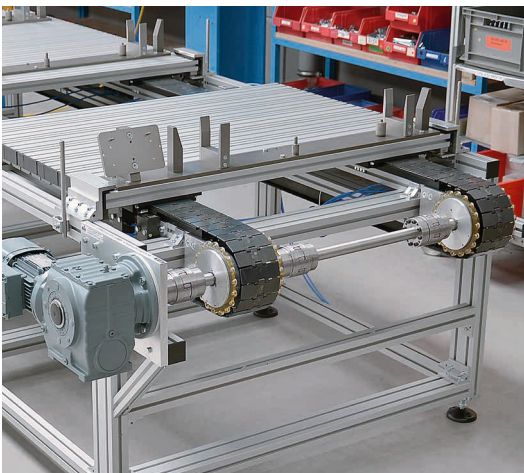
SPU 2040, single line, 114 chain width with positioning unit



SPU 2040, single line with protective device guard with pendulum flap



SPU 2040, single line with separating function for manual loading and removal by robots



SPU 2040, double-line, 114 chain width with customer-specific pallet

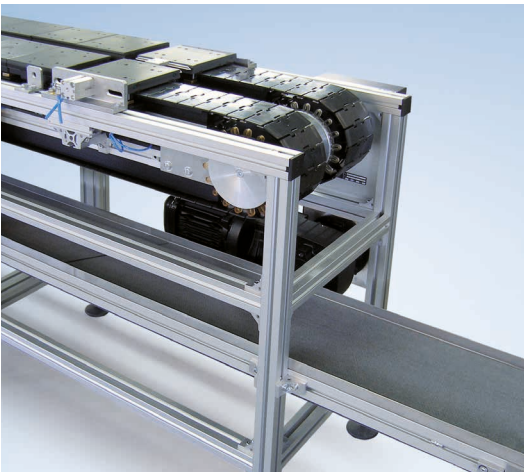


SPU 2040, single line with customer-specific workpiece fixture

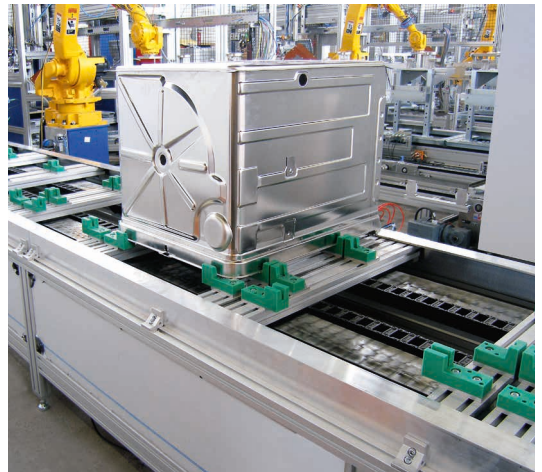
Application Examples



SPU 2040, single line with pallet separating function for supplying parts in a production facility



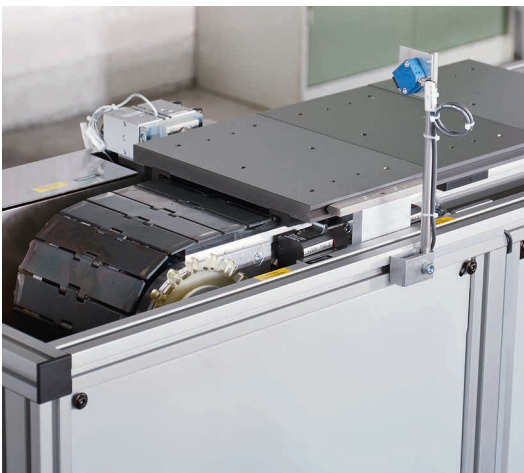
SPU 2040 interlink, dual-line with GUF-P 2000 belt conveyor as discharge belt for rejected parts



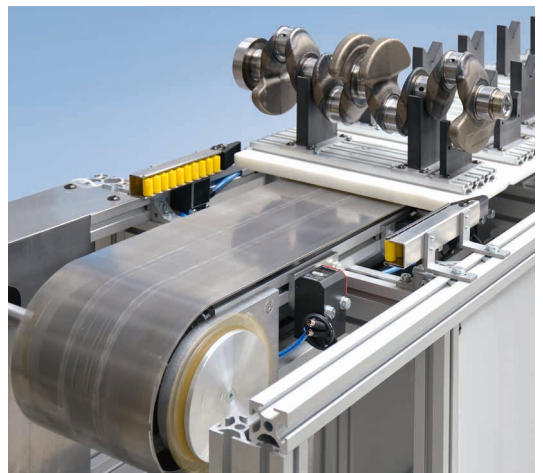
SPU 2040, double-line as infeed conveyor for dishwasher units



SPU 2040, double-line with separating function for supplying parts in an assembly and welding facility



SPU 2040, single line with positioning unit for manual removal during continuous operation



SPU 2040, single line with special chain and lateral positioning via roller strips



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