Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth
Bosch Group

TS 2*pv*

Version 2.0

The Drive & Control Company

Symbols

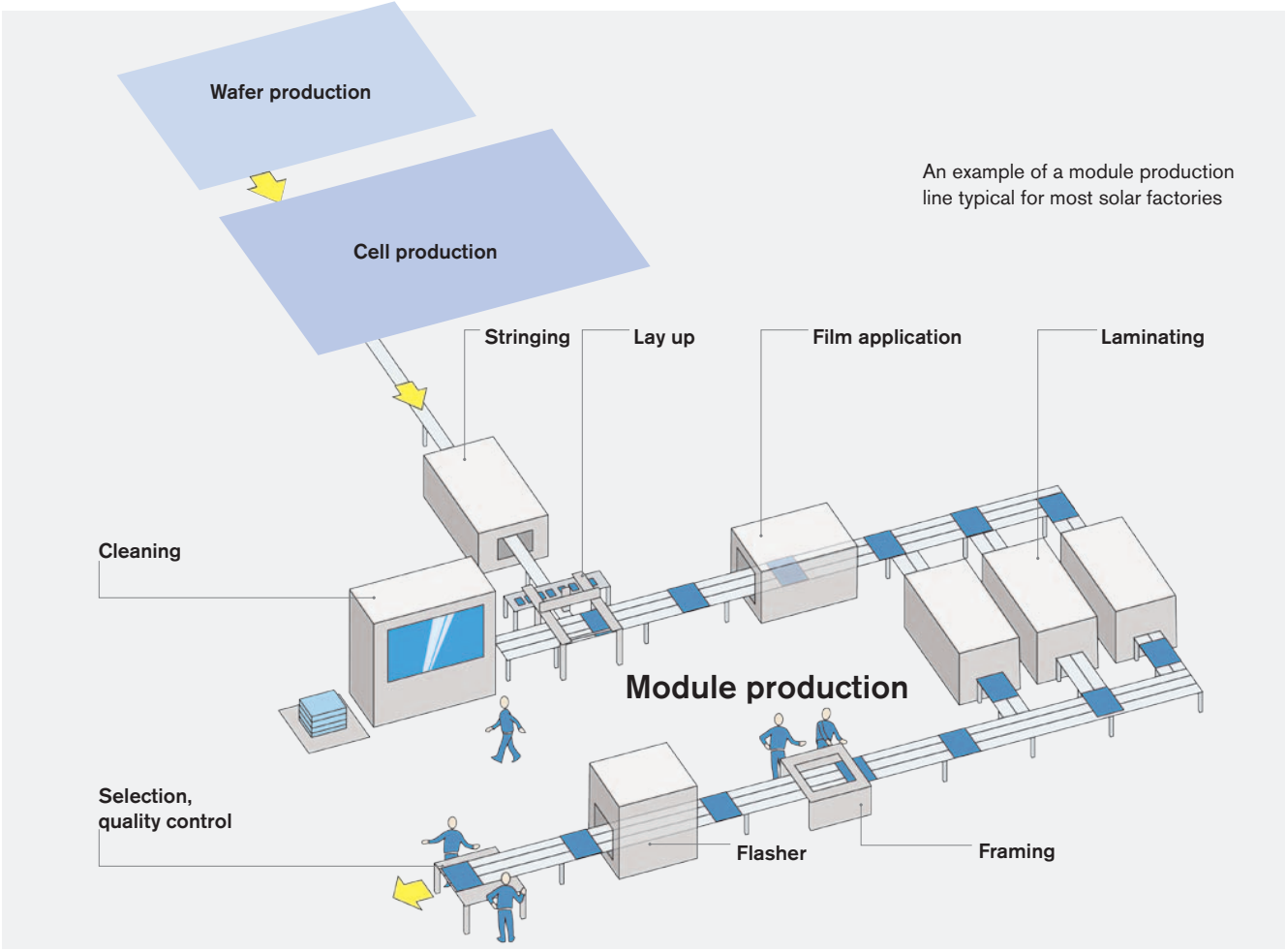
	Permissible section load (here: 120 kg)
	Toothed belt conveyor medium
	Reversible operation permissible (here: max. 1500 mm section length)
	Suitable for use in ESD sensitive areas. We recommend that you contact your Rexroth representative.
	Unit has its own drive
	Compressed air connection required (here: 4 to 6 bar)
	Pushlock-type clamped connection for compressed air (here: 4 mm diameter)
	Temperature of the transported material (here: 160°C)
	Reference to technical data/dimensions
	Reference to further information
☞ 8-35	Page reference

Table of contents

Rexroth – We bring movement into module production

Whether wafer-based solar modules or thin-film technology modules – production of these products is an extremely sensitive and complex process that consists of numerous processing steps, and also places the highest demands on material transport before, during, and after the individual processing stations.

The glass plates are not only relatively large and extremely fragile, but also extremely sensitive to contamination. Rexroth has developed a special transfer system that takes these high demands into consideration and is characterized by a high level of cost-effectiveness: the TS 2*pv*.



An example of a module production line typical for most solar factories

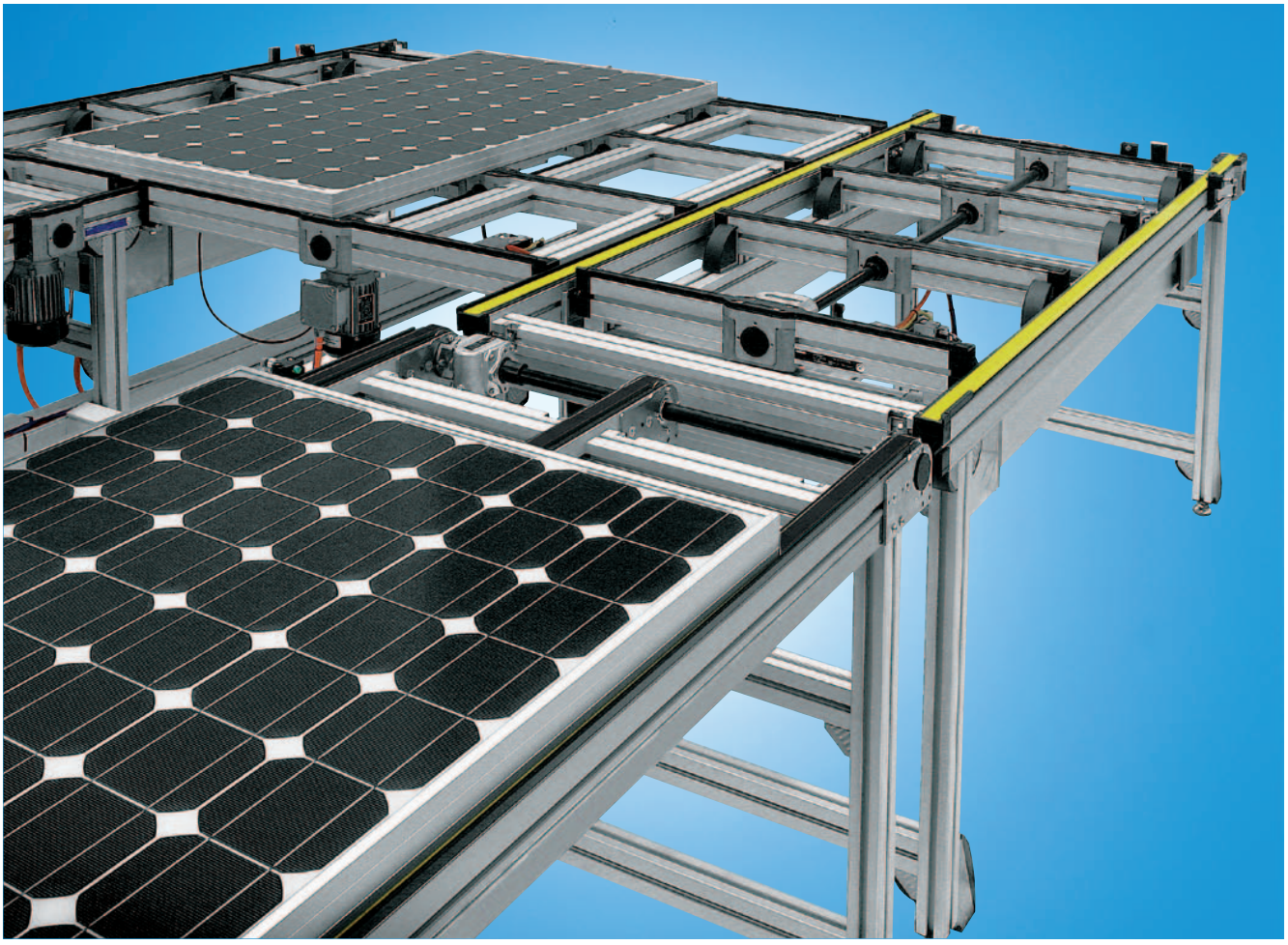
00136109

Special demands require customized solutions. The TS 2*pv* transfer system has been consistently adapted to product- and process-specific concerns in the solar industry.

In use for many years in various industries, our “classic” transfer technology forms the basis for customization.

Individual systems can be implemented quickly and inexpensively through the use of numerous standard components. Included is Rexroth's well-known quality and comprehensive, worldwide service. System implementation also includes individual consultation on how to configure your TS 2*pv* transfer system.

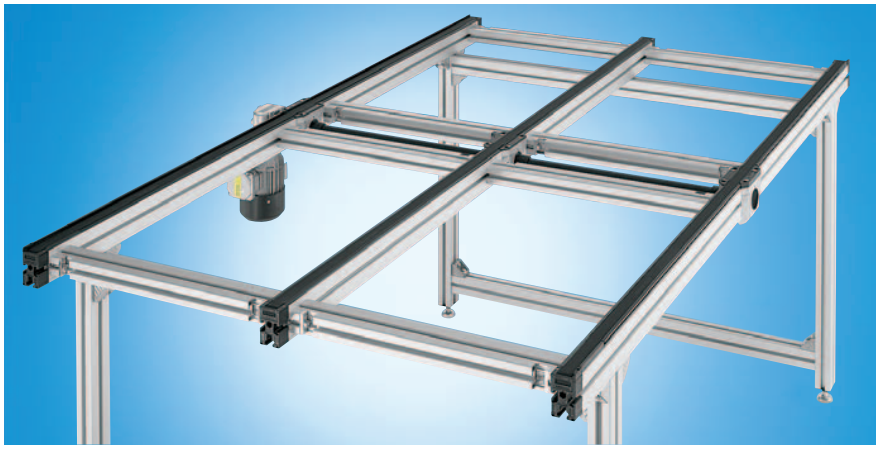
Please contact your Rexroth representative with any questions about system configuration. www.boschrexroth.com/various/utilities/location/



00136110

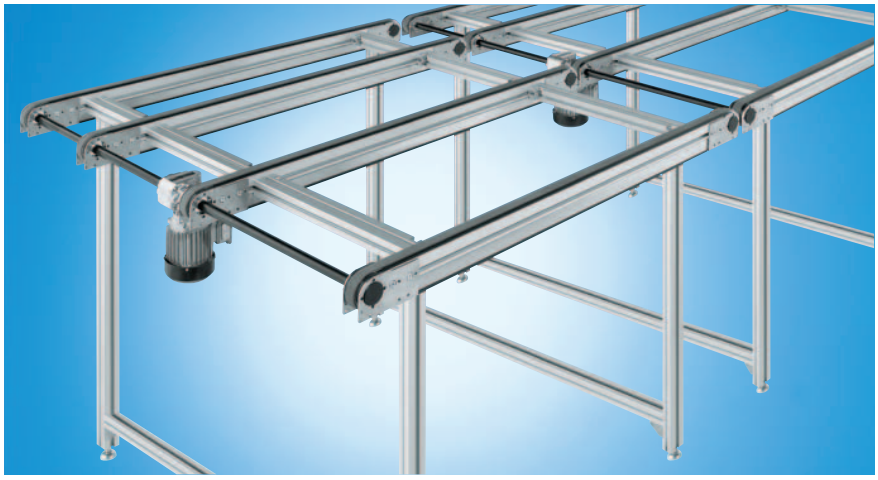
Ideal for gentle material flow
The production process for solar modules demands jolt and vibration-free transport without accumulation operation. To accomplish this, the conveyor sections are divided into short segments:
- Depending on the respective module dimensions, the individual segments are usually two to three meters long, 0.6 to 1.5 meters wide, and are made of two to five tracks.
- Each segment has its own drive.
- The drive stops to position the module for processing, or if the following section segment is still occupied by another module.
- Frequency converters ensure soft braking and accelerating.
- The LTS lift transverse unit gently moves the modules from longitudinal sections to transverse sections.

Created for clean production
A clean production environment is decisive when manufacturing modules, as this is the only way to ensure a uniformly high level of product quality. As a result, suitability for cleanrooms was at the forefront during the development of the TS 2*pv* and its associated components.
- Components that fulfill the requirements for cleanroom class 6 in accordance with EN ISO 14644-1 (corresponds to class 1000 in accordance with U.S. Fed. Standard 209E)
- No contamination by silicone, grease, or oil
- Almost fully wear-resistant toothed belts with an extremely tight textile coating and singed edge
- ESD-compatible components to avoid electrostatic charge, which prevents the attraction of dust particles

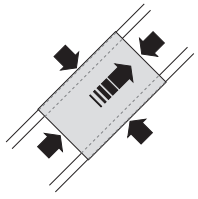
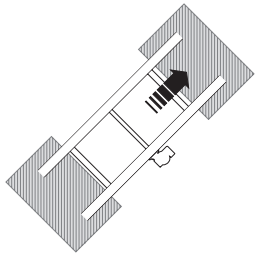
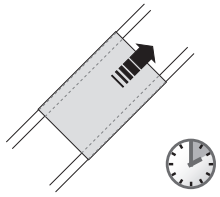
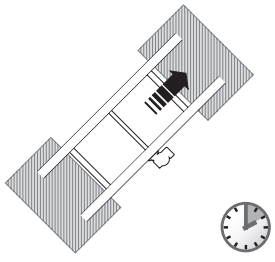
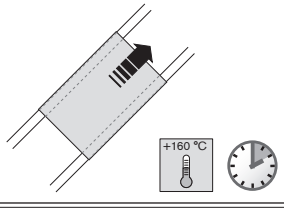

00136111

A hot tip for hot plates
The temperature-resistant solar conveyor has been specially designed for transporting hot glass plates with temperatures of up to 160°C. It can be implemented with up to 5 tracks, depending on the size of the solar panels.

Special features:
- Heat-resistant toothed belt and guide profile
- Hexagon shaft and flange for TS gear motors
- Integrated dynamic toothed belt tensioner

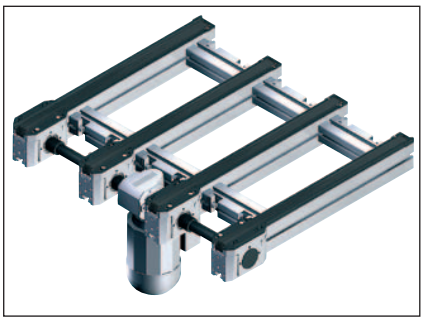

00132281

Components for longitudinal conveyors

CSS/B	• Slight corrections to the end position of the solar modules possible on the belt section • Cost-efficient solution	
CSS/BM	• Slight corrections to the end position of the solar modules possible on the belt section • Center motor mounting position	
CSS/F	• Conveyor medium with a high friction coefficient enables fast acceleration and deceleration • Modules do not slide on the belt section • System dimensions identical to CSS/B	
CSS/FM	• Conveyor medium with a high friction coefficient enables fast acceleration and deceleration • Center motor mounting position • System dimensions identical to CSS/B	
CSS/NT	• Transport of plates up to 160°C, e.g. after lamination • Conveyor medium with a high friction coefficient enables fast acceleration and deceleration • Modules do not slide on the belt section	

Components for longitudinal conveyors

CSS/B belt section

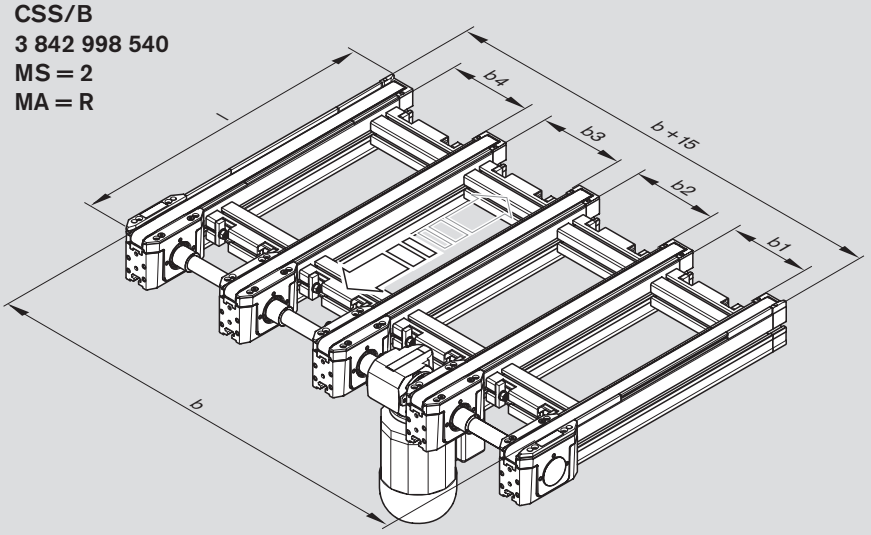


00136113

Application:
- Longitudinal conveyors to transport glass modules of varying dimensions
- Longitudinal conveyors to transport wafer trays
- Not designed for accumulation operation

Version:
- Belt section of 2 to 5 tracks to securely support glass modules over the entire width. Distance between tracks can be determined individually (b1 to b4).
- Permissible load:
  - Per track: max. 0.15 kg/cm of support surface length and max. 60 kg
  - Per belt section: max. 120 kg
- Suitable for reversible operation (up to 3000 mm)
- Conveyor medium: special textile toothed belt. Ideal for lateral positioning processes due to its low friction coefficient with the workpiece.
- Easy replacement of the toothed belts due to disassembly from above; no realignment necessary.
- Gear motors are suitable for operation with frequency converters.
- Motor mounting at right (MA = R) or left (MA = L) is possible at any track of the belt section (MS = 1 to 5; MS = 1 indicates the left-hand track in the direction of transport). Observe the min. distance of 165 mm if motor is mounted between the tracks (b1 to b4)
- Outside motor mounting: suspended or horizontal; motor mounting between the tracks: suspended
- Motor connection either with cable/plug (AT = S) or terminal box (AT = K)
- Version with lateral guide (FP = 1) ideal for framed glass modules; version without lateral guide (FP = 0) for unprocessed glass modules with rough edges
- Suitable for use in cleanroom environments up to cleanroom class 6 according to ISO 14644-1

CSS/B
3 842 998 540
MS = 2
MA = R



3 842 998 537: b_{min} = 160 mm
3 842 998 538: b_{min} = 290 mm
3 842 998 539: b_{min} = 420 mm
3 842 998 540: b_{min} = 550 mm

00136114

CSS/B

Tracks	No.	Ordering parameters	
2	**3 842 998 537**	b	(160 ... 3000 mm)
3	**3 842 998 538**	b1[1]	(85 ... 1000 mm)
4	**3 842 998 539**	b2[1] [3]	(85 ... 1000 mm)
5	**3 842 998 540**	b3[1] [3]	(85 ... 1000 mm)
		b4[1] [3]	(85 ... 1000 mm)
		l	(290 ... 6000 mm)
		FP	Lateral guide (1 = with; 0 = without)
		v_N[2]	(0; 6; 9; 12; 15; 18; 21; 36)
		U	(☞ 7-11)
		f	(☞ 7-11)
		AT	Motor connection (S = cable/plug; K = terminal box)
		MS	Motor mounting on track (1 = left ... 5 = right)
		MA	Motor mounting (R = right; L = left)

[1] bx_{min} = 165 mm if motor is mounted between the tracks
[2] v_N = 0, U = 0, f = 0: without motor and without gear
v_N = 0, U = 0, f = 50/60 Hz: without motor, with gear (if technically practical)
[3] Distance with the highest index is calculated
Special versions on request.

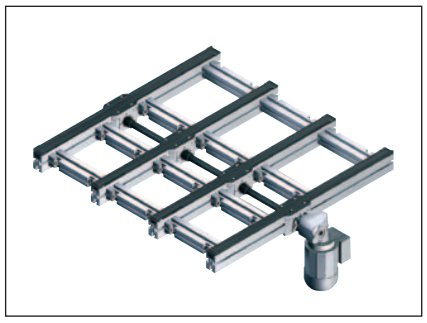
Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

Optional accessories:
- SFS frames, ☞ 4-2
- SZS/B leg set, ☞ 4-3
- FC frequency converter, ☞ 7-13

☞ 7-2

Components for longitudinal conveyors

CSS/BM belt section



00136116

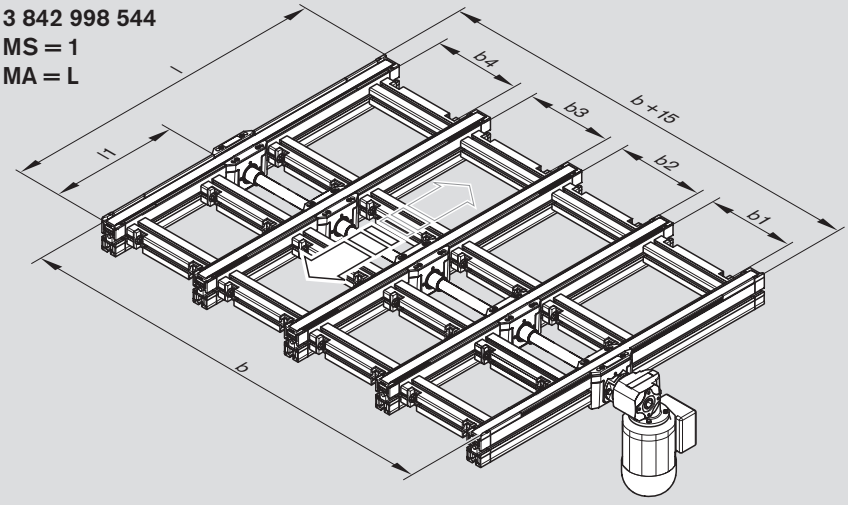
Application:
- Longitudinal conveyors to transport glass modules of varying dimensions
- Longitudinal conveyors to transport wafer trays
- For installation situations that have no space for the motor at the ends of the belt section
- Not designed for accumulation operation

Version:
- Lengthwise motor mounting position can be specified by the user (see dimension l1)
- Other features as with CSS/B

Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

Optional accessories:
- SFS frames, ☞ 4-2
- SZS/B leg set, ☞ 4-3
- FC frequency converter, ☞ 7-13

CSS/BM
3 842 998 544
MS = 1
MA = L



3 842 998 541: b_{min} = 160 mm
3 842 998 542: b_{min} = 290 mm
3 842 998 543: b_{min} = 420 mm
3 842 998 544: b_{min} = 550 mm

00136115

CSS/BM

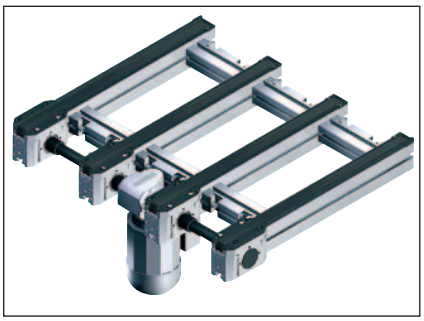
Tracks	No.	Ordering parameters	
2	**3 842 998 541**	b	(160 ... 3000 mm)
3	**3 842 998 542**	b1[1) 3)]	(85 ... 1000 mm)
4	**3 842 998 543**	b2[1) 3)]	(85 ... 1000 mm)
5	**3 842 998 544**	b3[1) 3)]	(85 ... 1000 mm)
		b4[1) 3)]	(85 ... 1000 mm)
		l	(450 ... 6000 mm)
		l1	(160 - l-290 mm)
		FP	Lateral guide (1 = with; 0 = without)
		v_N[2)]	(0; 6; 9; 12; 15; 18; 21; 36)
		U	(☞ 7-11)
		f	(☞ 7-11)
		AT	Motor connection (S = cable/plug; K = terminal box)
		MS	Motor mounting on track (1 = left ... 5 = right)
		MA	Motor mounting (R = right; L = left)

1) bx_{min} = 165 mm if motor is mounted between the tracks
2) v_N = 0, U = 0, f = 0: without motor and without gear
   v_N = 0, U = 0, f = 50/60 Hz: without motor, with gear (if technically practical)
3) Distance with the highest index is calculated

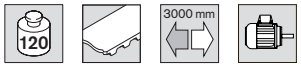
Special versions on request.

Components for longitudinal conveyors

CSS/F belt section



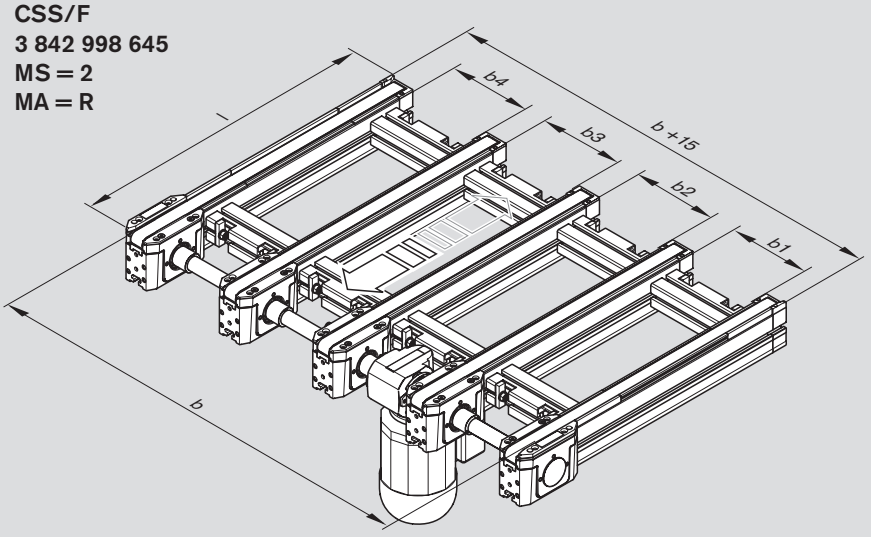
00136113



Application:
- Longitudinal conveyors to transport glass modules of varying dimensions
- Not designed for accumulation operation

Version:
- Belt section of 2 to 5 tracks to securely support glass modules over the entire width. Distance between tracks can be determined individually (b1 to b4). Observe the minimum dimensions.
- Permissible load:
  - Per track: max. 0.15 kg/cm of support surface length and max. 40 kg
  - Per belt section: max. 120 kg
- Suitable for reversible operation (up to 3000 mm)
- Textile toothed belt with PU layer for high friction coefficients and improved static friction when starting and accelerating
- Easy replacement of the toothed belts due to disassembly from above; no realignment necessary.
- Gear motors are suitable for operation with frequency converters.
- Motor mounting at right (MA = R) or left (MA = L) is possible at any track of the belt section (MS = 1 to 5; MS = 1 indicates the left-hand track in the direction of transport). Observe the min. distance of 165 mm if motor is mounted between the tracks (b1 to b4)
- Outside motor mounting: suspended or horizontal; motor mounting between the tracks: suspended
- Motor connection either with cable/plug (AT = S) or terminal box (AT = K)
- Version with lateral guide (FP = 1) ideal for framed glass modules; version without lateral guide (FP = 0) for unprocessed glass modules with rough edges
- Suitable for use in cleanroom environments up to cleanroom class 6 according to ISO 14644-1

CSS/F
3 842 998 645
MS = 2
MA = R



3 842 998 642: b_{min} = 160 mm
3 842 998 643: b_{min} = 290 mm
3 842 998 644: b_{min} = 420 mm
3 842 998 645: b_{min} = 550 mm

00136114

CSS/F

Tracks	No.	Ordering parameters	
2	**3 842 998 642**	b	(160 ... 3000 mm)
3	**3 842 998 643**	b1[1]	(85 ... 1000 mm)
4	**3 842 998 644**	b2[1] [3]	(85 ... 1000 mm)
5	**3 842 998 645**	b3[1] [3]	(85 ... 1000 mm)
		b4[1] [3]	(85 ... 1000 mm)
		l	(290 ... 6000 mm)
		FP	Lateral guide (1 = with; 0 = without)
		v_N[2]	(0; 6; 9; 12; 15; 18; 21; 36)
		U	(☞ 7-11)
		f	(☞ 7-11)
		AT	Motor connection (S = cable/plug; K = terminal box)
		MS	Motor mounting on track (1 = left ... 5 = right)
		MA	Motor mounting (R = right; L = left)

[1] bx_{min} = 165 mm if motor is mounted between the tracks
[2] v_N = 0, U = 0, f = 0: without motor and without gear
v_N = 0, U = 0, f = 50/60 Hz: without motor, with gear (if technically practical)
[3] Distance with the highest index is calculated
Special versions on request.

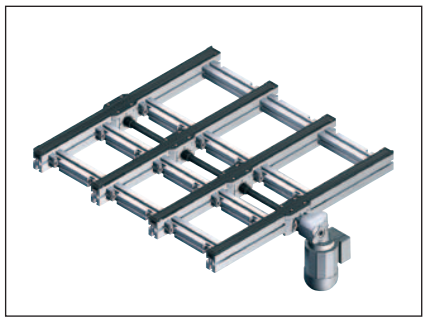
Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

Optional accessories:
- SFS frames, ☞ 4-2
- SZS/B leg set, ☞ 4-3
- FC frequency converter, ☞ 7-13

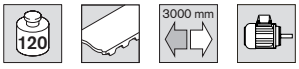
☞ 7-2

Components for longitudinal conveyors

CSS/FM belt section



00136116



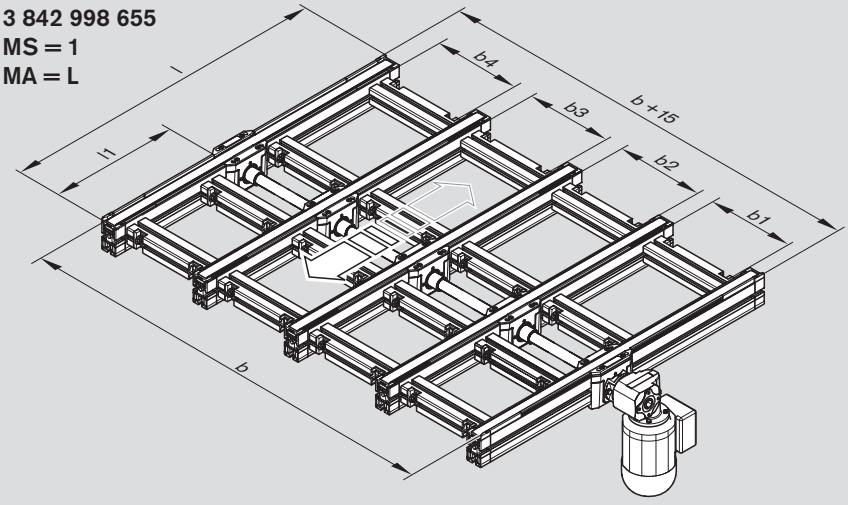
Application:
- Longitudinal conveyors to transport glass modules of varying dimensions
- For installation situations that have no space for the motor at the ends of the belt section
- Not designed for accumulation operation

Version:
- Lengthwise motor mounting position can be specified by the user (see dimension l1)
- Other features as with CSS/F

Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

Optional accessories:
- SFS frames, ☞ 4-2
- SZS/B leg set, ☞ 4-3
- FC frequency converter, ☞ 7-13

CSS/FM
3 842 998 655
MS = 1
MA = L



3 842 998 652: b_{min} = 160 mm
3 842 998 653: b_{min} = 290 mm
3 842 998 654: b_{min} = 420 mm
3 842 998 655: b_{min} = 550 mm

00136115

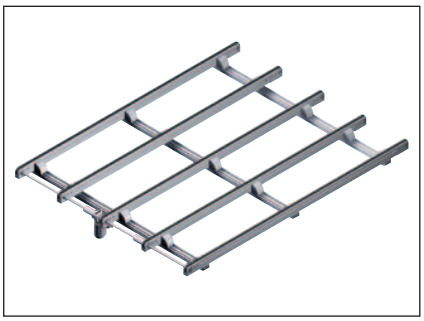
CSS/FM

Tracks	No.	Ordering parameters	
2	**3 842 998 652**	b	(160 ... 3000 mm)
3	**3 842 998 653**	b1[1)]	(85 ... 1000 mm)
4	**3 842 998 654**	b2[1) 3)]	(85 ... 1000 mm)
5	**3 842 998 655**	b3[1) 3)]	(85 ... 1000 mm)
		b4[1) 3)]	(85 ... 1000 mm)
		l	(450 ... 6000 mm)
		l1	(160 ... l-290 mm)
		FP	Lateral guide (1 = with; 0 = without)
		v_N[2)]	(0; 6; 9; 12; 15; 18; 21; 36)
		U	(☞ 7-11)
		f	(☞ 7-11)
		AT	Motor connection (S = cable/plug; K = terminal box)
		MS	Motor mounting on track (1 = left ... 5 = right)
		MA	Motor mounting (R = right; L = left)

1) bx_{min} = 165 mm if motor is mounted between the tracks
2) v_N = 0, U = 0, f = 0: without motor and without gear
   v_N = 0, U = 0, f = 50/60 Hz: without motor, with gear (if technically practical)
3) Distance with the highest index is calculated
Special versions on request.

Components for longitudinal conveyors

CSS/NT belt section



00136117a

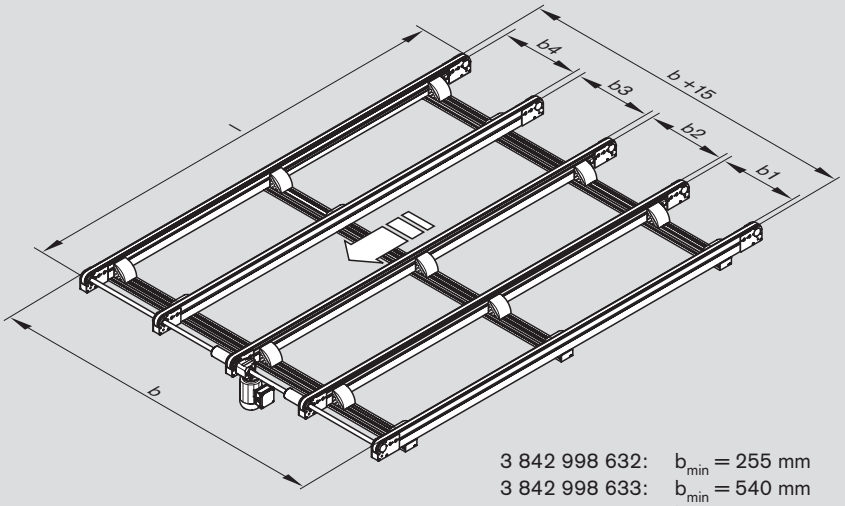
Application:
- Longitudinal conveyors to transport glass modules
- Suitable for transporting plates up to 160°C, e.g. as a transport system after lamination.
- Not designed for accumulation operation

Version:
- Belt section of 2 to 5 tracks to securely support glass modules over the entire width. Distance between tracks can be determined individually (b1 to b4). Observe the minimum dimensions.
- Permissible load:
  - Per track: max. 0.3 kg/cm of support surface length and max. 60 kg
  - Per belt section: max. 120 kg
- Suitable for reversible operation on section lengths of up to 1500 mm
- Special textile toothed belt with Viton coating
- Dynamic belt tensioner to compensate for belt elongation due to temperature
- Easy replacement of the endless toothed belts due to lateral disassembly; no realignment necessary. Also possible on inside tracks, due to couplings on the hexagonal shaft.
- Gear motors are suitable for operation with frequency converters.
- Price advantage for orders of specific standard lengths as well as significant reduction in delivery times for toothed belts in service cases
- Suitable for use in cleanroom environments up to cleanroom class 7 according to ISO 14644-1

Delivery condition:
- Motor is enclosed separately.

Optional accessories:
- SFS frames, ☞ 4-2
- SZS/N leg set, ☞ 4-4
- FC frequency converter, ☞ 7-13
- Toothed belt tensioner (tool for belt exchange), **3 842 541 202**

CSS/NT
3 842 998 635
MS = 3
MA = L



3 842 998 632: b_{min} = 255 mm
3 842 998 633: b_{min} = 540 mm
3 842 998 634: b_{min} = 825 mm
3 842 998 635: b_{min} = 1050 mm

00136116a

CSS/NT

Tracks	No.
2	**3 842 998 632**
3	**3 842 998 633**
4	**3 842 998 634**
5	**3 842 998 635**

Ordering parameters	
b	(255 ... 2300 mm)
b1[1]	(180 ... 1000 mm)
b2[1] [4]	(240 ... 1000 mm)
b3[1] [4]	(240 ... 1000 mm)
b4[1] [4]	(180 ... 1000 mm)
l[2]	(550 ... 3000 mm)
	Standard lengths: 550, 1000, 1500, 2000, 2500, 3000
FP	Lateral guide (1 = with; 0 = without)
v_N[3]	(0; 6; 9; 12; 15; 18; 36)
U	(☞ 7-11)
f	(☞ 7-11)
AT	Motor connection (S = cable/plug; K = terminal box)
MS	Motor mounting on track (1 = left ... 5 = right)
MA	Motor mounting (R = right; L = left)
TU	Toothed belt tensioner (1 = on every track; 0 = none)

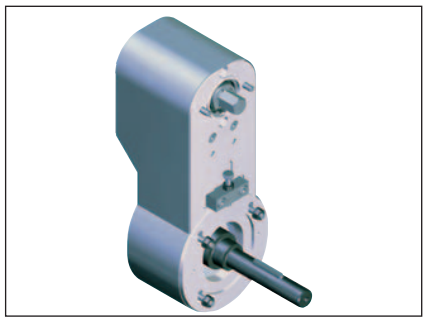
1) bx_{min} = 350 mm if motor is mounted between the tracks
2) Length deviation ± 0.5%
3) v_N = 0, U = 0, f = 0: without motor and without gear
   v_N = 0, U = 0, f = 50/60 Hz: without motor, with gear (if technically practical)
4) Distance with the highest index is calculated

Special versions on request.

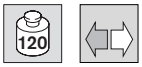
☞ 7-4

Components for longitudinal conveyors

Transmission drive



00139058

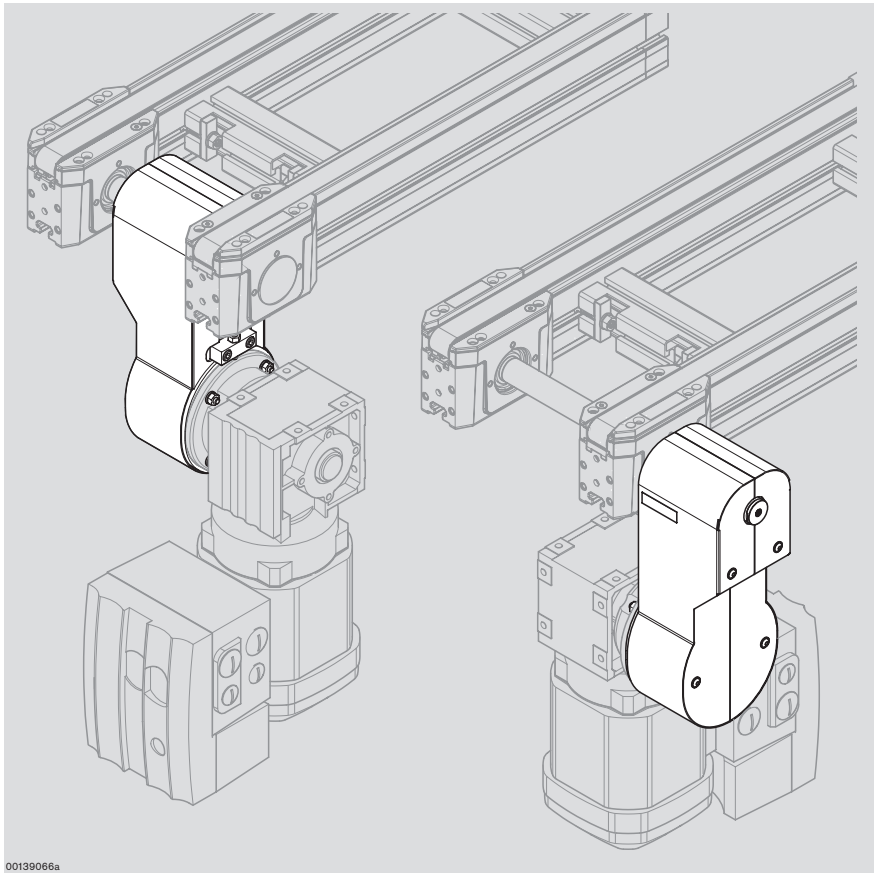


Application:
- For the installation of larger external motors to transfer higher torque values (maximum section loads of the belt sections may not be exceeded)

Version:
- Belt drive gear for gear motors that need to be installed at a lower depth so they can be passed over.
- Suitable for flange gear versions, flange diameter 120 mm (B5 version for worm gears), and hollow shaft, diameter 20 mm
- Designed for Spiroplan right-angle gear motors WAF20, WAF30 or WAF37 and worm gear motors SAF37
- Maximum transferable torque (at gear output):
  - CSS/B, CSS/BM, CSS/F, CSS/FM: M_{max} = 12 Nm
  - CSS/NT: M_{max} = 20 Nm
- Suspended mounting of gear motor required

Delivery condition:
- Not assembled, in single parts
- Pre-pressed bearing
- Including adapter set and additional hexagon shaft for mounting on CSS/B, CSS/BM, CSS/F and CSS/FM. The adapter set is omitted with CSS/NT.

Required accessories:
- Torque support – provided by system owner



00139066a

Transmission drive:
3 842 542 550

☞ 7-5

Components for longitudinal conveyors

Components for transverse conveyors

Components for transverse conveyors

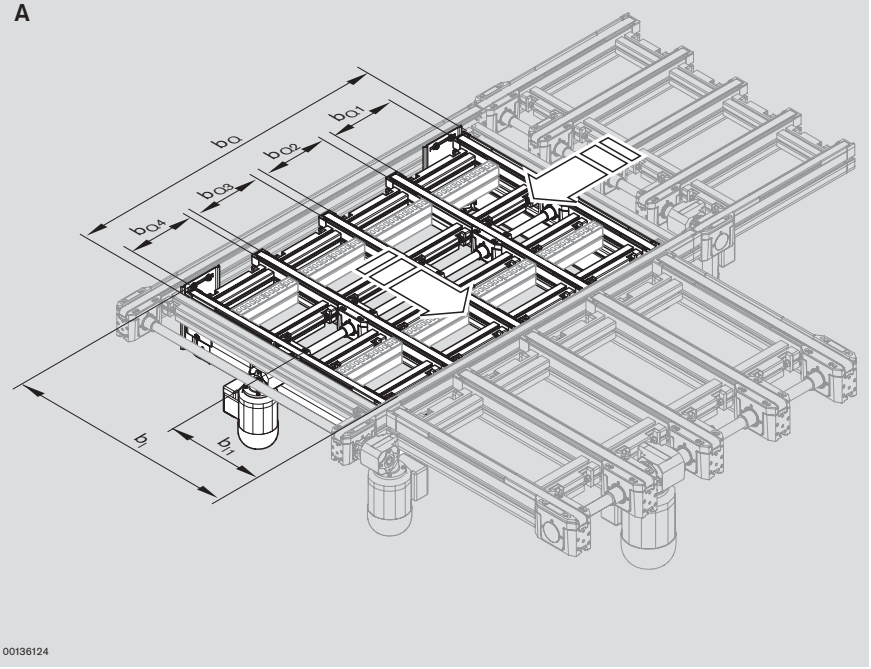
Lift transverse unit

LTS/B and LTS/F lift transverse units for constructing right-angled section branches are available in two designs:

A With continuous tracks in the lift transverse unit
- One drive for the lift transverse unit
- The inside tracks of the infeeding belt section are replaced by non-driven roller sections in the area of the lift transverse unit

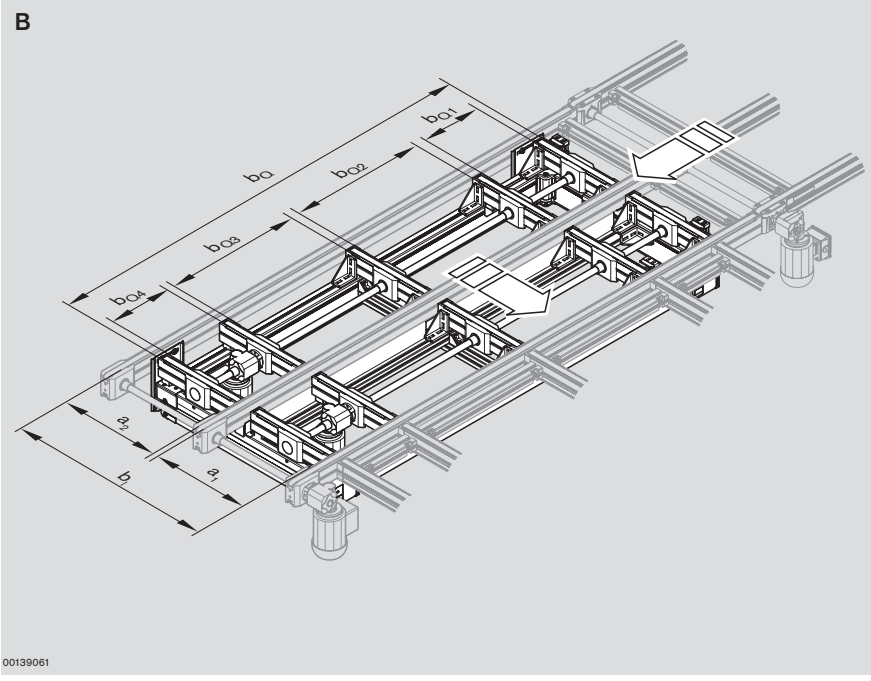
B With non-continuous tracks in the lift transverse unit
- All tracks of the infeeding belt section are driven and are extended in the area of the lift transverse unit

A



00136124

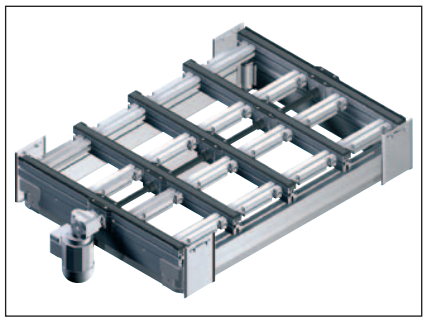
B



00139061

Components for transverse conveyors

LTS/B lift transverse unit

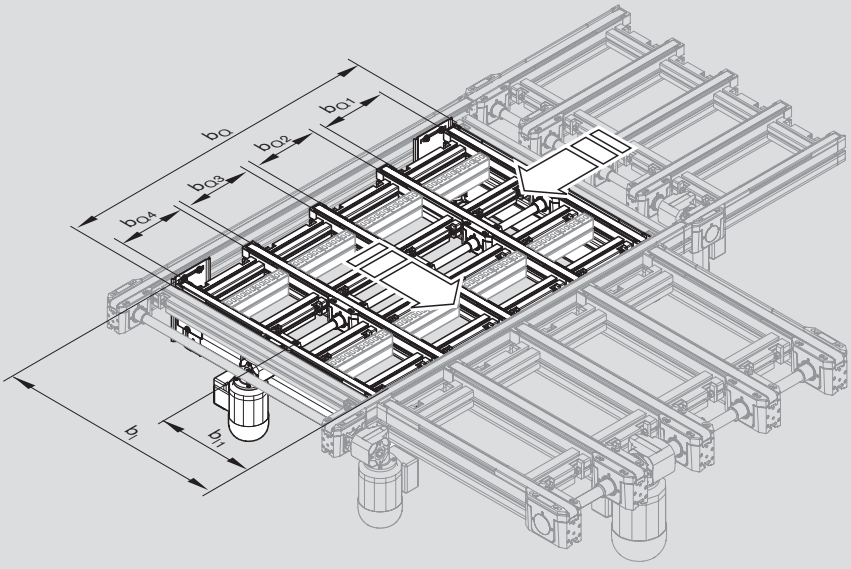


00136123

Application:
- LTS/B lift transverse unit for constructing right-angled section branches
- Installation in CSS/B and CSS/BM belt sections

Version:
- Version with two to five tracks. The distance between tracks can be determined individually (b_{Q1} to b_{Q4}). Observe the minimum dimensions.
- Section loads up to 120 kg (per track: max. 0.15 kg/cm surface length; max. 60 kg)
- Conveyor medium: special textile toothed belt for minimal abrasion, as with CSS/B
- Gear motors are suitable for operation with frequency converters.
- Motor mounting at right (MA = R) or left (MA = L) is possible at any track of the belt section
- Version with lateral guide (FP = 1) particularly suitable for framed glass modules; version without lateral guide (FP = 0) preferably for unprocessed glass modules with rough edges
- Two lift positions

LTS/B



00136124

Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

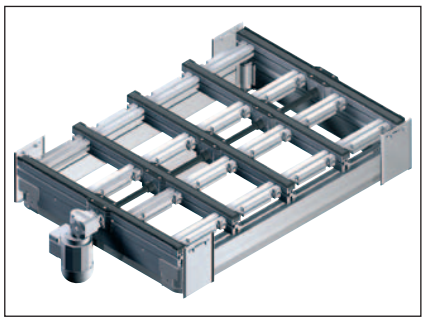
LTS/B:
Order on request

Required accessories:
- Belt section to be assembled

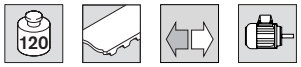
☞ 7-6

Components for transverse conveyors

LTS/F lift transverse unit



00136123



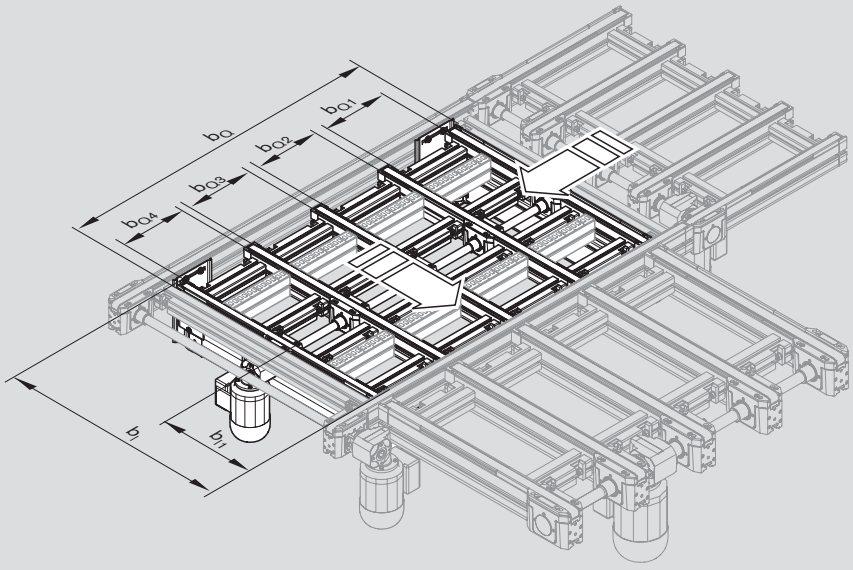
Application:
- LTS/F lift transverse unit for constructing right-angled section branches
- Installation in CSS/F and CSS/FM belt sections

Version:
- Version with two to five tracks. The distance between tracks can be determined individually (b_{Q1} to b_{Q4}). Observe the minimum dimensions.
- Permissible load:
  - Per track: max. 0.15 kg/cm of support surface length and max. 40 kg
  - Per belt section: max. 120 kg
- Toothed belt with PU layer for high friction coefficients and improved static friction when starting and accelerating, as with CSS/F
- Easy replacement of the endless toothed belt due to disassembly from above; no realignment necessary.
- Gear motors are suitable for operation with frequency converters.
- Motor mounting at right (MA = R) or left (MA = L) is possible at any track of the belt section
- Version with lateral guide (FP = 1) particularly suitable for framed glass modules; version without lateral guide (FP = 0) preferably for unprocessed glass modules with rough edges
- Two lift positions

Delivery condition:
- b ≤ 2000 mm: assembled
  b > 2000 mm: partially assembled
- Motor is enclosed separately.

Required accessories:
- Belt section to be assembled

LTS/F



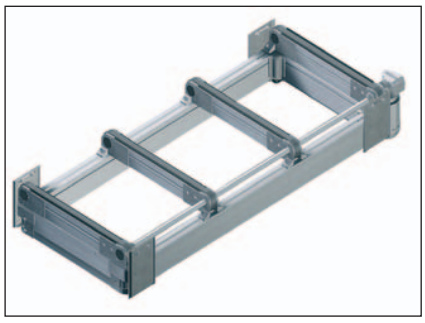
00136124

LTS/F:
Order on request

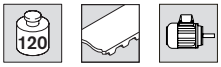
☞ 7-6

Components for transverse conveyors

LTS/NT lift transverse unit



00136127



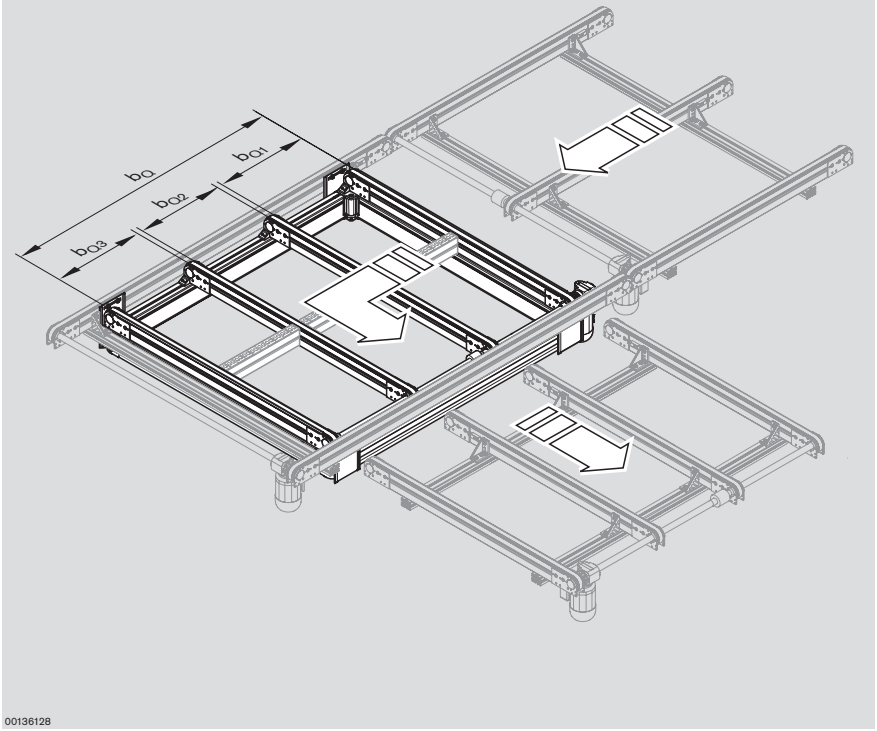
Application:
- LTS/NT lift transverse unit for constructing right-angled section branches
- Installation in CSS/NT belt sections
- Suitable for transporting plates up to 160°C, e.g. as a transport system after lamination.

Version:
- Special textile toothed belt with Viton coating
- Version with two to five tracks. The distance between tracks can be determined individually (b_{Q1} to b_{Q4}). Observe the minimum dimensions.
- Section load: max. 120 kg (per track: max. 0.3 kg/cm surface length, max. 60 kg)
- Easy replacement of the endless toothed belts due to lateral disassembly; no realignment necessary. Also possible on inside tracks, due to couplings on the hexagonal shaft.
- Optionally with integrated toothed belt tensioner (TU = 1)
- Toothed belt recirculation without reverse bending
- Gear motors are suitable for operation with frequency converters.
- Other features as with CSS/NT

Delivery condition:
- Motor is enclosed separately.

Required accessories:
- Belt section to be assembled

LTS/NT



00136128

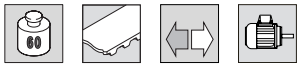
LTS/NT:
Order on request

3

☞ 7-7

Components for transverse conveyors

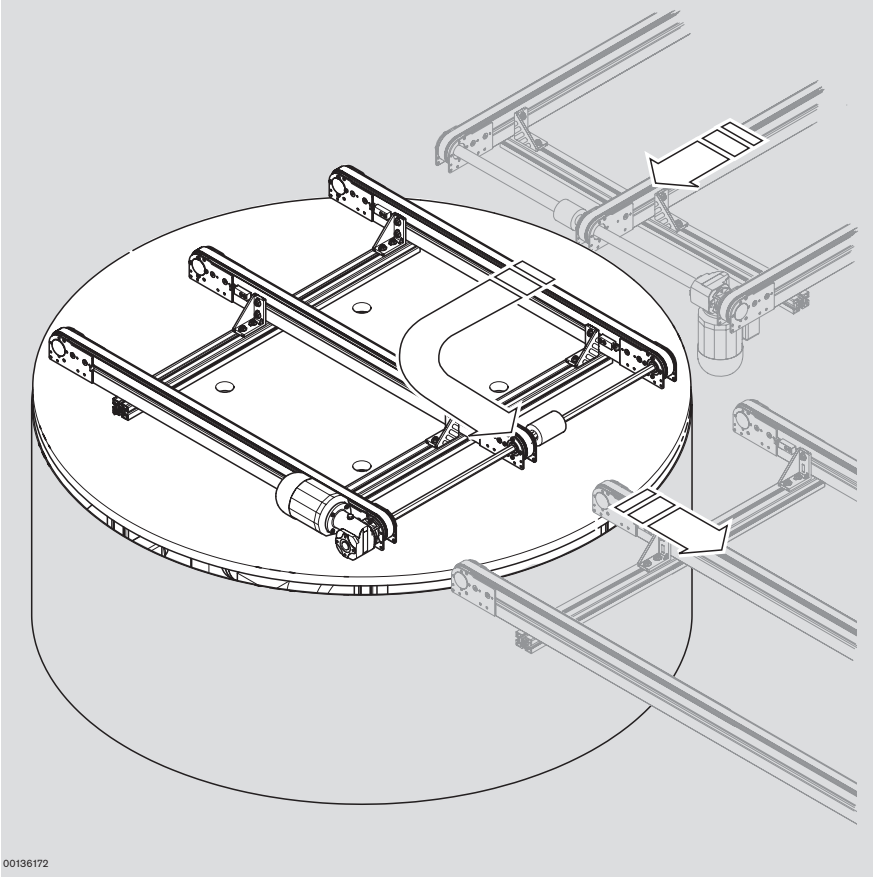
TTS/B, TTS/F, TTS/NT rotary module



Application:
- Particularly gentle transport for direction changes or as a corner return unit
- Direction change of 90°, 180° or 270° while maintaining orientation (front remains in the front)
- Diverter function to outfeed from a main transport section

Version:
- 2 to 5-track CSS/B, CSS/BM, CSS/F, CSS/FM, or CSS/NT belt section with rotating bearing
- Rotary movement generated by electric motor with adjustable acceleration and deceleration ramp
- Optional version: Rotary movement generated pneumatically
- Conveyor medium with varying friction coefficients
- Optionally available with protective enclosure
- Section load: max. 60 kg

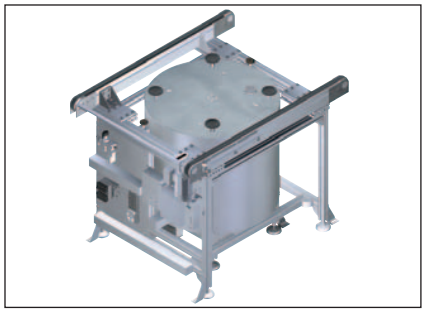
Scope of delivery:
- Incl. base frame



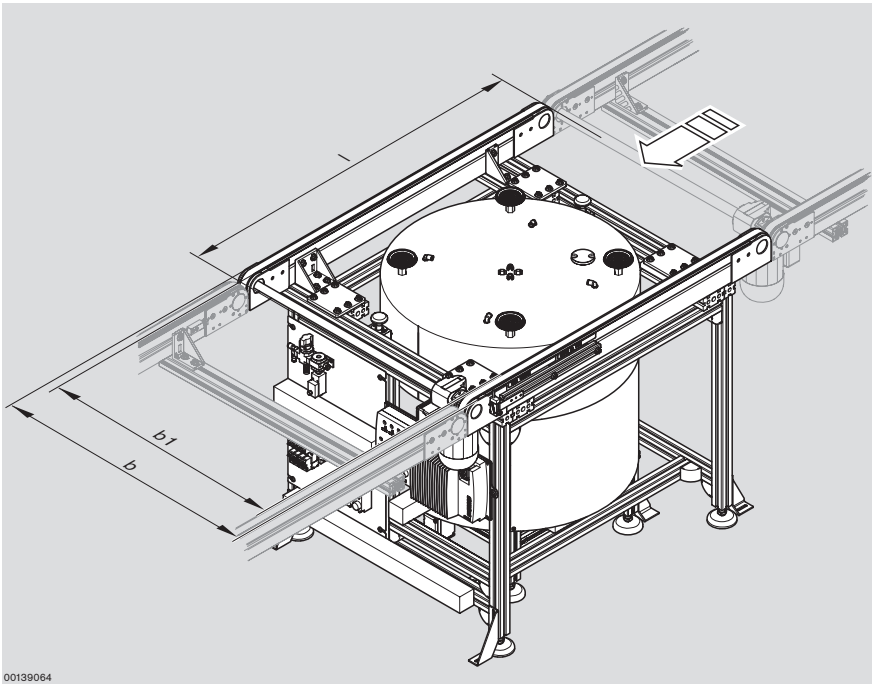
TTS/B, TTS/F, TTS/NT:
Order on request

Components for transverse conveyors

RES/M rotary module



00139063



00139064

Application:
Manual rotation of solar modules at a manual workstation

Version:
- Automatic lift unit with manual rotary table
- Prevents solar modules from sliding during manual rotation
- Mechanical safeguard against lowering
- Unobstructed edges for assembly, framing or gluing
- 2 rotational directions
- Section load up to 60 kg

Scope of delivery:
- Incl. base frame

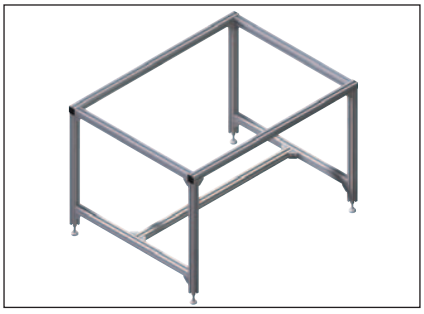
RES/M:
Order on request

Components for transverse conveyors

Frames, leg sets

Leg sets

SFS frames



00139065

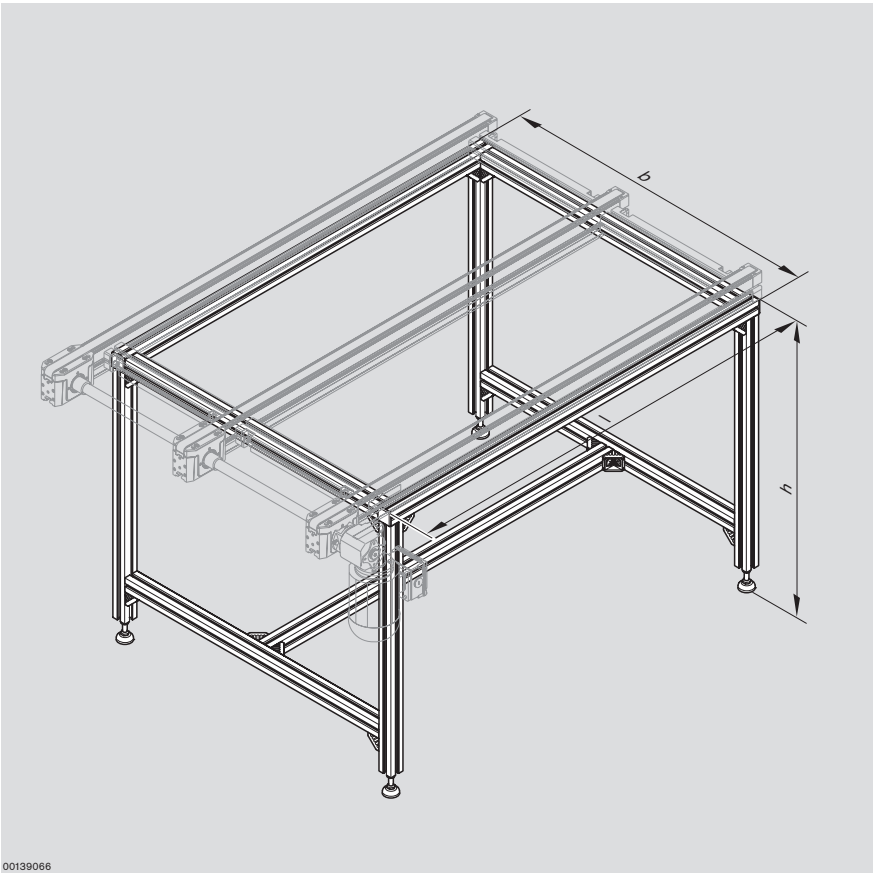
Application:
– Free-standing, stable frames for CSS/B, CSS/BM, CSS/F, CSS/FM and CSS/NT belt sections

Version:
– Extruded aluminum profiles
– Height-adjustable bases
– Easy assembly

Scope of delivery:
Incl. height-adjustable bases

Delivery condition:
Unassembled kit

Required accessories:
– Connection kit for fastening the unit

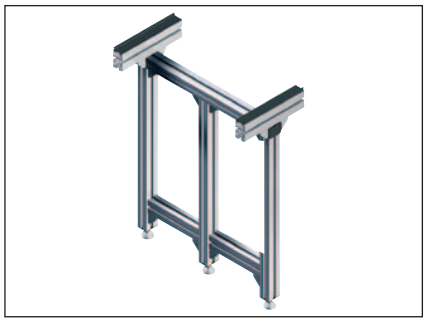


00139066

SFS frame:
Order on request

Leg sets

SZS/B leg set



00136157

Application:
Leg sets for belt sections
– CSS/B
– CSS/BM
– CSS/F
– CSS/FM

Leg sets must be installed close to the ends of the belt sections. They must be mounted at a uniform distance of max. 2000 mm and anchored to the floor with foundation brackets.

Version:
– Extruded aluminum profiles
– Height-adjustable bases
– The leg set comes with two, three, or four vertical struts, depending on the width.
– Reinforcement required, either by mounting to machines or installing braces with Basic Mechanical Elements, ☞ 4-4

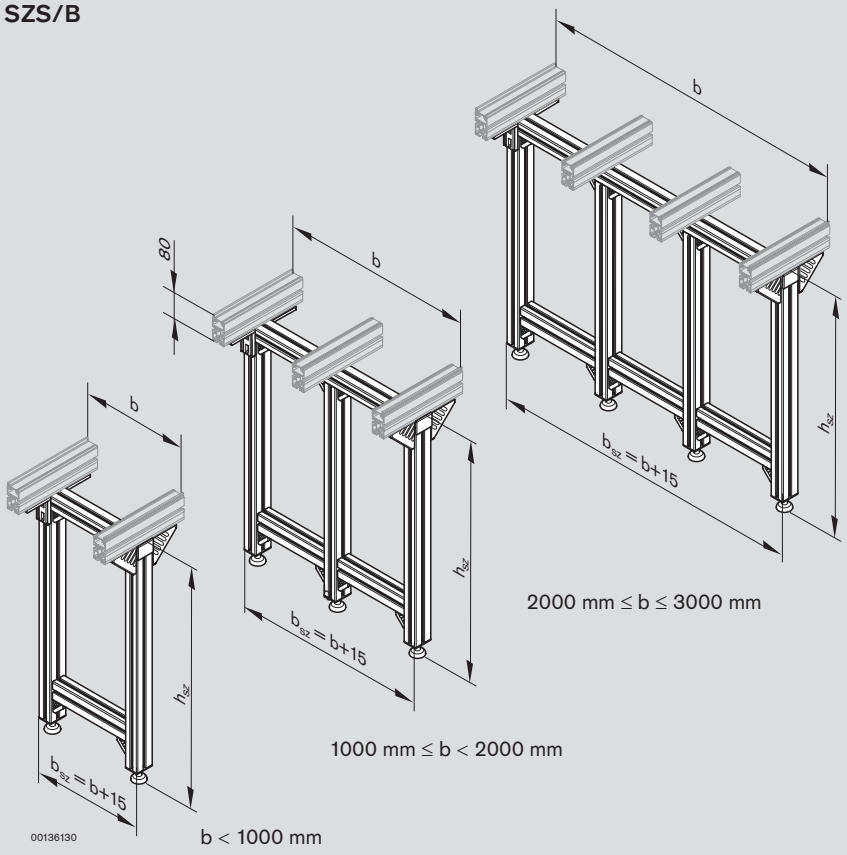
Scope of delivery:
Incl. height-adjustable bases, incl. fastening material for mounting the legs sets on the belt section.

Delivery condition: unassembled

Required accessories:
– Foundation bracket **3 842 146 815**, ☞ 4-4
– Anchor bolts **3 842 526 560**, ☞ 4-4

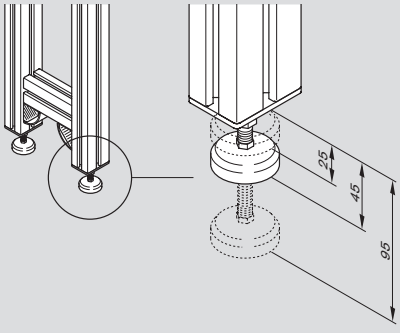
Optional accessories:
– Reinforcement made of Basic Mechanical Elements, ☞ 4-4

SZS/B



SZS/B

	No.	Ordering parameters	
SZS/B	**3 842 998 585**	b	(160 - 3000 mm)
		h_{SZ}	(250 - 2000 mm)



Leg sets

SZS/N leg set

00136131

Application:
Leg sets for belt sections
– CSS/NT

Leg sets must be installed close to the ends of the belt sections. They must be mounted at a uniform distance of max. 2000 mm and anchored to the floor with foundation brackets.

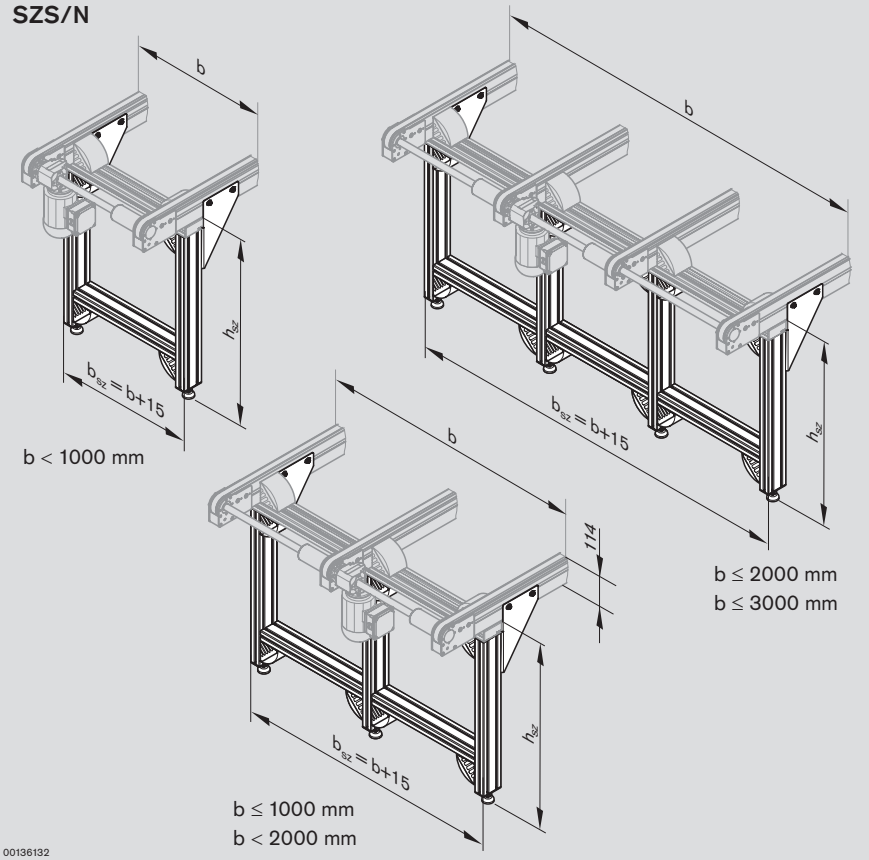
Version:
– Extruded aluminum profiles
– Height-adjustable bases
– The leg set is equipped with two, three, or four vertical struts, depending on the width.
– Reinforcement required, either by mounting to machines or installing braces with Basic Mechanical Elements, ☞ 4-5

Scope of delivery:
Incl. height-adjustable bases, incl. fastening material for mounting the legs sets on the belt section.

Delivery condition: unassembled
Required accessories:
– Foundation bracket **3 842 146 815**, ☞ 4-5
– Anchor bolts **3 842 526 560**, ☞ 4-5

Optional accessories:
– Reinforcement made of Basic Mechanical Elements, ☞ 4-5

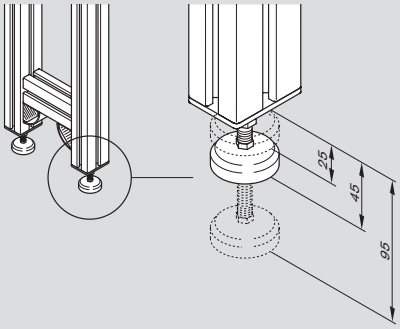
SZS/N



00136132

SZS/N

	No.	Ordering parameters	
SZS/N	**3 842 998 593**	b	(160 - 3000 mm)
		h_{SZ}	(250 - 2000 mm)

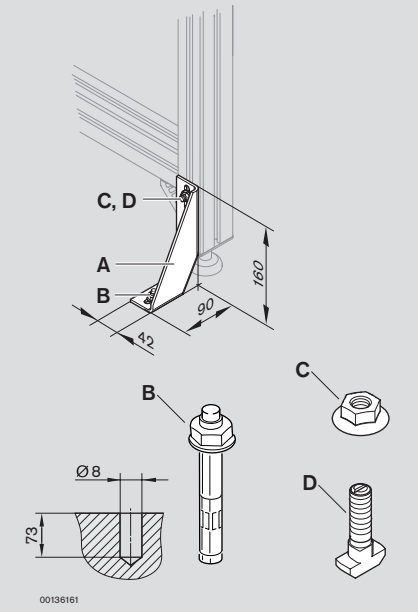


00126885

Leg sets

Accessories:
Basic Mechanical Elements

Application:
Foundation bracket (A) to secure the leg sets with anchor bolts (B).
45x45L profile (E), 45° connector (F) for reinforcing the frame.



Foundation bracket

		No.
A	20	**3 842 146 815***)

Anchor bolt

		No.
B	1	**3 842 526 560***)

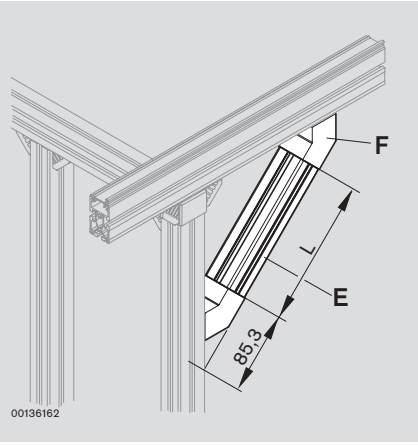
T-head bolt, flange nut

		No.
C	100	**3 842 345 081***)
D	100	**3 842 528 715***)

Foundation bracket set

		No.
(A + C + D)	20	**3 842 338 979***)

*) Part number. Article can only be ordered in the quantity specified as a packing unit ( ).



45x45L profile

		No.
E	1	**3 842 992 425/L**

45° connector

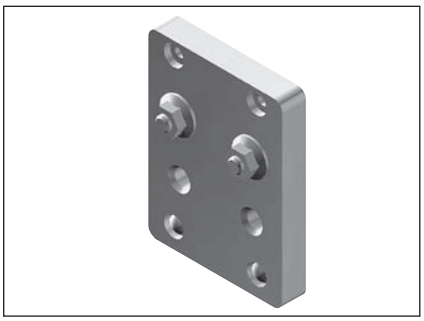
		No.
F	1	**3 842 535 428**

Leg sets

Positioning and orientation Transportation control

Positioning and orientation, transportation control

Stop



00136139

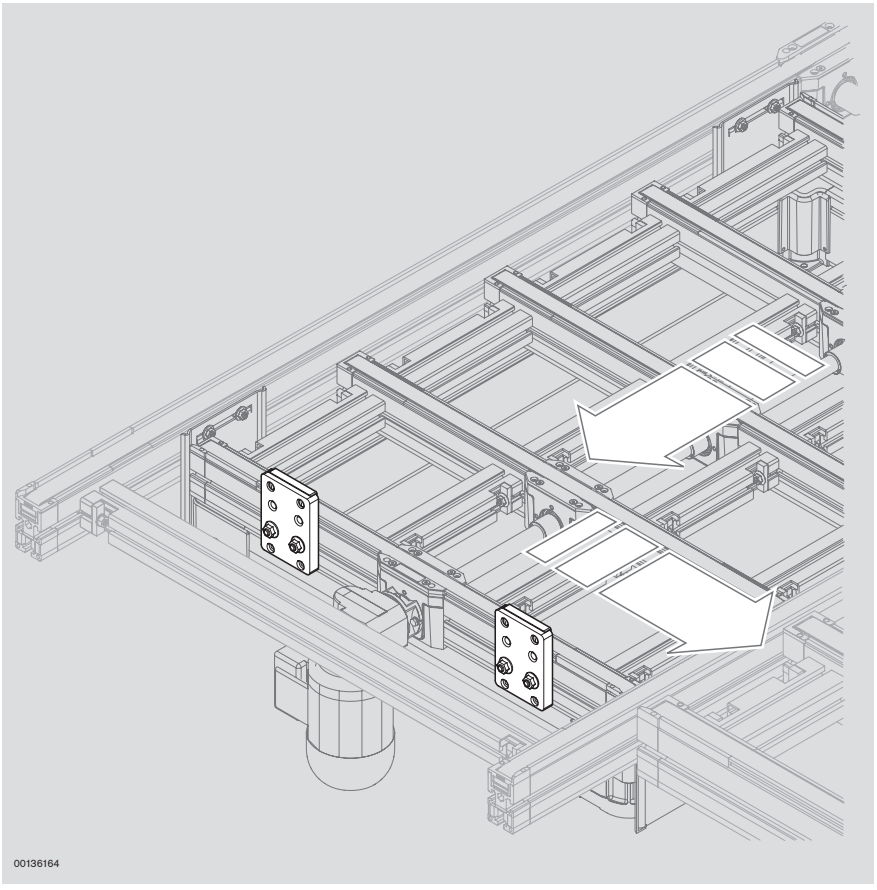
Application:
- As a stop for solar modules moving from a transverse section to a longitudinal section
- For simple lateral positioning processes
- Used only with toothed belts with a low friction coefficient
- Max. stop weight 60 kg for $v_{max} \leq 3$ m/min

Installation location:
- CSS/B, CSS/BM belt section
- LTS/B lift transverse unit

Version:
- Polymer in an anti-static version with screw-on stop rail

Scope of delivery:
Incl. fastening material for mounting to the belt section or lift transverse unit

Delivery condition: unassembled



00136164

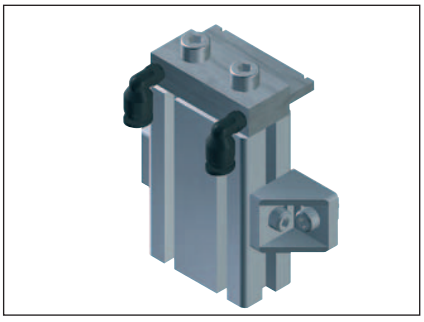
Stop

No.
3 842 519 717

7-8

Positioning and orientation, transportation control

Fixed stop with air nozzle



00136140

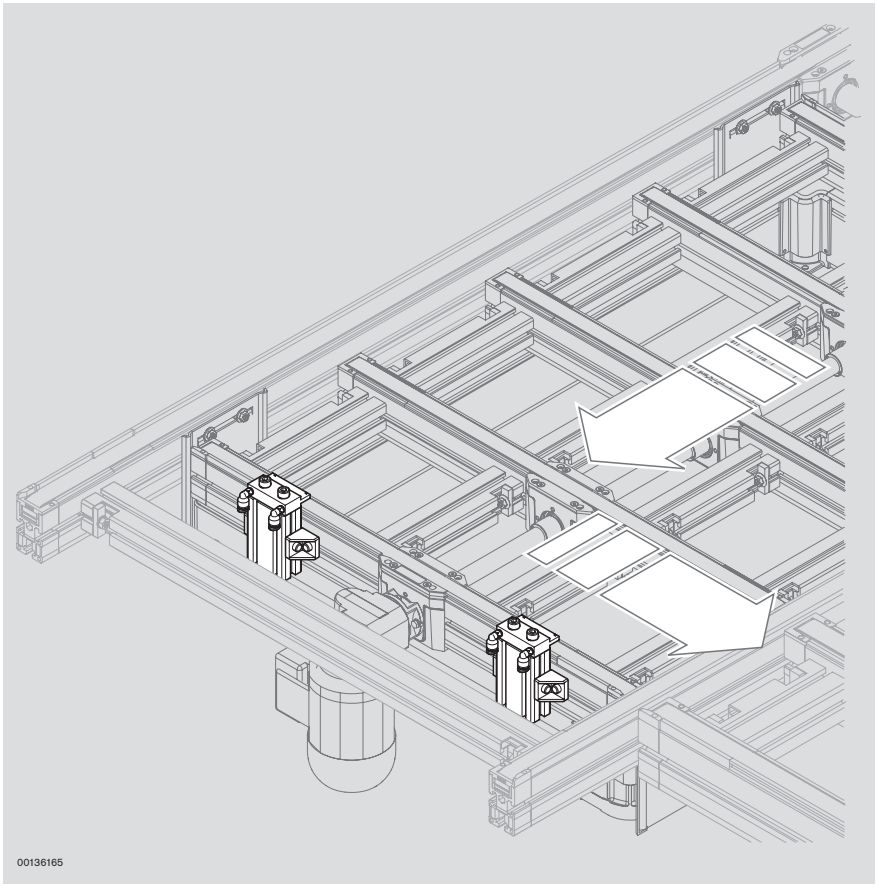
Application:
- As a stop for solar modules moving from a transverse section to a longitudinal section
- With blower to prevent EVA or PVF films from being caught
- Used only with toothed belts with a low friction coefficient
- Max. stop weight 60 kg for $v_{max} \leq 3$ m/min

Installation location:
- CSS/B, CSS/BM belt section
- LTS/B lift transverse unit

Version:
- A soft jet of air on the front side prevents hanging film from being caught when the solar module hits the stop
- Compressed air supply with approx. 4-6 bar
- Compressed-air connection via 4-mm pushlock-type connection
- Individually adjustable
- Nozzle outlet diameter: 1-1.5 mm

Scope of delivery:
Incl. fastening material for mounting to the belt section or lift transverse unit

Delivery condition: assembled



00136165

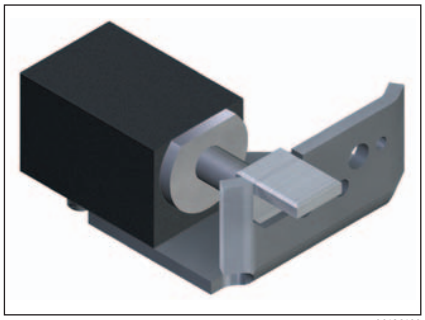
Stop with blower:
Order on request

5

☞ 7-8

Positioning and orientation, transportation control

DAS/30 damper



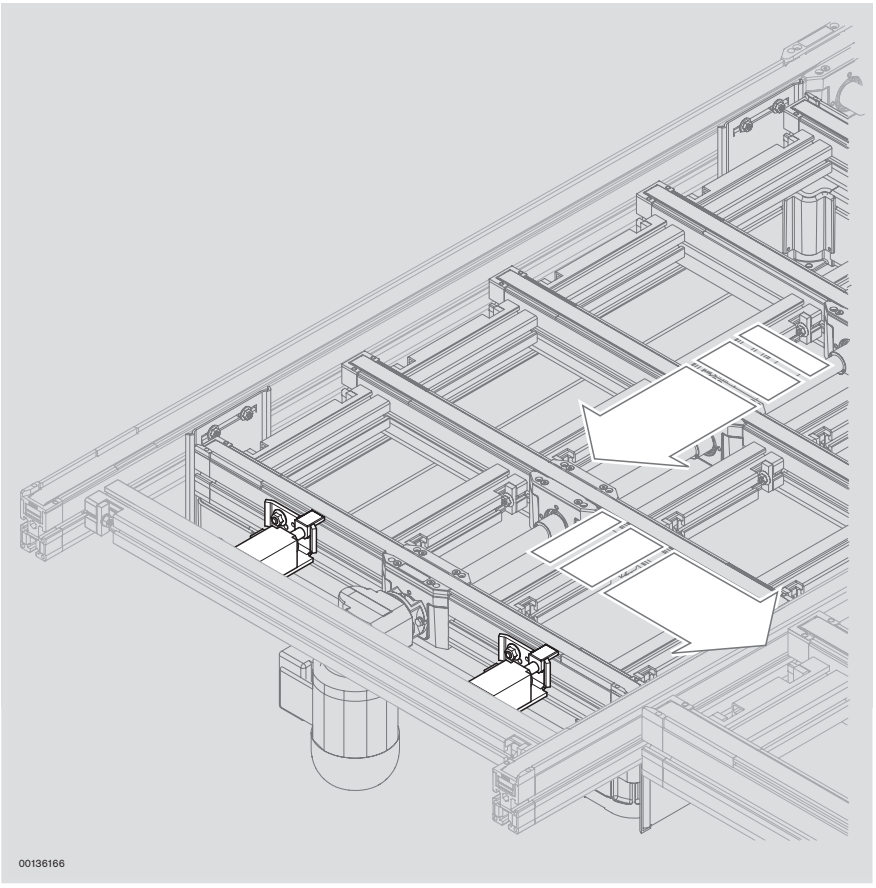
Application:
- As a stop for solar modules with cushioned movement from a transverse section to a longitudinal section or vice versa
- For solar modules with a total weight of 30-60 kg
- Transport speed when impacting the damper $v_{max} \leq 3$ m/min
- Used only with toothed belts with a low friction coefficient

Installation location:
- CSS/B, CSS/BM belt section
- LTS/B lift transverse unit

Version:
- Pneumatic damper with infinitely adjustable damping
- Pneumatic return parallel to opening of the stop gate, which permits the solar module to move towards the damper.

Scope of delivery:
Incl. fastening material for mounting to the lift transverse unit

Delivery condition: unassembled



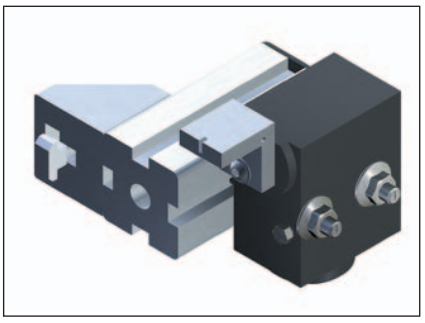
DAS/30

Load (kg)	**No.**
30-60	**3 842 515 351**

☞ 7-9

Positioning and orientation, transportation control

Damper with blower



00136143

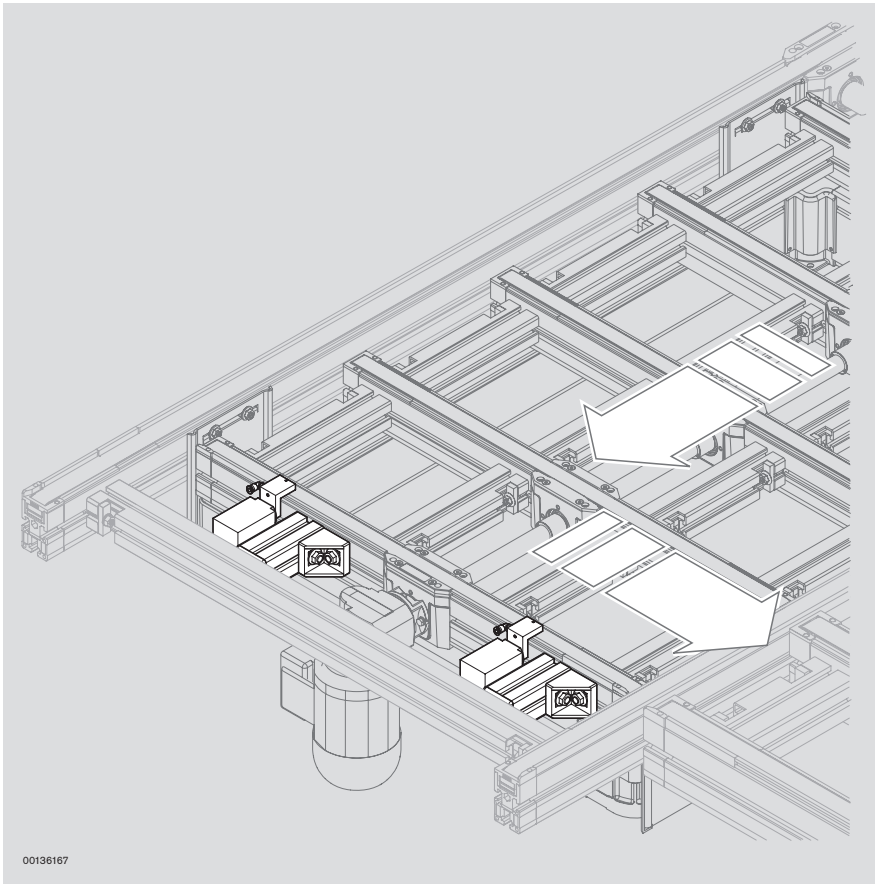
Application:
- As a stop for solar modules with cushioned movement from a transverse section to a longitudinal section or vice versa
- With blower to prevent EVA or PVF films from being caught
- For solar modules with a total weight of 30-60 kg
- Transport speed when approaching the damper $v_{max} \leq 3$ m/min
- Used only with toothed belts with a low friction coefficient

Installation location:
- CSS/B, CSS/BM belt section
- LTS/B lift transverse unit

Version:
- Pneumatic damper with infinitely adjustable damping
- Pneumatic return parallel to opening of the stop gate, which permits the solar module to move towards the damper.
- A soft jet of air on the front side prevents hanging film from being caught when the solar module hits the fixed stop
- Compressed air supply with approx. 4-6 bar
- Compressed air connection via 4-mm pushlock-type connection
- Individually adjustable

Scope of delivery:
Incl. fastening material for mounting to the lift transverse unit

Delivery condition: assembled



00136167

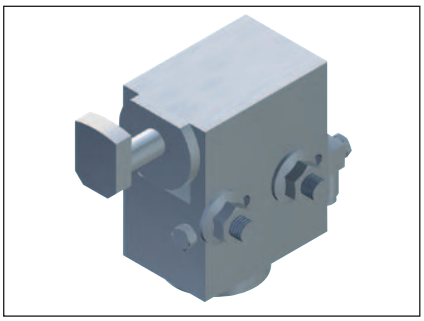
Damper with blower:
Order on request

5

☞ 7-9

Positioning and orientation, transportation control

VE 2/D-60 stop gate



00136144

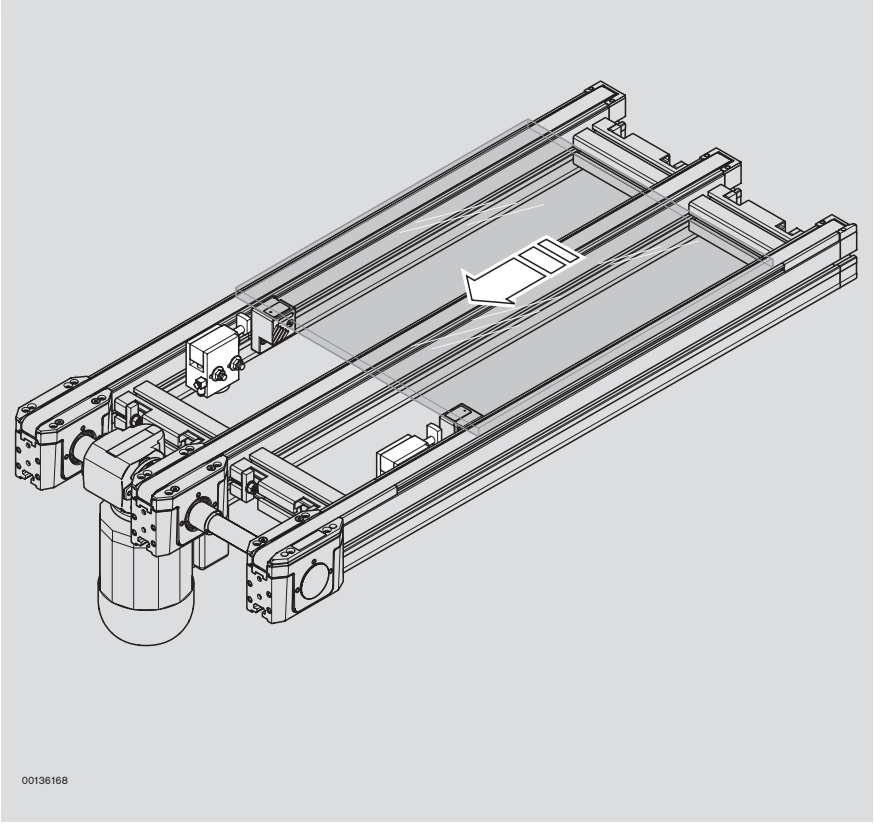
Application:
– Dampened stopping of a solar modular on defined bearing surfaces
– Transport speed when approaching the damper $v_{max} \leq 3$ m/min
– Used only with toothed belts with a low friction coefficient
– Correction of the position (centering) of a module on the belt section. Can be realized through a lateral mounting to the belt section.

Installation location:
– CSS/B, CSS/BM belt section

Version:
– Pneumatic stop gate with infinitely adjustable damping
– Optimum damping for small plate weights of up to 60 kg

Scope of delivery:
Incl. fastening material for mounting to the belt section

Delivery condition: assembled



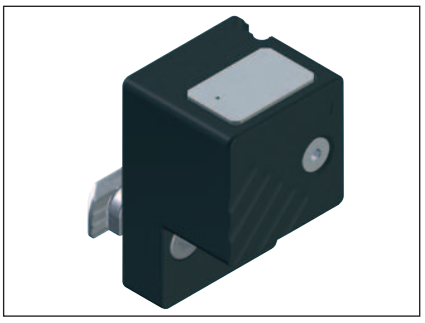
00136168

VE 2/D-60 stop gate:
Order on request

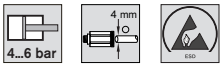
☞ 7-10

Positioning and orientation, transportation control

Air nozzle



00136146



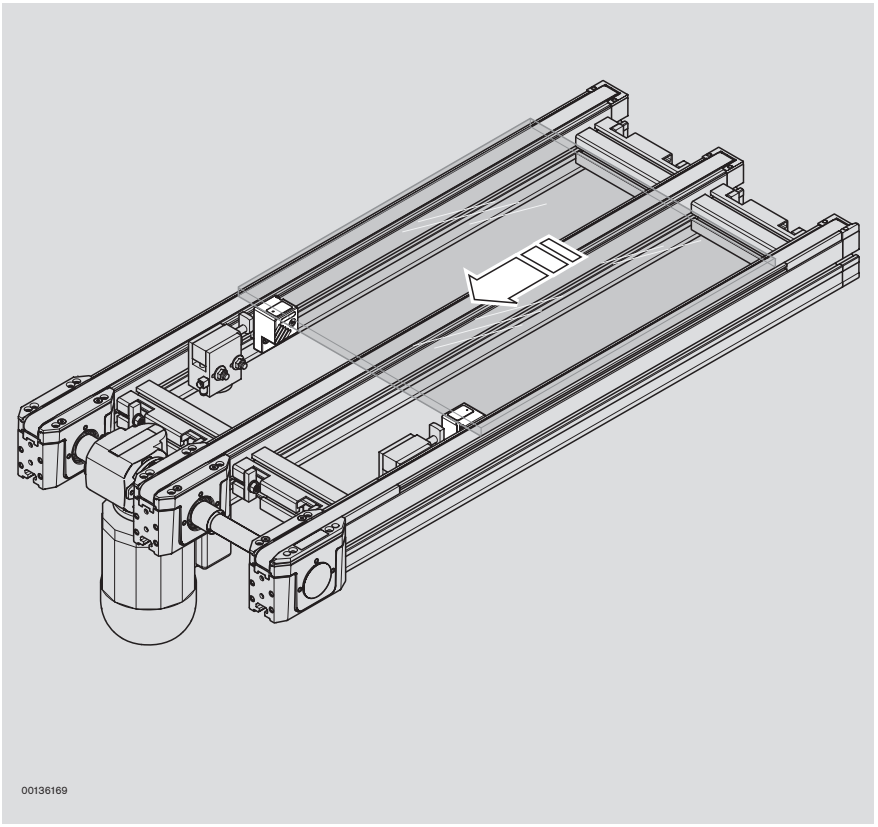
Application:
– Prevents hanging film from being caught, e.g. when the solar module hits a stop gate or stop
– Used in conjunction with a stop gate or stop

Installation location:
– CSS/... belt section

Version:
– Outlet on the top blows a soft jet of air below the protruding film on an approaching solar module, thus lifting the film. This prevents it from being caught when the module hits a subsequent stop.
– Compressed air supply with approx. 4-6 bar
– Compressed-air connection via 4-mm pushlock-type connection
– Individually adjustable

Scope of delivery:
Incl. fastening material for mounting to the belt section

Delivery condition: assembled



00136169

Air nozzle:
Order on request

5

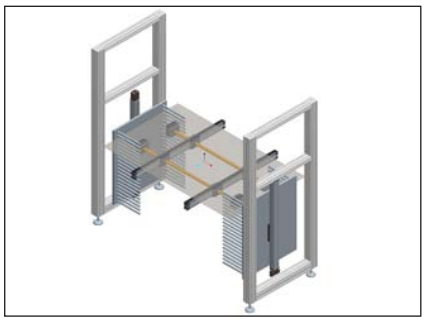
7-10

Positioning and orientation, transportation control

Special modules

Special modules

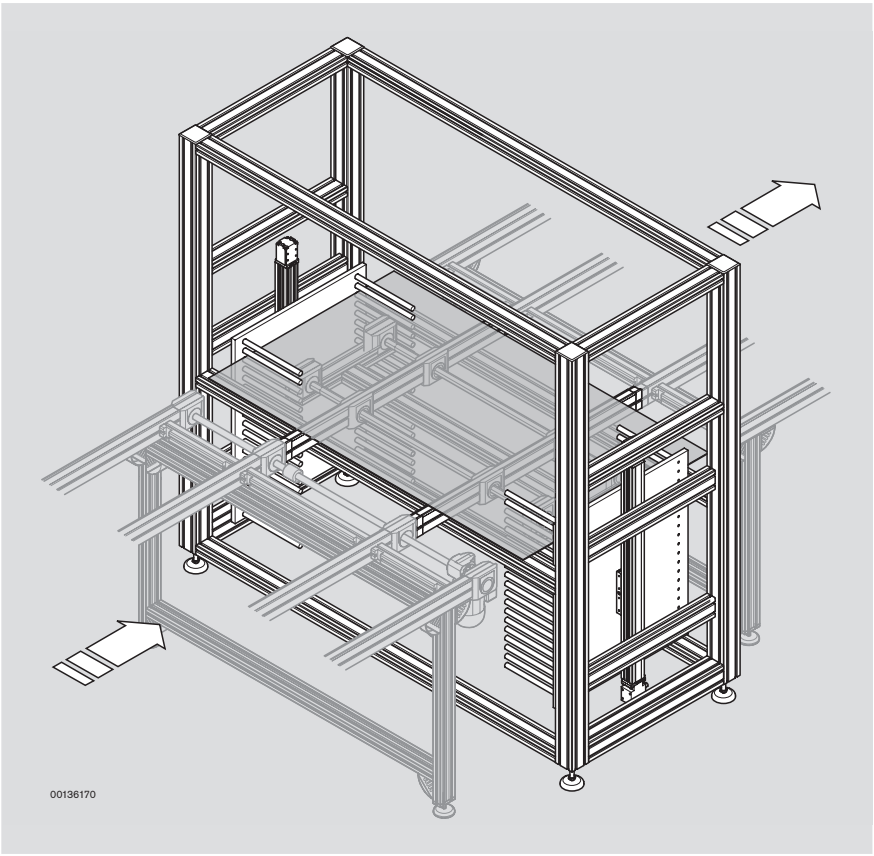
LIFO storage



Application:
- Vertical temporary storage for 10 to 30 solar modules. Functions in accordance with the “last in, first out” principle.
- Mounted within the line in the longitudinal or transverse conveyor

Version:
- Independent module
- Expanding mandrel to lift the solar modules from the belt section. Stored above the conveying level.
- Vertical movement via electrical axles

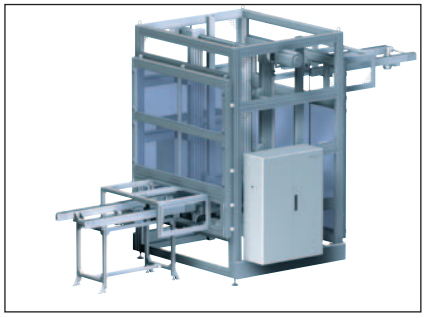
Scope of delivery:
- Incl. CSS belt section
- Incl. enclosure
- Incl. complete sensor system



LIFO storage:
Order on request

Special modules

Lift

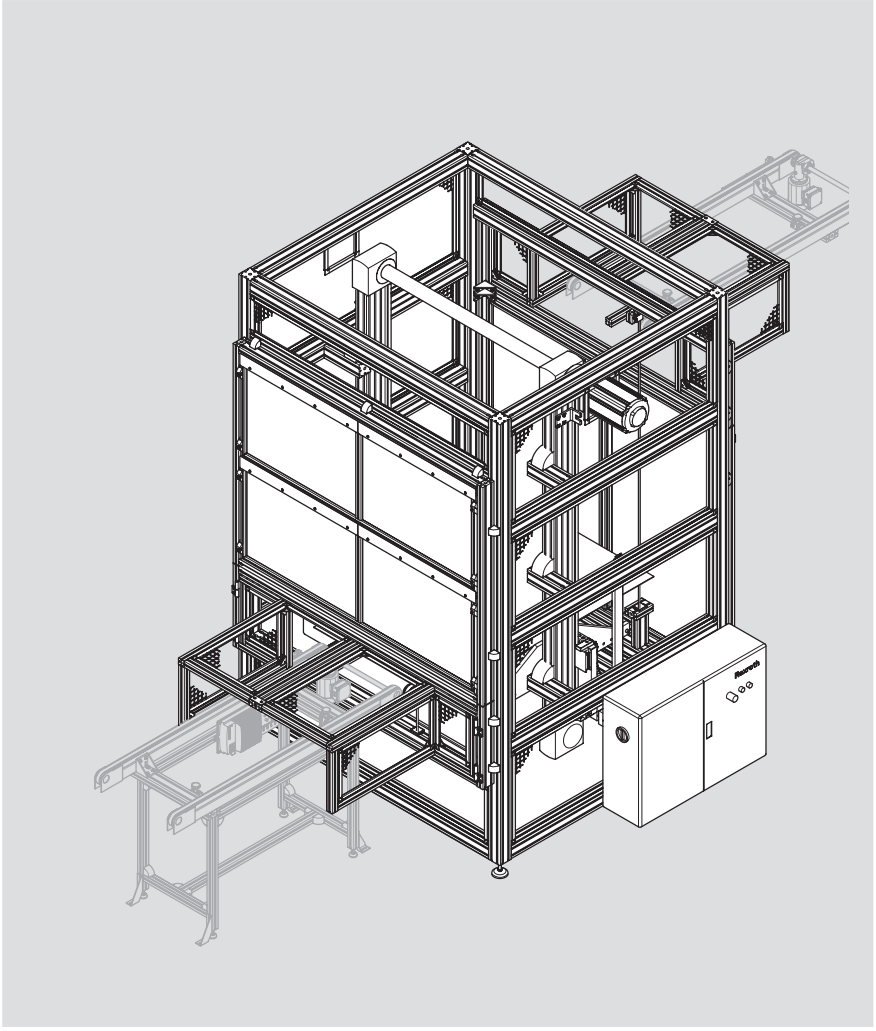


00139068

Application:
– To bridge differences in the transport level

Version:
– Lift of up to 550 mm (larger lifts are also possible)
– Lifting movement via servo drive for the vertical axis
– Optional version: pneumatic lifting movement (lift ≤ 50 mm)

Scope of delivery:
– Incl. CSS/BM, CSS/NT, or CSS/FM belt section
– Incl. frequency converter
– Incl. complete sensor system
– Optional version:
Incl. enclosure



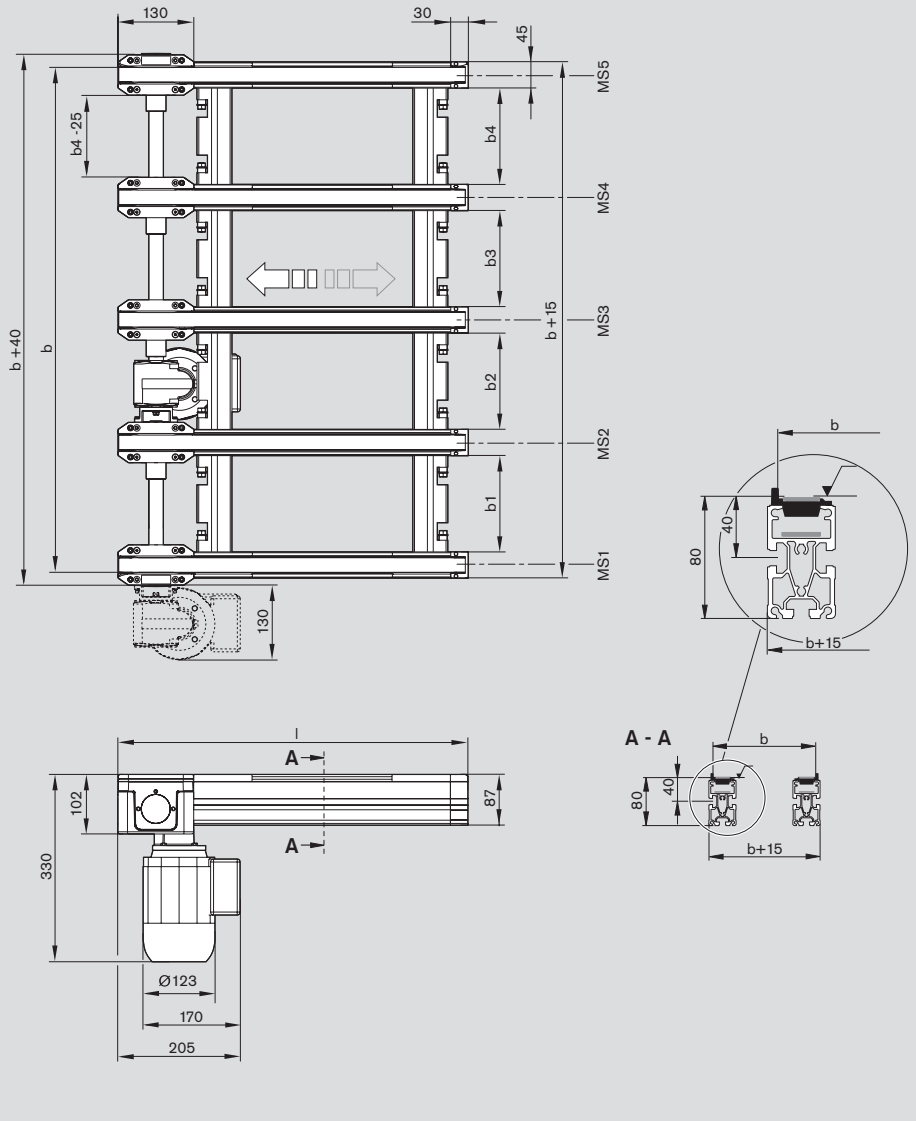
Lift:
Order on request

Special modules

Technical data

Technical data

CSS/B, CSS/F belt section



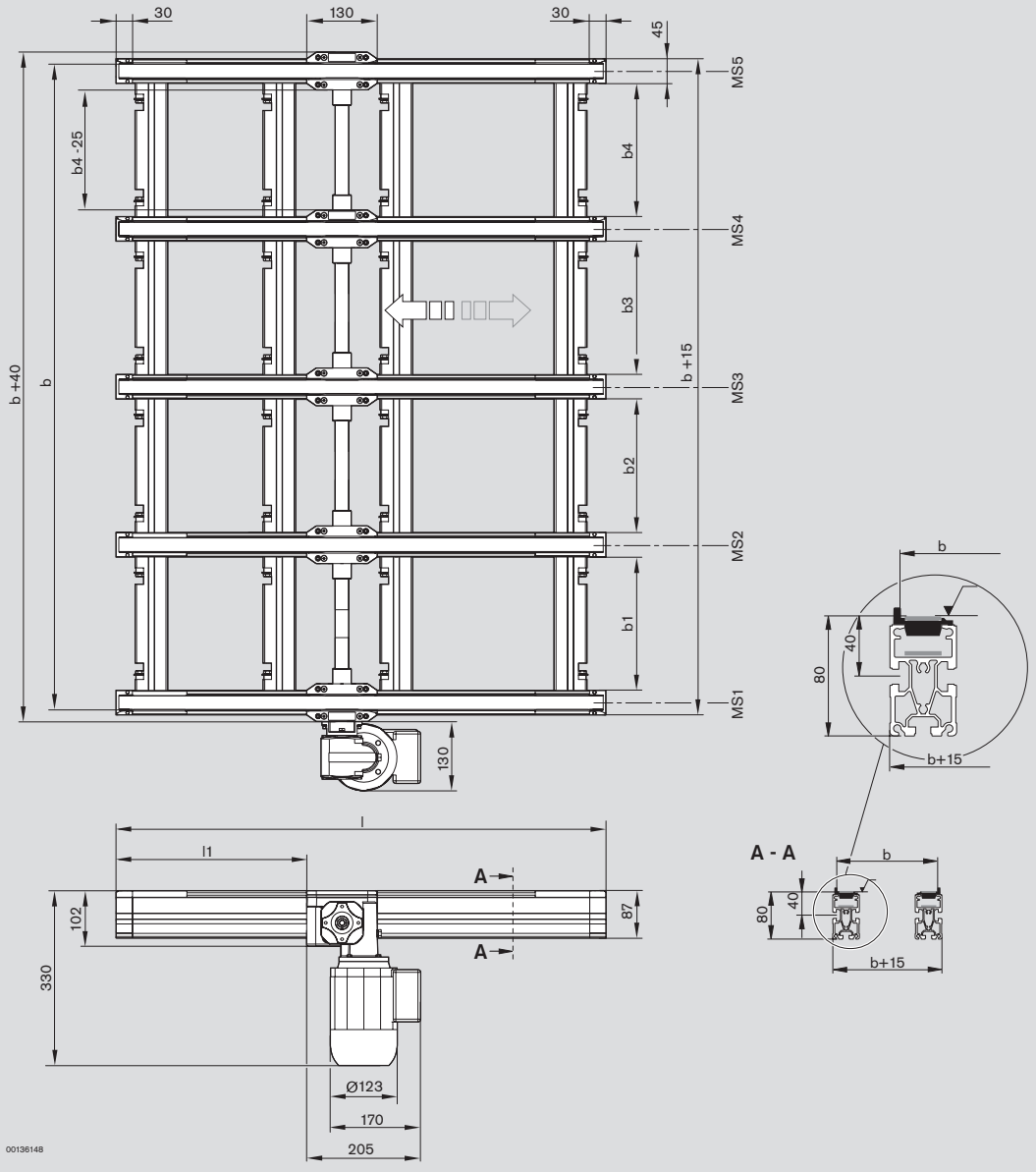
The position of the cross connector may deviate from that in the figure.

3 842 998 537: $b_{min} = 160$ mm
3 842 998 538: $b_{min} = b1_{min} + b2_{min} + 3 \times 45 - 15 = 290$ mm
3 842 998 539: $b_{min} = b1_{min} + b2_{min} + b3_{min} + 4 \times 45 - 15 = 420$ mm
3 842 998 540: $b_{min} = b1_{min} + b2_{min} + b3_{min} + b4_{min} + 5 \times 45 - 15 = 550$ mm

i ☞ 2-2, 2-4

Technical data

CSS/BM, CSS/FM belt section



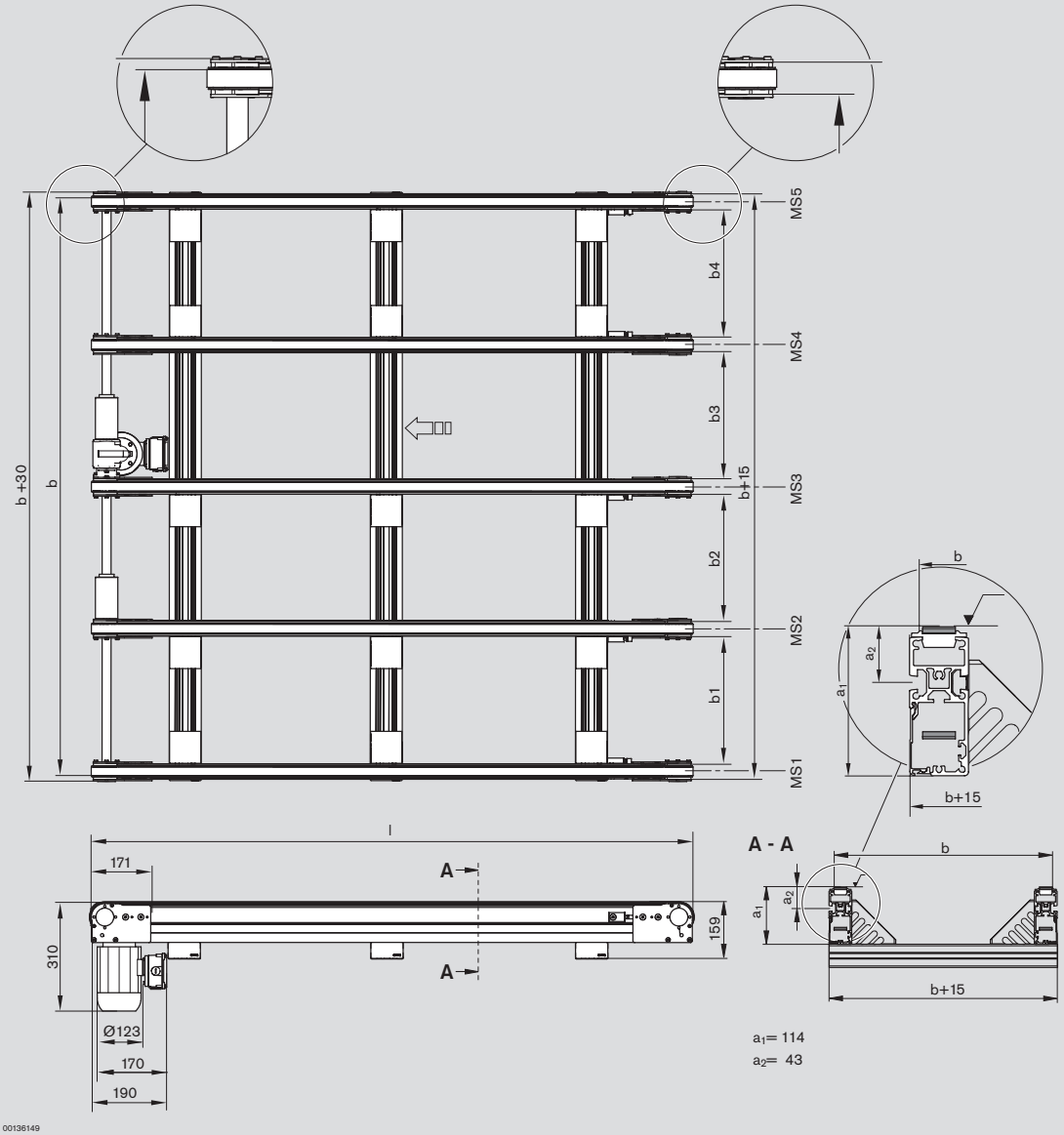
The position of the cross connector may deviate from that in the figure.

3 842 998 541: $b_{min} = 160$ mm
3 842 998 542: $b_{min} = b1_{min} + b2_{min} + 3 \times 45 - 15 = 290$ mm
3 842 998 543: $b_{min} = b1_{min} + b2_{min} + b3_{min} + 4 \times 45 - 15 = 420$ mm
3 842 998 544: $b_{min} = b1_{min} + b2_{min} + b3_{min} + b4_{min} + 5 \times 45 - 15 = 550$ mm

i ☞ 2-3, 2-5

Technical data

CSS/NT belt section

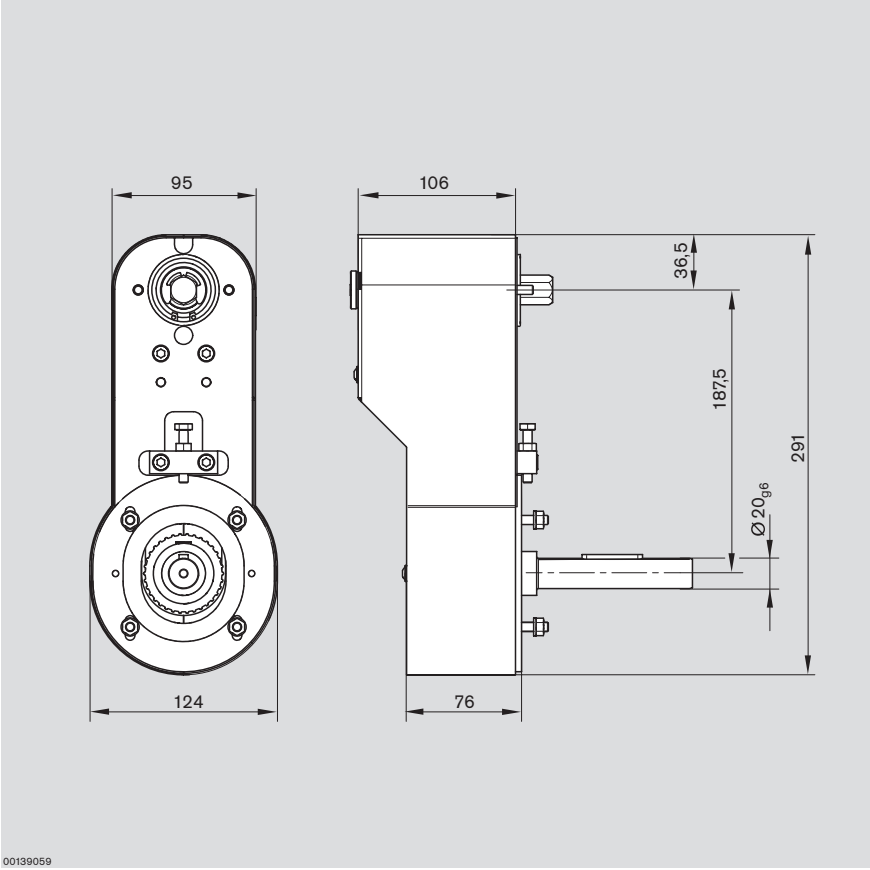


3 842 998 632: $b_{min} = 255$ mm
3 842 998 633: $b_{min} = b1_{min} + b2_{min} + 3 \times 45 - 15 = 540$ mm
3 842 998 634: $b_{min} = b1_{min} + b2_{min} + b3_{min} + 4 \times 45 - 15 = 825$ mm
3 842 998 635: $b_{min} = b1_{min} + b2_{min} + b3_{min} + b4_{min} + 5 \times 45 - 15 = 1050$ mm

i ☞ 2-6

Technical data

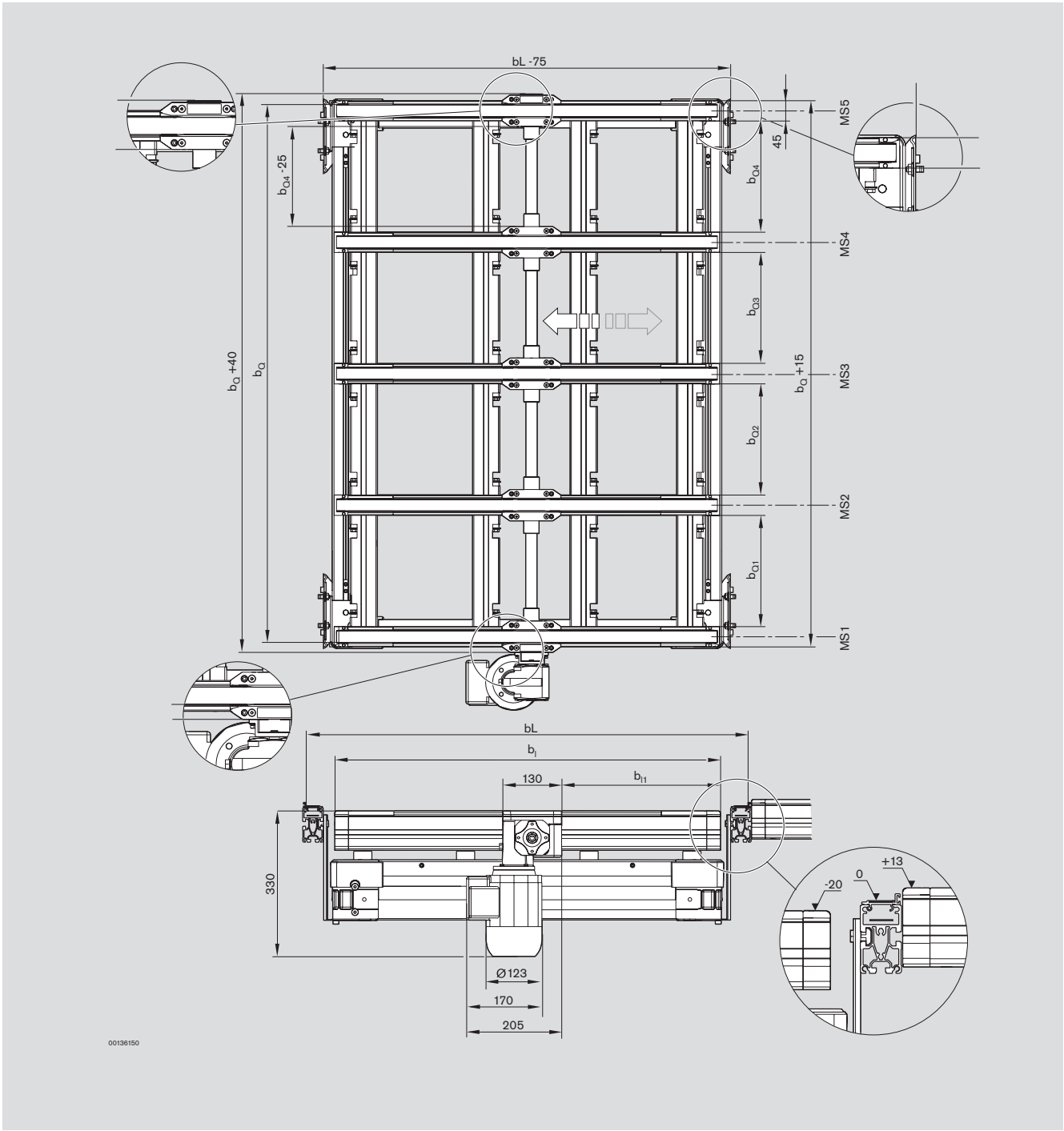
Transmission drive



i ☞ 2-7

Technical data

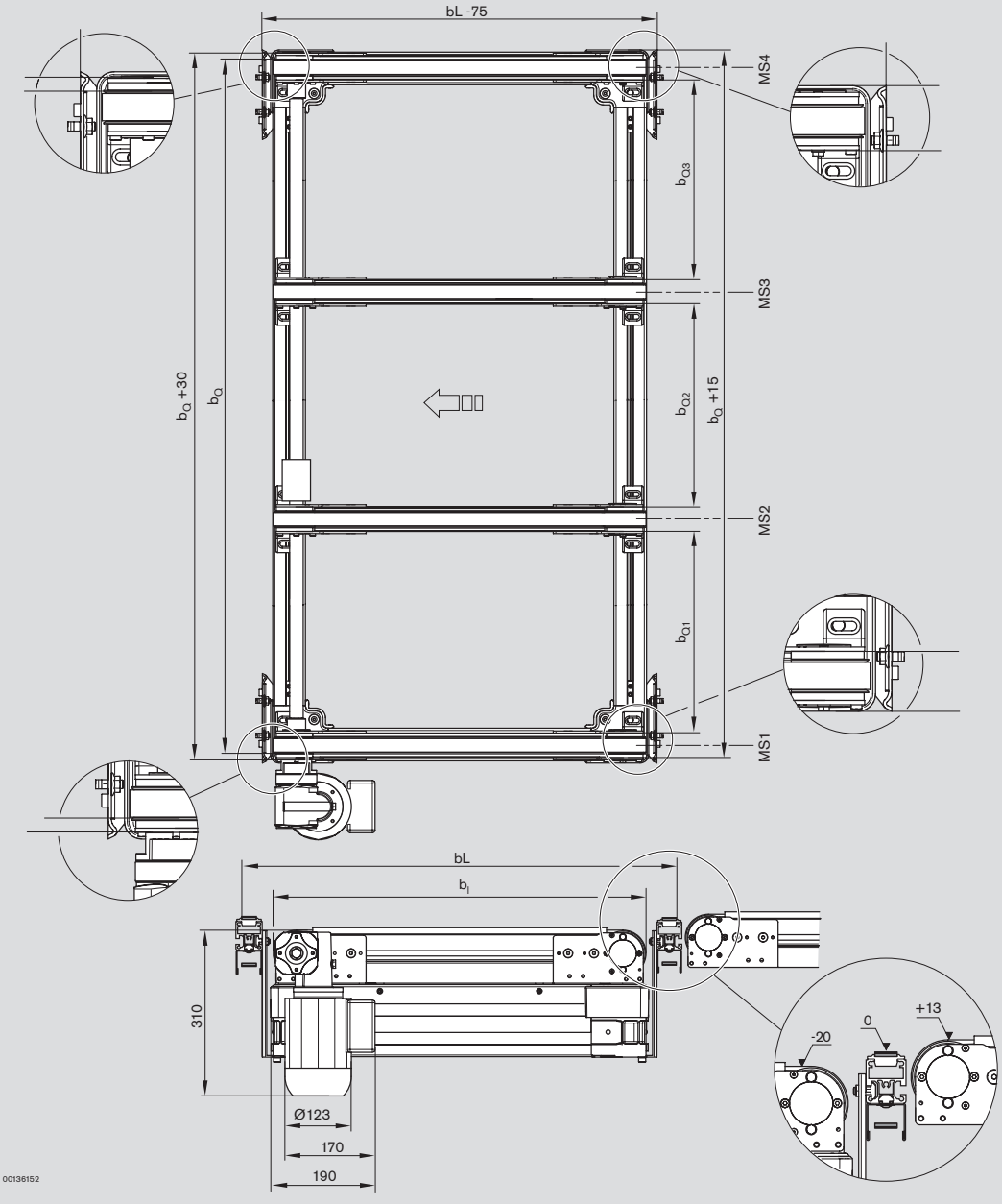
LTS/B, LTS/F lift transverse unit



☞ 3-3, 3-4

Technical data

LTS/NT lift transverse unit

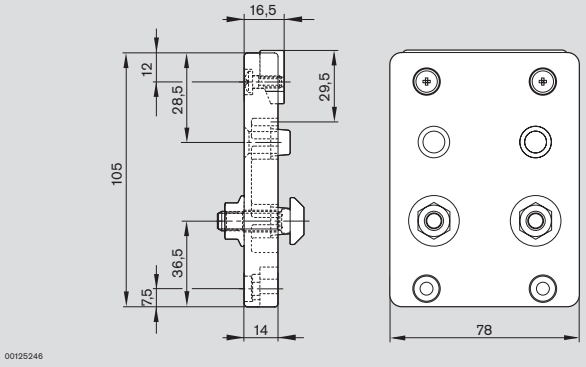


i ☞ 3-5

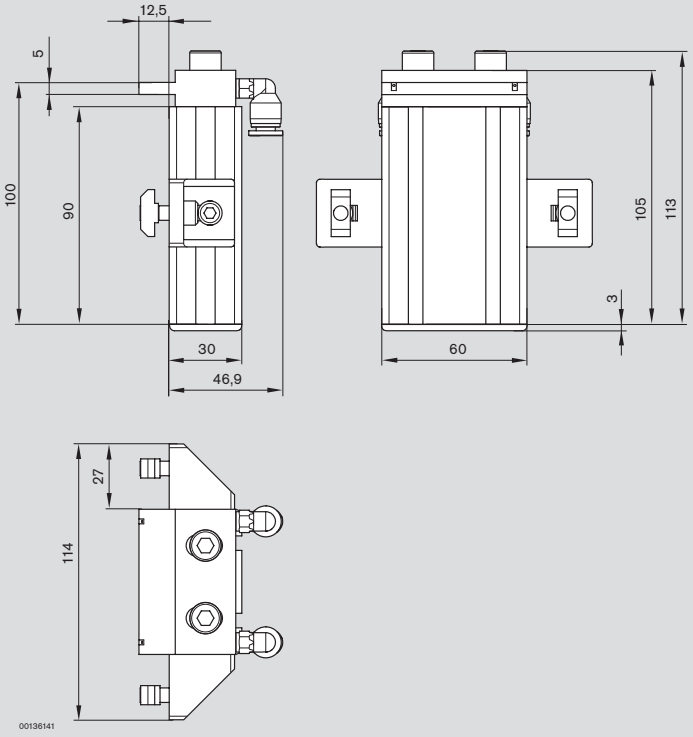
Technical data

Stop
Fixed stop with air nozzle

Stop



Fixed stop with air nozzle

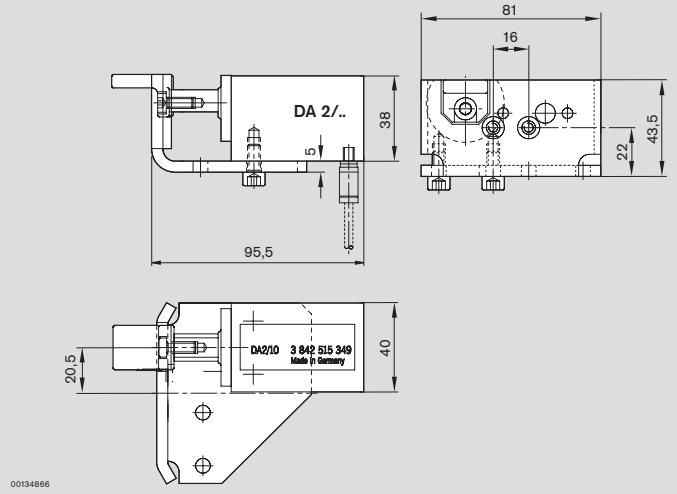


i ☞ 5-2, 5-3

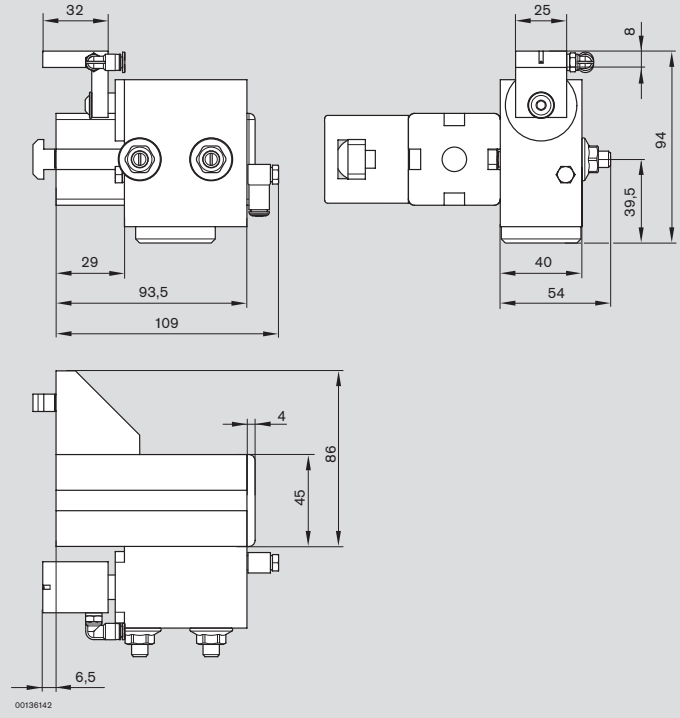
Technical data

DAS/30 damper
Damper with blower

DAS/30 damper



Damper with blower

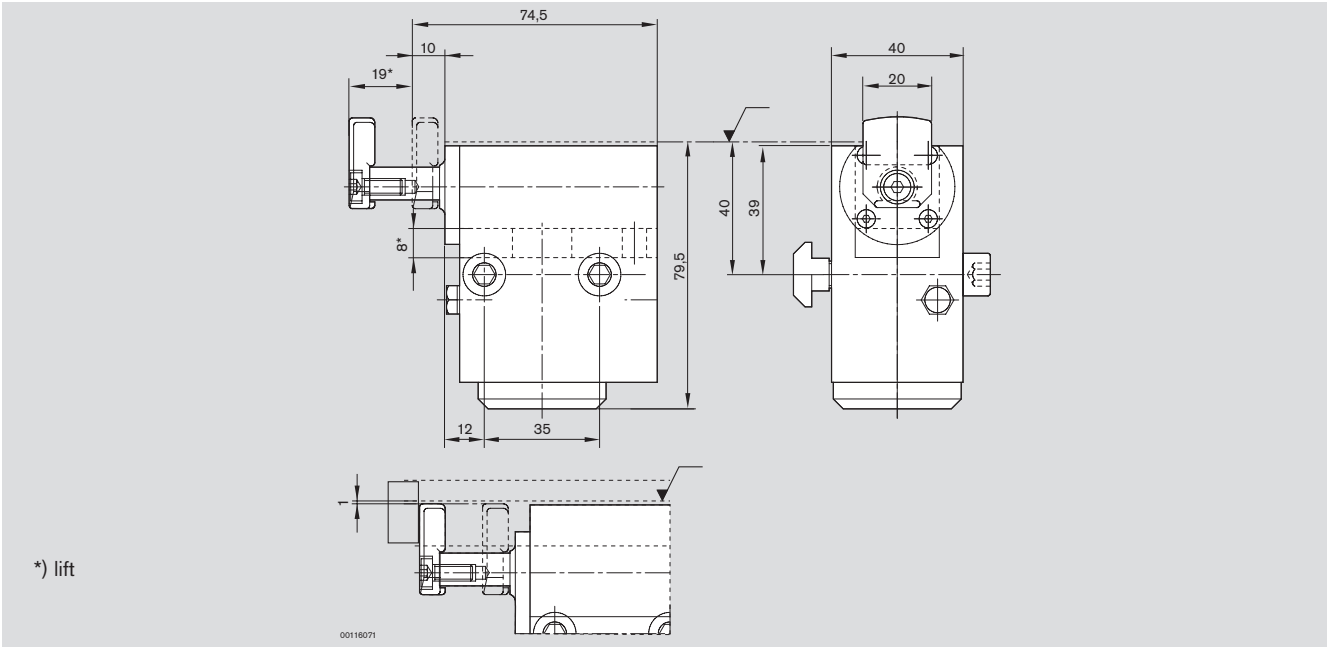


☞ 5-4, 5-5

Technical data

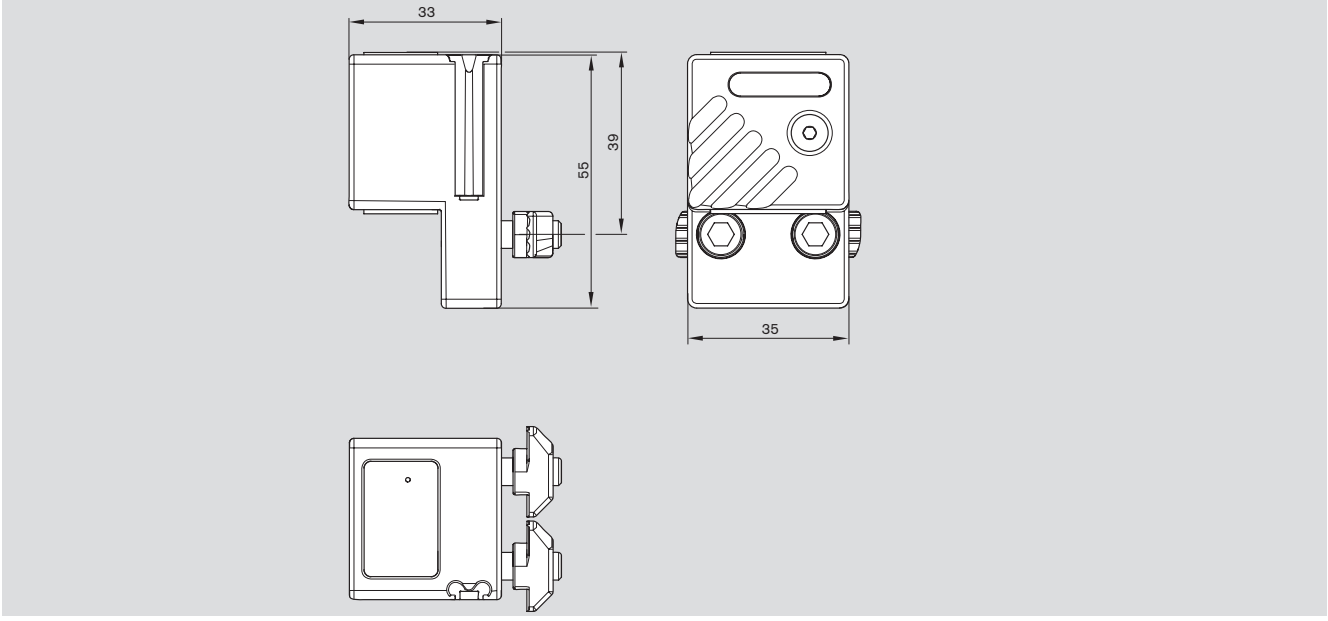
VE 2/D-60 stop gate
Air nozzle

VE 2/D-60 stop gate



*) lift

Air nozzle



☞ 5-6, 5-7

Technical data

Motor data

Electrical connection conditions for the drive motors:
Connection to a 3-phase, 5-wire system (L1, L2, L3, N, PE). All motors are equipped with protective temperature switches which must be connected to an overload switch-off and wired by the system installer according to the technical functions for operation during system set-up.

Standard connection voltages for three-phase motors:
Indicate the voltage/frequency combination in the ordering information for components that are operated with three-phase motors.

Voltage/frequency combinations (U/f)

U/f	U/f
200 V/50 Hz	220 V/60 Hz
230 V/50 Hz	380 V/60 Hz
400 V/50 Hz	**460 V/60 Hz**
500 V/50 Hz	575 V/60 Hz[2]
0[1] /50 Hz	**0**[1] /60 Hz

[1] Without motor, with gear (if technically practical)
[2] Motor design in accordance with cURus (UL Recognition Mark USA + Canada)

Circuit type		Δ	**Y**	Δ	**Y**	**Y**			
Voltage at 50 Hz		200 V		230 V	**400 V**	500 V			
Voltage at 60 Hz		220 V	380 V		**460 V**	575 V			
		I_N (A)	**I_N** (A)	**I_N** (A)	**I_N** (A)	**I_N** (A)	**cos φ**[3]	**(50 Hz) P** (W)[4]	**(60 Hz) P** (W)[5]
Current consumption at rated power	634	2.0	1.2	1.7	**1.1**	0.8	0.60	250	290

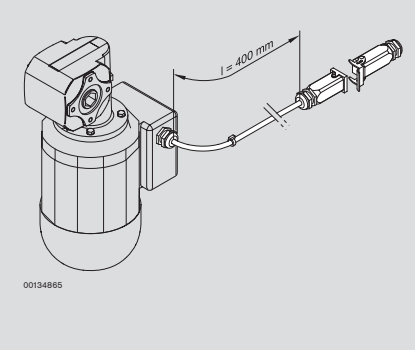
[3] Power factor
[4] Power output at 50 Hz
[5] Power output at 60 Hz
The data are typical values.
Subject to changes. See the motor rating plate for binding information.

Technical data

Transportation speeds v_N Motor connection

Modular unit	v_N (m/min)	50 Hz v (m/min)	50 Hz Motor type	60 Hz v (m/min)	60 Hz Motor type
CSS/B	36	37.4	634	(45.0)	634
CSS/BM	21	–	–	21.6	634
CSS/F	18	18.0	634	18.0	634
CSS/FM	15	15.0	634	14.4	634
	12	12.0	634	10.8	634
	9	9.0	634	8.7	634
	6	6.0	634	5.4	634
CSS/NT	36	33.8	634	33.9	634
	18	16.9	634	20.3	634
	15	13.5	634	16.3	634
	12	11.3	634	13.6	634
	9	8.5	634	8.1	634
	6	5.6	634	6.8	634

Motor connection with cable/plug (AT = S) and 3A metal industrial plug-in connector

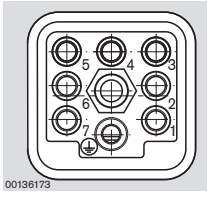


Shielded cable in accordance with VDE 0282 part 810, e.g.:
— Lapp Olflex (4 x 1.5 mm²) + 2 x (2 x 0.75 mm²)

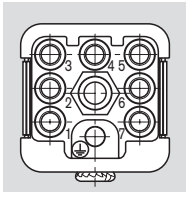
Connection list

Connection terminals motor 3~	Wire no.	Pin no.	Code
U1	1	1	L1
V1	2	2	L2
W1	3	3	L3
TW1	5	4	Thermo
TW2	6	5	Thermo
		6	Shield
	PE	PE	PE

Plug



Socket



Technical data

Layout of the belt sections and drive

The width and mass of the transported solar modules influence the layout of the belt sections (number of tracks) and the permissible operating time of the motor.

No. of tracks
- Lateral protrusion of the solar modules is permissible.
- For track spacing: $bx_{max} = 600$ mm; this limits deflection of the glass modules (glass strength: 4 mm).
- For framed modules, the entire longitudinal side must lie on the track.

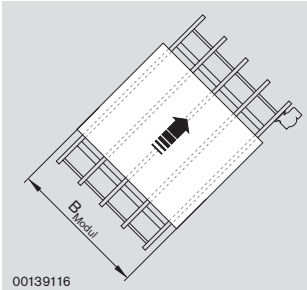
We recommend using the following frequency converters in regions with 230 V (single-phase)/400 V (3-phase) line voltage:
- Bosch Rexroth IndraDrive FC 230 V, 0.37 kW (**R911311055**)
- Bosch Rexroth IndraDrive FC 400 V, 0.55 kW (**R911311061**)

The frequency converter is supplied with a standard I/O module. Further available modules:
- PROFIBUS DP **(R911311072)**
- CANopen **(R911311074)**
- DeviceNet **(R911311075)**

Technical data:
- $T_{ambient}$: 0–50 °C (in control cabinet)
- Protection class IP20 (control cabinet installation)
- Altitude ≤ 1000 m above sea level. At higher altitudes, performance decreases by 1% for each 100 m of altitude.

Please ask your Rexroth representative for information on other operating conditions.

Table 1: Minimum number of tracks for 4 mm thick glass plates



Module width W_{module} (mm)	0 ... 1600	1601 ... 2100	> 2100
Minimum no. of tracks	2 ... 3	4	5

Technical data

Observe the following information for the drive layout:
– The permissible section load per track must not be exceeded.
– The permissible section load for all belt sections for v_N = 18 m/min or 36 m/min depends on the operating time of the drive; see Diagrams 1 to 3.

The operating time (OT) is valid for a travel time of 3 s ≤ t ≤ 20 s.

Acceleration and braking times of at least 0.5 s are included in the cycle times. To ensure sufficient self-cooling of the motors, the motor frequency must not fall below 16 Hz when at a standstill. The operating time must not exceed 66%.

The diagrams apply to a motor ambient temperature of 25°C. The motor temperatures may reach 60°C with a high number of cycles.

Permissible length of the shielded motor cable: max. 20 m

Example:
Glass plate with m = 20 kg on a 2-track CSS/B or CSS/BM with v_N = 36 m/min.
Based on Diagram 1:
Operating time OT ≤ 60%
Given a travel time of 6 s, the minimum cycle time$_{min}$ = 10 s

Diagram 1: CSS/B, CSS/BM; permissible section load

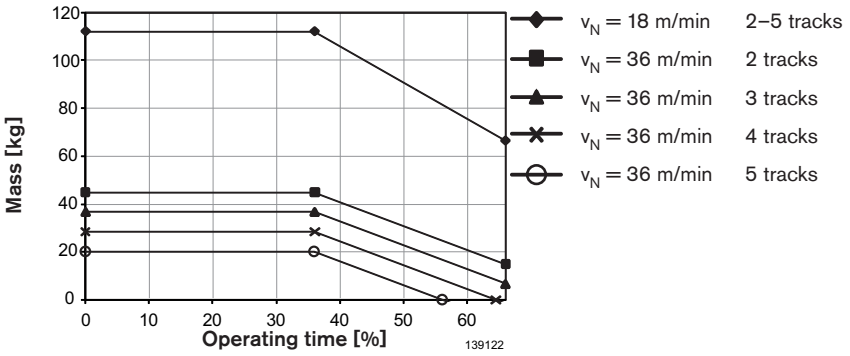


Diagram 2: CSS/F, CSS/FM; permissible section load

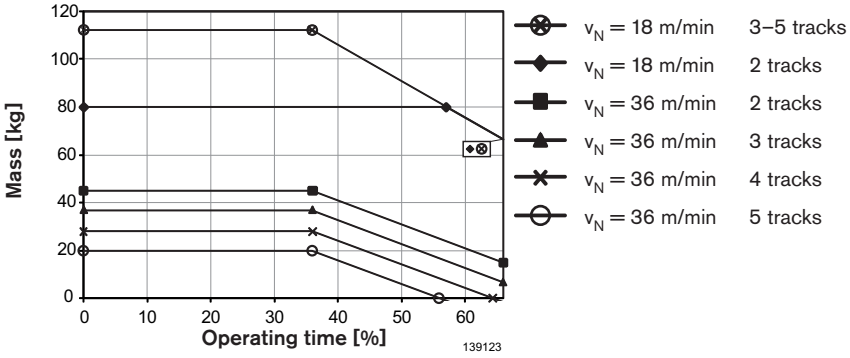
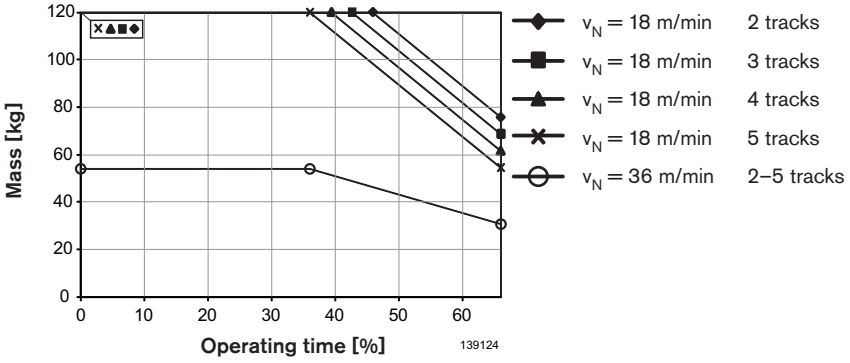


Diagram 3: CSS/NT; permissible section load



Material number overview, index

Material number overview

Material number overview, index

Index

Material number overview, index

Rexroth
Bosch Group

Bosch Rexroth AG
Linear Motion and
Assembly Technologies
Postfach 30 02 07
70442 Stuttgart, Germany
Tel. +49 711 811-30698
Fax +49 711 811-30364
www.boschrexroth.com/dcl

Find your local contact person here:
www.boschrexroth.com/addresses-dcl

Subject to technical modifications

Printed in Germany
3 842 540 432 (2011.04)
EN • DC-IA/MKT