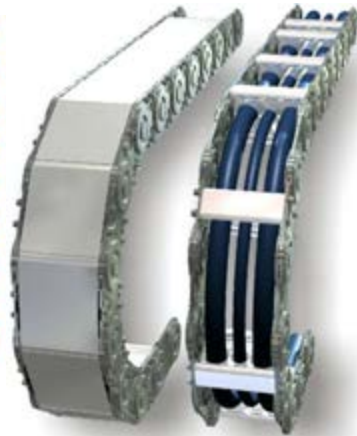


SLE

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closed + open

SLE CHARACTERISTICS

The SLE is available as **SLA** with aluminium T- or slot-profile, as **SLE** with plastic inserts or plastic slot profile, as **SLS** with foam slot profile, as **SLP** with plastic divider PZ or as **SLR** with pipe or roll stays.



In steel, stainless steel and hardened material is the steel chain in case of large free carrying lengths, large quantities of cables and heavy-duty hydraulic hoses first choice.

stay distributions in many variants
stay fast assembly and disassembly
simple shortening and lengthening
shroud protecting pivot mechanics

Travel

The maximum travel distance is determined by the arrangement and the additional weight (line weight). At normal arrangement the maximum travel is twice the free carrying length. Support rollers or similar constructive steps can increase this value.
In gliding arrangement travel distances up to 100 meters are possible (application dependent).
Exceeding this value additional constructive action is needed (see design guidelines).

Travel speed

The standard and the stainless steel design is limited at 1m/s. Exceeding this and high dynamic loads caused by e.g. vibrations or high number of cycles require the use of the hardened (carburised) material.

Acceleration

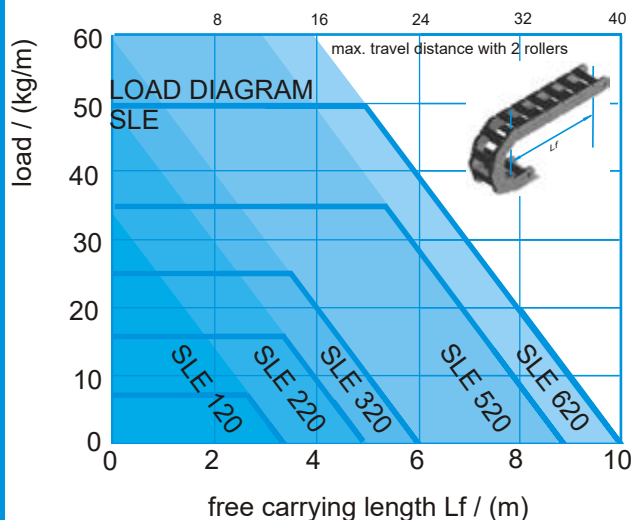
The acceleration in principle is not limited. Limits are achieved, by very long chains and line weight that cause extreme tensile forces.

Temperature

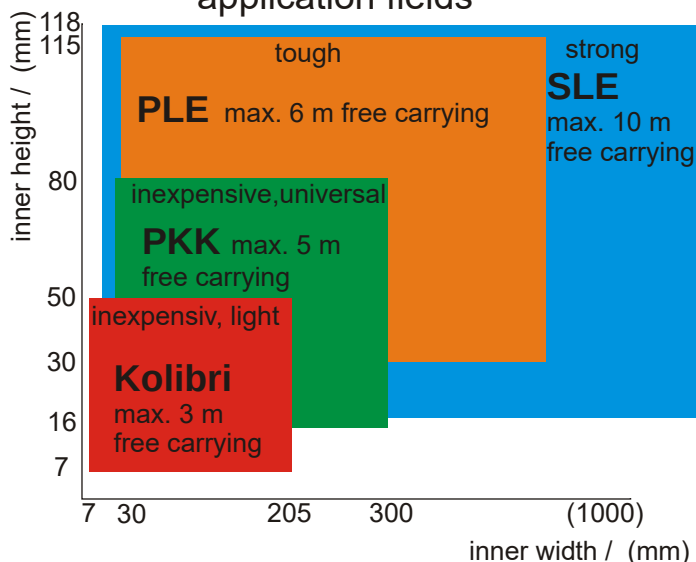
The long term operating temperature is -20 °C to 600 °C (-40 °C stainless steel to 600 °C).

Special types

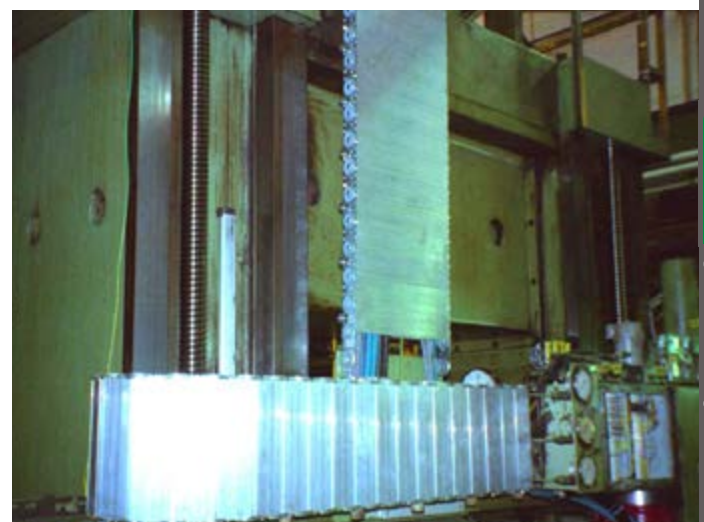
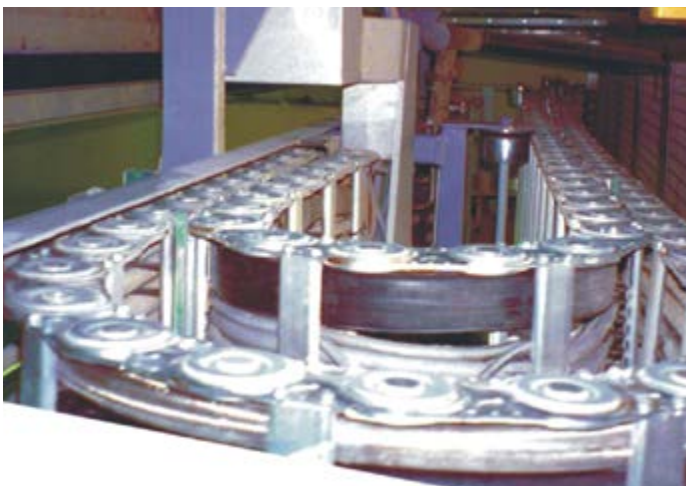
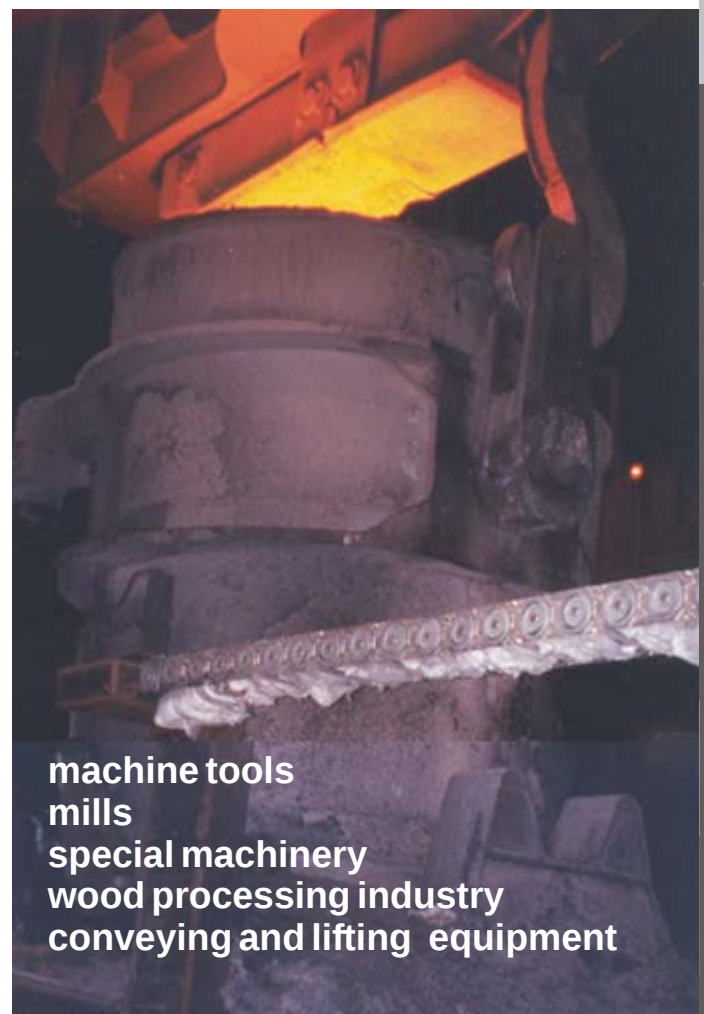
Stainless Steel
Carburised (hardened)



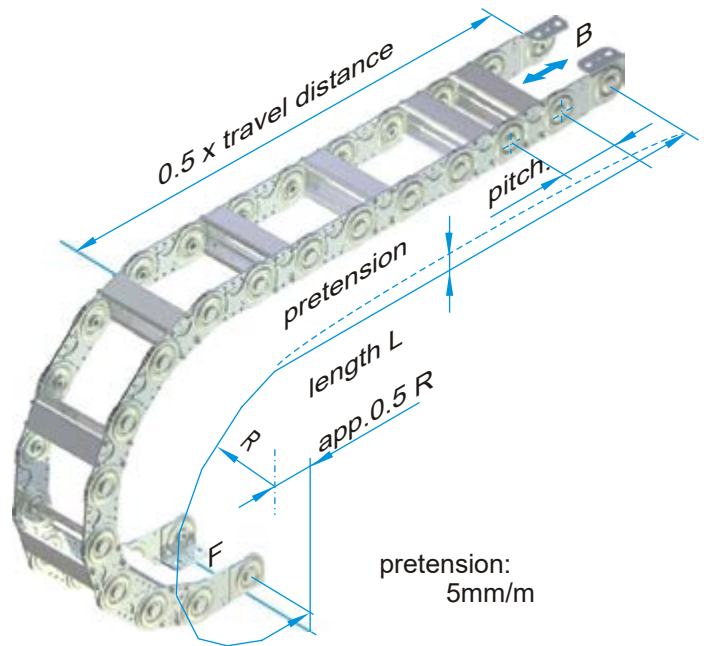
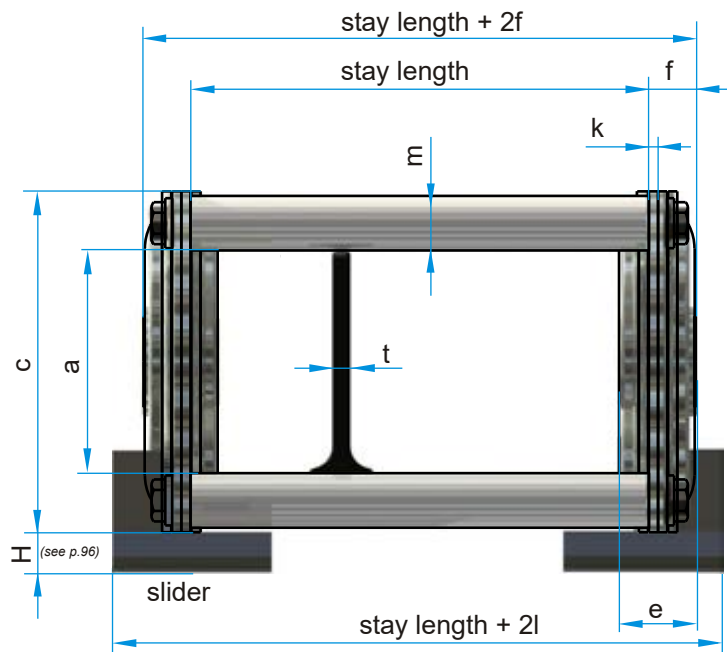
application fields



SLE APPLICATIONS



SLE DIMENSIONS



SLE	pitch	a	c	e	f	g	h	k	l ¹⁾	m	o	p	t	weight [kg/m]
120, 121, - , 128	50	20	35	10	6	7,5	7	1	9	7	10	20	4	2.3
220, 221, 225, 228	75	31	50	14	8	12	9	1,5	13	9	12	30	4	4.3 (5.8)
320, 321, 325, 328	100	49	75	17	11	17	11	2	18	12	12	50	4	7.9 (9.6)
520, 521, 525, 528	125	68	100	23.5	14	22	13	3	20	15	12	70	4	15.1 (16.9)
620, 621, 625, 628	175	118	150	23.5	14	26	13	3	20	15	24	115	8	19.3 (20.9)

the weight is given for the standard type with with a stay length of 100, values in brackets for closed version

1) stay length + 2l is the width of the chain with sliders

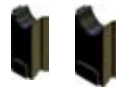
bending radius R [mm]

120, 121, - , 128			60	100	150		250								
220, 221, 225, 228				100	150	200	250	300							
320, 321, 325, 328 ¹⁾					150	200	250	300	400						
520, 521, 525, 528 ¹⁾						200	250	300	400	500					
620, 621, 625 ²⁾ 628 ¹⁾							250	300	400	500	600				

¹⁾ SLE 328 from R200, SLE 528 from R250, SLE 628 from R300 ²⁾ SLE 625 from R300

the stay lengths are offered in steps of 1 mm

stay length SLE plastic inserts Ø [mm]



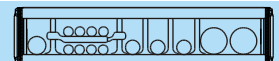
120, 121, - , 128	40 ... 800														
220, 221, 225, 228	50 ... 900	10	15	20	25	30									
320, 321, 325, 328	60 ... 1000	10	15	20	25	30	35	40	45	50					
520, 521, 525, 528	70 ... 1200	10	15	20	25	30	35	40	45	50	55	60	65	70	
620, 621, 625, 628	100 ..1200														

order example:

travel distance 3 m, bending radius 200 mm,

cables: 1x15 mm, 8x8 mm, 3x12 mm, 2x22 mm,

normal arrangement



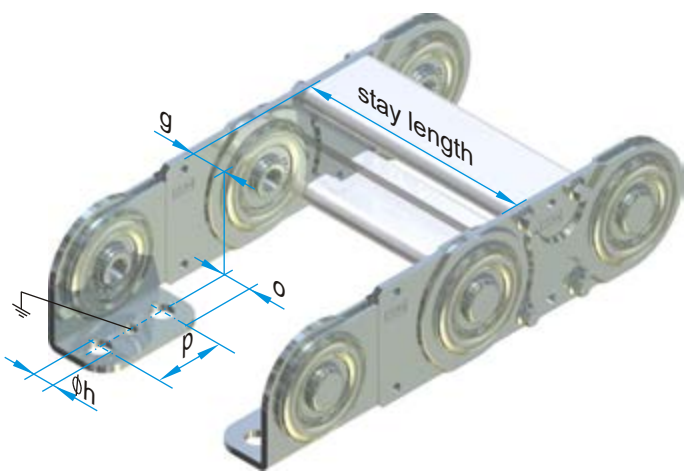
SLP 220 / 200 x 2325 / 200 / N/N¹⁾ / 5 PZ 1 PT55

type / radius x length / stay length / connectors / arrangement / stay distribution

1) 1. fixed connector / 2. moving connector

SLE CONNECTORS

Normal connector in outer radius

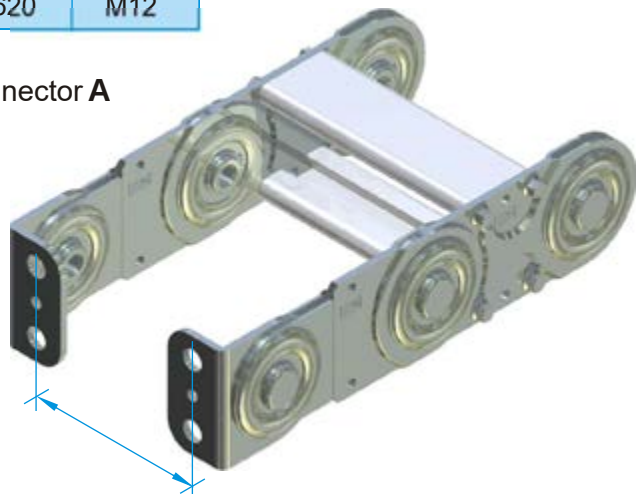


connector **E** in inner radius

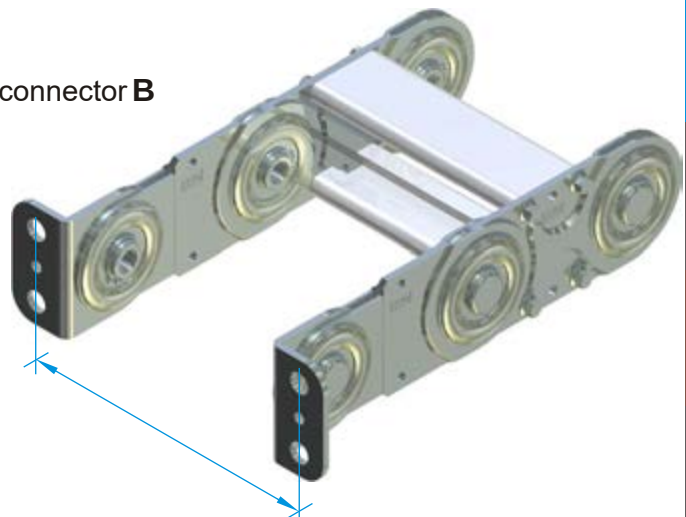


SLE	connector screws
120	M 6
220	M 8
320	M10
520	M12
620	M12

connector **A**



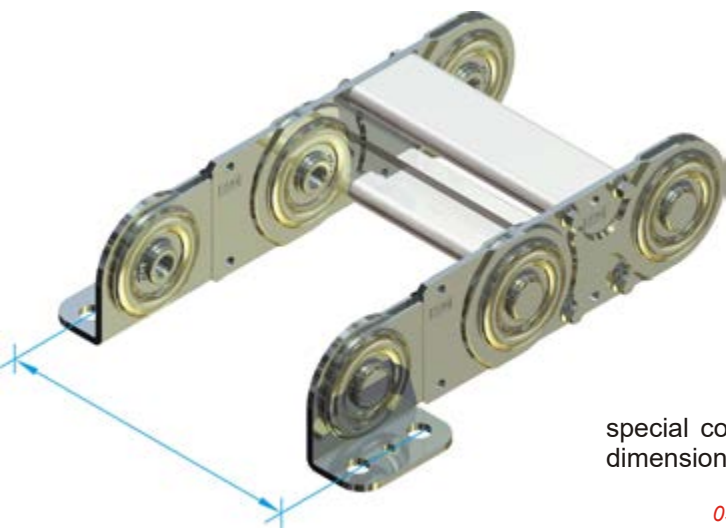
connector **B**



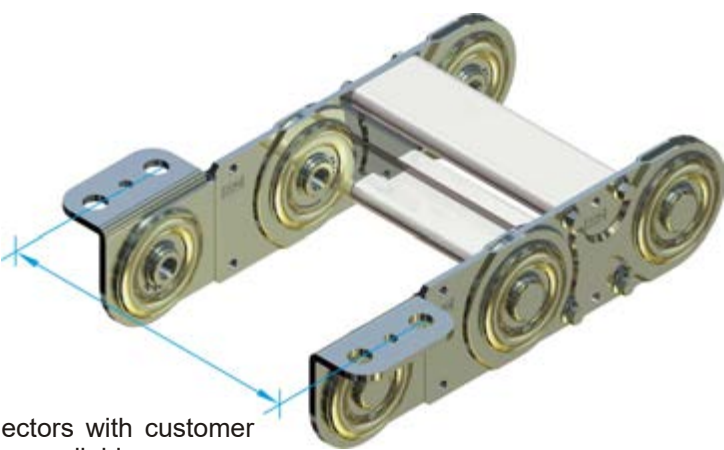
connector **A** dimension = staylength - 2g

connector **B, C, D** dimension = staylength + 2g + 4k

connector **C** in outer radius
(corresponding to connection dimension **B**)



connector **D** in inner radius
(corresponding to connection dimension **B**)



special connectors with customer dimensions are available

SLE TYPES

SLE 120, 220, 320, 520, 620

The standard type is built with stays in every second chain link. The steel link energy chains can be opened in the inner and in the outer bending radius.

order example

SLP 120	/ 100	x 2050	/ 100	/ D	/ E	/ h	/ 2PZ
type	radius	length	stayw.	connect.	arran.	stay dist.	

SLE 121, 221, 321, 521, 621

These designs are made with stays in each link. This increases the lateral stability and improves the guiding particularly of smaller diameter lines.

order example

SLP 321	/ 100 x 3100	/ 200	/ N	/ N	/ n	/ 5PZ, 3PT
type	radius length	stayw.	connect.	arran.	stay dist.	

SLE 225, 325, 525, 625

The closed types offer optimum protection of the lines against dust and cuts or other environmental influences. At higher temperatures the covers **Silver Star** provide excellent protection.

The closed types also may be built to replace the standard version stay.

order example

SLP 225	/ 200 x 2550	/ 150	/ N	/ N
type	radius length	stayw.	connectors	

SLE 128, 228, 328, 528, 628

These types are suitable for long travel, the upper strand slides on the lower strand. For greater stability these energy chains are built with stays in each link. The energy chains are fitted with sliders, which have a very low coefficient of friction ($\mu = 0.2$ to 0.25).

After reaching the wear limit the slider can be renewed and the energy chain will continue.

order example

SLP 328	/ 200 x 45000	/ 250	/ N	/ N	/ g	/ 3PZ
type	radius length	stayw.	connect.	arran.	stay dist.	

SLE TYPES

Compared to standard chains the SLE series is characterized by the fact that the sturdy aluminium profile can be steplessly adapted to the requirements. Stay lengths of up to 1500 mm can be provided. The subdivision of the interior satisfies every requirement and guarantees optimized cable protection, even at very high accelerations and travel speeds.

The **SLA** (SLE with aluminum T-profile or aluminium slot-profile) is a highly customized and robust energy chain, which is chosen primarily for larger dimensions. The stays are milled in accordance with the requirements of the user with individual hole patterns.

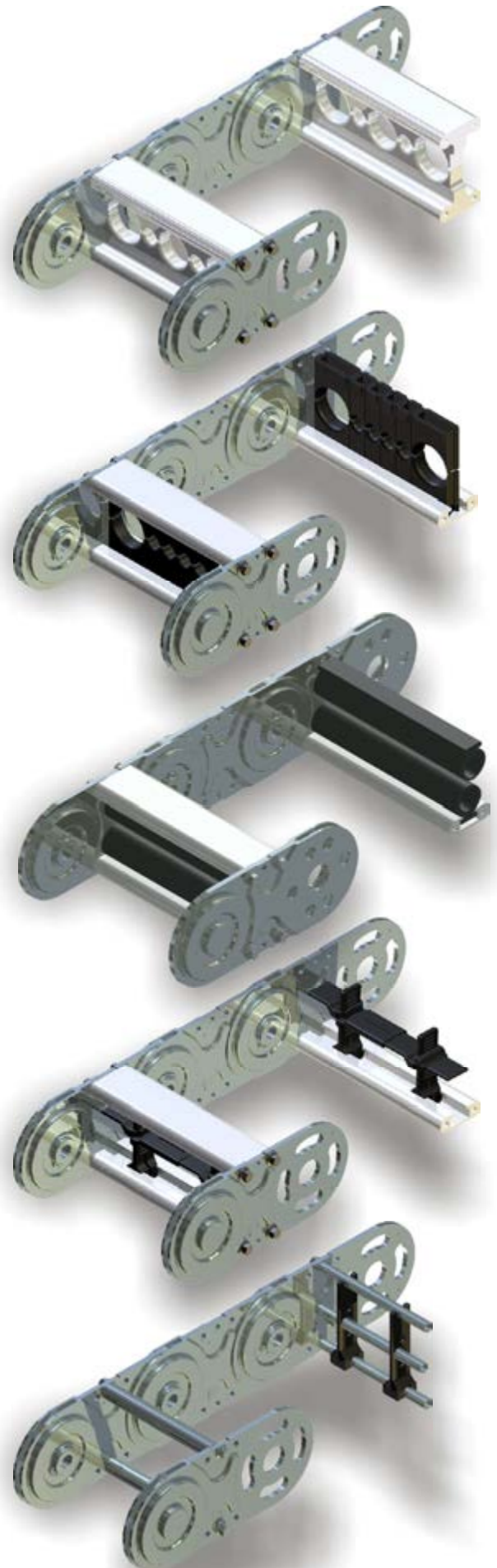
For extreme applications, the variants **SLA**, **SLS** and **SLE** should be preferred, since these offer optimize cable guiding. In the case of high speed and acceleration a multi-layer arrangement of the cable should be avoided.

The **SLE** (SLE with plastic inserts or plastic slot-profile) ensures at high speeds a perfect guide and almost excludes errors during installation of the lines. With this design the hole pattern of the stays can be adjusted accurately to the needs of the lines. Plastic inserts are available in a 5 mm grid. The plastic slot-profile can be ordered to suit special requirements.

For limited installation space, the **SLS** (SLE with foam slot-profile) are used. Again, the optimal guiding of the lines at high speeds and acceleration is ensured. Well-known automotive manufacturers have used this type for years with the best experiences. All lines lie in the neutral axis of the energy chain.

For space reasons, the **SLP** (SLE with plastic divider PZ and others) can be selected. This inexpensive design allows the guiding of large amounts of cable. The highly variable distribution possibility through small steps of (3mm) in height, plus the Telescopic divider (PT) allows maximum space for all needs, even when changes in cable diametres are required.

The **SLR** (SLE with a pipe or roll stays) is manufactured only upon request. The pipe stay allows special material combinations, such as the exclusion of aluminum or the use of stainless steel and brass. The roll bar has advantages particularly for heavy lines with high friction and wear in terms of durability of the cables and hoses: Relative movements on the energy chain are compensated by the rolling motion of the stays.



SLE SIZES



SLE 120

standard type			
height:	35	width:	52 ... 812
inner height:	20	inner width:	32 ... 792
		stay length:	40 ... 800



SLE 220

standard type			
height:	50	width:	66 ... 916
inner height:	31	inner width:	38 ... 888
		stay length:	50 ... 900



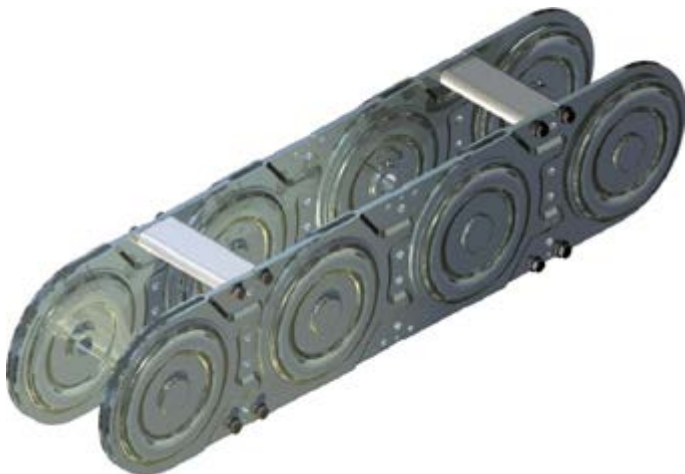
SLE 320

standard type			
height:	75	width:	80 ... 1020
inner height:	49	inner width:	50 ... 990
		stay length:	60 ... 1000



SLE 520

standard type			
height:	100	width:	98 ... 1028
inner height:	68	inner width:	54 ... 1184
		stay length:	70 ... 1500



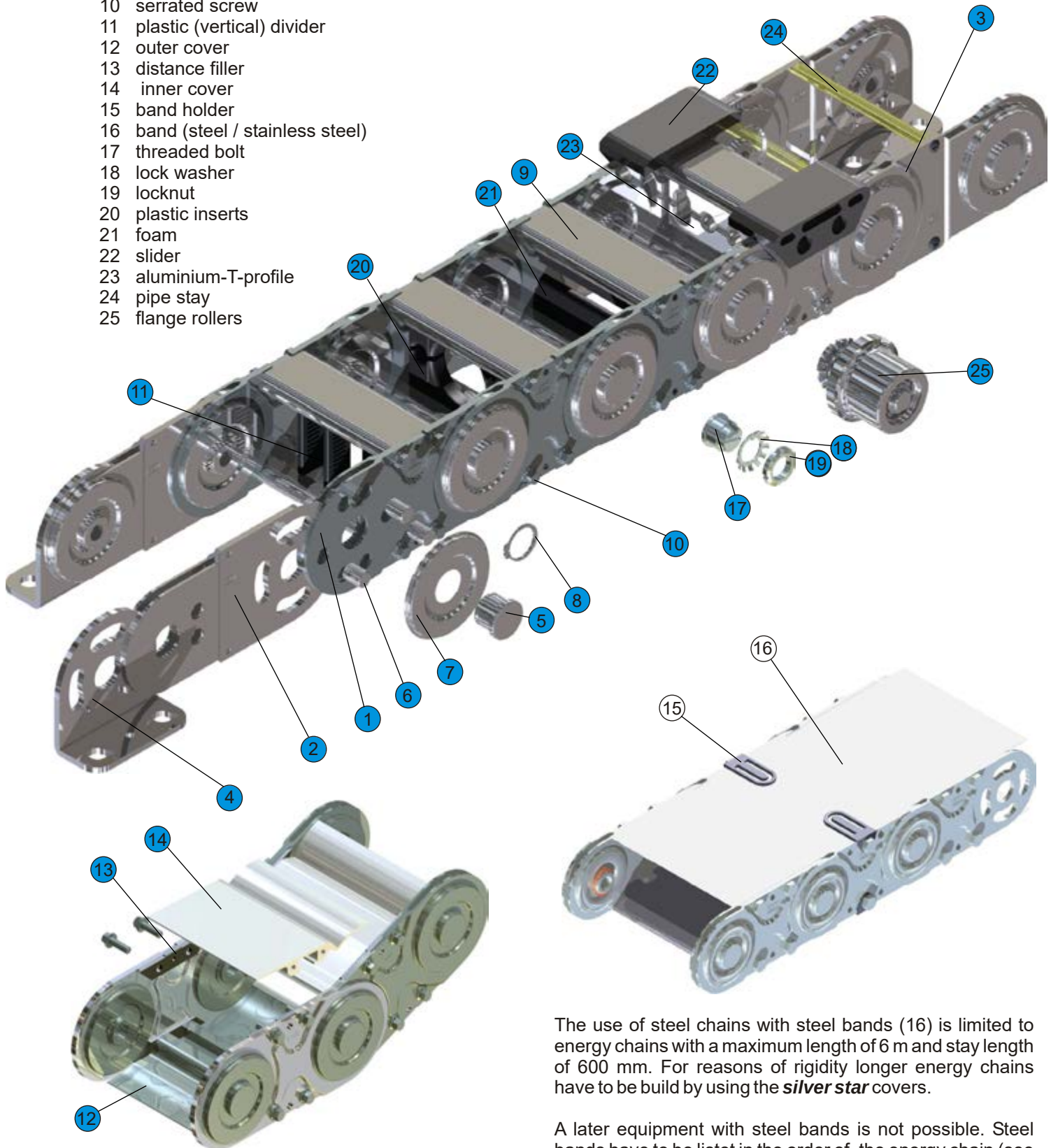
SLE 620

standard type			
height:	150	width:	128 ... 1228
inner height:	118	inner width:	84 ... 1184
		stay length:	100 ... 1500

SLE PARTS

item name

- 1 link
- 2 connector link single
- 3 connector link double
- 4 connector angle
- 5 flange bolt
- 6 radius bolt
- 7 cover plate
- 8 retaining ring
- 9 aluminum C-profile
- 10 serrated screw
- 11 plastic (vertical) divider
- 12 outer cover
- 13 distance filler
- 14 inner cover
- 15 band holder
- 16 band (steel / stainless steel)
- 17 threaded bolt
- 18 lock washer
- 19 locknut
- 20 plastic inserts
- 21 foam
- 22 slider
- 23 aluminium-T-profile
- 24 pipe stay
- 25 flange rollers



The use of steel chains with steel bands (16) is limited to energy chains with a maximum length of 6 m and stay length of 600 mm. For reasons of rigidity longer energy chains have to be build by using the **silver star** covers.

A later equipment with steel bands is not possible. Steel bands have to be listet in the order of the energy chain (see page 92 bottom).

Packaging

HELU Connectivity Solutions Haan GmbH energy chains are supplied in secured device packaging. When removing the packaging and moving the energy chains or parts of them, ensure that the energy chains are free of torsion and tension to avoid mechanical damage.

Lengthening or shortening

If energy chains are delivered in pieces, proceed with the installation as follows:

Push the link together (1) and insert the flange bolts (5) with a shroud (7) in the chain outside. Then build the radius by inserting the radius bolts (6) (see chart for correct radius). Finally put on the inner shroud (7) and fit the retaining ring (8). Roll the energy chain to check that the radius is correct throughout its length.

Shortening in the reverse order:

Loosen the retaining rings (8), pull out the flange bolts (5), lifting the shroud (7), pull the radius bolts (6) and remove the links (1).

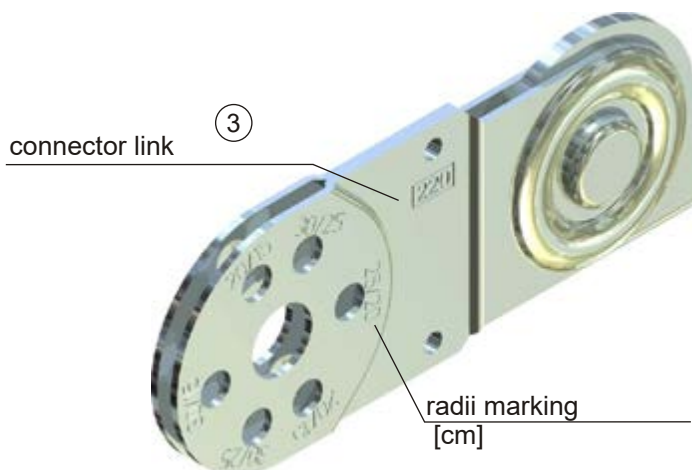
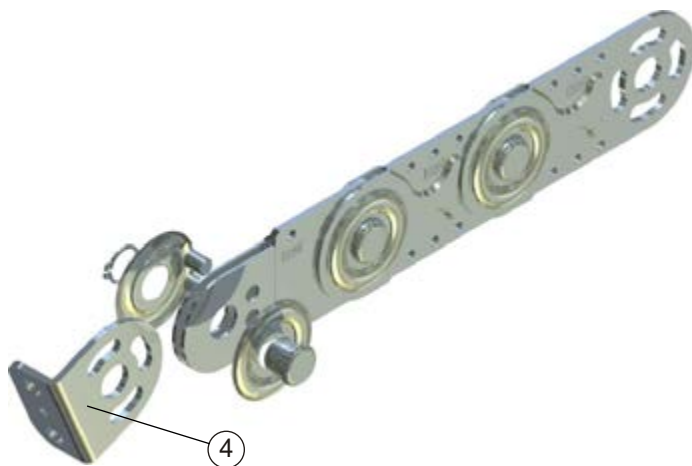
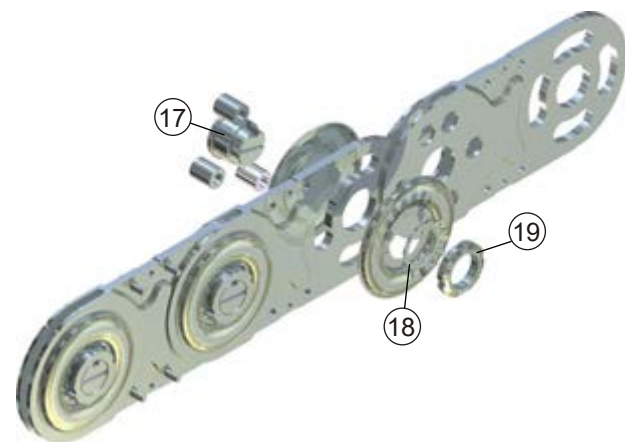
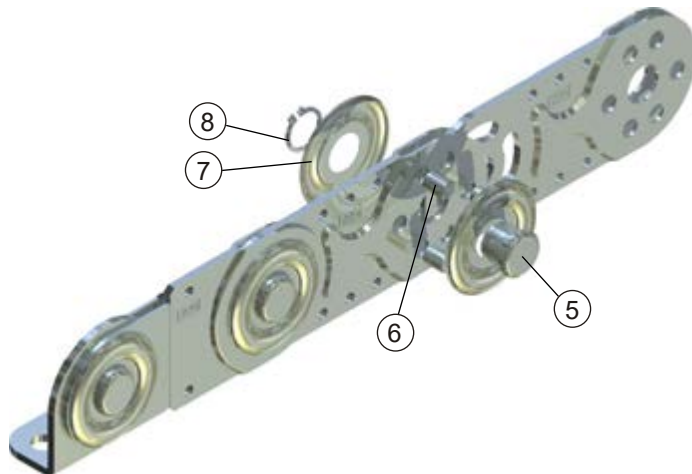
Energy chains with threaded bolts instead of the retaining rings (8), first unlock the locking plates (18) to solve the locknuts (19). Thereafter, the threaded bolts (17) and pins (6) can be removed and taken from the links (1).

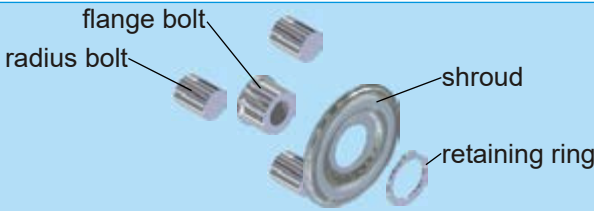
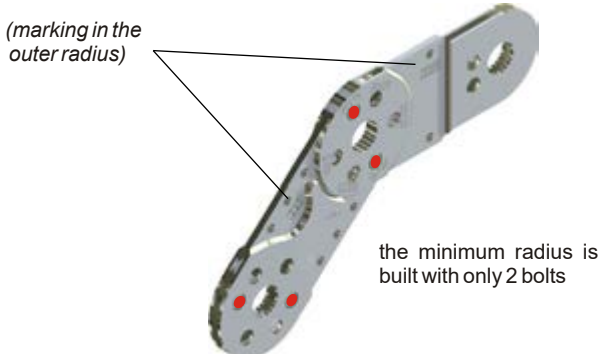
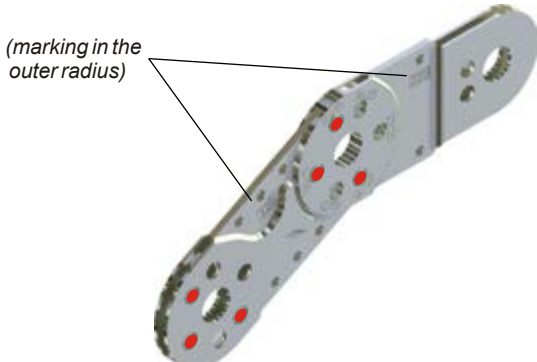
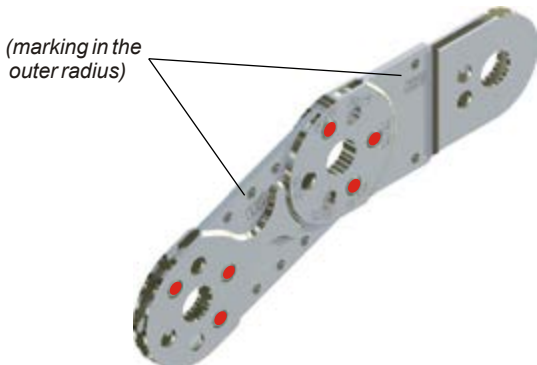
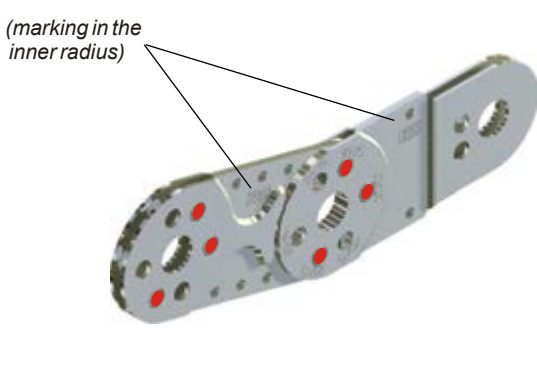
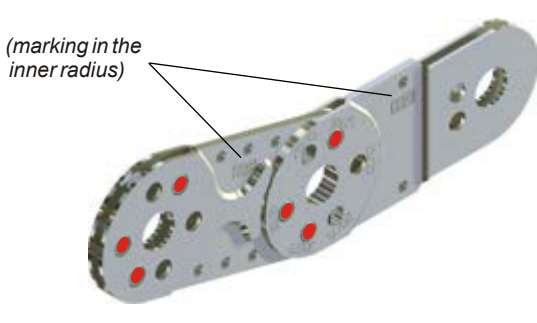
Implement the connector angle

The connector angles (4) are orientated to the outer radius and to the chain center (normal end mounted). By loosening the retaining rings (8), drag the flange bolts (5), lift off the shroud (7) and pull the radius bolts (6) the connector angles (4) can be disassembled and placed in a different position.

Bending radius

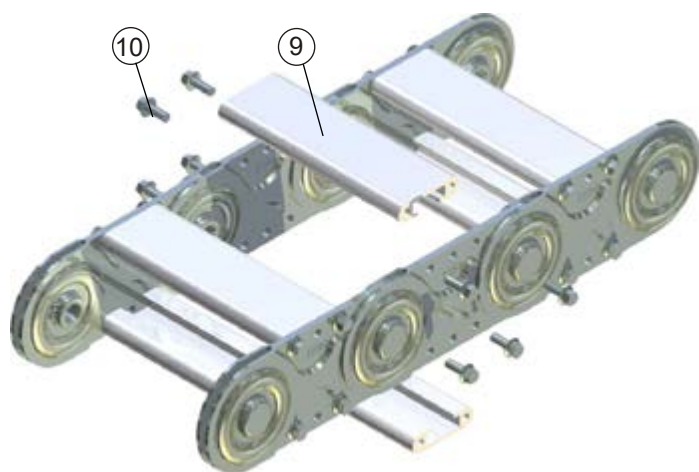
Loosen the retaining rings (8) and lift off the shrouds (7). Implement the radius bolts (6) according to table (page 89). Then mounting the shrouds (7) and retaining Rings (1). The detachable bolts position for the different radii can be found engraved on the double connector links (3).



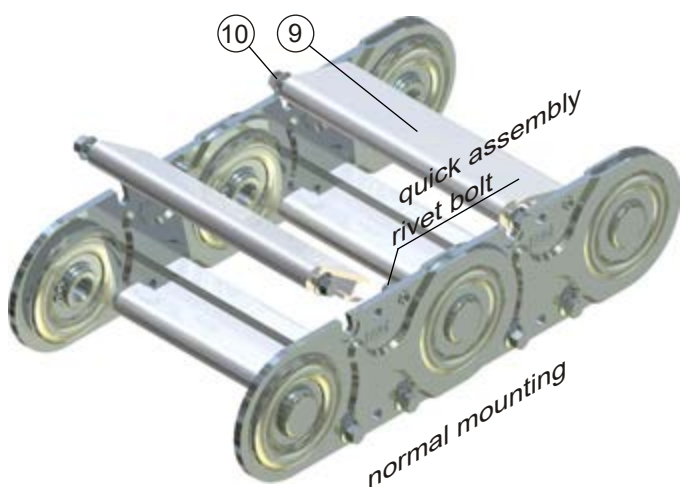
assembly of radius bolts						
SLE	120	220	320	520	620	
radius	60	100	150	200	250	
radius	100	150	200	250	300	
radius	150	200	250	300	400	
radius	250	250	300	400	500	
radius	-	300	400	500	600	

SLE Assembly

Stay removal

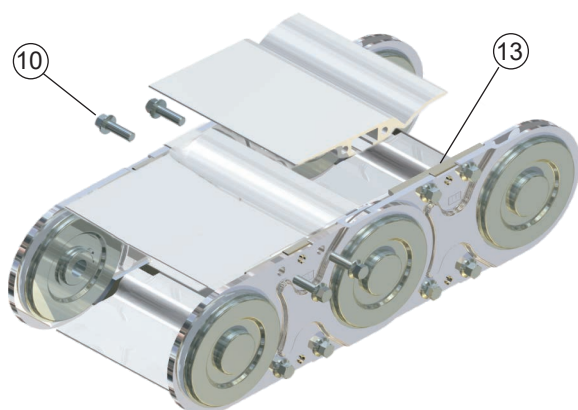


The stays (9) are fastened with serrated screws (10) to the links (1). They can be removed by unscrewing the four screws (10). Stay lengths up to 600 mm are available with quick assembly.



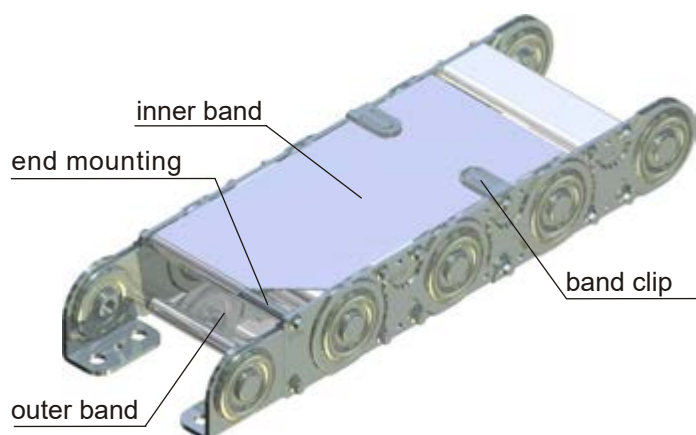
Quick assembly

In quick assembly only two screws must be tightened or loosened. The stays (9) are moved with the groove on the rivet and the serrated screw (10) snapped in the recess and tightened.



Cover Silver Star

The covers of the closed version can be removed like the stays by loosening the four serrated screws (10). The spacers (13) remain on the links.



Stainless steel bands

To protect the lines against external damage and pollution the chains can be equipped with steel or stainless steel bands in the inner and outer radius. The edges of the steel bands are circular smoothed to avoid injury. Stainless steel and steel bands are fastened with band holders screwed on sides and with screwed connections on each end of the chain.

Final assembly

The installation height should not fall below the level $H = (50 \text{ plus two times bend radius plus link height})$.
The pretension of cable carrier is taken into account with the additional space of 50 mm.

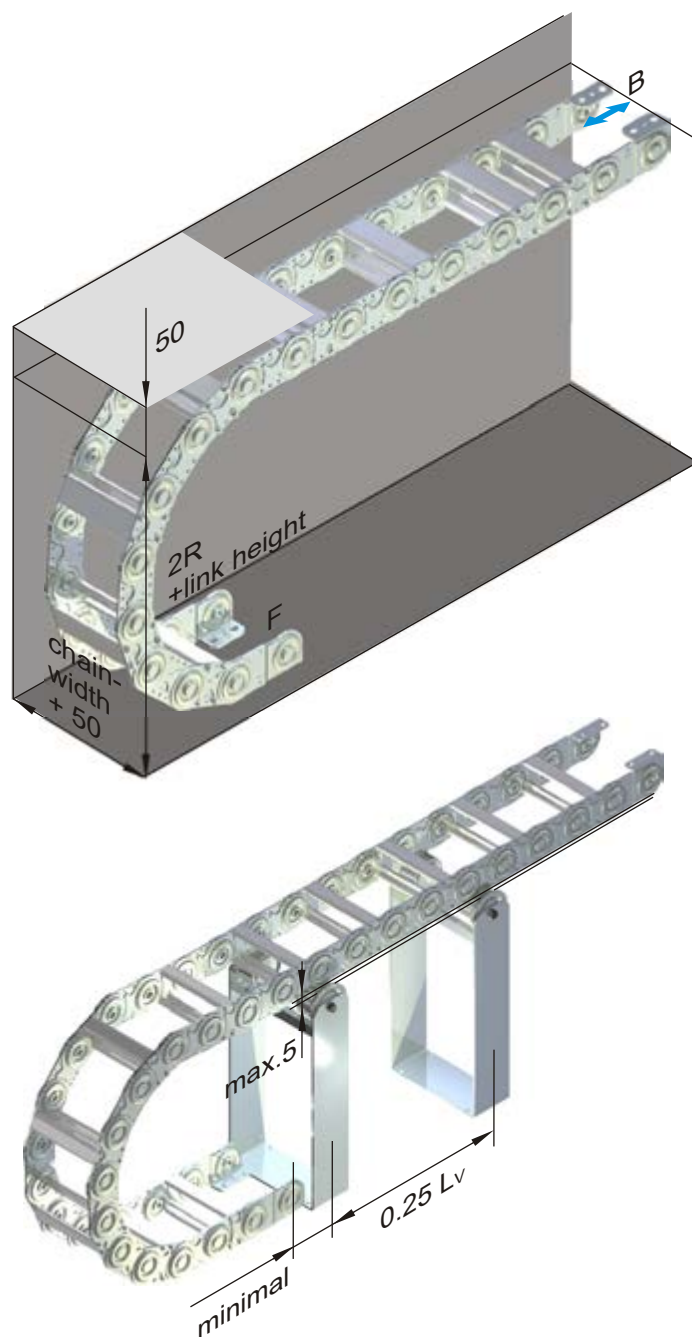
First fasten fixed connection (F) and then mount the movable connection using the specified bolt size (see SLE connectors).

Compliance with the maximum free carrying length is of vital importance for the life time of the energy chain, both during the installation as well as when operational. Over travel of the energy chain can lead to damage and premature wear.

If the energy chain is provided with support elements, the assembly of these must take place before the installation of the chain in order to avoid even a short-term stress point.

An energy chain may never exceed the free carrying length without support rollers.

The height of the moved connector must be adjusted so that the connector link is moving with a maximum of 5 mm distance from the base of the supporting roller.



Maintenance of the energy chain

PLE energy chains are maintenance free. Like every mechanical system this will depend on the ambient conditions so wear will occur which must be observed.

In case of the energy chain has to be exchanged.

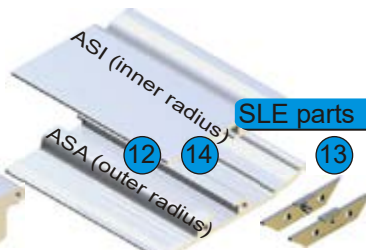
For long travels or in a circular motion, the energy chains are often equipped with sliding elements. These allow sliding of the upper part of the chain on a suitable surface (eg, slider-slider, slider-steel, glide bar).

The sliders wear depends on the application. The slider surfaces should be checked at regular intervals. With a thickness of 1-2 mm sliders have to be replaced.

Inform

01/2023

SLE PART NUMBERS



SLE parts

87

SLE

shroud

retaining ring

radius bolt

flange bolt

C-profile T-profile

ASA / ASI

distance filler

serrated screw

St VA

St CuSn

St VA

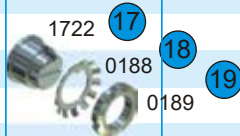
links rechts

120	-	1805	0109	-	0106	-	0108	-	0692	-	-	-	-	-	0127 (M4x12)
121	-	1805	0109	-	0106	-	0108	-	0692	-	-	-	-	-	0127
128	-	1805	0109	-	0106	-	0108	-	0692	-	-	-	-	-	0127

220	0119	0137	0118	0136	0120	0121	0122	0134	0124	0141	-	-	-	-	0127 (M4x12)
221	0119	0137	0118	0136	0120	0121	0122	0134	0124	0141	-	-	-	-	0127
225	0119	0137	0118	0136	0120	0121	0122	0134	-	-	1065	1066	1670	1404	0127
228	0119	0137	0118	0136	0120	0121	0122	0134	0124	0141	-	-	-	-	0127

320	0149	0166	0148	1247	0150	0151	0152	0165	0154	0171	-	-	-	-	0157 (M5x14)
321	0149	0166	0148	1247	0150	0151	0152	0165	0154	0171	-	-	-	-	0157
325	0149	0166	0148	1247	0150	0151	0152	0165	-	-	0847	0846	1293	1671	0157
328	0149	0166	0148	1247	0150	0151	0152	0165	0154	0171	-	-	-	-	0157

520	0177	0193	0176	0192	0178	0179	0180	1529	0182	0194	-	-	-	-	0185 (M6x18)
525	0177	0193	0176	0192	0178	0179	0180	1529	0182	0194	515:	0849	0848	1620	1672
525	0177	0193	0176	0192	0178	0179	0180	1529	-	-	0849	0848	1405	1673	0185
528	0177	0193	0176	0192	0178	0179	0180	1529	0182	0194	-	-	-	-	0185



620	0872	0176	0192	-	0874	0180	-	0182	0851	-	-	-	-	-	0185 (M6x18)
621	0872	0176	0192	-	0874	0180	-	0182	0851	-	-	-	-	-	0185
625	0872	0176	0192	-	0874	0180	-	-	-	0957	0956	-	-	-	0185
628	0872	0176	0192	-	0874	0180	-	0182	0851	-	-	-	-	-	0185

SLE PART NUMBERS

special material parts like UI94 V-0, EX or other have to be named in the order

SLE parts 87

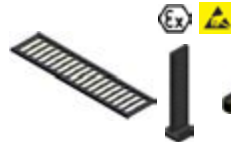
11



PZ



PTF PT 55 PT 75



LS

ZL

ZLA8

ZLS10

ZHS10

24



pipe stay

120	0691		0112			-	-	-			1665	1273	1159	1160	1407	D6 739
121	0691		0112			-	-	-			1665	1273	1159	1160	1407	D6 739
128	0691		0112			-	-	-			1665	1273	1159	1160	1407	D6 739



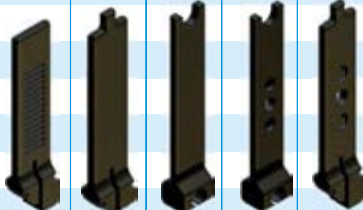
220	0778	1519	0779	1658		1927	0879	0880			1665	1273	1159	1160	1407	D6 740
221	0778	1519	0779	1658		1927	0879	0880			1665	1273	1159	1160	1407	D6 740
225	0778	1519	0779	1658		1927	0879	0880			1665	1273	1159	1160	1407	D6 740
228	0778	1519	0779	1658		1927	0879	0880			1665	1273	1159	1160	1407	D6 740



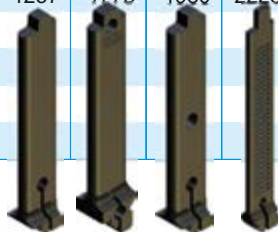
320	0163	1678	1659	1660		1927	0879	0880			1665	1273	1159	1160	1407	D8 741
321	0163	1678	1659	1660		1927	0879	0880			1665	1273	1159	1160	1407	D8 741
325	0163	1678	1659	1660		1927	0879	0880			1665	1273	1159	1160	1407	D8 741
328	0163	1678	1659	1660		1927	0879	0880			1665	1273	1159	1160	1407	D8 741



520	0719	1679	1661	1662	1680	1927	0879	0880			1665		1159	1160	1407	D8 742
521	0719	1679	1661	1662	1680	1927	0879	0880			1665		1159	1160	1407	D8 742
525	0719	1679	1661	1662	1680	1927	0879	0880			1665		1159	1160	1407	D8 742
528	0719	1679	1661	1662	1680	1927	0879	0880			1665		1159	1160	1407	D8 742



620	1257	1778	1980	2228	-	-	-	-			-		1159	1160	1407	D8 742
621	1257	1778	1980	2228	-	-	-	-			-		1159	1160	1407	D8 742
625	1257	1778	1980	2228	-	-	-	-			-		1159	1160	1407	D8 742
628	1257	1778	1980	2228	-	-	-	-			-		1159	1160	1407	D8 742



SLE PART NUMBERS

plastic inserts

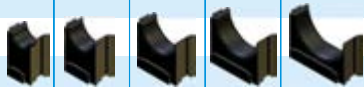
SLE parts

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diameter in mm

SLE 10 15 20 25 30 35 40 45 50 55 60 65 70

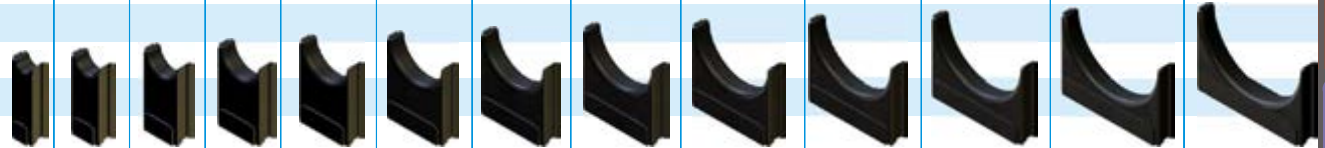
120	-	-	-	-	-	-	-	-	-	-	-	-	-
121	-	-	-	-	-	-	-	-	-	-	-	-	-
128	-	-	-	-	-	-	-	-	-	-	-	-	-



220	0649	0650	0651	0652	0653	-	-	-	-	-	-	-	-
221	0649	0650	0651	0652	0653	-	-	-	-	-	-	-	-
225	0649	0650	0651	0652	0653	-	-	-	-	-	-	-	-
228	0649	0650	0651	0652	0653	-	-	-	-	-	-	-	-



320	0654	0655	0656	0657	0658	0659	0660	0661	0662	-	-	-	-
321	0654	0655	0656	0657	0658	0659	0660	0661	0662	-	-	-	-
325	0654	0655	0656	0657	0658	0659	0660	0661	0662	-	-	-	-
328	0654	0655	0656	0657	0658	0659	0660	0661	0662	-	-	-	-



520	1628	0663	0664	0665	0666	0667	0668	0669	0670	0671	0672	0714	0715
521	1628	0663	0664	0665	0666	0667	0668	0669	0670	0671	0672	0714	0715
525	1628	0663	0664	0665	0666	0667	0668	0669	0670	0671	0672	0714	0715
528	1628	0663	0664	0665	0666	0667	0668	0669	0670	0671	0672	0714	0715

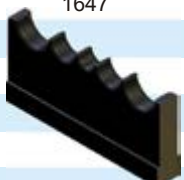
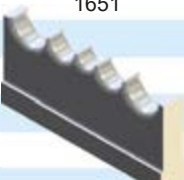
620	-	-	-	-	-	-	-	-	-	-	-	-	-
621	-	-	-	-	-	-	-	-	-	-	-	-	-
625	-	-	-	-	-	-	-	-	-	-	-	-	-
628	-	-	-	-	-	-	-	-	-	-	-	-	-

SLE PART NUMBERS

SLE parts 87

special material parts like UI94 V-0, EX or other have to be named in the order



SLE	plastic- insert profile	aluminium insert profile	foam	sliders	flange rollers (complete)
120	-	-	-		
121	-	-	-		
128	-	-	-	1443  H=3,5	
220	0 827 	1649 	-		0132 
221	0 827	1649	-		0132
225	0 827	1649	-		0132
228	0 827	1649	-	1444 <R200  H=7,5	-
				1970 ≥ R200 	
320	1646 	1650 	2365 	1445 	1448 H=9,5 
321	1646	1650	2365		0162 
325	1646	1650	2365		0162
328	1646	1650	2365	1955 (Standard) 	-
520	1647 	1651 	2365 	1446 H=9 	0190 
521	1647	1651	2365		0190
525	1647	1651	2365		0190
528	1647	1651	2365	1446 H=9 	-
				1987 H=15 	
620	1648 	1652 	-		0190
621	1648	1652	-		0190
6290	1648	1652	-	1447 (R400) 2070 (R300)  H=9	-
628	1648	1652	-		

Content



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St vz VA

Technical drawing of a stepped shaft. The drawing shows a shaft with a central section of diameter d and two outer sections of diameter D . The dimensions D and d are indicated with arrows and labels.



D155	D170
d30	d30
1538	1539
1538	1539
1538	1539
1538	1539