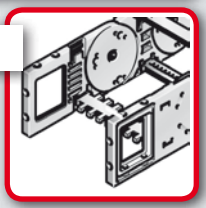
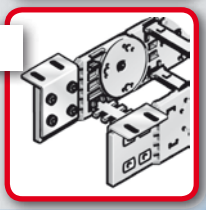
System overview

1 Chain bracket

Chain bracket flexible

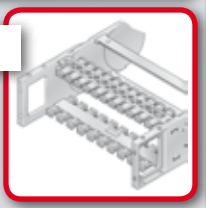


Chain bracket angle

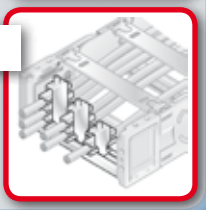


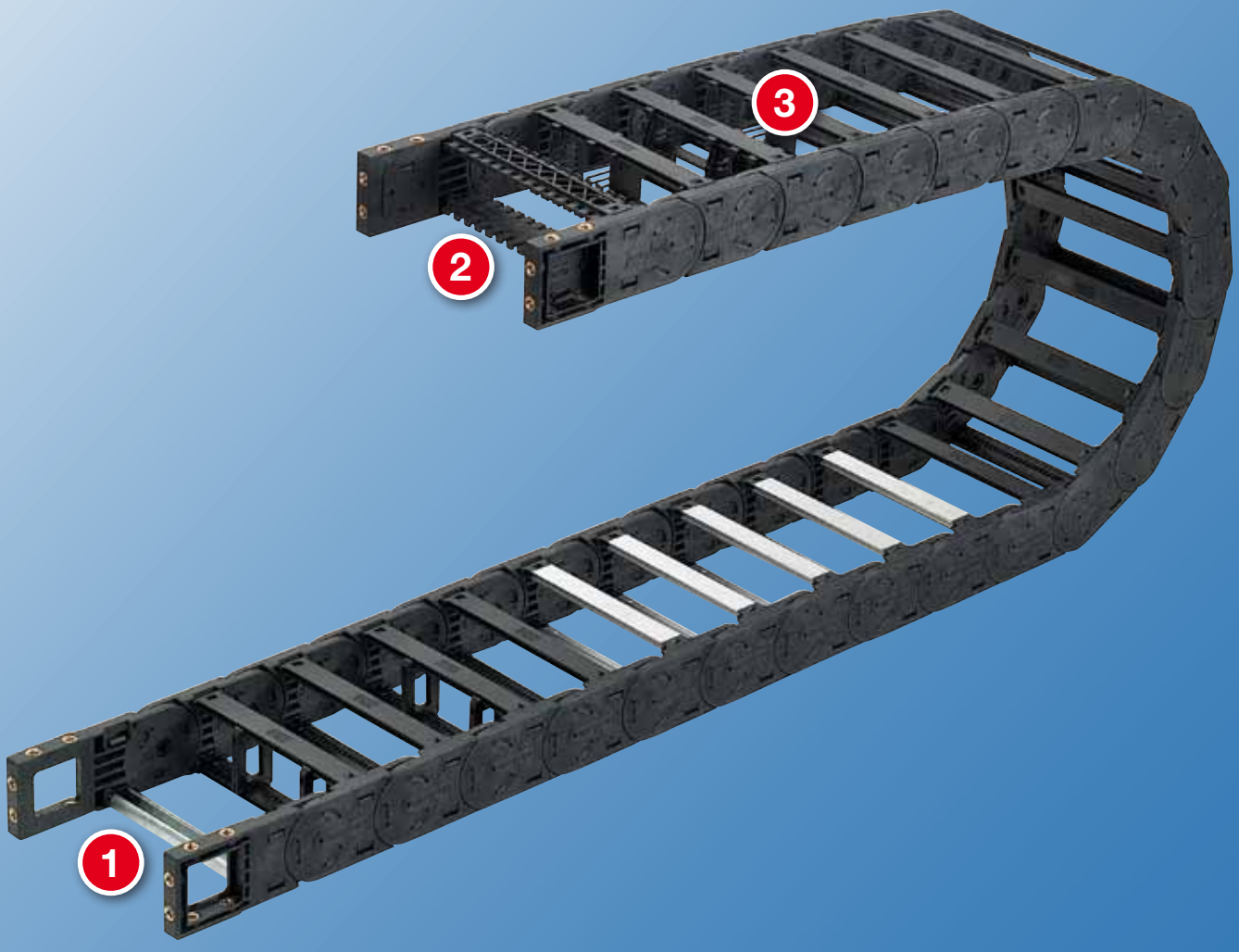
2 Strain relief

Frame bridge RS-ZL



STF Steel Fix

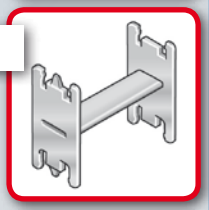




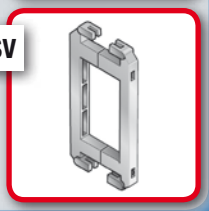
3 Shelving system

Separator TR

H-shaped shelf unit RE



Frame bridge connector RSV

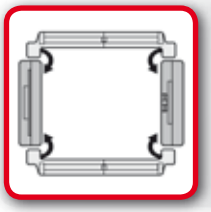


Guide channels

Aluminium VAW

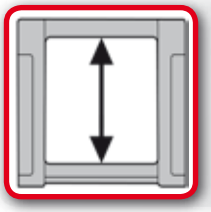
Stainless steel VAW-E

Technical data



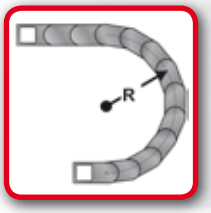
Loading side

inside and outside flexure curve



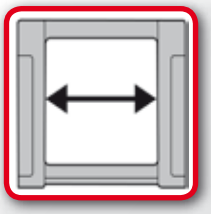
Available interior heights

52.0 mm



Available radii

100.0 – 350.0 mm



Available interior widths

45.0 – 546.0 mm

With aluminium frame bridge
80.0 – 600.0 mm

Ordering key

Type	Variation						
		Inside width mm	Outside width mm	Radius mm	Ridge version	Material	Chain length mm
0521	30	45 62 71 84 96 107 121 133 144 146 158 171 182 196 220 246 296 346 396 421 446 496 546	77 94 103 116 128 139 153 165 176 178 190 203 214 228 252 278 328 378 428 453 478 528 578	100 150 200 250 300 350	0 1 2 3 4 5 6 7 9	0 9	

Ordering key

Note on configuration

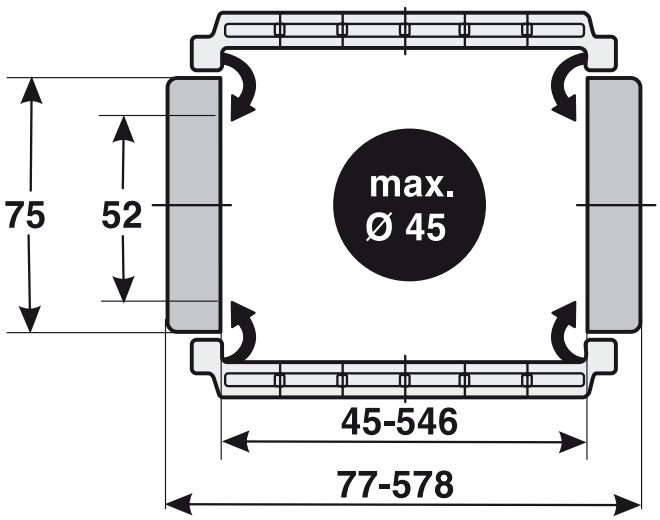
Frame bridges and cover from aluminium:
Aluminium frame bridges and covers can be supplied in 1 mm width sizes for inner widths from 80.0 mm – 600.0 mm.
If frame bridge strain relief plates (RS-ZL) are to be deployed, take standard widths into account.

Crossbar connector and frame bridge strain relief plate:
Once inner widths exceed 246 mm, we recommend the deployment of crossbar connectors (RSV). Crossbar connectors cannot be used in conjunction with covers made from plastic or aluminium. If frame bridge strain relief plates (RS-ZL) are to be placed in the chain brackets, take the standard widths that can be supplied into account.

For detailed information, please consult the corresponding product documentation.

Chain link

Loading side: inside and outside flexure curve



Dimensions in mm

0	Standard (PA/black)
9	Special version

0	PA full-ridged with bias
1	PA full-ridged without bias
2	PA half-ridged with bias
3	PA half-ridged without bias
4	Aluminium full-ridged with bias
5	Aluminium full-ridged without bias
6	Aluminium half-ridged with bias
7	Aluminium half-ridged without bias
9	Special version

30	Frame bridge on outside of radius Frame bridge on inside of radius Opens on inside and outside of radius

Order sample: 0521 30 045 100 0 0 1365
Frame bridge in outside bend, frame bridge in inside bend, can be opened from inside and outside bend
Inside width 45 mm; radius 100 mm
Plastic bridge, full-ridged with bias, material black-coloured polyamide
Chain length 1365 mm (15 links)

Technical specifications

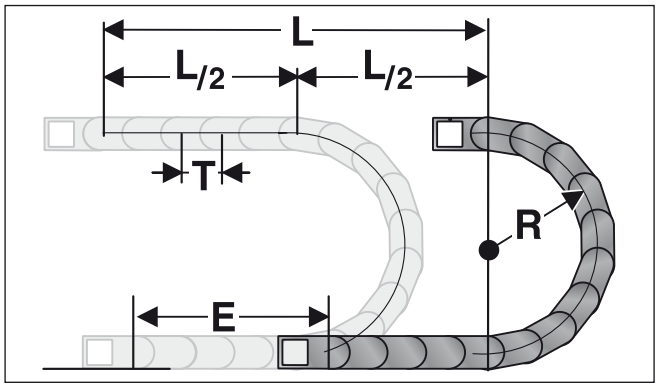
Travel distance gliding L_g max.:	150.0 m
Travel distance self-supporting L_f max.:	see diagram
Travel distance vertical, hanging L_{vh} max.:	60.0 m
Travel distance vertical, upright L_{vs} max.:	6.0 m
Rotated 90°, unsupported L_{90f} max.:	3.0 m
Speed, gliding V_g max.:	5.0 m/s
Speed, self-supporting V_f max.:	20.0 m/s
Acceleration, gliding a_g max.:	25.0 m/s²
Acceleration, self-supporting a_f max.:	30.0 m/s²

Material properties

Standard material:	Polyamide (PA) black
Service temperature:	-30.0 – 120.0 °C
Gliding friction factor:	0.3
Static friction factor:	0.45
Fire classification:	UL 94 HB

Other material properties on request.

Determining the chain length

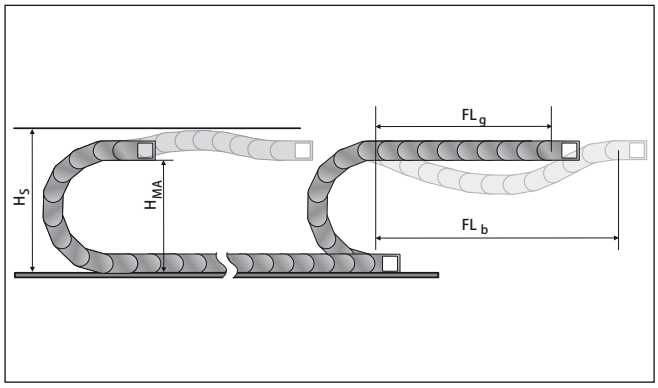


The fixed point of the cable drag chain should be connected in the middle of the travel distance.
This arrangement gives the shortest connection between the fixed point and the moving consumer and thus the most efficient chain length.

Chain length calculation = L/2 + π * R + E
≈ 1 m chain = 11 qty. x 91.0 mm links.

E = distance between entry point and middle of travel distance
L = travel distance
R = radius
P = Pitch

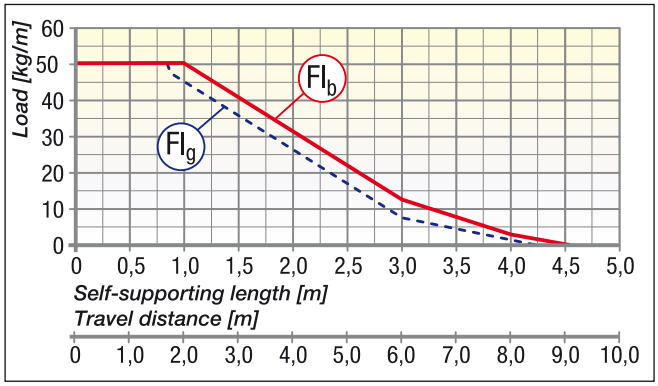
Self-supporting length



The self-supporting length is the distance between the chain bracket on the moving end and the start of the chain arch.
The installation variant FL_g offers the lowest load and wear for the cable drag chain.
The maximum travel parameters (speed and acceleration) can be applied for this variant.

H_S = Installation height plus safety
H_{MA} = Height of moving end connection
FL_g = Self-supporting length, upper run straight
FL_b = Self-supporting length, upper run bent

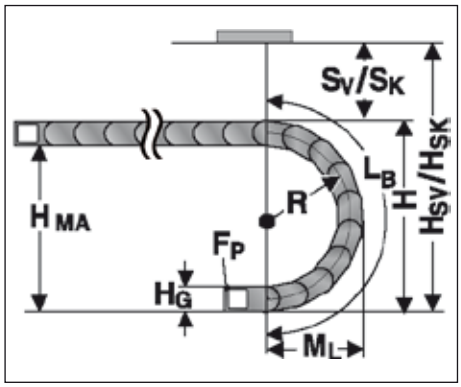
Load diagram for self-supporting applications



FL_g Self-supporting Length, upper run straight
In the FL_g range, the chain upper run still has a bias, is straight or has a maximum sag of

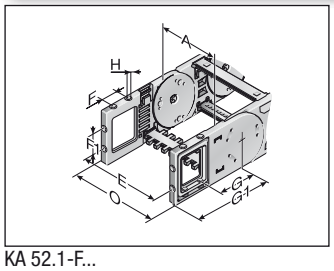
FL_b Self-supporting Length, upper run bent
In the FL_b range, the chain upper run has a sag of more than , but this is still less than the maximum sag.
Where the sag is greater than that permitted in the FL_b range, the application is critical and should be avoided. The self-supporting length can be optimized by using a support for the upper run or a more stable cable drag chain.

Installation dimensions



Radius R	100	150	200	250	300	350
Outside height of chain link (H_G)	74	74	74	74	74	74
Height of bend (H)	304	404	504	604	704	804
Height of moving end connection (H_{MA})	230	330	430	530	630	730
Safety margin with bias (S_V)	46	46	46	46	46	46
Installation height with bias (H_{SV})	350	450	550	650	750	850
Safety margin without bias (S_K)	16	16	16	16	16	16
Installation height without bias (H_{SK})	320	420	520	620	720	820
Arc projection (M_L)	243	293	343	393	443	493
Bend length (L_B)	568	725	882	1039	1196	1353

Chain bracket flexible

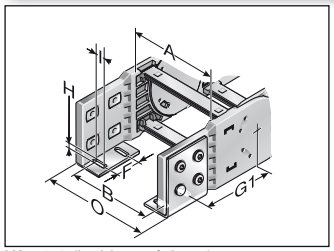


KA 52.1-F...

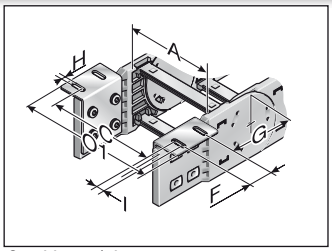
This chain bracket offers universal connection options (top, bottom and front) and is attached to the ends of the chain like a side link. This allows the chain to move right up to the bracket. Each chain requires one male and one female bracket. M8 screws are used to secure the brackets in place. Extrusion-coated metal bushes with either a through-hole (-FB) or a threaded hole (-FG) ensure the permanent, high-strength transmission of even extreme forces onto the cable drag chain.

Type	Order no.	Mate-rial	Version	Inside width A mm	E mm	F mm	F1 mm	G mm	G1 mm	H	HØ mm	Outside width KA O mm
KA 52.1-FB male	0521000056	Plastic	with bush	45.0 – 546.0	A+16.0	35.0	30.0	89.0	146.0		8.5	A+36.0
KA 52.1-FB female	0521000057	Plastic	with bush	45.0 – 546.0	A+16.0	35.0	30.0	89.0	146.0		8.5	A+36.0
KA 52.1-FG male	0521000058	Plastic	with thread	45.0 – 546.0	A+16.0	35.0	30.0	89.0	146.0	M8		A+36.0
KA 52.1-FG female	0521000059	Plastic	with thread	45.0 – 546.0	A+16.0	35.0	30.0	89.0	146.0	M8		A+36.0

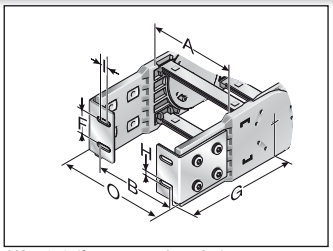
Chain bracket angle



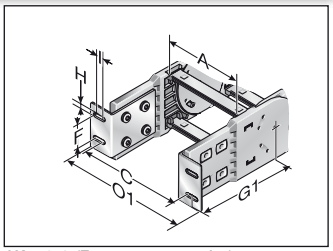
KA 52.1 (inside up / down)



Outside up / down



KA 52.1 (front page interior)

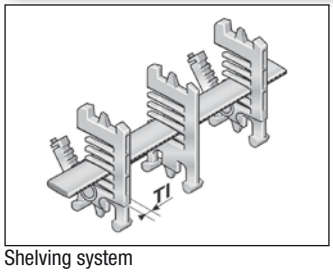


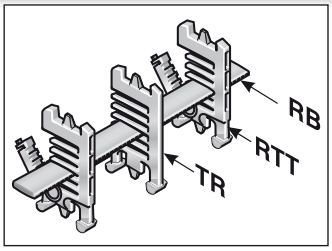
KA 52.1 (Front page exterior)

There are several options regarding the chain bracket. The fixed-point bracket (inside/bottom) and the moving end bracket (inside/top) are supplied as standard. However, any other combination can be supplied upon request. The chain bracket is fastened at the end like a side link. This enables the chain to move right up to the bracket. Each chain requires one male and one female bracket. The brackets should be fastened with M6 screws.

Type	Order no.	Material	Inside width A mm	B mm	C mm	F mm	G mm	G1 mm	HØ mm	I mm	Outside width KA O mm	Outside width KA O1 mm
KA 52.1 male	0521000050	Sheet steel	45.0 – 546.0	A-2.5	A+34.5	32.0	95.5	149.0	6.5	14.0	A+32.0	A+71.0
KA 52.1 female	0521000051	Sheet steel	45.0 – 546.0	A-2.5	A+34.5	32.0	95.5	149.0	6.5	14.0	A+32.0	A+71.0

Shelving system



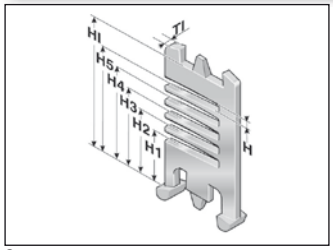


Shelving system

In connection with at least two shelf supports (RTT) the shelf becomes a shelving system. The additional levels prevent cables from criss-crossing and therefore destroying each other, while also avoiding excessive friction. Pre-assembly is not necessary as the shelving system and cabling can be assembled quickly and easily on site.

Type	Order no.	Designation	Width mm	Pitch mm	TI mm
RB 028-5	100000002800	Shelf	28.0	5.6	
RB 056-5	100000005601	Shelf	56.0	5.6	
RB 084-5	100000008400	Shelf	84.0	5.6	
RB 112-5	100000011200	Shelf	112.0	5.6	
RB 140-5	100000014000	Shelf	140.0	5.6	
RB 168-5	100000016800	Shelf	168.0	5.6	
RB 196-5	100000019600	Shelf	196.0	5.6	
RTT 52	100090522000	Shelf support, divisible		5.6	7.0

Separator

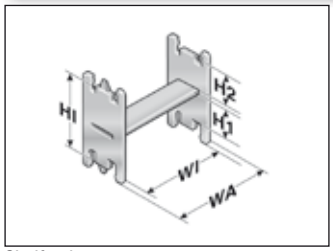


Separator

We recommend that separators be used if multiple round cables or conduits with differing diameters are to be installed. An offset configuration of the separators is advisable.

Type	Order no.	Designation	Pitch mm	TI mm	H mm	H1 mm	H2 mm	H3 mm	H4 mm	H5 mm	HI mm
TR 52.1	052100009200	TR 52.1 Separator	5.6	3.5	4.0	15.6	22.0	28.2	34.6	41.0	52.0

Shelf unit

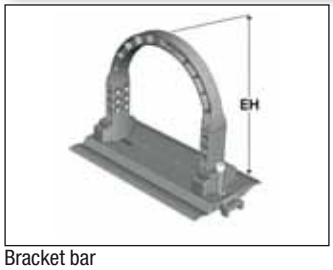


Shelf unit

Insert to obtain additional levels in pre-defined window distances.

Type	Order no.	Designation	Pitch mm	WA mm	WI mm	H1 mm	H2 mm	HI mm
RE 36/17	100000361714	H-shaped shelf unit	5.6	42.5	36.5	31.0	17.4	52.0
RE 59/24	100000592414	H-shaped shelf unit	5.6	65.0	59.0	24.2	24.2	52.0
RE 81/12	100000811214	H-shaped shelf unit	5.6	87.5	81.5	36.0	12.4	52.0

Bracket bar

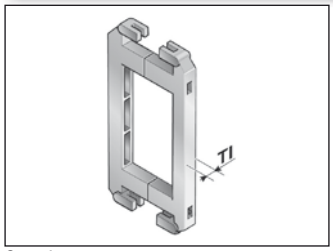


Bracket bar

Large-diameter conduits are routed securely by using a bracket bar (BS). This bar is installed on the frame bridges or the covers of the cable drag chain.
The bracket bar can be installed on both the inside and outside bend.
The bracket bar support (BSH) is used to attach the bars to PowerLine series frame bridges. Two bracket bar supports are required for each bar.

Type	Order no.	Designation	Conduit diameter max. mm	Installation height (EH) mm	Inner chain width min. mm
BS 120-5	052412000000	Bracket bar	115.0	140.0	171.0
BS 153-5	052415300000	Bracket bar	148.0	170.0	220.0
BS 187-5	052418700000	Bracket bar	182.0	205.0	246.0
BSH-5	052400000000	Bracket bar support			

Crossbar connector

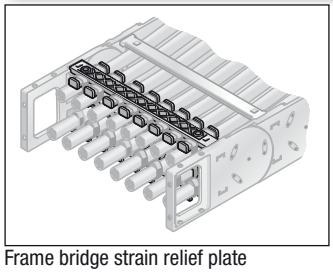


Crossbar connector

For frame bridges wider than 246 mm, we recommend the use of crossbar connectors. These prevent deformation to the frame bridge under large amounts of additional weight of the chain assembly.

Type	Order no.	Designation	TI mm
RSV 52	052000009600	Crossbar connector	7.5
RSV 52 Alu	052000009800	Crossbar connector for aluminium frame bridges	7.5

Frame bridge strain relief plate

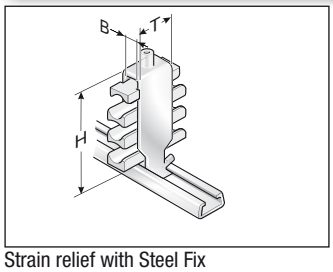


Frame bridge strain relief plate

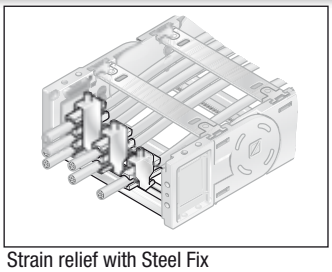
Fixed integrated frame bridge strain relief plates in the chain brackets. Tailored to all frame bridge widths up to 246 mm. May be assembled on the inside and outside bends at both chain endings.

Type	Order no.	Designation	Note	For internal width mm
RS-ZL 045-5	052004500010	Frame bridge strain relief plate		45.0
RS-ZL 062-5	052006200010	Frame bridge strain relief plate		62.0
RS-ZL 071-5	052007100010	Frame bridge strain relief plate		71.0
RS-ZL 084-5	052008400010	Frame bridge strain relief plate		84.0
RS-ZL 096-5	052009600010	Frame bridge strain relief plate		96.0
RS-ZL 107-5	052010700010	Frame bridge strain relief plate		107.0
RS-ZL 121-5	052012100010	Frame bridge strain relief plate		121.0
RS-ZL 133-5	052013300010	Frame bridge strain relief plate		133.0
RS-ZL 144/146-5	052014400010	Frame bridge strain relief plate	also for internal width 146 mm	144.0
RS-ZL 158-5	052015800010	Frame bridge strain relief plate		158.0
RS-ZL 171-5	052017100010	Frame bridge strain relief plate		171.0
RS-ZL 182-5	052018200010	Frame bridge strain relief plate		182.0
RS-ZL 196-5	052019600010	Frame bridge strain relief plate		196.0
RS-ZL 220-5	052022000010	Frame bridge strain relief plate		220.0
RS-ZL 246-5	052024600010	Frame bridge strain relief plate		246.0

Strain relief



Strain relief with Steel Fix



Strain relief with Steel Fix

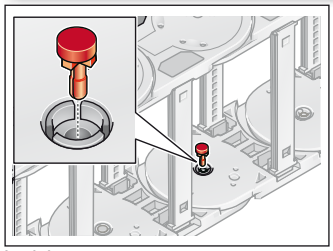
C-rails (cathodic dipped) for permanent integration, for accommodating the Steel Fix bow clamps in the chain brackets. The bow clamps can take up to 3 cables and are suitable for C-rails with a groove width of 11 mm. Due to the design of the trough elements a cable preserving cable guidance is ensured. Adjusted to all inside widths up to 200 mm. May be assembled on the inside and outside flexure curves at both chain endings. The entire height entered is a guide only. The actual height is, amongst other things, dependent on the diameter and the quality of the cable. A safety distance of 10 mm at the fixed point above the strain relief must be kept during gliding applications.

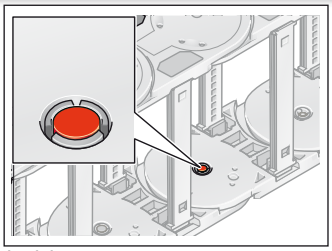
Type	Order no.	Designation	Ø mm	Seats qty.
Single clamp (for one cable)				
STF 12-1 Steel Fix	81661801	Hooped clamp	6.0 – 12.0	1
STF 14-1 Steel Fix	81661802	Hooped clamp	12.0 – 14.0	1
STF 16-1 Steel Fix	81661803	Hooped clamp	14.0 – 16.0	1
STF 18-1 Steel Fix	81661804	Hooped clamp	16.0 – 18.0	1
STF 20-1 Steel Fix	81661805	Hooped clamp	18.0 – 20.0	1
STF 22-1 Steel Fix	81661806	Hooped clamp	20.0 – 22.0	1
STF 26-1 Steel Fix	81661807	Hooped clamp	22.0 – 26.0	1
STF 30-1 Steel Fix	81661808	Hooped clamp	22.0 – 26.0	1

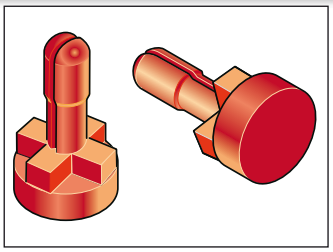
Strain relief (Continued...)

Type	Order no.	Designation	Ø mm	Seats qty.
STF 34-1 Steel Fix	81661809	Hooped clamp	26.0 – 30.0	1
STF 38-1 Steel Fix	81661810	Hooped clamp	34.0 – 38.0	1
STF 42-1 Steel Fix	81661811	Hooped clamp	38.0 – 42.0	1
Double clamp (for two cables)				
STF 12-2 Steel Fix	81661821	Hooped clamp	6.0 – 12.0	2
STF 14-2 Steel Fix	81661822	Hooped clamp	12.0 – 14.0	2
STF 16-2 Steel Fix	81661823	Hooped clamp	14.0 – 16.0	2
STF 18-2 Steel Fix	81661824	Hooped clamp	16.0 – 18.0	2
STF 20-2 Steel Fix	81661825	Hooped clamp	18.0 – 20.0	2
STF 22-2 Steel Fix	81661826	Hooped clamp	20.0 – 22.0	2
STF 26-2 Steel Fix	81661827	Hooped clamp	22.0 – 26.0	2
STF 30-2 Steel Fix	81661828	Hooped clamp	26.0 – 30.0	2
STF 34-2 Steel Fix	81661829	Hooped clamp	26.0 – 30.0	2
Triple clamp (for three cables)				
STF 12-3 Steel Fix	81661841	Hooped clamp	6.0 – 12.0	3
STF 14-3 Steel Fix	81661842	Hooped clamp	12.0 – 14.0	3
STF 16-3 Steel Fix	81661843	Hooped clamp	14.0 – 16.0	3
STF 18-3 Steel Fix	81661844	Hooped clamp	16.0 – 18.0	3
STF 20-3 Steel Fix	81661845	Hooped clamp	18.0 – 20.0	3
STF 22-3 Steel Fix	81661846	Hooped clamp	20.0 – 22.0	3

Lock button


Lock button

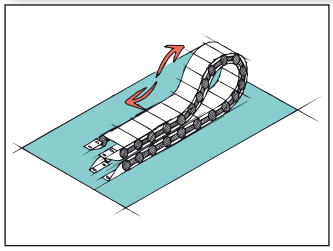

Lock button

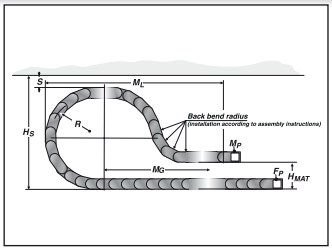


To increase the side stability, we recommend the use of lock buttons during strong lateral acceleration or when installed „laying on the side (turned 90°) without support“.

Type	Order no.
MP52/62/72 lock button	0520000080

Lowered fixing point





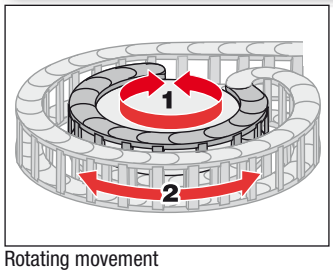
It is sometimes necessary to lower the height of the moving attachment point.

In such cases, modifications to the chain layout should be noted (e.g. extension of chain).

Please contact our application engineers.

Radius R mm	Height of moving end connection (H_{MA}) mm	Safety margin (S) mm	Installation height incl. safety (H_S) mm	Projection (M_L) mm	Additional links qty.	of which additional back chain links qty.
200.0	210.0	50.0	565.0	830.0	10.0	3.0
250.0	250.0	50.0	665.0	990.0	13.0	3.0
300.0	300.0	50.0	765.0	900.0	14.0	3.0
350.0	330.0	50.0	865.0	1180.0	16.0	3.0

Back radii

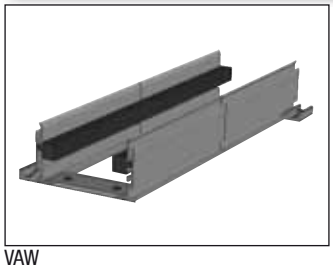


Rotating movement

Side links with radius forward (R) and radius backward (Rü) allow for movement in two directions. This is intended for rotating movements and lowered chain brackets. Note: This type of chain has different chain links for the left or right side!

Type	Order no.	Radius mm	Back radius mm
SR 52.1 (RÜ200/R135) left	052100010060	135.0	200.0
SR 52.1 (RÜ200/R135) right	052100010062	135.0	200.0
SR 52.1 (RÜ200/R170) left	052100015060	170.0	200.0
SR 52.1 (RÜ200/R170) right	052100015062	170.0	200.0
SR 52.1 (RÜ200/R200) left	052100020060	200.0	200.0
SR 52.1 (RÜ200/R200) right	052100020062	200.0	200.0
SR 52.1 (RÜ200/R250) left	052100025060	250.0	200.0
SR 52.1 (RÜ200/R250) right	052100025062	250.0	200.0
SR 52.1 (RÜ200/R300) left	052100030060	300.0	200.0
SR 52.1 (RÜ200/R300) right	052100030062	300.0	200.0
SR 52.1 (RÜ200/R350) left	052100035060	350.0	200.0
SR 52.1 (RÜ200/R350) right	052100035062	350.0	200.0

Guide channels (VAW)

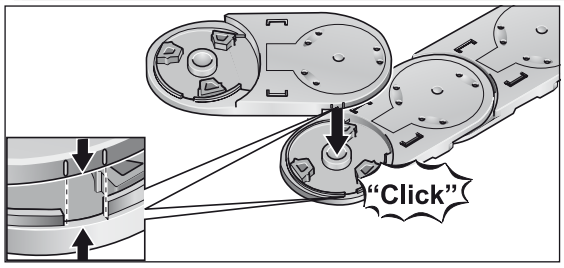


VAW

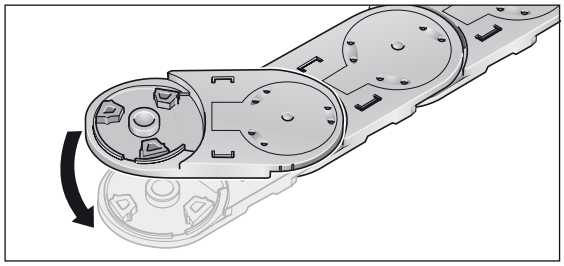
VAW-E

For this cable drag chain, a range of variable guide channel systems are available, constructed from aluminium or stainless steel sections.
The variable guide channel ensures that the cable drag chain is supported and guided securely.
For help on choosing, please consult the chapter „Variable Guide Channel System“.

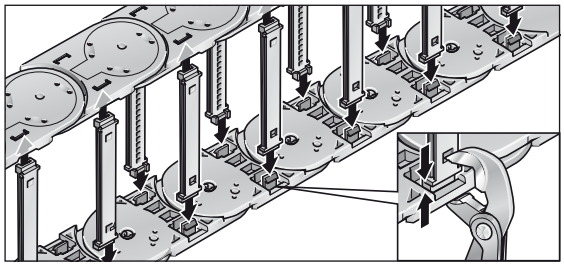
Assembly



Step 1

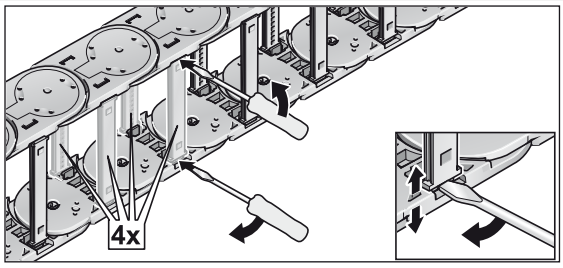


Step 2

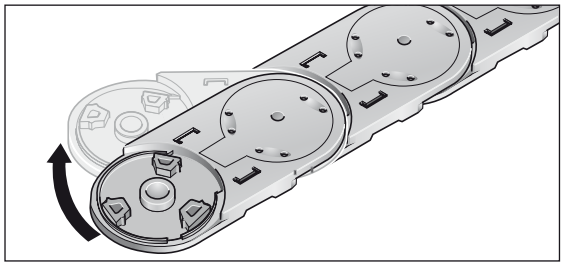


Step 3

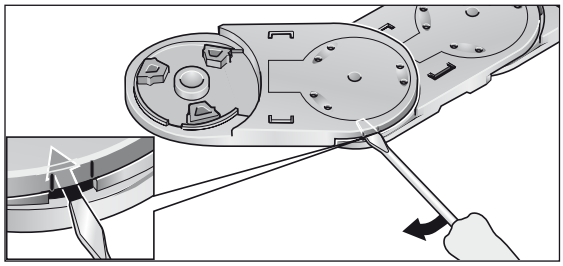
Disassembly



Step 1

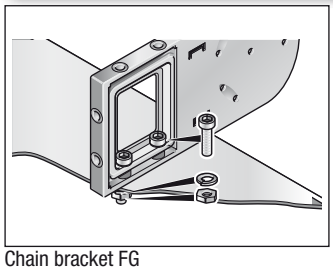


Step 2

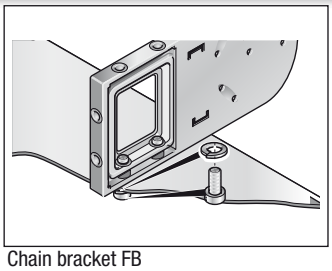


Step 3

Assembly instruction flexible chain bracket



Chain bracket FG



Chain bracket FB

Brass bushes guarantee long-lasting fastening without cold flow in the plastic.

Version KA-FB:
Integrated through-hole fastened down using screw and nut.
Version KA-FG:
Built-in threads allow for quick and easy on-site mounting, since a screw, including a retaining washer where necessary, is sufficient.