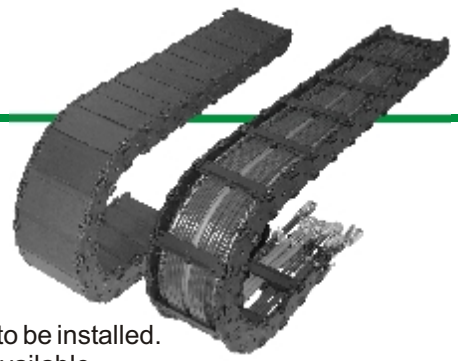


PKK Energy chains



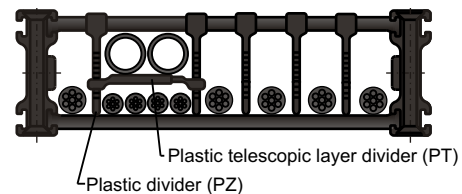
The order for a plastic energy chain PKK should contain the following data:

Type / Radius x Length / Width "Arrangement"; Separator arrangement

- ① **Type** selection is in accordance with diameter and quantity of the lines to be installed. A clearance of at least 10 % for cables and 20 % for hoses should be available.
- ② The **R(adius)** is also dependent on the cables to be installed. Comply with the statements of the manufacturer. 10 times the largest line diameter can be chosen in general.
- ③ The **L(ength)** of the chain depends on the travel distance. The following formula can be used:
 $L = \text{travel distance} / 2 + (4 \times \text{radius})$ (round up to link pitch)
 The energy chain is delivered with additional connector links. (see drawing below)
- ④ The **W(idth)** of the chain depends on the number and dimension of the cables to be installed. With slow applications cables can be installed on top of one another, creating extra space.
- ⑤ The **Arrangement** is only to be stated in special cases. (see page 29)
- ⑥ The **Separator arrangement** depend on the application. (see example)

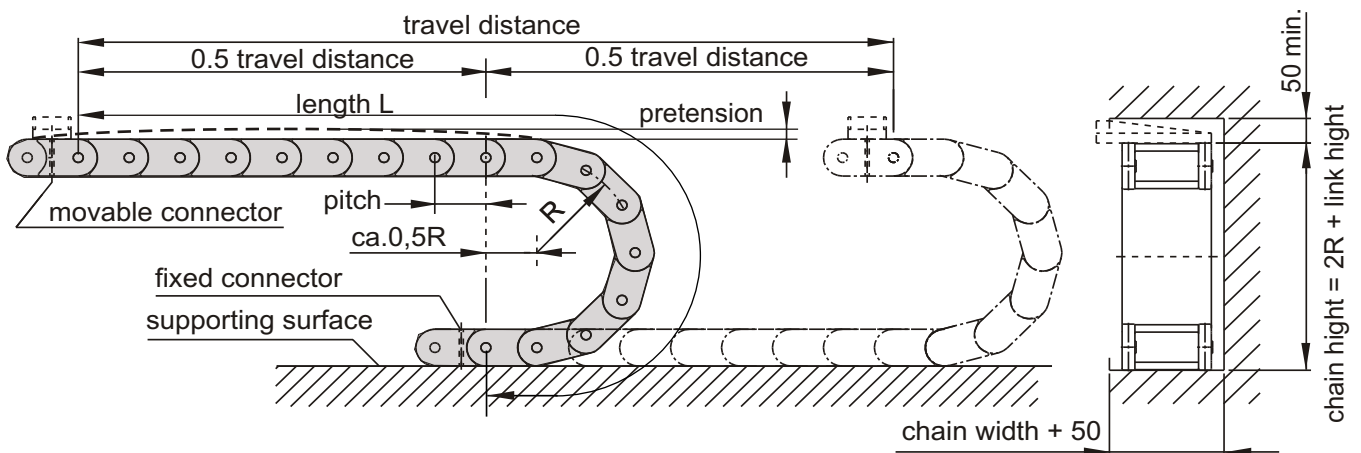
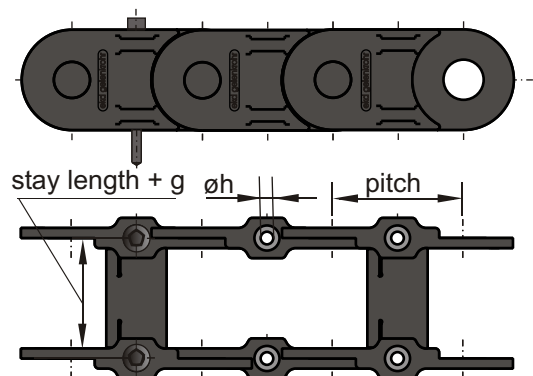
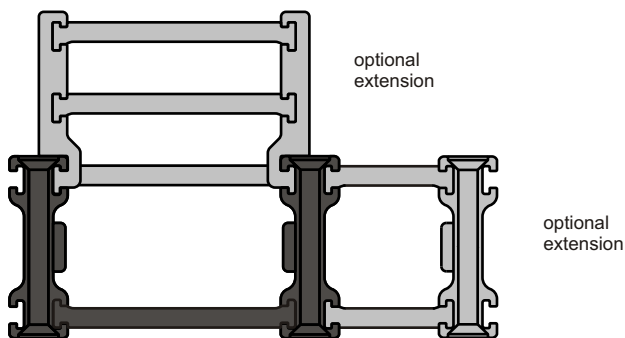
Example: Travel distance 3 m, bend radius 200 mm, cables: 1x15 mm, 8x8 mm, 3x12 mm, 2x22 mm

PKK 320 / 200 x 2340 / 200; 5Pz, 1PT55

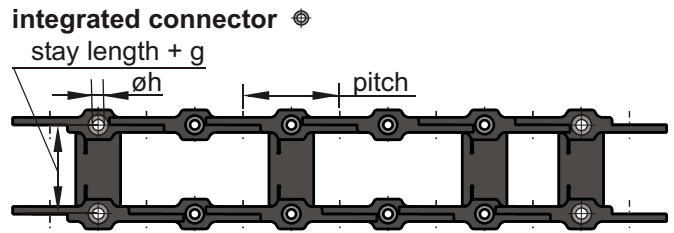
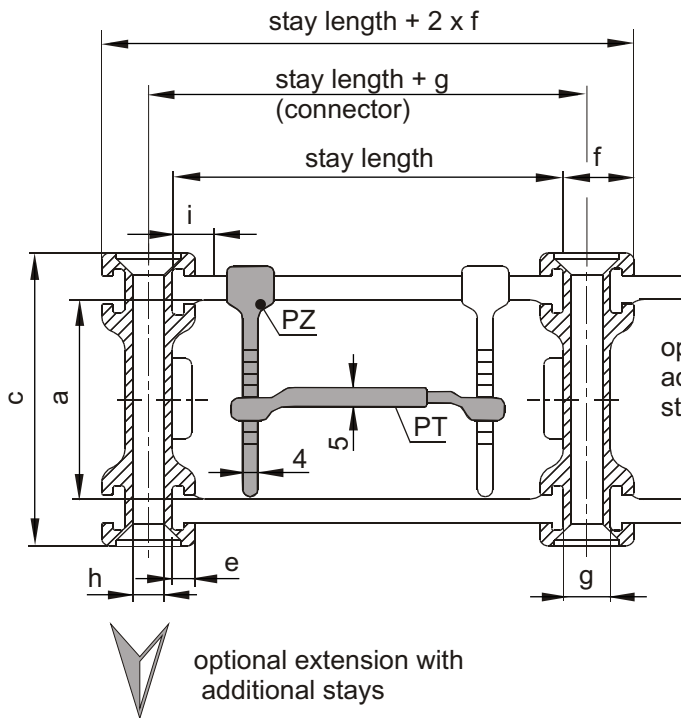


The PKK can easily be combined to every width by adding stays. Even the height can be changed by the customer or the stiffness may be increased electivly by additional link strands.

All PKK are supplied with the **integrated connector**, i.e. each link can also be used as connector.



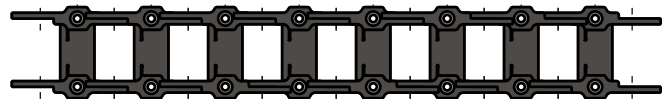
PKK 120/220/320/520 Dimensions



optional extension with additional stays and link strands

PKK 121/221/321/341/521

These types mainly express the basic type but do have a stay in every link.



Maximum height is offered by the PKK240 and 340.

PKK	bend radius R	pitch	a	c	e*	f	g	h	i**	weight*** kg/m
120,121	40/50/60/75	35	16	25	3	11	8	Ø4	15	0,60
220,221	75/100/150/200/300	65	34	50	5	15	10	Ø6	15	1,50
320,321	100/150/200/250/300/400	90	51	75	6	18	12	Ø8	20	2,50
520,521	150/200/300/400/500	115	80	104	6	20	14	Ø8	20	3,40

* max. usable staywidth is staylength - 2e

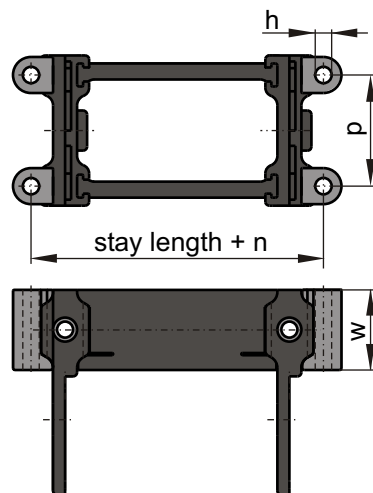
**1.st grid of Pz (grid each 2mm)

*** stay length 100 in each second link

Also with flange connector deliverable.
(Please request drawing C3.AP6087-1)

flange connector

	n	p	w
PKK 120	28,5	15,5	16
PKK 220	40	34,5	30
PKK 320	46	55,5	40
PKK 520	50	85,5	40

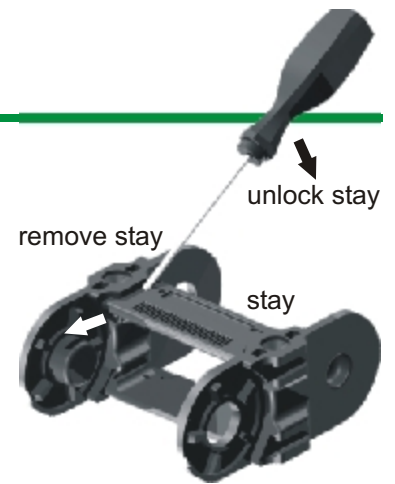


PKK	available stay length [mm]														
120,121,128	30	50	60		80	90	100								
220,221,228		50	60	70	80	90	100	110	120	130	150	170	200		
320,321,328		50	60	70	80	90	100		120	130	150	170	200	250	300
520,521		50	60	70	80	90	100		120	130	150	170	200	250	300

PKK Characteristics

PKK 120/220/240/320/340/520

PKK can be combined to every width by using different lengths of stays. Chain may easily be extended or shortened without using any tools by removing the clip. Both stays in the inner and outer radius may be removed to load chain with cables. For separation of cables plastic dividers may be fixed in 2 mm steps as well as telescopic dividers for horizontal separation. Each link is supplied with its own connecting hole. No additional connecting pieces are necessary. The basic type has a stay every second link.

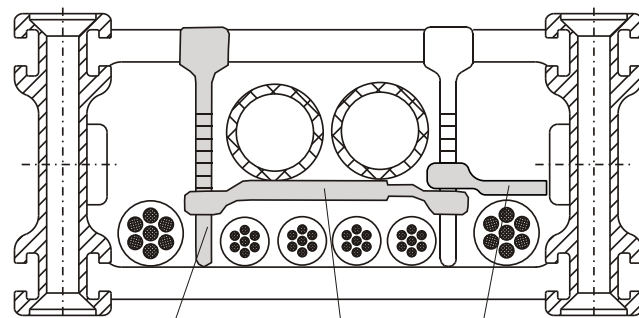


Inner separation:

The highly variable divider distribution, the small step of 3 mm in the height setting range and the telescopic layer dividers (PT) permit maximum flexibility for all requirements, also in case of retrospective changes.

plastic telescopic layer divider (PT)

type	range in mm
PT 55	55 to 80 mm
PT 75	75 to 100 mm



Plastic intermediate divider (PZ)

Plastic telescopic layer divider (PT)

Plastic layer divider stay, overhung (PF)

The professional assembly of the lines is prerequisite for a durable business. Detailed advice is necessary at high speeds, accelerations as well as at tubes. Notice the information from the line manufacturer (minimum bend radius, suitability for energy chains etc.) absolutely.

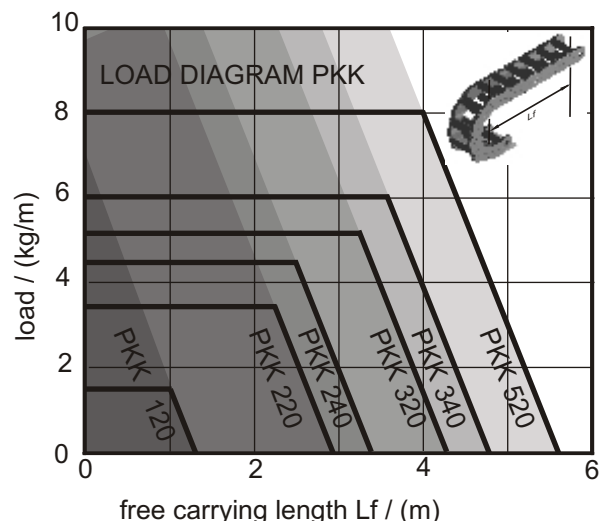
Material:

The used polymer material is a very high-quality, glass fibre reinforced polyamide. The resistance against chemical substances is very good (exception acids and concentrated alkalines). Ask our technicians in doubt under detail of the used chemicals.

The temperature range of application is between -20° and +100° C. Advice is also required in the clean room, surge, or explosion endangered areas as well as areas with extreme environmental conditions (e.g. tropics).

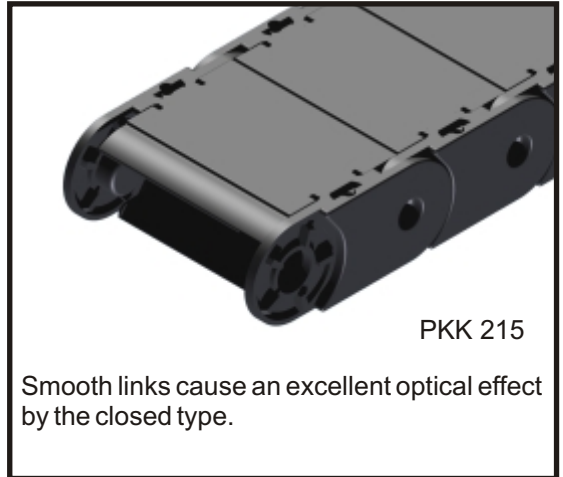
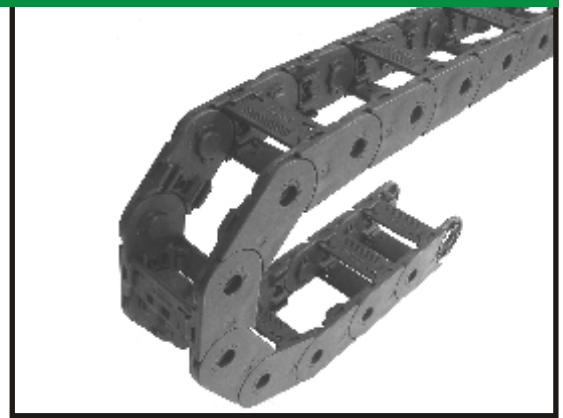
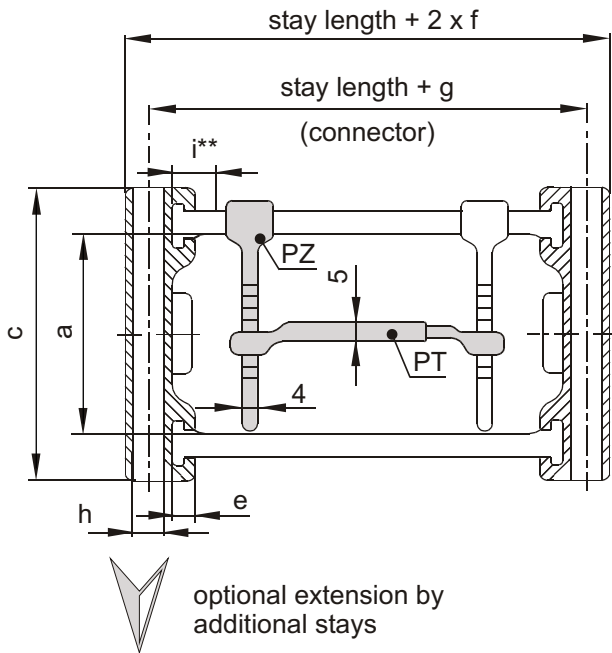
Load diagram:

The additional load is decisive for the choice of the energy chain next to minimum bend radius and maximum cable dimension. If the free carrying length is exceeded the next size must be chosen.



PKK 110/210/240/310/340 Smooth links

The PKK can, for optical reasons, also be delivered with smooth links. This option should be preferred, when ordering PKK closed type.



PKK	bend radius R	pitch							weight kg/m	
		a	c	e*	f	g	h	i**		
110, 111	40/50/60/75	35	16	25	3	8	10	Ø4	15	0.60
210, 211	65/75/100/125/150/200/215/250/300	65	34	50	5	10	10	Ø6	15	1,50
240, 241	75/100/150/200/250/300	65	44	60	5	10	10	Ø6	15	1,50
310, 311	100/130/150/200/300/400	90	51	75	6	12	12	Ø8	20	2,50
340, 341	100/150/200/300/400	90	60	85	6	15	15	Ø8	20	3,20

*max. usable inner width is stay length - 2e

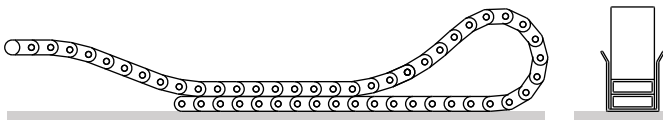
**1.st grid of PZ (grid each 2mm)

*** stay length 100 in every second link

PKK	available stay lengths [mm]														
	30	50	60	80	90	100	110	120	130	150	170	200	250	300	
110, 111															
210, 211															
240, 241															
310, 311															
340, 341															

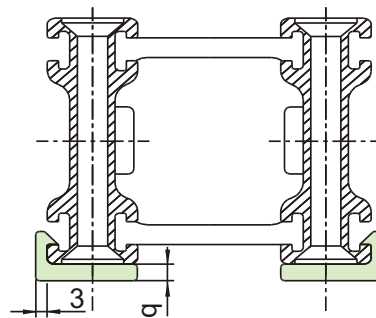
PKK 128/228/328 Slider

PKK is used very often for extremely long travels. The chain bands are gliding on each other by using sliders. These are made of a special plastic with extremely good friction values. Only few wear will occur. Sliders may be pressed into connecting holes of links afterwards. Low numbers of strokes and travelling speed less than 1 m/s do not require sliders. The minimum bending radius of each chain type is not available with sliders.



slider height q:
 PKK128 = 3 mm
 PKK228 = 5 mm
 PKK228 = 8 mm
 PKK328 = 5 mm

friction value 0,2 bis 0,25



If the travel distance is longer than twice of the free carrying length, then a guiding of the energy chain is necessary. The assembly and putting into operation of the guiding channel should be done with the greatest care to ensure a smooth function of the system. Guiding channels for all fields of application are available. The single channel segments are fastened with connection elements.

The moved part of the chain glides up to the half of the travel distance on the slide bar which is assembled at the end of the channel segments. The exchange area is arranged to ensure a smooth transition to the energy chain.

At travel distances up to app.30 m, travel speeds up to $v_{max} = 1.5 \text{ m/s}$ and accelerations of $a_{max} = 1 \text{ m/s}^2$ energy chain and channel can be realized like in the enclosed drawing. Applications at higher values request for advise to satisfy the special requirements by specific constructions.

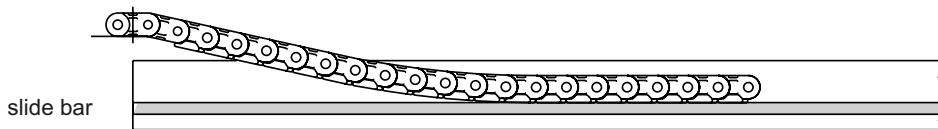
Usual assembly situation:

Energy chain connection at the moved end lower assembled and with an additional length at the end of the travel distance:

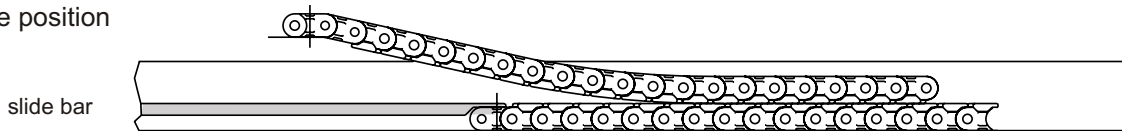


(application example)

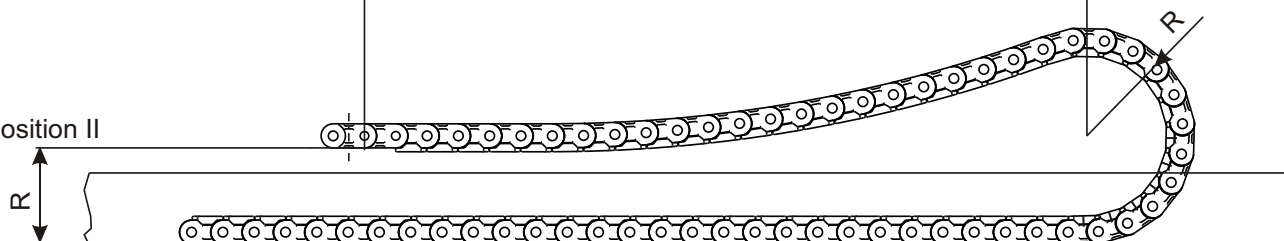
end position I



intermediate position



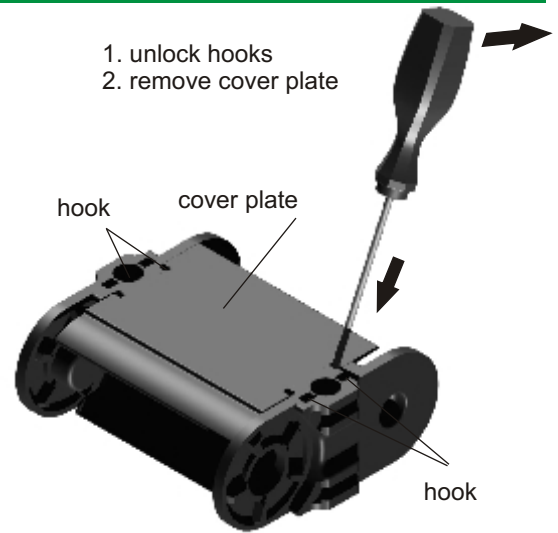
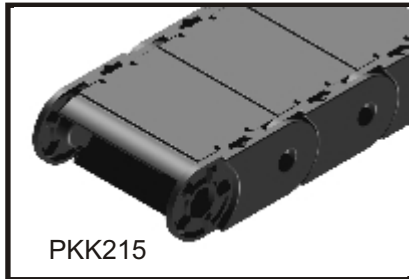
end position II



PKK 125/225/245/325/345/525 Closed type

These are the closed types of PKK. To install cables coverplates both in the outer and inner radius may be removed. Plastic dividers and plastic layer dividers may also be supplied to separate cables. Basic chain type can be changed into closed type simply by using cover plates instead of stays.

The PKK can also be delivered with smooth links which saves space and causes an excellent optical effect.

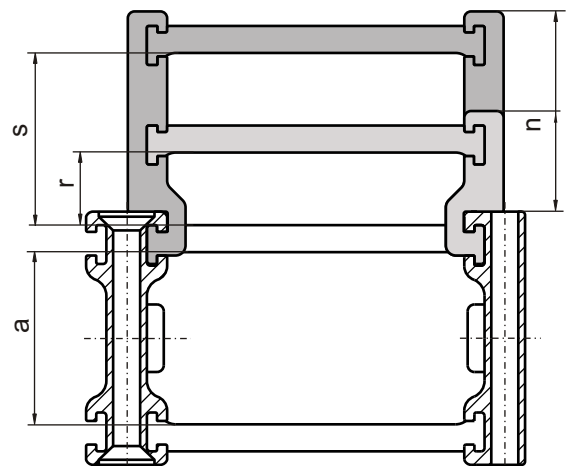
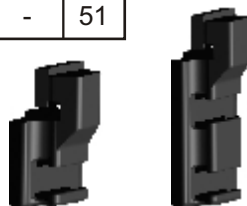


PKK	min. Radius	available cover plates (lengths)				
		50	100	150	200	300
125	50	50	100			
225, 215	100	50	100	150	200	
245	150	50	100	150	200	
325, 315	150		100	150	200	300
345	200		100	150	200	300
525	200			150	200	

PKK 213/223/243/313/323 Additional stays

PKK 213/223/243/313/323 do have an additional stay in the inner radius. It can be used in case of low travelling speed to get more space for additional layers of cables. Additional stays may also be placed in the outer radius. Other combinations can be delivered by request.

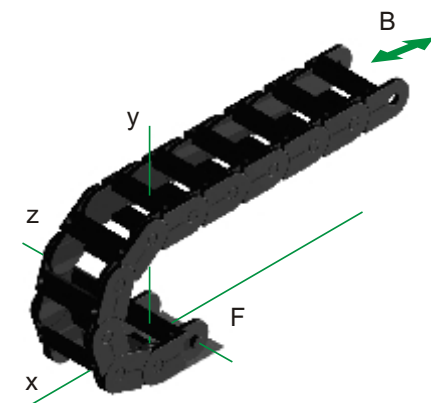
PKK	add. stay	n	r	s
213, 223, 243	short	19,5	14,5	-
	long	39	-	34
313, 323	short	29,5	21,5	-
	long	59	-	51



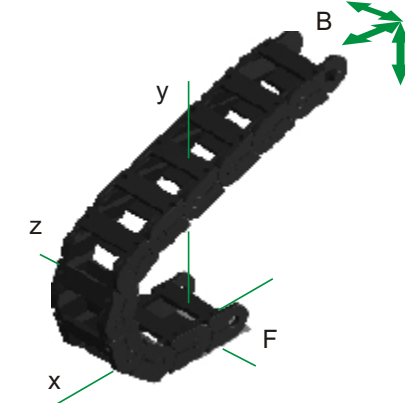
PKK	available stay lengths [mm]													
	50	60	70	80	90	100	110	120	130	150	170	200		
213, 223														
243														
313, 323													250	300

Arrangements

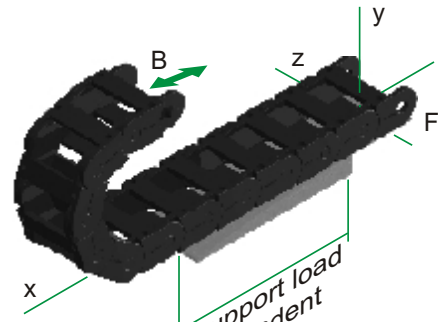
B = moved connector
F = fixed connector (mid of travel)



normal (no order comment)

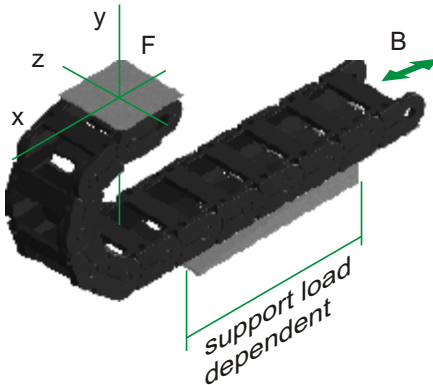


"m" multiaxial



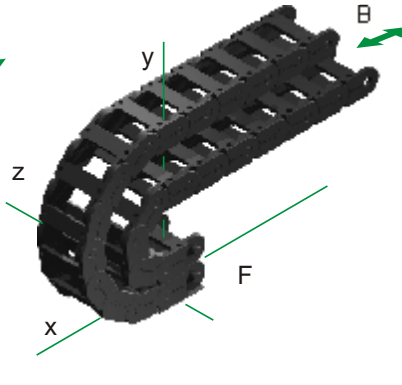
"f" free overhung

support load dependent

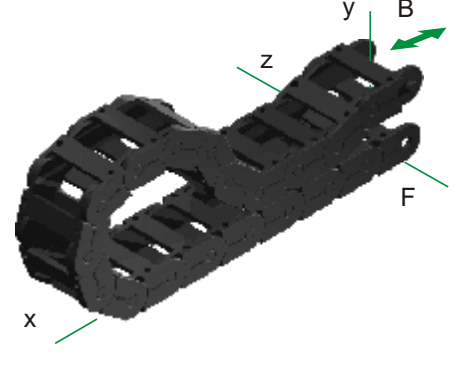


"u" moved end downside

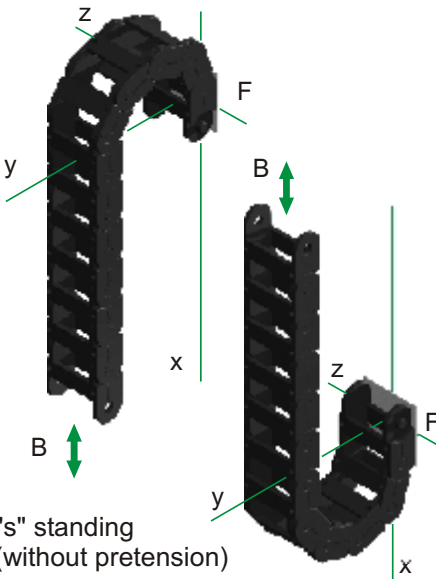
support load dependent



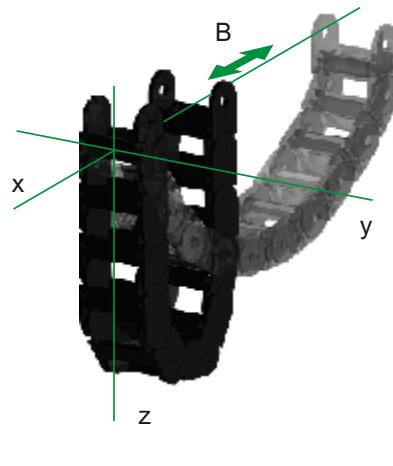
"i" into each other



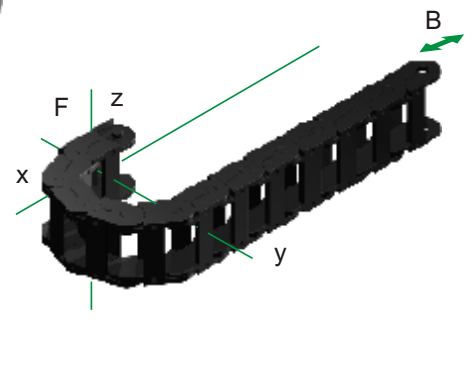
"g" sliding



"s" standing (without pretension)

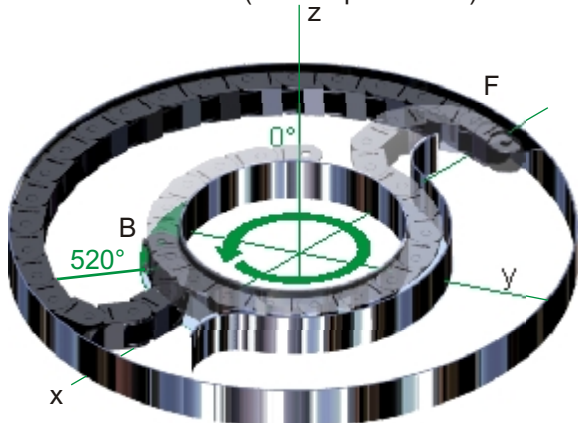


"a" moving apart



"w" horizontal, laying on side (without pretension)

"h" hanging (without pretension)



"k" circular, laying on side (on request)

2D CAD and 3D-CAD files
in different file formats
will be offered on
request or download:



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