

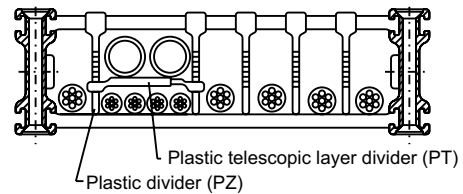
The order for a plastic energy chain PKK should contain the following data:

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)

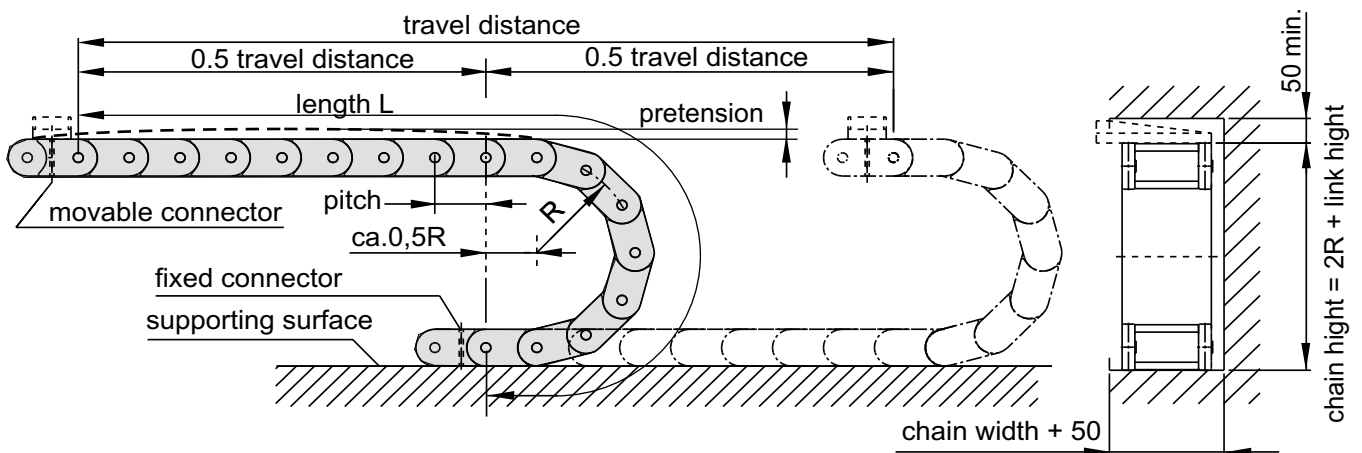
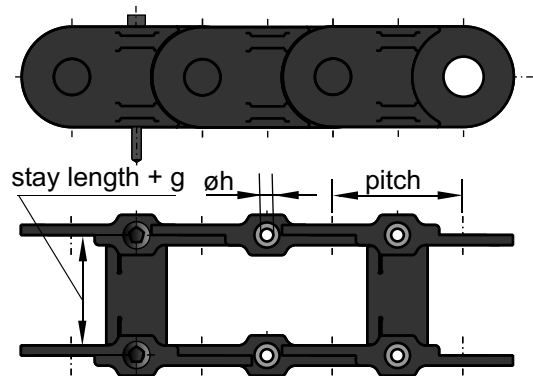
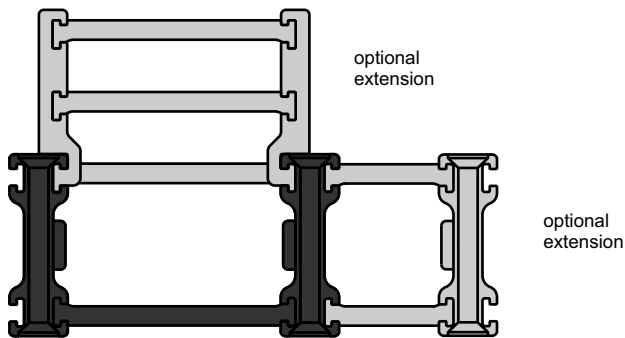
Example: Travel distance 3 m, bend radius 200 mm, cables: 1x15 mm, 8x8 mm, 3x12 mm, 2x22 mm

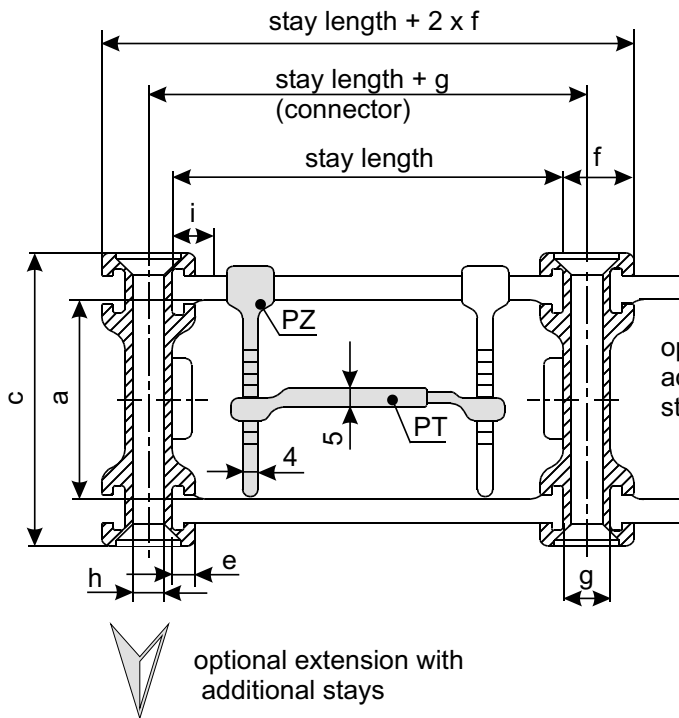
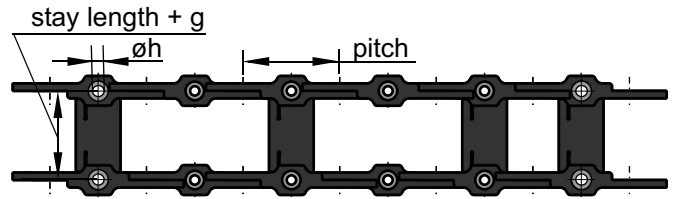
PKK 320 / 200 x 2340 / 200; 5Pz, 1PT55



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.

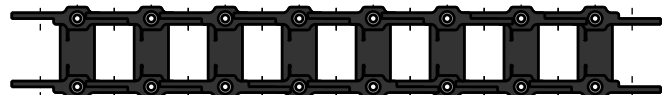



integrated connector


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

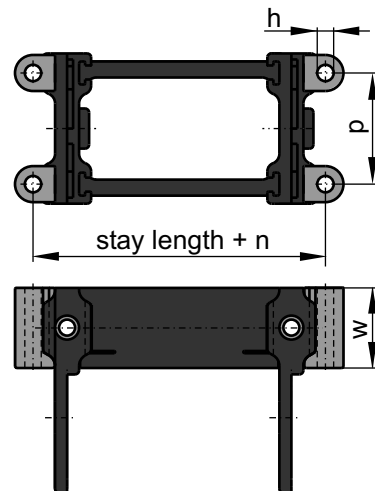
**1.st grid of Pz (grid each 2mm)

*** stay length 100 in each second link

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

flange connector

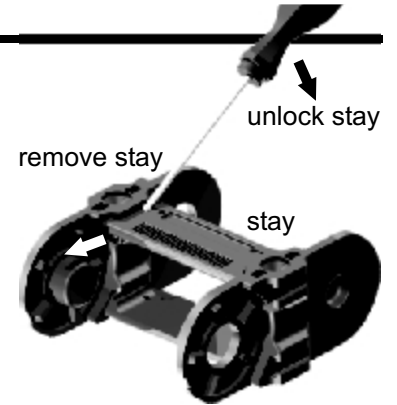
| | n | p | w |
|---------|------|------|----|
| PKK 120 | 28,5 | 15,5 | 16 |
| PKK 220 | 40 | 34,5 | 30 |
| PKK 320 | 46 | 55,5 | 40 |
| PKK 520 | 50 | 85,5 | 40 |



| 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 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.

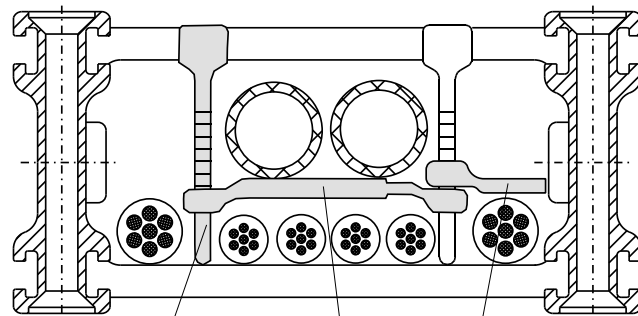


Inner separation:

The highly variable divider distribution, the small step of 3 mm in the height setting rang 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.

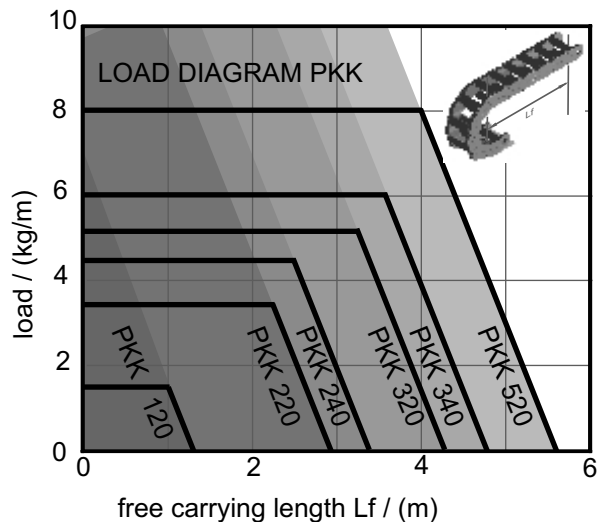
Material:

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.

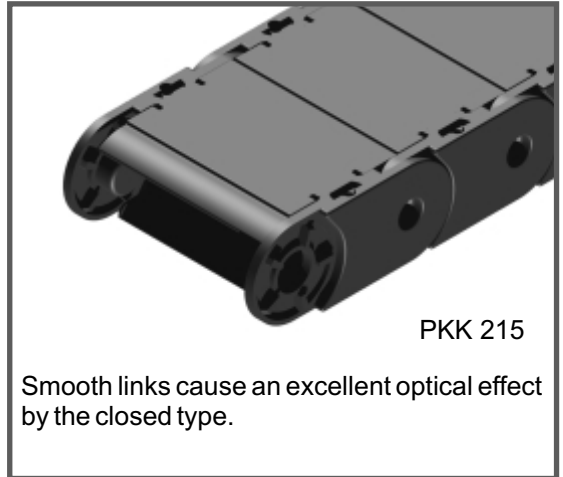
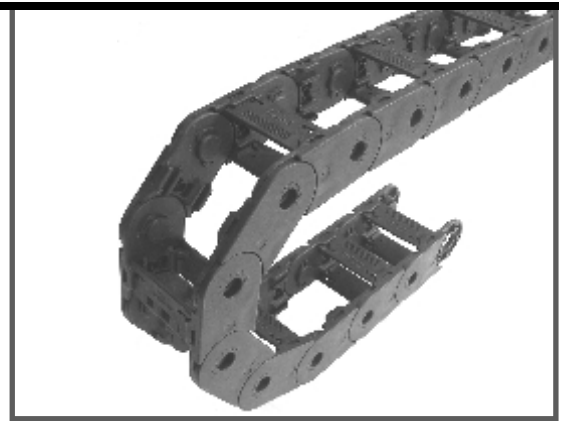
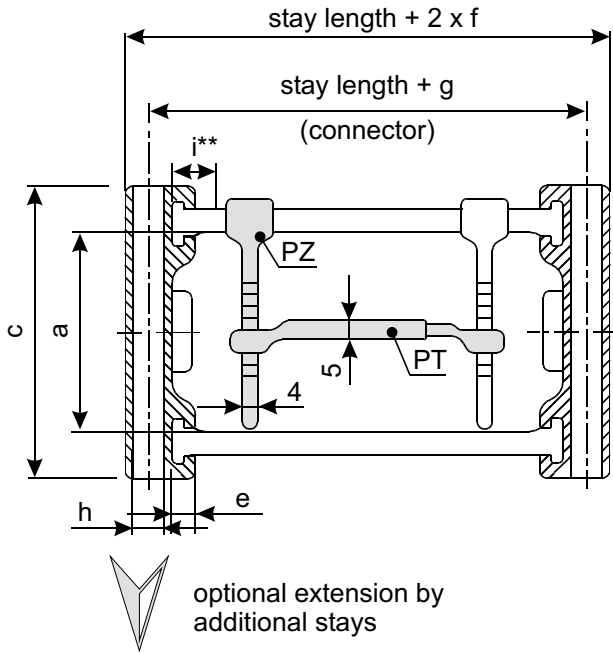
The temperature range of application is between - 20° and +100° C. Advice is also required in the clean room, surge, or explosion endangered areas as well as areas with extreme environmental conditions (e.g. tropics).

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.



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

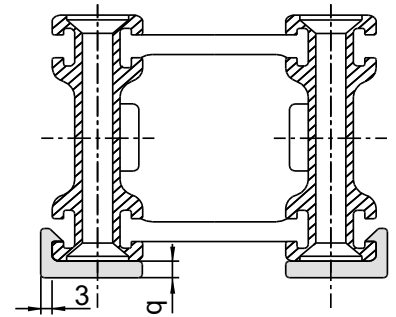


| PKK | bend radius R | pitch | | | | | | | weight kg/m | |
|----------|-----------------------------------|-------|----|----|---|----|----|-----|-------------|------|
| | | a | c | e* | f | g | h | i** | | |
| 110, 111 | 40/50/60/75 | 35 | 16 | 25 | 3 | 8 | 10 | Ø4 | 15 | 0.60 |
| 210, 211 | 65/75/100/125/150/200/215/250/300 | 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

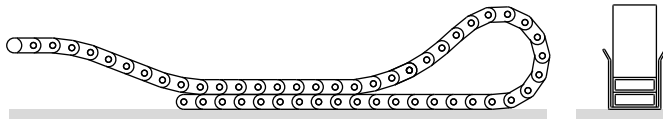
| PKK | available stay lengths [mm] | | | | | | | | | | | | | | |
|----------|-----------------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 30 | 50 | 60 | 80 | 90 | 100 | 110 | 120 | 130 | 150 | 170 | 200 | 250 | 300 | |
| 110, 111 | 30 | 50 | 60 | 80 | 90 | 100 | | | | | | | | | |
| 210, 211 | | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 150 | 170 | 200 | | |
| 240, 241 | | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 150 | 170 | 200 | | |
| 310, 311 | | 50 | 60 | 70 | 80 | 90 | 100 | | 120 | 130 | 150 | 170 | 200 | 250 | 300 |
| 340, 341 | | 50 | 60 | 70 | 80 | 90 | 100 | | 120 | 130 | 150 | 170 | 200 | 250 | 300 |

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

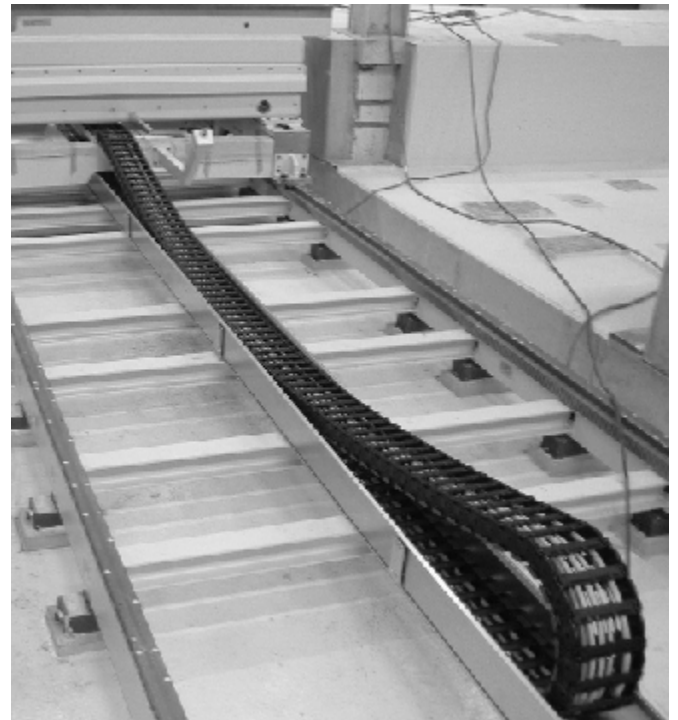
friction value 0,2 bis 0,25



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 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.

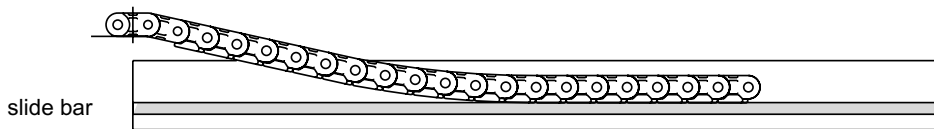


(application example)

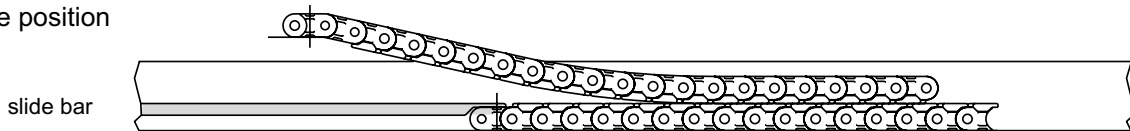
Usual assembly situation:

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

end position I

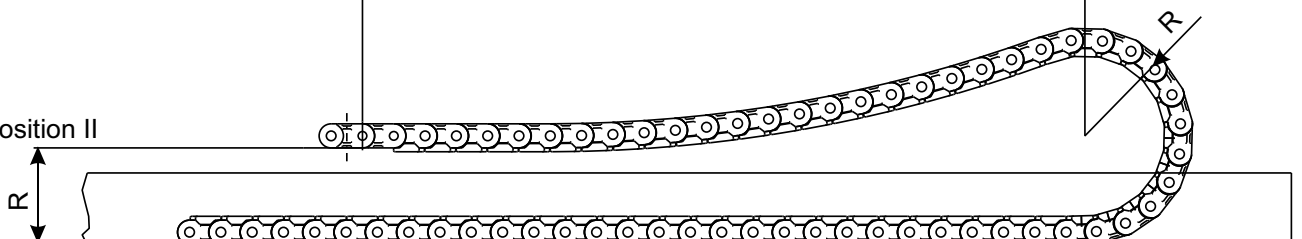


intermediate position



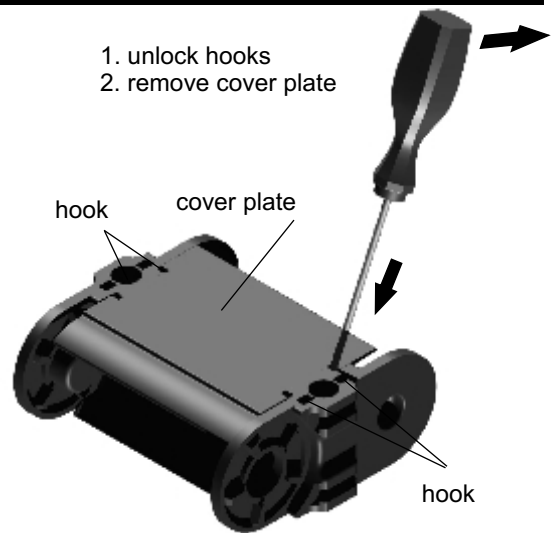
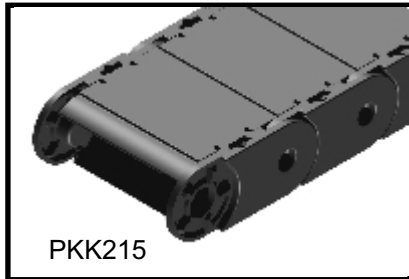
additional length

end position II



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.

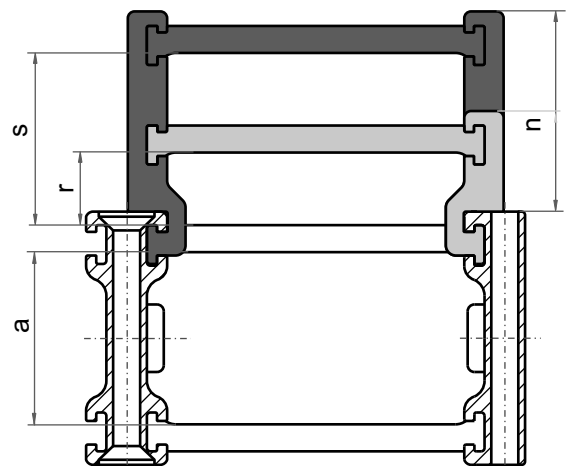
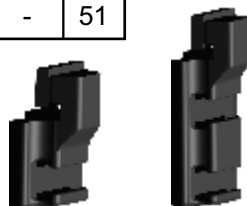


| PKK | min. Radius | available cover plates (lengths) | | | | |
|----------|-------------|----------------------------------|-----|-----|-----|-----|
| | | 50 | 100 | 150 | 200 | 300 |
| 125 | 50 | 50 | 100 | | | |
| 225, 215 | 100 | 50 | 100 | 150 | 200 | |
| 245 | 150 | 50 | 100 | 150 | 200 | |
| 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 |