RINGSPANN®
Power Transmission

Shaft-Hub-Connections

Shrink Discs • Cone Clamping Elements • Star Discs

36

Edition 2010/2011

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Issue 03/2010 • Technical details subject to change without notice.

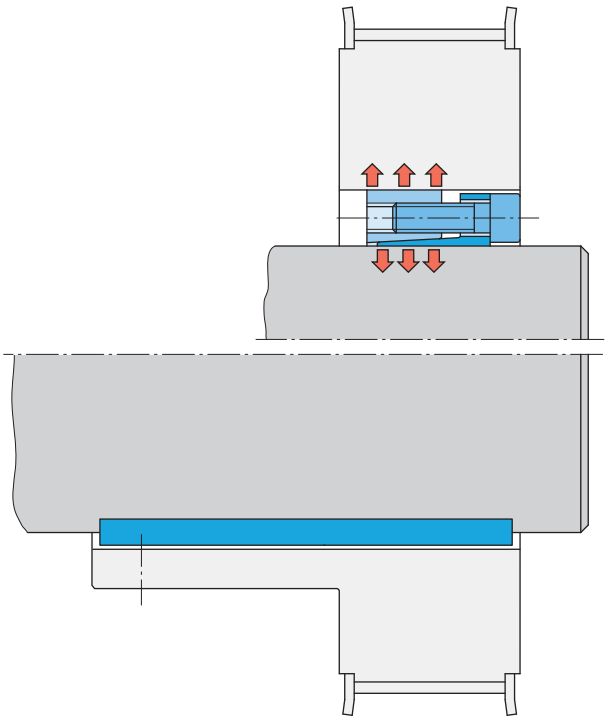
Why frictional shaft-hub-connections

Frictional shaft-hub-connections are standard machine elements used to connect shafts and hubs. They are capable of transmitting torque, axial forces, radial forces and bending moments.

Among the frictional shaft hub connections Shrink Discs and Cone Clamping Elements take an important position. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces provide the required frictional connection between the parts involved in the transmission of torques or forces.

Shrink Discs and Cone Clamping Elements are capable of transmitting much higher torques than conventional positive connections with keyways. The shafts can be designed smaller and shorter. The relationships between shaft diameter and shaft length are illustrated in the example shown in figure 3-1. In this comparison, the same torque is transmitted via a Cone Clamping Element (upper half of the figure) and via a keyway connection (lower half of the figure). The Cone Clamping Element design offers a much more compact and cost effective solution.

A special category of frictional shaft-hub-connection is the RINGSPANN Star Disc. Connections using Star Discs are ideally suite to applications requiring repeated adjustment with adjustment devices in a short overall length.



Upper half of figure: Shaft-hub-connection with Cone Clamping Element
Lower half of figure: Shaft-hub-connection with keyway 3-1

Advantages of Frictional Shaft-Hub-Connections

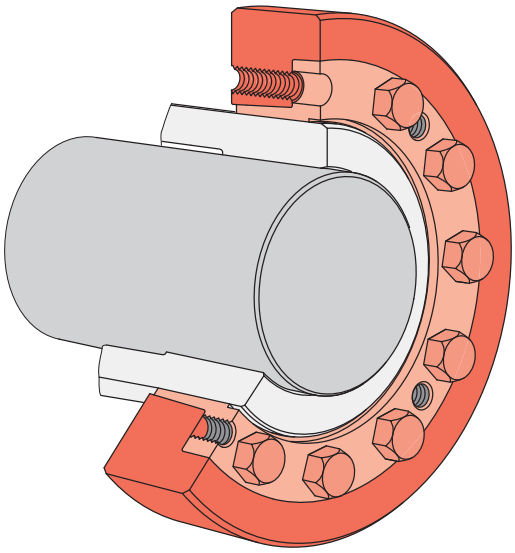
- **Backlash free connections**
- **No notch effect in contrast to keyway connections**
- **Ideal for reversing operation**
- **Simultaneous transmission of torque and axial force**
- **Easy alignment of hub to shaft**
- **Compact solutions due to high power density**
- **Reduced costs due to simple shaft and hub geometry**
- **Connections can be released even after long operation time**

Categories of RINGSPANN Shaft-Hub-Connections

Shrink Discs

Shrink Discs are external clamping connections for the backlash free fastening of hollow shafts or hubs to shafts. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces press the hollow shaft onto the shaft. Torques or axial forces can be transmitted frictionally from the hollow shaft to the shaft. The Shrink Disc itself is not involved in the transmission of torques or axial forces. The radial clamping forces which act through the circumference of the hollow shaft also ensure an optimum centering to the shaft.

Shrink Discs are used, for example, to fasten machine shafts to gearboxes with hollow-shafts.

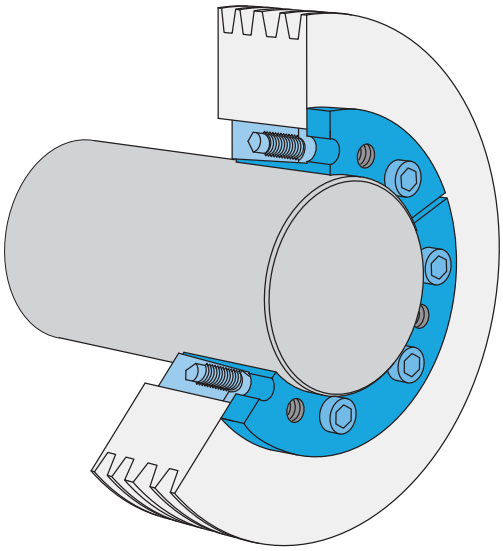


4-1

Cone Clamping Elements

Cone Clamping Elements are internal clamping connections for backlash free fastening of hubs on shafts. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces create a frictional connection between the Cone Clamping Element and the shaft as well as the hub. Torques or axial forces can be transmitted from the shaft via the Cone Clamping Element to the hub.

Cone Clamping Elements are used, for example to fasten sprockets, flywheels, levers, pulleys, brake discs or conveyor-belt drums.

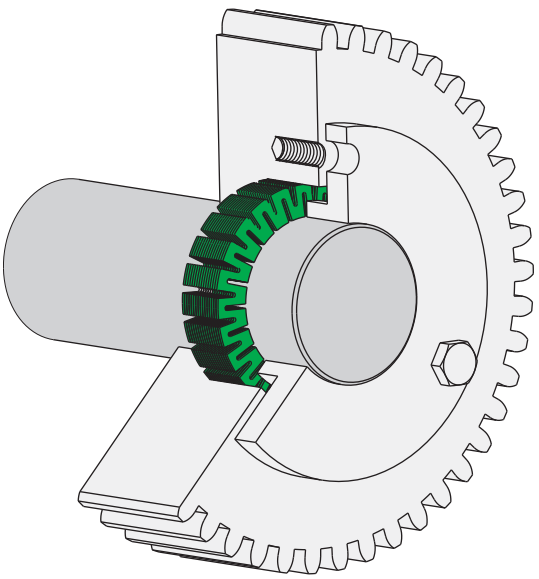


4-2

Star Discs

Star Discs are flat-bevelled rings which are slotted on the outside and inside. An external axial actuating force is translated by the Star Disc into a much higher radial force. This force creates a frictional connection between the Star Disc and the shaft as well as the hub. Generally, Star Discs are installed in a multiple arrangement as a disc pack. This makes it possible to adjust the transmissible torque to the requirements of the specific application.

Shaft-hub-connections with Star Discs are used wherever frequent clamping and release are required, for example in adjustment devices.

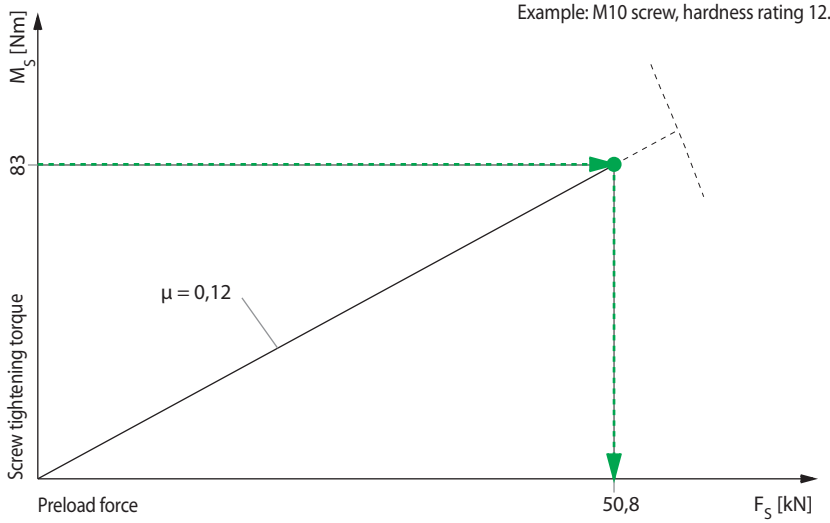


4-3

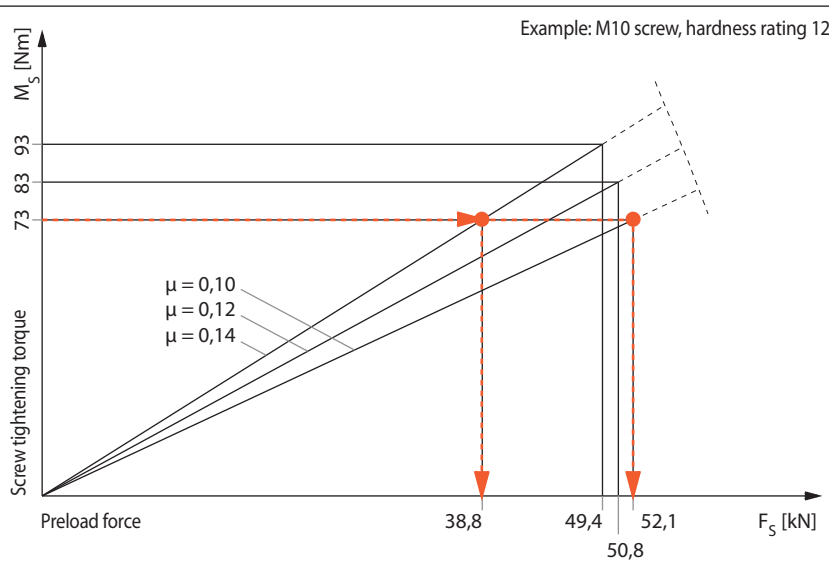
Ensured Torques with the RINGSPANN Calculation Method

The RINGSPANN calculation method takes into account the friction-coefficient fluctuations which naturally occur in all screw connections. The transmissible torques or axial forces listed in this catalogue are based on friction-coefficient fluctuations in accordance with VDI Guideline 2230 and are minimum values. This ensures a reliable selection of the shaft-hub-connection.

In contrast, torques shown in catalogues issued by various other manufacturers are based on simplified calculation methods. These catalogue values are often comparatively higher, but are subject to the friction-coefficient fluctuations described below and thus do not represent reliable minimum values for customers and users.



Simplified calculation method without accounting for friction-coefficient fluctuations 5-1



RINGSPANN calculation method accounting for friction-coefficient fluctuations 5-2

In most frictional shaft-hub-connections, the frictional connection is created by torque-controlled tightening of screws. These axially positioned screws are tightened to a specified screw tightening torque. On the basis of the determined preload forces and the transmission ratio of the conical angles, the radial forces between the clamping element and the shaft or hub are calculated by taking into account friction losses. With these radial forces and the friction coefficients between the components, the transmissible torques or axial forces can be calculated.

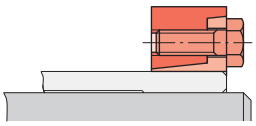
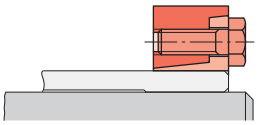
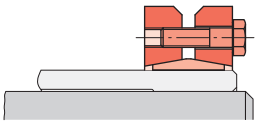
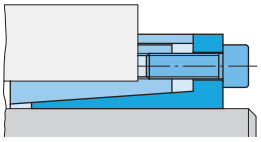
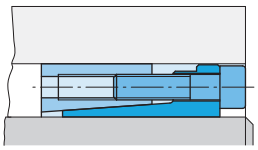
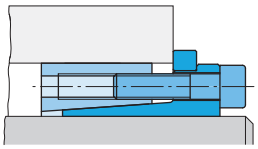
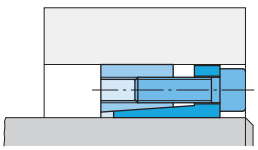
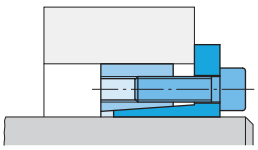
The determination of the correct actual preload force in a given application is of prime importance. Simple calculation methods are based on an assumed preload force, from which the pressures (and thus the component stress factors) as well as the transmissible torques or axial forces are calculated. The use of such calculation methods is dangerous, as friction-coefficient fluctuations lead to actual preload forces that are higher or lower than assumed. If the actual preload forces are higher, also higher torques may be transmitted, but then the component stress factors are also higher than calculated, which can cause component damage (e.g. to the hub) in extreme cases. In the opposite case, when the preload forces are lower than assumed, the calculated torques or axial forces may not be transmitted. Consequently, the connection slips.

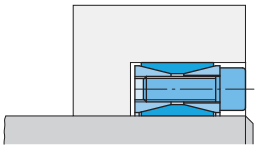
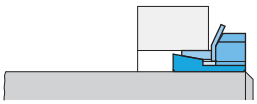
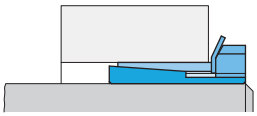
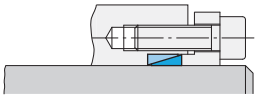
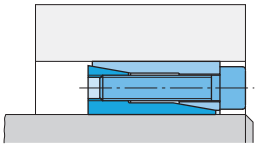
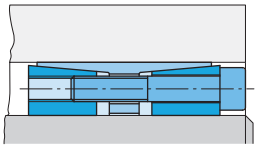
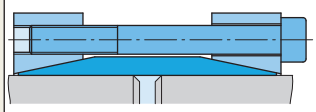
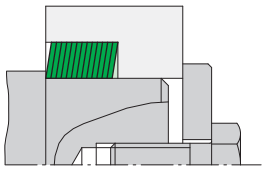
The RINGSPANN calculation method ensures that such errors in the dimensioning of shaft-hub-connections are avoided. This is achieved by using a method that has been tested and proven over many years, according to which the real friction coefficient μ_K in the contact area under the head of the screw and μ_G in the screw threading lie between 0,10 and 0,14. This conforms to current engineering standards as described in VDI Guidelines 2230. The RINGSPANN method for calculating preload forces is described below using the example of a M10 screw with a hardness rating of 12.9.

As the actual friction coefficient in a given case is unknown, the screw tightening torque M_S must correspond to the lowest friction coefficient of $\mu = 0,10$ ($M_S = 73$ Nm) according to the RINGSPANN calculation method. If a higher tightening torque is used, the screw could be overloaded.

If the actual friction coefficient is $\mu = 0,14$, then the preload force $F_S = 52,1$ kN will not be achieved with a screw tightening torque of $M_S = 73$ Nm. The preload force will be only $F_S = 38,8$ kN, as shown in figure 5-2. The transmissible torque is then calculated on the basis of a preload force of $F_S = 38,8$ kN, whereas the component stress factors in the hub are calculated on the basis of a preload force of $F_S = 52,1$ kN.

Overview RINGSPANN Shaft-Hub-Connections

	Type	Shaft diameter [mm]	Transmissible torque at a reference shaft of 50 mm [Nm]	Radial height		Axial width			Clamping element centers the hub to the shaft	No axial displacement of the hub to the shaft during clamping	Actuating device integrated (screws)	Page
				flat	standard	short	medium	long				
Shrink Discs	**RLK 608** 	30 up to 390	2600		●		●		●	●	●	**10**
Shrink Discs	**RLK 606** 	24 up to 155	1950		●		●		●	●	●	**14**
Shrink Discs	**RLK 603** 	14 up to 360	2200		●		●		●	●	●	**18**
Cone Clamping Elements	**RLK 110** 	6 up to 120	2360	●				●	●	●	●	**26**
Cone Clamping Elements	**RLK 130** 	20 up to 180	3070		●		●		●		●	**30**
Cone Clamping Elements	**RLK 131** 	20 up to 180	1890		●		●		●	●	●	**32**
Cone Clamping Elements	**RLK 132** 	20 up to 200	2600		●	●			●		●	**34**
Cone Clamping Elements	**RLK 133** 	20 up to 200	1890		●	●			●	●	●	**36**

	Type	Shaft diameter mm	Transmissible torque at a reference shaft of 50 mm [Nm]	Radial height		Axial width			Clamping element centers the hub to the shaft	No axial displacement of the hub to the shaft during clamping	Actuating device integrated (screws)	Page
				flat	standard	short	medium	long				
Cone Clamping Elements	**RLK 200** 	20 up to 400	1 890		●	●				●	●	**38**
	RLK 250 	15 up to 70	480	●		●			●		●	**40**
	RLK 250 L 	15 up to 60	930	●				●	●		●	**42**
	RLK 300 	10 up to 200	423	●		●						**44**
	RLK 350 	5 up to 50	1 900		●		●		●		●	**48**
	RLK 402 	25 up to 300	3 500		●			●	●	●	●	**50**
	RLK 500 	14 up to 100	1 200		●			●			●	**52**
Star Discs		5 up to 100	1 200*		●	●						**58**

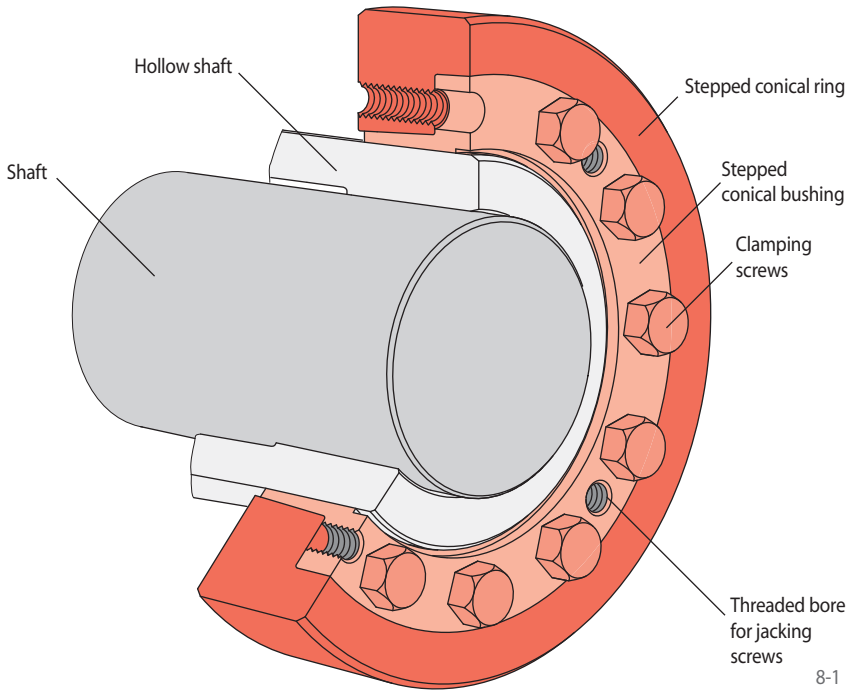
* For a pack of 16 Star Discs

Design and Function

Two-part shrink discs consist of an outer stepped conical ring, and an inner stepped conical bushing, as well as a number of clamping screws (see Figure 8-1).

The stepped conical ring is pulled onto the stepped conical bushing by tightening the clamping screws. A radial clamping force is generated by the conical sufaces, which is independent of the friction coefficients at the screws and conical surfaces. The radial clamping force presses the hollow shaft onto the shaft and creates a frictional connection at the contact surfaces between the shaft and the hollow shaft. Thereby, torque and/or axial force can be transmitted between the shaft and the hollow shaft.

During the clamping process, the position of the stepped conical bushing relative to the hollow shaft remains unchanged. The connection is released by tightening clamping screws in the threaded bores for the jacking screws.



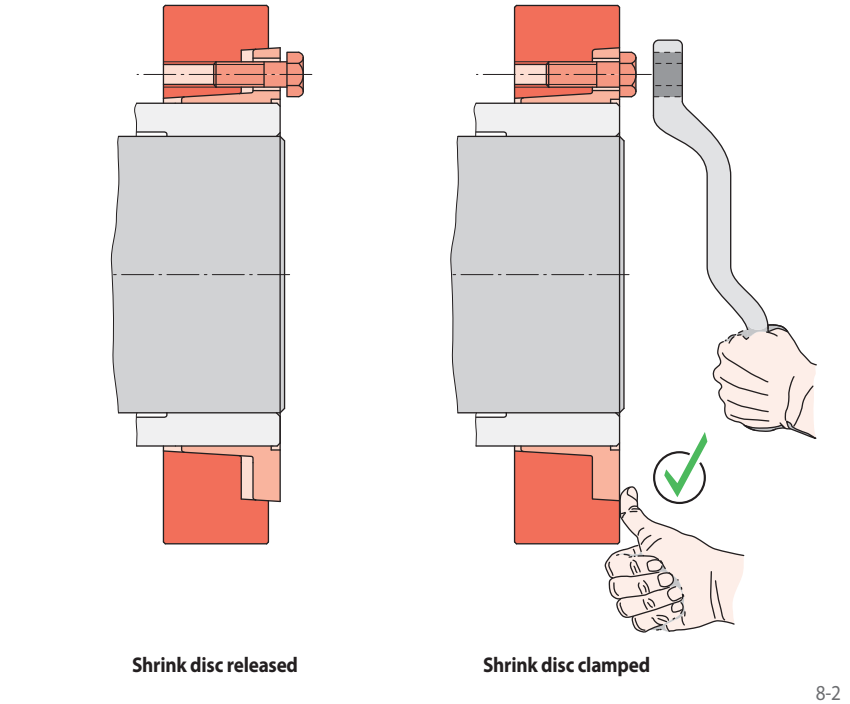
8-1

Distance-controlled assembly

The clamping screws are tightened uniformly in a clockwise sequence until the front face of the stepped conical ring is flush with the front face of the stepped conical bushing (see figure 8-2).

Once this assembly state is reached, the torque or axial force values shown in the tables can be reliably transmitted between the hollow shaft and the shaft.

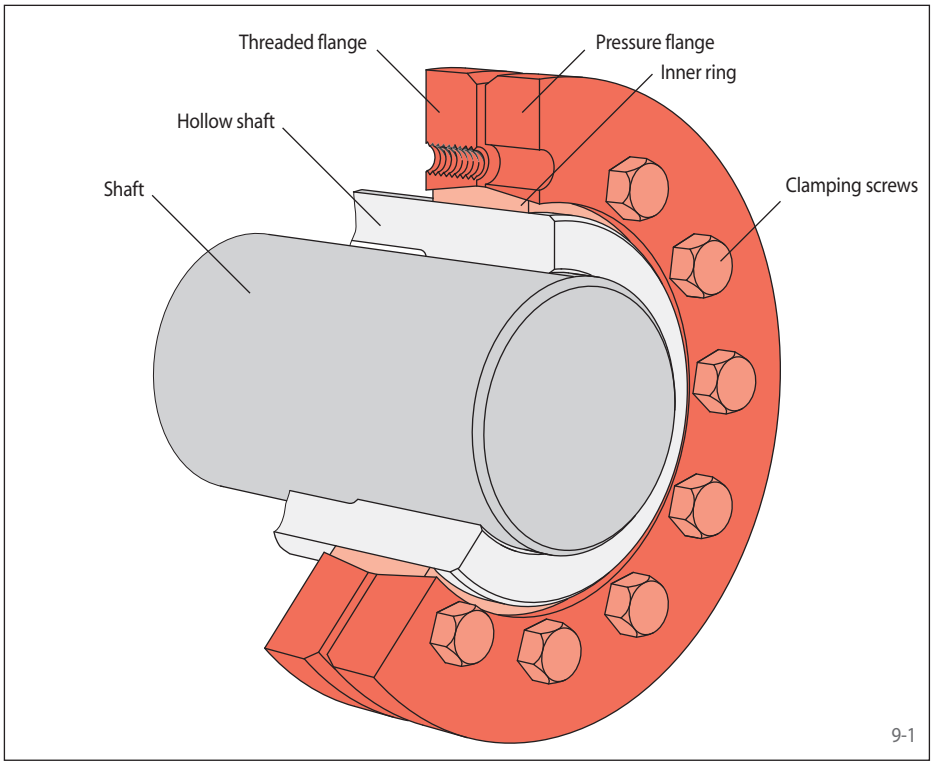
Insufficient or missing lubrication of the conical surfaces as might happen during servicing will make the assembly procedure impossible to complete.



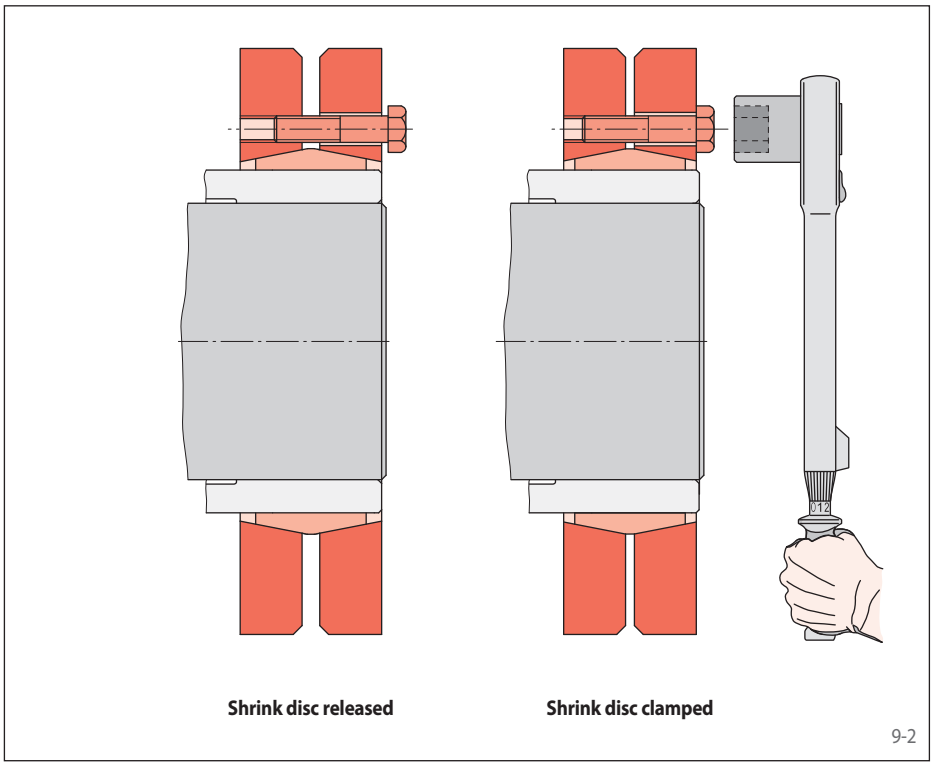
8-2

Characteristics

- **Easy, quick assembly by tightening clamping screws without a torque wrench**
- **Modern design with high power density**
- **Distance-controlled assembly ensures guaranteed transmissible torques**
- **Enclosed design, therefore impervious to dirt**
- **True running even at high speeds**



9-1



Shrink disc released

Shrink disc clamped

9-2

Characteristics

- **Thightening of clamping screws with a torque wrench**
- **Classical design**
- **Torque-controlled assembly**
- **Easy disassembly without jacking screws**

Design and Function

Three-part shrink discs consist of a threaded flange, a pressure flange, a slotted inner ring and a number of clamping screws (see figure 9-1).

The threaded flange and the pressure flange are pulled together over the inner ring by tightening the clamping screws. A radial clamping force is generated by the conical surfaces which is dependent on the friction coefficients at the screws and conical surfaces. The radial clamping force presses the hollow shaft onto the shaft and creates a frictional connection at the contact surfaces between the shaft and the hollow shaft. Thereby, torque and/or axial force can be transmitted between the shaft and the hollow shaft.

During the clamping process, the position of the inner ring relative to the hollow shaft remains unchanged. The connection is released simply by loosening the clamping screws, as the cone angles are self-releasing.

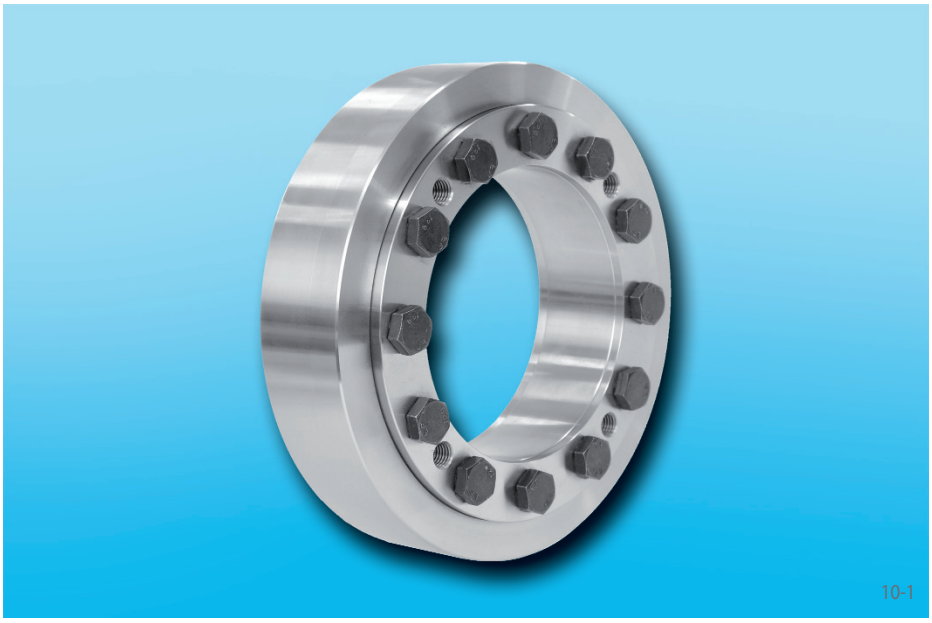
Torque-controlled assembly

The clamping screws are thightened uniformly in a clockwise sequence until the specified torque is achieved (see figure 9-2).

Insufficient or missing lubrication of the conical surfaces as might happen during servicing, results in a reduction of the radial clamping force. The torques or axial forces listed in the tables can no longer be transmitted reliably. This often goes unnoticed as the specified tightening torque was achieved during assembly and the assembly procedure is considered completed.

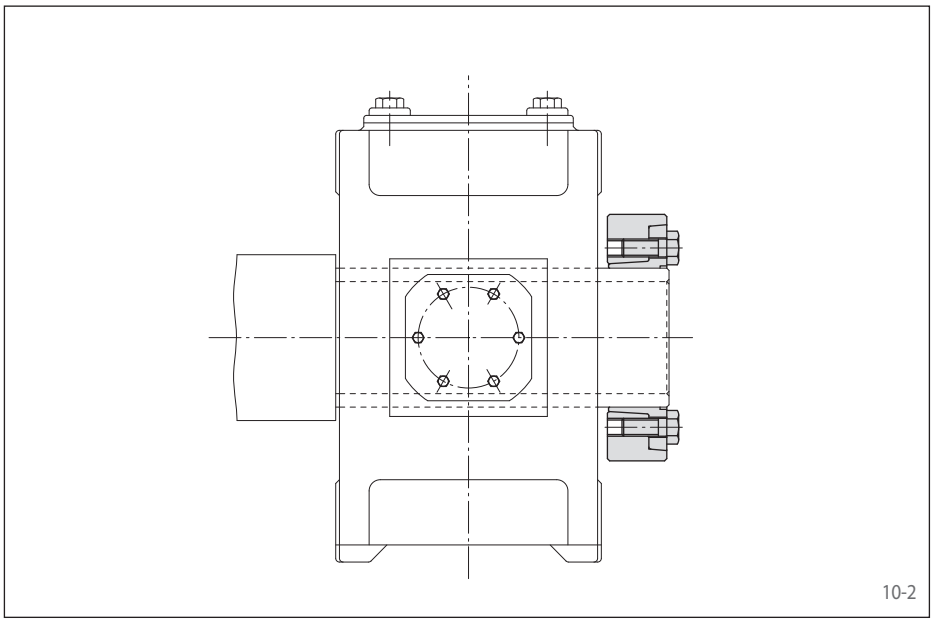
Shrink Discs RLK 608

Two-part design
Highest transmissible torques



Features

- Highest transmissible torques
- Easy, quick assembly by tightening clamping screws without a torque wrench
- Distance-controlled assembly ensures guaranteed transmissible torques
- Enclosed design, therefore impervious to dirt
- True running even at high speeds
- Centers the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 30 mm up to 390 mm



Application example

Backlash free connection of a hollow-shaft gearbox to a machine shaft with a Shrink Disc RLK 608. The backlash free connection reduces the risk of fretting corrosion. As a result, the connection can be easily disassembled even after long periods of operation.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 11 through 13 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

d_w > mm	d_w ≤ mm	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. mm	Joint clearance max. mm
24	30	H7	h6	0	0,034
30	50			0	0,041
50	80			0	0,049
80	120			0	0,057
120	160			0	0,065
160	180	H7	g6	0,014	0,079
180	250			0,015	0,090
250	315			0,017	0,101
315	390			0,018	0,111

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 360$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 608.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 22 and 23.

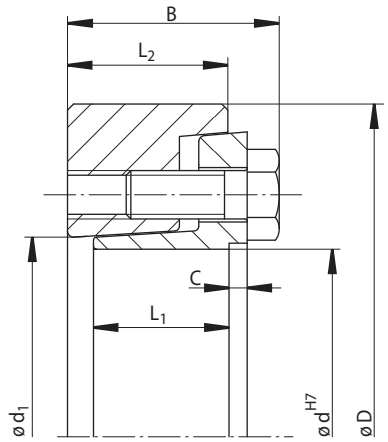
Example for ordering

Shrink Disc RLK 608 for hollow shaft with an outer diameter d = 155 mm:

- RLK 608-155
  Article number 4200.155.801.000000

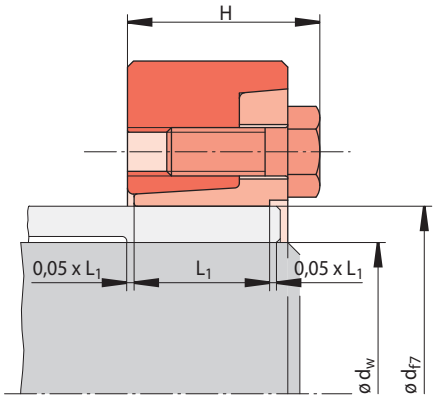
Shrink Discs RLK 608

Two-part design
Highest transmissible torques



Shrink Disc released

11-1



Shrink Disc clamped

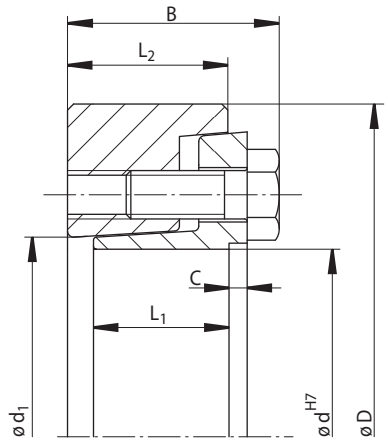
11-1

Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
30	60	32	25	16,5	19	2	23,0	24 25 26	300 350 400	25 28 30	6	M6	16	0,3	4200.030.801.000000
36	72	38	28	18	20,5	2	25,8	27 30 33	610 750 910	45 50 55	5	M8	20	0,5	4200.036.801.000000
44	80	47	30	20	22,5	2	27,8	34 35 37	760 850 920	44 48 49	6	M8	20	0,6	4200.044.801.000000
50	90	53	33	22	24,5	2	29,8	38 40 42	1650 1850 2100	86 92 100	8	M8	20	0,8	4200.050.801.000000
55	100	58	35	23	26,5	3	31,8	42 45 48	1750 2200 2600	83 97 100	8	M8	20	1,1	4200.055.801.000000
62	110	66	35	23	26,5	3	31,8	48 50 52	2400 2600 3000	100 100 110	9	M8	20	1,3	4200.062.801.000000
68	115	72	35	23	26,5	3	31,8	50 55 60	2500 3300 4100	100 120 130	9	M8	20	1,4	4200.068.801.000000
75	138	79	40	25	29	3	35,4	55 60 65	4600 5700 6900	160 190 210	10	M10	25	2,4	4200.075.801.000000
80	141	84	40	25	29	3	35,4	60 65 70	4600 5700 6900	150 170 190	10	M10	25	2,4	4200.080.801.000000
90	155	94	46	30	35	4	41,4	65 70 75	6500 7800 9200	200 220 240	10	M10	30	3,4	4200.090.801.000000
100	170	104	51	34	40	5	46,4	70 75 80	8100 9700 11300	230 250 280	12	M10	30	4,6	4200.100.801.000000
105	185	114	59	39	46	6	53,5	80 85 90	13900 16100 18600	340 370 410	12	M12	35	6,6	4200.105.801.000000
110	185	114	59	39	46	6	53,5	80 85 90	13900 16100 18600	340 370 410	12	M12	35	6,2	4200.110.801.000000
120	200	124	63	42	49	6	56,5	85 90 95	15000 17200 19800	350 380 410	12	M12	35	7,7	4200.120.801.000000
125	215	132	63	42	49	6	56,5	90 95 100	17900 20500 23300	390 430 460	12	M12	35	9,2	4200.125.801.000000
130	230	139	68	46	53	6	60,5	95 100 110	22500 25500 32000	470 510 580	14	M12	35	11,7	4200.130.801.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

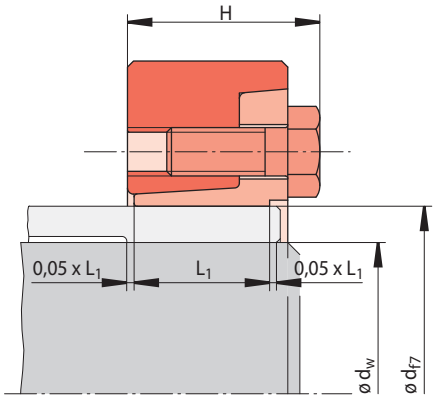
Shrink Discs RLK 608

Two-part design
Highest transmissible torques



Shrink Disc released

12-1



Shrink Disc clamped

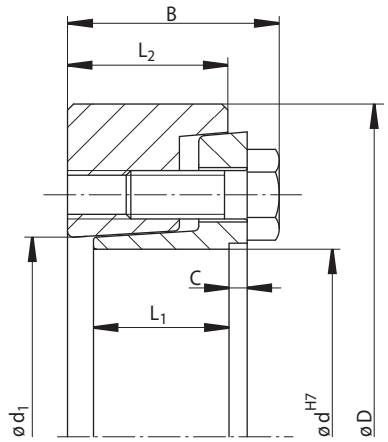
12-2

Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
140	230	144	71	46	53	6	61,8	100 105 115	25 300 28 000 35 600	500 530 610	12	M14	40	10,8	4200.140.801.000000
150	263	159	75	50	57	6	65,8	110 115 125	33 900 37 600 45 000	610 650 720	12	M14	40	16,3	4200.150.801.000000
155	263	159	75	50	57	6	65,8	110 115 125	33 900 37 600 45 000	610 650 720	12	M14	40	15,8	4200.155.801.000000
160	290	169	82	56	63	6	73,0	120 125 135	48 000 53 000 58 000	800 840 850	12	M16	50	22,6	4200.160.801.000000
165	290	169	82	56	63	6	73,0	120 125 135	48 000 53 000 58 000	800 840 850	12	M16	50	22,0	4200.165.801.000000
170	300	179	82	56	63	6	73,0	130 135 145	58 500 64 000 70 000	900 940 960	12	M16	50	23,6	4200.170.801.000000
175	300	179	82	56	63	6	73,0	130 135 140	58 500 64 000 70 000	900 940 1 000	12	M16	50	22,9	4200.175.801.000000
180	320	191	99	72	79	6	89,0	140 145 155	88 500 96 000 110 000	1 250 1 300 1 400	16	M16	50	33,9	4200.180.801.000000
185	320	191	99	72	79	6	89,0	140 145 155	88 500 96 000 110 000	1 250 1 300 1 400	16	M16	50	33,0	4200.185.801.000000
190	320	195	100	71	79	7	89,0	150 155 165	92 000 99 000 113 500	1 250 1 300 1 400	16	M16	50	33,0	4200.190.801.000001
195	340	206	100	71	79	7	89,0	150 155 165	105 000 113 000 121 500	1 400 1 450 1 450	16	M16	50	37,6	4200.195.801.000000
200	340	206	100	71	79	7	89,0	150 155 165	105 000 113 000 121 500	1 400 1 450 1 450	16	M16	50	36,6	4200.200.801.000000
220	370	228	121	87	95	7	107,5	160 170 180	142 000 153 000 169 000	1 750 1 800 1 850	16	M20	60	51,6	4200.220.801.000000
240	405	248	127	92	100	7	112,5	170 180 200	166 000 189 000 221 000	1 950 2 100 2 200	18	M20	60	65,3	4200.240.801.000000
260	430	268	137	102	110	7	122,5	190 200 220	233 000 262 000 299 000	2 450 2 600 2 700	21	M20	60	79,1	4200.260.801.000000
280	460	288	150	115	123	7	135,5	210 220 240	307 000 342 000 378 500	2 900 3 100 3 100	22	M20	60	100,0	4200.280.801.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

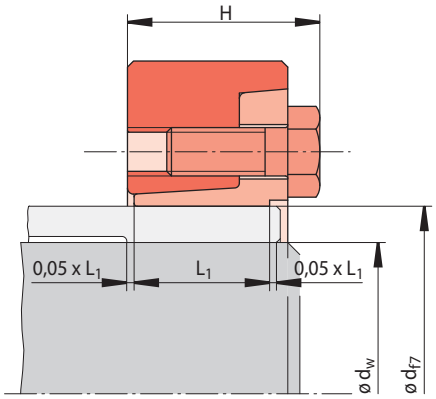
Shrink Discs RLK 608

Two-part design
Highest transmissible torques



Shrink Disc released

13-1



Shrink Disc clamped

13-2

Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
300	485	308	162	122	131	8	146	220 230 250	365 000 403 500 444 500	3 300 3 500 3 500	20	M24	80	116,3	4200.300.801.000000
320	520	328	158	116	125	8	140	240 250 270	444 500 488 500 533 500	3 700 3 900 3 900	18	M24	80	129,0	4200.320.801.000000
340	570	348	170	127	136	8	151	250 260 280	537 000 586 500 638 000	4 200 4 500 4 500	20	M24	80	175,0	4200.340.801.000000
360	590	369	177	133	142	8	157	270 280 300	658 000 708 000 814 000	4 800 5 000 5 400	20	M24	80	197,0	4200.360.801.000000
390	650	399	195	144	153	8	172	290 300 320	859 000 926 000 996 500	5 900 6 100 6 200	18	M30	100	254,0	4200.390.801.000000

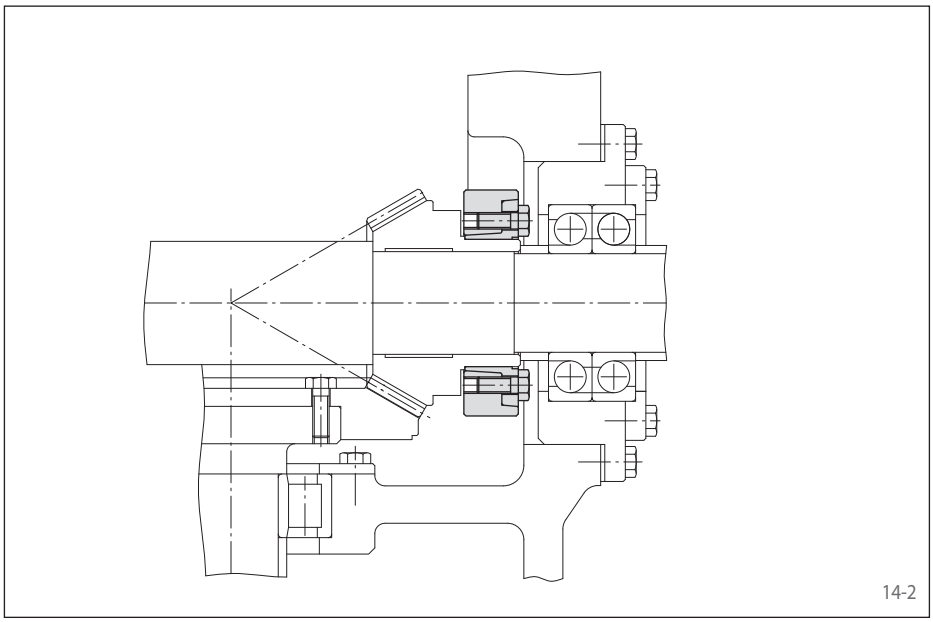
* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

Shrink Discs RLK 606

Two-part design
High transmissible torques

Features

- High transmissible torques
- Easy, quick assembly by tightening clamping screws without a torque wrench
- Distance-controlled assembly ensures guaranteed transmissible torques
- Enclosed design, therefore impervious to dirt
- True running even at high speeds
- Centers the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 24 mm up to 155 mm



Application example

Backlash free connection of a bevel spur gear to a drive shaft of a gearbox with a Shrink Disc RLK 606. The backlash free connection permits extended reversing operations.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 15 through 16 are subject to the following tolerances, surface characteristics and material requirement. Please contact us in the case of deviations.

Tolerances

d_w > [mm]	d_w ≤ [mm]	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. [mm]	Joint clearance max. [mm]
24	30	H7	h6	0	0,034
30	50			0	0,041
50	80			0	0,049
80	120			0	0,057
120	155			0	0,065

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 340$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 606.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 22 and 23.

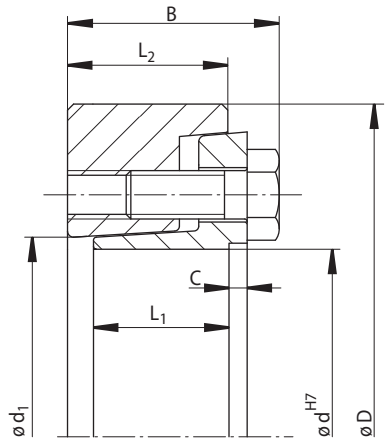
Example for ordering

Shrink Disc RLK 606 for hollow shaft with an outer diameter d = 100 mm:

- RLK 606-100
  Article number 4200.100.601.000000

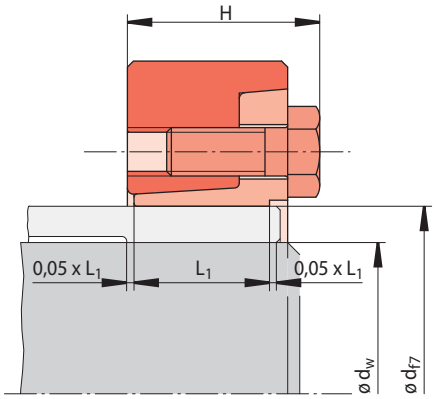
Shrink Discs RLK 606

Two-part design
High transmissible torques



Shrink Disc released

15-1



Shrink Disc clamped

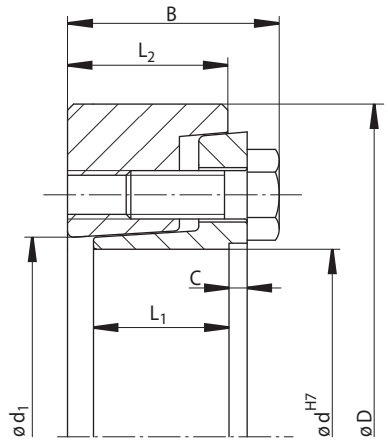
15-2

Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
24	50	26	22	15	17	1	21,0	19 20 21	165 210 240	17 21 22	5	M6	16	0,3	4200.024.601.000000
30	60	32	24	17	19	1	23,0	24 25 26	280 330 370	23 26 28	6	M6	16	0,3	4200.030.601.000000
36	72	39	27,5	19	20,5	1	25,8	27 30 33	480 630 820	35 42 49	5	M8	20	0,5	4200.036.601.000000
40	80	47	29,5	20,5	22,5	1,5	27,8	30 32 34	480 580 700	32 36 41	6	M8	20	0,6	4200.040.601.000000
44	80	47	29,5	20,5	22,5	1,5	27,8	34 35 37	720 780 920	42 44 49	6	M8	20	0,6	4200.044.601.000000
50	90	53	31	22	24	1,5	29,3	38 40 42	1 150 1 300 1 520	60 65 72	8	M8	20	0,8	4200.050.601.000000
55	100	58	34,5	24,5	27	1,5	32,3	42 45 48	1 300 1 600 1 900	61 71 79	8	M8	20	1,2	4200.055.601.000000
62	110	66	34,5	24,5	27	1,5	32,3	48 50 52	1 700 1 950 2 160	70 78 83	9	M8	20	1,5	4200.062.601.000000
68	115	72	35	24,5	27	1,5	32,3	50 55 60	1 900 2 500 3 150	76 90 105	9	M8	20	1,6	4200.068.601.000000
75	138	79	38	25	28	2	34,4	55 60 65	2 700 3 400 4 100	98 113 126	10	M10	25	2,6	4200.075.601.000000
80	141	84	38	25	28	2	34,4	60 65 70	3 300 4 100 4 950	110 126 141	10	M10	25	2,8	4200.080.601.000000
90	155	94	45	31,5	35	2,5	41,4	65 70 75	5 500 6 600 7 900	169 188 210	11	M10	25	3,4	4200.090.601.000000
100	170	104	50,5	36,5	40	2,5	46,4	70 75 80	6 200 7 400 8 600	177 197 215	14	M10	30	4,6	4200.100.601.000000
110	185	114	57	40,5	45,5	3	53,0	80 85 90	10 500 11 800 13 700	262 277 304	12	M12	35	6,2	4200.110.601.000000
120	197	124	61	45	49	3	56,5	85 90 95	12 500 14 100 16 000	294 313 336	14	M12	35	7,4	4200.120.601.000000
125	215	134	61,5	45	49	3	56,5	90 95 100	14 500 16 600 18 800	322 349 376	14	M12	35	9,3	4200.125.601.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

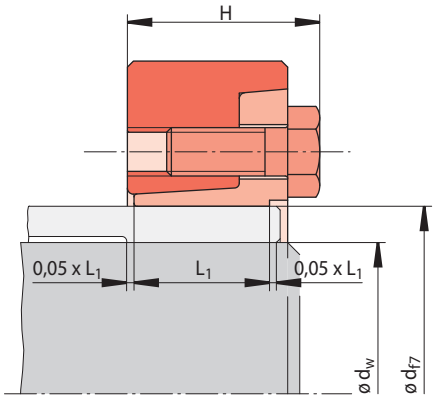
Shrink Discs RLK 606

Two-part design
High transmissible torques



Shrink Disc released

16-1



Shrink Disc clamped

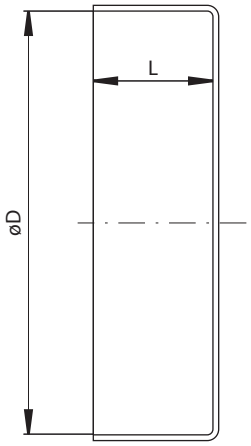
16-2

Dimensions									Technical Data					Article number
									Transmissible torque or axial force		Clamping screws		Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
130	215	134	61,5	45	49	3	56,5	95 100 110	17 000 18 400 22 000	357 368 400	14	M12	35	8,7	4200.130.601.000000
130	230	139	66,5	47	53	4	61,8	95 100 110	18 400 20 800 26 200	387 416 476	12	M14	40	11,9	4200.130.601.000001
140	230	144	67	47	53	4	61,8	100 105 115	19 900 22 200 27 800	398 422 483	12	M14	40	11,0	4200.140.601.000000
150	263	159	72	51	57	4	65,8	110 120 125	27 000 32 000 36 200	490 533 579	14	M14	40	16,0	4200.150.601.000000
155	263	159	72	51	57	4	65,8	110 120 125	27 000 32 000 36 200	490 533 579	14	M14	40	16,0	4200.155.601.000000

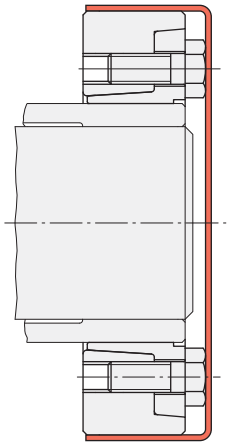
* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

Covers for Shrink Discs RLK 608 and RLK 606

17-1



17-2



17-3

Characteristics

The cost-effective covers made from black plastic (PVC) provide simple contact protection for Shrink Discs RLK 608 and RLK 606 against the screw heads of the rotating Shrink Disc.

Example for ordering

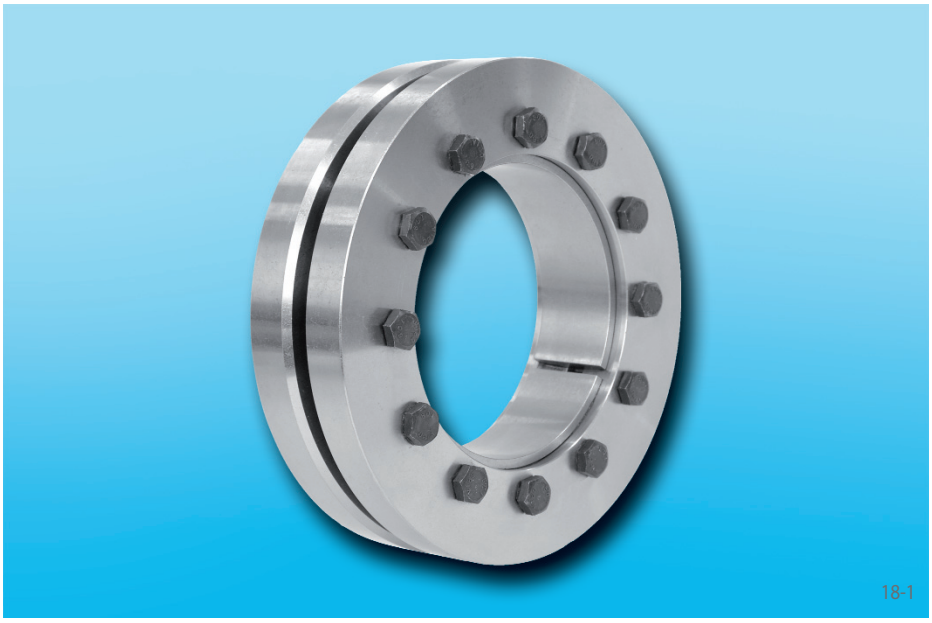
Cover for Shrink Disc RLK 608-100:

- Cover size 100:
  Article number 5025.168.901.000000

Size	Covers for shrink discs		Dimensions		Weight	Article number
			D	L		
	RLK 608	RLK 606	mm	mm	kg	
36	RLK 608-36	RLK 606-36	72	27	0,04	5025.070.901.000000
50	RLK 608-50	RLK 606-50	90	31	0,10	5025.087.901.000000
62	RLK 608-62	RLK 606-62	110	33	0,15	5025.108.901.000000
80	RLK 608-80	RLK 606-80	141	36	0,15	5025.139.901.000000
100	RLK 608-100	RLK 606-100	170	48	0,15	5025.168.901.000000
120	RLK 608-120	RLK 606-120	197	60	0,20	5025.195.901.000000
140	RLK 608-140	RLK 606-140	230	65	0,40	5025.228.901.000000
155	RLK 608-155	RLK 606-155	263	67	0,45	5025.261.901.000000

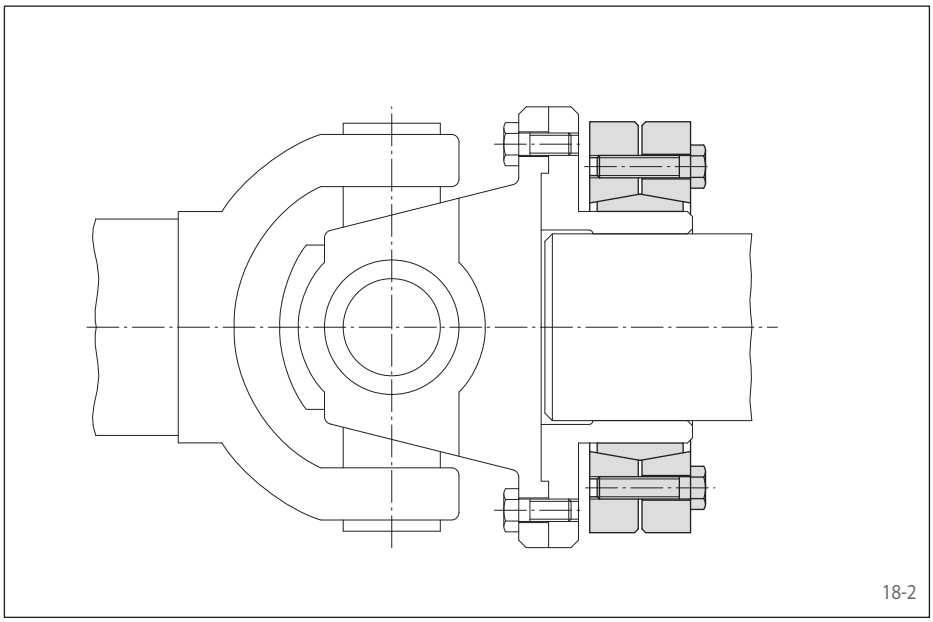
Shrink Discs RLK 603

Three-part design
High transmissible torques



Features

- High transmissible torques
- Tightening of clamping screws with a torque wrench
- Easy disassembly without jacking screws
- Centers the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 24 mm up to 155 mm



Application example

Backlash free connection of a cardan shaft flange to a machine shaft with a Shrink Disc RLK 603. The backlash free connection reduces the risk of fretting corrosion. As a result, the connection can be easily disassembled even after long periods of operation.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 19 through 21 are subject to the following tolerances, surface characteristics and material requirement. Please contact us in the case of deviations.

Tolerances

d_w > mm	d_w ≤ mm	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. mm	Joint clearance max. mm
10	18	H6	j6	0	0,014
18	30			0	0,017
30	50	H6	h6	0	0,032
50	80	H6	g6	0,029	0,048
80	120	H7	g6	0,012	0,069
120	180			0,014	0,079
180	250			0,015	0,090
250	315			0,017	0,101
315	360			0,018	0,111

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 340$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 603.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 22 and 23.

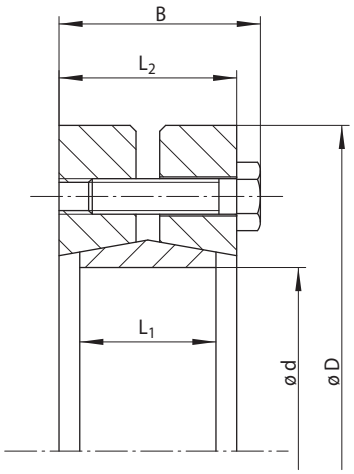
Example for ordering

Shrink Disc RLK 603 for hollow shaft with an outer diameter d = 100 mm:

- RLK 603-100
  Article number 4200.100.301.000000

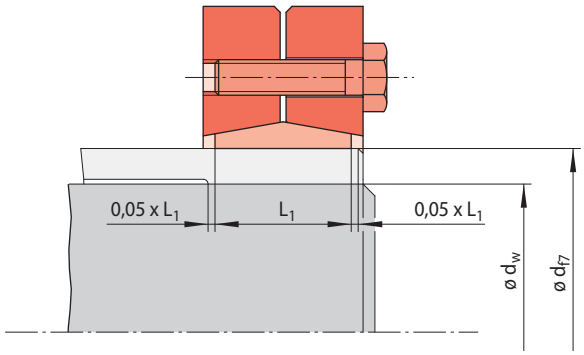
Shrink Discs RLK 603

Three-part design
High transmissible torques



Shrink Disc released

19-1



Shrink Disc clamped

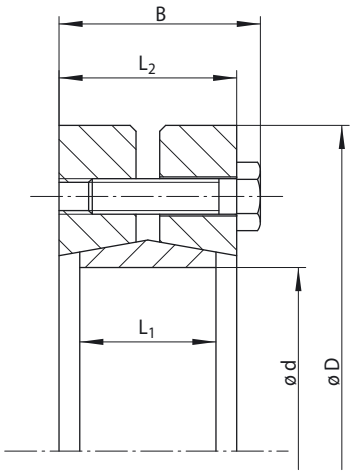
19-2

Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
14	38	15	9	11	10 11 12	25 35 50	5 6 8	4	4	M5	10	0,1	4200.014.301.000000
16	41	19	11	15	12 13 14	50 70 90	8 10 12	4	5	M5	14	0,1	4200.016.301.000000
20	50	23	14	19	15 16 18	130 150 200	17 18 22	4	6	M5	18	0,2	4200.020.301.000000
24	50	23	14	19	19 20 21	180 210 250	18 21 23	4	6	M5	18	0,2	4200.024.301.000000
30	60	25	16	21	24 25 26	310 340 380	25 27 29	6	6	M5	18	0,3	4200.030.301.000000
36	72	27	18	23	28 30 31	460 590 630	32 39 40	12	5	M6	20	0,5	4200.036.301.000000
44	80	29	20	25	32 35 36	630 780 860	39 44 47	12	7	M6	22	0,6	4200.044.301.A01000
50	90	31	22	27	38 40 42	940 1 100 1 300	49 55 61	12	8	M6	22	0,8	4200.050.301.A01001
55	100	34	23	30	42 45 48	1 200 1 500 1 900	57 66 79	12	8	M6	25	1,1	4200.055.301.000000
62	110	34	23	30	48 50 52	1 800 2 200 2 400	75 88 92	12	10	M6	25	1,3	4200.062.301.000000
68	115	34	23	30	50 55 60	2 000 2 500 3 100	80 90 100	12	10	M6	25	1,4	4200.068.301.000000
75	138	37	25	32	55 60 65	2 500 3 200 3 900	90 100 120	30	7	M8	30	2,3	4200.075.301.000000
80	145	37	25	32	60 65 70	3 200 3 900 4 600	100 120 130	30	7	M8	30	2,5	4200.080.301.000000
90	155	44	30	39	65 70 75	4 700 6 000 7 200	140 170 190	30	10	M8	25	3,3	4200.090.301.000000
100	170	49	34	44	70 75 80	6 300 7 500 9 000	180 200 220	30	12	M8	35	4,4	4200.100.301.000000
110	185	56	39	50	75 80 85	7 200 9 000 10 400	190 220 240	59	9	M10	40	6,0	4200.110.301.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

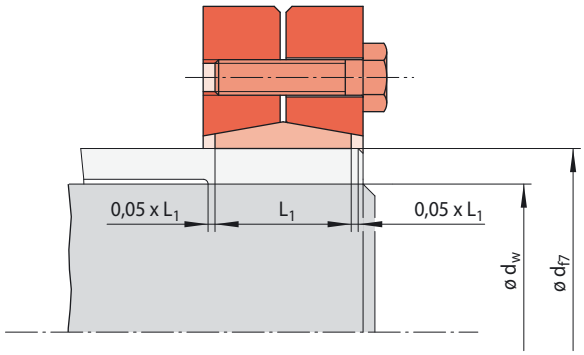
Shrink Discs RLK 603

Three-part design
High transmissible torques



Shrink Disc released

20-1



Shrink Disc clamped

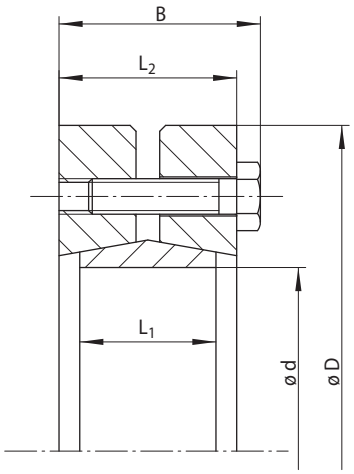
20-2

Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
115	185	56	39	50	80 85 90	8 500 9 300 11 300	210 210 250	59	9	M10	40	6,0	4200.115.301.000000
120	215	58	42	52	80 85 90	10 500 12 100 14 400	260 280 320	59	12	M10	40	9,0	4200.120.301.000000
125	215	58	42	52	85 90 95	11 000 13 000 15 000	250 280 310	59	12	M10	40	8,7	4200.125.301.000000
130	215	58	42	52	90 95 100	12 000 14 400 17 000	260 300 340	59	12	M10	40	8,3	4200.130.301.000000
140	230	68	46	60	95 100 105	14 900 17 000 20 000	310 340 380	100	10	M12	45	10,7	4200.140.301.000000
155	265	72	50	64	105 110 115	20 000 23 000 26 000	380 410 450	100	12	M12	50	16,0	4200.155.301.000000
160	265	72	50	64	110 115 120	21 900 25 200 28 600	390 430 470	100	12	M12	50	15,4	4200.160.301.000000
165	290	81	56	71	115 120 125	31 500 35 600 39 000	540 590 620	250	8	M16	60	21,7	4200.165.301.000000
170	290	81	56	71	120 125 130	31 700 35 800 40 000	520 570 610	250	8	M16	60	21,1	4200.170.301.000000
175	300	81	56	71	125 130 135	34 500 38 900 43 400	550 590 640	250	8	M16	60	22,7	4200.175.301.000000
180	300	81	56	71	130 135 140	36 700 41 100 45 700	560 600 650	250	8	M16	60	22,0	4200.180.301.000000
185	330	96	71	86	135 140 145	49 200 54 600 60 400	720 780 830	250	10	M16	65	35,0	4200.185.301.000000
190	330	96	71	86	140 145 150	51 900 57 400 63 200	740 790 840	250	10	M16	65	34,1	4200.190.301.000000
195	350	96	71	86	140 150 155	61 600 74 500 81 300	880 990 1 040	250	12	M16	65	39,6	4200.195.301.000000
200	350	96	71	86	150 155 160	71 200 77 900 84 700	940 1 000 1 050	250	12	M16	65	38,7	4200.200.301.000000
220	370	114	88	104	160 165 170	90 700 98 600 106 000	1 130 1 190 1 240	250	15	M16	80	50,0	4200.220.301.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

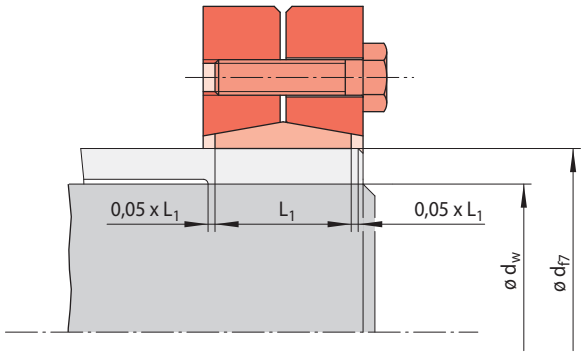
Shrink Discs RLK 603

Three-part design
High transmissible torques



Shrink Disc released

21-1



Shrink Disc clamped

21-2

Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
240	405	121	92	108	170 180 190	119 000 138 000 156 000	1 400 1 530 1 640	490	12	M20	80	62,0	4200.240.301.000000
260	430	133	103	120	190 200 210	161 000 184 000 204 000	1 690 1 840 1 940	490	14	M20	90	77,0	4200.260.301.000000
280	460	147	114	134	210 220 230	213 000 240 000 269 000	2 020 2 180 2 330	490	16	M20	100	97,0	4200.280.301.000000
300	485	155	122	142	230 240 245	274 000 296 000 316 000	2 380 2 460 2 570	490	18	M20	100	116,0	4200.300.301.000000
320	520	155	122	142	240 250 260	310 000 340 000 373 000	2 580 2 720 2 860	490	20	M20	100	133,0	4200.320.301.000000
340	570	169	134	156	250 260 270	381 000 412 000 453 000	3 040 3 160 3 350	490	24	M20	110	183,0	4200.340.301.000000
360	580	175	140	162	280 290 295	453 000 495 000 517 000	3 230 3 410 3 500	490	24	M20	110	186,0	4200.360.301.000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 22.

Technical Points for Shrink Discs

Shaft diameter d_w

The values for the transmissible torques M or axial forces F given in the tables are calculated for exemplary shaft diameters d_w. Values for shaft diameter d_w that fall between the shaft diameters d_w stated in the table can be determined with sufficient accuracy by interpolation. Please contact us for shaft diameters d_w which are smaller than those given in the tables. We will gladly calculate the transmissible torques M or axial forces F for you.

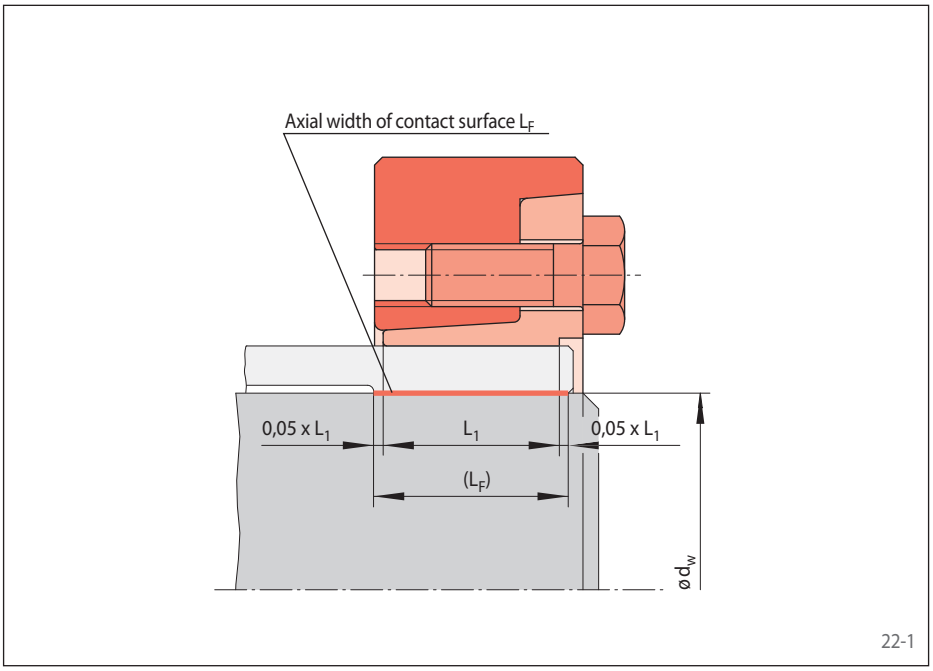
Axial width of contact surface L_F

The transmission of torque or axial force is achieved through the contact surface between shaft and hollow shaft. The pressure created by the Shrink Disc decreases strongly in areas that go beyond the bearing axial width L_1 of the Shrink Disc. In such areas with low pressure, there may be micro movements that allow the formation of harmful fretting corrosion.

The axial width of contact surface L_F should therefore be limited to:

$L_F \leq 1{,}1 \cdot L_1$

For contact surfaces with a width that is smaller than L_1, there is an increased pressure generated which may damage the shaft and/or hollow shaft or the hub. Please contact us.



Joint clearance between shaft and hollow shaft

When the joint clearance exceeds the value given in the tables, the transmissible torque or the transmissible axial force decreases. Additionally, the equivalent stress in the hollow shaft increases in this case. Please contact us.

If the joint clearance is lower than indicated, the Shrink Disc, shaft or hollow shaft may be damaged during assembly or the torque listed in the tables can no longer be transmitted. Please contact us.

Friction value

The values listed in the tables for transmissible torques M or axial forces F assume a friction value of μ=0,15 in the contact surface between shaft and hollow shaft. This value is safely achieved in a dry and degreased steel/steel pairing. For different friction values, the transmissible torque or axial force will change proportionally.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced compared to the values listed in the tables for M and F.

For a given axial force F_A, the reduced torque M_{red} is calculated as:

$$M_{red} = \sqrt{M^2 - (F_A \cdot \frac{d_w}{2})^2}$$

For a given torque M_A, the reduced axial force F_{red} is calculated as:

$$F_{red} = \frac{2}{d_w} \sqrt{M^2 - M_A{}^2}$$

Bending moments

Where there are bending moments in addition to the torque M_A or the axial force F_A, the transmissible torque or transmissible axial force decreases compared to the values for M or F as listed in the tables. Please contact us.

Formula symbols

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_{red} = Reduced torque [Nm]

F = Transmissible axial force according to table [kN]

F_A = Maximum actual application axial force [kN]

F_{red} = Reduced axial force [kN]

d_w = Shaft diameter/ inner diameter of hollow shaft according to table [mm]

L_1 = Load-bearing axial width of Shrink Disc according to table [mm]

L_F = Axial width of contact surface [mm]

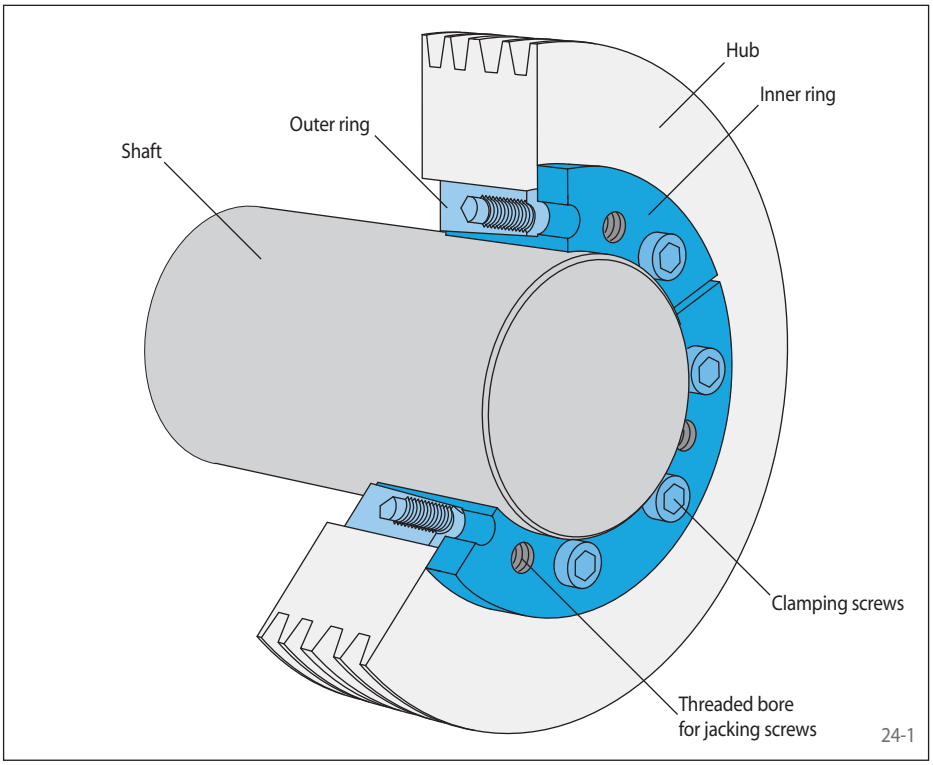
μ = Friction value

Cone Clamping Elements as shown in figure 27 consist of an outer ring with inside cone and an inner ring with outside cone as well as a number of clamping screws.

The outer ring is pulled onto the inner ring by tightening the clamping screws. Radial clamping forces are generated by the conical surfaces which are dependent on the torques of the clamping screws, the cone angle and the friction coefficients at the screws and conical surfaces.

The radial clamping forces press the outer ring into the hub bore and the inner ring onto the shaft and create a frictional connection at the respective contact surfaces. In this way, torque and/or axial force can be transmitted between the shaft and the hub.

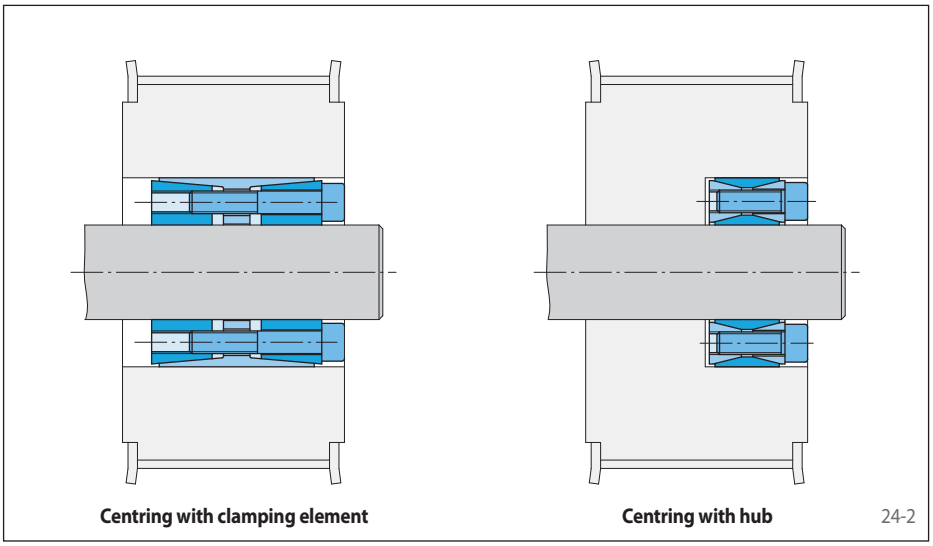
In the configuration shown in the illustration, the connection is released by turning some of the clamping screws into the threaded bores for the jacking screws. This presses off the outer ring.



24-1

Centring the hub to the shaft

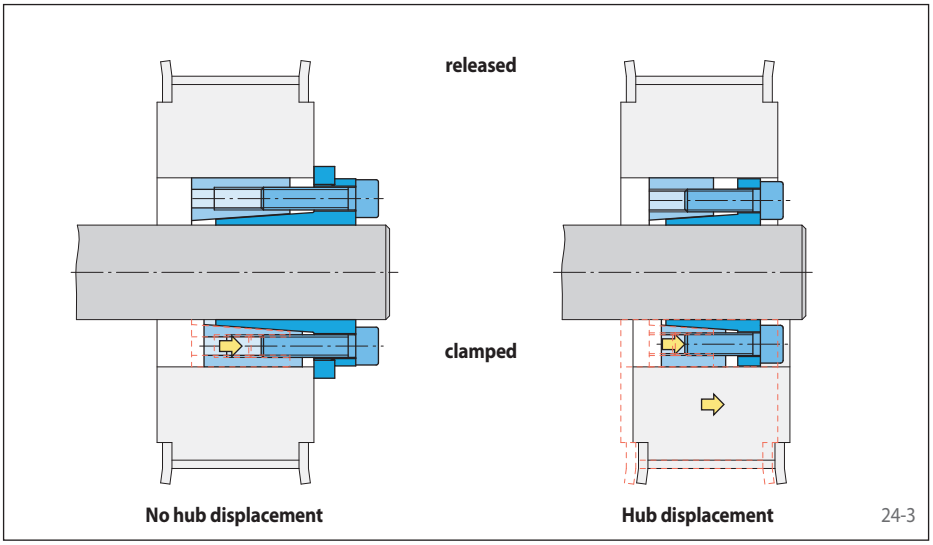
As a rule, a true running accuracy of the hub to the shaft of 0,02 to 0,04 mm can be achieved with Cone Clamping Elements. Exceptions are the Cone Clamping Elements of the series RLK 200 and RLK 300. With these series the hub must be centerd to the shaft in accordance with the specific requirements of the application.



24-2

No axial displacement of the hub relative to the shaft during clamping

The overview table on pages 6 and 7 shows the series for which no axial displacement of the hub relative to the shaft is created during the clamping procedure. This is ensured, for example, by a fixed hub backstop point on the collar of the inner ring. For all other series, the clamping procedure (tightening the clamping screws and pulling the outer ring onto the inner ring) involves an axial hub displacement.



24-3

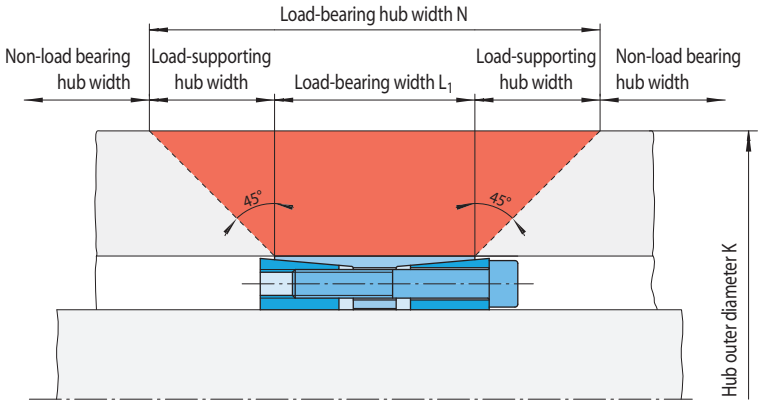
Hub Width and Hub Outer Diameter

Frictional Shaft-Hub-Connections with Cone Clamping Elements create very high radial clamping forces. This requires a hardness analysis of shaft and hub. For this, the Cone Clamping Element tables list the maximum pressures P_w in the contact surface at the shaft and the maximum pressures P_N in the contact surface at the hub.

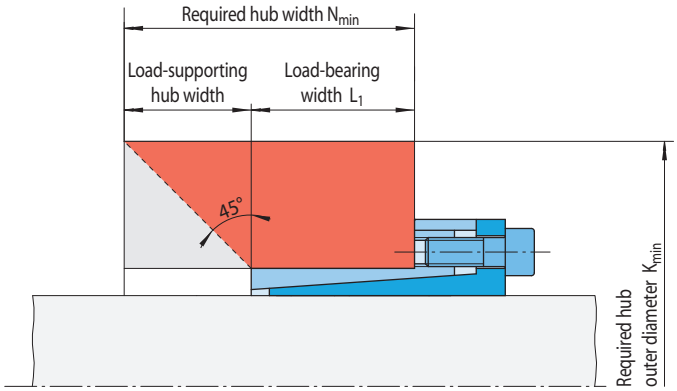
The contact pressure Pw leads to radial stress in the shaft that is usually not critical for steel shafts. There is always a tangential stress σ_t in the hub, and for thin-walled hubs it may be a multiple of the initiated pressure P_N. The amount of the actual tangential stress depends on the load-bearing hub width N, the hub outer diameter K and the pressure P_N. For the load-bearing hub width N is taken into account, that the hub pressure N is carried by the load-bearing width L_1, and in an angle of 45° beyond it (see figure 25-1).

For the different Cone Clamping Element series, the tables list the required hub width N_{min} and the required hub outer diameter K_{min} for three exemplary yield strengths R_e of the hub. Thereby, the hub is to be arranged as seen in figure 25-2 for Cone Clamping Elements with a fixed backstop point. For Cone Clamping Elements without a fixed backstop point, the hub is to be arranged according to figure 25-3. For this, we practically assume that the screw heads of the Cone Clamping Element are flush with the hub on one side.

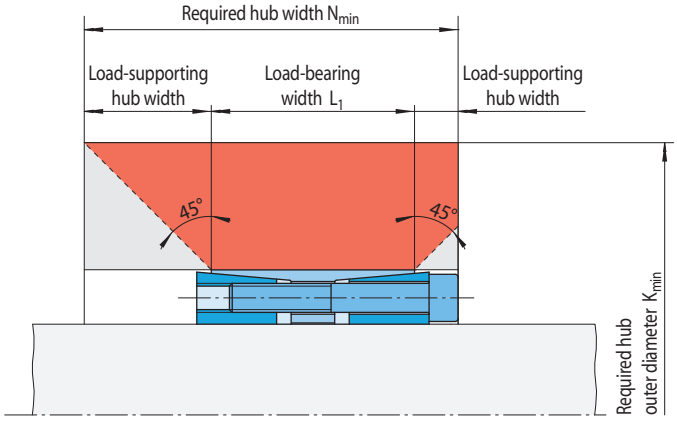
For any deviating hub arrangement and/or lower yield strengths R_e of the hub material, the shaft-hub-connection must be verified according to the technical points on pages 54 and 55.



Load-bearing hub width 25-1



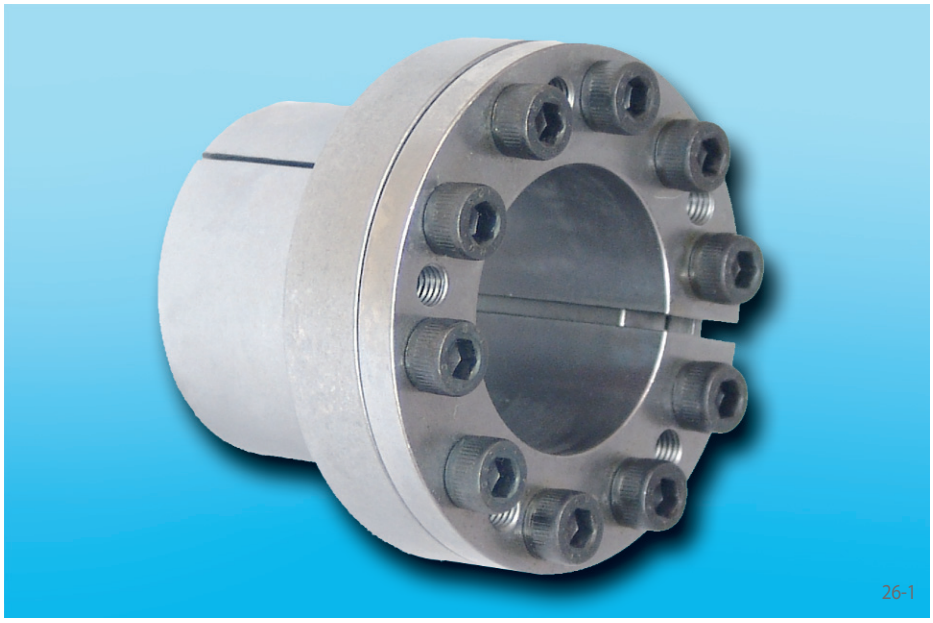
Hub arrangement for Cone Clamping Elements with a fixed backstop point 25-2



Hub arrangement for Cone Clamping Elements without a fixed backstop point 25-3

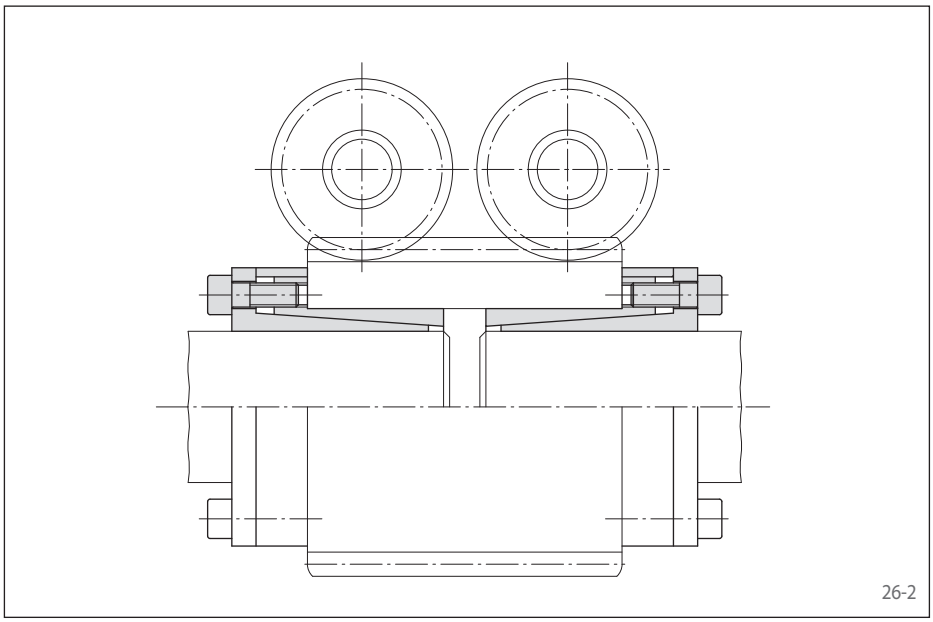
Cone Clamping Elements RLK 110

centers the hub to the shaft
radial flat height



Features

- Centers the shaft to the hub
- High transmissible torques
- Radial flat height is particularly suitable for small hub outer diameters
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 6 mm and 120 mm



Application example

Backlash free connection of a screw gear and simultaneous coupling of the divided drive shaft of a continuous heating furnace with two Cone Clamping Elements RLK 110. A simple and cost-effective solution, because clamping the screw gear and coupling the shaft ends is achieved simultaneously by the clamping elements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 27 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 110.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

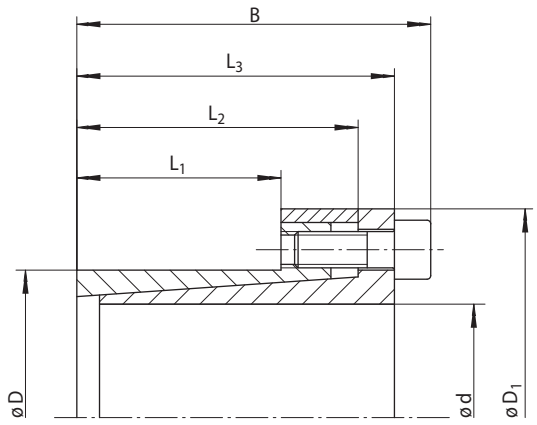
Example for ordering

Cone Clamping Element RLK 110 for shaft diameter d = 100 mm:

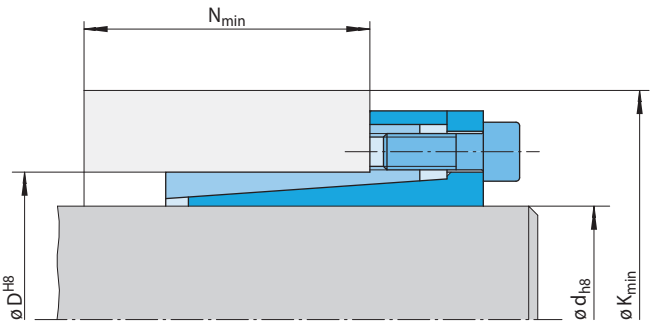
- RLK 110, size 100 x 125
  Article number 4206.100.001.000000

Cone Clamping Elements RLK 110

centers the hub to the shaft
radial flat height



27-1

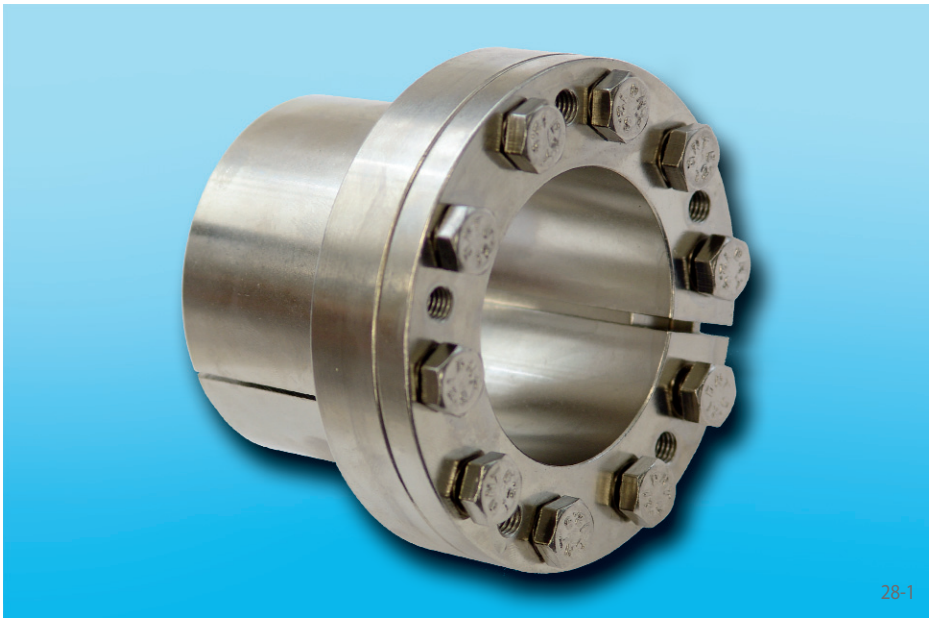


27-2

Dimensions														Technical Data								Article number
							Yield strength R_e of the hub material [N/mm²]							Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500					Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}		M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
6	14	25	24	10	19	21	31	19	25	16	21	14		14	4,8	228	98	1,8	4	M3	10	0,1	4206.006.001.000000
8	15	27	29	12	22	25	37	23	29	19	24	16		27	7	223	119	4,5	3	M4	10	0,1	4206.008.001.000000
9	16	28	30	14	23	26	42	27	32	22	26	19		41	9	218	122	4,5	4	M4	10	0,1	4206.009.001.000000
10	16	29	30	14	23	26	42	27	32	22	26	19		46	9	196	122	4,5	4	M4	10	0,2	4206.010.001.000000
11	18	32	30	14	23	26	43	26	34	22	28	19		50	9	185	113	4,5	4	M4	10	0,2	4206.011.001.000000
12	18	32	30	14	23	26	43	26	34	22	28	19		55	9	169	113	4,5	4	M4	10	0,2	4206.012.001.000000
14	23	38	30	14	23	26	45	25	37	21	32	19		64	9	140	85	4,5	4	M4	10	0,2	4206.014.001.000000
15	24	44	42	16	29	36	69	39	52	30	43	26		150	19	274	171	15	4	M6	18	0,2	4206.015.001.000000
16	24	44	42	16	29	36	69	39	52	30	43	26		150	19	257	171	15	4	M6	18	0,3	4206.016.001.000000
17	26	47	44	18	31	38	67	39	52	31	43	27		180	22	215	141	16	4	M6	18	0,3	4206.017.001.000000
18	26	47	44	18	31	38	67	39	52	31	43	27		195	22	203	141	16	4	M6	18	0,3	4206.018.001.000000
19	27	48	44	18	31	38	67	38	52	31	44	27		206	22	192	135	16	4	M6	18	0,3	4206.019.001.000000
20	28	49	44	18	31	38	67	38	53	31	45	27		217	22	183	130	16	4	M6	18	0,3	4206.020.001.000000
22	32	54	51	25	38	45	63	41	52	35	45	32		239	22	120	82	16	4	M6	18	0,3	4206.022.001.000000
24	34	56	51	25	38	45	64	40	53	35	47	32		261	22	110	77	16	4	M6	18	0,3	4206.024.001.000000
25	34	56	51	25	38	45	64	40	53	35	47	32		271	22	105	77	16	4	M6	18	0,3	4206.025.001.000000
28	39	61	51	25	38	45	82	47	66	39	57	34		456	33	141	101	16	6	M6	18	0,4	4206.028.001.000000
30	41	62	51	25	38	45	83	46	68	39	59	34		489	33	132	96	16	6	M6	18	0,4	4206.030.001.000000
32	43	65	51	25	38	45	97	52	78	43	66	37		695	43	164	122	16	8	M6	18	0,5	4206.032.001.000000
35	47	69	56	30	43	50	94	54	77	45	67	40		760	43	125	93	16	8	M6	18	0,5	4206.035.001.000000
38	50	72	56	30	43	50	96	53	80	45	70	40		825	43	115	88	16	8	M6	18	0,6	4206.038.001.000000
40	53	75	56	30	43	50	98	53	82	45	72	40		869	43	110	83	16	8	M6	18	0,6	4206.040.001.000000
42	55	78	65	32	50	57	131	70	104	57	87	48		1 580	76	171	130	37	8	M8	22	0,9	4206.042.001.000000
45	59	85	73	40	57	65	125	73	101	61	86	54		1 700	76	127	97	37	8	M8	22	1,0	4206.045.001.000000
48	62	87	78	45	62	70	123	76	100	64	87	58		1 810	76	106	82	37	8	M8	22	1,0	4206.048.001.000000
50	65	92	78	45	62	70	139	82	112	69	96	61		2 360	95	127	98	37	10	M8	22	1,3	4206.050.001.000000
55	71	98	83	50	67	75	139	84	114	72	99	64		2 590	95	104	81	37	10	M8	22	1,5	4206.055.001.000000
60	77	104	83	50	67	75	143	83	119	71	104	64		2 830	95	96	74	37	10	M8	22	1,7	4206.060.001.000000
65	84	111	83	50	67	75	148	82	125	71	111	64		3 070	95	88	68	37	10	M8	22	1,9	4206.065.001.000000
70	90	119	101	60	80	91	178	104	146	88	126	78		5 220	149	109	85	73	10	M10	25	2,9	4206.070.001.000000
75	95	126	101	60	80	91	181	103	150	88	131	78		5 600	149	101	80	73	10	M10	25	2,3	4206.075.001.000000
80	100	131	106	65	85	96	196	113	161	96	140	85		7 160	179	105	84	73	12	M10	25	3,3	4206.080.001.000000
85	106	137	106	65	85	96	200	112	166	95	145	85		7 610	179	99	80	73	12	M10	25	3,6	4206.085.001.000000
90	112	143	106	65	85	96	226	122	185	102	160	89		10 000	224	117	94	73	15	M10	25	4,0	4206.090.001.000000
95	120	153	106	65	85	96	231	121	192	101	167	89		10 600	224	111	88	73	15	M10	25	4,5	4206.095.001.000000
100	125	162	114	65	89	102	251	128	207	106	179	92		13 100	262	122	98	126	12	M12	30	5,5	4206.100.001.000000
110	140	180	140	90	114	128	241	141	205	123	182	111		14 400	262	80	63	126	12	M12	30	8,0	4206.110.001.000000
120	155	198	140	90	114	128	253	139	218	122	196	111		15 700	262	74	57	126	12	M12	30	10,5	4206.120.001.000000

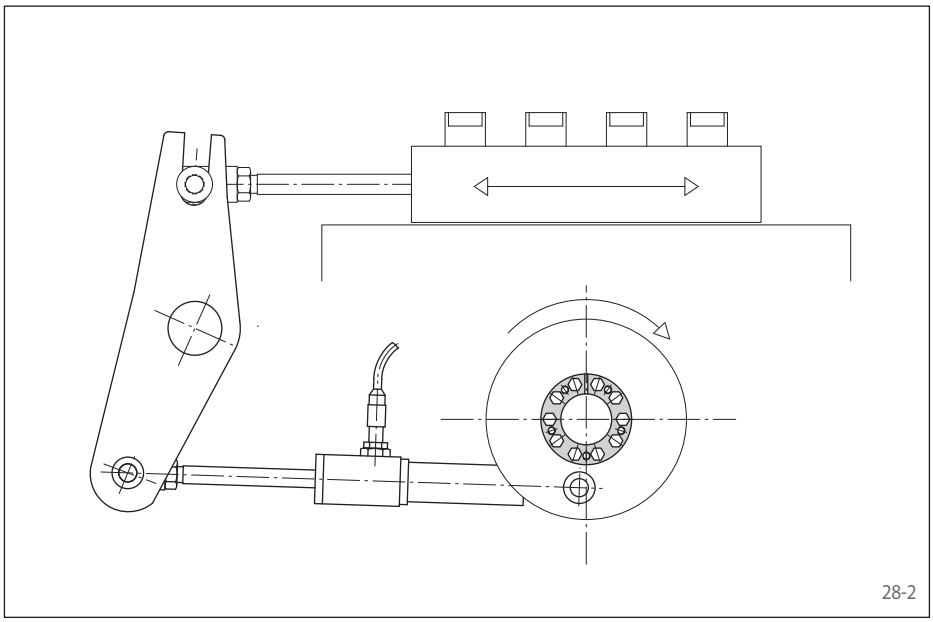
Cone Clamping Elements RLK 110 K

centers the hub to the shaft
corrosion protected



Features

- Centers the shaft to the hub
- All parts 35 µm chemically nickel-coated for high corrosion resistance pursuant to DIN 50021 (neutral salt spray test)
- High transmissible torques
- Radial flat height is particularly suitable for small hub outer diameters
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 19 mm and 60 mm



Application example

Backlash free connection of an eccentric wheel to the drive shaft of a packaging machine with a Cone Clamping Element RLK 110 K. The turning motion is transmitted into translatory motion by a driving rod that is protected from overload by a RINGSPANN force limiter.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 29 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 110 K.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

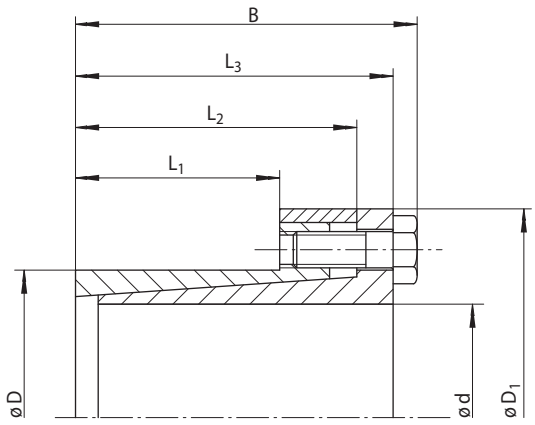
Example for ordering

Cone Clamping Element RLK 110 K for shaft diameter d = 50 mm:

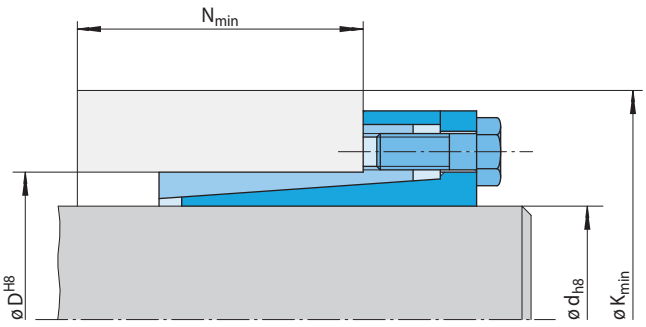
- RLK 110 K, size 50 x 65
  Article number 4206.050.001.A08101

Cone Clamping Elements RLK 110 K

centers the hub to the shaft
corrosion protected



29-1

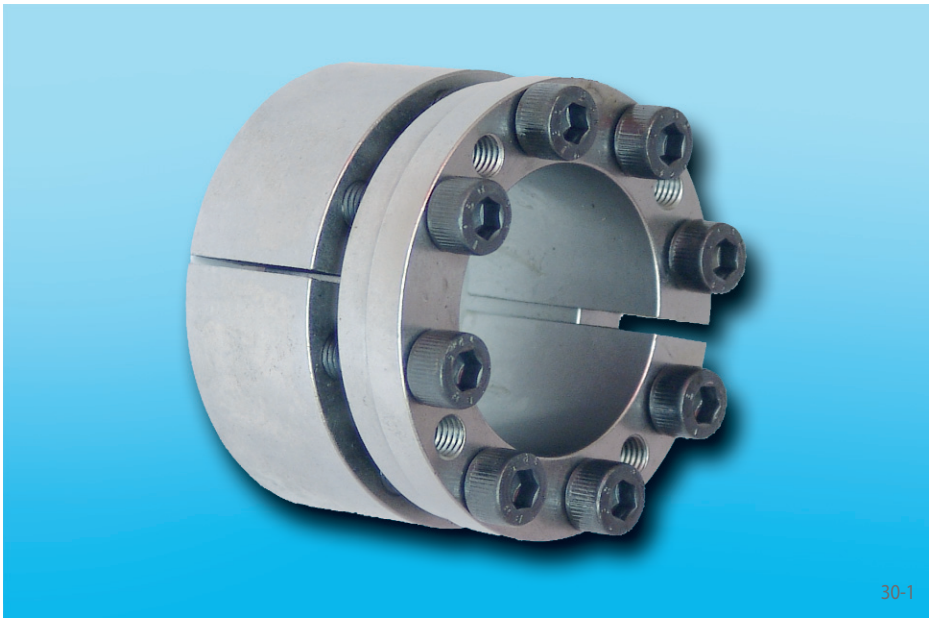


29-2

Dimensions													Technical Data									Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		400				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
19	27	49	41	18	31	38	63	36	50	30	46	28	180	19	164	116	15	4	M6	18	0,3	4206.019.001.A08101
20	28	49	41	18	31	38	64	36	51	30	47	28	190	19	156	111	15	4	M6	18	0,3	4206.020.001.A08101
22	32	54	48	25	38	45	60	39	50	34	46	32	200	19	102	70	15	4	M6	18	0,3	4206.022.001.A08101
25	34	56	48	25	38	45	62	39	51	34	48	32	230	19	90	66	15	4	M6	18	0,4	4206.025.001.A08101
28	39	61	49	25	38	45	78	45	64	38	59	35	390	28	120	86	15	6	M6	18	0,5	4206.028.001.A08101
30	41	62	49	25	38	45	78	44	66	38	60	35	420	28	112	84	15	6	M6	18	0,5	4206.030.001.A08101
32	43	65	56	30	43	50	88	53	71	44	66	42	590	37	117	87	15	8	M6	18	0,5	4206.032.001.A08101
35	47	69	56	30	43	50	90	52	75	44	69	41	650	37	107	80	15	8	M6	18	0,6	4206.035.001.A08101
38	50	72	56	30	43	50	92	51	77	44	72	41	710	37	99	75	15	8	M6	18	0,6	4206.038.001.A08101
40	53	75	56	30	43	50	94	51	80	44	75	41	740	37	94	71	15	8	M6	18	0,7	4206.040.001.A08101
45	59	85	71	40	57	65	119	70	97	59	90	56	1 550	37	114	87	35	8	M8	22	1,2	4206.045.001.A08101
50	65	92	76	45	62	70	132	79	108	67	99	62	2 150	69	114	88	35	10	M8	22	1,3	4206.050.001.A08101
55	71	98	81	50	67	75	132	81	110	70	102	66	2 400	87	93	72	35	10	M8	22	1,5	4206.055.001.A08101
60	77	104	81	50	67	75	137	80	115	69	108	66	2 600	87	85	67	35	10	M8	22	1,7	4206.060.001.A08101

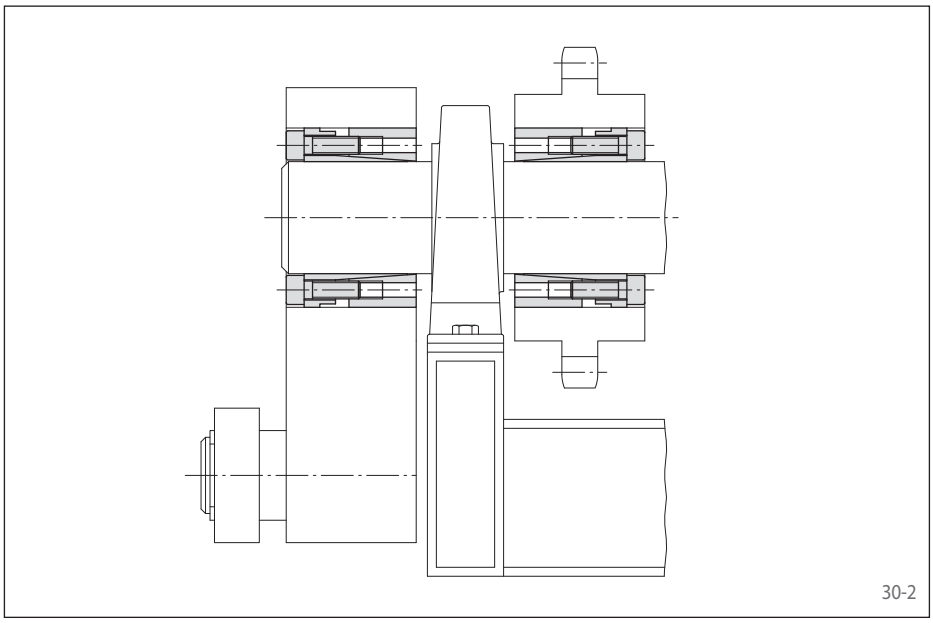
Cone Clamping Elements RLK 130

centers the hub to the shaft
very high transmissible torque



Features

- Centers the shaft to the hub
- Very high transmissible torques
- For shaft diameters between 20 mm and 180 mm



Application example

Backlash free connection of an eccentric lift unit and a sprocket to the drive shaft of a hoisting device using Cone Clamping Elements RLK 130. The eccentric force applied to the eccentric lift unit results in the clamping element transmitting not only torque, but also forces and bending moments.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 31 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 130.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

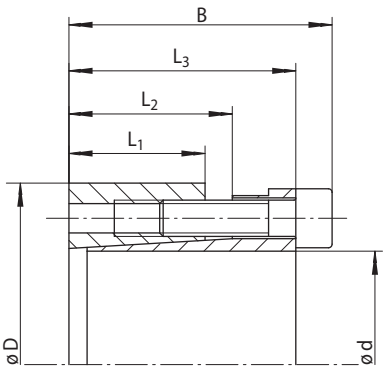
Example for ordering

Cone Clamping Element RLK 130 for shaft diameter d = 100 mm:

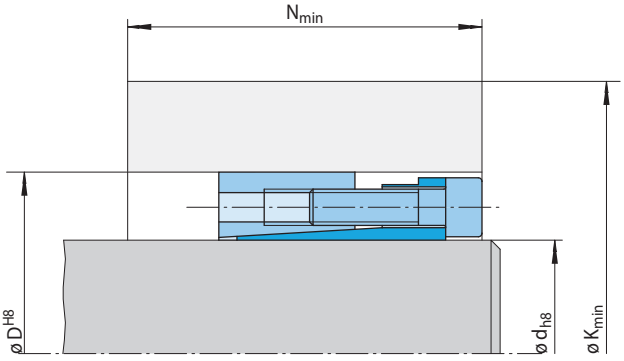
- RLK 130, size 100 x 145
  Article number 4204.100.001.000000

Cone Clamping Elements RLK 130

centers the hub to the shaft
very high transmissible torque



31-1



31-2

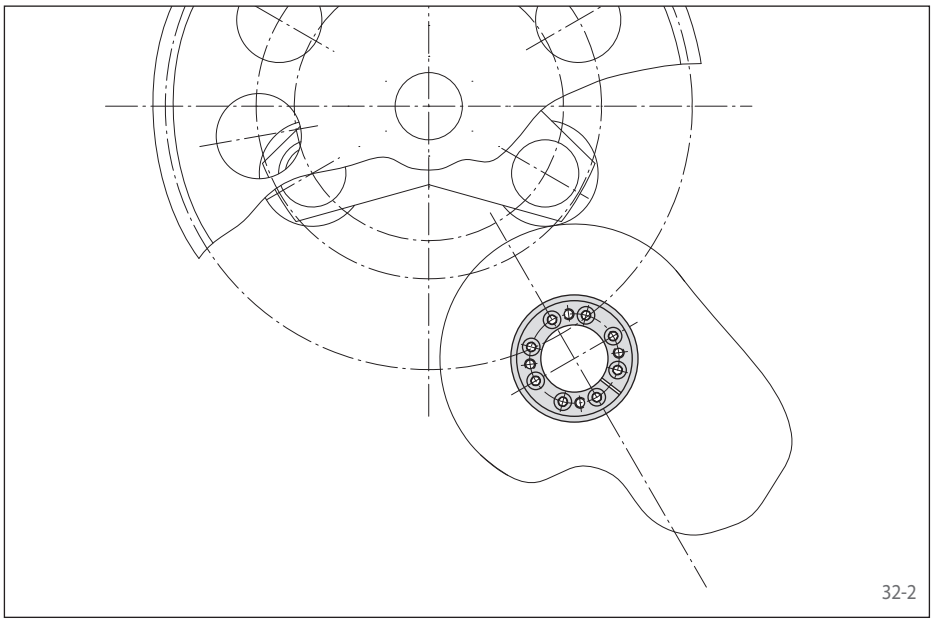
Dimensions													Technical Data									Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size						200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	48	26	31	42	90	70	77	63	68	59	530	53	309	131	16	6	M6	25	0,4	4204.020.001.000000
22	47	48	26	31	42	90	70	77	63	68	59	580	52	281	131	16	6	M6	25	0,4	4204.022.001.000000
24	50	48	26	31	42	93	70	79	63	71	59	630	52	257	123	16	6	M6	25	0,4	4204.024.001.000000
25	50	48	26	31	42	93	70	79	63	71	59	660	52	247	123	16	6	M6	25	0,4	4204.025.001.000000
28	55	48	26	31	42	97	69	84	63	75	58	740	52	220	112	16	6	M6	25	0,5	4204.028.001.000000
30	55	48	26	31	42	97	69	84	63	75	58	790	52	206	112	16	6	M6	25	0,5	4204.030.001.000000
32	60	48	26	31	42	113	75	95	66	85	61	1 130	70	257	137	16	8	M6	25	0,5	4204.032.001.000000
35	60	48	26	31	42	113	75	95	66	85	61	1 230	70	235	137	16	8	M6	25	0,5	4204.035.001.000000
38	65	48	26	31	42	116	74	100	66	90	61	1 300	70	217	127	16	8	M6	25	0,6	4204.038.001.000000
40	65	48	26	31	42	116	74	100	66	90	61	1 400	70	206	127	16	8	M6	25	0,6	4204.040.001.000000
42	75	59	30	35	51	133	88	116	80	104	74	1 930	92	222	124	37	6	M8	30	1,0	4204.042.001.000000
45	75	59	30	35	51	133	88	116	80	104	74	2 070	92	207	124	37	6	M8	30	0,9	4204.045.001.000000
48	80	59	30	35	51	156	97	130	84	116	77	2 950	123	259	155	37	8	M8	30	1,1	4204.048.001.000000
50	80	59	30	35	51	156	97	130	84	116	77	3 070	123	249	155	37	8	M8	30	1,0	4204.050.001.000000
55	85	59	30	35	51	159	96	135	84	121	77	3 380	123	226	146	37	8	M8	30	1,1	4204.055.001.000000
60	90	59	30	35	51	163	96	139	84	125	77	3 680	123	207	138	37	8	M8	30	1,2	4204.060.001.000000
65	95	59	30	35	51	167	95	144	84	130	77	3 990	123	191	131	37	8	M8	30	1,2	4204.065.001.000000
70	110	70	40	45	60	206	118	171	101	154	92	6 800	194	212	135	73	8	M10	30	2,3	4204.070.001.000000
75	115	70	40	45	60	210	118	176	101	158	92	7 280	194	198	130	73	8	M10	30	2,5	4204.075.001.000000
80	120	70	40	45	60	213	117	180	100	163	92	7 770	194	186	124	73	8	M10	30	2,6	4204.080.001.000000
85	125	70	40	45	60	238	127	198	107	176	96	10 300	243	218	150	73	10	M10	30	2,7	4204.085.001.000000
90	130	70	40	45	60	242	126	202	106	180	95	10 900	243	206	143	73	10	M10	30	2,8	4204.090.001.000000
95	135	70	40	46	60	245	125	207	106	185	95	11 500	243	195	138	73	10	M10	30	3,2	4204.095.001.000000
100	145	80	45	52	68	261	138	220	118	198	107	14 200	284	191	132	126	8	M12	35	3,9	4204.100.001.000000
110	155	80	45	52	68	269	137	229	117	208	107	15 600	284	174	123	126	8	M12	35	4,8	4204.110.001.000000
120	165	80	45	52	68	301	148	254	125	227	111	21 300	355	199	145	126	10	M12	35	5,0	4204.120.001.000000
130	180	80	45	52	68	336	158	283	132	249	115	27 700	426	221	159	126	12	M12	35	6,0	4204.130.001.000000
140	190	90	50	58	76	354	172	297	144	263	127	32 000	460	212	156	201	10	M14	40	8,2	4204.140.001.000000
150	200	90	50	58	76	389	185	325	153	284	132	41 000	550	237	178	201	12	M14	40	8,7	4204.150.001.000000
160	210	90	50	58	76	396	183	333	152	293	132	44 000	550	222	169	201	12	M14	40	9,0	4204.160.001.000000
170	225	90	50	58	76	433	194	364	160	319	137	54 500	640	244	184	201	14	M14	40	10,0	4204.170.001.000000
180	235	90	50	58	76	440	193	372	159	328	137	57 500	640	230	176	201	14	M14	40	11,0	4204.180.001.000000

Cone Clamping Elements RLK 131

centers the hub to the shaft
no axial displacement

Features

- Centers the shaft to the hub
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 20 mm and 180 mm



Application example

Backlash free connection of a cam disc to the drive shaft in a stepping gear in the material feed mechanism of a paper processing machine with a Cone Clamping Element RLK 131.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 33 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 131.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

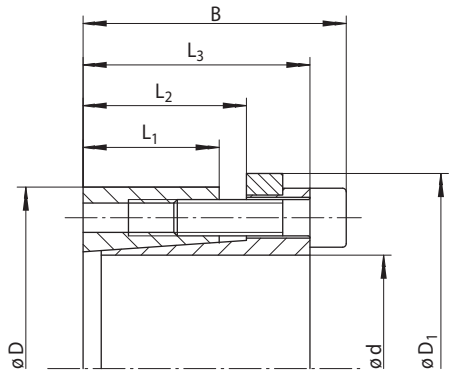
Example for ordering

Cone Clamping Element RLK 131 for shaft diameter d = 100 mm:

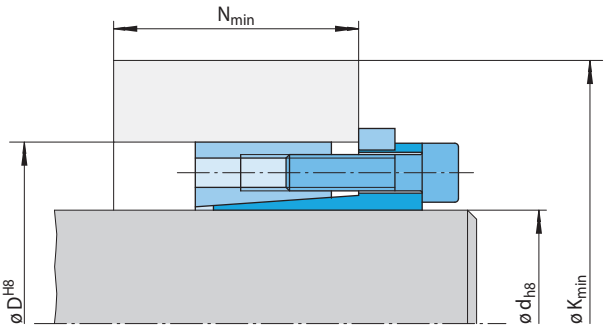
- RLK 131, size 100 x 145
  Article number 4204.100.101.000000

Cone Clamping Elements RLK 131

centers the hub to the shaft
no axial displacement



33-1

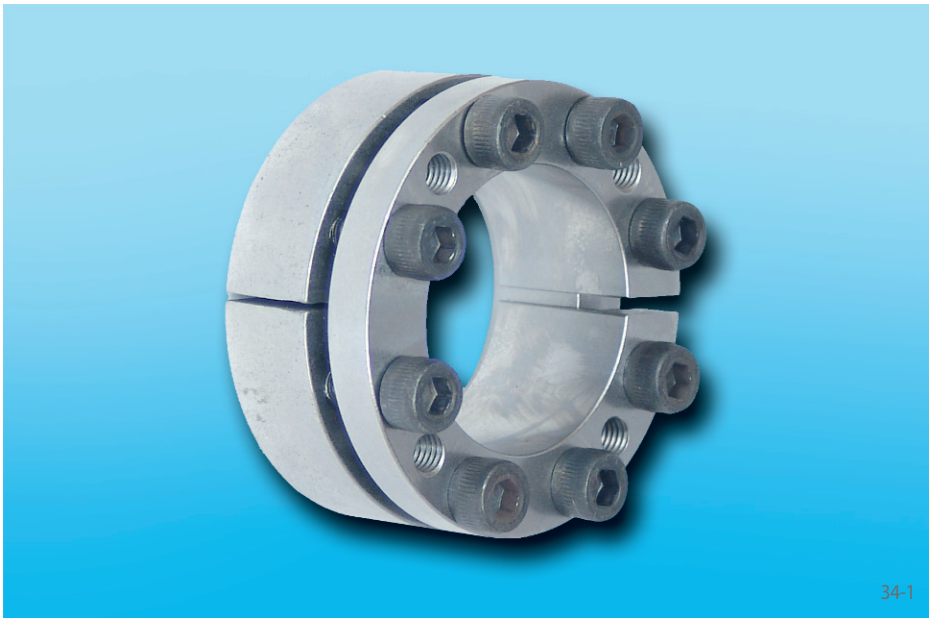


33-2

Dimensions													Technical Data								Weight	Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws					
Size							200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	53	48	26	31	42	82	49	70	48	62	53	320	32	190	81	16	6	M6	25	0,4	4204.020.101.000000
22	47	53	48	26	31	42	82	49	70	48	62	53	358	33	172	81	16	6	M6	25	0,4	4204.022.101.000000
24	50	56	48	26	31	42	85	49	72	49	65	55	390	33	158	76	16	6	M6	25	0,4	4204.024.101.000000
25	50	56	48	26	31	42	85	49	72	49	65	55	400	33	152	76	16	6	M6	25	0,4	4204.025.101.000000
28	55	61	48	26	31	42	89	48	77	50	69	56	450	33	136	69	16	6	M6	25	0,5	4204.028.101.000000
30	55	61	48	26	31	42	89	48	77	42	69	38	489	33	126	69	16	6	M6	25	0,5	4204.030.101.000000
32	60	66	48	26	31	42	103	53	88	45	79	41	690	43	158	84	16	8	M6	25	0,6	4204.032.101.000000
35	60	66	48	26	31	42	103	53	88	45	79	41	750	43	145	84	16	8	M6	25	0,5	4204.035.101.000000
38	65	71	48	26	31	42	107	52	93	45	83	40	820	43	133	78	16	8	M6	25	0,6	4204.038.101.000000
40	65	71	48	26	31	42	107	52	93	45	83	40	860	43	126	78	16	8	M6	25	0,6	4204.040.101.000000
42	75	81	59	30	35	51	125	60	108	52	97	46	1 190	57	137	76	37	6	M8	30	1,1	4204.042.101.000000
45	75	81	59	30	35	51	125	60	108	52	97	46	1 270	57	127	76	37	6	M8	30	1,1	4204.045.101.000000
48	80	86	59	30	35	51	144	67	122	56	108	49	1 810	76	159	96	37	8	M8	30	1,1	4204.048.101.000000
50	80	86	59	30	35	51	144	67	122	56	108	49	1 890	76	153	96	37	8	M8	30	1,1	4204.050.101.000000
55	85	91	59	30	35	51	148	67	127	56	113	49	2 070	76	139	90	37	8	M8	30	1,2	4204.055.101.000000
60	90	96	59	30	35	51	152	66	131	56	118	49	2 260	76	127	85	37	8	M8	30	1,3	4204.060.101.000000
65	95	101	59	30	35	51	156	66	136	56	123	49	2 450	76	118	80	37	8	M8	30	1,3	4204.065.101.000000
70	110	119	70	40	45	60	187	84	161	71	145	63	4 180	119	130	83	73	8	M10	30	2,4	4204.070.101.000000
75	115	124	70	40	45	60	192	84	166	71	149	62	4 480	119	122	80	73	8	M10	30	2,6	4204.075.101.000000
80	120	129	70	40	45	60	196	83	171	71	154	62	4 780	119	114	76	73	8	M10	30	2,7	4204.080.101.000000
85	125	134	70	40	45	60	216	91	186	76	166	66	6 340	149	134	91	73	10	M10	30	2,8	4204.085.101.000000
90	130	139	70	40	45	60	220	90	190	75	171	66	6 720	149	127	88	73	10	M10	30	3,0	4204.090.101.000000
95	135	144	70	40	46	60	223	90	194	76	175	66	7 090	149	120	85	73	10	M10	30	3,2	4204.095.101.000000
100	145	155	80	45	52	68	238	99	207	83	187	73	8 730	175	118	81	126	8	M12	35	4,1	4204.100.101.000000
110	155	165	80	45	52	68	247	98	217	83	197	73	9 610	175	107	76	126	8	M12	35	4,4	4204.110.101.000000
120	165	175	80	45	52	68	274	107	239	89	215	77	13 100	218	123	90	126	10	M12	35	4,7	4204.120.101.000000
130	180	188	80	45	52	68	303	114	264	94	238	81	17 000	262	136	100	126	12	M12	35	5,7	4204.130.101.000000
140	190	199	90	50	58	76	320	123	278	102	251	89	20 900	300	130	96	201	10	M14	40	6,9	4204.140.101.000000
150	200	209	90	50	58	76	349	133	302	109	270	93	26 900	360	146	109	201	12	M14	40	7,2	4204.150.101.000000
160	210	219	90	50	58	76	357	132	311	109	280	93	28 700	360	137	104	201	12	M14	40	7,8	4204.160.101.000000
170	225	234	90	50	58	76	388	140	337	114	303	97	35 600	420	150	113	201	14	M14	40	8,9	4204.170.101.000000
180	235	244	90	50	58	76	397	139	347	114	313	97	37 700	420	142	108	201	14	M14	40	9,5	4204.180.101.000000

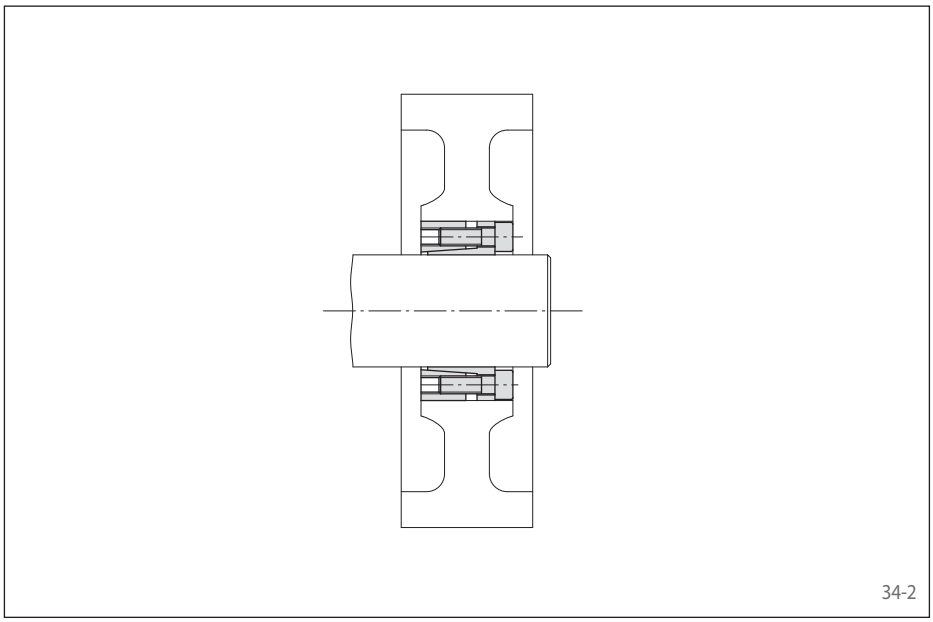
Cone Clamping Elements RLK 132

centers the hub to the shaft
short axial width



Features

- Centers the shaft to the hub
- High transmissible torques
- Short axial width
- For shaft diameters between 20 mm and 200 mm



Application example

Backlash free connection of a belt pulley to the drive shaft with a Cone Clamping Element RLK 132. The clamping element also centers the pulley to the shaft. The compact clamping element is a cost-efficient solution especially for applications with low space requirements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 35 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

- Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 132.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

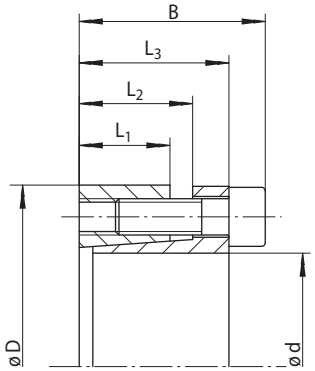
Example for ordering

Cone Clamping Element RLK 132 for shaft diameter d = 100 mm:

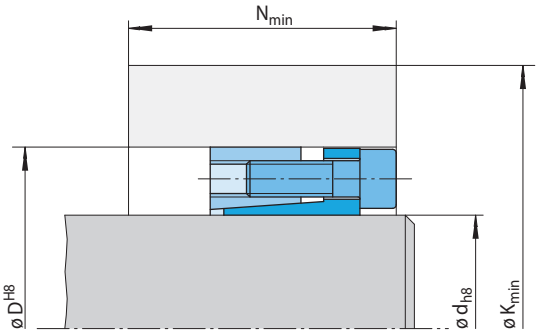
- RLK 132, size 100 x 145
  Article number 4204.100.201.000000

Cone Clamping Elements RLK 132

centers the hub to the shaft
short axial width



35-1

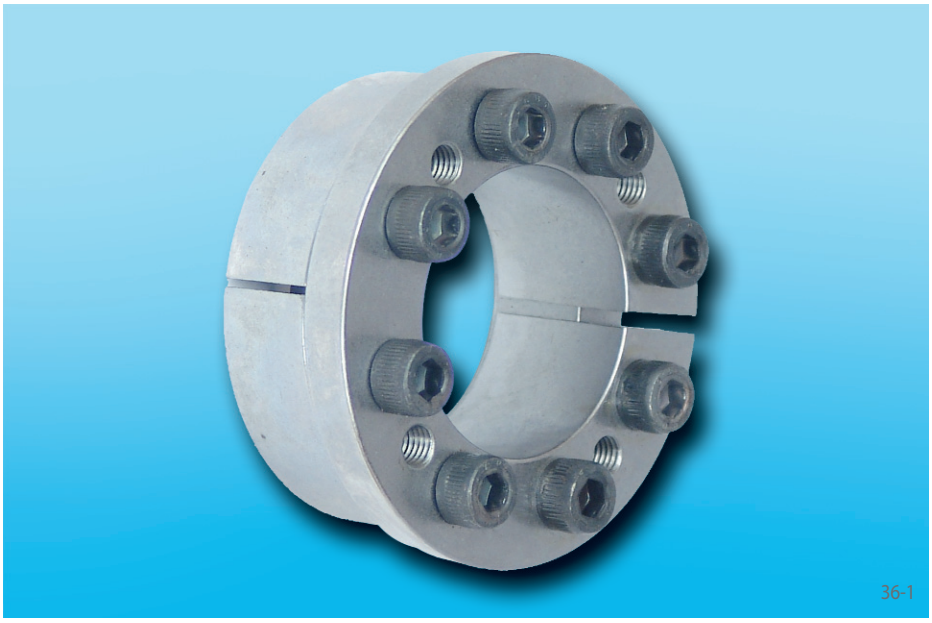


35-2

Dimensions													Technical Data									Article number
						Yield strength R_e of the hub material [N/mm²]							Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size						200		320		500					Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}		M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	34	17	22	28	100	61	81	51	71	46		410	41	470	200	14	6	M6	20	0,3	4204.020.201.000000
22	47	34	17	22	28	100	61	81	51	71	46		450	41	427	200	14	6	M6	20	0,3	4204.022.201.000000
24	50	34	17	22	28	102	60	84	51	74	46		490	41	393	189	14	6	M6	20	0,3	4204.024.201.000000
25	50	34	17	22	28	102	60	84	51	74	46		510	41	378	189	14	6	M6	20	0,3	4204.025.201.000000
28	55	34	17	22	28	105	59	88	51	79	46		570	41	337	172	14	6	M6	20	0,3	4204.028.201.000000
30	55	34	17	22	28	105	59	88	51	79	46		610	41	315	172	14	6	M6	20	0,3	4204.030.201.000000
32	60	34	17	22	28	121	65	100	54	88	48		880	55	375	200	14	8	M6	20	0,4	4204.032.201.000000
35	60	34	17	22	28	121	65	100	54	88	48		960	55	343	200	14	8	M6	20	0,3	4204.035.201.000000
38	65	34	17	22	28	127	65	105	54	94	49		1 000	55	331	194	14	8	M6	20	0,4	4204.038.201.000000
40	65	34	17	22	28	127	65	105	54	94	49		1 100	55	315	194	14	8	M6	20	0,4	4204.040.201.000000
42	75	41	20	25	33	152	80	125	66	110	59		2 070	99	357	200	30	8	M8	25	0,6	4204.042.201.000000
45	75	41	20	25	33	152	80	125	66	110	59		2 220	99	333	200	30	8	M8	25	0,6	4204.045.201.000000
48	80	41	20	24	33	160	81	132	67	116	59		2 500	105	333	200	32	8	M8	25	0,7	4204.048.201.000000
50	80	41	20	24	33	160	81	132	67	116	59		2 600	105	320	200	32	8	M8	25	0,7	4204.050.201.000000
55	85	41	20	24	33	167	82	139	68	123	60		2 900	105	309	200	34	8	M8	25	0,7	4204.055.201.000000
60	90	41	20	24	33	175	84	146	69	129	61		3 100	105	300	200	35	8	M8	25	0,8	4204.060.201.000000
65	95	41	20	24	33	181	84	152	70	134	61		3 400	105	287	196	35	8	M8	25	0,8	4204.065.201.000000
70	110	50	24	29	40	212	101	177	84	157	74		6 000	170	314	200	65	8	M10	30	1,5	4204.070.201.000000
75	115	50	24	29	40	220	103	184	85	163	74		6 400	170	307	200	68	8	M10	30	1,6	4204.075.201.000000
80	120	50	24	29	40	227	104	191	86	169	75		6 800	170	300	200	70	8	M10	30	1,7	4204.080.201.000000
85	125	50	24	29	40	234	105	198	87	175	75		8 340	196	294	200	59	10	M10	30	1,8	4204.085.201.000000
90	130	50	24	29	40	242	106	205	88	181	76		9 180	204	289	200	61	10	M10	30	1,9	4204.090.201.000000
95	135	50	24	29	40	249	107	211	88	187	76		10 000	210	284	200	64	10	M10	30	2,0	4204.095.201.000000
100	145	56	26	31	44	267	117	226	97	201	84		12 000	235	290	200	110	8	M12	30	2,6	4204.100.201.000000
110	155	56	26	31	44	281	119	240	99	213	85		13 000	260	282	200	115	8	M12	30	2,8	4204.110.201.000000
120	165	56	26	31	44	296	122	253	100	225	86		16 000	270	275	200	112	9	M12	30	3,6	4204.120.201.000000
130	180	64	34	39	52	343	146	290	119	255	102		23 000	350	277	200	115	12	M12	30	4,4	4204.130.201.000000
140	190	68	34	39	54	354	150	300	123	265	106		25 000	360	271	200	185	9	M14	40	4,9	4204.140.201.000000
150	200	68	34	39	54	368	152	314	125	278	107		30 000	400	267	200	185	10	M14	40	5,2	4204.150.201.000000
160	210	68	34	39	54	383	155	327	127	290	108		37 600	470	262	200	162	12	M14	40	5,6	4204.160.201.000000
170	225	78	44	49	64	418	175	355	143	314	123		41 300	490	238	130	185	12	M14	40	6,9	4204.170.201.000000
180	235	78	44	49	64	425	173	364	143	323	122		48 400	490	224	125	185	12	M14	40	8,5	4204.180.201.000000
190	250	78	44	49	64	473	190	402	154	355	131		64 100	600	263	145	185	15	M14	40	9,0	4204.190.201.000000
200	260	78	44	49	64	482	189	411	154	365	131		67 500	600	252	145	185	15	M14	40	9,6	4204.200.201.000000

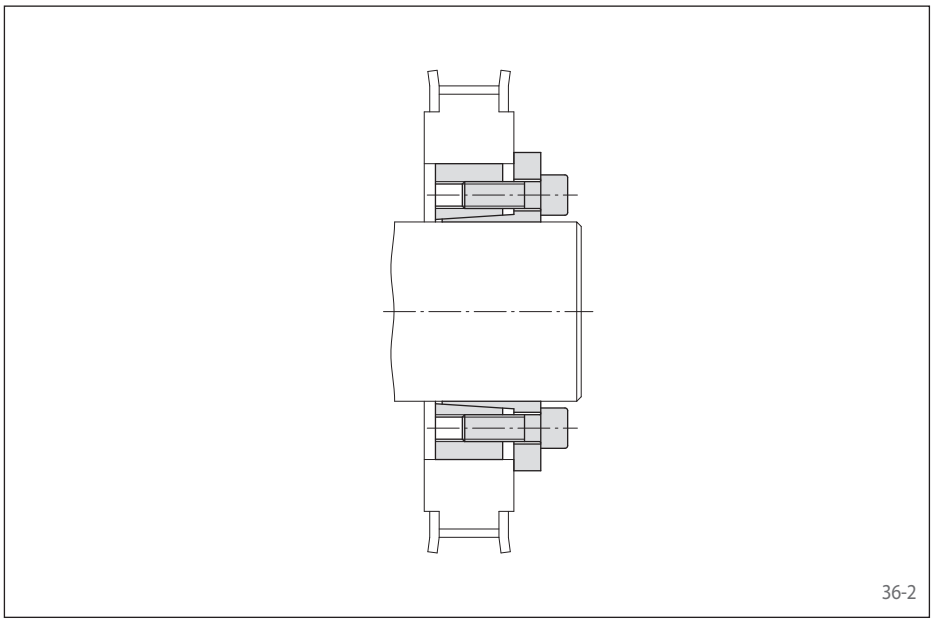
Cone Clamping Elements RLK 133

centers the hub to the shaft
short axial width with fixed backstop point



Features

- Centers the shaft to the hub
- Short axial width
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 20 mm and 200 mm



Application example

Backlash free connection of a timing belt pulley to the drive shaft with a Cone Clamping Element RLK 133. The clamping element also centers the pulley to the shaft. Due to the fixed backstop point, the timing belt pulley is not displaced axially during clamping. The clamping element also centers the timing belt pulley on the shaft. The compact clamping element is a cost-efficient solution especially for applications with low space requirements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 37 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 133.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

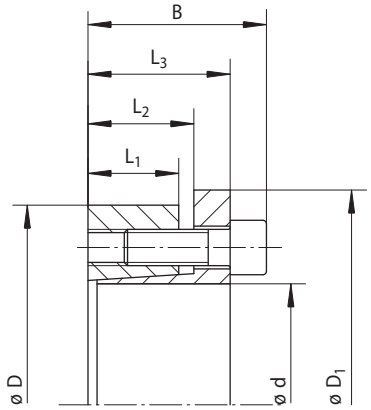
Example for ordering

Cone Clamping Element RLK 133 for shaft diameter d = 100 mm:

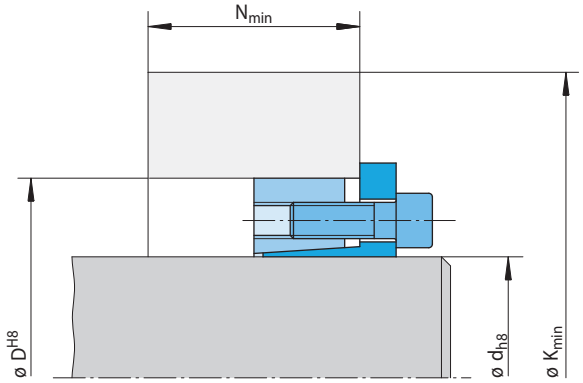
- RLK 131, size 100 x 145
  Article number 4204.100.301.000000

Cone Clamping Elements RLK 133

centers the hub to the shaft
short axial width with fixed backstop point



37-1

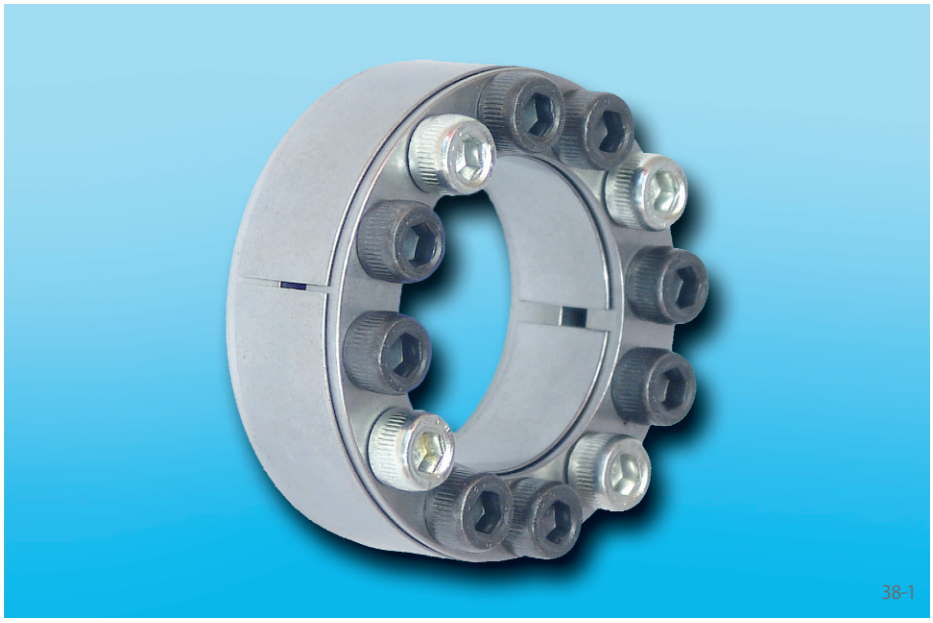


37-2

Dimensions													Technical Data									Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	53	34	17	22	28	89	43	75	36	66	32	320	32	290	123	16	6	M6	20	0,3	4204.020.301.000000
22	47	53	34	17	22	28	89	43	75	36	66	32	350	32	264	123	16	6	M6	20	0,3	4204.022.301.000000
24	50	56	34	17	22	28	92	43	78	36	69	32	390	32	242	116	16	6	M6	20	0,3	4204.024.301.000000
25	50	56	34	17	22	28	92	43	78	36	69	32	400	32	232	116	16	6	M6	20	0,3	4204.025.301.000000
28	55	62	34	17	22	28	95	42	82	36	73	31	450	32	207	106	16	6	M6	20	0,4	4204.028.301.000000
30	55	62	34	17	22	28	95	42	82	36	73	31	489	32	193	106	16	6	M6	20	0,3	4204.030.301.000000
32	60	69	34	17	22	28	110	47	94	39	83	34	695	43	242	129	16	8	M6	20	0,3	4204.032.301.000000
35	60	69	34	17	22	28	110	47	94	39	83	34	760	43	221	129	16	8	M6	20	0,4	4204.035.301.000000
38	65	72	34	17	22	28	114	47	98	39	88	34	820	43	204	119	16	8	M6	20	0,5	4204.038.301.000000
40	65	72	34	17	22	28	114	47	98	39	88	34	869	43	193	119	16	8	M6	20	0,4	4204.040.301.000000
42	75	84	41	20	25	33	149	62	125	50	110	43	1 580	76	273	153	37	8	M8	25	0,7	4204.042.301.000000
45	75	84	41	20	25	33	149	62	125	50	110	43	1 700	76	255	153	37	8	M8	25	0,7	4204.045.301.000000
48	80	89	41	20	24	33	154	61	130	49	115	42	1 810	76	239	143	37	8	M8	25	0,8	4204.048.301.000000
50	80	89	41	20	24	33	154	61	130	49	115	42	1 890	76	229	143	37	8	M8	25	0,8	4204.050.301.000000
55	85	91	41	20	24	33	157	60	135	49	120	42	2 070	76	208	135	37	8	M8	25	0,9	4204.055.301.000000
60	90	99	41	20	24	33	161	60	139	49	124	41	2 260	76	191	127	37	8	M8	25	0,9	4204.060.301.000000
65	95	104	41	20	24	33	165	59	144	49	129	41	2 450	76	176	121	37	8	M8	25	0,9	4204.065.301.000000
70	110	119	50	24	29	40	202	75	173	61	154	51	4 180	119	217	138	73	8	M10	30	1,6	4204.070.301.000000
75	115	124	50	24	29	40	206	75	178	61	159	51	4 480	119	203	132	73	8	M10	30	1,7	4204.075.301.000000
80	120	129	50	24	29	40	210	74	182	60	164	51	4 780	119	190	127	73	8	M10	30	1,9	4204.080.301.000000
85	125	134	50	24	29	40	230	82	198	66	177	55	6 340	149	224	152	73	10	M10	30	2,0	4204.085.301.000000
90	130	139	50	24	29	40	234	81	203	66	181	55	6 720	149	211	146	73	10	M10	30	2,0	4204.090.301.000000
95	135	144	50	24	29	40	238	81	207	65	186	55	7 090	149	200	141	73	10	M10	30	2,3	4204.095.301.000000
100	145	154	56	26	31	44	257	87	223	70	200	59	8 730	175	204	140	126	8	M12	30	2,8	4204.100.301.000000
110	155	164	56	26	31	44	265	86	232	70	210	59	9 610	175	185	131	126	8	M12	30	3,1	4204.110.301.000000
120	165	174	56	26	31	44	283	90	248	73	224	61	11 700	197	191	150	126	9	M12	30	3,2	4204.120.301.000000
130	180	189	64	34	39	52	315	107	274	86	247	73	17 000	262	180	130	126	12	M12	30	4,6	4204.130.301.000000
140	190	199	68	34	39	54	326	107	285	87	258	73	18 800	270	172	140	201	9	M14	40	5,0	4204.140.301.000000
150	200	209	68	34	39	54	346	112	302	90	273	76	22 400	300	178	134	201	10	M14	40	5,2	4204.150.301.000000
160	210	219	68	34	39	54	375	122	326	97	293	81	28 700	360	201	153	201	12	M14	40	5,6	4204.160.301.000000
170	225	234	78	44	49	64	378	126	331	102	300	87	30 500	360	146	105	201	12	M14	40	6,5	4204.170.301.000000
180	235	244	78	44	49	64	386	125	341	102	309	86	32 300	360	138	106	201	12	M14	40	8,5	4204.180.301.000000
190	250	259	78	44	49	64	427	138	374	111	338	93	42 700	450	163	120	201	15	M14	40	9,0	4204.190.301.000000
200	260	269	78	44	49	64	435	137	383	111	347	93	44 900	450	155	119	201	15	M14	40	9,6	4204.200.301.000000

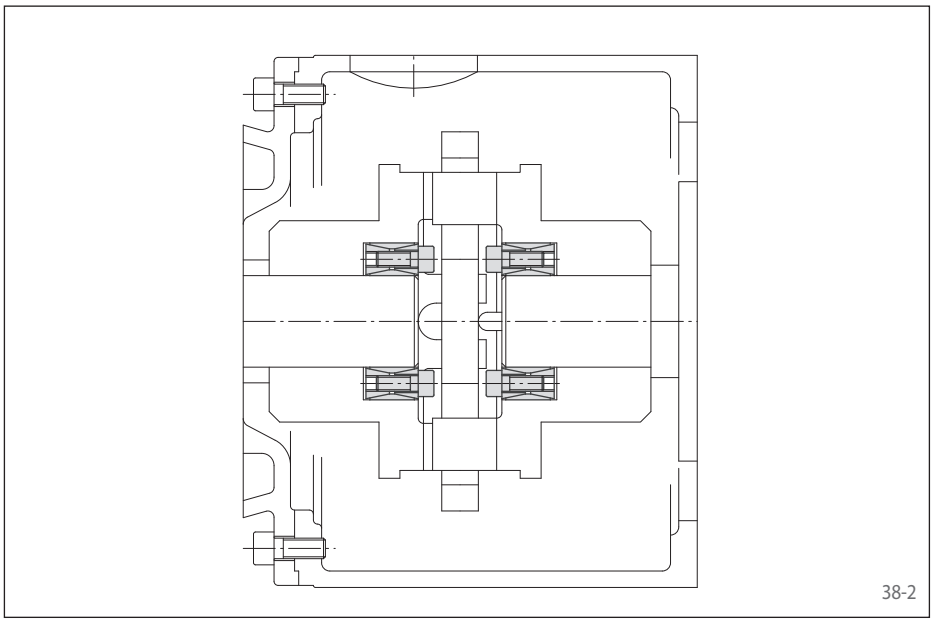
RLK 200 Cone Clamping Elements

easy to release
compact design



Features

- Easy to release
- Compact design
- No axial displacement between hub and shaft during clamping procedure
- Extended tolerances for hub and shaft
- For shaft diameters between 20 mm and 400 mm



Application example

Backlash free connection of the two hubs of a Flexible Coupling L 42 from RINGSPANN with a Cone Clamping Element RLK 200. The Flexible Coupling is situated in the latern of a geared motor driving a roller conveyor.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 39 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h9 for shaft diameter d
- H9 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 200.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

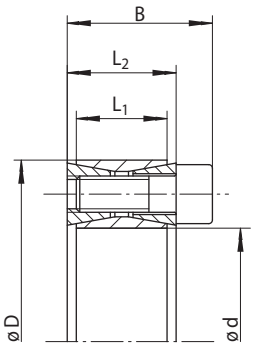
Example for ordering

Cone Clamping Element RLK 200 for shaft diameter d = 100 mm:

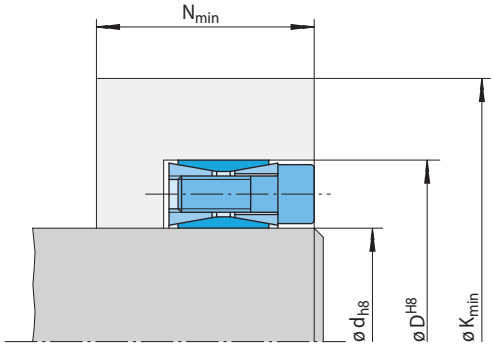
- RLK 200, size 100 x 145
  Article number 4201.100.001.000000

RLK 200 Cone Clamping Elements

easy to release
compact design



39-1



39-2

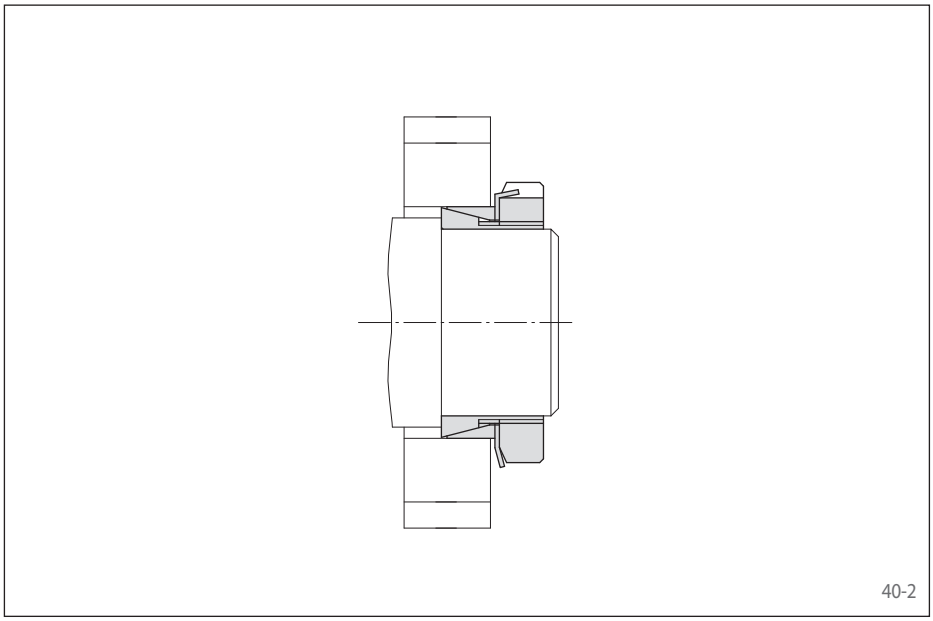
Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	26	17	20	83	43	70	36	62	32	273	27	240	102	16	8	M6	18	0,2	4201.020.001.000000
22	47	26	17	20	83	43	70	36	62	32	300	27	218	102	16	8	M6	18	0,2	4201.022.001.000000
24	50	26	17	20	85	42	73	36	65	32	330	28	200	96	16	8	M6	18	0,3	4201.024.001.000000
25	50	26	17	20	85	42	73	36	65	32	340	27	192	96	16	8	M6	18	0,3	4201.025.001.000000
28	55	26	17	20	104	49	87	41	77	36	570	41	257	131	16	12	M6	18	0,3	4201.028.001.000000
30	55	26	17	20	104	49	87	41	77	36	610	41	240	131	16	12	M6	18	0,3	4201.030.001.000000
32	60	26	17	20	107	48	92	41	81	35	660	41	225	120	16	12	M6	18	0,3	4201.032.001.000000
35	60	26	17	20	107	48	92	41	81	35	720	41	205	120	16	12	M6	18	0,3	4201.035.001.000000
38	65	26	17	20	121	53	103	44	91	38	970	51	236	138	16	15	M6	18	0,4	4201.038.001.000000
40	65	26	17	20	121	53	103	44	91	38	1000	50	225	138	16	15	M6	18	0,4	4201.040.001.000000
42	75	32	20	24	143	64	120	53	106	46	1580	75	264	148	38	12	M8	22	0,6	4201.042.001.000000
45	75	32	20	24	143	64	120	53	106	46	1700	76	246	148	38	12	M8	22	0,5	4201.045.001.000000
48	80	32	20	24	147	64	125	53	110	45	1800	75	231	139	38	12	M8	22	0,6	4201.048.001.000000
50	80	32	20	24	147	64	125	53	110	45	1890	76	222	139	38	12	M8	22	0,6	4201.050.001.000000
55	85	32	20	24	164	70	138	57	121	48	2600	95	252	163	38	15	M8	22	0,6	4201.055.001.000000
60	90	32	20	24	167	69	142	56	126	48	2800	93	231	154	38	15	M8	22	0,7	4201.060.001.000000
65	95	32	20	24	171	68	147	56	131	48	3050	94	213	146	38	15	M8	22	0,8	4201.065.001.000000
70	110	38	24	28	211	87	179	71	157	60	5300	151	270	172	75	15	M10	25	1,3	4201.070.001.000000
75	115	38	24	28	215	86	183	70	162	60	5600	149	252	164	75	15	M10	25	1,2	4201.075.001.000000
80	120	38	24	28	219	86	187	70	167	60	6000	150	236	157	75	15	M10	25	1,4	4201.080.001.000000
85	125	38	24	28	223	85	192	70	171	59	6400	151	222	151	75	15	M10	25	1,4	4201.085.001.000000
90	130	38	24	28	227	85	196	69	176	59	6800	151	210	145	75	15	M10	25	1,5	4201.090.001.000000
95	135	38	24	28	246	92	211	74	188	63	8600	181	239	168	75	18	M10	25	1,6	4201.095.001.000000
100	145	44	26	32	266	102	228	83	203	70	11000	220	257	177	130	15	M12	30	2,2	4201.100.001.000000
110	155	44	26	32	274	101	237	82	212	70	12000	218	234	166	130	15	M12	30	2,3	4201.110.001.000000
120	165	44	26	32	288	103	250	84	225	71	14000	233	228	166	130	16	M12	30	2,4	4201.120.001.000000
130	180	50	34	38	317	117	274	95	245	81	19000	292	202	146	130	20	M12	35	3,5	4201.130.001.000000
140	190	50	34	38	335	121	290	98	260	83	22000	314	206	152	130	22	M12	35	3,8	4201.140.001.000000
150	200	50	34	38	353	125	306	101	274	85	26000	346	210	157	130	24	M12	35	4,0	4201.150.001.000000
160	210	50	34	38	371	129	322	104	289	88	30000	375	213	162	130	26	M12	35	4,4	4201.160.001.000000
170	225	58	38	44	396	141	343	114	308	97	35400	416	207	156	200	22	M14	40	5,7	4201.170.001.000000
180	235	58	38	44	416	146	361	118	323	99	40900	454	213	163	200	24	M14	40	6,0	4201.180.001.000000
190	250	66	46	52	443	160	383	130	343	110	50300	529	195	148	200	28	M14	45	8,0	4201.190.001.000000
200	260	66	46	52	461	164	399	133	358	112	56700	567	198	153	200	30	M14	45	8,2	4201.200.001.000000
220	285	72	50	56	504	179	436	145	391	122	72000	655	199	154	300	26	M16	50	11,0	4201.220.001.000000
240	305	72	50	56	545	189	472	153	423	128	90800	757	211	166	300	30	M16	50	12,2	4201.240.001.000000
260	325	72	50	56	585	199	506	160	453	133	108500	835	221	177	300	34	M16	50	13,2	4201.260.001.000000
280	355	84	60	66	625	216	542	175	487	147	137000	979	192	151	410	32	M18	60	19,2	4201.280.001.000000
300	375	84	60	66	666	227	578	183	518	153	165000	1100	201	161	410	36	M18	60	20,5	4201.300.001.000000
320	405	98	72	78	736	261	635	210	566	176	229000	1430	202	160	590	36	M20	70	29,6	4201.320.001.000000
340	425	98	72	78	752	259	652	209	585	175	243000	1430	190	152	590	36	M20	70	31,1	4201.340.001.000000
360	455	112	84	90	821	292	708	236	633	198	320000	1770	191	151	790	36	M22	80	42,2	4201.360.001.000000
380	475	112	84	90	836	290	726	235	651	197	337000	1770	181	145	790	36	M22	80	44,0	4201.380.001.000000
400	495	112	84	90	853	288	744	234	670	197	355000	1770	172	139	790	36	M22	80	46,0	4201.400.001.000000

Cone Clamping Elements RLK 250

centers the hub to the shaft
quick assembly, easy to release

Features

- Centers the hub to the shaft
- Radial flat height is particularly suitable for small hub outer diameters
- Quick assembly by central groove nut
- Easy to release
- For shaft diameters between 15 mm and 70 mm



Application example

Backlash free connection of a drive wheel to a shaft with a Cone Clamping Element RLK 250. The central groove nut leads to a uniform displacement of the cone ring during clamping and thus achieves a centering that is sufficient for lower requirements. The central groove nut and the self-releasing cone ensure quick disassembly. Thus, a worn drive wheel can be replaced with the shortest of downtimes.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 41 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 250.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

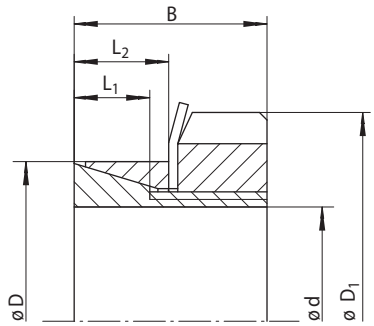
Example for ordering

Cone Clamping Element RLK 250 for shaft diameter d = 50 mm:

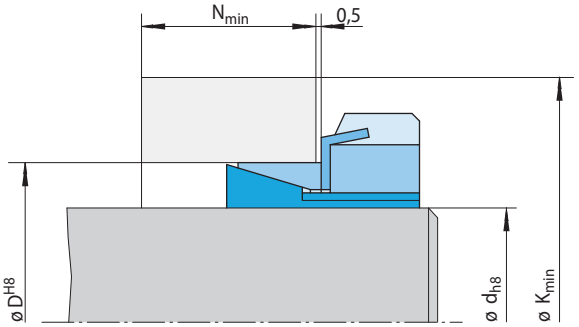
- RLK 250, size 50 x 62
  Article number 4202.050.001.000000

Cone Clamping Elements RLK 250

centers the hub to the shaft
quick assembly, easy to release



41-1



41-2

Dimensions												Technical Data							Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Groove nut Tightening torque	Groove nut Size	Weight	
Size						200		320		500				Shaft	Hub				
d	D	D_1	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm		kg	
15	25	32	16,5	6,5	9,5	38	16	34	14	31	13	28	3,7	120	72	46	KM4	0,050	4202.015.001.000000
16	25	32	16,5	6,5	9,5	39	17	34	14	31	13	32	4,0	120	76	49	KM4	0,048	4202.016.001.000000
19	30	38	18,0	6,5	10,0	45	18	40	15	37	14	45	4,7	120	76	72	KM5	0,080	4202.019.001.000000
20	30	38	18,0	6,5	10,0	45	18	41	16	37	14	50	5,0	120	80	76	KM5	0,070	4202.020.001.000000
24	35	45	18,0	6,5	10,0	52	19	47	16	43	14	73	6,0	120	82	110	KM6	0,100	4202.024.001.000000
25	35	45	18,0	6,5	10,0	53	19	47	16	44	15	79	6,3	120	85	120	KM6	0,090	4202.025.001.000000
30	40	52	19,5	7,0	10,5	61	21	54	18	50	16	120	8,0	120	90	170	KM7	0,130	4202.030.001.000000
35	45	58	21,5	8,0	10,5	71	24	63	20	58	17	190	10,0	120	93	250	KM8	0,170	4202.035.001.000000
36	45	58	21,5	8,0	10,5	71	24	63	20	58	17	200	11,0	120	96	260	KM8	0,150	4202.036.001.000000
40	52	65	24,5	10,0	12,5	84	27	75	22	68	19	310	15,0	120	92	410	KM9	0,240	4202.040.001.000000
45	57	70	25,5	10,0	12,5	90	29	80	24	73	21	390	17,0	119	94	500	KM10	0,270	4202.045.001.000000
48	62	75	25,5	10,0	12,5	96	30	86	25	79	21	440	18,0	120	92	590	KM11	0,320	4202.048.001.000000
50	62	75	25,5	10,0	12,5	97	30	87	25	79	21	480	19,0	120	96	610	KM11	0,280	4202.050.001.000000
55	68	80	27,5	12,0	15,0	104	33	93	28	86	24	610	22,0	104	84	770	KM12	0,360	4202.055.001.000000
56	68	80	27,5	12,0	15,0	104	33	93	28	86	24	620	22,0	102	84	770	KM12	0,340	4202.056.001.000000
60	73	85	28,5	12,0	16,5	109	35	98	29	91	26	720	24,0	103	85	890	KM13	0,390	4202.060.001.000000
63	79	92	30,5	14,0	17,0	119	37	107	31	99	27	890	28,0	98	78	1 100	KM14	0,560	4202.063.001.000000
65	79	92	30,5	14,0	17,0	119	37	107	31	99	27	920	28,0	95	78	1 100	KM14	0,520	4202.065.001.000000
70	84	98	31,5	14,0	17,0	126	38	113	32	105	28	1 050	30,0	96	80	1 250	KM15	0,600	4202.070.001.000000

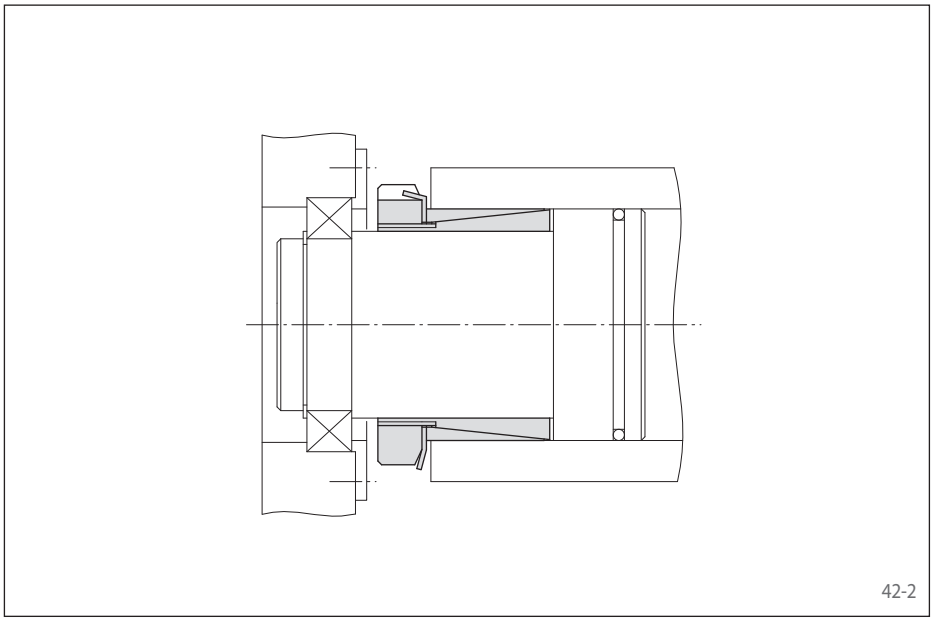
If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. In this case, the required hub outer diameter K_{min} and the required hub width N_{min} may be lower than indicated.

Cone Clamping Elements RLK 250 L

centers the hub to the shaft
quick assembly

Features

- Centers the hub to the shaft
- Radial flat height is particularly suitable for small hub outer diameters
- Quick assembly by central groove nut
- For shaft diameters between 15 mm and 70 mm



Application example

Backlash free connection of a hollow shaft with a Cone Clamping Element RLK 250 L. The clamping element centers the hollow shaft on the shaft. Due to the flat radial height of the clamping element, the hollow shaft can be designed thin walled.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 43 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 250 L.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

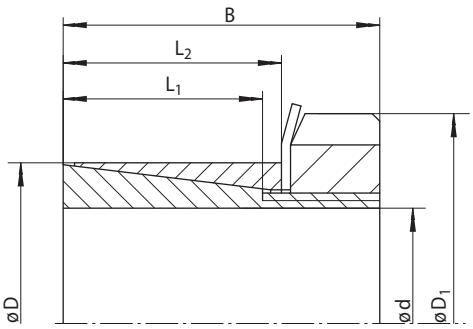
Example for ordering

Cone Clamping Element RLK 250 L for shaft diameter d = 50 mm:

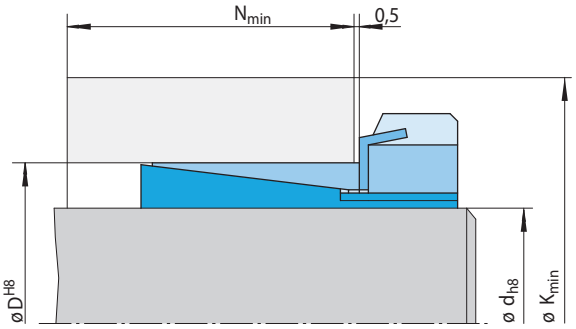
- RLK 250 L, size 50 x 60
  Article number 4202.050.002.000000

Cone Clamping Elements RLK 250 L

centers the hub to the shaft
quick assembly



43-1



43-2

Dimensions												Technical Data							Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Groove nut Tightening torque		Weight	
Size						200		320		500				Shaft	Hub		Size		
d	D	D_1	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm		kg	
15	25	32	29	17	23	43	32	36	29	33	27	74	9,8	120	72	53	KM4	0,080	4202.015.001.A00000
16	25	32	29	17	23	45	33	37	29	33	27	80	10	120	76	56	KM4	0,070	4202.016.001.A00000
17	25	38	31	18	24	46	35	38	31	34	29	100	11	120	81	72	KM5	0,130	4202.017.001.A00000
18	30	38	31	18	24	51	35	43	31	39	29	110	12	120	72	83	KM5	0,120	4202.018.002.000000
19	30	38	31	18	24	52	35	44	31	39	29	120	12	120	76	90	KM5	0,120	4202.019.001.A00000
20	30	38	31	18	24	54	36	45	32	40	29	130	13	120	80	100	KM5	0,110	4202.020.001.A00000
22	35	45	35	21	26	62	40	52	35	46	32	180	16	120	75	130	KM6	0,180	4202.022.001.A00000
24	35	45	35	21	26	65	41	54	36	47	32	230	19	119	82	160	KM6	0,160	4202.024.001.A00000
25	35	45	35	21	26	66	42	55	36	48	33	200	16	120	85	160	KM6	0,150	4202.025.001.A00000
28	40	52	35	22	27	74	44	62	38	54	34	330	23	120	84	220	KM7	0,240	4202.028.001.A00000
30	40	52	35	22	27	76	45	63	39	55	35	300	20	120	90	230	KM7	0,210	4202.030.004.000000
35	45	58	42	28	31,5	91	55	74	46	64	41	460	26	120	93	320	KM8	0,260	4202.035.001.A00000
40	50	65	44	28	34	98	58	81	50	70	44	640	32	120	96	440	KM9	0,330	4202.040.002.000000
45	55	70	45	28	34	108	61	89	51	77	45	760	33	120	98	550	KM10	0,390	4202.045.001.A00000
50	60	75	46	28	34	116	62	97	53	84	46	930	37	120	100	660	KM11	0,400	4202.050.002.000000
55	65	80	47	28	34	122	63	103	53	90	47	1 100	40	120	97	770	KM12	0,440	4202.055.002.000000
60	70	85	52	28	38,5	126	67	107	57	94	51	1 500	50	120	97	890	KM13	0,550	4202.060.001.A00000

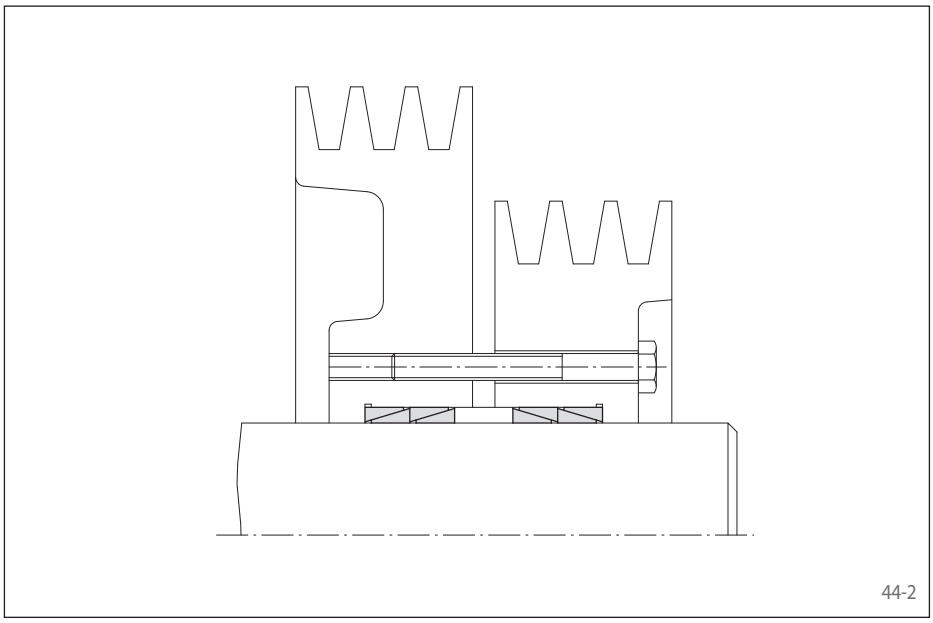
If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. In this case, the required hub outer diameter K_{min} and the required hub width N_{min} may be lower than indicated.

Cone Clamping Elements RLK 300

for individual clamping connections

Features

- For individual clamping connections
- Compact design
- For shaft diameters between 10 mm and 200 mm



Application example

Backlash free connection of two V-belt pulleys with two Cone Clamping Elements RLK 300 each. In this assembly, the screw force is used on both sides. By this, both packages with two clamping elements each are charged with the preload force. Due to the double arrangement of the clamping elements, the transmissible torque is increased. Because of the recessed hub, separate pressure flanges are not required. This makes the solution very cost-effective.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 46 through 47 are subject to the following tolerances, surface characteristics, materials and preload force requirement. Please contact us in the case of deviations.

Tolerances

d > mm	d ≤ mm	Hub bore ISO	Shaft ISO
10	40	H7	h6
40	96	H8	h8

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft $R_a \leq 1$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Preload force

The preload force is achieved by the clamping screws provided by the customer. The preload force E_1 or E_2 stated in the table may be increased or decreased according to the technical notes on page 54.

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 300.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

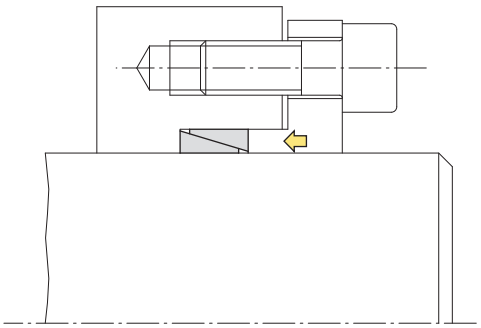
Example for ordering

Cone Clamping Element RLK 300 for shaft diameter d = 50 mm:

- RLK 300, size 50 x 57
  Article number 4203.050.001.000000

Installation case 1

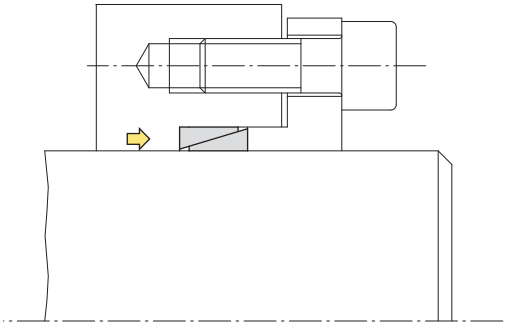
The adjusted axial position of the hub is not changed during clamping. The preload force E_1 must be provided for.



45-1

Installation case 2

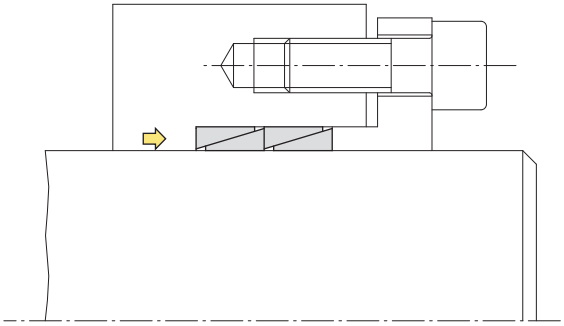
During clamping, the hub is displaced slightly to the right compared to the shaft. The preload force E_2 must be provided for. The connection can easily be released when the clamping element is assembled according to figure 45-2.



45-2

Double Arrangement

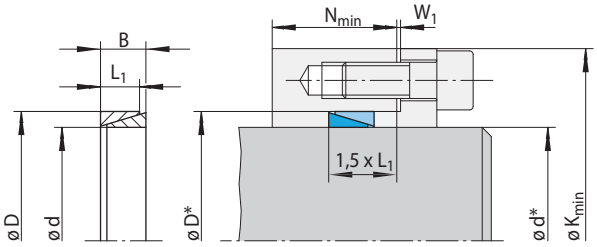
A double arrangement of two clamping elements must be built according to installation case 2. The transmissible torque or axial force are not doubled compared to the values for M or F listed in the tables but are increased by 55%. The preload force E_1 must be provided for. The hub stress σ_V must be verified (page 55)



45-3

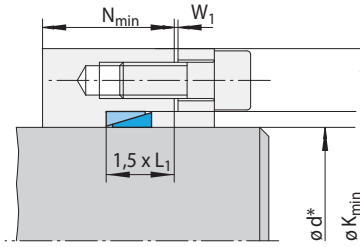
Cone Clamping Elements RLK 300

for individual clamping connections



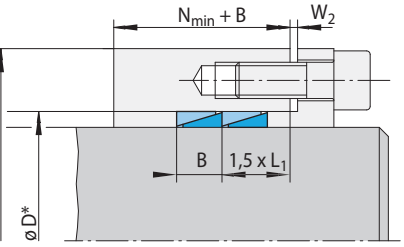
46-1 46-2

Installation case 1



46-3

Installation case 2



46-4

Double Arrangement

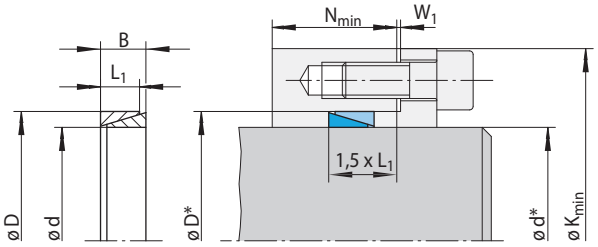
*For tolerances see page 44.

For notes on assembly cases 1 and 2 and double arrangement, see page 45.

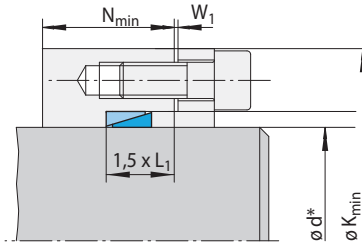
Dimensions												Technical Data							Article number
Size						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Tightening torque		Weight	
						200		320		500				Shaft	Hub				
d	D	B	L_1	W_1	W_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	E_1	E_2		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	kN	kN	kg	
10	13	4,5	3,7	3	3	22	10	19	8	17	7	7,3	1,4	120	92	10,1	8,4	0,002	4203.010.001.000000
12	15	4,5	3,7	3	3	25	10	22	9	20	8	10,5	1,7	120	96	11,6	9,5	0,002	4203.012.001.000000
13	16	4,5	3,7	3	3	27	11	23	9	21	8	12,3	1,8	120	98	12,4	10,1	0,002	4203.013.001.000000
14	18	6,3	5,3	3	4	31	14	27	12	24	10	20,4	2,9	120	93	20,0	16,5	0,005	4203.014.001.000000
15	19	6,3	5,3	3	4	32	14	28	12	25	10	23,5	3,1	120	95	21,1	17,4	0,005	4203.015.001.000000
16	20	6,3	5,3	3	4	34	14	29	12	27	11	26,0	3,3	120	96	22,2	18,2	0,005	4203.016.001.000000
17	21	6,3	5,3	3	4	35	14	31	12	28	11	30,0	3,5	120	97	23,3	19,1	0,006	4203.017.001.000000
18	22	6,3	5,3	3	4	37	15	32	12	29	11	33,0	3,7	120	98	24,4	19,9	0,006	4203.018.001.000000
19	24	6,3	5,3	3	4	39	15	35	13	31	11	37,7	3,9	120	95	26,7	21,9	0,007	4203.019.001.000000
20	25	6,3	5,3	3	4	41	15	36	13	33	11	41,7	4,1	120	96	27,7	22,8	0,008	4203.020.001.000000
22	26	6,3	5,3	3	4	43	16	37	13	34	11	50,0	4,5	120	102	28,8	23,4	0,008	4203.022.001.000000
24	28	6,3	5,3	3	4	45	16	40	13	37	12	60,1	5,0	120	103	31,0	25,1	0,008	4203.024.001.000000
25	30	6,3	5,3	3	4	48	16	42	13	39	12	65,2	5,2	120	100	33,2	27,1	0,009	4203.025.001.000000
28	32	6,3	5,3	3	4	51	17	45	14	41	12	81,8	5,8	120	105	35,4	28,6	0,010	4203.028.001.000000
30	35	6,3	5,3	3	4	55	17	49	14	45	12	93,9	6,2	120	103	38,7	31,4	0,010	4203.030.001.000000
32	36	6,3	5,3	3	4	56	17	50	14	46	12	107	6,6	120	107	39,8	32,0	0,012	4203.032.001.000000
35	40	7	6,0	3	4	62	19	56	16	51	14	145	8,2	120	105	50,0	40,4	0,017	4203.035.001.000000
36	42	7	6,0	4	5	65	20	58	16	53	14	153	8,5	120	103	52,6	42,7	0,020	4203.036.001.000000
38	44	7	6,0	4	5	67	20	61	17	56	14	171	8,9	120	104	55,1	44,6	0,020	4203.038.001.000000
40	45	8	6,6	4	5	70	21	63	18	58	15	208	10,3	120	107	61,9	49,9	0,020	4203.040.001.000000
42	48	8	6,6	4	5	74	22	66	18	61	15	229	10,9	120	105	66,1	53,4	0,028	4203.042.001.000000
45	52	10	8,6	4	5	82	27	73	22	67	19	343	15,2	120	104	93,3	75,5	0,042	4203.045.001.000000
48	55	10	8,6	4	5	86	27	77	23	70	19	390	16,2	120	105	98,6	79,7	0,045	4203.048.001.000000
50	57	10	8,6	4	5	89	28	79	23	73	20	423	16,9	120	105	102	82,6	0,047	4203.050.001.000000
55	62	10	8,6	4	5	96	29	86	24	79	20	512	18,6	120	106	111	89,6	0,050	4203.055.001.000000
60	68	12	10,4	4	5	106	33	95	28	87	24	737	24,5	120	106	148	119	0,072	4203.060.001.000000
65	73	12	10,4	4	5	113	34	101	28	93	24	865	26,6	120	107	158	128	0,079	4203.065.001.000000
70	79	14	12,2	4	5	124	39	110	32	101	28	1 176	33,6	120	106	201	162	0,111	4203.070.001.000000
75	84	14	12,2	4	5	130	40	116	33	107	28	1 351	36,0	120	107	214	172	0,120	4203.075.001.000000
80	91	17	15,0	5	6	143	47	127	39	117	34	1 889	47,2	120	105	285	230	0,190	4203.080.001.000000
85	96	17	15,0	5	6	150	48	134	40	123	34	2 133	50,1	120	106	300	242	0,200	4203.085.001.000000
90	101	17	15,0	5	6	157	49	140	40	129	35	2 391	53,1	120	107	316	254	0,220	4203.090.001.000000
95	106	17	15,0	5	6	164	50	146	41	135	35	2 664	56,0	120	108	332	267	0,230	4203.095.001.000000
100	114	21	18,7	5	6	179	59	159	49	146	42	3 680	73,6	120	105	445	359	0,380	4203.100.001.000000

Cone Clamping Elements RLK 300

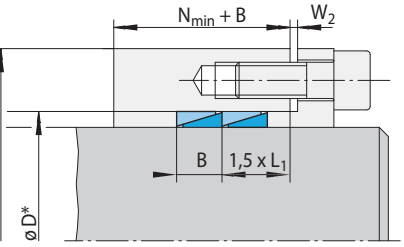
for individual clamping connections



47-1 Installation case 1 47-2



47-3 Installation case 2



47-4 Double Arrangement

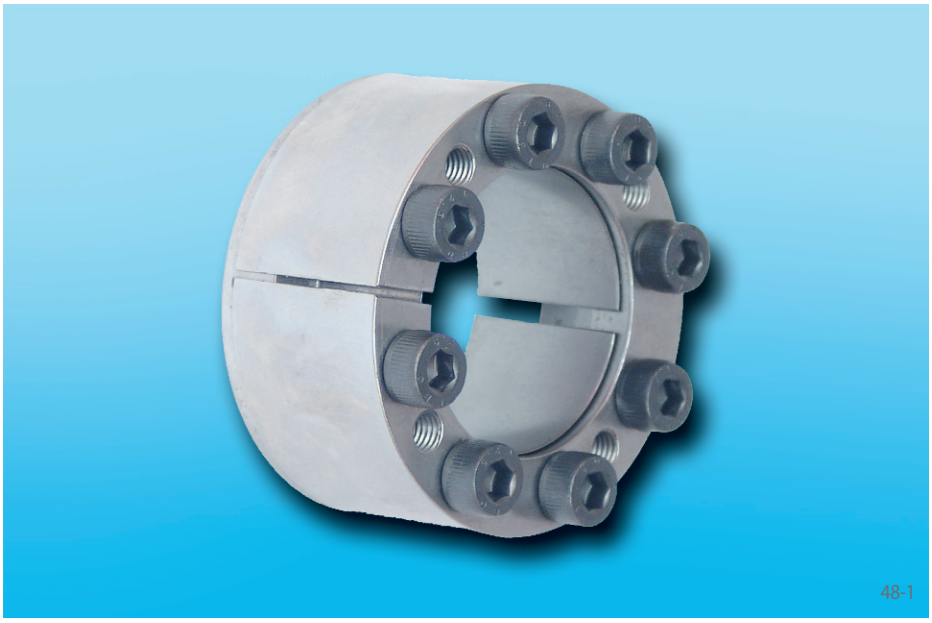
*For tolerances see page 44.

For notes on installation cases 1 and 2 and double arrangement, see page 45.

Dimensions												Technical Data							Article number
Size						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Tightening torque		Weight	
						200		320		500				Shaft	Hub				
d	D	B	L_1	W_1	W_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	E_1	E_2		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	kN	kN	kg	
110	124	21	18,7	5	6	193	61	172	50	158	43	4453	80,9	120	106	483	389	0,410	4203.110.001.000000
120	134	21	18,7	5	6	205	62	184	51	169	44	5299	88,3	120	107	516	415	0,452	4203.120.001.000000
130	148	28	25,3	6	7	232	78	206	65	188	56	8414	129	120	105	762	616	0,847	4203.130.001.000000
140	158	28	25,3	6	7	245	79	218	66	200	57	9758	139	120	106	808	652	0,910	4203.140.001.000000
150	168	28	25,3	6	7	258	81	231	67	212	58	11202	149	120	107	855	689	0,967	4203.150.001.000000
160	178	28	25,3	6	7	271	82	243	68	224	59	12746	159	120	108	902	726	1,020	4203.160.001.000000
170	191	33	30,0	7	8	294	94	262	78	241	67	17062	200	120	107	1138	917	1,500	4203.170.001.000000
180	201	33	30,0	7	8	307	95	275	79	253	68	19128	212	120	107	1195	962	1,580	4203.180.001.000000
190	211	33	30,0	7	9	320	97	287	80	265	69	21312	224	120	108	1252	1007	1,690	4203.190.001.000000
200	224	38	34,8	7	9	342	108	306	90	281	78	27393	273	120	107	1530	1233	2,320	4203.200.001.000000

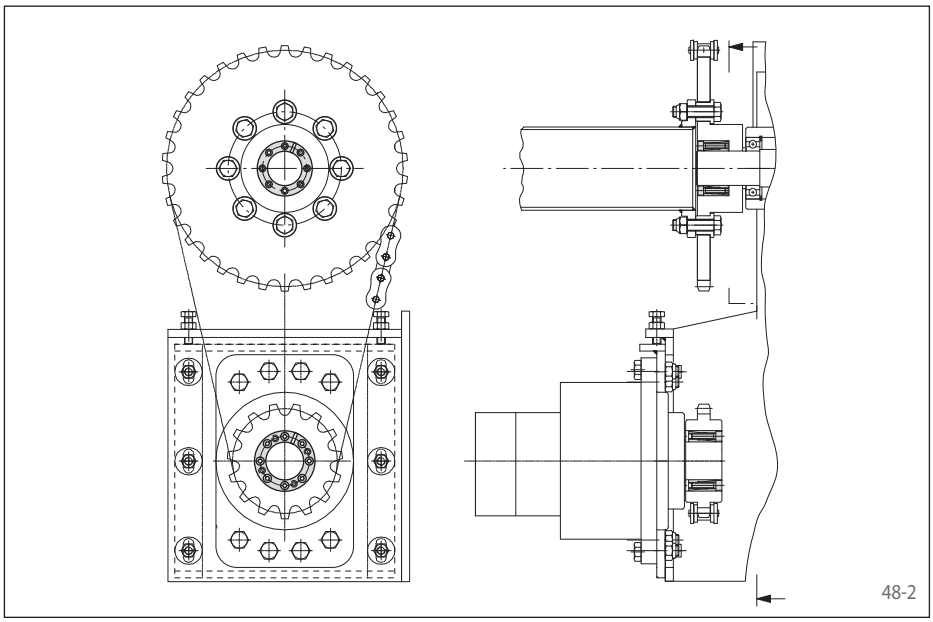
Cone Clamping Elements RLK 350

centers the hub to the shaft
for small shaft diameters



Features

- Centers the hub to the shaft
- For shaft diameters between 5 mm and 50 mm



Application example

Backlash free connection of sprocket wheels to shafts in the drive of an industrial door with Cone Clamping Elements RLK 350. The clamping elements center the sprocket wheels on the shaft. The sprocket wheels can be easily aligned in axial and circumferential directions during assembly.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 43 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. Kmin can be decreased. See the technical notes on page 55.

Please request our installation and operating instructions for Cone Clamping Elements RLK 350.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

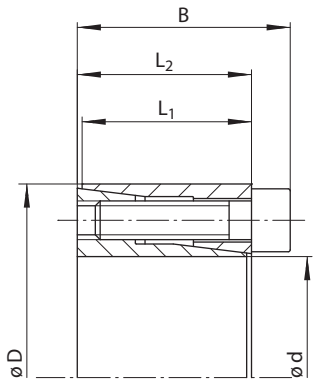
Example for ordering

Cone Clamping Element RLK 350 for shaft diameter d = 50 mm:

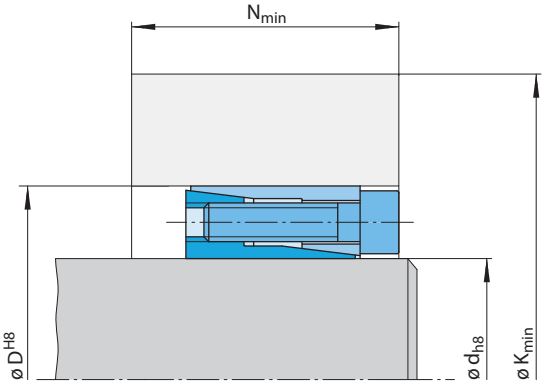
- RLK 350, size 50 x 80
  Article number 4208.050.001.000000

Cone Clamping Elements RLK 350

centers the hub to the shaft
for small shaft diameters



49-1

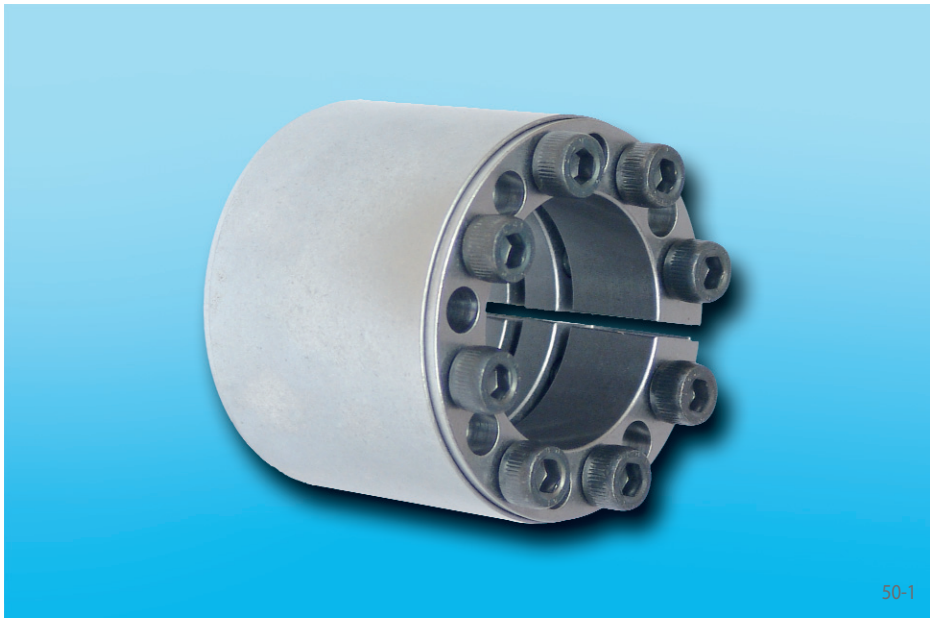


49-2

Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
5	16	13,5	10	11	24	18	21	16	20	16	4,0	1,6	176	55	1,0	3	M2,5	10	0,010	4208.005.001.000000
6	16	13,5	10	11	24	18	21	16	20	16	5,0	1,7	147	55	1,0	3	M2,5	10	0,012	4208.006.001.000000
7	17	13,5	10,5	11	25	18	22	16	21	16	6,5	1,9	134	55	1,0	3	M2,5	10	0,013	4208.007.001.000000
8	18	13,5	10,5	11	26	18	23	16	22	16	8,0	2,0	113	50	1,0	3	M2,5	10	0,015	4208.008.001.000000
9	20	15,5	12,5	13	29	20	26	19	24	18	12,5	2,8	123	55	1,0	4	M2,5	12	0,020	4208.009.001.000000
10	20	15,5	12,5	13	29	20	26	19	24	18	12,5	2,5	110	55	1,0	4	M2,5	12	0,019	4208.010.001.000000
11	22	15,5	12,5	13	31	20	28	19	26	18	15,0	2,7	100	50	1,0	4	M2,5	12	0,024	4208.011.001.000000
12	22	15,5	12,5	13	31	20	28	19	26	18	16,5	2,8	92	50	1,0	4	M2,5	12	0,022	4208.012.001.000000
14	26	20	16,5	17	36	25	33	24	31	23	30	4,3	103	55	1,8	4	M3	16	0,039	4208.014.001.000000
15	28	20	16,5	17	38	25	35	24	33	23	33	4,4	94	50	1,8	4	M3	16	0,044	4208.015.001.000000
16	32	21	16,5	17	48	29	42	26	39	25	64	8	130	65	4,5	4	M4	16	0,067	4208.016.001.000000
17	35	25	20,5	21	49	32	44	30	41	28	68	8	124	60	4,5	4	M4	20	0,090	4208.017.001.000000
18	35	25	20,5	21	49	32	44	30	41	28	73	8	117	60	4,5	4	M4	20	0,087	4208.018.001.000000
19	35	25	20,5	21	49	32	44	30	41	28	78	8	111	60	4,5	4	M4	20	0,083	4208.019.001.000000
20	38	26	20,5	21	59	37	51	33	47	31	150	15	143	75	9,0	4	M5	20	0,100	4208.020.001.000000
22	40	26	20,5	21	61	37	53	33	49	31	160	14	128	70	9,0	4	M5	20	0,110	4208.022.001.000000
24	47	32	25	26	71	44	62	40	58	38	250	20	147	75	16	4	M6	25	0,200	4208.024.001.000000
25	47	32	25	26	71	44	62	40	58	38	260	20	141	75	16	4	M6	25	0,190	4208.025.001.000000
28	50	32	25	26	85	50	72	43	65	40	440	31	179	100	16	6	M6	25	0,180	4208.028.001.000000
30	55	32	25	26	89	49	77	43	69	39	470	31	175	95	16	6	M6	30	0,220	4208.030.001.000000
32	55	32	25	26	89	49	77	43	69	39	500	31	164	95	16	6	M6	30	0,270	4208.032.001.000000
35	60	37	30	31	100	57	86	50	77	46	730	41	163	95	16	6	M6	30	0,250	4208.035.001.000000
38	65	37	30	31	104	57	90	50	82	46	800	42	154	90	16	8	M6	35	0,360	4208.038.001.000000
40	65	37	30	31	104	57	90	50	82	46	840	42	147	90	16	8	M6	35	0,430	4208.040.001.000000
45	75	44	35	36	134	74	113	63	100	57	1 300	57	150	90	37	8	M8	35	0,630	4208.045.001.000000
50	80	44	35	36	138	73	118	63	105	57	1 900	76	184	115	37	8	M8	35	0,700	4208.050.001.000000

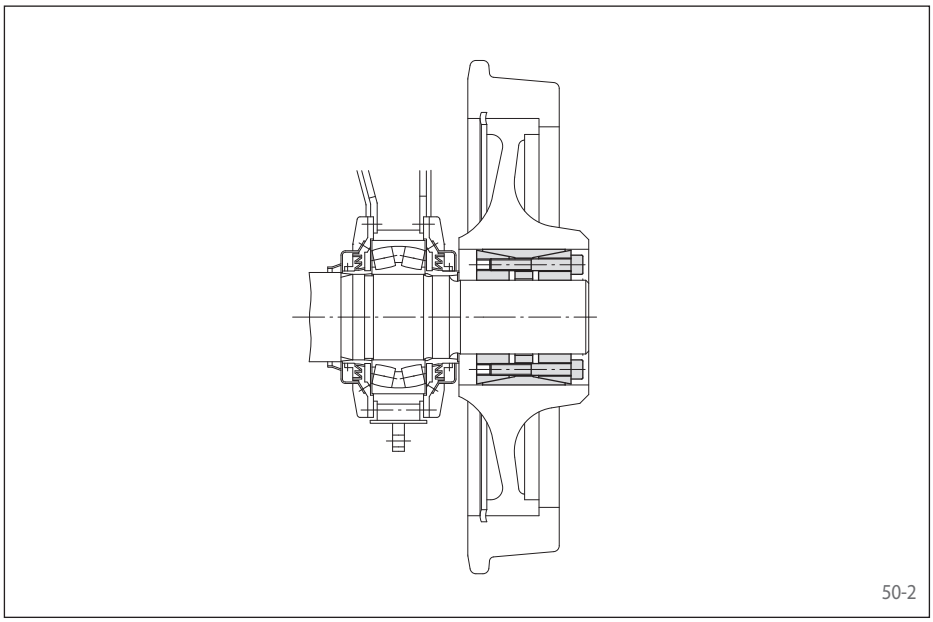
Cone Clamping Elements RLK 402

centers the hub to the shaft
highest transmissible torque



Features

- Centers the hub to the shaft
- Highest transmissible torque
- For heavy duty applications
- No axial displacement between hub and shaft during clamping procedure
- For shaft diameters between 25 mm and 300 mm



Application example

Backlash free connection of rail wheels of a crane with Cone Clamping Elements RLK 402. The clamping elements center the rail wheels on the shaft. Because there is no axial displacement during clamping, the axial position of the wheel is maintained on the shaft.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 43 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 402.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

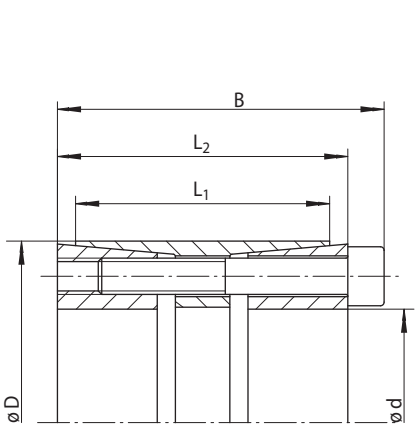
Example for ordering

Cone Clamping Element RLK 402 for shaft diameter d = 50 mm:

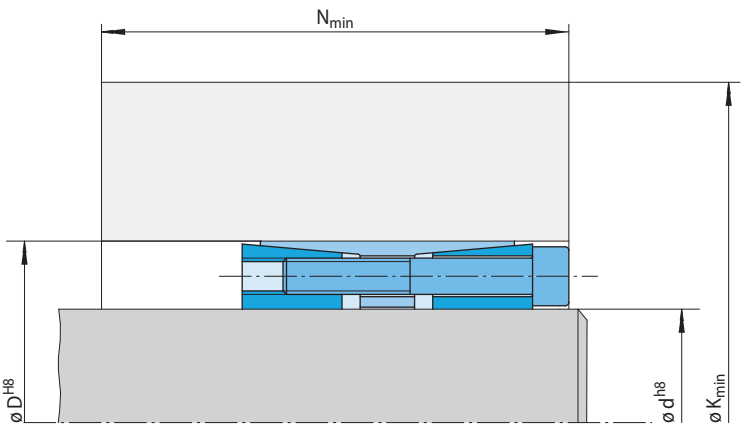
- RLK 402, size 100 x 145
  Article number 4205.100.201.000000

Cone Clamping Elements RLK 402

centers the hub to the shaft
highest transmissible torque



51-1



51-2

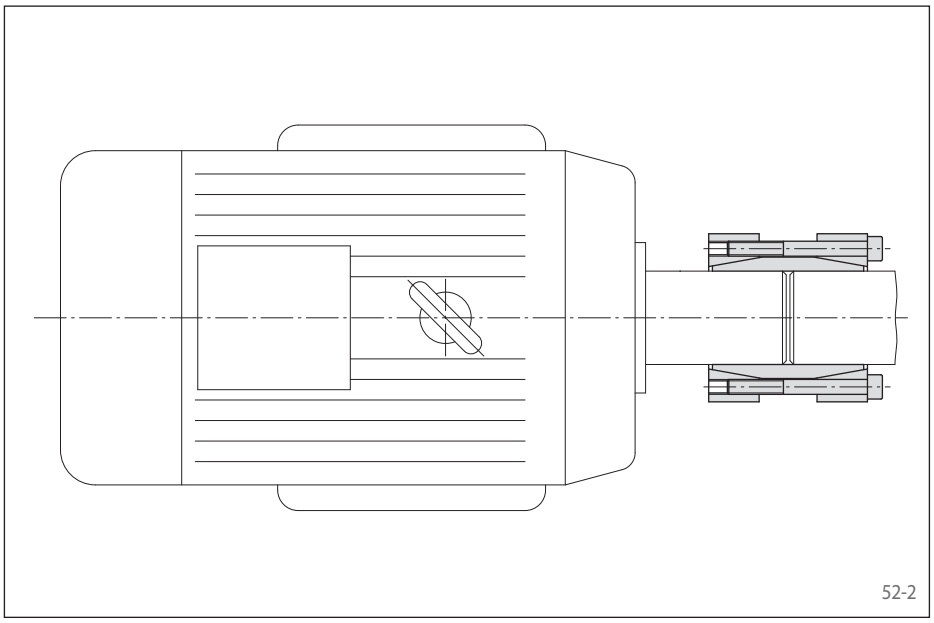
Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
25	50	51	41	45	98	73	80	64	69	59	700	55	182	91	16	6	M6	35	0,5	4205.025.201.000000
28	55	51	41	45	118	81	94	69	80	62	1 000	70	217	90	16	8	M6	35	0,5	4205.028.201.000000
30	55	51	41	45	118	81	94	69	80	62	1 200	70	202	110	16	8	M6	35	0,5	4205.030.201.000000
32	60	51	41	45	121	80	98	68	84	61	1 250	70	189	90	16	8	M6	35	0,8	4205.032.201.000000
35	60	51	41	45	121	80	98	68	84	61	1 400	70	173	101	16	8	M6	35	0,7	4205.035.201.000000
38	65	51	41	45	138	86	111	72	95	64	1 850	90	199	100	16	10	M6	35	1,1	4205.038.201.000000
40	65	51	41	45	138	86	111	72	95	64	2 000	90	189	117	16	10	M6	35	1,1	4205.040.201.000000
42	75	51	41	45	175	99	139	81	116	70	2 900	140	252	130	37	8	M8	35	1,2	4205.042.201.000000
45	75	51	41	45	175	99	139	81	116	70	3 200	140	235	141	37	8	M8	35	1,1	4205.045.201.000000
48	80	70	58	62	161	109	130	93	112	84	3 400	140	156	80	37	8	M8	55	1,5	4205.048.201.000000
50	80	70	58	62	161	109	130	93	112	84	3 570	140	149	93	37	8	M8	55	1,4	4205.050.201.000000
55	85	70	58	62	164	108	134	93	117	84	3 920	140	136	88	37	8	M8	55	1,5	4205.055.201.000000
60	90	70	58	62	187	117	151	99	129	88	5 350	170	156	104	37	10	M8	55	1,6	4205.060.201.000000
65	95	70	58	62	190	116	155	98	133	87	5 800	170	144	98	37	10	M8	55	1,7	4205.065.201.000000
70	110	86	70	76	236	146	189	123	161	109	9 880	280	176	112	73	10	M10	60	3,1	4205.070.201.000000
75	115	86	70	76	238	145	193	122	165	108	10 500	280	164	107	73	10	M10	60	3,3	4205.075.201.000000
80	120	86	70	76	265	156	212	129	179	113	13 500	339	185	123	73	12	M10	60	3,5	4205.080.201.000000
85	125	86	70	76	267	154	215	128	184	113	14 300	339	174	118	73	12	M10	60	3,6	4205.085.201.000000
90	130	86	70	76	270	153	219	128	188	112	15 200	339	164	114	73	12	M10	60	3,8	4205.090.201.000000
95	135	86	70	76	273	152	223	127	193	112	16 000	339	156	110	73	12	M10	60	4,0	4205.095.201.000000
100	145	110	92	98	313	191	251	160	213	141	24 700	495	163	112	126	12	M12	80	6,1	4205.100.201.000000
110	155	110	92	98	319	189	259	159	222	141	27 200	495	148	105	126	12	M12	80	6,6	4205.110.201.000000
120	165	110	92	98	350	200	283	166	242	146	34 600	578	159	115	126	14	M12	80	7,1	4205.120.201.000000
130	180	128	108	114	373	222	302	186	259	165	44 200	680	147	106	201	12	M14	90	10,0	4205.130.201.000000
140	190	128	108	114	409	235	329	195	280	170	55 500	794	159	117	201	14	M14	90	10,6	4205.140.201.000000
150	200	128	108	114	443	247	356	203	301	176	68 000	900	170	127	201	16	M14	90	11,2	4205.150.201.000000
160	210	128	108	114	449	245	363	202	310	175	72 500	900	159	121	201	16	M14	90	11,9	4205.160.201.000000
170	225	162	136	146	470	280	380	235	325	207	91 700	1 079	142	107	309	14	M16	110	17,6	4205.170.201.000000
180	235	162	136	146	509	294	409	244	348	214	111 000	1 200	153	117	309	16	M16	110	18,5	4205.180.201.000000
190	250	162	136	146	517	291	421	243	361	213	117 200	1 200	145	110	309	16	M16	110	21,4	4205.190.201.000000
200	260	162	136	146	523	289	429	242	370	212	123 300	1 200	138	106	309	16	M16	110	22,4	4205.200.201.000000
220	285	162	136	146	598	314	487	258	418	224	140 500	1 200	157	121	309	20	M16	110	26,6	4205.220.201.000000
240	305	162	136	146	638	324	522	266	449	229	203 500	1 500	158	124	309	22	M16	110	28,7	4205.240.201.000000
260	325	162	136	146	649	320	537	264	466	229	220 500	1 700	146	117	309	22	M16	110	31,2	4205.260.201.000000
280	355	197	165	177	716	372	589	308	509	268	304 300	2 100	143	113	605	18	M20	130	46,8	4205.280.201.000000
300	375	197	165	177	764	386	629	318	543	275	362 300	2 400	148	118	605	20	M20	130	49,7	4205.300.201.000000

Cone Clamping Elements RLK 500

for coupling of shafts

Features

- Rigid shaft coupling
- Centers the shaft to the shaft
- Easy to release
- For shaft diameters between 14 mm and 100 mm



Application example

Simple and cost-effective connection of two shaft ends with a Cone Clamping Element RLK 500. The Cone Clamping Element connects the shafts without backlash.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 53 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d

Surfaces

Average surface roughness at the contact surfaces of the shafts $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ca. 170 kN/mm^2

Installation

The shaft ends must at least overlap L_1.

Please request our installation and operating instructions for Cone Clamping Elements RLK 500.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 54 and 55.

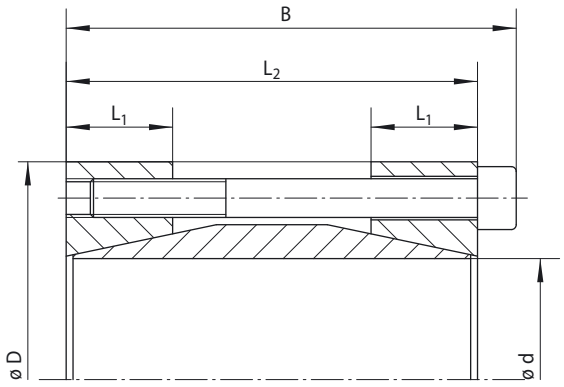
Example for ordering

Cone Clamping Element RLK 500 for shaft diameter d = 50 mm:

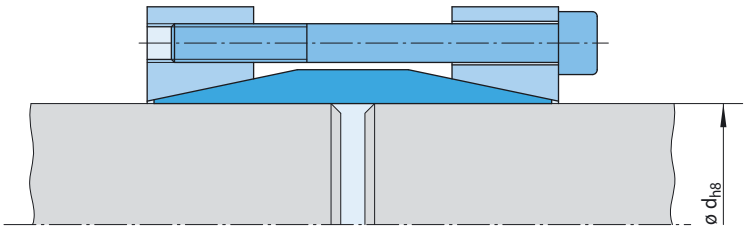
- RLK 500, size 50 x 80
  Article number 4207.050.001.000000

Cone Clamping Elements RLK 500

for coupling of shafts



53-1



53-2

Dimensions					Technical Data							Article number
					Transmissible torque or axial force		Clamping screws					
Size							Tightening torque	Num-ber	Size	Length	Weight	
d mm	D mm	B mm	L_1 mm	L_2 mm	M Nm	F kN	M_S Nm			mm	kg	
14	45	56	15	50	130	18	16	4	M6	45	0,380	4207.014.001.000000
15	45	56	15	50	140	18	16	4	M6	45	0,350	4207.015.001.000000
16	45	56	15	50	150	18	16	4	M6	45	0,370	4207.016.001.000000
17	45	56	15	50	160	18	16	4	M6	45	0,400	4207.017.001.000000
18	50	56	15	50	160	17	16	4	M6	45	0,450	4207.018.001.000000
19	50	56	15	50	170	17	16	4	M6	45	0,440	4207.019.001.000000
20	50	56	15	50	180	18	16	4	M6	45	0,440	4207.020.001.000000
22	55	66	18	60	310	28	16	6	M6	55	0,500	4207.022.001.000000
24	55	66	18	60	330	27	16	6	M6	55	0,630	4207.024.001.000000
25	55	66	18	60	350	28	16	6	M6	55	0,610	4207.025.001.000000
28	60	66	18	60	340	24	16	6	M6	55	0,750	4207.028.001.000000
30	60	66	18	60	370	24	16	6	M6	55	0,710	4207.030.001.000000
32	75	83	20	75	520	32	37	4	M8	70	0,140	4207.032.001.000000
35	75	83	20	75	570	32	37	4	M8	70	1,330	4207.035.001.000000
38	75	83	20	75	620	32	37	4	M8	70	1,200	4207.038.001.000000
40	75	83	20	75	650	32	37	4	M8	70	1,190	4207.040.001.000000
42	85	93	22	85	990	47	37	6	M8	80	1,800	4207.042.001.000000
45	85	93	22	85	1050	46	37	6	M8	80	1,720	4207.045.001.000000
50	90	93	22	85	1200	48	37	6	M8	80	1,800	4207.050.001.000000
55	95	93	22	85	1700	61	37	8	M8	80	2,000	4207.055.001.000000
60	100	93	22	85	1950	65	37	8	M8	80	2,170	4207.060.001.000000
65	105	93	22	85	2150	66	37	8	M8	80	2,600	4207.065.001.000000
70	115	110	35	100	2800	80	73	6	M10	80	4,100	4207.070.001.000000
75	120	110	35	100	2900	77	73	6	M10	80	4,300	4207.075.001.000000
80	125	110	35	100	4200	100	73	8	M10	80	4,480	4207.080.001.000000
90	135	110	35	100	4700	100	73	8	M10	80	5,200	4207.090.001.000000
100	155	132	40	120	7600	150	126	8	M12	100	6,000	4207.100.001.000000

Technical Points for Cone Clamping Elements

Clamping screw tightening torque

The tightening torque M_S listed in the tables must be achieved during assembly and must not be exceeded by more than 10%. If the indicated tightening torque M_S is not achieved, the transmissible torque or axial force, as well as the contact pressures at the shaft and at the hub will be proportionally reduced compared to the values listed in the tables for M or F as well as for P_W and P_N. When the indicated tightening torque M_S is undercut by more than 30%, please contact us.

Preload force for RLK 300

The preload force is achieved by clamping screws to be provided by the customer, with the tightening torque M_S and the preload force for metric screws E_S to be taken from the table to the right.

The preload forces indicated in the table are corrected for friction value deviations.

Size	Preload Force E_S (kN)			Tightening torque for μ_k=0,1 M_S (Nm)		
	8.8	10.9	12.9	8.8	10.9	12.9
M4	3,8	5,5	6,7	2,6	3,9	4,5
M5	6,3	9,4	11,0	5,2	7,6	8,9
M6	9,1	13,2	15,5	9,0	13,2	15,4
M8	16,3	24,0	28,2	21,6	31,8	37,2
M10	26,5	38,5	44,7	43	63	73
M12	37,4	55,5	64,8	73	108	126
M14	52,0	76,5	89,1	117	172	201
M16	70,7	103,9	121,3	180	264	309
M18	89,6	127,1	149,3	259	369	432
M20	113,7	162,4	189,7	363	517	605
M22	141,4	201,5	236,3	495	704	824
M24	164,6	233,7	273,8	625	890	1041

Number z and size of the clamping screws are to be chosen so that

$z \cdot E_S = E_1$ bzw. E_2

For RLK 300, the preload force E_1 or E_2 may be increased or decreased as compared to the value indicated in the table. M, F, P_W and P_N change approximately proportionally. When the preload force is exceeded by more than double the value or lower by more than half the value indicated in the table, please contact us.

Design security

On page 5, the RINGSPANN calculation method for determination of the preload forces according to common friction-coefficient fluctuations is explained. As already shown there, the transmissible torques M and axial forces F listed in the tables are calculated based on the minimum preload force F_S, whereas the required hub outer diameters K_{min} are calculated based on the maximum preload force F_S. This assumes that the screw tightening torques M_S assumed in the table are exceeded by 10%.

The calculation for the elements RLK 300, assumes that the preload force of the clamping screws provided by the customer is distributed accordingly.

In the interest of the best design security, the following assumptions were made for the calculation of the Cone Clamping Elements:

For calculating	Assumed preload force	
	for all series except RLK 300	for series RLK 300
M and F	Lower limit value F_S	87% of the table value E_1 or E_2
P_W and P_N	Middle limit value F	table value E_1 or E_2
K_{min}	Upper limit value F_S	128% of the table value E_1 or E_2

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced compared to the values listed in the tables for M and F.

For a given axial force F_A, the reduced torque M_{red} is calculated as:

$$M_{red} = \sqrt{M^2 - (F_A \cdot \frac{d_w}{2})^2}$$

For a given torque M_A, the reduced axial force F_{red} is calculated as:

$$F_{red} = \frac{2}{d_w} \sqrt{M^2 - M_A^2}$$

Bending moments

Where there are bending moments in addition to the torque M_A or the axial force F_A, the transmissible torque or transmissible axial force is reduced compared to the values for M or F as listed in the tables. Please contact us.

Hollow shafts

When clamping Cone Clamping Elements on hollow shafts, the tangential stress σ_{tWi} must not exceed the yield strength R_e of the hub material. For double arrangements of Cone Clamping Elements RLK 300, assume twice the value for L_1.

$$\sigma_{tWi} = 1{,}28 \cdot P_W \cdot \frac{L_1}{L_1 + d - d_{Wi}} \cdot \frac{2}{1 - C_W^2} \quad \text{with}$$

$$C_W = \frac{d_{Wi}}{d}$$

Hub Design

For the different Cone Clamping Element series, the tables list the required hub width N_{min} and the required hub outer diameter K_{min} for three exemplary yield strengths R_e of the hub. Thereby, the hub is to be arranged as seen in figure 55-1 for Cone Clamping Elements with a fixed backstop point. For Cone Clamping Elements without a fixed backstop point, the hub is to be arranged according to figure 55-2. For this, we practically assume that the screw heads of the Cone Clamping Element are flush with the hub on one side.

When the actual load-bearing hub width N_A is smaller than the required hub width N_{min} and the yield strengths R_e of the hub material is known, the required hub outer diameter K_{min} can be calculated as follows:

$$K_{min} = \frac{D \cdot (H + 0{,}5)}{H - 1} \quad \text{with}$$

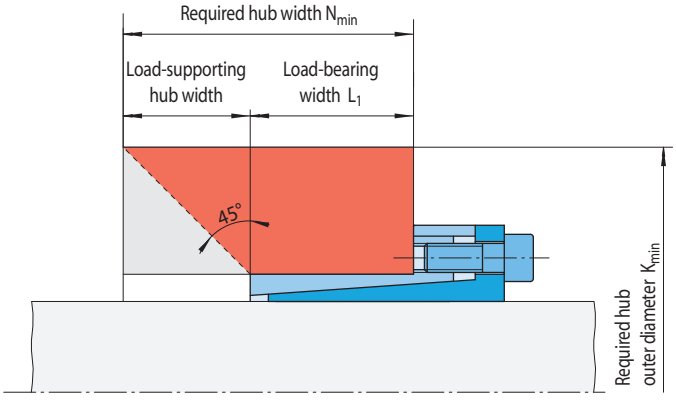
$$H = \frac{5}{8} \cdot \frac{R_e}{P_N} \cdot \frac{N_A}{L_1}$$

When the hub width N_A is known and the hub outer diameter K_A is known, the hub material yield strength R_e must be higher than the equivalent stress σ_v in the hub.

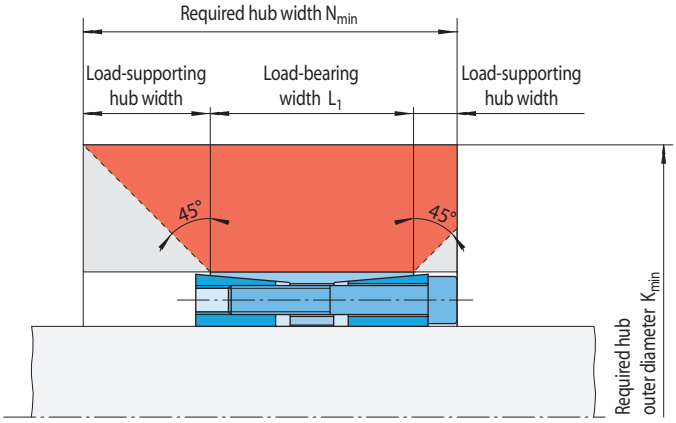
$$\sigma_v = 1{,}28 \cdot P_N \cdot \frac{L_1}{N_A} \cdot \frac{1 + 0{,}5 \cdot C_N}{0{,}8 \cdot (1 - C_N)} \quad \text{with}$$

$$C_N = \frac{D}{K_A}$$

The load-bearing hub width N_A in the application must not be smaller than the load-bearing width L_1.



Hub arrangement for Cone Clamping Elements with a fixed backstop point 55-1



Hub arrangement for Cone Clamping Elements without a fixed backstop point 55-2

Formula symbols

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_{red} = Reduced torque [Nm]

M_S = Screw tightening torque [Nm]

F = Transmissible axial force according to table [kN]

F_A = Maximum actual application axial force [kN]

F_{red} = Reduced axial force [kN]

F_S = Preload force [kN]

E_1 = Preload force according to table [kN]

E_2 = Preload force according to table [kN]

E_S = Preload force for metric screws according to table [kN]

P_N = Contact pressure at the hub according to table [N/mm²]

P_W = Contact pressure at the shaft according to table [N/mm²]

σ_v = Equivalent stress in the hub [N/mm²]

σ_{tWi} = Tangential stress in the hollow shaft [N/mm²]

R_e = Hub material yield strength [N/mm²]

d = Shaft diameter [mm]

d_{Wi} = Inner hollow shaft diameter [mm]

D = Hub bore [mm]

K_A = Hub outer diameter in the application [mm]

K_{min} = Required hub outer diameter according to table or calculation [mm]

L_1 = Load-bearing axial width according to table [mm]

N_A = Load-bearing hub width in the application [mm]

N_{min} = Required hub width according to table [mm]

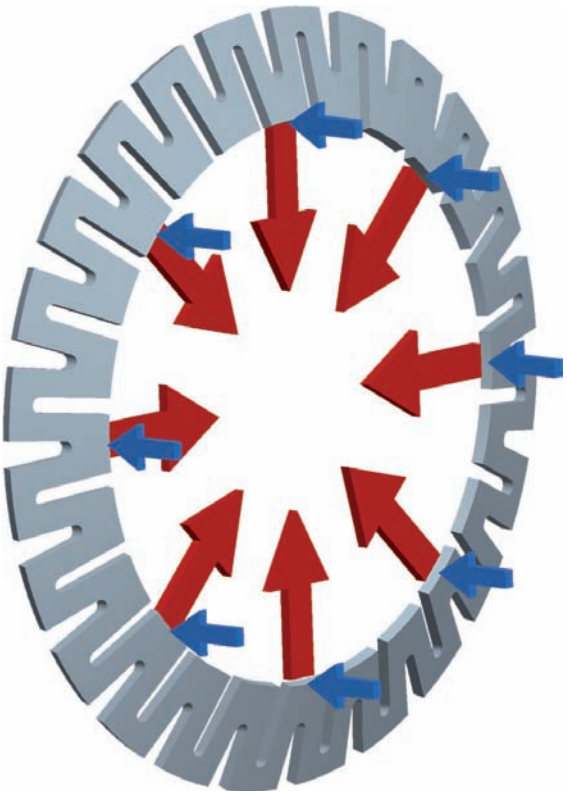
C_N, C_W and H are reference values without units.

Design and Function of Star Discs

The RINGSPANN Star Disc is a flat conical ring made of special hardened spring steel. The characteristic slot pattern, alternating from the outside to the inside edge, gives the Star Discs its very high elasticity. The outer circumference of the Star Disc is supported in the bore of the hub to be connected. The axial actuating force applied to the inner circumference of the Star Disc causes an elastic change in the conical angle and thus reduces the inner circumference of the Star Disc (see figure 56-1). A particular advantage of this configuration is that the axial actuating force is converted virtually without friction loss into a much higher radial force. This facilitates simple actuating devices, such as clamping with the aid of a central clamping screw or a manually adjusted knurled nut, for example.

Depending upon the torque required, Star Discs are used singly or in multiple arrangements as disc packs, generally consisting of a maximum of 16 discs. This arrangement provides for space-saving, clamping connections.

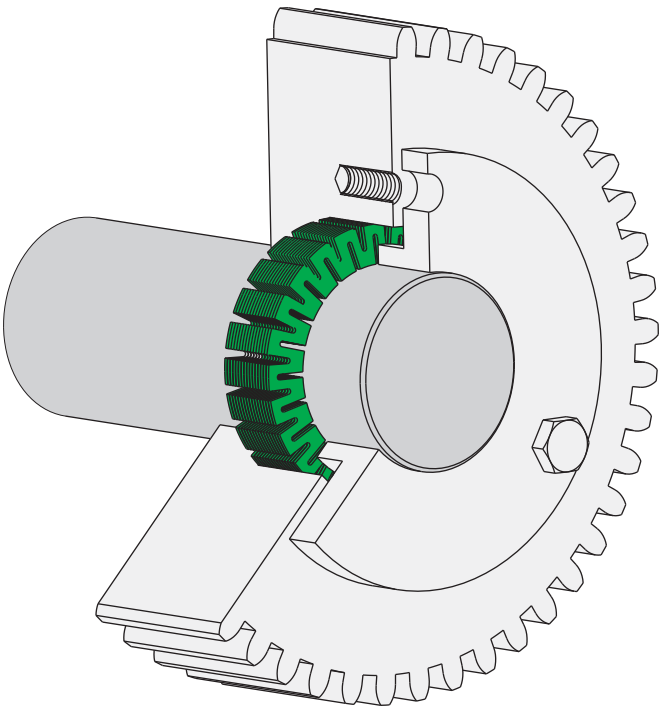
Clamping connections with Star Discs are easy to release even after frequent clamping. This makes the Star Disc the ideal clamping element, e.g. in adjustment devices.



56-1

Features

- For frequent clamping and release
- Short axial width
- Adjustable to the required torque by multiple arrangements in the form of disc packs
- Low actuating force required, thus ideal for manual actuation

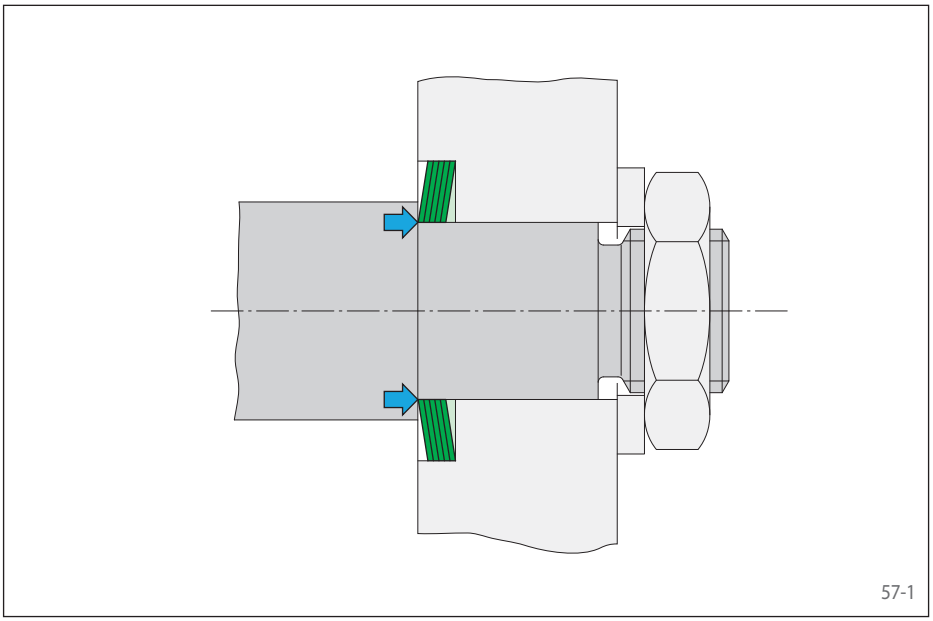


56-2

Clamping with star discs

Clamping connection at the shaft end

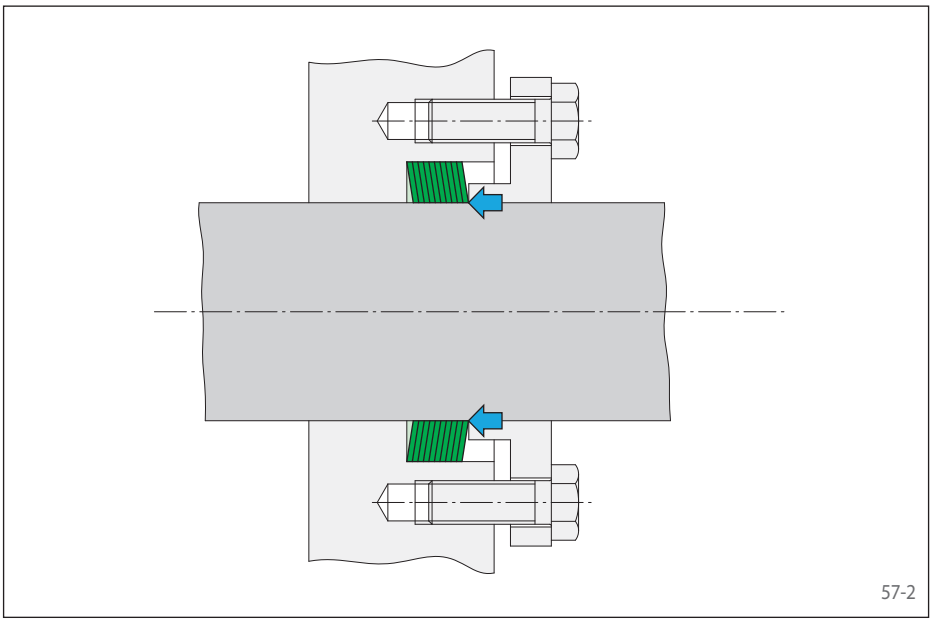
Figure 57-1 shows a clamping connection with a disc pack that consists of five Star Discs. The preload force of the clamping nut is transmitted to the disc pack by the opposite shaft shoulder.



57-1

Clamping connection on a continuous shaft

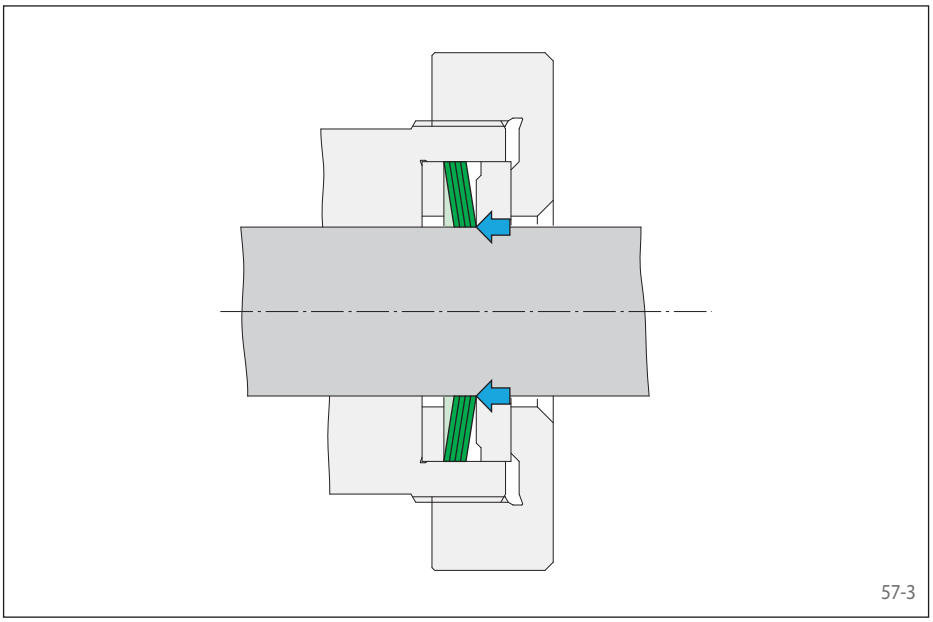
Figure 57-2 shows a clamping connection with a disc pack consisting of ten Star Discs. The preload force of the screws acts on the disc set through a clamping flange.



57-2

Clamping connection with a threaded ring

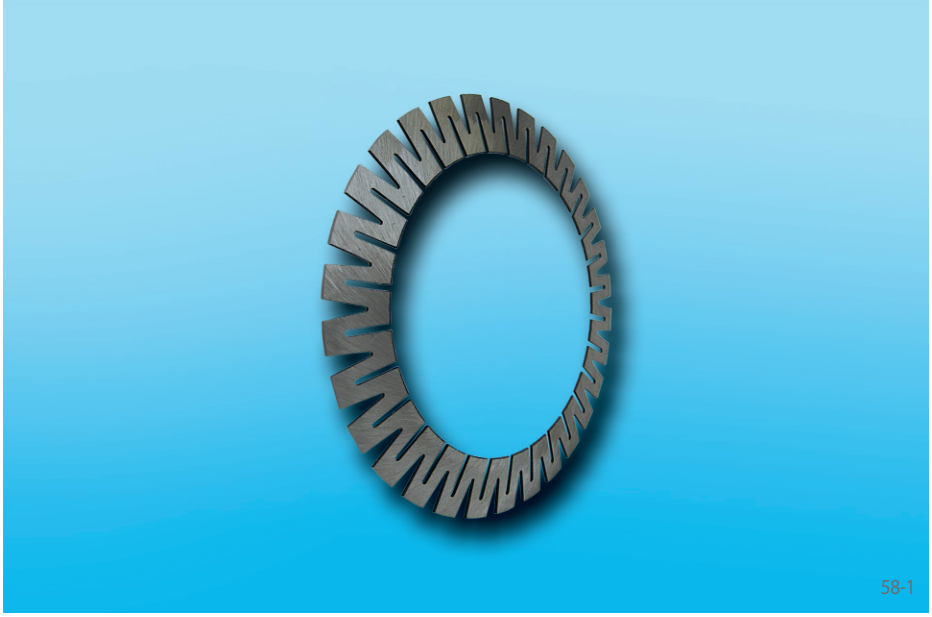
Figure 57-3 shows a clamping connection with a disc pack consisting of four Star Discs and a manually adjusted threaded ring. Between the disc pack and the threaded ring, there is a pressure disc. It transmits the axial actuation force to the disc pack inner diameter and thereby prevents the disc pack from turning as well when the threaded ring is tightened.



57-3

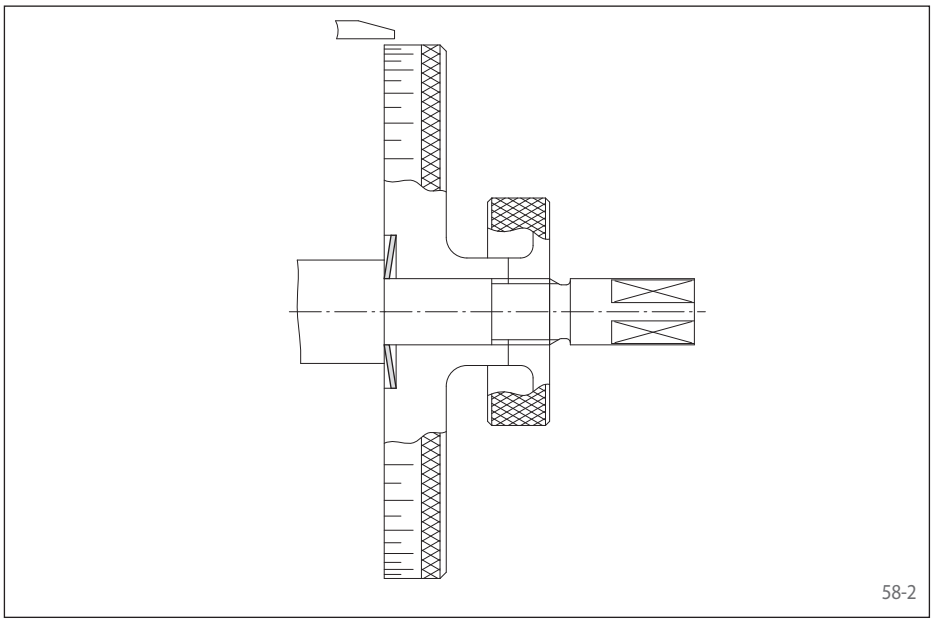
Star Discs

for frequent clamping and loosening
short axial width



Features

- For frequent clamping and release
- Short axial width
- Adjustable to the required torque by multiple arrangements in the form of disc packs
- Low actuating force required, thus ideal for manual actuation



Application example

Backlash free attachment of a graduated dial in a feed unit with a Star Disc. After release of the right knurled nut, the dial can be adjusted in circumferential direction.

Transmissible torques

The transmissible torques listed on page 59 are subject to the following information about disc pack, tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Disc Pack

The torque M stated in the table applies for one star disc. In case of multiple arrangements of star discs in disc packs of up to 16 star discs, the following applies:

Torque	$M_n = n \cdot M$
Preload force	$E_n = n \cdot E$
Load-bearing axial width	$L_1 \approx n \cdot s$

Tolerances

- h9 for shaft diameter d
- H9 for hub bore D

Surfaces

Average surface roughness at the contact surfaces of the shafts $R_a \leq 3{,}2$ µm.

Materials

The following apply to the shaft and the hub:

- Yield strength $R_e \geq 300$ N/mm^2
- E-module ca. 170 kN/mm^2

Installation

Please request our installation and operating instructions for Start Discs.

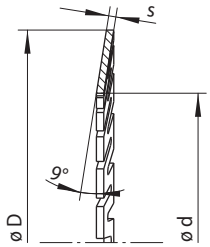
Example for ordering

100 Star Discs for shaft diameter d = 20 mm:

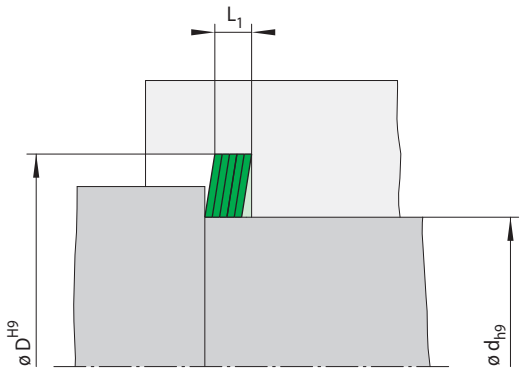
- 100 pcs. A 20 SS 37
  Article number 1032.037.004.000000

Star Discs

for frequent clamping and loosening
short axial width



59-1



59-2

Dimensions			Technical Data					Type	Article number
Size			Transmissible torque	Contact pressure at Shaft	Contact pressure at Hub	Preload force	Weight		
d mm	D mm	s mm	M Nm	P_W N/mm²	P_N N/mm²	E N	kg		
4	14	0,50	0,16	100	29	140	0,033	A 4 SS 14	1032.014.002.000000
5	14	0,50	0,29	116	41	210	0,034	A 5 SS 14	1032.014.003.000000
6	18	0,50	0,34	94	31	180	0,055	A 6 SS 18	1032.018.001.000000
8	18	0,50	0,72	113	50	310	0,059	A 8 SS 18	1032.018.003.000000
10	22	0,60	1,26	105	48	430	0,110	A 10 SS 22	1032.022.002.000000
11	22	0,60	1,53	105	53	500	0,110	A 11 SS 22	1032.022.003.000000
12	27	0,65	1,95	104	46	520	0,130	A 12 SS 27	1032.027.001.000000
14	27	0,65	2,80	110	57	680	0,140	A 14 SS 27	1032.027.003.000000
15	27	0,65	3,30	113	63	770	0,140	A 15 SS 27	1032.027.004.000000
16	37	0,90	5,10	111	48	1030	0,340	A 16 SS 37	1032.037.001.000000
17	37	0,90	5,90	113	52	1150	0,340	A 17 SS 37	1032.037.002.000000
18	37	0,90	6,80	117	57	1270	0,350	A 18 SS 37	1032.037.003.000000
20	37	0,90	8,70	121	65	1540	0,370	A 20 SS 37	1032.037.004.000000
22	42	0,90	9,90	114	60	1490	0,470	A 22 SS 42	1032.042.001.000000
24	42	0,90	12,2	118	67	1760	0,480	A 24 SS 42	1032.042.002.000000
25	42	0,90	13,5	120	71	1900	0,490	A 25 SS 42	1032.042.003.000000
28	52	1,15	21,0	116	63	2550	0,920	A 28 SS 52	1032.052.001.000000
30	52	1,15	25,0	121	70	2900	0,950	A 30 SS 52	1032.052.002.000000
35	52	1,15	33,5	119	80	3750	1,000	A 35 SS 52	1032.052.004.000000
38	62	1,15	40,5	122	75	3600	1,200	A 38 SS 62	1032.062.001.000000
40	62	1,15	45,5	124	80	4000	1,250	A 40 SS 62	1032.062.002.000000
42	62	1,15	51,0	126	85	4450	1,300	A 42 SS 62	1032.062.003.000000
45	62	1,15	60,0	129	94	5200	1,350	A 45 SS 62	1032.062.004.000000
48	70	1,15	68,0	128	88	5000	1,500	A 48 SS 70	1032.070.001.000000
50	70	1,15	75,0	130	93	5500	1,550	A 50 SS 70	1032.070.002.000000
55	70	1,15	93,0	134	105	7000	1,650	A 55 SS 70	1032.070.003.000000
60	80	1,15	112	135	101	6800	2,100	A 080 060 IV	1032.080.001.000000
65	90	1,15	131	135	97	6700	2,150	A 090 065 IV	1032.090.001.000000
70	90	1,15	154	137	106	8000	2,250	A 090 070 IV	1032.090.002.000000
75	100	1,15	176	136	102	7800	2,400	A 100 075 IV	1032.100.001.000000
80	100	1,15	205	139	111	9300	2,600	A 100 080 IV	1032.100.002.000000
85	110	1,15	230	138	107	9000	2,700	A 110 085 IV	1032.110.001.000000
100	120	1,15	325	141	118	11900	3,400	A 120 100 IV	1032.120.001.000000

Technical Points for Star Discs

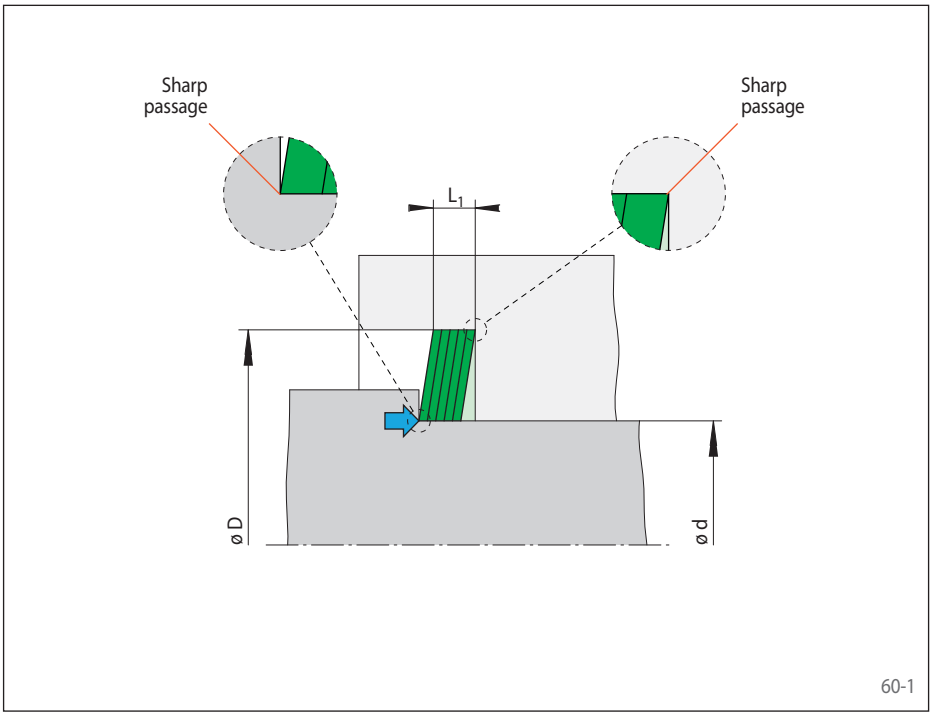
Design points

The outer diameter D of the Star Disc is supported in the bore of the hub to be connected. The Star Disc seats with the concave face of the cone against the fixed backstop point of the hub. The axial actuation force must be applied opposite at the front side of the inner diameter d.

The passages from shaft diameter d and supporting diameter D to the respective plane surfaces must be sharp-edged, without corner arc or undercut.

The shaft must be centerd according to the requirements.

If a torque M_A and an axial force F_A are to be transmitted at the same time, please contact us.



Frequent clamping and release

Clamping connections with Star Discs can be easily released repeatedly. They can be clamped and released up to 5 000 times. Star Discs from size A 080 060 IV are durable and not subject to this limitation.

For loosening the clamping connection, displace the hub against the shaft

Preload force

The preload force is achieved by clamping screws to be provided by the customer, with the tightening torque M_S and the preload force for metric screws E_S to be taken from the table to the right.

The preload forces indicated in the table are corrected for friction value deviations.

Size	Preload force E_S (kN)			Tightening torque for μ_k=0,1 M_S (Nm)		
	8.8	10.9	12.9	8.8	10.9	12.9
M4	3,8	5,5	6,7	2,6	3,9	4,5
M5	6,3	9,4	11,0	5,2	7,6	8,9
M6	9,1	13,2	15,5	9,0	13,2	15,4
M8	16,3	24,0	28,2	21,6	31,8	37,2

Number z and size of the clamping screws are to be chosen so that

E or $E_n = z \cdot E_S \cdot 1\,000$

If the preload force E or E_1 is exceeded, the Star Disc will be overstressed or the permissible contact pressure will be exceeded.

Disc Pack

Star Discs are used separately or combined to disc packs according to the required torque. For multiple arrangements in a disc pack of n = 16 Star Discs, the following applies:

Torque $M_n = n \cdot M$

Preload force $E_n = n \cdot E$

Load-bearing axial width $L_1 \approx n \cdot s$

For disc packs with more than 16 Star Discs, any Star Discs exceeding 16 will only transmit approx. 50% of the torque M. The maximum number of Star Discs in a pack is limited to 25.

Hollow Shafts

When clamping Star Discs on hollow shafts, the tangential stress σ_{tWi} must not exceed the yield strength R_e of the hub material.

$$\sigma_{tWi} = 1{,}28 \cdot P_W \cdot \frac{n \cdot s}{n \cdot s + d - d_{Wi}} \cdot \frac{2}{1 - C_W^2} \quad \text{with}$$

$$C_W = \frac{d_{Wi}}{d}$$

Hub Design

The contact pressure P_W leads to radial stress in the shaft that is usually not critical for solid steel shafts.

There is always a tangential stress σ_t in the hub, and for thin-walled hubs it may be a multiple of the initiated pressure P_N. The amount of the applicable tangential stress depends on the load-bearing hub width N, the hub outer diameter K and the pressure P_N. For the load-bearing hub width N is taken into account, that the hub pressure N is carried by the load-bearing width L_1, and in an angle of 45° beyond it (see figure 61-1).

When the load-bearing hub width N_A and the yield strength R_e of the hub material are given, the required hub outer diameter K_{min} can be calculated as follows:

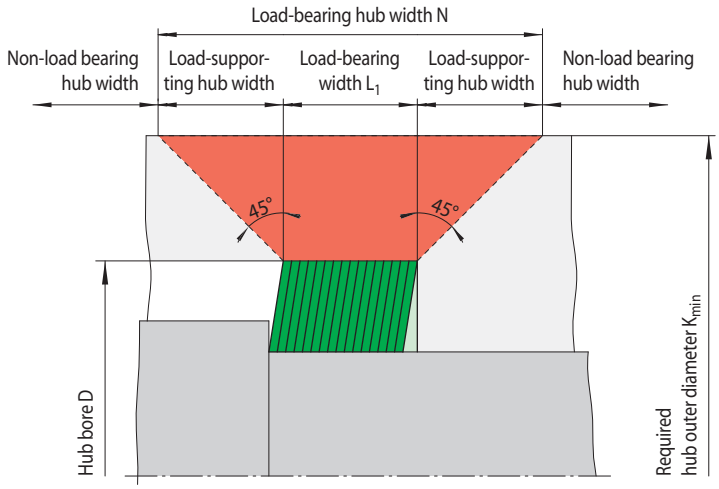
$$K_{min} = \frac{D \cdot (H + 0{,}5)}{H - 1} \quad \text{with}$$

$$H = \frac{5}{8} \cdot \frac{R_e}{P_N} \cdot \frac{N_A}{n \cdot s}$$

When the hub width N_A and the hub outer diameter K_A are given, the hub material yield strength R_e must be higher than the equivalent stress σ_v in the hub.

$$\sigma_v = 1{,}28 \cdot P_N \cdot \frac{n \cdot s}{N_A} \cdot \frac{1 + 0{,}5 \cdot C_N}{0{,}8 \cdot (1 - C_N)} \quad \text{with}$$

$$C_N = \frac{D}{K_A}$$



Load-bearing hub width 61-1

Formula symbols

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_S = Screw tightening torque [Nm]

E = Preload force according to table [N]

E_n = Preload force disc pack [N]

E_S = Preload force for metric screws according to table [kN]

P_N = Contact pressure at the hub according to table [N/mm²]

P_W = Contact pressure at the shaft according to table [N/mm²]

σ_v = Equivalent stress in the hub [N/mm²]

σ_{tWi} = Tangential stress in the hollow shaft [N/mm²]

R_e = Hub material yield strength [N/mm²]

d = Shaft diameter [mm]

d_{Wi} = Inner hollow shaft diameter [mm]

D = Hub bore [mm]

K_A = Hub outer diameter in the application [mm]

K_{min} = Required hub outer diameter according to table or calculation [mm]

L_1 = Load-bearing axial width [mm]

N_A = Load-bearing hub width in the application [mm]

s = Axial width according to table [mm]

n = Number of star discs in the pack

z = Number of clamping screws

C_N, C_W and H are reference values without units.

RINGSPANN®
Power Transmission

Freewheels

Backstops
Automatic protection against reverse running of conveyor belts, elevators, pumps and fans.

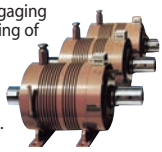
Catalogue 84

Overrunning Clutches
Automatic engaging and disengaging of drives.

Catalogue 84

Indexing Freewheels
For gradual feed of materials.

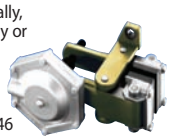
Catalogue 84

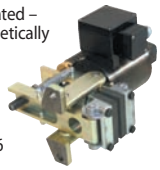
Housing Freewheels
Automatic engaging and disengaging of multimotor drives for installations with continuous operation.

Catalogue 84

Freewheel Elements
Cage Freewheels, Sprag Sets and Freewheel Chains.

Catalogue 89

Brakes

Industrial Disc Brakes
Spring activated – pneumatically, hydraulically or manually released.

Catalogue 46

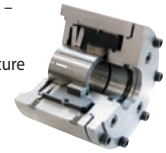
Industrial Disc Brakes
Spring activated – electromagnetically released.

Catalogue 46

Industrial Disc Brakes
Pneumatically activated – spring released.

Catalogue 46

Industrial Disc Brakes
Hydraulically activated – spring released.

Catalogue 46

Safety Clamping Units
Spring actuated – hydraulically or pneumatically released. For secure and precise positioning of piston rods.

Catalogue 32

Shaft-Hub-Connections

Two-part Shrink Discs
External clamping connection. Advantages: Simple, secure mounting even without torque wrench.

Catalogue 36

Three-part Shrink Discs
External clamping connection for the fastening of hollow shafts on solid shafts

Catalogue 36

Cone Clamping Elements
For shaft-hub connections. High torques with small dimensions.

Catalogue 36

Star and Clamping Discs
Ideal for shaft-hub-connection for frequent release.

Catalogue 36

Star Spring Washers
Axial spring element for preloading of ball bearings.

Catalogue 20

Torque and Force Limiters

Torque Limiters with Screw Face
Reliable overload protection for tough operating conditions.

Catalogue 45

Torque Limiters with Rollers
With double or single Rollers. Through ratcheting or disengaging, also for 360° synchronous running.

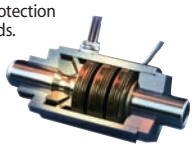
Catalogue 45

Torque Limiters with Balls
Reliable overload protection with maximum response accuracy. Also backlash free.

Catalogue 45

Torque Limiters with Friction Linings
RIMOSTAT Torque Limiter for constant torque. Belleville Spring Torque Limiter for simple release.

Catalogue 45

Force Limiters
Reliable axial overload protection in piston rods.

Catalogue 49

Couplings

Flexible Couplings
Large, allowed radial and angular misalignements. Minimum resiliency.

Catalogue 44

Flexible Couplings
Large, allowed radial and angular misalignements. Minimum resiliency.

Catalogue 44

Flange-Couplings
Rigid, easily removable shaft coupling with backlash free cone clamping elements.

E04.020

Rigid Couplings
Rigid, easily removable shaft coupling with backlash free cone clamping elements.

Catalogue 36

RINGSPANN®
Workholding Technology

Precision Clamping Fixtures

Standard Parts for Clamping Fixtures
The RINGSPANN-System for the manufacture of your own precision clamping fixtures.

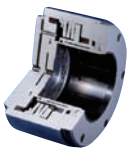
Catalogue 14

Standard Clamping Fixtures
Standard program in high precision, ready manufactured chucks and mandrels.


Special Clamping Fixtures
Custom made solutions for specific clamping problems.


Collet Mandrels
Universal, cost effective standard series. Fast collet change to other clamping diameters.

Catalogue 15

Clamping Clutches
For the automatic coupling of rolls. Fast, safe and free from slipping connection.


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