

Cone Clamping Elements

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Cone Clamping Elements

The economical shaft-hub connection for gears, chain wheels, pulleys, conveyor drums and many others.

Advantages

Fastening without play for the transmission of torques, axial forces and longitudinal forces.

Smooth and cost-effective shafts; no weakening through keyways, excellent stability.

... and when they are self-centering:
cost-effective, continuous hub bores;
no recesses necessary for centering
or axial fastening.

Concentricity (TIR) of the clamping connection
maintained within 0.02–0.04 mm

DXF-Files: <http://www.ringspann.com>

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Cone Clamping Elements

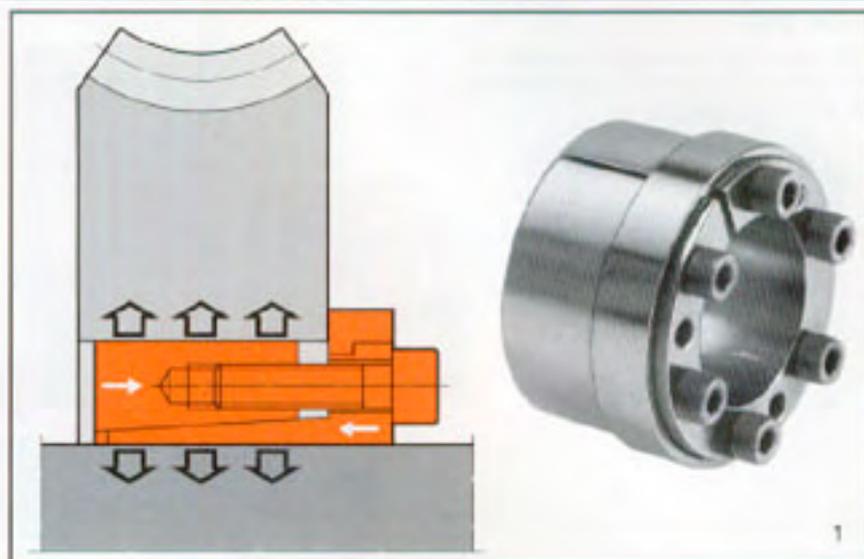
... for a universal, cost-effective clamping connection

RLK 131 + RLK 133

● self-centering

A universal clamping element for standard applications. The long clamping length guarantees true centering of the hub. The stop ring secures the axial position of the hub; the set position does not alter during clamping.

Available for shaft diameters of 20 to 200 mm.

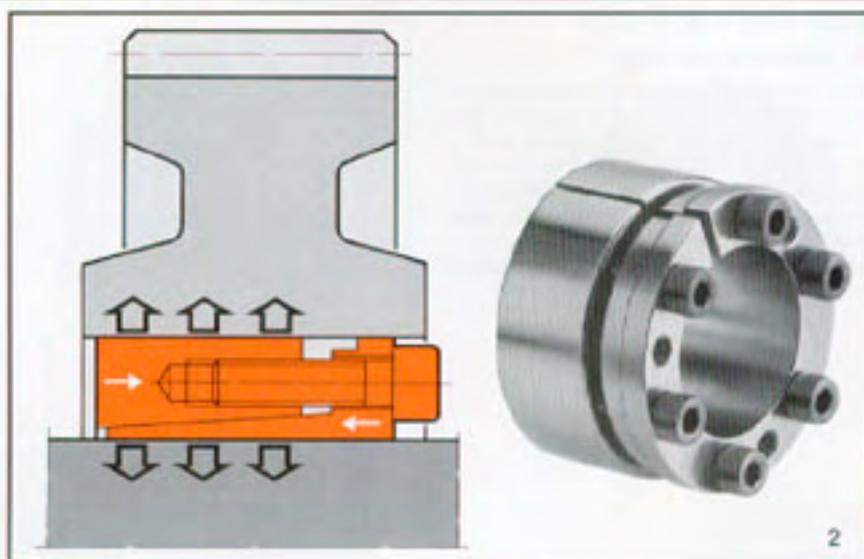


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RLK 130 + RLK 132

● self-centering

Same type as RLK 131 but without the lateral stop ring. The transmissible torques are 60% higher because only the cone surfaces slide during tightening. Available for shaft diameters of 20 to 200 mm.

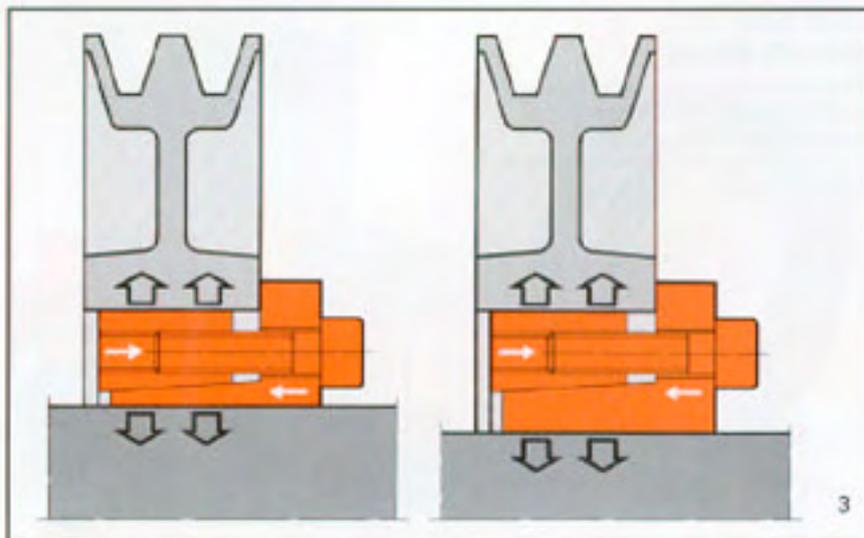


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RLK 134

● self-centering

This clamping element is available with various inner diameters thus providing a cost-effective method for fastening hubs with the same bore to shafts of different sizes. The lateral location ring secures the axial position of the hub; the set position does not alter during clamping. Available for shaft diameters from 18 to 50 mm.



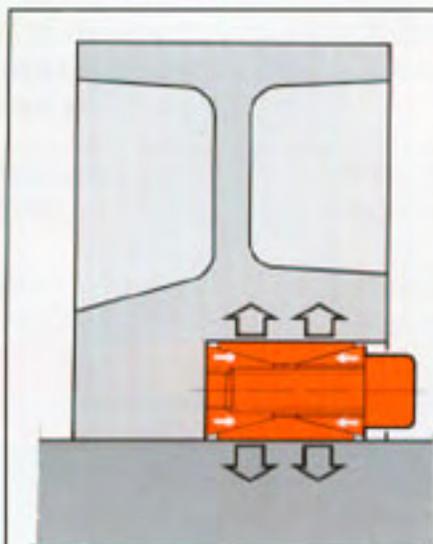
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Cone Clamping Elements

... for transmitting maximum torques.

RLK 200

The classic standard type. Available in a choice of 50 sizes for shaft diameters of 20 to 900 mm.



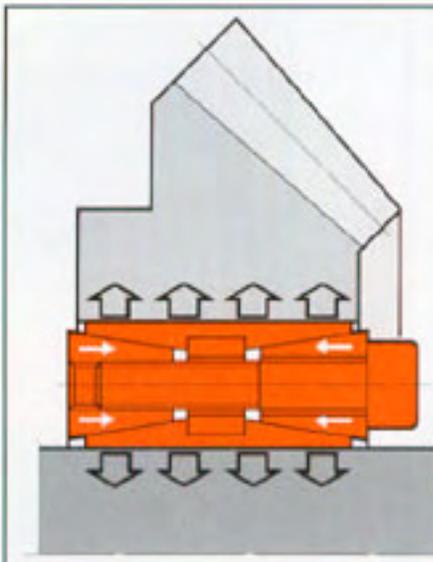
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RLK 400 + RLK 402

● self-centering

The clamping element for heavy applications. Of particular advantage are the large clamping areas of the inner and outer rings, resulting in relatively minor surface pressures on the shaft and hub even at high torques. The setting of the axial position does not change during clamping. Available for shaft diameters of 45 to 600 mm.



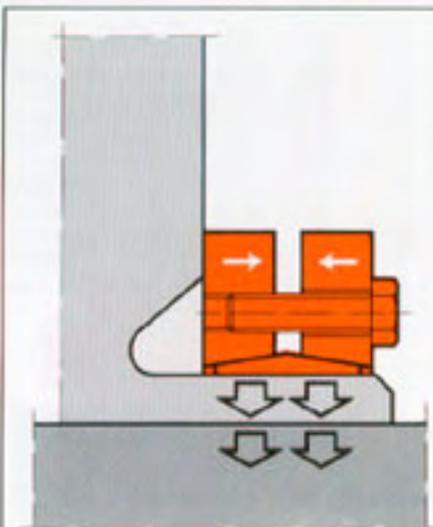
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RLK 603

Shrink Discs

The standard outer clamping connection for the play-free fastening of hollow shafts to shaft ends. Available for shaft diameters from 14 to 480 mm.



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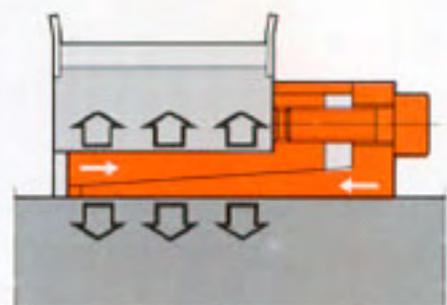
Cone Clamping Elements

... when there is to be no change from the well-known designs

RLK 110

● self-centering

This clamping element is particularly suited to clamping thin-walled hubs. The long clamping length guarantees true centering of the hub. The lateral location ring secures the axial position of the hub; the set position does not alter during clamping. Available for shaft diameters from 6 to 130 mm.



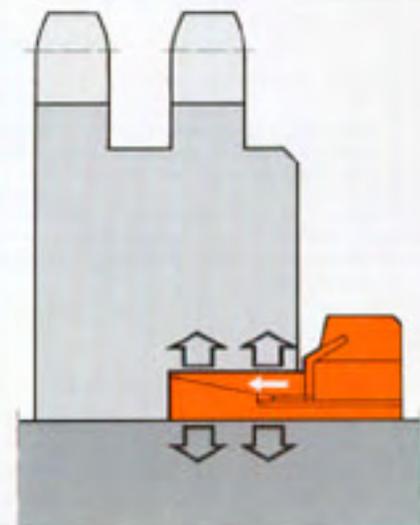
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RLK 250

● self-centering

A clamping element which is very easy to mount, all you have to do is tighten the keywayed locking nut. Can be made to space-saving dimensions axially as tightening is radially with a C-spanner. Available for shaft diameters of 15 to 70 mm.

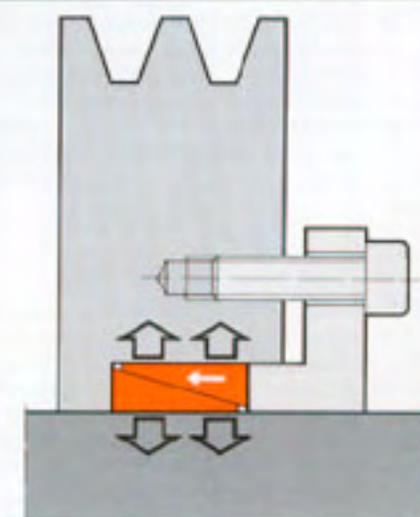


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RLK 300

The clamping element for the specific clamping connection. Tightening is via thrust rings or pressure flanges. Minimum radial installation dimensions offer particular advantages. Available for shaft diameters of 10 to 540 mm.



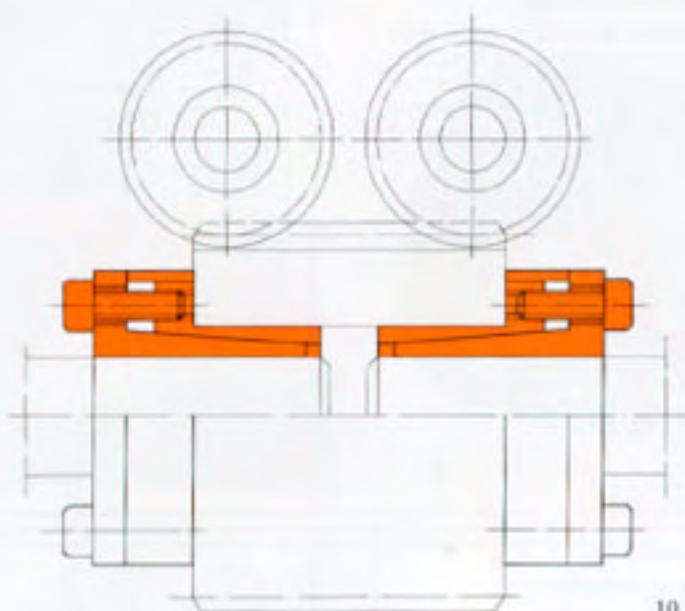
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Series RLK 110

● self-centering

Application Example



Fastening a skew gear with two clamping elements RLK 110 and simultaneous coupling of the separate driving shaft on a continuous heating furnace. A simple and

cost-effective solution as the tightening of the screw gear and the coupling of the shaft ends is effected simultaneously via the clamping elements.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used. We recommend the following fits on the pressure surfaces:
h 8 for the shaft,
H 8 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

$$R_z \leq 16 \mu\text{m}$$

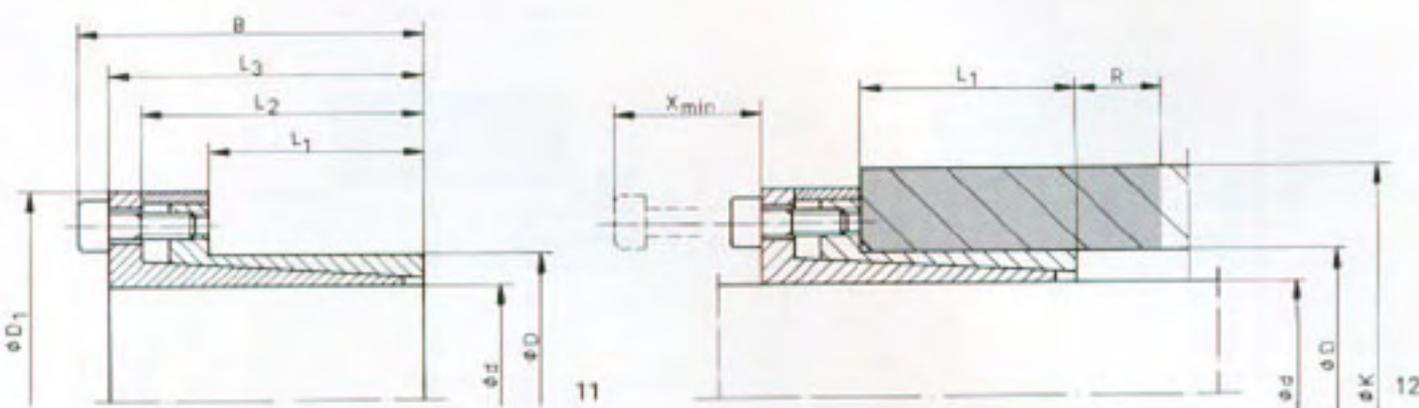
Mounting

1. Loosen clamping screws for a couple of turns.
2. Unscrew as many clamping screws as release threads available and turn these into the release bores, so that inner and outer part are kept apart.
3. Lightly oil the clamping element. Do not use oil which contains molybdenum disulphide or high pressure additives, and do not use grease.
4. Insert the clamping element into the part to be fastened and push onto shaft.
5. Turn screws out of the release threads and screw back into the clamping holes.
6. Tighten clamping screws diagonally across by hand while aligning the hub.
7. With a torque wrench tighten the clamping screws diagonally across with half the tightening torque M_c . Continue diagonally across with full tightening torque.
8. Tighten the clamping screws on after the other with full tightening torque. Repeat several times. The tightening process is only completed when none of the screws can be turned any further.

Dismantling

1. Unscrew the clamping screws for a couple of turns.
2. Unscrew as many clamping screws as release threads available and screw them into the release thread bores.
3. Tighten diagonally opposite screws evenly in stages. This forces
4. Remove the hub and clamping element from the shaft.

the outer cone off the inner cone and frees the connection.



d x D mm	Art. No. 4206 ...	B mm	L1 mm	L2 mm	L3 mm	D1 mm	Transmissible with tightening torque M _t torque		Surface pressure on		Clamping screws size	tightening torque M _t Nm	Yield point R _e (N/mm ²) of hub material						
							M Nm	axial force F kN	P _{sh} N/mm ²	P _h N/mm ²			160 K ₁₆₀ mm	200 K ₂₀₀ mm	250 K ₂₅₀ mm	280 K ₂₈₀ mm	320 K ₃₂₀ mm	400 K ₄₀₀ mm	
6 x 14	006.001	24	10	18	21	25	10	3	166	71	M 3	2	30	27	24	23	22	21	20
7 x 15	007.001	29	12	22	25	27	21	6	222	104	M 4	4	40	35	31	29	27	25	25
8 x 15	008.001	29	12	22	25	27	24	6	195	104	M 4	4	40	35	31	29	27	25	25
9 x 16	009.001	30	14	23	26	28	37	8	198	111	M 4	4	45	39	35	33	31	28	25
10 x 16	010.001	30	14	23	26	28	41	8	178	111	M 4	4	45	39	35	33	31	28	25
11 x 18	011.001	30	14	23	26	32	45	8	162	99	M 4	4	46	40	36	34	32	29	25
12 x 18	012.001	30	14	23	26	32	49	8	148	99	M 4	4	46	40	36	34	32	29	25
13 x 23	013.001	30	14	23	26	38	53	8	137	77	M 4	4	48	43	39	38	36	34	25
14 x 23	014.001	30	14	23	26	38	57	8	127	77	M 4	4	48	43	39	38	36	34	25
15 x 24	015.001	42	16	29	36	45	104	14	176	110	M 6	15	62	55	49	46	44	40	30
16 x 24	016.001	42	16	29	36	45	111	14	165	110	M 6	15	62	55	49	46	44	40	30
17 x 26	017.001	44	18	31	38	47	158	19	184	120	M 6	15	72	63	56	53	50	45	30
18 x 26	018.001	44	18	31	38	47	167	19	173	120	M 6	15	72	63	56	53	50	45	30
19 x 27	019.001	44	18	31	38	49	176	19	164	116	M 6	15	72	63	56	53	50	46	30
20 x 28	020.001	44	18	31	38	50	186	19	156	111	M 6	15	72	64	57	54	51	47	30
22 x 32	022.001	51	25	38	45	54	204	19	102	70	M 6	15	67	60	55	52	50	46	30
24 x 34	024.001	51	25	38	45	56	223	19	94	66	M 6	15	68	62	56	54	51	48	30
25 x 34	025.001	51	25	38	45	56	232	19	90	66	M 6	15	68	62	56	54	51	48	30
28 x 39	028.001	51	25	38	45	61	390	28	120	86	M 6	15	87	78	70	67	65	59	30
30 x 41	030.001	51	25	38	45	62	418	28	112	84	M 6	15	88	78	71	68	66	60	30
32 x 43	032.001	56	30	43	50	65	446	28	117	87	M 6	15	98	88	79	75	71	66	30
35 x 47	035.001	56	30	43	50	69	650	37	107	80	M 6	15	100	90	82	78	75	69	30
38 x 50	038.001	56	30	43	50	72	706	37	99	75	M 6	15	102	92	84	81	77	72	30
40 x 53	040.001	56	30	43	50	75	743	37	94	71	M 6	15	104	94	87	83	80	75	30
42 x 55	042.001	58	32	45	52	78	780	37	84	64	M 6	15	104	95	87	84	80	76	30
45 x 59	045.001	73	40	57	65	85	1563	69	114	87	M 8	35	134	119	108	103	97	90	35
48 x 62	048.001	78	45	62	70	87	1667	69	95	73	M 8	35	131	117	106	102	97	90	35
50 x 65	050.001	78	45	62	70	92	1737	69	114	88	M 8	35	149	132	119	114	108	99	35
55 x 71	055.001	83	50	67	75	98	2149	78	93	72	M 8	35	147	132	120	115	110	102	35
60 x 77	060.001	83	50	67	75	104	2344	78	85	67	M 8	35	151	137	125	120	115	108	35
65 x 84	065.001	83	50	67	75	111	2540	78	79	61	M 8	35	156	142	131	126	121	114	35
70 x 90	070.001	101	60	80	91	119	4330	124	100	78	M 10	71	189	170	155	148	141	131	45
75 x 95	075.001	101	60	80	91	126	4639	124	93	74	M 10	71	192	174	159	152	145	136	45
80 x 100	080.001	106	65	85	96	131	6598	165	97	77	M 10	71	209	188	171	164	156	145	45
85 x 106	085.001	106	65	85	96	137	7010	165	91	73	M 10	71	212	192	176	169	161	151	45
90 x 112	090.001	106	65	85	96	144	7423	165	108	86	M 10	71	241	216	197	188	179	166	45
95 x 120	095.001	106	65	85	96	153	8141	192	102	81	M 10	71	245	222	203	195	186	174	45
100 x 125	100.001	114	65	85	102	162	11957	239	113	91	M 12	71	266	240	219	210	200	186	45
110 x 140	110.001	140	90	114	128	190	13152	239	74	58	M 12	121	255	235	215	207	199	187	50
120 x 155	120.001	140	90	114	128	198	14348	239	68	53	M 12	121	266	245	228	220	213	202	50
130 x 165	130.001	140	90	114	128	208	20725	319	84	66	M 12	121	307	281	259	250	240	226	50

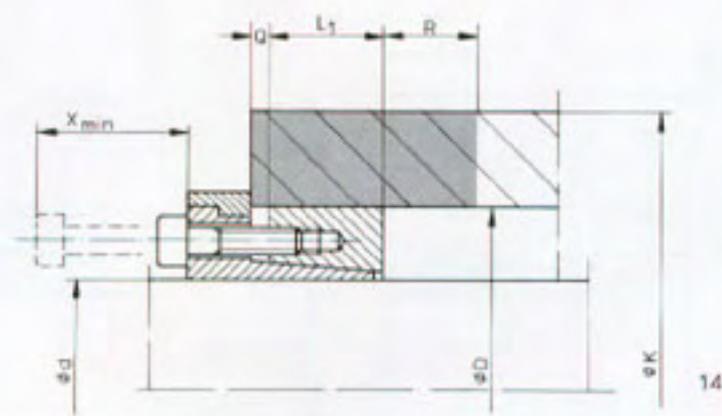
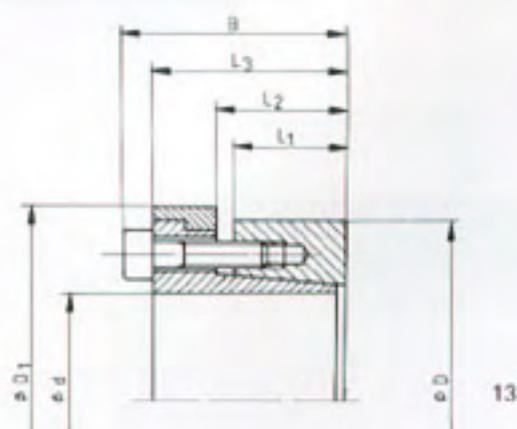
¹⁾ The minimum values for K are applicable when the hub overhang R ≥ 0.5 (K-D).

²⁾ If the clamping element is to be released without moving the adjacent component, then the distance x_{min} to this component must be maintained.

Series RLK 131

self-centering

Please note technical points on pages 30 and 31.
Seiten 30 and 31.



d x D mm	Art. No. 0204...	B mm	L1 mm	L2 mm	L3 mm	D1 mm	Transmissible with tightening torque M _t		Surface pressure-on		Clamping screws size	tightening torque M _t Nm	Yield point R _e (N/mm ²) of hub material						
							M Nm	axial force F kN	P _{sh} N/mm ²	P _h N/mm ²			160 K _{min} mm	200 K _{min} mm	250 K _{min} mm	290 K _{min} mm	320 K _{min} mm	400 K _{min} mm	
20 x 47	020.001	48	26	31	42	53	279	28	162	69	M 6	15	88	81	74	71	69	64	35
22 x 47	022.001	48	26	31	42	53	308	28	147	69	M 6	15	88	81	74	71	69	64	35
24 x 50	024.001	48	26	31	42	56	334	28	135	65	M 6	15	91	83	77	74	71	67	35
25 x 50	025.001	48	26	31	42	56	348	28	130	65	M 6	15	91	83	77	74	71	67	35
28 x 55	028.001	48	26	31	42	61	390	28	116	59	M 6	15	94	87	81	79	76	72	35
30 x 55	030.001	48	26	31	42	61	418	28	108	59	M 6	15	94	87	81	79	76	72	35
32 x 60	032.001	48	26	31	42	66	594	37	135	72	M 6	15	108	99	92	89	86	81	35
35 x 60	035.001	48	26	31	42	66	650	37	123	72	M 6	15	108	99	92	89	86	81	35
38 x 65	038.001	48	26	31	42	71	708	37	114	66	M 6	15	112	100	96	93	90	86	35
40 x 65	040.001	48	26	31	42	71	743	37	108	66	M 6	16	112	100	96	93	90	86	35
42 x 75	042.001	58	30	36	50	81	1094	52	122	68	M 8	35	131	121	113	109	105	100	40
45 x 75	045.001	58	30	36	50	81	1172	52	114	68	M 8	35	131	121	113	109	105	100	40
48 x 80	048.001	58	30	36	50	86	1250	52	142	85	M 8	35	150	137	127	123	118	111	40
50 x 80	050.001	58	30	36	50	86	1302	52	137	85	M 8	35	150	137	127	123	118	111	40
55 x 85	055.001	58	30	36	50	91	1910	69	124	80	M 8	35	155	142	132	128	123	116	40
60 x 90	060.001	58	30	36	50	96	2084	69	114	76	M 8	35	158	146	137	132	128	121	40
65 x 95	065.001	58	30	36	50	102	2258	69	105	72	M 8	35	162	151	141	137	132	126	40
70 x 110	070.001	70	40	46	60	119	3368	96	120	76	M 10	71	196	181	168	163	157	148	45
75 x 115	075.001	70	40	46	60	124	3608	96	112	73	M 10	71	200	185	173	167	161	153	45
80 x 120	080.001	70	40	46	60	129	3849	96	105	70	M 10	71	204	189	177	172	166	158	45
85 x 125	085.001	70	40	46	60	134	4674	110	123	84	M 10	71	225	208	194	187	181	171	45
90 x 130	090.001	70	40	46	60	139	4949	110	116	81	M 10	71	229	212	199	192	186	176	45
95 x 135	095.001	70	40	46	60	144	6529	137	110	78	M 10	71	234	217	203	197	190	181	45
100 x 145	100.001	80	45	52	68	155	6975	139	109	75	M 12	121	249	231	218	209	202	192	50
110 x 155	110.001	80	45	52	68	175	7672	139	99	70	M 12	121	257	240	225	219	212	202	50
120 x 165	120.001	80	45	52	68	175	9565	159	114	83	M 12	121	286	265	248	241	233	221	50
130 x 180	130.001	80	45	52	68	188	12953	199	126	91	M 12	121	317	294	275	267	258	245	50
140 x 190	140.001	90	51	58,5	76	199	19160	274	119	87	M 14	195	326	311	291	282	272	258	60
150 x 200	150.001	90	51	58,5	76	209	24634	328	133	100	M 14	195	365	338	315	305	294	278	60
160 x 210	160.001	90	51	58,5	76	219	26276	328	124	95	M 14	195	374	347	324	314	304	288	60
170 x 225	170.001	90	51	58,5	76	234	32571	383	137	103	M 14	195	406	377	352	341	329	312	60
180 x 235	180.001	90	51	58,5	76	244	34487	383	129	99	M 14	195	414	385	361	350	338	321	60

¹¹ The minimum values for K are applicable when the hub overhangs are as follows: $Q \geq L_1 - L_2$ and $R \geq 0.5(K-D)$.

¹² If the clamping element is to be released without moving the adjacent component, then the distance x_{min} to this component must be maintained.

Example for ordering: Cone clamping element RLK 131, 20 x 47, part number: 0204.020.001

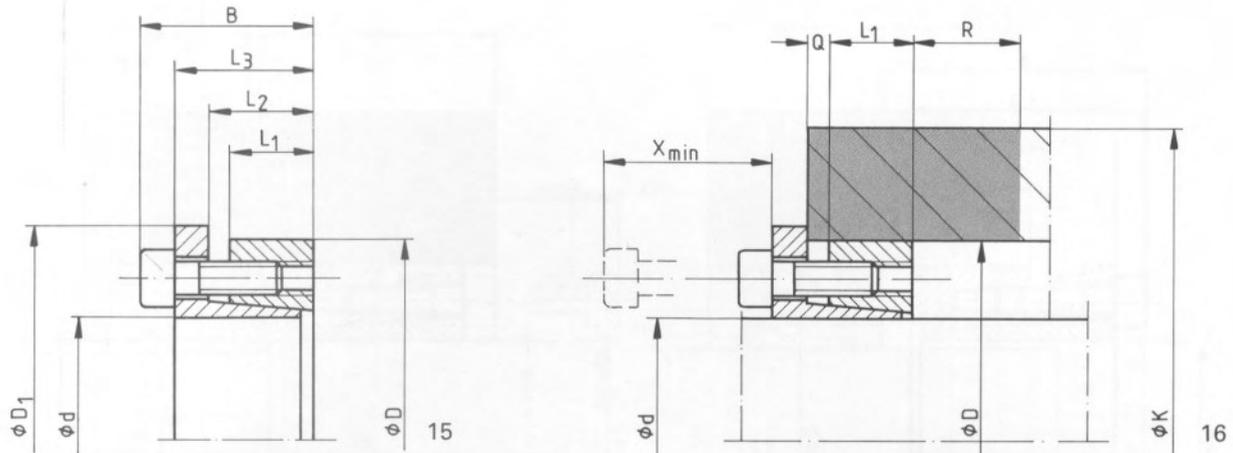
For installation and mounting instructions see page 6

Series RLK 133

● self-centering

short design

Please note technical points on pages 30 and 31.



The lateral stop secures the axial position of the hub, the setting is not altered during clamping.

d x D mm	Art. No. 4204...	B mm	L1 mm	L2 mm	L3 mm	D1 mm	Transmissible with tightening torque M _s torque		Surface pressure on		Clamping screws		Yield point R _e [N/mm ²] of hub material						
							M Nm	axial force F kN	P _w N/mm ²	hub P _N N/mm ²	size	tightening torque M _s Nm	160	200	250	280	320	400	X _{min} mm ²⁾
20 x 47	020.301	34	17	22	28	56	232	23	248	105	M 6	14	94	86	79	76	73	68	20
22 x 47	022.301	34	17	22	28	56	255	23	225	105	M 6	14	94	86	79	76	73	68	20
24 x 50	024.301	34	17	22	28	59	279	23	207	99	M 6	14	96	88	81	78	75	71	20
25 x 50	025.301	34	17	22	28	59	348	28	198	99	M 6	14	96	88	81	78	75	71	20
28 x 55	028.301	34	17	22	28	64	390	28	177	90	M 6	14	100	92	86	83	80	75	20
30 x 55	030.301	34	17	22	28	64	418	28	165	90	M 6	14	100	92	86	83	80	75	20
32 x 60	032.301	34	17	22	28	69	446	28	155	83	M 6	14	104	96	90	87	84	80	20
35 x 60	035.301	34	17	22	28	69	650	37	189	110	M 6	14	116	106	98	95	91	86	20
38 x 65	038.301	34	17	22	28	74	706	37	174	102	M 6	14	120	110	103	99	96	90	20
40 x 65	040.301	34	17	22	28	74	743	37	165	102	M 6	14	120	110	103	99	96	90	20
42 x 75	042.301	41	20	25	33	84	1094	52	183	103	M 8	35	140	129	120	116	111	105	25
45 x 75	045.301	41	20	25	33	84	1172	52	171	103	M 8	35	140	129	120	116	111	105	25
48 x 80	048.301	41	20	25	33	89	1459	61	214	128	M 8	35	160	147	136	131	126	118	25
50 x 80	050.301	41	20	25	33	89	1520	61	205	128	M 8	35	160	147	136	131	126	118	25
55 x 85	055.301	41	20	25	33	94	1910	69	186	121	M 8	35	164	151	140	135	130	123	25
60 x 90	060.301	41	20	25	33	99	2084	69	171	114	M 8	35	167	155	144	140	134	127	25
65 x 95	065.301	41	20	25	33	104	2258	69	158	108	M 8	35	171	159	149	144	139	132	25
70 x 110	070.301	50	24	30	40	119	3849	110	200	127	M 10	71	211	194	181	175	168	158	35
75 x 115	075.301	50	24	30	40	124	4124	110	186	122	M 10	71	215	198	185	179	172	163	35
80 x 120	080.301	50	24	30	40	129	4399	110	175	116	M 10	71	218	203	189	183	177	168	35
85 x 125	085.301	50	24	30	40	134	5258	124	206	140	M 10	71	241	222	207	200	192	182	35
90 x 130	090.301	50	24	30	40	139	5567	124	194	134	M 10	71	244	226	211	204	197	186	35
95 x 135	095.301	50	24	30	40	144	6529	137	184	129	M 10	71	248	230	215	209	201	191	35
100 x 145	100.301	56	26	32	44	154	7971	159	189	130	M 12	121	267	248	232	225	217	205	45
110 x 155	110.301	56	26	32	44	164	8768	159	172	122	M 12	121	275	256	241	233	226	215	45
120 x 165	120.301	56	26	32	44	174	10761	179	197	143	M 12	121	305	283	265	257	248	235	45
130 x 180	130.301	64	34	40	52	189	15544	239	167	120	M 12	121	328	305	285	276	267	253	45
140 x 190	140.301	68	34	40	54	199	15328	219	142	105	M 14	195	327	306	288	279	271	258	60
150 x 200	150.301	68	34	40	54	209	20528	274	166	124	M 14	195	360	336	314	305	295	280	60
160 x 210	160.301	68	34	40	54	219	21897	274	156	119	M 14	195	368	344	323	314	309	289	60
170 x 225	170.301	78	44	50	64	234	27918	328	136	103	M 14	195	393	367	344	334	323	308	60
180 x 235	180.301	78	44	50	64	244	29561	328	128	98	M 14	195	401	375	353	343	333	317	60
190 x 250	190.301	78	44	50	64	259	39004	411	152	115	M 14	195	444	414	389	377	365	347	60
200 x 260	200.301	78	44	50	64	269	41056	411	144	111	M 14	195	452	423	398	386	374	356	60

¹⁾ The minimum values vor K are applicable when the hub overhangs are as follows: $Q \geq L_2 - L_1$ and $R \geq 0.5 (K - D)$.

²⁾ If the clamping element is to be released without moving the adjacent component, then the distance X_{min} to this component must be maintained.

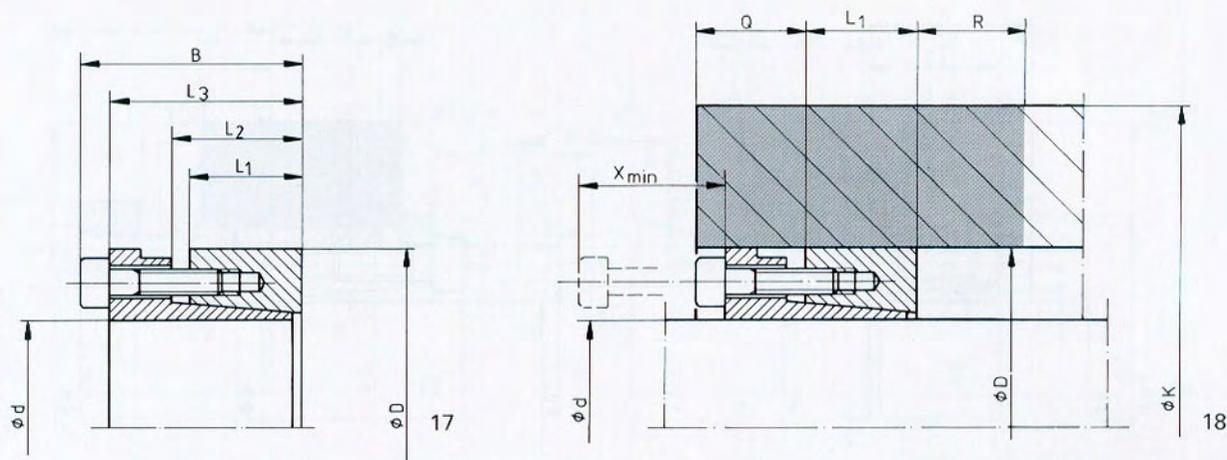
Example for ordering: Cone clamping element RLK 133, 20 x 47, part number: 4204.020.301

For installation and mounting instructions see page 6

Series RLK 130

● self-centering

Please note technical points on pages 30 and 31.



d x D mm	Art. No. 4204...	B mm	L ₁ mm	L ₂ mm	L ₃ mm	Transmissible with tightening torque M _s torque		Surface pressure on		Clamping screws		Yield point R _e [N/mm ²] of hub material						
						M Nm	axial force F kN	P _w N/mm ²	P _N N/mm ²	size	tightening torque M _s Nm	160	200	250	280	320	400	x _{min} mm ²⁾
												K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	
20 x 47	020.001	48	26	31	42	445	45	259	110	M 6	15	94	87	80	77	74	70	35
22 x 47	022.001	48	26	31	42	490	45	236	110	M 6	15	94	87	80	77	74	70	35
24 x 50	024.001	48	26	31	42	534	45	216	104	M 6	15	96	89	83	80	77	73	35
25 x 50	025.001	48	26	31	42	557	45	207	104	M 6	15	96	89	83	80	77	73	35
28 x 55	028.001	48	26	31	42	623	45	185	94	M 6	15	100	93	87	84	81	77	35
30 x 55	030.001	48	26	31	42	668	45	173	94	M 6	15	100	93	87	84	81	77	35
32 x 60	032.001	48	26	31	42	950	59	216	115	M 6	15	134	120	109	104	99	92	35
35 x 60	035.001	48	26	31	42	1039	59	197	115	M 6	15	134	120	109	104	99	92	35
38 x 65	038.001	48	26	31	42	1128	59	182	106	M 6	15	136	123	113	108	103	96	35
40 x 65	040.001	48	26	31	42	1187	59	173	106	M 6	15	136	123	113	108	103	96	35
42 x 75	042.001	58	30	36	50	1749	83	195	109	M 8	35	138	128	120	117	113	107	40
45 x 75	045.001	58	30	36	50	1873	83	182	109	M 8	35	138	128	120	117	113	107	40
48 x 80	048.001	58	30	36	50	1998	83	228	137	M 8	35	186	167	151	145	137	127	40
50 x 80	050.001	58	30	36	50	2082	83	218	137	M 8	35	186	167	151	145	137	127	40
55 x 85	055.001	58	30	36	50	3053	111	199	129	M 8	35	188	170	155	149	142	131	40
60 x 90	060.001	58	30	36	50	3331	111	182	121	M 8	35	191	173	159	153	146	136	40
65 x 95	065.001	58	30	36	50	3608	111	168	115	M 8	35	194	177	163	157	150	140	40
70 x 110	070.001	70	40	46	60	5382	154	192	122	M 10	71	239	217	198	190	181	168	45
75 x 115	075.001	70	40	46	60	5767	154	179	117	M 10	71	242	220	202	194	185	173	45
80 x 120	080.001	70	40	46	60	6151	154	168	112	M 10	71	245	224	206	198	189	177	45
85 x 125	085.001	70	40	46	60	7469	176	197	134	M 10	71	274	249	227	218	208	194	45
90 x 130	090.001	70	40	46	60	7909	176	186	129	M 10	71	277	252	231	222	212	198	45
95 x 135	095.001	70	40	46	60	10435	220	176	124	M 10	71	280	256	235	226	216	203	45
100 x 145	100.001	80	45	52	68	11147	223	174	120	M 12	121	299	273	251	241	231	216	50
110 x 155	110.001	80	45	52	68	12262	223	159	113	M 12	121	306	280	259	250	239	225	50
120 x 165	120.001	80	45	52	68	15288	255	182	132	M 12	121	342	313	288	277	265	248	50
130 x 180	130.001	80	45	52	68	20702	318	201	145	M 12	121	380	347	319	307	294	275	50
140 x 190	140.001	90	51	58,5	76	24497	350	189	140	M 14	195	403	368	338	325	311	291	60
150 x 200	150.001	90	51	58,5	76	32808	437	212	159	M 14	195	443	403	369	354	339	316	60
160 x 210	160.001	90	51	58,5	76	34996	437	199	152	M 14	195	448	409	377	362	347	324	60
170 x 225	170.001	90	51	58,5	76	44619	525	212	160	M 14	195	482	440	406	390	374	349	60
180 x 235	180.001	90	51	58,5	76	47244	525	206	158	M 14	195	494	453	418	402	386	361	60

¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: Q ≥ 0.5 (K-D) and R ≥ 0.5 (K-D).

²⁾ If the clamping element is to be released without moving the adjacent component, then the distance x_{min} to this component must be maintained.

Example for ordering: Cone clamping element RLK 130, 20 x 47, part number: 4204.020.001

For installation and mounting instructions see page 6

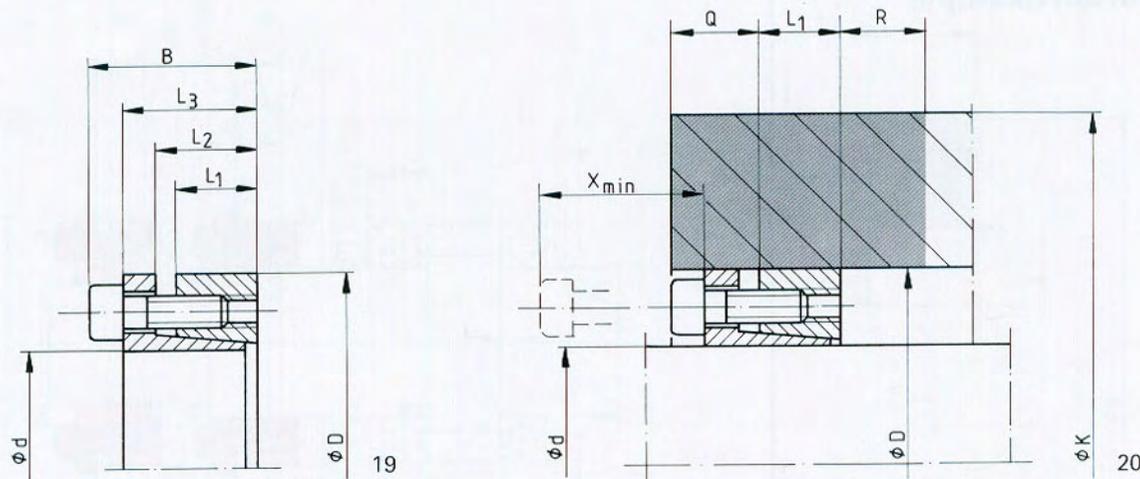
Please note: If the hub is already in a fixed connection with the shaft before mounting, then the lower values of RLK 131 (see page 8) apply to M, F, P_w, P_N and K_{min}.

Series RLK 132

Please note technical points on pages 30 and 31.

● self-centering

short design



d x D mm	Art. No. 4204 . . .	B mm	L ₁ mm	L ₂ mm	L ₃ mm	Transmissible with tightening torque M _s torque		Surface pressure on		Clamping screws		Yield point R _e [N/mm ²] of hub material						
						M Nm	axial force F kN	P _w N/mm ²	P _N N/mm ²	size	tightening torque M _s Nm	160	200	250	280	320	400	X _{min} mm ²⁾
												K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	K _{min} mm ¹⁾	
20 x 47	020.201	34	17	22	28	307	31	273	116	M 6	10	88	81	76	73	71	67	20
22 x 47	022.201	34	17	22	28	338	31	248	116	M 6	10	88	81	76	73	71	67	20
24 x 50	024.201	34	17	22	28	369	31	228	109	M 6	10	91	83	78	76	74	70	20
25 x 50	025.201	34	17	22	28	461	37	262	131	M 6	12	98	89	82	80	77	73	20
28 x 55	028.201	34	17	22	28	516	37	234	119	M 6	12	102	93	87	84	81	78	20
30 x 55	030.201	34	17	22	28	553	37	219	119	M 6	12	102	93	87	84	81	78	20
32 x 60	032.201	34	17	22	28	712	45	248	132	M 6	14	112	103	95	92	89	85	20
35 x 60	035.201	34	17	22	28	860	49	250	146	M 6	12	119	108	99	95	92	87	20
38 x 65	038.201	34	17	22	28	1011	53	249	146	M 6	13	127	116	106	102	98	93	20
40 x 65	040.201	34	17	22	28	1065	53	237	146	M 6	13	127	116	106	102	98	93	20
42 x 75	042.201	41	20	25	33	1708	81	286	160	M 8	34	152	138	126	121	116	110	25
45 x 75	045.201	41	20	25	33	1830	81	267	160	M 8	34	152	138	126	121	116	110	25
48 x 80	048.201	41	20	25	33	2065	86	265	159	M 8	27	160	145	133	128	123	116	25
50 x 80	050.201	41	20	25	33	2151	86	254	159	M 8	27	160	145	133	128	123	116	25
55 x 85	055.201	41	20	25	33	2534	92	247	160	M 8	29	168	153	141	135	130	123	25
60 x 90	060.201	41	20	25	33	2927	98	240	160	M 8	31	176	160	148	142	136	129	25
65 x 95	065.201	41	20	25	33	3347	103	234	160	M 8	29	183	168	155	149	143	135	25
70 x 110	070.201	50	24	30	40	4846	138	251	160	M 10	56	212	193	178	172	165	157	35
75 x 115	075.201	50	24	30	40	5428	145	245	160	M 10	59	219	201	185	179	171	163	35
80 x 120	080.201	50	24	30	40	6041	151	240	160	M 10	61	226	208	192	185	178	169	35
85 x 125	085.201	50	24	30	40	6686	157	235	160	M 10	51	234	215	199	192	185	175	35
90 x 130	090.201	50	24	30	40	7363	164	231	160	M 10	53	241	222	206	199	191	181	35
95 x 135	095.201	50	24	30	40	8071	170	227	160	M 10	55	249	229	213	206	198	187	35
100 x 145	100.201	56	26	32	44	9788	196	232	160	M 12	93	265	244	227	219	211	201	45
110 x 155	110.201	56	26	32	44	11509	209	225	160	M 12	99	279	258	240	232	224	213	45
120 x 165	120.201	56	26	32	44	13366	223	220	160	M 12	85	294	272	253	245	237	225	45
130 x 180	130.201	64	34	40	52	20656	318	222	160	M 12	101	340	313	290	280	269	254	45
140 x 190	140.201	68	34	40	54	23395	334	217	160	M 14	158	350	323	300	290	279	263	60
150 x 200	150.201	68	34	40	54	26358	352	213	160	M 14	157	366	338	314	304	293	277	60
160 x 210	160.201	68	34	40	54	29552	369	210	160	M 14	165	380	352	328	317	306	289	60
170 x 225	170.201	78	44	50	64	43536	512	212	160	M 14	190	433	398	368	355	341	321	60
180 x 235	180.201	78	44	50	64	47244	525	205	157	M 14	195	445	409	380	367	353	332	60
190 x 250	190.201	78	44	50	64	54064	569	211	160	M 14	169	470	433	403	389	374	353	60
200 x 260	200.201	78	44	50	64	59186	592	208	160	M 14	176	485	447	416	402	387	366	60

¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: Q ≥ 0.5 (K-D) and R ≥ 0.5 (K-D).

²⁾ If the clamping element is to be released without moving the adjacent component, then the distance X_{min} to this component must be maintained.

Example for ordering: Cone clamping element RLK 132, 20 x 47, part number: 4204.020.201

For installation and mounting instructions see page 6

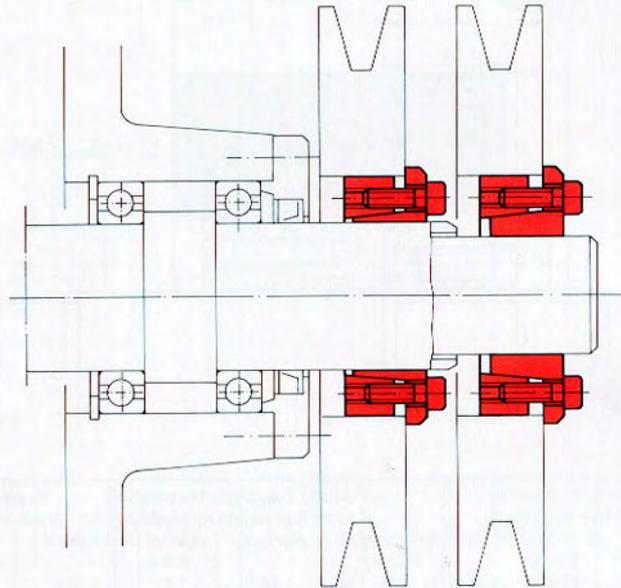
Please note: If the hub is already in a fixed connection with the shaft before mounting, then the lower values of RLK 133 (see page 9) apply to M, F, P_w, P_N and K_{min}.

Series RLK 134

● self-centering

Series RLK 134
self-centering
not to scale

Application Example



21

Rigid fastening of two identical V-belt pulleys with clamping elements RLK 134 on different shaft diameters of the coaxial twin drive of a food packing machine.

Elements with one outer diameter but a range of inner diameters can be used to fasten parts having the same bore diameter onto shafts of different diameters.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used.

We recommend the following fits on the pressure surfaces:

h 8 for the shaft,

H 8 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

$$R_z \leq 16 \mu\text{m}$$

Mounting

1. Loosen clamping screws for a couple of turns.
2. Unscrew as many clamping screws as release threads available and turn these into the release bores, so that inner and outer part are kept apart.
3. Lightly oil the clamping element. Do not use oil which contains molybdenum disulphide or high pressure additives, and do not use grease.
4. Insert the clamping element into the part to be fastened and push onto shaft.

5. Turn screws out of the release threads and screw back into the clamping holes.
6. Tighten clamping screws diagonally across by hand while aligning the hub.
7. With a torque wrench tighten the clamping screws diagonally across with half the tightening torque M_s . Continue diagonally across with full tightening torque.
8. Tighten the clamping screws on after the other with full tightening torque. Repeat several times. The tightening process is only completed when none of the screws can be turned any further.

Dismantling

1. Unscrew the clamping screws for a couple of turns.
2. Unscrew as many clamping screws as release threads available and screw them into the release thread bores.
3. Tighten diagonally opposite screws evenly in stages. This forces the

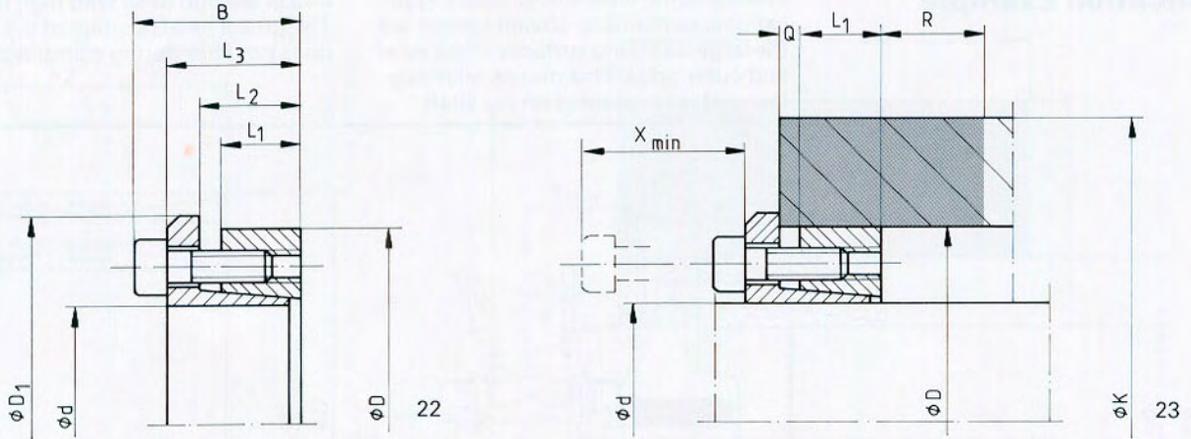
outer cone off the inner cone and frees the connection.

4. Remove the hub and clamping element from the shaft.

Series RLK 134

● self-centering

Please note technical points on pages 30 and 31.



The lateral stop secures the axial position of the hub, the setting is not altered during clamping.

d x D mm	B mm	L ₁ mm	L ₂ mm	L ₃ mm	D ₁ mm	Transmissible with tightening torque M _s		Surface pressure on		Clamping screws		Yield point R _e [N/mm ²] of hub material						X _{min} mm ²⁾
						M Nm	axial force F kN	P _w N/mm ²	hub P _N N/mm ²	size	tightening torque M _s Nm	160 K _{min} mm ¹⁾	200 K _{min} mm ¹⁾	250 K _{min} mm ¹⁾	280 K _{min} mm ¹⁾	320 K _{min} mm ¹⁾	400 K _{min} mm ¹⁾	
18 x 55	38	17	22	30	62	181	20	251	82	M8	35	97	89	83	81	79	74	25
19 x 55	38	17	22	30	62	197	21	238	82	M8	35	97	89	83	81	79	74	25
20 x 55	38	17	22	30	62	212	21	226	82	M8	35	97	89	83	81	79	74	25
22 x 55	38	17	22	30	62	246	22	206	82	M8	35	97	89	83	81	79	74	25
24 x 55	38	17	22	30	62	280	23	188	82	M8	35	97	89	83	81	79	74	25
25 x 55	38	17	22	30	62	298	24	181	82	M8	35	97	89	83	81	79	74	25
28 x 55	38	17	22	30	62	353	25	162	82	M8	35	97	89	83	81	79	74	25
30 x 55	38	17	22	30	62	391	26	151	82	M8	35	97	89	83	81	79	74	25
24 x 65	38	17	22	30	72	346	29	269	99	M8	30	119	110	102	99	97	90	25
25 x 65	38	17	22	30	72	380	30	267	103	M8	31	120	111	103	100	98	91	25
28 x 65	38	17	22	30	72	509	36	269	116	M8	35	126	116	107	103	101	93	25
30 x 65	38	17	22	30	72	564	37	251	116	M8	35	126	116	107	103	101	93	25
32 x 65	38	17	22	30	72	622	38	236	116	M8	35	126	116	107	103	101	93	25
35 x 65	38	17	22	30	72	711	40	215	116	M8	35	126	116	107	103	101	93	25
38 x 65	38	17	22	30	72	804	42	198	116	M8	35	126	116	107	103	101	93	25
40 x 65	38	17	22	30	72	868	43	188	116	M8	35	126	116	107	103	101	93	25
30 x 80	41	20	25	33	87	646	43	273	103	M8	32	147	136	126	122	120	112	25
32 x 80	41	20	25	33	87	756	47	272	109	M8	34	150	139	129	125	122	113	25
35 x 80	41	20	25	33	87	890	51	256	112	M8	35	152	140	130	126	123	114	25
38 x 80	41	20	25	33	87	1007	53	236	112	M8	35	152	140	130	126	123	114	25
40 x 80	41	20	25	33	87	1088	55	224	112	M8	35	152	140	130	126	123	114	25
42 x 80	41	20	25	33	87	1169	56	214	112	M8	35	152	140	130	126	123	114	25
45 x 80	41	20	25	33	87	1298	58	199	112	M8	35	152	140	130	126	123	114	25
48 x 80	41	20	25	33	87	1430	60	187	112	M8	35	152	140	130	126	123	114	25
50 x 80	41	20	25	33	87	1520	61	179	112	M8	35	152	140	130	126	123	114	25

¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: $Q \geq L_2 - L_1$ and $R \geq 0.5 (K - D)$.

²⁾ If the clamping element is to be released without moving the adjacent component, then the distance X_{min} to this component must be maintained.

Example for ordering: Cone clamping element RLK 134, 18 x 55

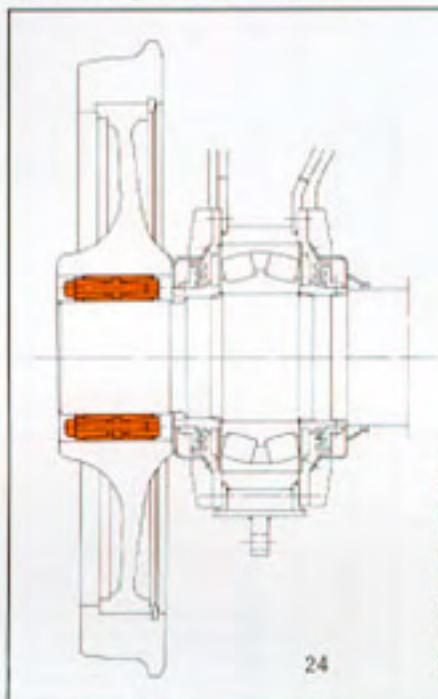
Series RLK 400

● self-centering

Application Example

The clamping element for heavy applications; particularly advantageous are the large clamping surfaces of the inner and outer rings. This means relatively low surface pressures on the shaft

and in the hub even with high torques. The preset axial position of the hub does not alter during clamping.



Free-from-play fastening of the rail wheels of a crane. Here the clamping elements RLK 400 ensure maximum operating safety despite the oscillations and shock loads which occur, operating conditions which previously were the cause of frequent breakdowns and stoppages because of the keyway connections then in use. The bores for the wheels and shaft are easy and cheap to make. It is of particular advantage that the shaft is not weakened by a keyway.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used.

We recommend the following fits on the pressure surfaces:

h 8 for the shaft,
H 8 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

$$R_z \leq 16 \mu\text{m}$$

Mounting

1. To ensure that the two cone rings are relaxed before mounting, unscrew all the clamping screws for a few threads. Loosen the rear cone ring by applying pressure on the screw heads. Now remove two opposite screws and relocate these into the neighbouring release threads, thereby also releasing the front cone ring.
2. Lightly oil the clamping element. Do not use any oil containing molybdenum disulphide or high-pressure additives and do not use grease.

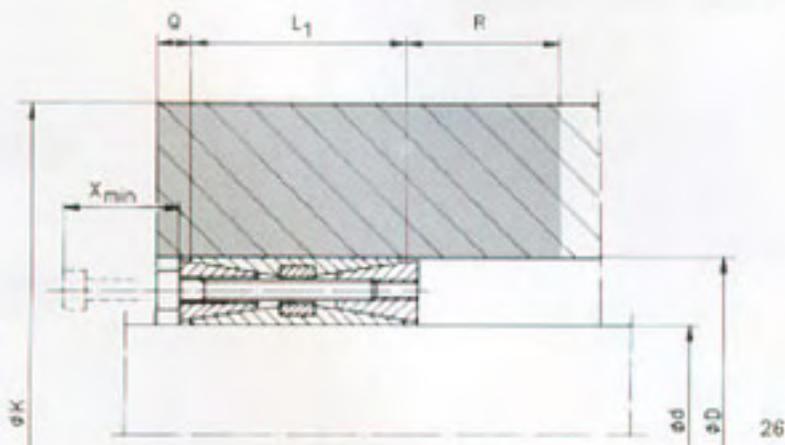
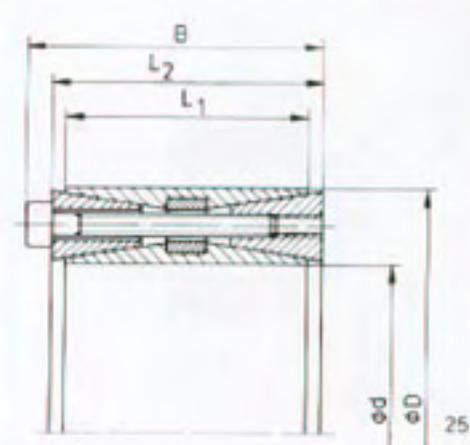
3. Insert the clamping element into the part to be clamped and push onto shaft.
4. Turn screws out of the release threads and screw back into the clamping holes.
5. Manually tighten opposite clamping screws, aligning the hub at the same time.
6. Tighten opposite clamping screws with half the catalogue tightening torque. Then, in a clockwise direction, tighten the clamping screws with full tightening torque, and repeat.

Dismantling

1. Unscrew all the clamping screws.
2. Turn screws into the release threads.
3. Tighten diagonally opposite release screws in stages until the front cone ring is released/loosened.
4. Draw the front cone ring off. Unscrew the release screws and turn them into the release threads of the intermediate ring.
5. Tighten diagonally opposite release

screws overly in stages until the rear cone ring is released.

6. Remove the machine part together with the clamping element from the shaft.



d x D mm	Art. No. 4205 ...	B mm	L ₁ mm	L ₂ mm	Transmissible with tightening torque M, axial force F kN		Surface pressure on		Clamping screws		Yield point R _{0.2} [N/mm ²] of hub material						
					M Nm	F kN	P _W N/mm ²	P _S N/mm ²	size	tightening torque M _s Nm	160	200	250	280	320	400	
											K _{min} mm	K _{min} mm	K _{min} mm	K _{min} mm	K _{min} mm	K _{min} mm	K _{min} mm
45 x 75	045.001	72	56	64	2888	128	156	50	M 8	35	167	148	133	127	120	111	48
48 x 80	048.001	72	56	64	3081	128	141	85	M 8	35	170	151	137	131	124	115	48
50 x 80	050.001	72	56	64	3209	128	135	85	M 8	35	170	151	137	131	124	115	48
55 x 85	055.001	72	56	64	3530	128	123	60	M 8	35	172	155	141	135	129	120	48
60 x 90	060.001	72	56	64	4813	150	141	54	M 8	35	197	175	158	151	144	133	48
65 x 95	065.001	72	56	64	5214	150	138	89	M 8	35	199	179	162	155	148	137	48
70 x 110	070.001	88	70	78	8890	254	158	101	M 10	71	205	235	211	201	190	175	45
75 x 115	075.001	88	70	78	9525	254	148	96	M 10	71	251	224	203	194	184	170	45
80 x 120	080.001	88	70	78	12192	395	168	111	M 10	71	280	249	224	213	201	185	45
85 x 125	085.001	88	70	78	12954	395	158	108	M 10	71	282	252	227	216	205	190	45
90 x 130	090.001	88	70	78	13710	395	148	102	M 10	71	285	255	231	220	209	194	45
95 x 135	095.001	88	70	78	14478	395	140	98	M 10	71	287	258	235	224	214	199	45
100 x 145	100.001	112	90	100	22994	442	151	104	M 12	121	332	295	265	252	239	220	50
110 x 155	110.001	112	90	100	24300	442	128	98	M 12	121	336	301	272	260	247	229	50
120 x 165	120.001	112	90	100	30932	516	147	107	M 12	121	370	330	299	285	270	250	50
130 x 180	130.001	130	104	116	39450	607	139	100	M 14	195	356	353	320	305	290	268	60
140 x 190	140.001	130	104	116	49565	708	150	111	M 14	195	435	387	349	333	315	291	60
150 x 200	150.001	130	104	116	60492	809	160	120	M 14	195	472	420	378	360	340	313	60
160 x 210	160.001	130	104	116	64738	809	150	115	M 14	195	476	426	385	367	348	322	60
170 x 225	170.001	162	134	146	82751	974	133	101	M 16	300	459	445	402	384	364	337	70
180 x 235	180.001	162	134	146	100138	1113	144	110	M 16	300	541	482	434	413	392	361	70
190 x 250	190.001	162	134	146	105899	1113	136	104	M 16	300	548	491	445	425	404	374	70
200 x 260	200.001	162	134	146	111262	1113	129	100	M 16	300	553	497	452	433	412	383	70
220 x 285	220.001	162	134	146	152985	1391	147	114	M 16	300	633	568	516	492	468	434	70
240 x 305	240.001	162	134	146	163582	1530	148	117	M 16	300	674	606	551	527	501	465	70
260 x 325	260.001	162	134	146	198880	1530	137	110	M 16	300	685	620	566	543	518	483	70
280 x 355	280.001	197	165	177	302649	2162	143	113	M 20	580	795	714	647	618	587	544	80
300 x 375	300.001	197	165	177	356694	2378	147	118	M 20	580	845	759	688	657	625	579	80
320 x 405	320.001	197	165	177	380474	2378	138	109	M 20	580	861	778	711	681	650	605	80
340 x 425	340.001	197	165	177	441003	2594	141	113	M 20	580	908	822	751	719	686	639	80
360 x 455	360.001	224	190	202	535191	2973	131	103	M 22	780	955	864	790	757	723	674	90
380 x 475	380.001	224	190	202	667637	3514	146	117	M 22	780	1040	943	859	822	783	727	90
400 x 495	400.001	224	190	202	702778	3514	135	112	M 22	780	1057	957	874	838	800	745	90
420 x 515	420.001	224	190	202	737915	3514	132	108	M 22	780	1069	971	890	854	816	762	90
440 x 535	440.001	224	190	202	773054	3514	126	104	M 22	780	1081	985	906	871	834	780	90
460 x 555	460.001	224	190	202	808193	3514	121	100	M 22	780	1094	1000	922	885	851	799	90
480 x 575	480.001	224	190	202	873075	4054	134	112	M 22	780	1177	1073	986	948	908	849	90
500 x 595	500.001	224	190	202	1013620	4054	128	108	M 22	780	1190	1088	1003	965	925	867	90
520 x 615	520.001	224	190	202	1124442	4325	132	111	M 22	780	1236	1130	1042	1003	961	901	90
540 x 635	540.001	224	190	202	1167890	4325	127	108	M 22	780	1250	1145	1058	1020	979	919	90
560 x 655	560.001	224	190	202	1284621	4595	130	111	M 22	780	1295	1187	1097	1057	1014	952	90
580 x 675	580.001	224	190	202	1322572	4595	125	108	M 22	780	1309	1202	1112	1074	1032	971	90
600 x 695	600.001	224	190	202	1378522	4595	121	105	M 22	780	1323	1218	1130	1091	1049	989	90

¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: Q ≥ B - 0.5 (L₁ + L₂) and R ≥ 0.5 (K - D).

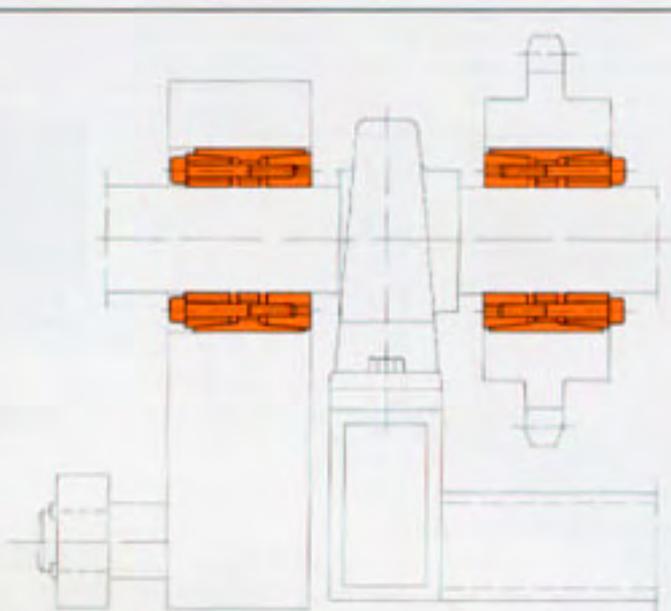
²⁾ If the clamping element is to be released without moving the adjacent component, then the distance x_{min} to this component must be maintained.

Example for ordering: Cone clamping element RLK 400, 50 x 80, part number: 4205.050.001

Series RLK 402

● self-centering

Application Example



Secure fixing of an eccentric and sprocket in a lift unit fitted to an automatic welding line for car bodies using clamping elements RLK 402. In addition to the drive torque, there is a resultant moment due

to the eccentric. The RLK 402 guarantees a very high operating safety factor and its particular advantage is that even after a long running period, the device can be easily dismantled and re-mounted.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used.

We recommend the following fits on the pressure surfaces:

h 8 for the shaft,
H 8 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

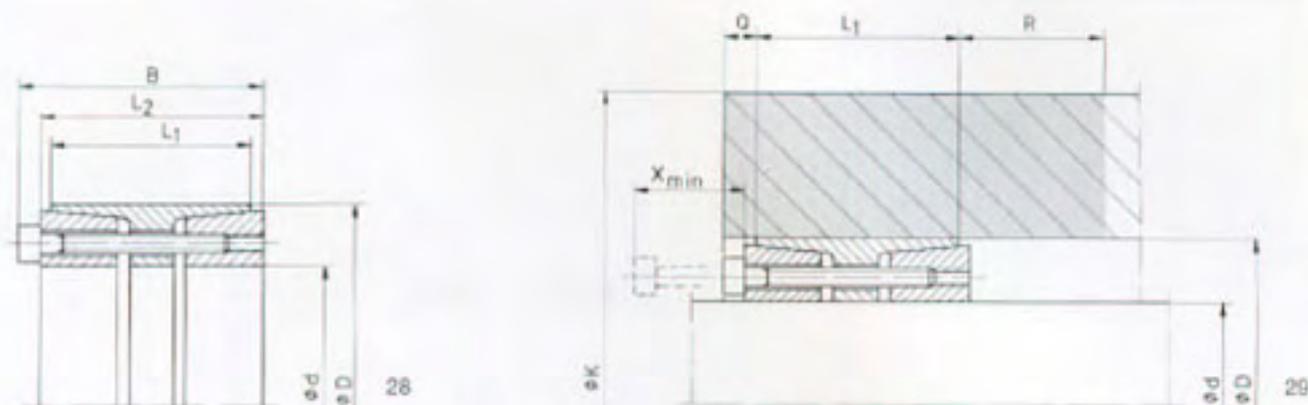
$$R_z \leq 16 \mu\text{m}$$

Mounting

1. Before mounting, ensure that both cone rings are relaxed by unscrewing all the clamping screws for a few threads. Press on the screw heads to release the rear cone ring. Now completely remove two opposing screws and relocate these into the neighbouring release threads, thereby also releasing the front cone ring.
2. Lightly oil the clamping element. Do not use any oil containing molybdenum disulphide or high-pressure additives and do not use grease.
3. Insert the clamping element into the part to be clamped and push onto shaft.
4. Remove screws from the release threads and screw back into the clamping holes.
5. Tighten clamping screws diagonally across by hand aligning the hub at the same time.
6. Tighten the clamping screws diagonally across with half the catalogue torque, then twice in a clockwise direction with full tightening torque.

Dismantling

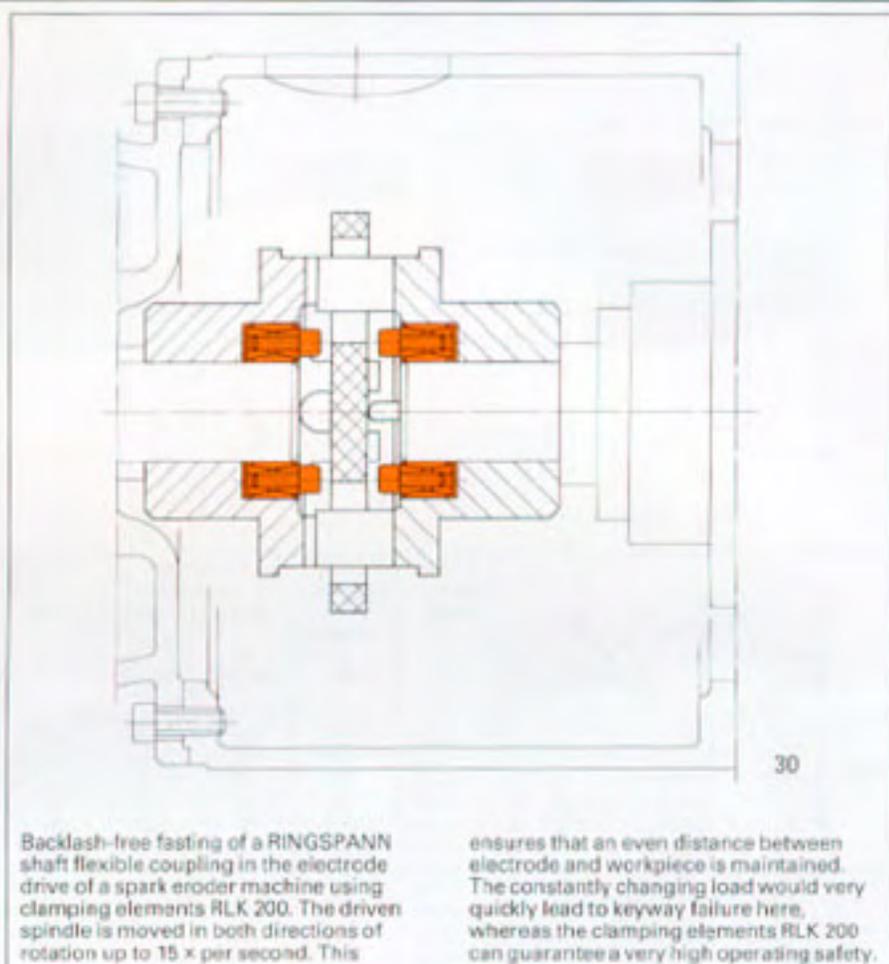
1. Remove all the clamping screws.
2. Turn screws into the release threads.
3. Tighten the release screws diagonally across in several stages until the front cone ring is released.
4. Draw off the front cone ring. Remove the release screws and screw into the release threads of the intermediate ring.
5. Evenly tighten opposing release screws in several stages until the rear cone ring is released.
6. The clamped part, together with the clamping element, can then be drawn off the shaft.



d x D mm	Art. No. 4205 ...	B mm	L ₁ mm	L ₂ mm	Transmissible with tightening torque M _s axial force		Surface pressure on		Clamping screws size	tightening torque M _s Nm	Yield point R _e [N/mm ²] of hub material						
					M Nm	F kN	P ₀ N/mm ²	P ₀ N/mm ²			160	200	250	280	320	400	
45 x 75	045.201	72	56	64	3086	137	161	96	M 8	35	174	153	137	130	123	113	40
48 x 80	048.201	72	56	64	3291	137	151	90	M 8	35	176	156	141	134	127	118	40
50 x 80	050.201	72	56	64	3428	137	145	90	M 8	35	176	156	141	134	127	118	40
55 x 85	055.201	72	56	64	3771	137	131	85	M 8	35	178	160	145	138	132	122	40
60 x 90	060.201	72	56	64	5143	171	151	100	M 8	35	204	181	163	155	147	136	40
65 x 95	065.201	72	56	64	5571	171	139	95	M 8	35	206	184	167	159	151	140	40
70 x 110	070.201	88	70	78	9498	271	169	108	M 10	71	250	229	205	195	184	170	45
75 x 115	075.201	88	70	78	10177	271	158	103	M 10	71	251	232	209	199	189	174	45
80 x 120	080.201	88	70	78	13026	326	177	118	M 10	71	291	267	230	219	207	190	45
85 x 125	085.201	88	70	78	13640	326	167	114	M 10	71	293	260	234	223	211	194	45
90 x 130	090.201	88	70	78	14655	326	158	109	M 10	71	295	263	237	226	215	198	45
95 x 135	095.201	88	70	78	15450	326	149	105	M 10	71	297	266	241	230	219	203	45
100 x 145	100.201	112	90	100	23626	472	162	111	M 12	121	345	305	273	260	245	225	50
110 x 155	110.201	112	90	100	25996	472	147	104	M 12	121	348	311	280	267	253	234	50
120 x 165	120.201	112	90	100	33048	551	157	114	M 12	121	384	341	307	293	277	256	50
130 x 180	130.201	130	104	116	42149	648	148	107	M 14	195	410	365	329	313	297	274	60
140 x 190	140.201	130	104	116	52957	757	161	118	M 14	195	451	400	360	342	324	298	60
150 x 200	150.201	130	104	116	64845	865	171	129	M 14	195	489	434	389	370	350	321	60
160 x 210	160.201	130	104	116	69158	865	161	122	M 14	195	493	439	396	377	357	329	60
170 x 225	170.201	162	134	146	88413	1040	142	108	M 16	300	517	460	414	394	374	344	70
180 x 235	180.201	162	134	146	106987	1180	154	118	M 16	300	561	498	447	425	400	369	70
190 x 250	190.201	162	134	146	112931	1189	146	111	M 16	300	567	507	457	436	414	382	70
200 x 250	200.201	162	134	146	118875	1189	138	106	M 16	300	572	513	465	444	422	391	70
220 x 285	220.201	162	134	146	163453	1486	157	121	M 16	300	655	586	530	505	480	443	70
240 x 305	240.201	162	134	146	196143	1635	158	125	M 16	300	697	625	568	541	514	475	70
260 x 325	260.201	162	134	146	212489	1635	146	117	M 16	300	707	638	581	556	530	490	70
280 x 355	280.201	197	165	177	323358	2310	153	121	M 20	580	823	736	665	635	602	556	80
300 x 375	300.201	197	165	177	381100	2541	157	126	M 20	580	874	783	708	675	641	591	80
320 x 405	320.201	197	165	177	406507	2541	147	116	M 20	580	885	801	729	698	665	617	80
340 x 425	340.201	197	165	177	471179	2772	151	121	M 20	580	938	846	770	737	702	652	80
360 x 455	360.201	224	190	202	571811	3177	140	111	M 22	780	985	889	810	776	739	687	90
380 x 475	380.201	224	190	202	713320	3754	156	125	M 22	780	1080	972	882	843	802	742	90
400 x 495	400.201	224	190	202	750853	3754	149	120	M 22	780	1091	984	897	859	818	760	90
420 x 515	420.201	224	190	202	798406	3754	142	115	M 22	780	1102	998	912	875	835	777	90
440 x 535	440.201	224	190	202	805949	3754	135	111	M 22	780	1113	1012	908	891	852	795	90
460 x 555	460.201	224	190	202	893492	3754	129	107	M 22	780	1126	1026	914	907	868	813	90
480 x 575	480.201	224	190	202	1039656	4332	143	119	M 22	780	1212	1102	1010	970	927	865	90
500 x 595	500.201	224	190	202	1082975	4332	137	115	M 22	780	1225	1116	1026	986	944	883	90
520 x 615	520.201	224	190	202	1201301	4621	141	119	M 22	780	1272	1160	1066	1025	981	918	90
540 x 635	540.201	224	190	202	1247588	4621	135	115	M 22	780	1285	1174	1082	1042	998	936	90
560 x 655	560.201	224	190	202	1374657	4909	139	119	M 22	780	1332	1217	1122	1080	1035	970	90
580 x 675	580.201	224	190	202	1423752	4909	134	115	M 22	780	1345	1232	1138	1096	1052	988	90
600 x 695	600.201	224	190	202	1472847	4909	130	112	M 22	780	1358	1247	1155	1114	1070	1006	90

¹ The minimum values for K are applicable when the hub overhangs are as follows: $Q \geq B - 0.5(L_1 + L_2)$ and $R \geq 0.5(K-D)$.
² If the clamping element is to be released without moving the adjacent component, then the distance x_{min} to this component must be maintained.
 Example for ordering: Cone clamping element RLK 402, 70 x 110, part number: 4205.070.201

Application Example



Backlash-free fastening of a RINGSPANN shaft flexible coupling in the electrode drive of a spark eroder machine using clamping elements RLK 200. The driven spindle is moved in both directions of rotation up to 15 x per second. This

ensures that an even distance between electrode and workpiece is maintained. The constantly changing load would very quickly lead to keyway failure here, whereas the clamping elements RLK 200 can guarantee a very high operating safety.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used. Fits up to h 11 are permissible for the shaft, and H 11 for the clamping surfaces in the hub.

The following fits are recommended for the pressure surfaces:

h 9 for the shaft,
H 9 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

$$R_z \leq 16 \mu\text{m}$$

The concentricity depends exclusively on the fit between shaft and hub bore d , because the clamping element itself does not have any centering effect.

Mounting

1. Lightly oil the clamping element. Do not use any oil containing molybdenum disulphide or high-pressure additives, and do not use grease.
2. Push on the hub and insert the clamping element.
3. Tighten the clamping screws crosswise by hand, aligning the hub at the same time.
4. With a torque wrench tighten the clamping screws crosswise with

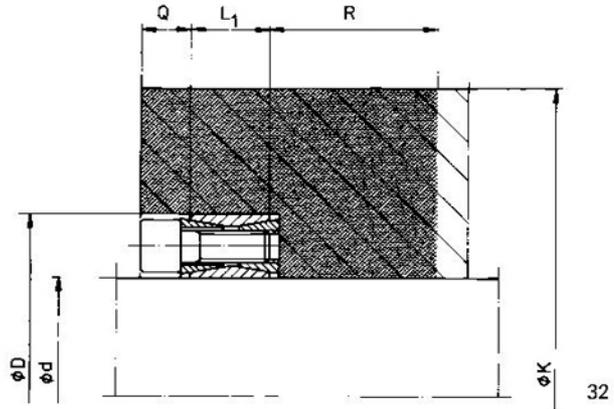
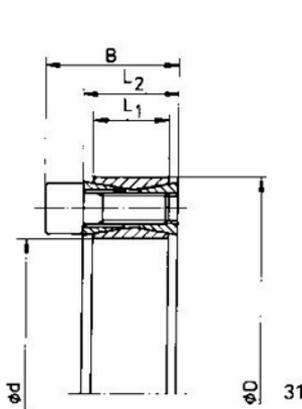
half the tightening torque M_t , then with full tightening torque, again crosswise.

5. Tighten the clamping screws one by one with full tightening torque. Repeat several times. The tightening is only completed when none of the screws can be turned any further.

Dismantling

Normally the clamping element is released automatically when opposing clamping screws are relaxed in stages.

1. Release the clamping screws in stages crosswise.
2. Tap the clamping screws lightly.



d x D mm	Art. No. 4201 ...	B mm	L ₁ mm	L ₂ mm	Transmissible with tightening torque M _s		Surface pressure on		Clamping screws size	tightening torque M _s Nm	Yield point R _e [N/mm ²] of hub material					
					M Nm	F kN	P _w N/mm ²	P _v N/mm ²			160	200	250	280	320	400
											K _{min} mm ²	K _{min} mm ²	K _{min} mm ²	K _{min} mm ²	K _{min} mm ²	K _{min} mm ²
20 x 47	020.001	26	17	20	313	31	278	118	M 6	15	97	88	80	77	74	69
22 x 47	022.001	26	17	20	344	31	253	118	M 6	15	97	88	80	77	74	69
24 x 50	024.001	26	17	20	422	35	261	125	M 6	15	104	95	87	83	79	74
25 x 50	025.001	26	17	20	440	35	251	125	M 6	15	104	95	87	83	79	74
28 x 55	028.001	26	17	20	547	39	298	152	M 6	15	122	110	100	96	92	85
30 x 55	030.001	26	17	20	587	39	278	152	M 6	15	122	110	100	96	92	85
32 x 60	032.001	26	17	20	751	47	261	139	M 6	15	126	114	105	100	96	90
35 x 60	035.001	26	17	20	821	47	239	139	M 6	15	126	114	105	100	96	90
38 x 65	038.001	26	17	20	1040	55	274	160	M 6	15	141	128	117	112	107	100
40 x 65	040.001	26	17	20	1095	55	260	160	M 6	15	141	128	117	112	107	100
42 x 75	042.001	32	20	24	1708	81	286	160	M 8	32	163	148	135	130	124	115
45 x 75	045.001	32	20	24	1830	81	267	160	M 8	32	163	148	135	130	124	115
48 x 80	048.001	32	20	24	2082	87	267	160	M 8	35	171	155	142	137	131	122
50 x 80	050.001	32	20	24	2168	87	256	160	M 8	35	171	155	142	137	131	122
55 x 85	055.001	32	20	24	2534	92	247	160	M 8	30	179	163	150	144	137	128
60 x 90	060.001	32	20	24	2927	98	240	160	M 8	31	186	170	157	151	144	135
65 x 95	065.001	32	20	24	3347	103	234	160	M 8	33	194	177	164	158	151	142
70 x 110	070.001	38	24	28	4846	138	251	160	M 10	57	225	206	190	182	175	164
75 x 115	075.001	38	24	28	5428	145	245	160	M 10	59	232	213	197	189	182	170
80 x 120	080.001	38	24	28	6041	151	240	160	M 10	62	240	220	203	196	188	177
85 x 125	085.001	38	24	28	6686	157	235	160	M 10	64	247	227	210	203	195	183
90 x 130	090.001	38	24	28	7363	164	231	160	M 10	67	255	234	217	210	202	190
95 x 135	095.001	38	24	28	8071	170	227	160	M 10	58	262	241	224	216	208	196
100 x 145	100.001	45	26	33	9788	196	232	160	M 12	94	280	258	239	231	222	210
110 x 155	110.001	45	26	33	11509	209	225	160	M 12	101	294	272	253	245	236	222
120 x 165	120.001	45	26	33	13366	223	220	160	M 12	100	309	286	266	258	249	235
130 x 180	130.001	50	34	38	20656	318	222	160	M 12	115	356	327	304	293	281	265
140 x 190	140.001	50	34	38	23481	335	217	160	M 12	110	371	342	317	306	295	278
150 x 200	150.001	50	34	38	26482	353	213	160	M 12	106	385	356	331	320	308	290
160 x 210	160.001	50	34	38	29660	371	210	160	M 12	103	400	370	344	333	321	303
170 x 225	170.001	58	38	44	37599	442	212	160	M 14	170	431	398	371	358	345	325
180 x 235	180.001	58	38	44	41580	462	209	160	M 14	163	446	412	384	372	358	338
190 x 250	190.001	66	46	52	56522	595	211	160	M 14	180	493	454	421	407	391	368
200 x 260	200.001	66	46	52	61876	619	208	160	M 14	174	508	468	435	420	404	381
220 x 285	220.001	72	50	56	80436	731	207	160	M 16	266	552	509	474	457	440	415
240 x 305	240.001	72	50	56	93906	783	203	160	M 16	247	581	537	501	484	466	441
260 x 325	260.001	72	50	56	108402	834	200	160	M 16	232	610	565	527	511	493	466
280 x 355	280.001	84	60	66	156036	1115	203	160	M 18	373	692	638	593	573	552	520
300 x 375	300.001	84	60	66	176600	1177	200	160	M 18	350	721	666	621	600	578	546
320 x 405	320.001	98	72	78	244000	1525	202	160	M 20	499	800	737	684	661	635	598
340 x 425	340.001	98	72	78	272052	1600	200	160	M 20	523	829	765	711	687	662	624
360 x 455	360.001	112	84	90	365925	2033	202	160	M 22	715	912	839	778	750	721	678
380 x 475	380.001	112	84	90	403232	2122	200	160	M 22	747	941	867	805	777	747	704
400 x 495	400.001	112	84	90	442326	2212	198	160	M 22	778	970	895	832	804	774	729

¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: Q ≥ B - 0.5 (L₁ + L₂) and R ≥ 0.5 (K - D).

Apart from the sizes listed in the table, clamping elements RLK 200 are also available on request up to diameter of d = 900 mm.

Example for ordering: Cone clamping element RLK 200, 20 x 47, part number: 4201.020.001

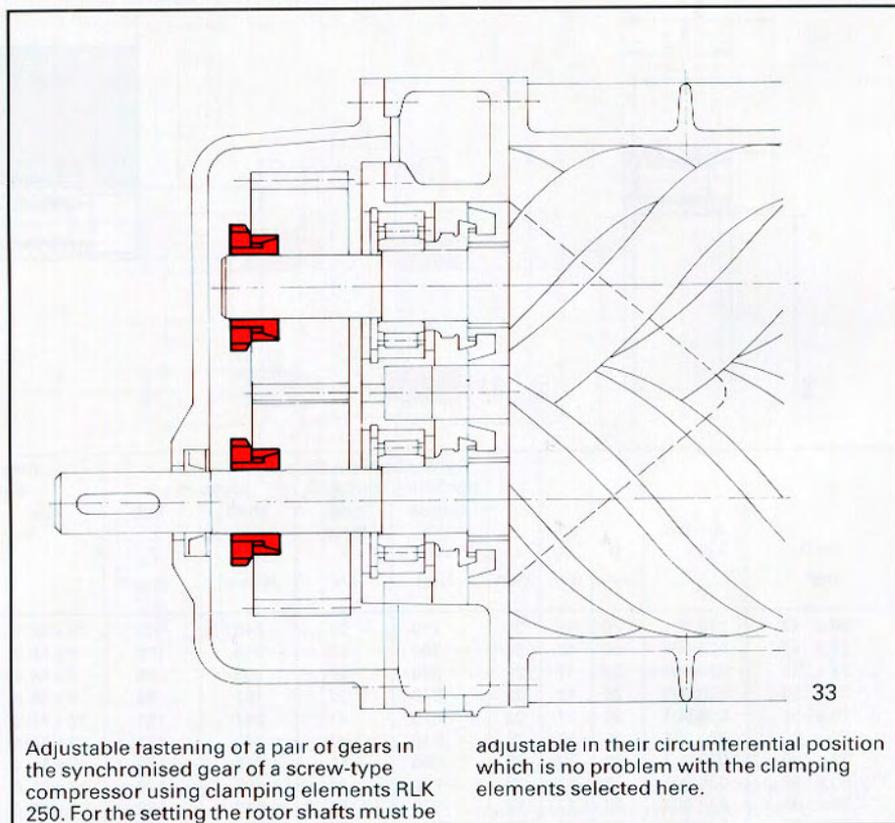
Series RLK 250

● self-centering

Application Example

These clamping elements permit a space-saving construction because the clamping is effected radially by means

of a C-spanner. Mounting is very simple by merely tightening the central nut.



Installation

Installation Example 1

It is not possible for the hub to slide to the right (ill. 29, top). The values for M , F , P_w and P_N should be reduced by 37%. K_{min} may be reduced (calculation see page 31).

Installation Example 2

A slight movement to the right of the hub towards the shaft of a few tenths of a millimetre occurs during clamping (ill. 35, bottom). The table values have been calculated for this case.

Fits, Surfaces

Both cones are slit, therefore rough fits can be used.

We recommend the following fits on the pressure surfaces:

h 8 for the shaft,
H 8 for the seating D in the hub.

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be:

$$R_z \leq 16 \mu\text{m}$$

The clamping element is self-centering, unless a particularly high rotational accuracy is required.

Mounting

1. Lightly oil the clamping element. Do not use any oil containing molybdenum disulphide or high-pressure additives and do not use grease.
2. Push on the hub and position the clamping element, making sure that the inner clamping sleeve does not protrude over the shaft end.
3. Tighten the keyed nut by hand until

- the element is clamping while holding a tab washer in position.
4. Tighten the keyed nut to tightening torque M_s using a torque wrench which is inserted at a right angle into the square of a C-spanner.
5. Bend the flange of the tab washer into a suitable keyway of the keyed nut.

Dismantling

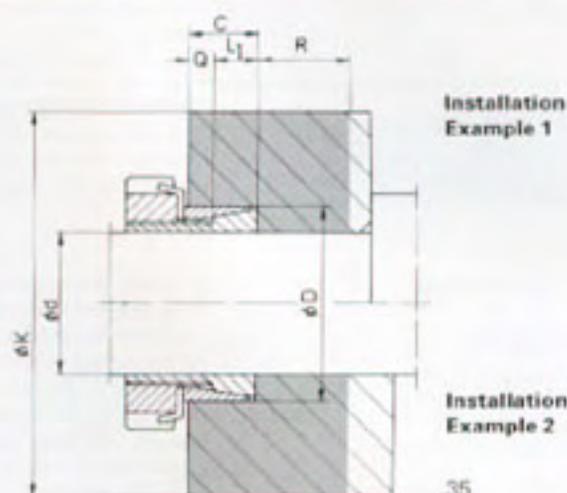
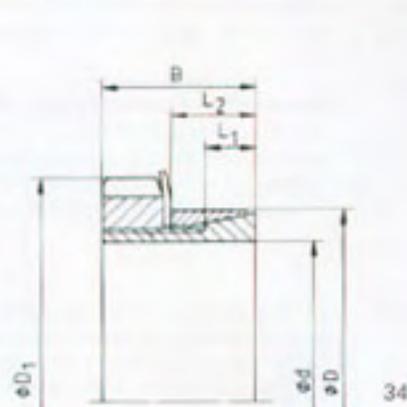
1. Extract the flange of the tab washer from the keyway of the keyway nut.
2. Loosen the nut with the C-spanner and turn back by hand.
3. Pull back tab washer.

4. Normally the clamping set is automatically released; if jammed, loosen with light tapping on the circumference.

Series RLK 250

● self-centering

Please note technical points of pages 30 and 31.



d x D mm	Art. No. 4202 ...	B mm	C mm	D ₁ mm	L ₁ mm	L ₂ mm	Transmissible with tightening torque M _t		Surface pressure		Nut ²⁾		Yield point R _e [N/mm ²] of hub material					
							M Nm	axial force F kN	P _{sh} N/mm ²	P _h N/mm ²	size	tightening torque M _t Nm	160 K ₁₆₀ mm	200 K ₂₀₀ mm	250 K ₂₅₀ mm	280 K ₂₈₀ mm	320 K ₃₂₀ mm	400 K ₄₀₀ mm
15 x 25	015.001	16,5	9	32	6,5	9,5	29	4	120	72	KM 4	46	41	38	36	35	34	32
16 x 25	016.001	16,5	9	32	6,5	9,5	33	4	120	76	KM 4	48	41	39	36	35	34	33
19 x 33	019.001	18	9,5	38	6,5	10	46	5	120	76	KM 5	72	48	45	42	41	40	38
20 x 33	020.001	18	9,5	38	6,5	10	51	5	120	80	KM 5	75	48	45	43	42	41	39
24 x 35	024.001	18	9,5	45	6,5	10	73	6	120	82	KM 6	106	56	52	50	48	47	45
25 x 35	025.001	18	9,5	45	6,5	10	79	6	120	85	KM 6	111	56	53	50	49	47	45
30 x 40	030.001	19,5	10	52	7	10,5	123	8	120	90	KM 7	164	65	61	58	56	54	52
35 x 45	035.001	21,5	10	58	8	10,5	191	11	120	93	KM 8	247	75	71	67	65	63	60
36 x 45	036.001	21,5	10	58	8	10,5	202	11	120	96	KM 8	254	76	71	67	65	63	60
40 x 52	040.001	24,5	12	65	10	12,5	312	16	120	92	KM 9	401	88	83	78	76	73	70
45 x 57	045.001	25,5	12	70	10	12,5	395	18	115	94	KM 10	490	96	90	85	82	80	76
48 x 62	048.001	25,5	12	75	10	12,5	480	19	120	92	KM 11	583	102	96	91	88	86	82
50 x 62	050.001	25,5	12	75	10	12,5	488	20	120	98	KM 11	607	103	97	92	89	87	83
55 x 68	055.001	27,5	14,5	80	12	15	618	23	104	84	KM 12	762	111	104	98	96	93	89
56 x 68	056.001	27,5	14,5	80	12	15	629	23	107	84	KM 12	762	111	104	98	96	93	89
60 x 73	060.001	28,5	16	85	12	16,5	727	24	103	85	KM 13	886	116	109	104	101	98	94
63 x 79	063.001	30,5	16,5	92	14	17	882	28	98	78	KM 14	1115	126	119	113	110	107	102
65 x 79	065.001	30,5	16,5	92	14	17	920	28	95	78	KM 14	1115	126	119	113	110	107	102
70 x 84	070.001	31,5	16,5	98	14	17	1075	31	98	80	KM 15	1290	134	126	119	117	113	109

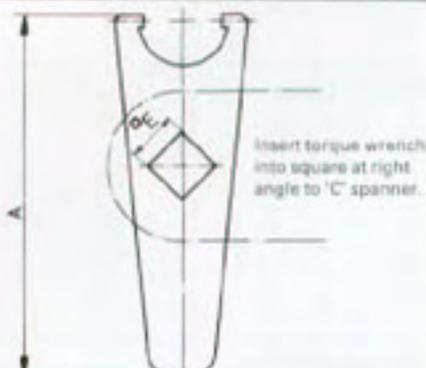
¹⁾ The minimum values for K are applicable when the hub overhangs are as follows: Q ≥ C - L₁ and R = 0,5 (K-D).

²⁾ The tightening torque M_t listed in the table above is necessary for the transmission of M or F. If the tightening torques achievable during mounting are lower than those given in the table, the values of M, F, P_{sh} and P_h will be reduced proportionally.

Example for ordering: Cone clamping element RLK 250, 30 x 40, part number: 4202.030.001

'C' Spanner for Mounting

Nut	'C' Spanner		Art. No. 2523 ...
	A mm	E inch	
KM 4	122	1/2	032.001
KM 5	154	3/4	038.001
KM 6	182	3/4	045.001
KM 7	162	3/4	052.001
KM 8	212	3/4	058.001
KM 9	212	3/4	055.001
KM 10	212	3/4	070.001
KM 11	212	3/4	075.001
KM 12	242	3/4	080.001
KM 13	242	3/4	085.001
KM 14	242	1	092.001
KM 15	252	1	098.001



Example for ordering: 'C' Spanner for Nut KM 7, Art. No. 2523.052.001

Application	The clamping element for the specific clamping connection. Tightening is via thrust rings or pressure flanges.	Minimum radial installation dimensions offer particular advantages.
Installation	<p>Installation Example 1 (III. 37) The set axial position is not changed during clamping. Preload force E_1 should be provided.</p> <p>Installation Example 2 (III. 38) A slight movement to the left of the hub towards the shaft of a few tenths of a millimetre occurs during clamping. Preload force E_2 should be provided.</p>	

**Double Arrangement
Implementation always according
to Installation Example 2**

When using 2 clamping elements in a row, M and F values will increase by about 55% compared with the table values. Preload force E_1 should be provided. Check the hub pressure (page 31). The preload force is produced by clamping screws provided by the user,

while clamping force and tightening torque should be taken from the table below. Quantity z and size of the clamping screws must be designed so that $z \times F_s = E_1$ or E_2 . In this table allowances are made for the variation of the preload force explained on page 30.

Metric Screws

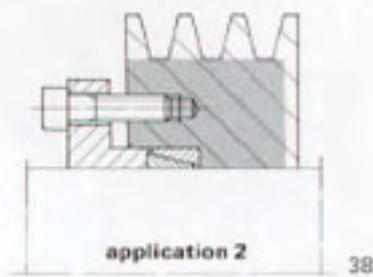
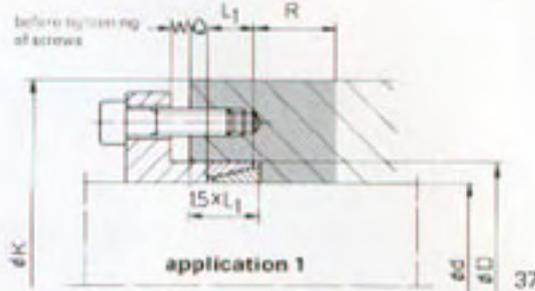
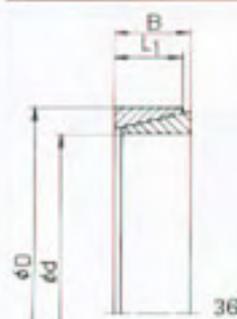
Clamping forces are amended to allow for variations of friction values.

Thread	Clamping force F_s (kN)			Tightening torque for $\mu_s=0,1$ M_s (Nm)		
	8.8	10.9	12.9	8.8	10.9	12.9
M 4	3.6	5.4	6.3	2.5	3.7	4.3
M 5	5.9	8.7	10.2	4.9	7.3	8.5
M 6	8.4	12.2	14.1	8.5	12.5	14.5
M 8	15.3	22	25.8	20.5	30	35
M 10	24.5	35.3	42.3	41	60	71
M 12	36	52.5	61.8	71	104	121
M 14	49.7	71.3	85.2	113	165	195
M 16	65.4	99	118	170	250	300
M 18	82	121	140	245	350	410
M 20	109	151	180	350	490	580
M 22	135	193	222	470	670	780
M 24	157	220	259	600	850	1000
M 27	202	295	338	880	1250	1450
M 30	247	358	413	1190	1700	2000

Fits, Surfaces	<p>We recommend the following fits on the pressure surfaces: up to $d = 40$ mm: h 6 for the shaft, H 7 for the seating D in the hub. from $d = 42$ mm: h 8 for the shaft, H 8 for the seating D in the hub.</p>	<p>The mean peak-to-valley height R_z on the pressure surfaces of shaft and hub should be $R_z \leq 6 \mu\text{m}$ The concentricity depends entirely on the fit between shaft and hub bore d, as the clamping element itself does not have any centering effect.</p>
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Mounting	<ol style="list-style-type: none"> 1. Lightly oil the clamping element. Do not use any oil containing molybdenum disulphide or high-pressure additives, and do not use grease. 2. Push on the hub; insert clamping elements and, if necessary, distance rings. 3. Attach the clamping flange, lightly tighten the clamping screws and align the hub. 	<ol style="list-style-type: none"> 4. Tighten diagonally opposite screws in several stages with a torque wrench to tightening torque M_s. If possible, this procedure should be repeated after the first application of stress to the clamping element.
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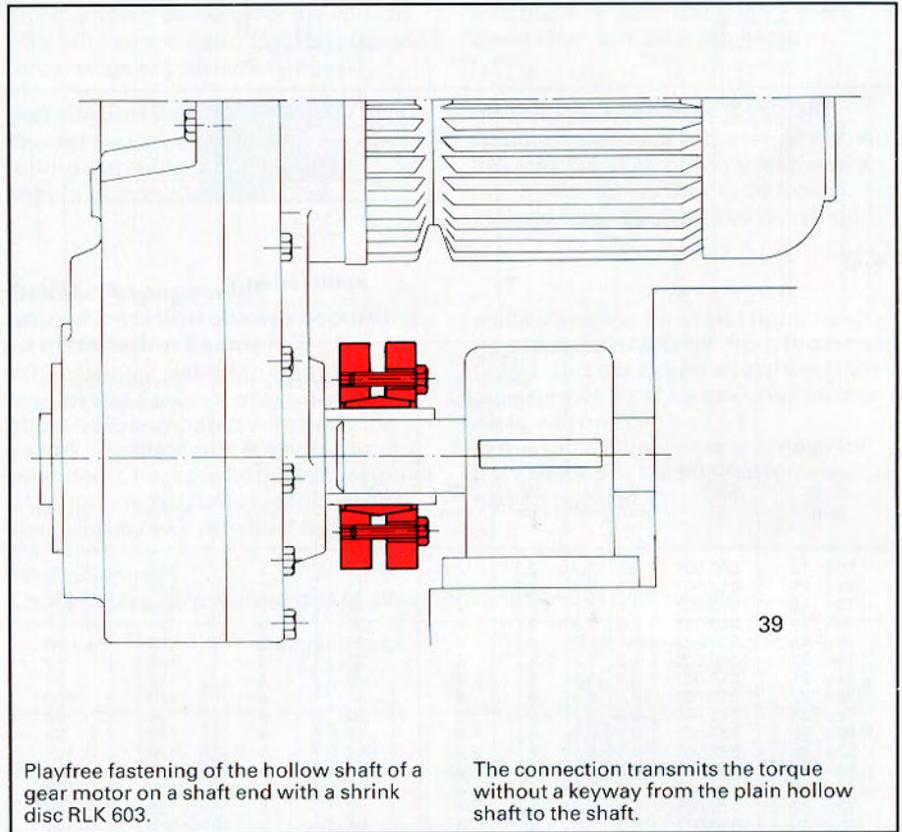
Dismantling	<ol style="list-style-type: none"> 1. Release diagonally opposite screws, taking care to prevent any tilting. 2. Release the hub radially by lightly tapping evenly over the circumference. 	<ol style="list-style-type: none"> 3. With applications without shaft shoulders, draw off the parts in both directions.
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e x D mm	Art. No. 4203 ...	B mm	L ₁ mm	Number of elements arranged in parallel		Transmissible with preload forces E ₁ or E ₂		Surface pressure with preload force E ₁ or E ₂		Preload force		Yield point P _{0.2} (N/mm ²) of hub material					
				1	2	torque M Nm	axial force F kN	shaft P _w N/mm ²	hub P _h N/mm ²	E ₁ kN	E ₂ kN	K _{max}					
												mm	mm	mm	mm	mm	mm
10 x 13	010.001	4,5	3,7	2,5	2,5	7	2	120	86	90	8	23	22	20	20	19	18
12 x 15	012.001	4,5	3,7	2,5	2,5	11	2	120	99	12	10	27	25	23	22	22	21
13 x 16	013.001	4,5	3,7	2,5	2,5	12	2	120	100	12	10	28	26	24	24	23	22
14 x 18	014.001	6,3	5,3	3	4	20	3	120	97	20	17	33	30	28	27	26	25
15 x 19	015.001	6,3	5,3	3	4	24	3	120	98	21	17	34	32	29	28	27	26
16 x 20	016.001	6,3	5,3	3	4	27	3	120	99	22	18	36	33	31	30	29	27
17 x 21	017.001	6,3	5,3	3	4	30	4	120	99	23	19	37	35	32	31	30	29
18 x 22	018.001	6,3	5,3	3	4	34	4	120	100	24	20	39	36	34	33	31	30
19 x 24	019.001	6,3	5,3	3	4	38	4	120	98	27	22	41	38	36	35	34	32
20 x 25	020.001	6,3	5,3	4	4	42	4	120	99	28	23	43	40	37	36	35	33
22 x 26	022.001	6,3	5,3	4	4	51	5	120	103	29	23	45	42	39	38	37	35
24 x 28	024.001	6,3	5,3	4	4	60	5	120	104	31	25	48	45	42	41	39	38
25 x 30	025.001	6,3	5,3	4	4	65	5	120	102	33	27	50	47	44	43	42	40
28 x 32	028.001	6,3	5,3	4	4	82	6	120	106	35	29	53	50	47	46	45	43
30 x 35	030.001	6,3	5,3	4	4	94	6	120	104	39	31	57	54	51	50	48	46
32 x 36	032.001	6,3	5,3	4	4	107	7	120	107	40	32	59	56	52	51	50	48
35 x 40	035.001	7	6	4	4	145	8	120	106	50	40	66	62	58	57	55	53
38 x 42	038.001	7	6	4	4	153	9	120	104	53	43	68	64	61	59	57	55
38 x 44	038.001	7	6	4	4	171	8	120	105	55	45	71	67	63	62	60	57
40 x 45	040.001	8	6,6	4	5	209	10	120	107	62	50	74	69	65	64	62	59
42 x 48	042.001	8	6,6	4	5	229	11	120	106	66	53	77	73	69	67	65	63
45 x 52	045.001	10	8,6	4	5	343	15	120	105	93	76	86	81	76	74	72	69
48 x 55	048.001	10	8,6	4	5	390	16	120	105	99	80	91	85	80	78	76	72
50 x 57	050.001	10	8,6	4	5	423	17	120	106	102	83	93	88	83	81	78	75
55 x 62	055.001	10	8,6	4	5	512	19	120	107	111	90	100	94	89	87	85	81
56 x 64	056.001	12	10,4	4	5	642	23	120	106	139	112	106	99	94	91	88	84
60 x 68	060.001	12	10,4	4	5	737	25	120	106	148	119	112	105	99	96	94	89
63 x 71	063.001	12	10,4	4	5	812	26	120	107	154	124	116	109	103	100	97	93
65 x 73	065.001	12	10,4	4	5	865	27	120	107	158	128	119	112	106	103	100	96
70 x 79	070.001	14	12,2	4	6	1176	34	120	107	201	142	130	122	115	112	109	104
71 x 80	071.001	14	12,2	4	6	1210	34	120	107	204	144	132	123	116	113	110	105
75 x 84	075.001	14	12,2	4	6	1351	36	120	107	214	172	137	129	122	119	115	110
80 x 91	080.001	17	15	4	6	1889	47	120	106	264	229	151	141	133	130	126	120
85 x 96	085.001	17	15	4	6	2133	60	120	107	300	242	158	148	140	136	132	126
90 x 101	090.001	17	15	4	6	2391	63	120	107	316	254	166	155	147	143	139	133
95 x 108	095.001	17	15	4	6	2664	56	120	107	331	266	172	162	153	149	145	139
100 x 114	100.001	21	18,7	5	6	3690	74	120	105	440	355	188	176	166	162	157	150
110 x 124	110.001	21	18,7	5	6	4453	81	120	104	473	382	202	189	179	174	169	162
120 x 134	120.001	21	18,7	5	6	5299	88	120	104	508	408	215	202	192	187	182	174
130 x 148	130.001	28	25,3	5	7	8414	129	120	103	762	616	245	229	216	210	204	195
140 x 158	140.001	28	25,3	6	7	9758	139	120	103	800	652	259	243	229	223	216	207
150 x 168	150.001	28	25,3	6	7	11202	149	120	103	855	689	272	256	242	236	229	218
160 x 178	160.001	28	25,3	6	7	12746	159	120	103	902	726	286	269	254	248	241	231
170 x 191	170.001	33	30	7	8	17062	201	120	102	1138	917	310	291	275	268	260	249
180 x 201	180.001	33	30	7	9	19128	213	120	102	1195	962	324	304	288	280	272	261
190 x 211	190.001	33	30	7	9	21312	224	120	104	1267	1019	339	319	302	294	286	274
200 x 224	200.001	38	34,8	7	9	27393	274	120	102	1548	1247	363	341	322	314	305	291
210 x 234	210.001	38	34,8	7	9	30201	288	120	102	1615	1300	377	354	335	326	317	304
220 x 244	220.001	38	34,8	7	9	33146	301	120	102	1681	1362	390	367	348	339	330	316
230 x 257	230.001	43	39,5	7	10	41120	358	120	101	1996	1608	415	390	368	359	348	333
240 x 267	240.001	43	39,5	7	10	44774	373	120	101	2072	1668	428	403	381	371	361	346
250 x 280	250.001	48	44	8	11	54117	433	120	100	2405	1939	452	425	401	391	380	363
260 x 290	260.001	48	44	8	11	58533	450	120	101	2508	2020	467	439	415	404	393	376
270 x 300	270.001	48	44	8	11	63122	468	120	101	2593	2087	481	452	428	417	405	388
280 x 313	280.001	53	49	8	11	75589	540	120	100	2995	2414	505	475	448	437	424	408
290 x 323	290.001	53	49	8	11	81095	550	120	100	3091	2488	519	489	461	450	437	418
300 x 333	300.001	53	49	8	11	86784	579	120	101	3187	2564	533	501	474	462	449	430
320 x 360	320.001	65	59	11	16	118852	743	120	99	4127	3330	584	548	517	503	489	467
340 x 380	340.001	65	59	11	16	134218	790	120	100	4356	3510	612	575	543	529	514	492
360 x 400	360.001	65	59	11	16	150473	838	120	100	4587	3692	639	601	569	555	539	514
380 x 420	380.001	65	59	11	16	167657	882	120	101	4821	3875	667	628	595	580	564	541
400 x 440	400.001	65	59	11	16	185769	929	120	101	5055	4059	694	655	621	606	589	565

¹⁾ The minimum values for K are applicable when the hub overhang is $R \geq 0,5 (K-D)$.
Apart from the sizes listed in the table, clamping elements RLK 300 are also available on request up to diameter of $d = 540$ mm.
Example for ordering: Cone clamping element RLK 300, 150 x 168, part number: 4203.150.001

Application Example



Playfree fastening of the hollow shaft of a gear motor on a shaft end with a shrink disc RLK 603.

The connection transmits the torque without a keyway from the plain hollow shaft to the shaft.

Fits, Surfaces

The torques and axial forces listed in the tables are based on the following tolerances:

d_w		tolerance	
from	to	bore hollow shaft	outer diameter shaft
11	30	H6	j6
30	50	H6	h6
50	80	H6	g6
80	400	H7	g6

The mean peak-to-valley height R_z on the pressure surfaces of shaft and hollow shaft should be:

$$R_z \leq 16 \mu\text{m}$$

Tolerance for outer diameter of hollow shaft: h 8

Mounting

1. Remove all grease from shaft and hollow shaft bore.
2. Lightly oil the seating of the shrink disc on the hollow shaft.
3. Draw shrink disc onto hollow shaft.
4. Slide shaft and hollow shaft into one another.
5. Tighten diametrically opposed clamping screws by hand whilst aligning the shrink disc so that the

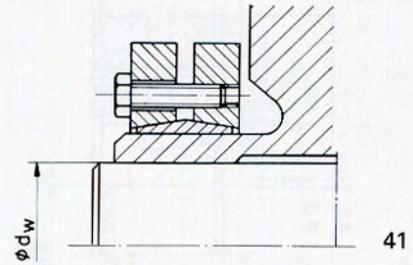
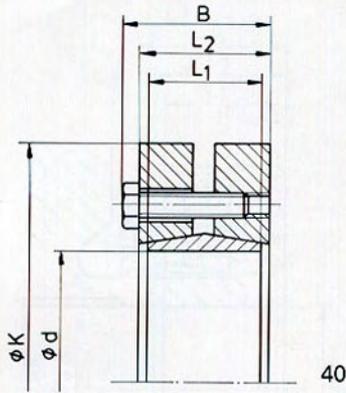
clamping flanges lie parallel to each other.

6. Tighten the clamping screws one by one with a torque wrench to tightening torque M_c . Repeat several times. The tightening process is only finished when none of the screws can be turned any further.

Dismantling

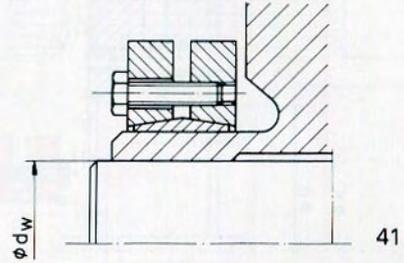
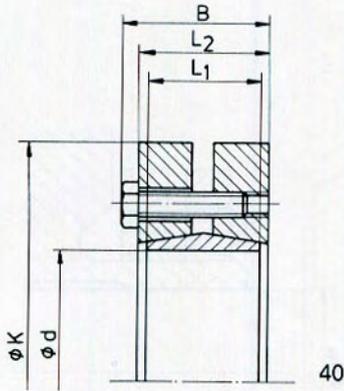
1. Part-release the clamping screws evenly in stages in order to avoid any tilting of the clamping flanges whilst taking great care for safety reasons that the clamping screws are not completely released from the thread bore as the pretensions in the shrink disc could cause the discs to jump apart.

2. Draw the shrink disc off the hollow shaft.



d mm	d _w mm	Art- number 4200 . . .	B mm	L ₁ mm	L ₂ mm	K mm	Transmissible with tightening torque M _s		Clamping screws		Surface pressure on shaft P _w N/mm ²
							M Nm	axial force F kN	size	tightening torque M _s Nm	
14	11 12	014.301	14,5	7	11,0	38	54 64	10 11	M 5	3	373
16	13 14	016.301	18,5	11	15,0	41	118 135	18 19	M 5	4	364
24	19 20 21	024.301	23	14	19,5	50	202 225 248	21 22 24	M 5	4	238
30	24 25 26	030.301	25	16	21,5	60	301 328 355	25 26 27	M 5	4	195
36	28 30 31	036.301	27,5	18	23,5	72	649 729 714	46 49 46	M 6	12	253
44	32 35 36	044.301	30	22	26	80	868 1070 1137	54 61 63	M 6	12	260
50	38 40 42	050.301	32	22	28	90	1265 1417 1567	67 71 75	M 6	12	238
55	42 45 48	055.301	34,5	23	30,5	100	1384 1617 1846	66 72 77	M 6	12	207
62	48 50 52	062.301	35	25	31	110	2115 2295 2313	88 92 89	M 6	12	230
68	50 55 60	068.301	34,5	23	30,5	115	2064 2307 2843	83 84 95	M 6	12	209
75	55 60 65	075.301	38	25	32,5	138	2839 3513 4170	103 117 128	M 8	30	230
80	60 65 70	080.301	38	25	32,5	145	3189 3868 4529	106 119 129	M 8	30	215
85	65 70 75	085.301	46,5	33	41	155	5387 6262 7120	166 179 190	M 8	30	241
90	65 70 75	090.301	44,5	30	39	155	4997 5893 6773	154 168 181	M 8	30	228
100	70 75 80	100.301	49,5	34	44	170	6333 7385 8423	181 197 211	M 8	30	217
110	75 80 85	110.301	57	39	50	185	7644 8852 9119	204 221 215	M10	59	203

Example for ordering: Shrink disc RLK 603, 30 x 25, part number: 4200.030.301.

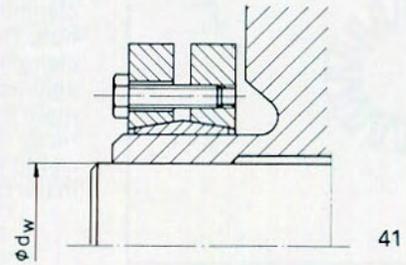
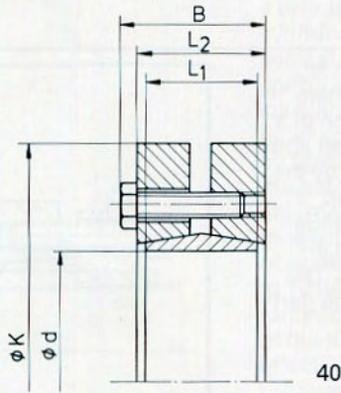


d mm	d _w mm	Art- number 4200 ...	B mm	L ₁ mm	L ₂ mm	K mm	Transmissible with tightening torque M _s		Clamping screws		Surface pressure on shaft P _w N/mm ²
							torque M Nm	axial force F kN	size	tightening torque M _s Nm	
115	80 85 90	115.301	62	45	55	185	8335 8402 9818	208 198 218	M10	59	194
120	80 85 90	120.301	61	42	54	215	11428 11469 13181	286 270 293	M10	59	230
125	85 90 95	125.301	61	42	54	215	10653 12391 14113	251 275 297	M10	59	221
130	90 95 100	130.301	61	42	54	215	11568 13316 15047	257 280 301	M10	59	213
140	95 100 105	140.301	68,5	46	60,5	230	14575 16575 18560	307 332 354	M12	100	218
155	105 110 115	155.900	90	68	82	263	20097 22410 24707	383 407 430	M12	100	218
160	110 115 120	160.301	72,5	50	64,5	265	21405 23729 26035	389 413 434	M12	100	211
165	115 120 125	165.301	81	56	71	290	32124 34954 36729	559 583 588	M16	250	239
170	120 125 130	170.301	81	56	71	290	33872 35522 38493	565 568 592	M16	250	232
175	125 130 135	175.301	81	56	71	300	34276 37278 40259	548 574 596	M16	250	226
180	130 135 140	180.301	81	56	71	300	36023 39037 42026	554 578 600	M16	250	219
185	135 140 145	185.301	96	71	86	330	47913 51557 55182	710 737 761	M16	250	210
190	140 145 150	190.301	96	71	86	330	50107 53762 57396	716 742 765	M16	250	205
195	140 150 155	195.301	96	71	86	350	61198 69447 73539	874 926 949	M16	250	239
200	150 155 160	200.301	96	71	86	350	67980 72105 76206	906 930 953	M16	250	234

Example for ordering: Shrink disc RLK 603, 125 x 95, part number: 4200.125.301.

Series RLK 603

Please note technical points on pages 30 and 31.



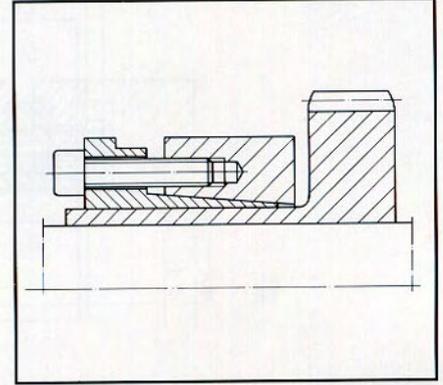
d mm	d _w mm	Art- number 4200 ...	B mm	L ₁ mm	L ₂ mm	K mm	Transmissible with tightening torque M _s		Clamping screws		Surface pressure on shaft P _w N/mm ²
							M Nm	axial force F kN	size	tightening torque M _s Nm	
220	160 165 170	220.301	114	88	104	370	89062 94137 99195	1113 1141 1167	M16	250	214
240	170 180 190	240.301	122	92	109	405	117357 129276 138883	1381 1436 1462	M20	490	229
260	190 200 210	260.301	133	103	120	430	154183 168380 182487	1623 1684 1738	M20	490	221
280	210 220 230	280.301	147	114	134	460	199766 215732 231603	1903 1961 2014	M20	490	212
300	230 240 245	300.301	155	122	142	485	251512 269164 277952	2187 2243 2269	M20	490	208
320	240 250 260	320.301	155	122	142	520	291313 310526 326107	2428 2484 2509	M20	490	216
340	250 260 270	340.301	169	134	156	570	364830 382056 405153	2919 2939 3001	M20	490	222
350	270 280 285	350.301	175	140	162	580	396752 420081 431703	2939 3001 3029	M20	490	207
360	280 290 295	360.301	175	140	162	590	413120 436495 448137	2951 3010 3038	M20	490	201
380	290 300 310	380.301	183	144	168	645	518485 545550 572495	3576 3637 3694	M24	840	222
390	300 310 320	390.301	183	144	168	660	568049 596156 619707	3787 3846 3873	M24	840	227
400	315 320 330	400.301	183	144	168	680	602850 611766 640488	3828 3824 3882	M24	840	221
420	330 340 350	420.301	203	164	188	690	715920 748553 781047	4339 4403 4463	M24	840	212
440	340 350 360	440.301	217	177	202	750	725473 758774 791950	4267 4336 4400	M24	840	187
460	360 370 380	460.301	217	177	202	770	916095 953478 990721	5089 5154 5214	M24	840	209
480	380 390 400	480.301	228	188	213	800	1042789 1082635 1122339	5488 5552 5612	M24	840	202

The special types of the series RLK 130 shown here have no slits in the outer cone ring in order to absorb the outwardly effective radial forces.

Dimensions to be taken from the table on page 10.

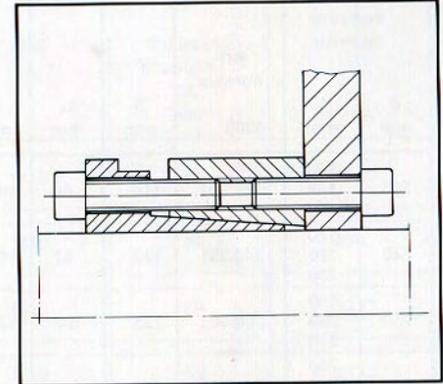
Outer Clamping Connection

The outer clamping connection is used when the radial fitting dimensions do not permit the insertion of a clamping element between shaft and hub. The radial forces effected by the clamping element press the hub against the shaft. With this arrangement the torque is transmitted directly from the shaft to the hub. The clamping element itself plays no part in the torque transmission.



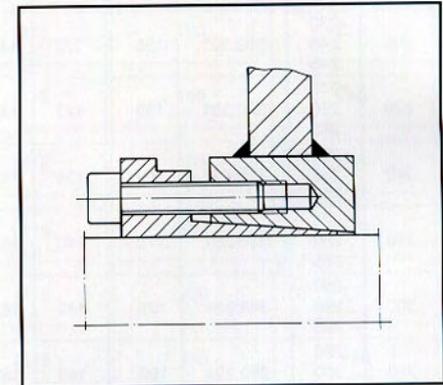
Clamping Elements for Front End Fastening

The clamping element shown here has thread bores passing through the outer cone, so that front mounted machine parts can be screwed on.



Clamping Elements for Welding-On of Machine Parts

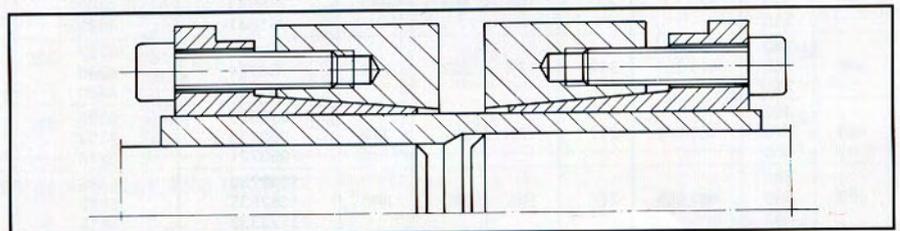
The clamping connection shown here allows narrow machine parts, like chain wheels or similar, to be welded on to the outer cone.



Shaft Coupling

Shafts which are perfectly aligned towards each other can be coupled simply and cheaply with a through-housing and two clamping elements. This is basically a double-sided version of the outer clamping connection.

Both shafts with the same diameter or with different diameters can be coupled. The connection forms an absolutely rigid coupling and there is no dampening effect to the torque transmission.

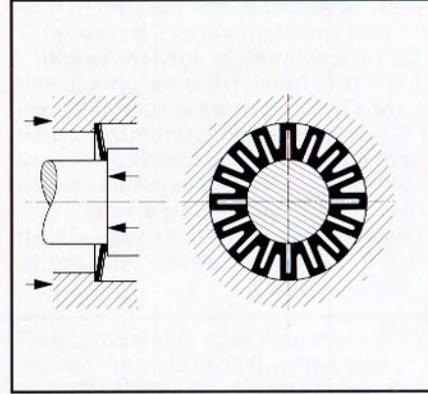


Connections with RINGSPANN Star Discs and Clamping Discs

Description

RINGSPANN star discs and clamping discs are used to produce force-locking connections through radial clamping of a cylindrical outer surface against a cylindrical inner surface. They are flat conical rings made of hardened special spring steel and have radial slits starting alternatively from outer and inner rim. When the cone is pressed flat by forces in the direction of the arrows, the outer diameter of the discs is enlarged while at the same time the inner diameter is reduced. The axial operating force converts by a factor of 5 to 10 times resulting in high radial forces on the cylindrical seatings areas of the discs which, being equally effective inwards and outwards, produce a corresponding frictional

locking action on the shaft and seating surfaces of the hub.



Advantages

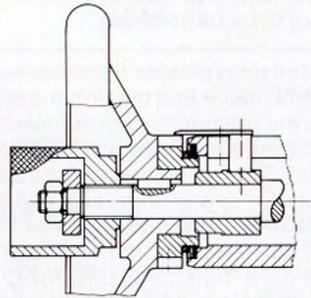
- The fastening can be released repeatedly with ease-important for applications which require constant adjustment of the angular or the axial position of a component.
- Perfect relation between axial clamping forces and the resulting fastening. In many applications sufficiently tight clamping is achieved just by using

a knurled screw or nut (without using a spanner).

- Fastening is possible on finished drawn or turned shafts; the clamping elements can also accommodate rough fits.

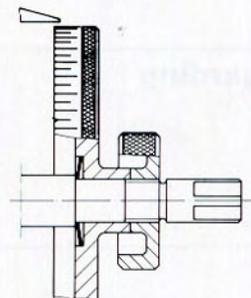
Application Examples

Setting mechanism on pressure roller



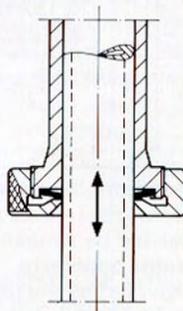
45

Clamping to prevent axial displacement



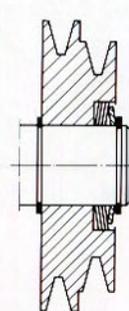
46

Fastening of scale discs



47

Fastening of plastic parts



48

More detailed information and tables can be found in our catalogue

'Star Discs and Clamping Discs', available on request.

Formulae

M_a [Nm]	maximum torque to be transmitted	L_1 [mm]	axial bearing length of clamping element
M [Nm]	transmissible torque (from table)	Q [mm]	load-sharing hub length, left
F_a [kN]	axial force to be transmitted during operation	R [mm]	load-sharing hub length, right
F [kN]	transmissible axial force (from table)	K [mm]	outer diameter of hub
P_w [N/mm ²]	surface pressure on hub (from table)	d_{in} [mm]	inner diameter of hollow shaft
P_s [N/mm ²]	surface pressure on shaft (from table)	C_N -	= D/K
E [kN]	required preload force	C_w -	= d_w/d
F_s [kN]	screw clamping force	σ_r [N/mm ²]	reference stress in the hub
M_s [Nm]	screw tightening torque	σ_{td} [N/mm ²]	tangential stress in hollow shaft bore
D [mm]	clamping element – outer diameter	R_h [N/mm ²]	yield limit of hub material with inner clamping connections
d [mm]	clamping element – inner diameter	R_{sh} [N/mm ²]	yield limit of hollow shaft material with shrink disc connections
d_w [mm]	diameter of shaft in the case of shrink disc connections		

Torque, Axial Force, Tilting Forces

The design of the connection must be such that the transmissible torque M is always higher than the highest peak torque M_a which can occur at the point of connection. For example, one should consider the fact that the usual electric motors produce a peak when starting which can be 4 x as high as the nominal torque. The axial force F from the tables is only applicable when hardly any torque occurs. If torque and axial force are to be transmitted

simultaneously, then the following formula applies:

$$M \geq \sqrt{M_a^2 + \left(\frac{F_a \cdot d}{2}\right)^2} \quad [\text{Nm}]$$

Tilting forces reduce the transmission effect of the elements. If the clamping element is required to transmit a tilting moment which exceeds $0.25 \times M$, it is advisable to have the connection checked by us.

Notes regarding Tables

Due to the unavoidable fluctuations of the friction value and the tightening torque, the preload force produced by the clamping screws is subject to variation. The calculation of the table values assumes a friction value variation in the thread and below the screw head of between 0.10 and 0.14, and that the given tightening torque M_s is exceeded by no more than 10% during mounting. With this assumption and with the help of the VDI-Guideline 2230 (issue 1986) the extent of variation

of the preload forces could be determined. The calculations in respect of elements RLK 300 also assumed that the preload force of the user's clamping screws were subject to the same type of variation.

For the sake of optimum design and safety, the calculations of elements were therefore based on the following assumptions:

Calculated values	based on preload force	
	for series RLK 110, 130, 131, 132, 133, 134 200, 250, 400, 402, 603	for series RLK 300
M and F P_w and P_s K_{min}	lower limit mean value upper limit	87 % of table value Table value E_1 or E_2 128 % of table value

Tightening Torque, Preload Force

The tightening torque from the tables must be achieved during assembly and should only be exceeded by a maximum of 10%. The same applies to clamping screws provided by the user which are used with RLK 300. With the series RLK 110, 130, 131, 132, 133, 134, 200, 250, 400, 402 and 603, a shortfall of the tightening torques given

in the tables would effect a proportional reduction of M , F , P_w and P_s . With RLK 300, the preload force E_1 or E_2 can be increased or reduced compared with the table value; M , F , P_w and P_s would change roughly proportionately.

Technical Information for Inner Clamping Connections

Hub Outer Diameter

The hub outer diameters in the tables have been calculated for varying yield limits of the hub material assuming and assume the following conditions:

- only one clamping element is used; no multi-arrangement
- availability of the bearing length $Q + L_1 + R$ given in the tables, the drawing or footnote 1)
- the E-module of the hub material is at least $150\,000\text{ N/mm}^2$.

A further calculation to check the hub pressure is necessary when

- $R_e < 160\text{ N/mm}^2$

- when the bearing hub length $Q + L_1 + R$ given in the tables is not available
- or in the case of RLK 300, when operation is with a preload force which is higher than the table value E_1 or E_2 .

Calculating the distribution of stress on irregular hubs is a complicated and time consuming process. However, it is usually sufficient to approximate the active volume of material by considering it to be a simple ring. In that case the equations below provide perfectly satisfactory results.

Checking the Hub Pressure

The maximum comparable stress must be checked as follows:

$$\sigma_r = 1.28 \cdot P_N \cdot \frac{L_1}{Q + L_1 + R} \cdot \frac{1 + 0.5 \cdot C_N}{0.8(1 - C_N)}$$

This comparable stress must not exceed the yield limit R_e of the hub material. With a double arrangement of clamping elements RLK 300 the value for L_1 should be doubled.

Hollow Shafts

The tangential stress in the shaft bore of hollow shafts must be checked as follows:

$$\sigma_{rW} = 1.28 \cdot P_w \cdot \frac{L_1}{Q + L_1 + R} \cdot \frac{2}{1 - C_w^2}$$

σ_{rW} should not exceed the yield limit R_e of the shaft material. With a double arrangement of clamping elements RLK 300 the value for L_1 should be doubled.

Technical Data for Shrink Disc Connections

Material of the Hollow Shaft

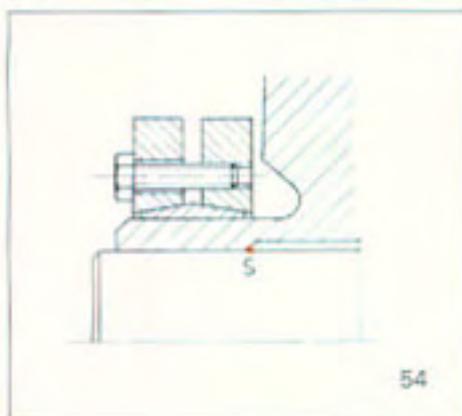
The material used for the hollow shaft should be steel, cast steel or spheroidal cast iron with a yield limit $R_{eH} > 360\text{ N/mm}^2$.

Calculating the Stress in the Hollow Shaft

The greatest stress in shrink disc connections occurs in the bore of the hollow shaft on point S. For this multiple-axle clamping condition the comparable stress σ_{sS} should be calculated according to the deformation formula

$$\sigma_{sS} = \sqrt{\sigma_t^2 + \sigma_r^2 - \sigma_t \cdot \sigma_r + 3\tau^2} \quad [\text{N/mm}^2]$$

The stress value thus arrived at must be smaller than R_{eH} .



Freewheels

Backstops

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



Catalogue 88

Indexing Freewheels

For gradual feed of materials.



Catalogue 80

Overrunning Freewheels

Automatic engaging and disengaging of drives.



Catalogue 80

Housing Freewheels

Automatic engaging and disengaging for multi-motor drives for installations with continuous operation.



Catalogue 80.1

Freewheel Elements

Cage Freewheels, Sprag Sets and Freewheel Chains.



Catalogue 89

Brakes

Industrial Disc Brakes

Spring Activated - Pneumatic Release.



Catalogue 46

Industrial Disc Brakes

Spring Activated - Hydraulic Release.



Catalogue 46

Industrial Disc Brakes

Pneumatically Activated.



Catalogue 46

Industrial Disc Brakes

Brake Calipers - Hydraulically Activated.



Catalogue 46

Fail-Safe Clamping Units

For secure and precise positioning of piston rods.



Catalogue 32

Torque and Force Limiters

Torque Limiter with Screw Face

Reliable overload protection for tough operating conditions.



Catalogue 45

Torque Limiter with Rollers

With double or single Roller. Through ratcheting or disengaging, also for 360° synchronous running.



Catalogue 45

Torque Limiter with Spherical Rollers

Reliable overload protection with maximum response accuracy. Also backlash free.



Catalogue 45

Torque Limiter with Friction Linings

RIMOSTAT Torque Limiter for constant torque. Belleville Spring Torque Limiter for simple release.



Catalogue 45

Force Limiter

Reliable axial overload protection in piston rods.



Catalogue 49

Couplings

Flexible Couplings

Large, safe radial and angular misalignments. Minimum resiliency.



Catalogue 44

HELICAL-Flexures Shaft Couplings

Special construction on specific application requirements.



Catalogue 43

HELICAL-Flexures with Integrated Connectors

Shaft coupling, space saving connectors integrated.



Catalogue 43

HELICAL-Flexures Spring Elements

Single Spring element with maximum resistance to wear.



Catalogue 43

Clamping Coupling

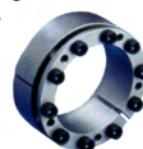
For the automatic coupling of rolls. Fast, safe and free from slipping connection.



Shaft-Hub-Connection

Cone Clamping Elements

For shaft-hub connections. High torques with small dimensions.



Catalogue 31

Three-part Shrink Discs

External clamping connection for the fastening of hollow shafts on solid shafts



Catalogue 31

Two-part Shrink Discs

External clamping connection. Advantages: Simple, secure mounting even without torque wrench.



Catalogue 31.1

Star Discs

Ideal for shaft-hub-connection for frequent release.



Catalogue 30

Star Spring Washers

Axial spring elements for preloading of ball bearings.



Catalogue 20

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 programme in high precision, ready manufactured Chucks and Mandrels.



Catalogue 13

Special Clamping Fixtures

Custom made solutions for specific clamping problems.



Glidebush Mandrels

Universal, cost effective standard series. Fast tool change to other clamping diameters.



Catalogue 15

Hydraulic Expanding Clamping Tools

Mandrels and chucks with high concentricity. Clamping several work pieces in one process possible.



Catalogue 16