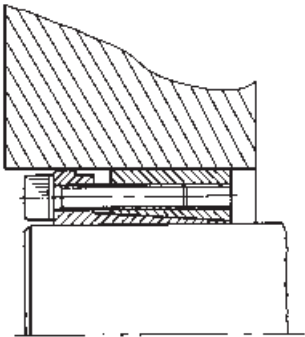


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Clamping Elements Type RCK 70



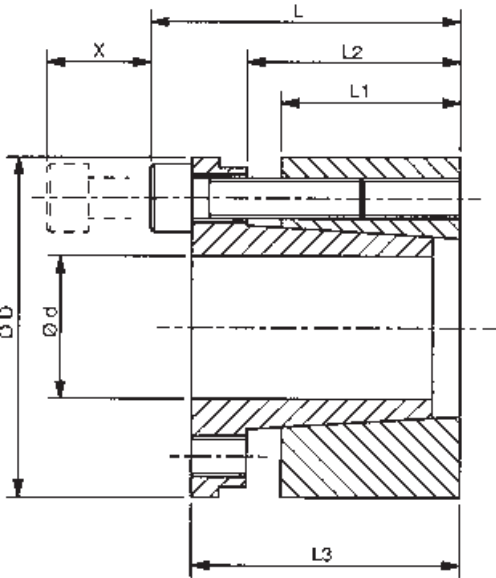
These shaft clamping elements are designed to give optimum concentricity, both radially and axially. Similar in design to the RCK 13, but with increased length to provide improved support, and reduced pressures on both shaft and hub. These units must always be installed inside the hub to ensure optimum concentricity. Axial movement of hub will occur during clamping operation.



Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

Clamping surfaces to be finished to $R_z \leq 15 \mu\text{m}$.



X = Distance required to remove screws, additional clearance for alan key may be required.

Dimensions

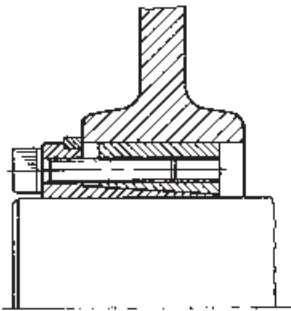
Part No.	Dimensions mm							Torque Cap. M Nm	Axial Force F kN	Surface Pressure		Clamping Screws		Approx. Weight kg	Min. Hub Dia* mm		
	d	D	L	L ₁	L ₂	L ₃	X			Shaft Ps N/mm ²	Hub Ph N/mm ²	Size	Torque Nm		Assy Type A	Assy Type B	Assy Type C
RCK70-19x47	19	47	45	26	31	39	25	403	42	228	98	M6	17	0.38	64	60	57
RCK70-20x47	20	47	45	26	31	39	25	443	44	226	98	M6	17	0.37	64	60	57
RCK70-22x47	22	47	45	26	31	39	25	510	46	215	93	M6	17	0.36	63	60	56
RCK70-24x50	24	50	45	26	31	39	25	607	51	215	102	M6	17	0.39	70	65	61
RCK70-25x50	25	50	45	26	31	39	25	689	55	225	102	M6	17	0.38	70	65	61
RCK70-28x55	28	55	45	26	31	39	25	826	59	215	107	M6	17	0.45	78	72	67
RCK70-30x55	30	55	45	26	31	39	25	865	58	196	117	M6	17	0.42	81	74	69
RCK70-32x60	32	60	45	26	31	39	25	1129	71	225	111	M6	17	0.52	86	80	74
RCK70-35x60	35	60	45	26	31	39	25	1177	67	196	116	M6	17	0.48	88	81	75
RCK70-38x65	38	65	45	26	31	39	25	1451	76	205	121	M6	17	0.57	97	89	82
RCK70-40x65	40	65	45	26	31	39	25	1537	77	196	122	M6	17	0.54	97	89	82
RCK70-42x75	42	75	55	30	36	47	30	2314	110	232	137	M8	41	0.91	119	107	98
RCK70-45x75	45	75	55	30	36	47	30	2657	118	232	137	M8	41	0.89	119	107	98
RCK70-48x80	48	80	55	30	36	47	30	2775	116	213	132	M8	41	1.00	124	113	103
RCK70-50x80	50	80	55	30	36	47	30	3011	120	213	132	M8	41	0.95	124	113	103
RCK70-55x85	55	85	55	30	36	47	30	3729	136	218	142	M8	41	1.02	137	123	112
RCK70-60x90	60	90	55	30	36	47	30	3949	132	194	153	M8	41	1.11	151	135	121
RCK70-65x95	65	95	55	30	36	47	30	4970	153	208	137	M8	41	1.19	150	136	124
RCK70-70x110	70	110	67	40	46	57	35	8128	232	220	140	M10	83	2.20	176	159	144
RCK70-75x115	75	115	72	40	46	62	35	8694	232	205	135	M10	83	2.53	180	163	149
RCK70-80x120	80	120	72	40	46	62	35	9458	236	196	127	M10	83	2.66	183	167	153
RCK70-85x125	85	125	72	40	46	62	35	11167	263	205	142	M10	83	2.79	201	181	164
RCK70-90x130	90	130	72	40	46	62	35	11970	266	196	135	M10	83	2.93	204	185	168
RCK70-95x135	95	135	72	40	46	62	35	13950	294	205	145	M10	83	3.06	220	197	178
RCK70-100x145	100	145	89	46	52	77	45	18295	366	211	145	M12	145	4.54	236	212	192
RCK70-110x155	110	155	89	46	52	77	45	20144	366	192	136	M12	145	4.92	244	221	201
RCK70-120x165	120	165	89	46	52	77	45	26345	439	211	152	M12	145	5.28	277	246	221
RCK70-130x180	130	180	89	46	52	77	45	28135	433	192	137	M12	145	5.52	284	257	234
RCK70-140x190	140	190	98	51	59	84	45	36177	517	192	142	M14	230	7.25	306	275	250
RCK70-150x200	150	200	98	51	59	84	45	43476	580	201	150	M14	230	7.65	333	297	267
RCK70-160x210	160	210	98	51	59	84	45	49466	618	201	150	M14	230	8.16	349	311	280
RCK70-170x225	170	225	98	51	59	84	45	44452	523	160	120	M14	230	8.75	334	307	283
RCK70-180x235	180	235	98	51	59	84	45	48901	543	157	117	M14	230	9.35	345	318	294
RCK70-190x250	190	250	98	51	59	84	45	65000	684	192	146	M14	230	10.80	409	367	331
RCK70-200x260	200	260	98	51	59	84	45	68000	680	184	141	M14	230	11.30	417	376	341

*Minimum outside diameter of hubs manufactured in medium carbon steel with yield strength $\geq 320 \text{ N/mm}^2$.
For hub types, and other materials, refer to page 3.
For assembly and disassembly instructions refer to page 24.

Clamping Elements Type RCK 71



The RCK 71 is a type RCK 70 with addition of a distance ring to prevent axial movement of the hub during clamping. Due to the additional friction between the element and hub during clamping maximum torques are reduced, but with reduction in surface pressures also. This design can be mounted within the confines of a hub providing a stepped bore is provided to accommodate the flange.

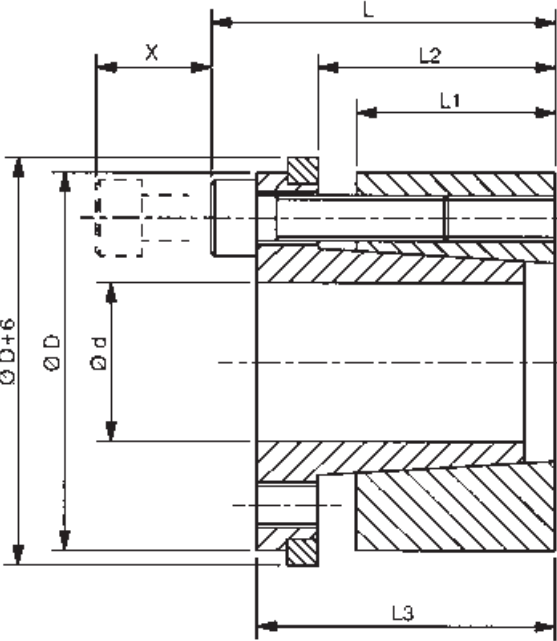


Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

Clamping surfaces to be finished to $R_z \leq 15 \mu\text{m}$.

X = Distance required to remove screws, additional clearance for alan key may be required.



Dimensions

Part No.	Dimensions mm							Torque Cap. M Nm	Axial Force F kN	Surface Pressure		Clamping Screws		Approx. Weight kg	Min. Hub Dia* mm		
	d	D	L	L ₁	L ₂	L ₃	X			Shaft Ps N/mm ²	Hub Ph N/mm ²	Size	Torque Nm		Assy Type A	Assy Type B	Assy Type C
RCK71-19x47	19	47	45	26	31	39	25	294	31	228	96	M6	17	0.39	64	60	56
RCK71-20x47	20	47	45	26	31	39	25	313	31	226	96	M6	17	0.38	64	60	56
RCK71-22x47	22	47	45	26	31	39	25	362	33	206	97	M6	17	0.37	64	60	56
RCK71-24x50	24	50	45	26	31	39	25	421	35	206	100	M6	17	0.41	69	65	60
RCK71-25x50	25	50	45	26	31	39	25	470	38	221	110	M6	17	0.40	72	66	62
RCK71-28x55	28	55	45	26	31	39	25	578	41	202	105	M6	17	0.48	77	72	67
RCK71-30x55	30	55	45	26	31	39	25	637	42	221	118	M6	17	0.45	81	75	69
RCK71-32x60	32	60	45	26	31	39	25	784	49	197	114	M6	17	0.56	87	80	75
RCK71-35x60	35	60	45	26	31	39	25	843	48	202	118	M6	17	0.52	88	81	75
RCK71-38x65	38	65	45	26	31	39	25	1010	53	197	121	M6	17	0.62	97	89	82
RCK71-40x65	40	65	45	26	31	39	25	1108	55	234	143	M6	17	0.59	105	94	86
RCK71-42x75	42	75	55	30	36	47	30	1892	90	216	135	M8	41	0.97	118	107	97
RCK71-45x75	45	75	55	30	36	47	30	1912	85	216	135	M8	41	0.95	118	107	97
RCK71-48x80	48	80	55	30	36	47	30	2137	89	221	142	M8	41	1.07	129	116	105
RCK71-50x80	50	80	55	30	36	47	30	2167	87	221	143	M8	41	1.02	129	116	105
RCK71-55x85	55	85	55	30	36	47	30	2677	97	221	143	M8	41	1.09	137	124	112
RCK71-60x90	60	90	55	30	36	47	30	2853	95	197	131	M8	41	1.19	139	126	116
RCK71-65x95	65	95	55	30	36	47	30	3500	108	206	142	M8	41	1.27	153	138	125
RCK71-70x110	70	110	67	40	46	57	35	5717	163	221	142	M10	83	2.03	177	159	145
RCK71-75x115	75	115	72	40	46	62	35	6207	166	216	148	M10	83	2.65	190	170	153
RCK71-80x120	80	120	72	40	46	62	35	6707	168	198	139	M10	83	2.78	191	172	157
RCK71-85x125	85	125	72	40	46	62	35	8002	188	216	157	M10	83	2.92	214	189	169
RCK71-90x130	90	130	72	40	46	62	35	8502	189	197	143	M10	83	3.07	210	189	171
RCK71-95x135	95	135	72	40	46	62	35	10002	211	187	138	M10	83	3.21	214	193	176
RCK71-100x145	100	145	89	46	52	77	45	13336	267	197	148	M12	145	4.80	239	214	193
RCK71-110x155	110	155	89	46	52	77	45	14582	265	197	178	M12	145	5.20	290	250	219
RCK71-120x165	120	165	89	46	52	77	45	19083	318	216	158	M12	145	5.58	283	251	224
RCK71-130x180	130	180	89	46	52	77	45	20417	314	198	143	M12	145	5.86	291	262	237
RCK71-140x190	140	190	98	51	59	84	45	24920	356	188	138	M14	230	7.62	301	272	248
RCK71-150x200	150	200	98	51	59	84	45	30130	402	198	149	M14	230	8.04	331	296	266
RCK71-160x210	160	210	98	51	59	84	45	32520	407	198	149	M14	230	8.56	348	311	280
RCK71-170x225	170	225	98	51	59	84	45	33350	392	158	119	M14	230	9.19	333	306	282
RCK71-180x235	180	235	98	51	59	84	45	33600	373	154	119	M14	230	9.83	347	319	295
RCK71-190x250	190	250	98	51	59	84	45	46400	488	150	114	M14	230	11.35	363	335	311
RCK71-200x260	200	260	98	51	59	84	45	48200	482	144	110	M14	230	11.90	372	345	321

*Minimum outside diameter of hubs manufactured in medium carbon steels with yield strength $\geq 320 \text{ N/mm}^2$.
For hub types, and other materials, refer to page 3.
For assembly and disassembly instructions refer to page 24.

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Cross Shaft Clamping Elements



In order to make the best selection of a Cross Shaft Clamping Element for your application a number of factors must be taken into consideration. These include the shaft diameter; the outside diameter of the hub of connecting component; the drive torque to be transmitted, and axial thrust loads, and tilting or bending loads, maximum shaft speeds, operating temperature, and general design parameters and space restrictions.

Shaft Diameter:-

The shaft diameter will determine the particular size of clamping element in any series, and by reference to the catalogue details the suitability of that to meet the other parameters can be checked. Also hollow shafts must be checked for any load carrying strength, see below.

Hub Outside Diameter:-

The Hub Diameter has to be sufficient to support the stresses imposed by the shaft clamping element. The catalogue gives maximum hub diameters for medium carbon steel, but for other materials and method of determining refer below. Generally if hub diameter is over 2.5 times shaft diameter all series are suitable, but for smaller ratios consider types RCK 80, ACE 81, CCE 54 and CCE 55, and for very thin walled hubs use types RCK 19, RCK 20 and RCK 25.

Determination of Minimum Hub Diameter and Max. Hollow Shaft Bore:-

The following calculations are for static conditions only, considering only stresses imposed by the clamping element. The hub diameter is controlled by the pressure applied by the outer cone of the clamping element; the shape of the hub bore and total length of hub; and yield stress for permanent elongation of 0.2%.

Minimum Hub Dia. $D_m = D \sqrt{\frac{\sigma + PhC}{\sigma - PhC}}$

Where D = Clamping element outside diameter mm
 σ = Yield strength of material N/mm²
 Ph = Surface pressure on hub N/mm²
 C = Constant for Hub shape - see drawings

The tables in the catalogue give minimum hub diameters for hubs manufactured in medium carbon steel (080M40 or C45) or other material where $\sigma = 320$ N/mm². Values for σ on other commonly used hub materials are:-

220 Grade Cast Iron	$\sigma = 150$ N/mm ²
260 Grade Cast Iron	$\sigma = 180$ N/mm ²
Mild Steels	$\sigma = 220$ N/mm ²
070M55 (En9)	$\sigma = 350$ N/mm ²
Stainless Steel	$\sigma = 200$ N/mm ²
Aluminium	$\sigma = 100$ N/mm ²

For hollow bored Shafting:-

Max. Bore in Shaft $D_m = d \sqrt{\frac{\sigma - 1.6 Ps}{\sigma}}$

Where d = Clamping element bore mm
 Ps = Surface pressure on Shaft N/mm²

For solid shafting yield strength of material σ must be higher than surface pressure Ps .

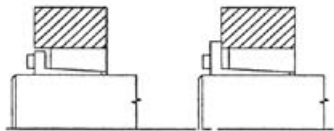
Maximum Shaft Speed:-

The centrifugal forces generated by high shaft speeds can reduce torque capacity and increase stress loads on hubs. Consult Cross & Morse if speed of shaft results in outer clamping diameter D running above 25M/sec.

Operating Temperature:-

Maximum temperatures should not exceed 100°C. At temperatures above 70°C the locking screws should be rechecked after 1 hour operation, whilst assembly is still warm.

Hub Assembly Type A C=1.0



$$L_1 \leq H_w < 2L_1 \quad L_2 \leq H_w < 2L_2$$

Where H_w = Hub Width
For Dimensions L_1 & L_2 ref. Product Pages

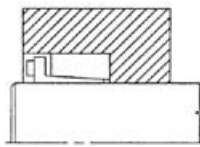
Hub Assembly Type B C=0.8



$$H_w \geq 2L_1$$

$$H_w \geq 2L_2$$

Hub Assembly Type C C=0.6



$$H_w \geq 2L_1 \text{ (All Types)}$$

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Installation Instructions

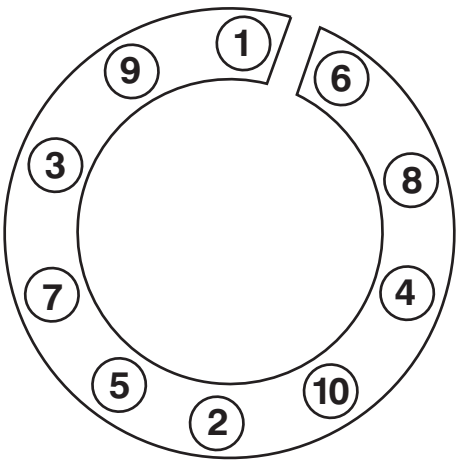


Installation and Removal of Cross Shaft Clamping Elements

Types RCK 10, 11, 12, 13, 15, 16, 61, 70, 71, 80 and ACE81

Installation:-

1. Slacken all screws in element by approx. two turns.
2. Remove two or three screws completely, and fit into equally spaced empty release thread holes. Tighten these screws lightly so as to ensure inner and outer cones are kept apart.
3. Clean all contact surfaces including screw threads, and lightly oil with clean thin unmodified oil.*
4. Insert clamping element into hub and push onto shaft and locate.
5. Remove screws from release holes and replace in original holes.
6. Tighten all screws finger tight and align hub.
7. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half screw catalogue torque, then 3/4 value, and finally full torque. Check all screws at full torque until no further rotation of screws occurs.



Disassembly:-

1. Slacken all clamping screws by couple of turns, completely removing as many as release holes in element.
2. Fit screws in release holes and tighten in sequence as clamping to force inner and outer cones apart.
3. Carefully remove hub and clamping element from shaft, and take element from hub.

Types RCK 40 and 45

Installation:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Fit hub to shaft and insert clamping element.
3. Tighten all screws finger tight and align hub.
4. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half catalogue torque for screw, then at 3/4 value, and finally at full torque. Check all screws are at full torque until no further rotation of screws can be achieved.

Disassembly:-

1. Release clamping screws in same sequence as for clamping. Element should now self release. If required lightly tap clamping screws to aid release. If still not released remove light coloured screws completely and replace with next larger metric size and tighten these screws to jack the cones apart.

Type RCK 50

Installation procedure depends detailed design, but following is typical:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Push hub onto shaft and insert spacer sleeves and clamping ring sets according to application drawing.
3. Insert distance ring if fitted and attach clamping flange lightly tightening screws. Align hub.
4. Tighten all screws in a diametrically opposite sequence, in several stages up to max. torque for screw size.

Disassembly:-

The taper of the individual rings is such that the assembly should automatically release when the locking screws are slackened. If not light tapping on the hub circumference should release them.

Types CCE 54 and 55

Installation:-

1. Clean all contact surfaces, and lightly oil with clean unmodified mineral oil.*
2. Turn locking nut anticlockwise until outer sleeve loose on inner cone.
3. Position hub on shaft and insert clamping element.
4. Align hub and tighten locking nut to catalogue torque value, and bend suitable tab on lock washer to prevent further rotation.

Disassembly:-

1. Release bent washertab and undo nut until sleeve loose.
2. Remove clamping element, If tight give end of tab gentle tap to release.

Types RCK 19/20 and 95

Installation:-

1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Slacken all clamping bolts by a couple of turns.
3. (RCK 19/20 only) Fit clamping element on outer diameter of hub, and slide assembly onto shaft and position.
(RCK 95 only) Fit shaft ends equally into clamping element ensuring small clearance between shafts.
4. Tighten all bolts in a diametrically opposite sequence, in several stages up to max. specified torque.

Disassembly:-

Slacken all bolts and gently tap on bolts to release clamping element.

***WARNING:** Never use, lubricant containing Molydenum or E.P additives, synthetic lubricant, or grease.