

Clamping Elements Type RCK 15



Designed for use with standardised ranges of pulleys, sprockets, and gears, the shaft clamping elements can accommodate a large range of shaft diameters with a hub of constant bore diameter. On clamping precise axial and radial positioning is provided, combined with medium torque transmission capability.

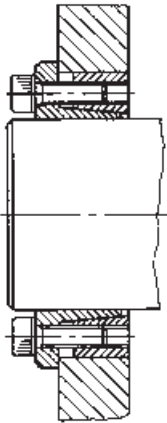
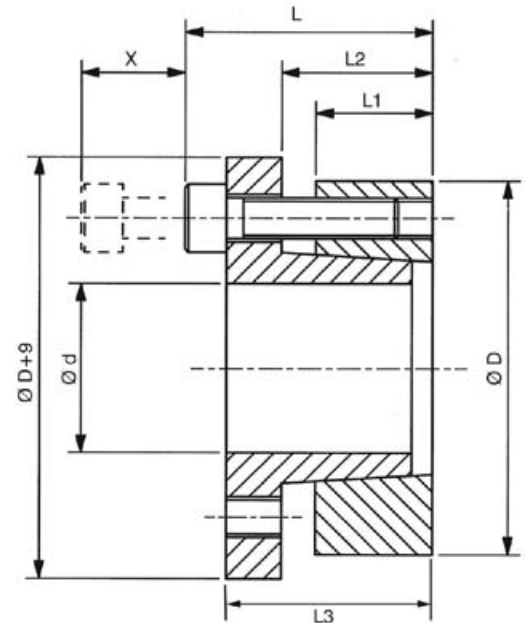
Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

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

Cross & Morse can provide standard Roller Chain Sprockets finish bored to accommodate RCK 15 shaft clamping elements, with ability to fit to either hub or sprocket end.

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
RCK15-14x55	14	55	39	17	22	31	25	282	39	458	118	M8	41	0.51	81	75	69
RCK15-16x55	16	55	39	17	22	31	25	313	39	400	118	M8	41	0.49	81	75	69
RCK15-18x55	18	55	39	17	22	31	25	353	39	356	118	M8	41	0.48	81	75	69
RCK15-19x55	19	55	39	17	22	31	25	372	39	337	118	M8	41	0.47	81	75	69
RCK15-20x55	20	55	39	17	22	31	25	392	39	320	118	M8	41	0.47	81	75	69
RCK15-22x55	22	55	39	17	22	31	25	431	39	290	118	M8	41	0.45	81	75	69
RCK15-24x55	24	55	39	17	22	31	25	470	39	265	118	M8	41	0.44	81	75	69
RCK15-25x55	25	55	39	17	22	31	25	490	39	255	118	M8	41	0.43	81	75	69
RCK15-28x55	28	55	39	17	22	31	25	549	39	228	118	M8	41	0.41	81	75	69
RCK15-30x55	30	55	39	17	22	31	25	588	39	213	118	M8	41	0.40	81	75	69
RCK15-24x65	24	65	39	17	22	31	25	617	51	332	122	M8	41	0.68	97	89	82
RCK15-25x65	25	65	39	17	22	31	25	637	51	320	122	M8	41	0.63	97	89	82
RCK15-28x65	28	65	39	17	22	31	25	725	51	285	122	M8	41	0.61	97	89	82
RCK15-30x65	30	65	39	17	22	31	25	764	51	267	122	M8	41	0.58	97	89	82
RCK15-32x65	32	65	39	17	22	31	25	823	51	250	122	M8	41	0.56	97	89	82
RCK15-35x65	35	65	39	17	22	31	25	902	51	228	122	M8	41	0.53	97	89	82
RCK15-38x65	38	65	39	17	22	31	25	970	51	210	122	M8	41	0.50	97	89	82
RCK15-40x65	40	65	39	17	22	31	25	1029	51	200	122	M8	41	0.47	97	89	82
RCK15-30x80	30	80	41	20	25	33	25	1082	72	315	120	M8	41	1.04	119	109	101
RCK15-32x80	32	80	41	20	25	33	25	1155	72	298	120	M8	41	1.03	119	109	101
RCK15-35x80	35	80	41	20	25	33	25	1260	72	272	120	M8	41	0.98	119	109	101
RCK15-38x80	38	80	41	20	25	33	25	1370	72	250	120	M8	41	0.94	119	109	101
RCK15-40x80	40	80	41	20	25	33	25	1440	72	238	120	M8	41	0.91	119	109	101
RCK15-42x80	42	80	41	20	25	33	25	1510	72	226	120	M8	41	0.89	119	109	101
RCK15-45x80	45	80	41	20	25	33	25	1620	72	212	120	M8	41	0.83	119	109	101
RCK15-48x80	48	80	41	20	25	33	25	1735	72	198	120	M8	41	0.79	119	109	101
RCK15-50x80	50	80	41	20	25	33	25	1806	72	190	120	M8	41	0.74	119	109	101
RCK15-40x80H	40	80	41	20	25	33	25	2157	108	340	169	M8	41	0.89	144	126	111
RCK15-45x80H	45	80	41	20	25	33	25	2422	108	302	169	M8	41	0.85	144	126	111
RCK15-50x80H	50	80	41	20	25	33	25	2700	108	272	169	M8	41	0.78	144	126	111

*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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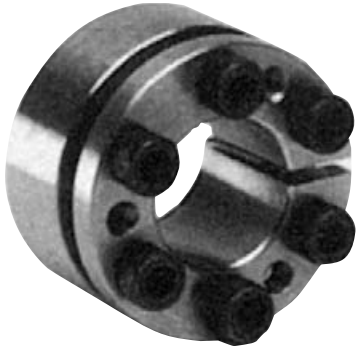
Fax: +44 121 325 1079

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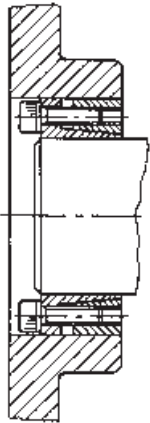
Clamping Elements Type RCK 13



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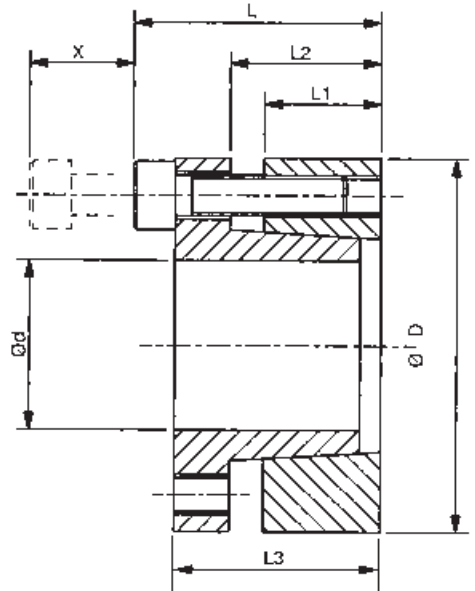
These shaft clamping elements are very compact units capable of transmitting medium torques. Their design ensures good concentricity between hubs and shafts, without any other means of location. A slight axial movement between hub and shaft occurs during clamping. These units can be installed totally within the hub providing optimum safety, and minimal axial length.



Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

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



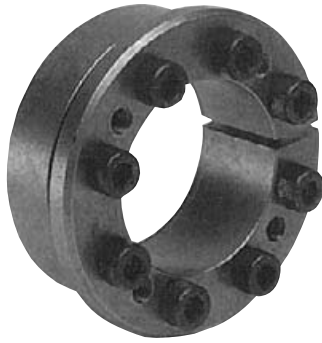
X = Distance required to remove screws, additional clearance for alan key may be required.

Dimensions

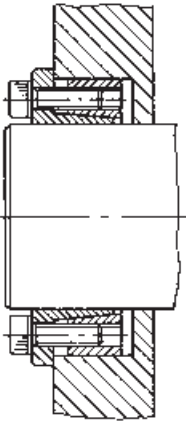
Part No.	Dimensions mm							Torque Cap. M Nm	Axial Force F kN	Surface Pressure		Clamping Screws		Approx. Weight kg	Min. Hub Dia* mm		
	d	D	L	L ₁	L ₂	L ₃	X			Shaft Ps N/mm ²	Hub Ph N/mm ²	Size	Torque Nm		Assy Type A	Assy Type B	Assy Type C
RCK13-18x47	18	47	34	17	22	28	20	350	39	280	120	M6	14	0.27	70	64	59
RCK13-19x47	19	47	34	17	22	28	20	355	37	280	120	M6	14	0.27	70	64	59
RCK13-20x47	20	47	34	17	22	28	20	360	36	280	120	M6	14	0.26	70	64	59
RCK13-22x47	22	47	34	17	22	28	20	400	36	268	123	M6	14	0.25	70	65	59
RCK13-24x50	24	50	34	17	22	28	20	440	37	243	120	M6	14	0.28	74	68	63
RCK13-25x50	25	50	34	17	22	28	20	560	45	280	138	M6	14	0.27	79	72	65
RCK13-28x55	28	55	34	17	22	28	20	625	45	250	128	M6	14	0.32	84	77	70
RCK13-30x55	30	55	34	17	22	28	20	650	43	235	128	M6	14	0.30	84	77	70
RCK13-32x60	32	60	34	17	22	28	20	950	59	290	150	M6	14	0.37	100	89	80
RCK13-35x60	35	60	34	17	22	28	20	1050	60	268	150	M6	14	0.34	100	89	80
RCK13-38x65	38	65	34	17	22	28	20	1140	60	252	146	M6	14	0.41	106	95	86
RCK13-40x65	40	65	34	17	22	28	20	1200	60	232	146	M6	14	0.38	106	95	86
RCK13-45x75	45	75	41	20	25	33	25	2180	97	285	168	M8	35	0.63	134	117	104
RCK13-50x80	50	80	41	20	25	33	25	2430	97	258	158	M8	35	0.68	137	121	109
RCK13-55x85	55	85	41	20	25	33	25	3050	111	268	173	M8	35	0.73	156	135	119
RCK13-60x90	60	90	41	20	25	33	25	3350	112	243	163	M8	35	0.78	158	139	123
RCK13-65x95	65	95	41	20	25	33	25	4080	126	253	173	M8	35	0.83	174	151	133
RCK13-70x110	70	110	50	24	30	40	30	6280	179	278	178	M10	70	1.33	206	177	156
RCK13-75x115	75	115	50	24	30	40	30	6680	178	258	168	M10	70	1.39	206	180	159
RCK13-80x120	80	120	50	24	30	40	30	7130	178	248	168	M10	70	1.48	215	188	166
RCK13-85x125	85	125	50	24	30	40	30	8450	199	258	178	M10	70	1.55	234	202	177
RCK13-90x130	90	130	50	24	30	40	30	9080	202	248	168	M10	70	1.63	233	203	180
RCK13-95x135	95	135	50	24	30	40	30	10580	223	258	178	M10	70	1.70	253	218	191
RCK13-100x145	100	145	56	26	32	44	35	13380	268	268	188	M12	125	2.60	284	241	210
RCK13-110x155	110	155	56	26	32	44	35	14580	265	238	178	M12	125	2.80	290	250	219
RCK13-120x165	120	165	56	26	32	44	35	17880	298	248	178	M12	125	3.00	309	266	233
RCK13-130x180	130	180	64	34	40	52	35	25950	399	238	168	M12	125	4.60	323	282	249
RCK13-140x190	140	190	68	34	40	54	40	26950	385	208	148	M14	190	4.90	313	280	253
RCK13-150x200	150	200	68	34	40	54	40	32950	439	228	168	M14	190	5.20	358	313	277
RCK13-160x210	160	210	68	34	40	54	40	38800	485	213	170	M14	190	5.50	380	331	292
RCK13-170x225	170	225	78	44	49	64	50	41300	486	188	130	M14	190	7.70	346	315	289
RCK13-180x235	180	235	78	44	49	64	50	43700	486	178	125	M14	190	8.10	355	325	298
RCK13-190x250	190	250	78	44	49	64	50	57700	607	173	145	M14	190	8.60	408	365	330
RCK13-200x260	200	260	78	44	49	64	50	60700	607	165	140	M14	190	9.00	416	375	340
RCK13-220x285	220	285	88	51	57	72	55	78100	710	180	132	M16	290	12.00	442	402	367
RCK13-240x305	240	305	88	51	57	72	55	106500	848	182	154	M16	290	13.00	515	458	411
RCK13-260x325	260	325	88	51	57	72	55	138500	1017	198	174	M16	290	13.90	598	518	456
RCK13-280x355	280	355	102	60	66	84	65	160300	1094	169	143	M18	400	20.40	574	516	467
RCK13-300x375	300	375	102	60	66	84	65	193200	1230	174	152	M18	400	21.60	629	559	503

*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.

Clamping Elements Type RCK 16



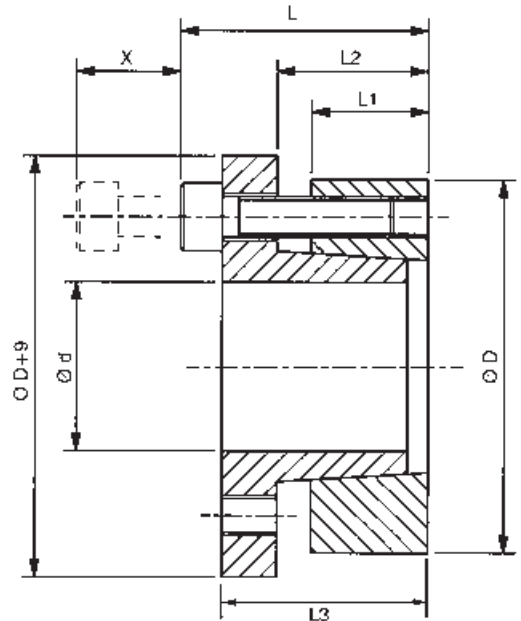
These clamping elements are basically to same design as RCK 13, but with increased diameter flange to locate hub and prevent axial movements, so combining good concentricity with positive axial location. The increase in friction between the cones due to axial restriction results in torque reduction of approx 20%, but this also means reduced surface pressures to both hub and shaft.



Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

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



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
RCK16-18x47	18	47	34	17	22	28	20	264	29	215	93	M6	17	0.28	63	60	56
RCK16-19x47	19	47	34	17	22	28	20	274	29	215	93	M6	17	0.27	63	60	56
RCK16-20x47	20	47	34	17	22	28	20	284	28	215	93	M6	17	0.26	63	60	56
RCK16-22x47	22	47	34	17	22	28	20	314	29	196	93	M6	17	0.25	63	60	56
RCK16-24x50	24	50	34	17	22	28	20	401	33	215	107	M6	17	0.28	71	66	61
RCK16-25x50	25	50	34	17	22	28	20	441	35	210	107	M6	17	0.27	71	66	61
RCK16-28x55	28	55	34	17	22	28	20	490	35	196	98	M6	17	0.35	75	71	66
RCK16-30x55	30	55	34	17	22	28	20	529	35	186	98	M6	17	0.32	75	71	66
RCK16-32x60	32	60	34	17	22	28	20	755	47	210	112	M6	17	0.38	86	80	74
RCK16-35x60	35	60	34	17	22	28	20	824	47	186	107	M6	17	0.35	85	79	74
RCK16-38x65	38	65	34	17	22	28	20	892	47	191	112	M6	17	0.41	94	87	80
RCK16-40x65	40	65	34	17	22	28	20	941	47	186	102	M6	17	0.39	90	84	79
RCK16-45x75	45	75	41	20	25	33	25	1716	76	225	132	M8	41	0.65	116	106	97
RCK16-50x80	50	80	41	20	25	33	25	1893	76	205	127	M8	41	0.69	122	111	102
RCK16-55x85	55	85	41	20	25	33	25	2403	87	210	132	M8	41	0.75	132	120	109
RCK16-60x90	60	90	41	20	25	33	25	2648	88	186	122	M8	41	0.80	134	123	114
RCK16-65x95	65	95	41	20	25	33	25	3188	98	196	132	M8	41	0.85	147	134	122
RCK16-70x110	70	110	50	24	30	40	30	4905	140	215	137	M10	83	1.35	174	157	143
RCK16-75x115	75	115	50	24	30	40	30	5150	137	195	127	M10	83	1.42	175	160	147
RCK16-80x120	80	120	50	24	30	40	30	5490	137	185	122	M10	83	1.51	179	164	151
RCK16-85x125	85	125	50	24	30	40	30	6620	156	195	132	M10	83	1.58	194	176	161
RCK16-90x130	90	130	50	24	30	40	30	6960	155	185	127	M10	83	1.66	198	181	166
RCK16-95x135	95	135	50	24	30	40	30	8190	172	195	137	M10	83	1.73	213	193	176
RCK16-100x145	100	145	56	26	32	44	35	10100	202	205	145	M12	145	2.64	236	212	192
RCK16-110x155	110	155	56	26	32	44	35	11030	201	190	135	M12	145	2.84	243	220	201
RCK16-120x165	120	165	56	26	32	44	35	13600	227	205	142	M12	145	3.05	266	239	217
RCK16-130x180	130	180	64	34	40	52	35	19000	292	186	137	M12	145	4.70	284	257	234
RCK16-140x190	140	190	68	34	40	54	40	21800	311	177	127	M14	230	4.95	289	264	242
RCK16-150x200	150	200	68	34	40	54	40	25600	341	185	130	M14	230	5.30	308	280	256
RCK16-160x210	160	210	68	34	40	54	40	31300	391	174	150	M14	230	5.60	349	311	280
RCK16-170x225	170	225	78	44	49	64	50	33200	391	147	110	M14	230	7.90	322	298	277
RCK16-180x235	180	235	78	44	49	64	50	35000	389	139	100	M14	230	8.30	325	303	284
RCK16-190x250	190	250	78	44	49	64	50	46500	489	132	120	M14	230	8.80	371	341	314
RCK16-200x260	200	260	78	44	49	64	50	49000	500	125	110	M14	230	9.20	372	345	321
RCK16-220x285	220	285	88	51	57	72	55	57100	519	132	97	M16	360	12.30	390	365	343
RCK16-240x305	240	305	88	51	57	72	55	77800	649	134	113	M16	360	13.30	441	408	378
RCK16-260x325	260	325	88	51	57	72	55	101200	778	145	127	M16	360	14.30	495	452	414
RCK16-280x355	280	355	102	60	66	84	65	113300	808	120	101	M18	480	21.00	492	460	430
RCK16-300x375	300	375	102	60	66	84	65	136500	910	123	107	M18	480	22.20	531	493	460

*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.

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%.

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

- 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:-

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

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

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

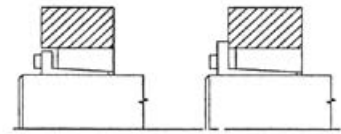
Maximum Shaft Speed:-

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 L₁ & L₂ ref. Product Pages

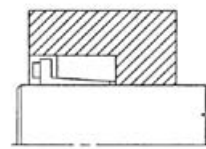
Hub Assembly Type B C=0.8



$$H_w \geq 2L_1$$

$$H_w \geq 2L_2$$

Hub Assembly Type C C=0.6



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

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Installation Instructions

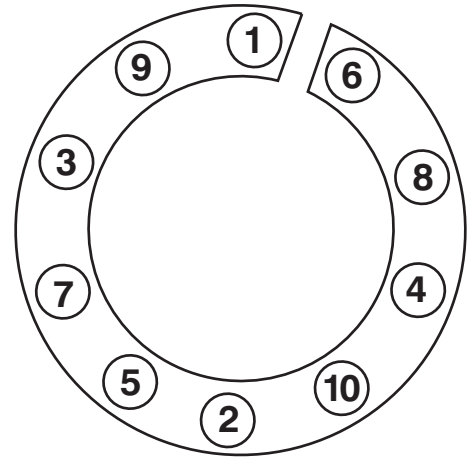


Installation and Removal of Cross Shaft Clamping Elements

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.

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