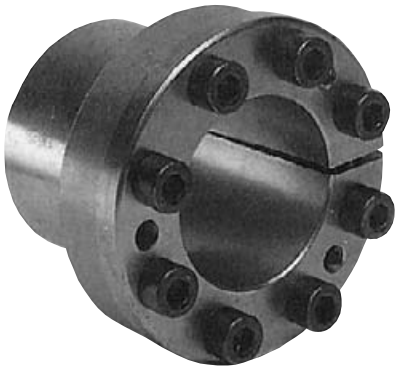
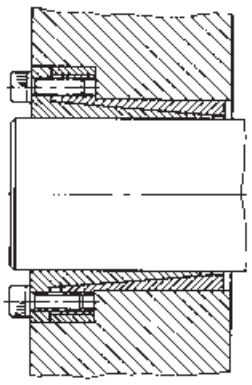
Clamping Elements Type RCK 80



Available for shaft diameters down to 6mm, these shaft clamping elements are designed to fit into small diameter hubs, being particularly suited to light duty, light torque applications. A spacer ring prevents axial movement during clamping; and design ensures good levels of concentricity.
For correct operation of these units, the hub diameter should not be less than the flange diameter D_2, even though with many materials stress limits would allow selection of smaller hub diameters.

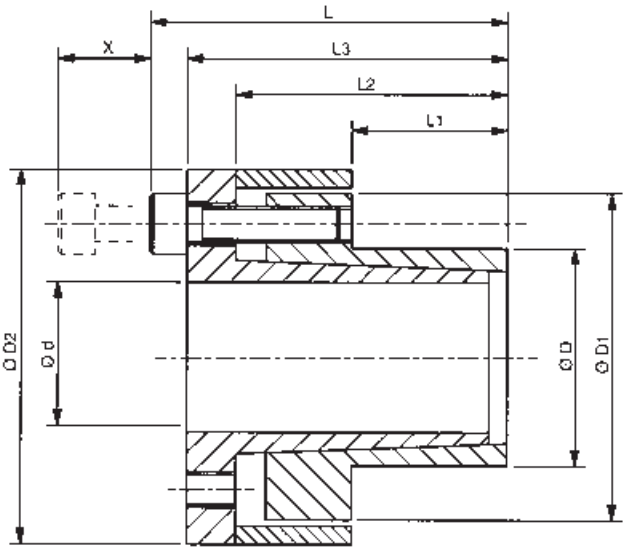


Recommended tolerances for full torque transmission are:-

Shaft	h8
Hub	H8

Clamping surfaces to be finished to Rz ≤ 15 μm.

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	Min. Hub Dia* mm		
	d	D	D_1	D_2	L	L_1	L_2	L_3	X			Shaft Ps N/mm²	Hub Ph N/mm²	Size	Torque Nm	kg	Assy Type A	Assy Type B	Assy Type C
RCK80-6x14	6	14	23	25	25.5	10	19	23	10	12	4	187	80	M3	2.2	0.04	18	18	17
RCK80-8x15	8	15	24	28	28.0	12	21	24	12	28	7	197	105	M4	5	0.05	21	20	19
RCK80-9x16	9	16	28	32	31.0	14	23	27	12	31	7	164	92	M4	5	0.07	22	21	19
RCK80-10x16	10	16	28	32	31.0	14	23	27	12	40	8	144	90	M4	5	0.06	22	21	19
RCK80-11x18	11	18	30	34	31.0	14	23	27	12	51	9	175	107	M4	5	0.09	26	24	22
RCK80-12x18	12	18	30	34	31.0	14	23	27	12	56	9	161	107	M4	5	0.08	26	24	22
RCK80-14x23	14	23	35	39	31.0	14	23	27	12	64	9	138	84	M4	5	0.18	30	29	27
RCK80-15x24	15	24	40	45	42.0	16	29	36	18	145	19	162	101	M6	17	0.22	34	31	29
RCK80-16x24	16	24	40	45	42.0	16	29	36	18	155	19	152	101	M6	17	0.21	34	31	29
RCK80-17x26	17	26	42	47	45.5	18	32	38	18	170	20	191	125	M6	17	0.21	40	36	33
RCK80-18x26	18	26	42	47	44.0	18	31	38	18	158	18	160	111	M6	17	0.24	38	35	33
RCK80-19x27	19	27	43	48	44.0	18	31	38	18	199	21	152	107	M6	17	0.25	39	36	33
RCK80-20x28	20	28	44	49	44.0	18	31	45	18	210	21	144	103	M6	17	0.26	39	37	34
RCK80-22x32	22	32	48	54	51.0	25	38	45	18	232	21	113	78	M6	17	0.35	41	39	37
RCK80-24x34	24	34	50	56	52.5	25	38	45	18	253	21	103	73	M6	17	0.36	43	41	39
RCK80-25x34	25	34	50	56	52.5	25	38	45	18	263	21	99	73	M6	17	0.40	43	41	39
RCK80-28x39	28	39	55	61	52.5	25	38	45	18	428	31	111	80	M6	17	0.42	51	48	46
RCK80-30x41	30	41	57	63	52.5	25	38	45	18	474	32	124	91	M6	17	0.44	55	52	49
RCK80-32x43	32	43	59	65	56.0	30	43	50	18	600	38	97	72	M6	17	0.46	54	52	50
RCK80-35x47	35	47	63	69	56.0	30	43	50	18	737	42	118	88	M6	17	0.57	63	59	56
RCK80-38x50	38	50	66	72	56.0	30	43	50	18	800	42	109	83	M6	17	0.60	66	62	59
RCK80-40x53	40	53	69	75	58.0	32	45	52	18	947	47	109	82	M6	17	0.66	69	66	62
RCK80-42x55	42	55	71	77	58.0	32	45	52	18	994	47	103	79	M6	17	0.71	71	68	64
RCK80-45x59	45	59	79	85	72.0	40	56	64	22	1750	78	127	97	M8	41	1.14	81	76	71
RCK80-48x62	48	62	82	88	72.0	40	56	64	22	1867	78	119	92	M8	41	1.40	84	79	74
RCK80-50x65	50	65	85	92	82.0	50	66	74	22	2431	97	127	98	M8	41	1.58	90	84	79
RCK80-55x71	55	71	91	98	82.0	50	66	74	22	2674	97	105	81	M8	41	2.00	92	88	83
RCK80-60x77	60	77	97	104	82.0	50	66	74	22	2917	97	95	74	M8	41	2.30	98	93	89
RCK80-65x84	65	84	104	111	82.0	50	66	74	22	3160	97	89	69	M8	41	2.50	105	100	96
RCK80-70x90	70	90	115	122	101.0	60	80	91	25	4322	123	86	67	M10	83	2.83	112	107	103
RCK80-75x95	75	95	119	126	101.0	60	80	91	25	6171	165	94	74	M10	83	3.10	121	115	110
RCK80-80x100	80	100	124	131	106.0	65	85	96	25	7899	197	96	77	M10	83	3.27	128	122	116
RCK80-85x106	85	106	130	137	106.0	65	85	96	25	8393	197	91	73	M10	83	3.50	134	128	122
RCK80-90x112	90	112	136	143	106.0	65	85	96	25	10367	230	63	51	M10	83	3.80	132	128	124
RCK80-95x120	95	120	144	153	106.0	65	85	96	25	10943	230	95	75	M10	83	4.20	153	145	139
RCK80-100x125	100	125	153	162	114.0	65	89	102	25	14520	290	114	91	M10	83	4.90	168	158	149
RCK80-110x140	110	140	168	177	119.0	70	94	107	30	15972	290	95	75	M12	145	5.80	178	170	162
RCK80-120x155	120	155	185	195	139.0	90	114	127	30	23231	387	92	71	M12	145	6.60	195	186	178
RCK80-130x165	130	165	195	205	139.0	90	114	127	30	25168	387	84	66	M12	145	7.30	204	195	187
RCK80-140x175	140	175	205	215	139.0	90	114	127	30	27104	387	79	63	M12	145	7.90	214	206	197
RCK80-150x185	150	185	215	225	139.0	90	114	127	30	29041	387	73	59	M12	145	8.70	223	215	207

For the unit to function correctly hub diameter should not be less than the flange outside diameter D_2.
*Minimum outside diameter of hubs manufactured in medium carbon steels with yield strength ≥ 320 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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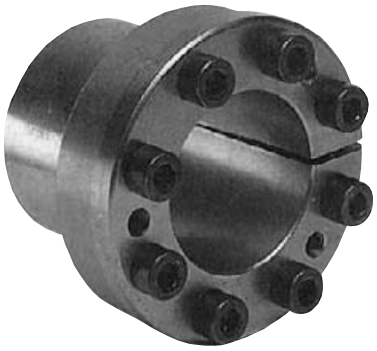
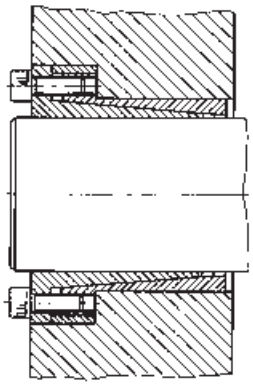
Clamping Elements Type ACE 81



Available for shaft diameters down to 11mm, these shaft clamping elements are designed to fit into very small diameter hubs, being particularly suited to Timing pulley and overload clutch applications. A spacer ring prevents axial movement during clamping; and design ensures good levels of concentricity. For correct operation of these units, the hub diameter should not be less than the flange diameter D_2, even though with many materials stress limits would allow selection of smaller hub diameters.

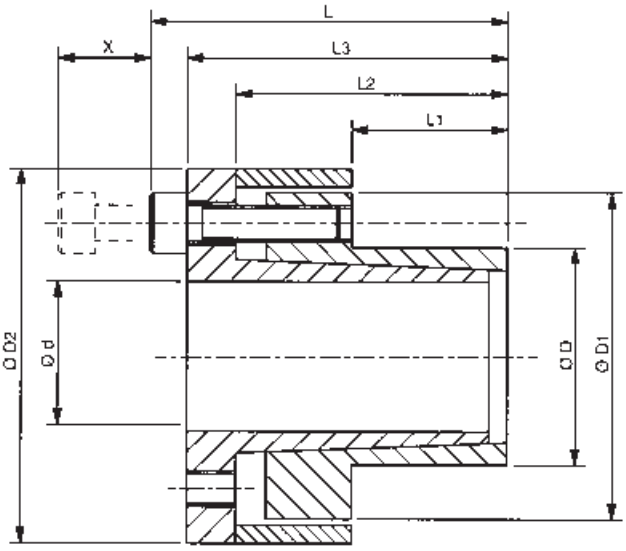


Recommended tolerances for full torque transmission are:-

Shaft h8
Hub H8

Clamping surfaces to be finished to Rz ≤ 15 μm.

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	Min. Hub Dia* mm		
	d	D	D_1	D_2	L	L_1	L_2	L_3	X			Shaft Ps N/mm²	Hub Ph N/mm²	Size	Torque Nm	kg	Assy Type A	Assy Type B	Assy Type C
ACE81-10x26	10	26	37.5	40.5	31.5	14	22.5	27.5	12	45	9.0	260	100	M4	5	0.22	36	34	32
ACE81-11x26	11	26	37.5	40.5	31.5	14	22.5	27.5	12	50	9.1	236	100	M4	5	0.22	36	34	32
ACE81-12x26	12	26	37.5	40.5	31.5	14	22.5	27.5	12	54	9.0	217	100	M4	5	0.22	36	34	32
ACE81-14x26	14	26	37.5	40.5	31.5	14	22.5	27.5	12	90	14.5	186	100	M4	5	0.22	36	34	32
ACE81-15x26	15	26	37.5	40.5	31.5	14	22.5	27.5	12	109	14.5	173	100	M4	5	0.22	36	34	32
ACE81-16x26	16	26	37.5	40.5	31.5	14	22.5	27.5	12	116	14.5	163	100	M4	5	0.22	36	34	32
ACE81-18x26	18	26	37.5	40.5	31.5	14	22.5	27.5	12	130	14.5	144	100	M4	5	0.22	36	34	32
ACE81-19x26	19	26	37.5	40.5	31.5	14	22.5	27.5	12	138	14.5	137	100	M4	5	0.22	36	34	32
ACE81-20x26	20	26	37.5	40.5	31.5	14	22.5	27.5	12	145	14.5	130	100	M4	5	0.22	36	34	32
ACE81-19x38	19	38	53.0	57.0	39	14	26	33	18	205	22	208	104	M6	17	0.32	54	50	47
ACE81-20x38	20	38	53.0	57.0	39	14	26	33	18	215	22	198	104	M6	17	0.32	54	50	47
ACE81-22x38	22	38	53.0	57.0	39	14	26	33	18	240	22	180	104	M6	17	0.32	54	50	47
ACE81-24x38	24	38	53.0	57.0	39	14	26	33	18	265	22	165	104	M6	17	0.32	54	50	47
ACE81-25x38	25	38	53.0	57.0	39	14	26	33	18	276	22	158	104	M6	17	0.32	54	50	47
ACE81-28x38	28	38	53.0	57.0	39	14	26	33	18	309	22	141	104	M6	17	0.32	54	50	47
ACE81-30x38	30	38	53.0	57.0	39	14	26	33	18	331	22	132	104	M6	17	0.32	54	50	47
ACE81-19x38H	19	38	53.0	57.0	52	27	39	46	18	314	33	162	81	M6	17	0.40	50	47	45
ACE81-20x38H	20	38	53.0	57.0	52	27	39	46	18	331	33	154	81	M6	17	0.40	50	47	45
ACE81-22x38H	22	38	53.0	57.0	52	27	39	46	18	364	33	140	81	M6	17	0.40	50	47	45
ACE81-24x38H	24	38	53.0	57.0	52	27	39	46	18	397	33	128	81	M6	17	0.40	50	47	45
ACE81-25x38H	25	38	53.0	57.0	52	27	39	46	18	413	33	123	81	M6	17	0.40	50	47	45
ACE81-28x38H	28	38	53.0	57.0	52	27	39	46	18	465	33	110	81	M6	17	0.40	50	47	45
ACE81-30x38H	30	38	53.0	57.0	52	27	39	46	18	497	33	103	81	M6	17	0.40	50	47	45
ACE81-24x52	24	52	66.5	70.5	52	27	39	46	18	529	44	171	79	M6	17	0.60	67	64	61
ACE81-25x52	25	52	66.5	70.5	52	27	39	46	18	552	44	164	79	M6	17	0.60	67	64	61
ACE81-28x52	28	52	66.5	70.5	52	27	39	46	18	618	44	147	79	M6	17	0.60	67	64	61
ACE81-30x52	30	52	66.5	70.5	52	27	39	46	18	662	44	137	79	M6	17	0.60	67	64	61
ACE81-32x52	32	52	66.5	70.5	52	27	39	46	18	706	44	128	79	M6	17	0.60	67	64	61
ACE81-35x52	35	52	66.5	70.5	52	27	39	46	18	772	44	117	79	M6	17	0.60	67	64	61
ACE81-38x52	38	52	66.5	70.5	52	27	39	46	18	839	44	108	79	M6	17	0.60	67	64	61
ACE81-40x52	40	52	66.5	70.5	52	27	39	46	18	883	44	103	79	M6	17	0.60	67	64	61
ACE81-42x52	42	52	66.5	70.5	52	27	39	46	18	926	44	98	79	M6	17	0.60	67	64	61
ACE81-28x72	28	72	91.5	96.5	68	37	52	60	22	1462	104	255	99	M8	41	1.50	100	93	87
ACE81-30x72	30	72	91.5	96.5	68	37	52	60	22	1567	104	238	99	M8	41	1.50	100	93	87
ACE81-32x72	32	72	91.5	96.5	68	37	52	60	22	1671	104	223	99	M8	41	1.50	100	93	87
ACE81-35x72	35	72	91.5	96.5	68	37	52	60	22	1828	104	204	99	M8	41	1.50	100	93	87
ACE81-38x72	38	72	91.5	96.5	68	37	52	60	22	1985	104	188	99	M8	41	1.50	100	93	87
ACE81-40x72	40	72	91.5	96.5	68	37	52	60	22	2089	104	178	99	M8	41	1.50	100	93	87
ACE81-42x72	42	72	91.5	96.5	68	37	52	60	22	2194	104	170	99	M8	41	1.50	100	93	87
ACE81-45x72	45	72	91.5	96.5	68	37	52	60	22	2350	104	158	99	M8	41	1.50	100	93	87
ACE81-48x72	48	72	91.5	96.5	68	37	52	60	22	2506	104	149	99	M8	41	1.50	100	93	87
ACE81-50x72	50	72	91.5	96.5	68	37	52	60	22	2611	104	143	99	M8	41	1.50	100	93	87
ACE81-55x72	55	72	91.5	96.5	68	37	52	60	22	2872	104	130	99	M8	41	1.50	100	93	87
ACE81-60x72	60	72	91.5	96.5	68	37	52	60	22	3133	104	119	99	M8	41	1.50	100	93	87

For the unit to function correctly hub diameter should not be less than the flange outside diameter D_2.
*Minimum outside diameter of hubs manufactured in medium carbon steels with yield strength ≥ 320 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. $Dm = D \sqrt{\frac{\sigma + PhC}{\sigma - PhC}}$

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 σ = 320 N/mm². Values for σ on other commonly used hub materials are:-

220 Grade Cast Iron	σ =	150 N/mm²
260 Grade Cast Iron	σ =	180 N/mm²
Mild Steels	σ =	220 N/mm²
070M55 (En9)	σ =	350 N/mm²
Stainless Steel	σ =	200 N/mm²
Aluminium	σ =	100 N/mm²

For hollow bored Shafting:-

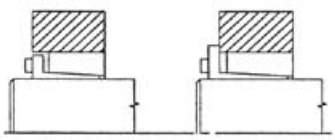
Max. Bore in Shaft $Dm = d \sqrt{\frac{\sigma - 1.6\ Ps}{\sigma}}$

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.

Hub Assembly Type A

C=1.0



$L_1 \leq Hw < 2L_1$ $L_2 \leq Hw < 2L_2$

Where Hw = Hub Width

For Dimensions L_1 & L_2 ref. Product Pages

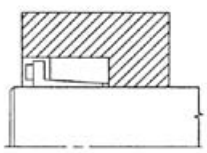
Hub Assembly Type B

C=0.8

$Hw \geq 2L_1$ $Hw \geq 2L_2$

Hub Assembly Type C

C=0.6



$Hw \geq 2L_1$ (All Types)

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.

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Installation Instructions

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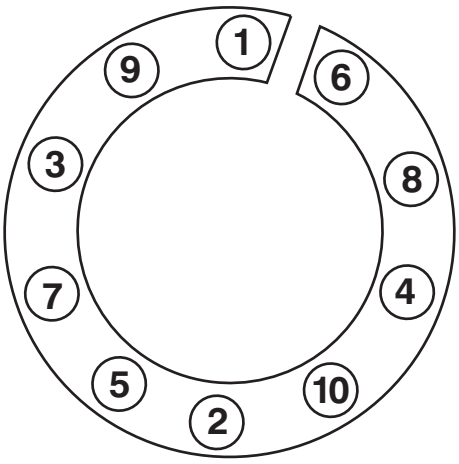
Installation and Removal of Cross Shaft Clamping Elements

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.