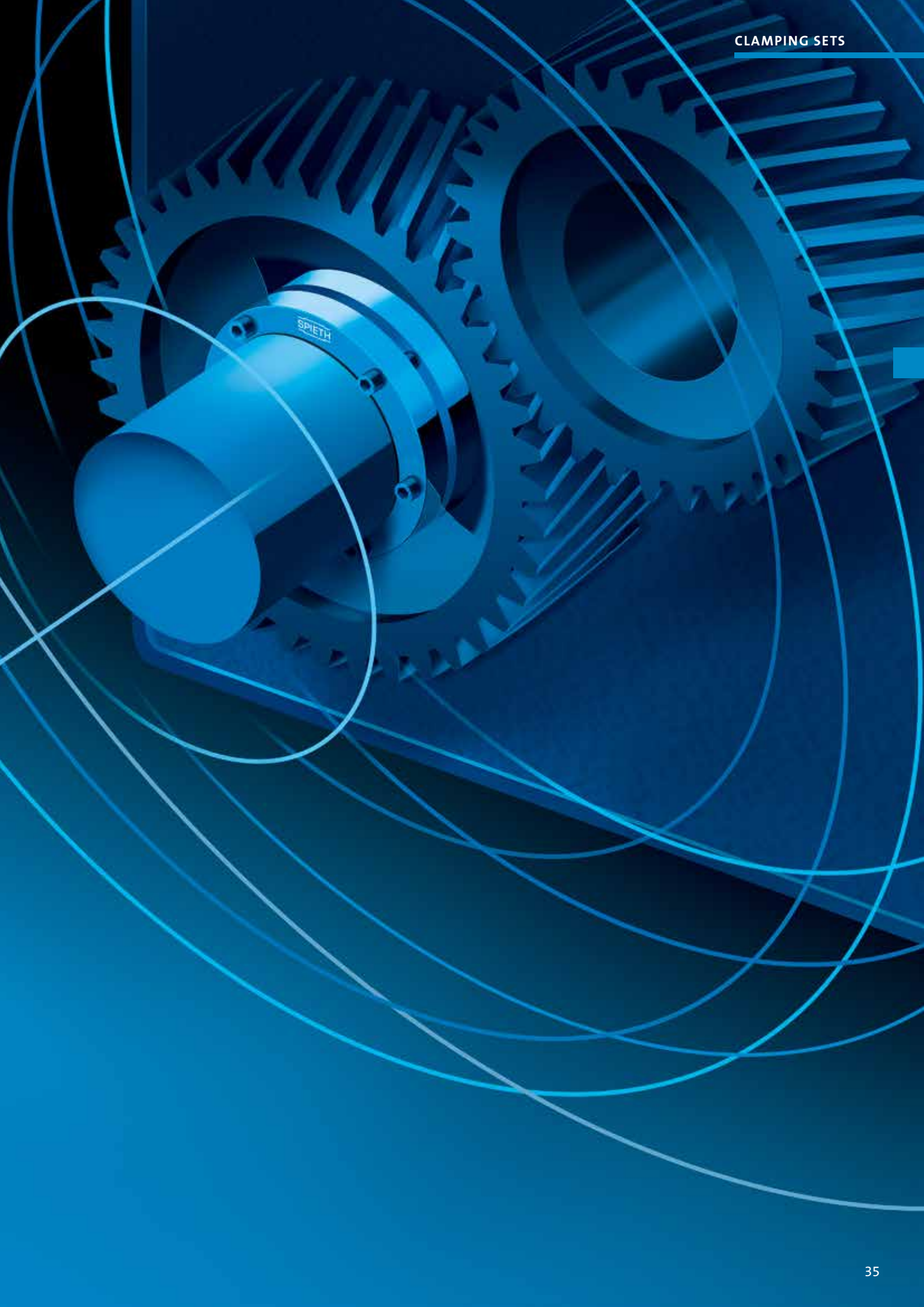


APPLYING ALL-ROUND PRESSURE WITH PRECISION

Spieth clamping sets – friction-locked shaft-hub connections.

Rising power densities. Increasing levels of dynamic stress. And the required function must be realised within increasingly restrictive cost parameters. The stringent demands of modern mechanical engineering can only be satisfied with high-quality shaft-hub connecting elements.

Spieth clamping sets apply uniform pressure. Without compromise. They are designed to be more accurate, precise, efficient, simpler to install and easier to service. The economical solution for modern machinery designs. Offering outstanding performance.



SPIETH CLAMPING SETS

4 UNIQUE FEATURES – NUMEROUS BENEFITS

Precise

All functional surfaces that determine precision are machined to the finest geometrical and positional tolerances.

Single-piece design

Unlike tapered clamping sets, the single-piece steel body does not have any joints that could compromise tolerances. This ensures that the high degree of precision achieved in the manufacturing process can also be brought to bear in the relevant application.

Self-centering

When subjected to axial compression, the unique geometry of the absolutely symmetrical base body ensures uniform transverse contraction in the direction of the shaft and hub. The resulting centring effect is equivalent to that of the hydro-expansion principle, only much simpler, safer and stiffer.

Intelligent

Cylindrical clamping sets exert very low levels of wear on their connecting components. Significantly better clamping homogeneity at the contact surfaces eliminates any possibility of peak clamping force acting at specific points, which frequently lead to damage and installation problems. At the same time, the Spieth design in the tensioned state is equivalent to the combination of a knee lever and a spring compressed against a block, thus guaranteeing an extremely rigid connection. And when released, the cylindrical clamping set easily returns to its original shape.

BENEFITS TO YOU

Competitiveness through technological leadership – a strategy that calls for an economical increase in power density, efficiency and accuracy. Cylindrical clamping sets create the foundation for this.

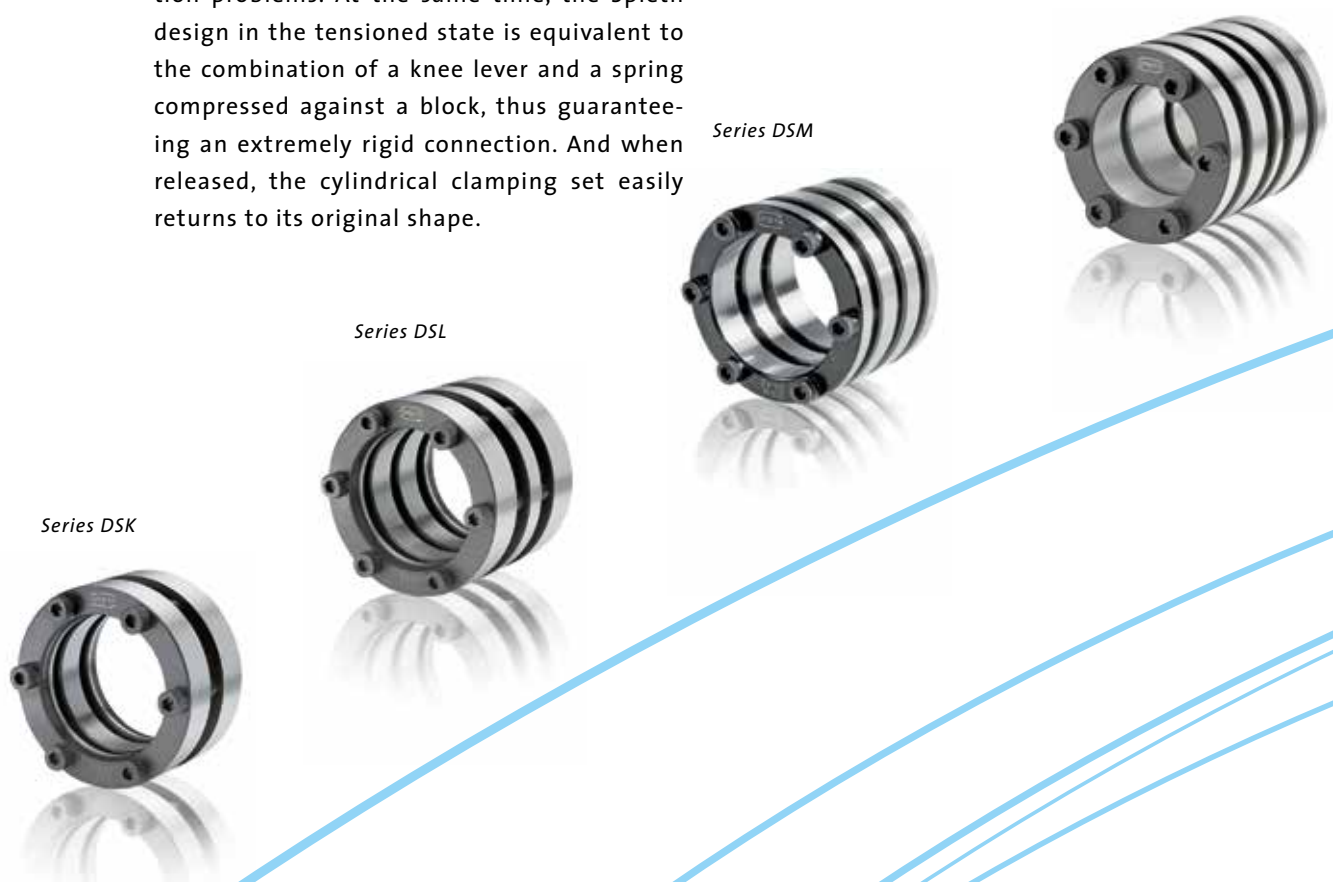
Lower Resource Input

- Simple configuration of connecting components.
- Simple installation and dismantling of all components thanks to mating play.
- Minimum axial drag during clamping process.
- Clamping force initiation can be freely configured.
- Quick-release connection.

More Success

- High level of concentricity.
- Minimised vibrational excitation.
- High torque levels and axial forces.
- Suitable for alternating torsion.
- Axial and angular position freely adjustable.
- Preserves connecting components.
- Connection can be automated/switched.
- Re-usable.

Series DSM .. 1, DSM .. 2



FIELDS OF APPLICATION

Spieth clamping sets are friction-locked shaft-hub connections for all areas of mechanical engineering. They are used wherever high-quality and reliable connections perform key functional roles. At the same time, they are the ideal solution for applications with high levels of replacement and adjustment as well as for manual or automated clamping of sleeves, skids, pivoting heads or rotary tables.

APPLICATION EXAMPLES

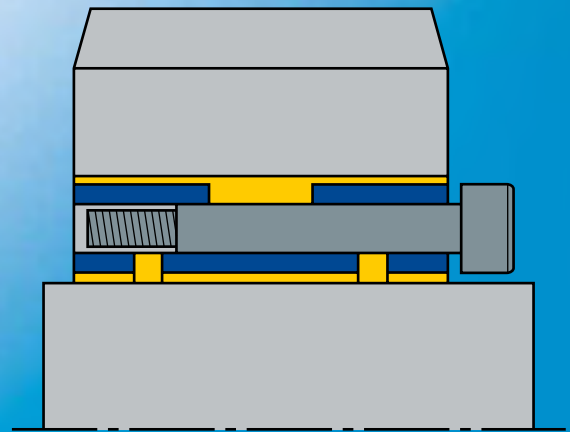
- In machining, forming and cutting machine tools.
- In handling and automation equipment.
- In materials handling.
- In general drive engineering and transmissions.
- In packaging machinery.
- In fixture construction.
- In compressors and pumps.
- In printing presses and paper-making technology.
- In textile machines.
- In woodworking machines.
- In process engineering applications for mixing, crushing and centrifuging.
- For metrology, control and test engineering.
- In precision engineering and optical technology.



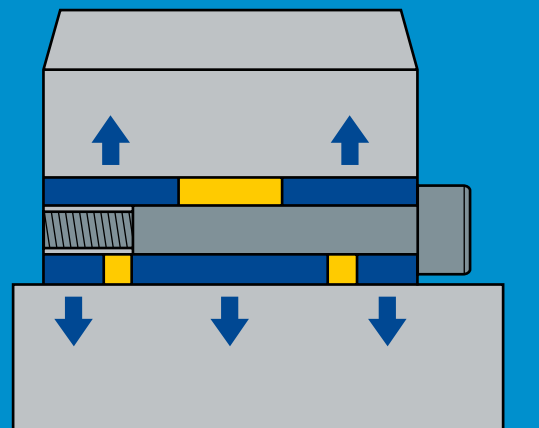
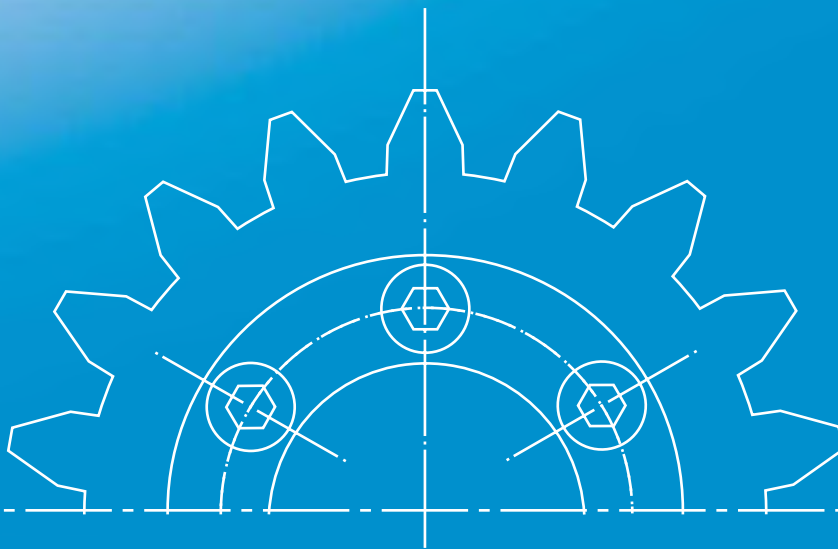
FUNCTIONAL PRINCIPLE

Shown here using a clamping set from series DSK with an integrated clamping screw.

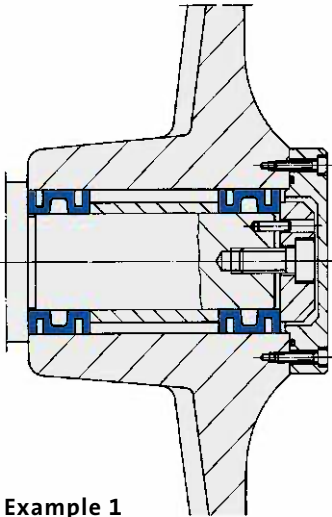
The principle is illustrated in a simplified diagram with enlarged play.



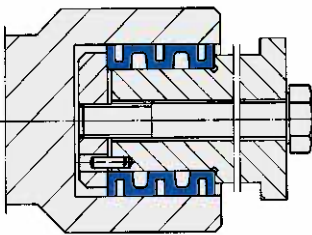
Clamping set released, easy installation or dismantling with mating play.



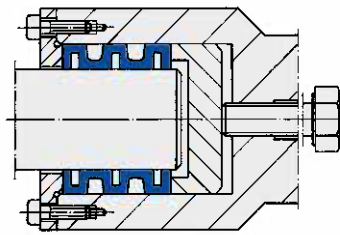
Clamping set clamped, connection is centred with a high load capacity. No lateral displacement during tightening. This ensures ultra-high precision centring and optimum concentricity.

**Example 1****Example 1: Blade wheel fixture**

The clamping sleeves arranged over a wide basis exert a positive influence on run-out accuracy and rotating flexural stress of the shaft-hub fit. The degree of torque which can be transferred with two consecutively arranged clamping sleeves is approx. 30 % higher than when using a single clamping sleeve.



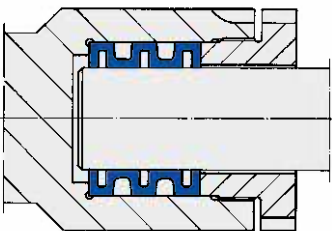
Example 2
Clamping force initiated
by tension screw.



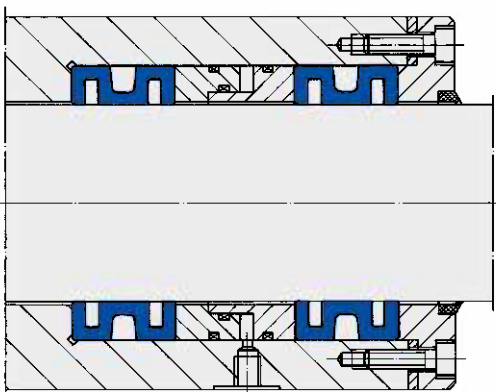
Example 3
Clamping force initiated
by set screw.

Example 2-4: Plug-in connections

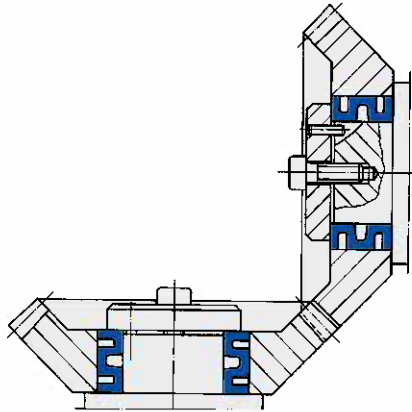
This shaft-hub connection is completely free of play and can be released an unlimited number of times. The tightening torque levels for clamping force initiating screws depend on the required clamping force for each individual clamping sleeve.



Example 4
Clamping force initiated
by hollow screw.

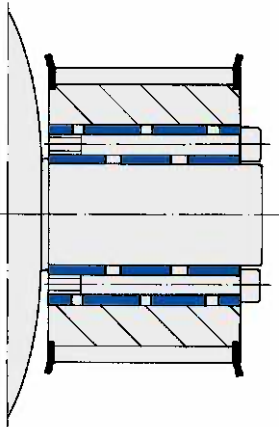
**Example 5****Example 5: Sleeve clamping**

The sleeve is hydraulically tensioned and precisely centred. Free movement is immediately possible in the un-tensioned state. The axial thrust created during the clamping process with single arrangement of a clamping sleeve is theoretically balanced out in this case by forces working in opposition. In practice, however, in case of a freely located sleeve, allowance must be made for a slight residual thrust as it is not possible to create identical clamping conditions at the clamping sleeves.



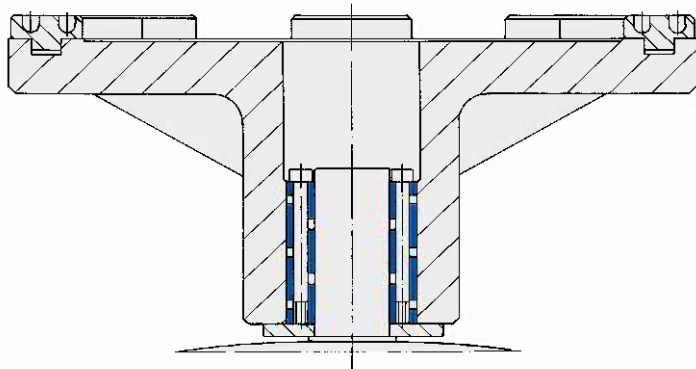
Example 6: Bevel wheel fixture

This connection is characterized by simple connecting components, a high degree of concentricity and absolute freedom from play.



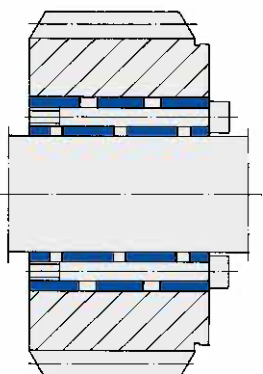
Example 7: Pulley fixture

The hub can be made of an aluminium alloy. Observe the minimum strength specification. High temperatures can impair retention force.



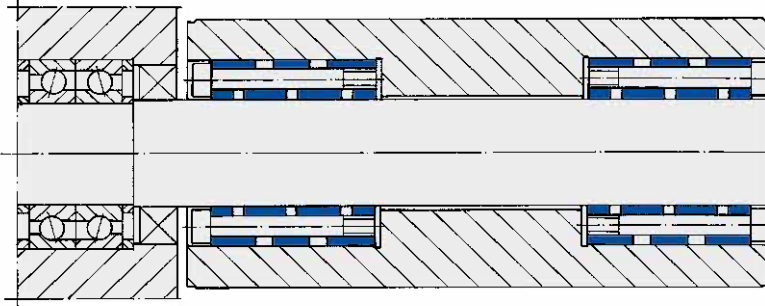
Example 8: Indexing plate

Indexing plate in alloy material at the shaft end of an indexing gear. Here, precise concentricity and run-out are vital.

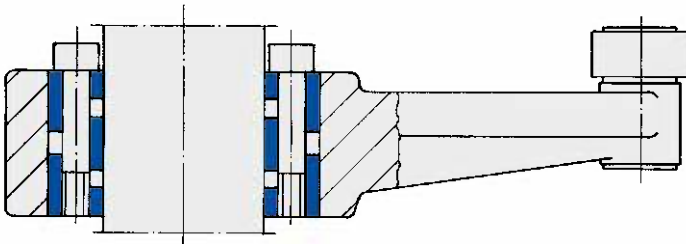


Example 9: Gear fixture

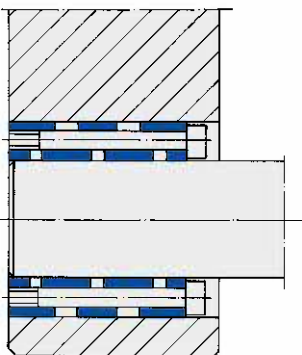
To satisfy the highest concentricity requirements, we recommend mounting a control facility on the gear to allow the concentricity to be checked and adjusted if necessary.

**Example 10: Pressure roller fixture**

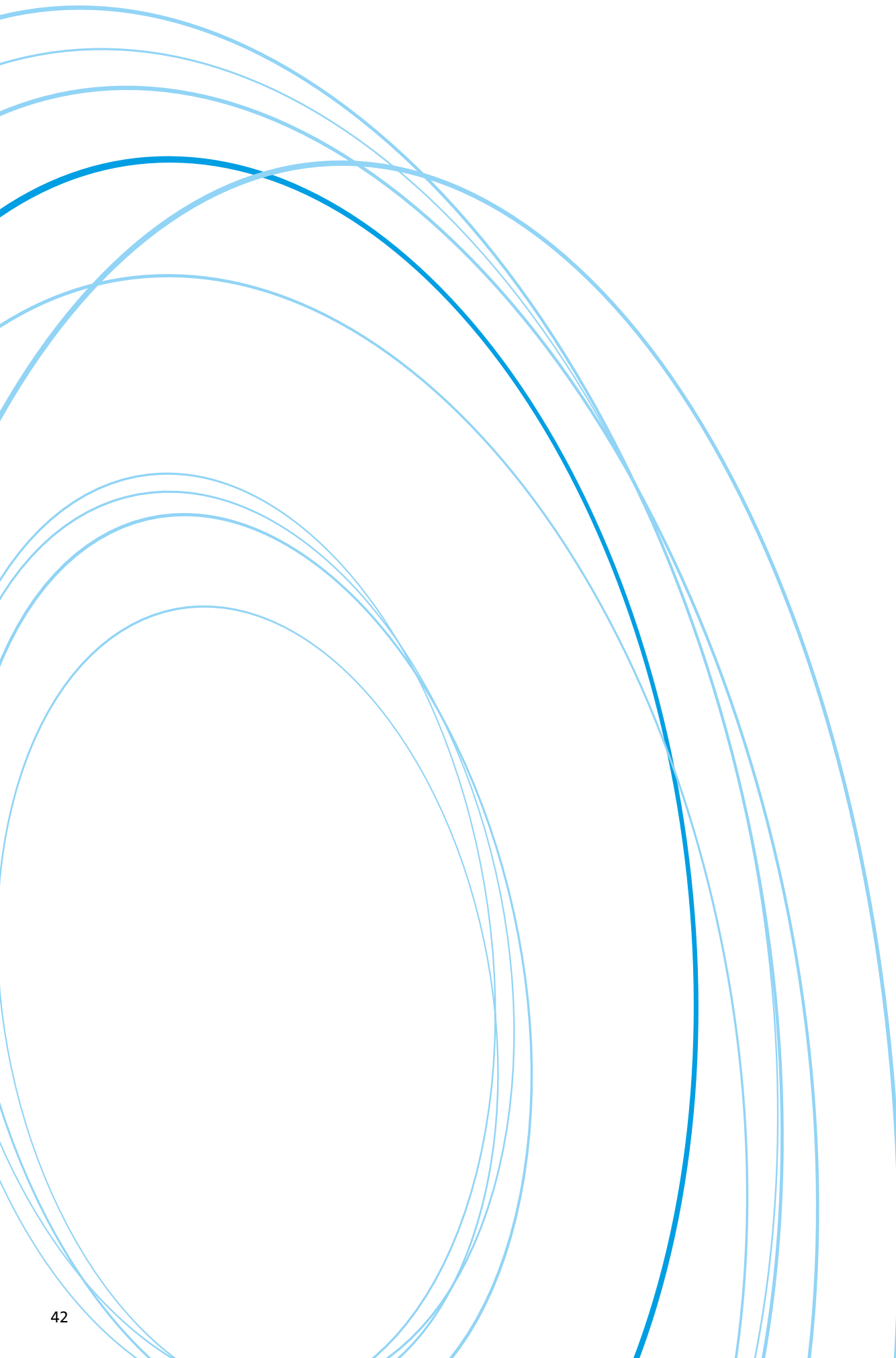
Here, 2 long clamping sets are used to achieve high overall radial rigidity due to intensive tensioning of the shaft and hub. The pressure roller is exchanged by pulling the shaft out of the bearings.

**Example 11: Rocker arm fixture**

The peripheral and axial position can be ideally adjusted during assembly.

**Example 12: Guide column**

Fixture of a guide column in the machine body.



SPIETH CLAMPING SETS: THE RIGHT CHOICE

We'll provide you with the perfect clamping sets for your application. We'll also help you choose the right one – with expert advice from our specialists.

Series DSK, DSL

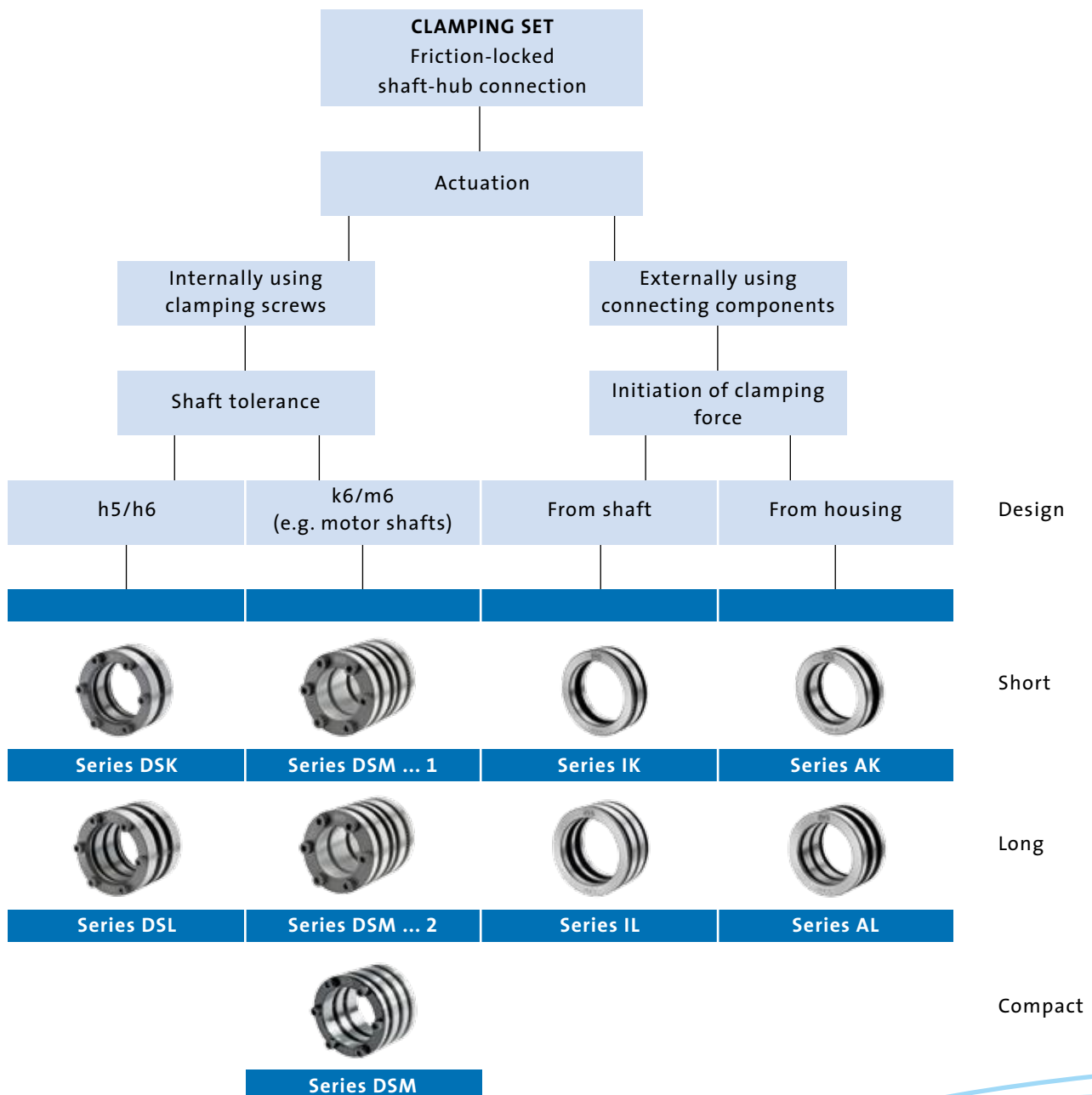
Ready-to-use friction-locked shaft-hub connection for quick and easy installation.

Series DSM

Ready-to-use friction-locked shaft-hub connection for use on motor shafts to DIN 748.

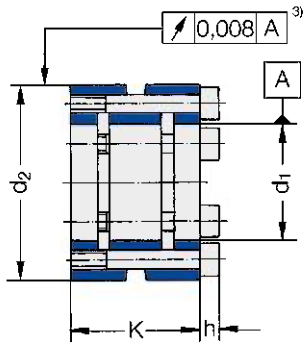
Series AK/IK and AL/IL

Friction-locked shaft-hub connection that can be automated. Clamping force initiation can be freely configured.



SPIETH CLAMPING SETS SERIES DSK

For shafts with h tolerance zone



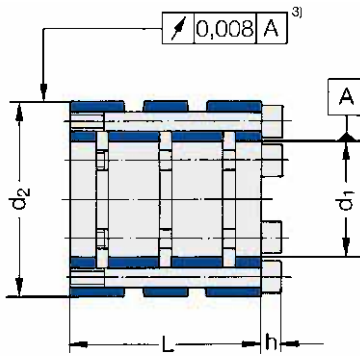
Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d_1	d_2	K	ISO 4762	h	M_A	No.	M or F_a		
	H6	h5		mm	Nm	Nm		N		
DSK 14.26	14	26	21	M3	3	2	6	36	5100	0.045
DSK 15.28	15	28	21	M3	3	2	6	44	5900	0.059
DSK 16.28	16	28	21	M3	3	2	6	43	5400	0.058
DSK 16.32	16	32	31	M4	4	5	6	71	8900	0.161
DSK 18.30	18	30	21	M3	3	2	6	53	5900	0.074
DSK 18.35	18	35	31	M4	4	5	6	96	10700	0.227
DSK 20.32	20	32	21	M3	3	2	6	62	6200	0.093
DSK 20.37	20	37	31	M4	4	5	6	100	10000	0.278
DSK 20.40	20	40	36	M5	5	7	6	130	13000	0.434
DSK 22.35	22	35	21	M3	3	2	6	75	6800	0.131
DSK 22.38	22	38	31	M4	4	5	6	100	9100	0.302
DSK 22.42	22	42	36	M5	5	10	6	210	19100	0.519
DSK 25.37	25	37	21	M3	3	2	6	85	6800	0.155
DSK 25.42	25	42	31	M4	4	5	6	140	11200	0.439
DSK 25.45	25	45	36	M5	5	10	6	260	20800	0.666
DSK 28.40	28	40	21	M3	3	2	6	98	7000	0.203
DSK 28.45	28	45	31	M4	4	5	6	170	12100	0.562
DSK 28.48	28	48	36	M5	5	10	6	300	21400	0.840
DSK 30.42	30	42	21	M3	3	2	6	110	7300	0.240
DSK 30.47	30	47	31	M4	4	5	6	190	12700	0.655
DSK 30.50	30	50	36	M5	5	10	6	340	22700	0.973
DSK 30.55	30	55	41	M6	6	13	6	390	26000	1.590
DSK 32.48	32	48	31	M4	4	5	6	180	11300	0.690
DSK 32.52	32	52	36	M5	5	10	6	360	22500	1.120
DSK 32.56	32	56	41	M6	6	13	6	410	25600	1.690
DSK 35.52	35	52	31	M4	4	5	6	230	13100	0.936
DSK 35.55	35	55	36	M5	5	10	6	420	24000	1.360
DSK 35.60	35	60	41	M6	6	17	6	630	36000	2.180
DSK 40.56	40	56	31	M4	4	5	6	240	12000	1.170
DSK 40.62	40	62	36	M5	5	10	6	540	27000	2.140
DSK 40.65	40	65	41	M6	6	17	6	750	37500	2.900
DSK 40.70	40	70	52	M8	8	25	6	830	41500	5.300
DSK 45.68	45	68	36	M5	5	10	6	640	28400	3.010
DSK 45.70	45	70	41	M6	6	17	6	860	38200	3.760
DSK 45.75	45	75	52	M8	8	25	6	950	42200	6.780
DSK 50.72	50	72	36	M5	5	10	6	750	30000	3.600

Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d ₁	d ₂	K	ISO 4762	h mm	M _A Nm	No.	M or F _a		
	H6	h5						Nm	N	
DSK 50.75	50	75	41	M 6	6	17	6	1040	40800	4.780
DSK 50.80	50	80	52	M 8	8	40	6	1850	74000	8.520
DSK 55.80	55	80	41	M 6	6	17	6	1100	40000	5.980
DSK 55.85	55	85	52	M 8	8	40	6	2070	75400	10.500
DSK 60.85	60	85	41	M 6	6	17	6	1320	44000	7.360
DSK 60.90	60	90	52	M 8	8	40	6	2370	79000	12.900
DSK 65.90	65	90	41	M 6	6	17	6	1450	44600	8.950
DSK 65.95	65	95	52	M 8	8	40	6	2640	81400	15.500
DSK 70.100	70	100	52	M 8	8	40	6	2990	85400	18.500
DSK 75.105	75	105	52	M 8	8	40	6	3250	86700	21.900
DSK 80.110	80	110	52	M 8	8	40	6	3520	88000	25.600
DSK 85.120	85	120	57	M 8	8	40	6	3560	83800	40.300
DSK 90.120	90	120	52	M 8	8	40	7	4300	95500	35.200
DSK 95.125	95	125	52	M 8	8	40	8	4540	95600	40.700
DSK 100.130	100	130	52	M 8	8	40	8	4780	95600	46.300
DSK 110.140	110	140	52	M 8	8	40	10	6570	119500	60.200
DSK 120.150	120	150	52	M 8	8	40	10	7170	119500	75.200
DSK 130.160	130	160	52	M 8	8	40	10	7760	119500	92.500
DSK 140.170	140	170	52	M 8	8	40	10	8360	119500	112.000
DSK 150.180	150	180	52	M 8	8	40	10	8960	119500	134.000
DSK 160.190	160	190	52	M 8	8	40	12	11470	143300	162.000
DSK 170.200	170	200	52	M 8	8	40	12	12180	143300	190.000
DSK 180.210	180	210	52	M 8	8	40	12	12900	143300	221.000
DSK 190.230	190	230	62	M10	10	60	12	16650	175300	487.000
DSK 200.240	200	240	62	M10	10	60	12	17530	175300	588.000
DSK 210.250	210	250	62	M10	10	60	12	18400	175300	614.000
DSK 220.260	220	260	62	M10	10	60	12	19250	175300	639.000
DSK 230.270	230	270	62	M10	10	60	12	20160	175300	812.000
DSK 240.280	240	280	62	M10	10	60	12	21040	175300	984.000
DSK 250.300	250	300	72	M10	10	60	15	27390	219100	1580.000
DSK 260.310	260	310	72	M10	10	60	15	28480	219100	1760.000
DSK 270.320	270	320	72	M10	10	60	15	29580	219100	1950.000
DSK 280.330	280	330	72	M10	10	60	15	30670	219100	2150.000
DSK 290.340	290	340	72	M10	10	60	15	31770	219100	2360.000
DSK 300.350	300	350	72	M10	10	60	15	32860	219100	2590.000

³⁾ d₂ > 80 mm = Concentricity to IT4

SPIETH CLAMPING SETS SERIES DSL

For shafts with h tolerance zone



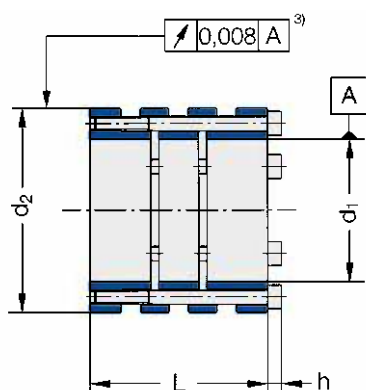
Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d_1	d_2	L	ISO 4762	h	M_A	No.	M or F_a		
	H6	h5		mm	Nm	Nm		N		
DSL 14.26	14	26	31	M3	3	2	6	60	8600	0.059
DSL 15.28	15	28	31	M3	3	2	6	66	8800	0.078
DSL 16.28	16	28	31	M3	3	2	6	73	9100	0.077
DSL 16.32	16	32	41	M4	4	5	6	130	16300	0.179
DSL 18.30	18	30	31	M3	3	2	6	86	9600	0.099
DSL 18.35	18	35	41	M4	4	5	6	160	17800	0.250
DSL 20.32	20	32	31	M3	3	2	6	100	10000	0.124
DSL 20.37	20	37	41	M4	4	5	6	180	18000	0.307
DSL 20.40	20	40	52	M5	5	7	6	170	17000	0.547
DSL 22.35	22	35	31	M3	3	2	6	110	10000	0.173
DSL 22.38	22	38	41	M4	4	5	6	180	16400	0.334
DSL 22.42	22	42	52	M5	5	10	6	260	23600	0.653
DSL 25.37	25	37	31	M3	3	2	6	140	11200	0.206
DSL 25.42	25	42	41	M4	4	5	6	250	20000	0.484
DSL 25.45	25	45	52	M5	5	10	6	320	25600	0.839
DSL 28.40	28	40	31	M3	3	2	6	160	11400	0.269
DSL 28.45	28	45	41	M4	4	5	6	280	20000	0.619
DSL 28.48	28	48	52	M5	5	10	6	370	26400	1.060
DSL 30.42	30	42	31	M3	3	2	6	180	12000	0.318
DSL 30.47	30	47	41	M4	4	5	6	320	21300	0.722
DSL 30.50	30	50	52	M5	5	10	6	410	27300	1.230
DSL 30.55	30	55	62	M6	6	13	6	430	28700	2.130
DSL 32.48	32	48	41	M4	4	5	6	340	21200	0.764
DSL 32.52	32	52	52	M5	5	10	6	440	27500	1.410
DSL 32.56	32	56	62	M6	6	13	6	460	28700	2.260
DSL 35.52	35	52	41	M4	4	5	6	400	22900	1.030
DSL 35.55	35	55	52	M5	5	10	6	520	29700	1.720
DSL 35.60	35	60	62	M6	6	17	6	700	40000	2.910
DSL 40.56	40	56	41	M4	4	5	6	470	23500	1.300
DSL 40.62	40	62	52	M5	5	10	6	620	31000	2.690
DSL 40.65	40	65	62	M6	6	17	6	830	41500	3.870
DSL 40.70	40	70	77	M8	8	25	6	900	45000	6.890
DSL 45.68	45	68	52	M5	5	10	6	720	32000	3.770
DSL 45.70	45	70	62	M6	6	17	6	960	42600	5.030
DSL 45.75	45	75	77	M8	8	25	6	1100	48900	8.810
DSL 50.72	50	72	52	M5	5	10	6	850	34000	4.520

Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d ₁	d ₂	L	ISO 4762	h mm	M _A Nm	No.	M or F _a		
	H6	h5						Nm	N	
DSL 50.75	50	75	62	M 6	6	17	6	1130	45200	6.400
DSL 50.80	50	80	77	M 8	8	40	6	1980	79200	11.100
DSL 55.80	55	80	62	M 6	6	17	6	1260	45900	8.000
DSL 55.85	55	85	77	M 8	8	40	6	2240	81500	13.700
DSL 60.85	60	85	62	M 6	6	17	6	1480	49400	9.850
DSL 60.90	60	90	77	M 8	8	40	6	2600	86600	16.700
DSL 65.90	65	90	62	M 6	6	17	6	1630	50100	12.000
DSL 65.95	65	95	77	M 8	8	40	6	2900	89300	20.100
DSL 70.100	70	100	77	M 8	8	40	6	3210	91800	24.000
DSL 75.105	75	105	77	M 8	8	40	6	3560	95000	28.400
DSL 80.110	80	110	77	M 8	8	40	6	3870	96800	33.200
DSL 85.120	85	120	92	M 8	8	40	6	3900	91800	60.200
DSL 90.120	90	120	77	M 8	8	40	7	6850	152200	48.100
DSL 95.125	95	125	77	M 8	8	40	8	7390	155600	55.700
DSL 100.130	100	130	77	M 8	8	40	8	7780	155600	63.300
DSL 110.140	110	140	77	M 8	8	40	10	10690	194500	82.300
DSL 120.150	120	150	77	M 8	8	40	10	11670	194500	103.000
DSL 130.160	130	160	77	M 8	8	40	10	12640	194500	126.000
DSL 140.170	140	170	77	M 8	8	40	10	13610	194500	153.000
DSL 150.180	150	180	77	M 8	8	40	10	14580	194500	184.000
DSL 160.190	160	190	77	M 8	8	40	12	18670	233400	221.000
DSL 170.200	170	200	77	M 8	8	40	12	19830	233400	260.000
DSL 180.210	180	210	77	M 8	8	40	12	21000	233400	302.000
DSL 190.230	190	230	92	M10	10	60	12	27110	285400	678.000
DSL 200.240	200	240	92	M10	10	60	12	28540	285400	777.000
DSL 210.250	210	250	92	M10	10	60	12	29960	285400	885.000
DSL 220.260	220	260	92	M10	10	60	12	31390	285400	1000.000
DSL 230.270	230	270	92	M10	10	60	12	32800	285400	1130.000
DSL 240.280	240	280	92	M10	10	60	12	34250	285400	1270.000
DSL 250.300	250	300	102	M10	10	60	15	44580	356700	2050.000
DSL 260.310	260	310	102	M10	10	60	15	46370	356700	2280.000
DSL 270.320	270	320	102	M10	10	60	15	48150	356700	2520.000
DSL 280.330	280	330	102	M10	10	60	15	49900	356700	2780.000
DSL 290.340	290	340	102	M10	10	60	15	51700	356700	3060.000
DSL 300.350	300	350	102	M10	10	60	15	53500	356700	3360.000

³⁾ d₂ > 80 mm = Concentricity to IT4

SPIETH CLAMPING SETS SERIES DSM

For motor shafts to DIN 748 with k6/m6 tolerance zone



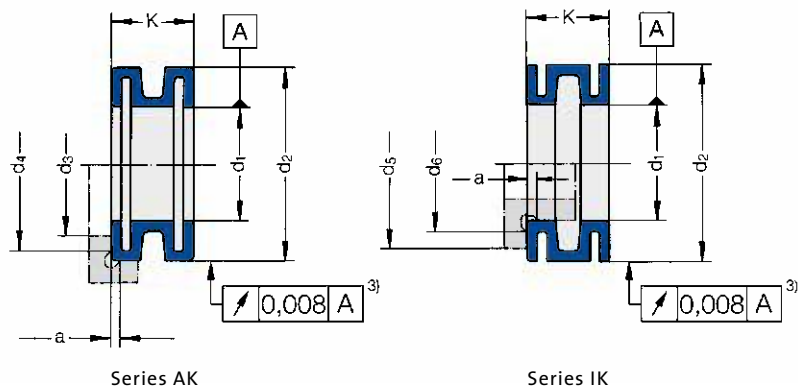
Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d_1	d_2	L	ISO 4762	h mm	M_A Nm	No.	M or F_a		
		h5						Nm	N	
DSM 14.2	14	26	26	M3	3	2	4	50	7100	0.055
DSM 16.28	16	28	26	M3	3	2	6	66	8250	0.071
DSM 16.1	16	32	26	M4	4	5	6	95	11900	0.138
DSM 16.2	16	32	36	M4	4	5	6	130	16300	0.178
DSM 18.30	18	30	26	M3	3	2	6	92	10222	0.091
DSM 18.2	18	34	36	M4	4	5	6	160	17800	0.222
DSM 19.32	19	32	26	M3	3	2	6	100	10526	0.118
DSM 19.1	19	35	26	M4	4	5	6	130	13700	0.192
DSM 19.2	19	35	36	M4	4	5	6	200	21100	0.247
DSM 20.32	20	32	26	M3	3	2	6	108	10800	0.115
DSM 20.1	20	40	36	M5	5	10	5	190	19000	0.437
DSM 20.2	20	40	46	M5	5	10	5	240	24000	0.534
DSM 22.35	22	35	26	M3	3	2	6	122	11091	0.162
DSM 22.1	22	42	36	M5	5	10	5	220	20000	0.524
DSM 22.2	22	42	46	M5	5	10	5	290	26400	0.639
DSM 24.36	24	36	26	M3	3	2	6	145	12083	0.174
DSM 24.1	24	44	36	M5	5	10	5	260	21700	0.621
DSM 24.2	24	44	46	M5	5	10	5	360	30000	0.757
DSM 25.37	25	37	26	M3	3	2	6	184	14720	0.191
DSM 25.1	25	45	41	M5	5	10	6	280	22400	0.755
DSM 25.2	25	45	52	M5	5	10	6	450	35900	0.925
DSM 28.40	28	40	26	M3	3	2	6	205	14643	0.251
DSM 28.1	28	48	41	M5	5	10	6	320	22900	0.954
DSM 28.2	28	48	52	M5	5	10	6	550	39300	1.170
DSM 30.42	30	42	26	M3	3	2	6	220	14667	0.297
DSM 30.1	30	52	57	M6	6	17	5	690	46000	1.850
DSM 30.2	30	52	62	M6	6	17	5	710	47300	1.920
DSM 32.48	32	48	36	M4	4	5	6	365	22813	0.754
DSM 32.1	32	55	57	M6	6	17	5	770	48100	2.290
DSM 32.2	32	55	62	M6	6	17	5	800	50000	2.370
DSM 35.52	35	52	36	M4	4	5	6	400	22857	1.020
DSM 35.1	35	58	57	M6	6	17	6	1080	61700	2.790
DSM 35.2	35	58	62	M6	6	17	6	1120	63900	2.880
DSM 38.55	38	55	36	M4	4	5	6	435	22895	1.240
DSM 38.1	38	60	57	M6	6	17	6	1250	65800	3.080
DSM 38.2	38	60	62	M6	6	17	6	1300	68400	3.180

Order No.	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J kg cm ²
	d ₁	d ₂	L	ISO 4762	h mm	M _A Nm	No.	M or F _a		
		h5						Nm	N	
DSM 40.56	40	56	36	M4	4	5	6	455	22750	1.290
DSM 40.1	40	70	77	M8	8	40	5	1750	87500	7.800
DSM 40.2	40	70	92	M8	8	40	5	1800	90800	9.080
DSM 42.58	42	58	36	M4	4	5	6	480	22857	1.460
DSM 42.1	42	72	77	M8	8	40	5	1850	88100	8.630
DSM 42.2	42	72	92	M8	8	40	5	2000	95200	10.000
DSM 45.62	45	62	36	M4	4	5	6	510	22667	1.900
DSM 45.1	45	75	77	M8	8	40	5	2100	93300	10.000
DSM 45.2	45	75	92	M8	8	40	5	2250	101000	11.600
DSM 48.65	48	65	36	M4	4	5	6	545	22708	2.250
DSM 48.1	48	78	77	M8	8	40	5	2370	98800	11.500
DSM 48.2	48	78	92	M8	8	40	5	2600	108000	13.400
DSM 50.1	50	80	77	M8	8	40	6	2500	100000	12.600
DSM 50.2	50	80	92	M8	8	40	6	2700	109000	14.700
DSM 55.1	55	85	77	M8	8	40	6	2850	104000	15.600
DSM 55.2	55	85	92	M8	8	40	6	3100	113000	18.200
DSM 60.1	60	90	92	M8	8	40	6	3550	118000	22.300
DSM 60.2	60	90	122	M8	8	40	6	3550	118000	34.300
DSM 65.1	65	95	92	M8	8	40	6	4000	123000	26.900
DSM 65.2	65	95	122	M8	8	40	6	4000	123000	41.400
DSM 70.1	70	100	92	M8	8	40	6	4500	129000	30.000
DSM 70.2	70	100	122	M8	8	40	6	4500	129000	49.400
DSM 75.1	75	105	92	M8	8	40	7	5000	133000	38.100
DSM 75.2	75	105	122	M8	8	40	7	5000	133000	58.700
DSM 80.1	80	110	122	M8	8	40	8	6500	163000	69.000
DSM 85.1	85	115	122	M8	8	40	8	7150	168000	80.000

³⁾ d₂ > 80 mm = Concentricity to IT4

SPIETH CLAMPING SLEEVES SERIES AK/IK

For shafts with h tolerance zone



Designation of a clamping sleeve with initiation of clamping force from the shaft with $d_1 = 28$ mm, $d_2 = 40$ mm and $K = 16$ mm: **IK 28.40**.

Order No.	Dimensions in mm			Initiation of clamping force		Transmittable forces		Dimensions for connecting components in mm					
	AK/IK	d_1 H6	d_2 h5	K	$F_{max}^{1)}$ N	$C_{min}^{2)}$ mm	M Nm	F_a N	d_3 max.	d_4 min.	d_5 min.	d_6 max.	a max.
8.12		8	12	12	10000	0.3	7	1750	9	10.8	11	9.2	1.5
10.15		10	15	12	11000	0.4	11	2200	11	13.8	14	11.2	1.5
12.18		12	18	12	11800	0.4	18	2950	13	16.8	17	13.2	1.5
14.20		14	20	12	13400	0.5	25	3620	15	18.8	19	15.2	1.5
15.22		15	22	12	13700	0.5	29	3840	16	20.8	21	16.2	1.5
16.22		16	22	12	14900	0.5	35	4320	17	20.8	21	17.2	1.5
18.25		18	25	12	15900	0.6	44	4930	19	23.8	24	19.2	1.5
20.32		20	32	16	20600	0.6	82	8240	24	30	28	22	1.7
22.35		22	35	16	21700	0.6	95	8680	27	33	30	24	1.7
25.37		25	37	16	24500	0.7	128	10290	29	35	33	27	1.7
28.40		28	40	16	26900	0.7	162	11570	32	38	36	30	1.7
30.42		30	42	16	28300	0.7	187	12450	34	40	38	32	1.7
32.48		32	48	21	32400	0.8	259	16200	40	46	40	34	2.2
35.52		35	52	21	34400	0.8	307	17540	43	50	44	37	2.2
40.56		40	56	21	38900	0.8	404	20230	48	54	49	42	2.2
45.68		45	68	26	44700	0.8	553	24590	58	65	55	48	3
50.72		50	72	26	49400	0.8	679	27170	62	69	60	53	3
55.80		55	80	31	59000	1.0	908	33040	70	77	65	58	3
60.85		60	85	31	63300	1.0	1082	36080	75	82	70	63	3
63.88		63	88	31	66000	1.0	1205	38280	78	85	73	66	3
65.90		65	90	31	67700	1.0	1298	39940	80	87	75	68	3
70.100		70	100	38	78800	1.0	1682	48070	88	96	82	74	4
75.105		75	105	38	83400	1.0	1907	50870	93	101	87	79	4
80.110		80	110	38	88100	1.1	2185	54620	98	106	92	84	4
85.115		85	115	38	92700	1.1	2442	57470	103	111	97	89	4
90.120		90	120	38	97200	1.1	2799	62200	108	116	102	94	4
95.125		95	125	38	101800	1.2	3139	66100	113	121	107	99	4
100.130		100	130	38	106500	1.3	3460	69200	118	126	112	104	4
110.140		110	140	38	115700	1.4	4136	75200	128	136	122	114	4
120.150		120	150	38	125000	1.4	4950	82500	138	146	132	124	4
125.155		125	155	38	129600	1.4	5343	85500	143	151	137	129	4
130.160		130	160	38	134300	1.5	5759	88 600	148	156	142	134	4
140.170		140	170	38	143500	1.5	6727	96100	158	166	152	144	4
150.180		150	180	38	152800	1.5	7672	102300	168	176	162	154	4

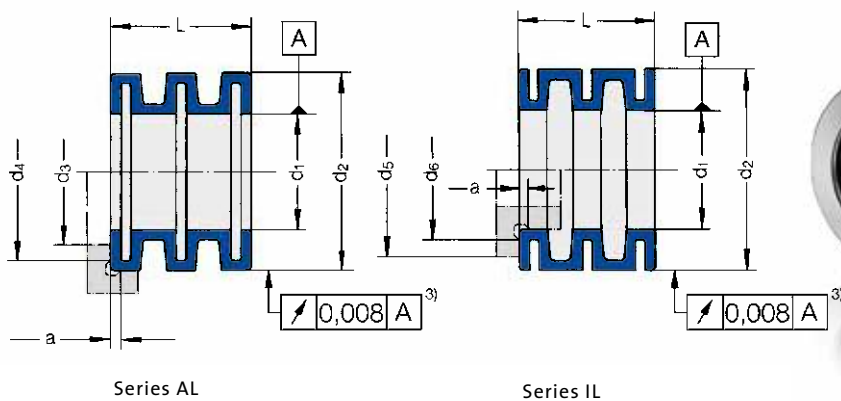
¹⁾ Max. perm. clamping force. For automated operation, the clamping sleeve should be clamped with max. 0.75x F .

²⁾ Design specification, not to be confused with actuation travel. For explanations, see p. 55.

³⁾ $d_2 > 80$ mm = Concentricity to IT4

SPIETH CLAMPING SLEEVES SERIES AL/IL

For shafts with h tolerance zone



Designation of a clamping sleeve with initiation of clamping force from the housing with $d_1 = 55$ mm, $d_2 = 80$ mm and $L = 52$ mm: **AL 55.80**.

Order No.	Dimensions in mm			Initiation of clamping force		Transmittable forces		Dimensions for connecting components in mm				
	AL/IL	d_1 H6	d_2 h5	L	$F_{max}^{1)}$ N	$C_{min}^{2)}$ mm	M Nm	F_a N	d_3 max.	d_4 min.	d_5 min.	d_6 max.
8.12	8	12	19	10000	0.5	12	3000	9	10.8	11	9.2	1.5
10.15	10	15	19	11000	0.6	21	4200	11	13.8	14	11.2	1.5
12.18	12	18	19	11800	0.7	35	5900	13	16.8	17	13.2	1.5
14.20	14	20	19	13400	0.8	49	6970	15	18.8	19	15.2	1.5
15.22	15	22	19	13700	0.8	54	7260	16	20.8	21	16.2	1.5
16.22	16	22	19	14900	0.8	64	8050	17	20.8	21	17.2	1.5
18.25	18	25	19	15900	0.9	80	8900	19	23.8	24	19.2	1.5
20.32	20	32	26	20600	0.9	124	12360	24	30	28	22	1.7
22.35	22	35	26	21700	0.9	143	13020	27	33	30	24	1.7
25.37	25	37	26	24500	1.1	190	15190	29	35	33	27	1.7
28.40	28	40	26	26900	1.1	237	16950	32	38	36	30	1.7
30.42	30	42	26	28300	1.1	272	18110	34	40	38	32	1.7
32.48	32	48	35	32400	1.2	389	24300	40	46	40	34	2.2
35.52	35	52	35	34400	1.2	457	26140	43	50	44	37	2.2
40.56	40	56	35	38900	1.2	599	29950	48	54	49	42	2.2
45.68	45	68	42	44700	1.2	804	35760	58	65	55	48	3
50.72	50	72	42	49400	1.2	988	39520	62	69	60	53	3
55.80	55	80	52	59000	1.5	1314	47790	70	77	65	58	3
60.85	60	85	52	63300	1.5	1557	51910	75	82	70	63	3
63.88	63	88	52	66000	1.5	1725	54780	78	85	73	66	3
65.90	65	90	52	67700	1.5	1848	56870	80	87	75	68	3
70.100	70	100	62	78800	1.5	2372	67770	88	96	82	74	4
75.105	75	105	62	83400	1.5	2690	71720	93	101	87	79	4
80.110	80	110	62	88100	1.6	3065	76650	98	106	92	84	4
85.115	85	115	62	92700	1.6	3427	80650	103	111	97	89	4
90.120	90	120	62	97200	1.6	3802	84500	108	116	102	94	4
95.125	95	125	62	101800	1.8	4251	89500	113	121	107	99	4
100.130	100	130	62	106500	2.0	4685	93700	118	126	112	104	4
110.140	110	140	62	115700	2.1	5599	101800	128	136	122	114	4
120.150	120	150	62	125000	2.1	6672	111200	138	146	132	124	4
125.155	125	155	62	129600	2.1	7206	115300	143	151	137	129	4
130.160	130	160	62	134300	2.2	7767	119500	148	156	142	134	4
140.170	140	170	62	143500	2.2	9037	129100	158	166	152	144	4
150.180	150	180	62	152800	2.2	10314	137520	168	176	162	154	4

¹⁾ Max. perm. clamping force. For automated operation, the clamping sleeve should be clamped with max. 0.75xF.

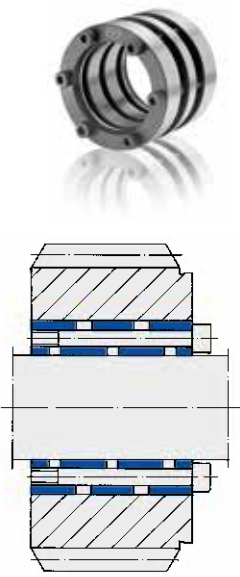
²⁾ Design specification, not to be confused with actuation travel. For explanations, see p. 55.

³⁾ $d_2 > 80$ mm = Concentricity to IT4

GENERAL APPLICATION

The clamping sleeve may only be actuated when the bore and outside surface of the clamping sleeve are covered by the connecting components. Otherwise the clamping set could be destroyed as a result of plastic deformation.

APPLICATION USING SCREWS



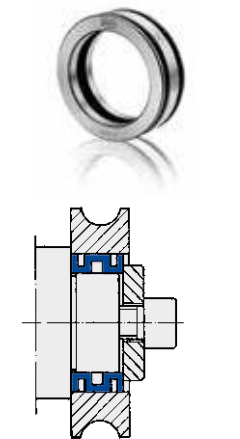
Assembly

1. Clean the clamping set, shaft and hub bore carefully and wet slightly with a low-viscosity machine oil.
2. Join the clamping set and connecting components without applying force.
3. Tighten the clamping screws evenly in diagonal order until the initial assembly play is eliminated. The play elimination phase is particularly important for ensuring good concentricity results.
4. Continue tightening evenly and gradually in diagonal sequence until you have applied full torque.
5. Finally, check the tightening torque all round.

Dismantling

1. Release the clamping screws gradually in diagonal sequence. Never completely unscrew one screw after the other. This would cause the last screw to be subjected to the total spring-back force exerted by the clamping sleeve and consequently to block. An attempt to release it can result in destruction of the hexagonal socket.
2. After releasing the clamp screws, all the components of the connection can be freely moved. After several assembly processes, an unfavourable alteration of the friction ratio between the head and contact surface of the clamping screws can take place. A stick-slip effect can occur during the tightening procedure, which results in jerky movement of the clamping screw. In this case, the contact surface of the screw head must be re-lubricated using a standard machine oil without additives.

APPLICATION WITHOUT SCREWS



Assembly

1. Clean the clamping sleeve, shaft and hub bore carefully and wet slightly with a low-viscosity machine oil.
2. Join the clamping sleeve and connecting components without applying force.
3. Initiate clamping force. The clamping sleeve deforms elastically and creates a friction-locked connection between the shaft and the housing bore.

Dismantling

1. Release the clamping force.
2. The clamping sleeve relaxes and resumes its original shape. All the parts are once again freely movable. Due to the many possible ways of initiating the clamping force, this description can only be formulated in general terms.

The clamping sets are manufactured from spring-hardened steel. The concentricity of the bore/outside diameter is accurate to 0.008 mm and from $d_2 > 80$ mm, concentricity to IT4.

The outside diameter is machined according to ISO tolerance h5. Depending on the design, the inside diameter is machined to ISO tolerance H6 or, for shaft ends, to DIN 748 (k6/m6).

Two different series (AK/AL and IK/IL) are offered to enable the different types of clamping force initiation. The AK/AL series sleeves are designed

for use where the clamping force is initiated from the housing (Fig. 1). IK/IL series clamping sleeves are used in cases where clamping force is initiated from the shaft (Fig. 2).

However, of decisive importance is that the clamping force is applied to the end faces of the clamping sleeves in the area of diameter d_3 and d_4 or d_5 and d_6 .

CONNECTING COMPONENTS

The cylindrical bore and outside surfaces of the clamping set must be completely covered by the connecting components. The shaft and bore must be machined cylindrically with a mean peak-to-valley height of $Rz=2.5 \dots 6.3$ μm microns.

To ensure that the stress exerted on the hub or housing bore remains within the elastic range, we recommend the following minimum wall thickness:

Steel C 45	$= 0.6 (d_2 - d_1)$
Aluminium alloys	
Minimum strength F 38	$= 1.0 (d_2 - d_1)$
Grey cast iron GG 25	
shrinkage-free casting	$= 1.0 (d_2 - d_1)$

Hub bore

The following manufacturing tolerance applies for all series:

H7 (H6 for stringent concentricity requirements or a hydraulically operated clamp).

Shaft

Shafts must generally be manufactured to manufacturing tolerance h5 (max. perm. h6). As an exception when the DSM series is used, shafts must be manufactured to DIN 748 for motor shafts (up to dia.50 mm in k6 tolerance field, from dia.55 mm in m6 tolerance field).

Series AK/IK, AL/IL (without screws)

To permit simple configuration of the connecting components, however, projection of the clamping sleeve up to max. a (Fig. 1 and 2) can be tolerated.

Initiation of clamping force

The functional surfaces of the connecting components, which are used to initiate clamping force in the clamping sleeves, must be manufactured with a run-out accuracy of 0.01 mm or to IT4.

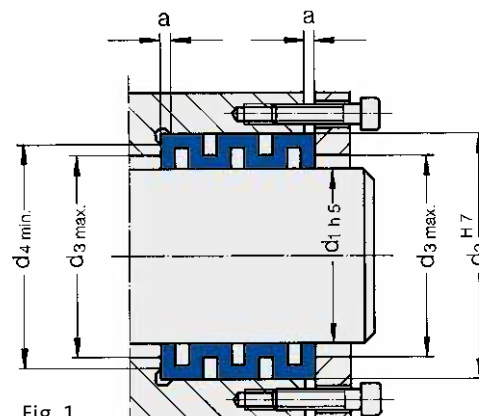


Fig. 1

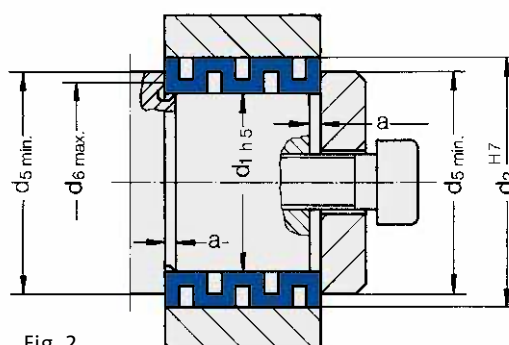


Fig. 2

CLAMPING SCREWS

Cheese-head screws with a hexagon socket ISO 4762 (DIN 912) with strength class 12.9 are used. As the power transmission of the clamping sleeves depends on the exerted

clamping force, the clamping screws should be tightened using a torque wrench.

M_A: Tightening torque per clamping screw

TRANSMITTABLE FORCES

DSK/DSL/AK/IK/AL/IL

The specifications provided in the table apply to a bore tolerance of H7 and a shaft tolerance of h5 in the connecting components. For an h6 shaft, in the most unfavourable scenario, a reduction of transmittable forces of approx. 10 % may be expected.

DSM

The specifications provided in the table apply to a bore tolerance of H7 and a shaft tolerance to DIN 748 (k6/m6).

M: Transmittable torque at F_a = 0

The specified values were ascertained in a series of tests, in which the connecting components were made of C45steel, produced with the stipulated surface quality.

F_a: Transmittable axial force at M = 0

The F_a values are calculated according to

$$F_a = 2000 \cdot \frac{M}{d_1} \text{ [N]}$$

Subjection of the clamped connection to steady, pulsating, alternating or sudden stress has no impact provided that the occurring peak forces do not exceed the catalogue val-

ues. The risk of fretting corrosion is always a possibility in friction-locked connections subjected to alternating torsion or rotating bending stress. This phenomenon can complicate dismantling, and can be prevented by complying with the following instructions:

$$\begin{aligned} \text{Perm. alternating torsion} & \quad \tilde{T}_{\text{perm.}} \leq 0,6 M \\ \text{Perm. rotating bending stress} & \quad \tilde{M}_{\text{bperm.}} \leq 0,3 M \end{aligned}$$

M and F_a:

If both torque and axial forces act on a clamping set at the same time, check using the following formula whether the resulting torque M_r is transmittable.

$$M \geq M_r = \sqrt{M_e^2 + \left(\frac{F_{ae} \cdot d_1}{2000}\right)^2} \text{ [Nm]}$$

M = Transmittable torque
(catalogue value) [Nm]

M_e = Required torque [Nm]

M_r = Resulting torque [Nm]

F_{ae} = Required axial force [N]

d₁ = Shaft diameter [mm]

For series AK/IK, AL/IL only**F: Maximum permissible clamping force**

To avoid the danger of fatigue failure and fretting corrosion, the clamping sleeves should be tensioned in case of high clamping/release cycle frequencies to a maximum of 0.75 F.

C: Required functional installation space

Spieth clamping sleeves must be clamped using the controlled application of force. The clamping force cannot be applied in relation to the clamping path. To prevent premature blocking, a "free" functional path "C" must be provided.

Automated operation

In the case of automated operation, for example, using hydraulic actuation, a variety of influencing variables can cause the actual values of the system to deviate from the catalogue values. For this application scenario, we strongly recommend that you verify the force or torque values required. In this application, care must be taken to ensure that the installation is completely free of axial play. To avoid fatigue failure and due to the danger of fretting corrosion, in case of high clamping/release cycle frequencies, the clamping sleeves should be tensioned at a maximum of 0.75x F.

General

If it is not possible to apply the clamping force F, the following formula is used for approximate determination of the torque M_{red} which can be transmitted with the given clamping force $F_{giv.}$ (<F).

$$M_{red} = \frac{M (F_{giv.} - 0.05 F)}{0.95 F} \text{ [Nm]}$$

To ascertain the necessary clamping force for a transmittable torque $M_{red} < M$ an approximation is possible using the following formula:

$$F_{req.} = \frac{M_{red} \cdot 0.95 F}{M} + 0.05 F \text{ [N]}$$

M = Transmittable torque
(catalogue value) [Nm]

M_{red} = Reduced transmittable
torque [Nm]

F = Max. perm. clamping force
(catalogue value) [N]

F_{ae} = Required axial force [N]

$F_{req.}$ = Required clamping force [N]

$F_{giv.}$ = Given clamping force (<F) [N]

NOTE

During the clamping process, the clamping sleeve reduces in length by some tenths of a mm (depending on the size of the clamping sleeve, the clamping force and the real dimensions of the clamping sleeve and connected components), dragging the clamped part in the direction of clamping. The resulting axial displacement of the clamped part can be up to 0.5 times the clamping path. When positioned against a thrust collar or similar, the axial thrust produces an intensive face contact with the clamped part. AK and IK series clamping sleeves can be supplied in a low-thrust ver-

sion. However, the retention force of these versions only achieves 0.5 times the values listed in the table.

For clamping sets with integrated clamping screws, this effect is theoretically cancelled as the actuating force is applied symmetrically. Due to the actual dimensions of all components, however, allowance must be made for a slight residual thrust in an undefined direction.