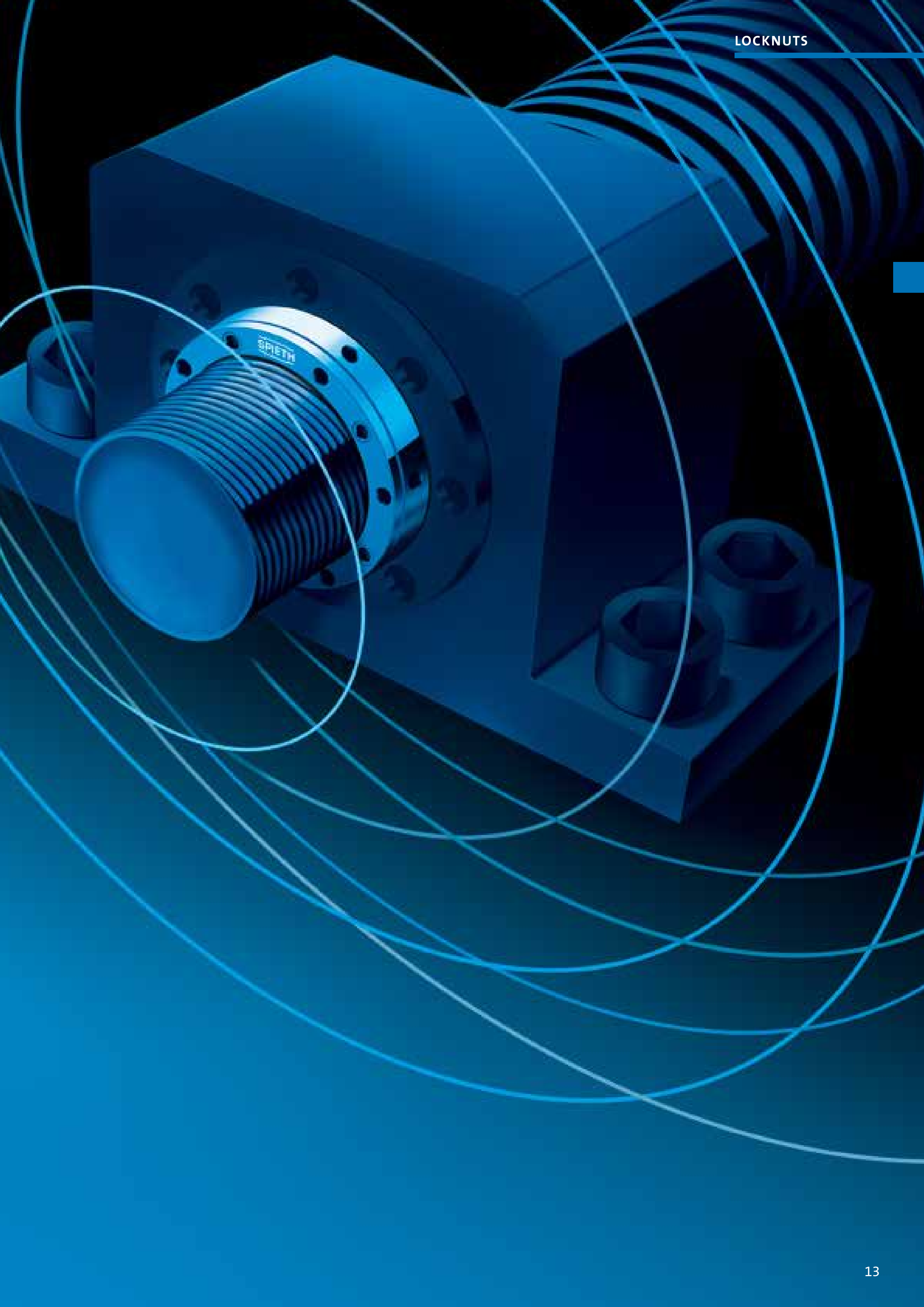
HOLDING PRECISLY IN POSITION WHEN THINGS GET GOING

Spieth locknuts – precision nuts by design.
With exceptional precision and uniform clamping forces at the thread flanks, Spieth locknuts can be exactly adjusted to perform demanding duties in mechanical engineering. Thanks to perfect functionality, they cope without difficulty with the increasing levels of dynamic stress and power densities inherent in modern machinery designs – and are therefore designed to deliver maximum economy.

Locknuts demonstrate their strength when things really get going: They ensure optimum concentricity of spindles. The locknut owes its unique capability to a combination of manufacturing precision and the diaphragm locking system developed by Spieth. The relevant functional components such as the load thread, locking thread and end face are inseparable components of the nut body and are manufactured to a high degree of precision as a clamping device. The diaphragm lock ensures that this precision is preserved when assembled in your application result and that it is also retained throughout its operation.


SPIETH

4 UNIQUE FEATURES – NUMEROUS BENEFITS

Secure
The locking system enables the application of high clamping forces to ensure that the nut is friction-locked onto the spindle thread. The load is applied to the thread across 360° symmetrically and evenly. The locking force and working load act in the same direction and cannot cancel each other out. This is the requirement for the highest locking effect while at the same time preserving the connecting components.

Self-centering
The locking procedure is designed to exert a self-centring effect for the nut on the spindle thread. This is the prerequisite for ensuring a coaxial end position of the nut relative to the spindle and for a vertical orientation of the end face with respect to the connection assembly. For demanding applications, this effect can be used in a separate installation step specifically to minimise thread join play.

Precise
All functional surfaces that determine precision are manufactured in a single set-up. And in contrast to other locking concepts, the precision is retained by design once it has been created, even during installation and operation.

Consistent rigidity
Irrespective of the degree of pretension in the nut, the closed distribution of locking force ensures an intensive application of the thread flanks in the direction of the working load. The assembly process creates an elastic pretension in the join of the thread pairing, as a result of which the bearing area of the thread flanks and the rigidity of the join are significantly increased. Damaging micro-movements, caused by strong impulses or abrupt changes in the direction of force, are drastically reduced.

BENEFITS TO YOU

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

Lower resource input
- No additional grooves or locking plates required.
- Free, infinitely variable and exact positioning.
- Fast, precise installation results.
- Simple to dismantle thanks to back-sprung diaphragm.

More success
- Optimum locking effect.
- High degree of run-out accuracy, even in the assembled state.
- High dynamic loading capacity.
- High dynamic rigidity.
- Dynamically balanced structure.
- Suitable for high speeds.

Series MSR large

Series MSR standard

Series MSR from size M10

FIELDS OF APPLICATION

Spieth locknuts are precision nuts fitted with an integrated premium thread lock.
They are used in all areas of mechanical engineering. Precision, safety, rigidity and ease of use are key aspects in the design of a threaded connection. Spieth nuts are the first choice whenever at least one of these aspects is required.

APPLICATION EXAMPLES

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

Series MSA

Series MSF

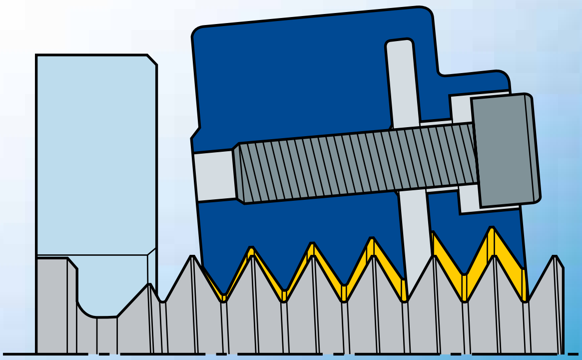
Series MSW

Series MSW > M70

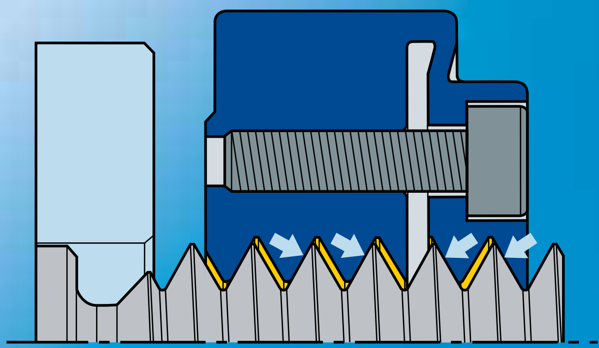
FUNCTIONAL PRINCIPLE

In this example, based on a type MSF locknut.

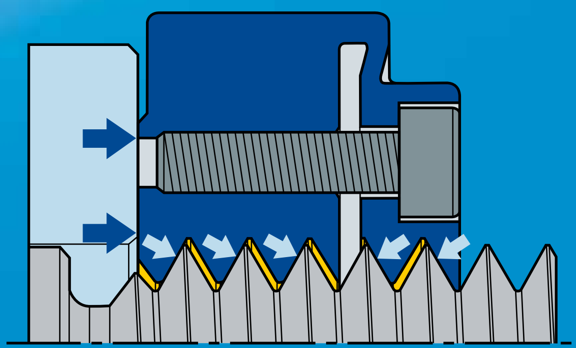
The principle is illustrated in a simplified diagram with enlarged thread flank play.



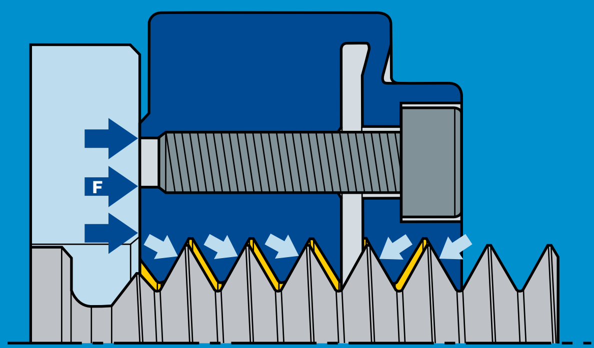
1. Screwing on the locknut
As with every threaded connection, there is a degree of mating play when the nuts are screwed on. As a result, the nut may be aligned with a parallel and/or angled axial offset relative to the spindle axis; in other words, the contact surface of the nut may be at an incline.



2. Spieth locknuts: Self-centring and self-aligning thanks to play restriction
Unique: Spieth locknuts are automatically self-centring and eliminate mating play (thread flank play) as far as possible. Thanks to play restriction, the locknut centres itself and the contact surface of the engages at right angles to the spindle axis.

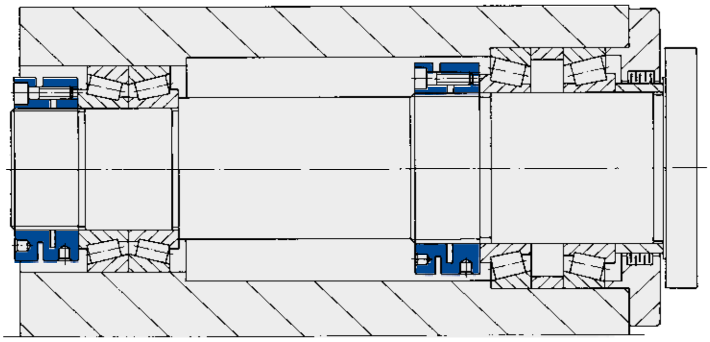


3. Tightening and locking
The locknut is tightened with the required level of preliminary torque. The lock screws are then locked with the specified level of locking torque. This ensures optimum contact at the thread flanks and maximum concentricity.



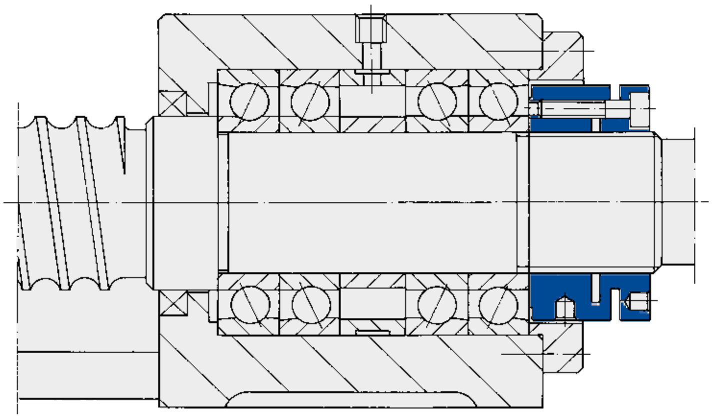
4. Higher levels of operational safety
Spieth benefit: The previously set locking forces are not cancelled by the working load, but are superimposed and therefore reinforced. Put simply: the forces act in the same direction and are therefore added to each other. The optimum solution that delivers improved safety.

ASSEMBLY EXAMPLES



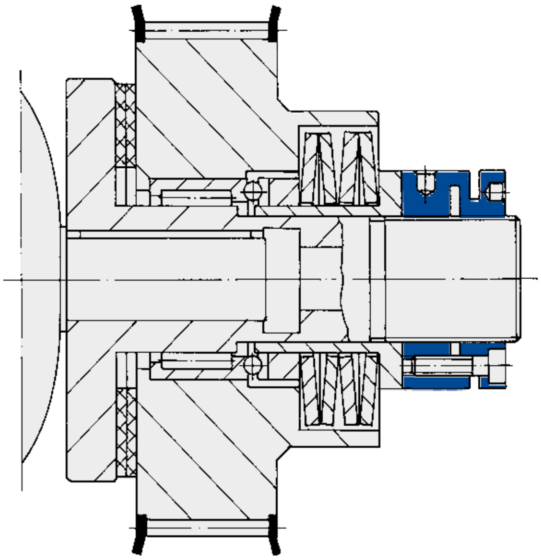
Example 1: Tapered roller bearing

In tapered roller bearings, run-out accuracy, a high level of axial rigidity and dynamic safety create a major contribution to perfect bearing operation: Radial stress applied to the tapered roller bearing generates axial forces (axial rigidity). Due to a lack of axial pretension (no axial friction), the intrinsic safety of the locknut is extremely important.



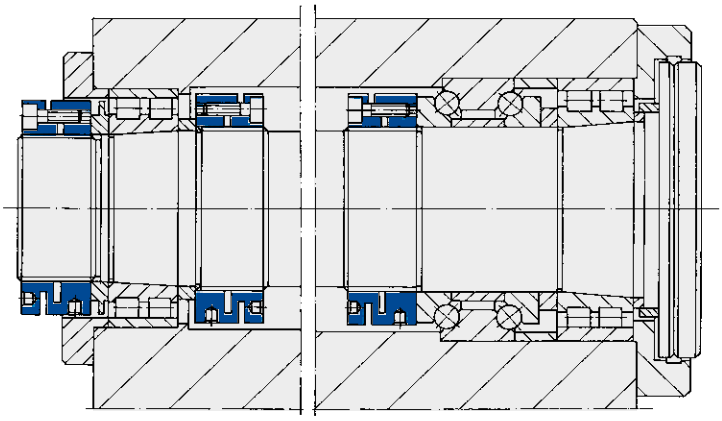
Example 2: Ball roller spindle

The use of a locknut gives the bearing of the ball roller spindle a high degree of axial rigidity. Under highly dynamic operating conditions, the high degree of dynamic safety of the locknut represents a major advantage.

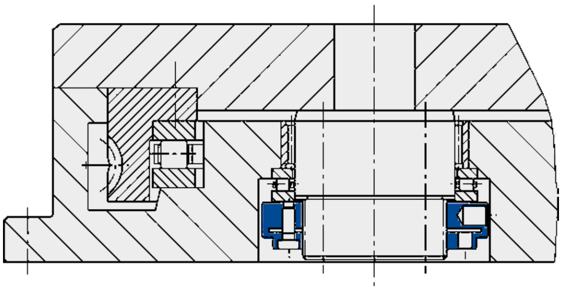


Example 3: Friction clutch

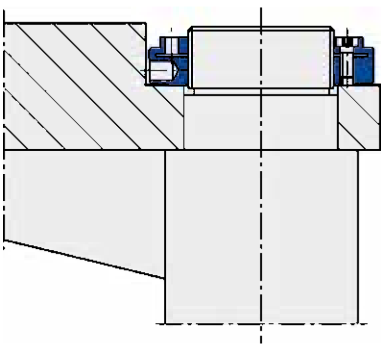
A locknut is used here to provide precise and infinitely variable adjustment of the pretension of the spring on a friction clutch. The reliable locking function is of particular importance here.



Example 4: Main spindle bearing
The locknut ensures a high level of axial rigidity and excellent concentricity on the main spindle bearing in a turning lathe.

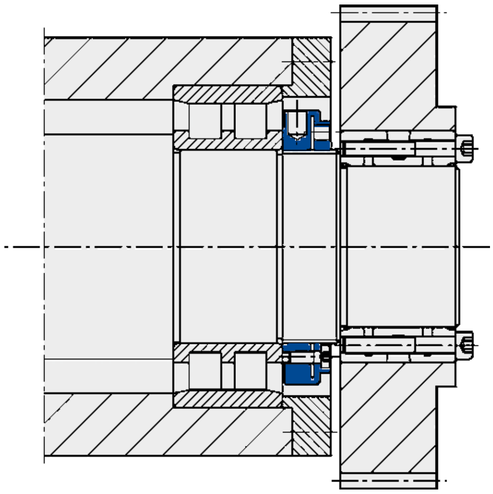


Example 5: Round axis
Not a millimetre is lost in the axial direction and, despite this, there is no need to sacrifice run-out accuracy, axial rigidity or a high degree of dynamic safety.



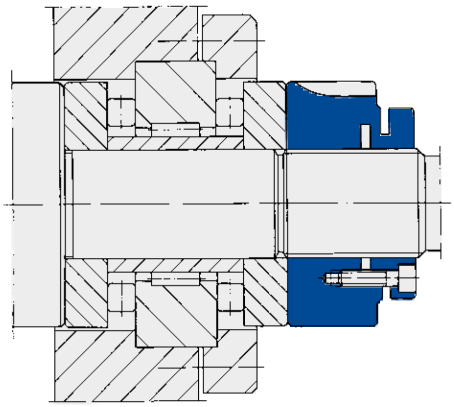
Example 6: Table structure
Due to the flat design, countersunk installation is possible without causing any interfering contours in the table surface. Straining of the structure due to a tilting locknut caused by thread flank play, or even opening under dynamic load are not possible due to the characteristic properties of the locknut.

ASSEMBLY EXAMPLES



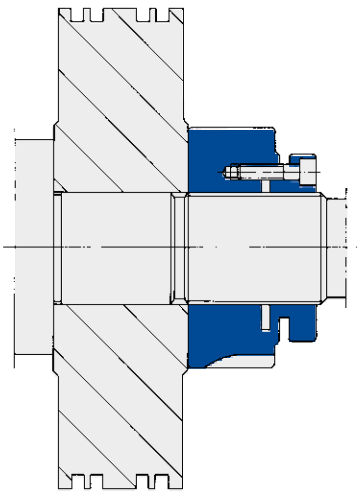
Example 7: Tooling spindle

The low installation height of the MSF locknut makes it possible to create a compact drive side of the spindle. This configuration saves valuable installation space and minimises destructive rotating bending stress. At the same time, the benefits of a Spieth high-precision locknut are fully exploited.



Example 8: Feed drive system

The installation using a locknut reliably transmits the high load-bearing capacity and axial rigidity of the needle axial cylindrical bearing to the feed drive system. The excellent locking properties provided by the locknut are of major importance under dynamic stress.



Example 9: Piston fixture

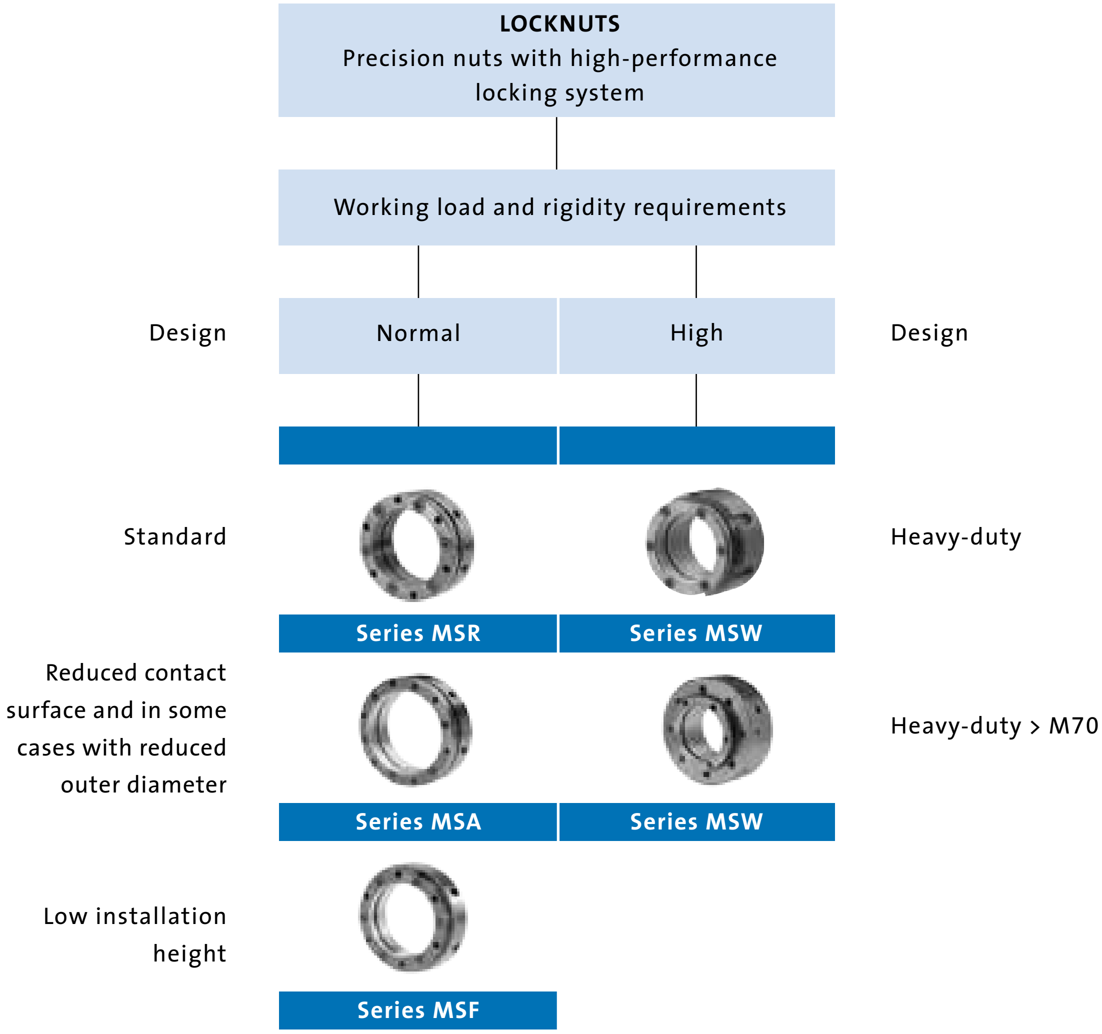
The piston fixture utilizes all the technical benefits of locknuts: Load-bearing capacity, axial rigidity and excellent locking properties.

SPIETH **LOCKNUTS: THE RIGHT CHOICE**

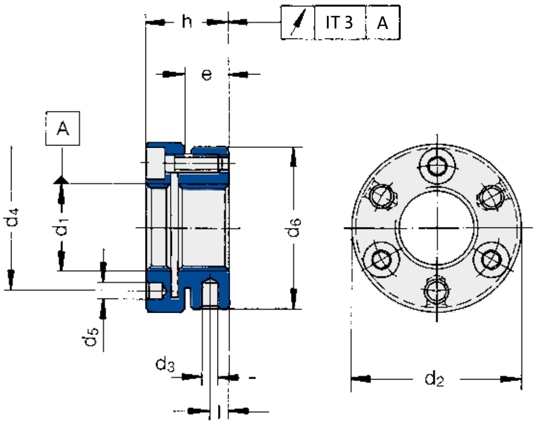
We'll provide you with the perfect locknuts for your application. We'll also help you choose the right one – with expert advice from our specialists.

Series MSR – MSA, MSF and MSW

- Excellent axial rigidity and loading capacity under high levels of dynamic stress.
- Simple connecting components, no grooves, locking plates etc.
- Axial position of the contact surface can be easily and precisely adjusted.
- Even in the installed state, exact run-out accuracy, which can be further improved with adjustment.

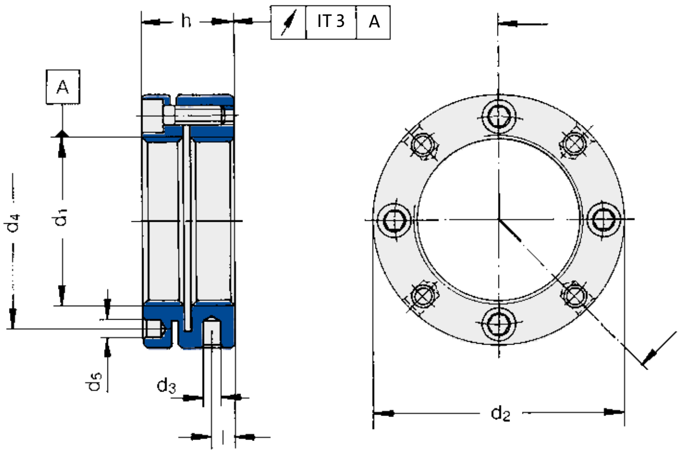


SPIETH LOCKNUTS SERIES **MSR**



NEW
Increased Axial Loads &
Display of Breakaway Torques

Name	Dimensions in mm									Clamping screws			Calculation factor A	Calculation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 1)	d_4	d_5 1)	d_6	h	l	e	ISO 4762	M_A	No.l			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11					Nm		mm	N	kN	Nm	kg cm²
MSR 10x0.75	M10x0.75	24	2.5	17	3.2	22	14	3	6.5	M3	2	3	0.672	2457	28	22	0.025
MSR 10x1	M10x1	24	2.5	17	3.2	22	15	3	6.5	M3	2	3	0.703	2457	27	22	0.027
MSR 12x1	M12x1	26	3	19	3.2	25	14	3	6.5	M3	2	3	0.819	2438	34	27	0.037
MSR 12x1.5	M12x1.5	26	3	19	3.2	25	15	3	6.5	M3	2	3	0.881	2438	32	24	0.04
MSR 14x1.5	M14x1.5	32	4	22.5	4.3	30	16	3	7	M4	2.9	3	0.997	2995	42	31	0.096
MSR 15x1	M15x1	33	4	23.5	4.3	31	16	3	7	M4	2.9	3	0.992	2984	46	37	0.108



NEW
Increased Axial Loads &
Display of Breakaway Torques

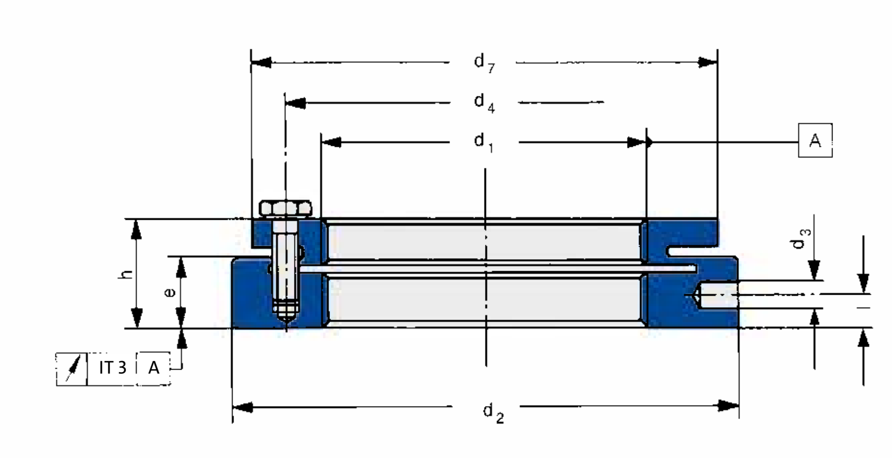
Name	Dimensions in mm							Clamping screws			Calculation factor A	Calculation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 1)	d_4	d_5 1)	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11				Nm		mm	N	kN	Nm	kg cm²
MSR 16x1.5	M16x1.5	34	4	24.5	4.3	18	5	M4	2.9	4	1.112	3962	43	42	0.147
MSR 17x1	M17x1	35	4	25.5	4.3	18	5	M4	2.9	4	1.108	3947	48	54	0.164
MSR 18x1.5	M18x1.5	36	4	26.5	4.3	18	5	M4	2.9	4	1.228	3931	50	49	0.183
MSR 20x1	M20x1	40	4	30.5	4.3	18	5	M4	2.9	4	1.281	3900	50	63	0.283
MSR 20x1.5	M20x1.5	40	4	30.5	4.3	18	5	M4	2.9	4	1.344	3900	48	57	0.283
MSR 22x1.5	M22x1.5	40	4	30.5	4.3	18	5	M4	2.9	4	1.459	3869	54	64	0.27
MSR 24x1.5	M24x1.5	42	4	32.5	4.3	18	5	M4	2.9	4	1.575	3838	60	72	0.323
MSR 25x1.5	M25x1.5	45	5	36.5	4.3	20	6.5	M4	2.9	4	1.633	3822	81	80	0.488
MSR 26x1.5	M26x1.5	45	5	36.5	4.3	20	6.5	M4	2.9	4	1.69	3806	85	82	0.479
MSR 28x1.5	M28x1.5	46	5	38.5	4.3	20	6.5	M4	2.9	4	1.805	3775	92	85	0.504

Name	Dimensions in mm							Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1)]	d_4	d_5 [1)]	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11				Nm		mm	N	kN	Nm	kg cm²
MSR 30x1.5	M30x1.5	48	5	40.5	4.3	20	6.5	M4	2.9	4	1.921	3744	99	92	0.588
MSR 32x1.5	M32x1.5	50	5	42.5	4.3	22	7	M4	2.9	4	2.037	3713	114	99	0.743
MSR 35x1.5	M35x1.5	53	5	45.5	4.3	22	7	M4	2.9	4	2.21	3666	117	111	0.914
MSR 38x1.5	M38x1.5	58	5	48.5	4.3	22	7	M4	2.9	4	2.449	3619	138	125	1.34
MSR 40x1.5	M40x1.5	58	5	50.5	4.3	22	7	M4	2.9	4	2.5	3588	122	131	1.25
MSR 42x1.5	M42x1.5	60	5	52.5	4.3	22	7	M4	2.9	4	2.617	3557	123	138	1.41
MSR 45x1.5	M45x1.5	68	6	58	4.3	22	6.5	M4	2.9	6	2.789	5265	145	221	2.49
MSR 48x1.5	M48x1.5	68	6	59.5	4.3	25	9	M4	2.9	6	2.962	5195	163	225	2.63
MSR 50x1.5	M50x1.5	70	6	61.5	4.3	25	9	M4	2.9	6	3.079	5148	165	233	2.91
MSR 52x1.5	M52x1.5	72	6	63.5	4.3	25	9	M4	2.9	6	3.196	5101	167	242	3.21
MSR 55x1.5	M55x1.5	75	6	66.5	4.3	25	9	M4	2.9	6	3.369	5031	169	256	3.69
MSR 55x2	M55x2	75	6	66.5	4.3	25	9	M4	2.9	6	3.43	5031	166	273	3.69
MSR 58x1.5	M58x1.5	82	6	72.5	5.3	26	9	M5	6	6	3.541	8077	353	420	5.81
MSR 60x1.5	M60x1.5	84	6	74.5	5.3	26	9	M5	6	6	3.655	8001	356	448	6.32
MSR 60x2	M60x2	84	6	74.5	5.3	26	9	M5	6	6	3.718	8001	350	465	6.32
MSR 62x1.5	M62x15	86	6	76.5	5.3	28	10.5	M5	6	6	3.774	7925	404	474	7.33
MSR 65x1.5	M65x1.5	88	6	78.5	5.3	28	10.5	M5	6	6	3.948	7811	386	471	7.71
MSR 65x2	M65x2	88	6	78.5	5.3	28	10.5	M5	6	6	4.007	7811	380	489	7.71
MSR 68x1.5	M68x1.5	95	8	83	5.3	28	9.5	M5	6	6	4.121	7696	481	525	11
MSR 70x1.5	M70x1.5	95	8	85	5.3	28	9.5	M5	6	6	4.238	7620	439	554	10.5
MSR 70x2	M70x2	95	8	85	5.3	28	9.5	M5	6	6	4.297	7620	432	515	10.5
MSR 72x1.5	M72x1.5	98	8	86	6.4	28	8.5	M6	10	6	4.354	10692	374	731	11.8
MSR 75x1.5	M75x1.5	100	8	88	6.4	28	8.5	M6	10	6	4.525	10530	354	758	12.3
MSR 75x2	M75x2	100	8	88	6.4	28	8.5	M6	10	6	4.583	10530	348	720	12.3
MSR 80x2	M80x2	110	8	95	6.4	32	11	M6	10	6	4.873	10260	559	798	22
MSR 85x2	M85x2	115	8	100	6.4	32	11	M6	10	6	5.168	9990	569	830	25.7
MSR 90x2	M90x2	120	8	108	6.4	32	11	M6	10	6	5.453	9720	578	909	29.6
MSR 95x2	M95x2	125	8	113	6.4	32	11	M6	10	6	5.744	9450	584	955	34
MSR 100x2	M100x2	130	8	118	6.4	32	11	M6	10	6	6.033	9180	592	1019	38.8
MSR 105x2	M105x2	135	8	123	6.4	32	11	M6	10	6	6.321	8910	598	1069	44.1
MSR 110x2	M110x2	140	8	128	6.4	32	11	M6	10	6	6.616	8640	605	1098	49.8
MSR 115x2	M115x2	145	8	133	6.4	36	13	M6	10	6	6.9	8370	713	1181	64.2
MSR 120x2	M120x2	155	8	140	6.4	36	13	M6	10	6	7.193	8100	885	1300	89.7
MSR 125x2	M125x2	160	8	148	6.4	36	13	M6	10	6	7.474	7830	892	1331	99.7
MSR 130x3	M130x3	165	8	153	6.4	36	13	M6	10	6	7.895	7560	834	1491	111
MSR 140x3	M140x3	180	10	165	6.4	36	12	M6	10	8	8.475	9360	984	1856	161
MSR 150x3	M150x3	190	10	175	6.4	36	12	M6	10	8	9.05	8640	1001	1983	193
MSR 160x3	M160x3	205	10	185	8.4	40	14	M8	25	8	9.633	14520	1142	3929	301
MSR 170x3	M170x3	215	10	195	8.4	40	14	M8	25	8	10.213	13200	1156	4077	353
MSR 180x3	M180x3	230	10	210	8.4	40	14	M8	25	8	10.789	11880	1334	4360	478
MSR 190x3	M190x3	240	10	224	8.4	40	14	M8	25	8	11.362	10560	1158	4529	550
MSR 200x3	M200x3	245	10	229	8.4	40	14	M8	25	8	11.948	9240	1021	4604	545

[1)] The number of holes corresponds to the number of clamping screws.

All information is supplied without liability and subject to technical changes. Please observe the operating instructions at https://www.spieth-maschinenelemente.de/en/download-faqs/catalogueinstructions/

SPIETH LOCKNUTS SERIES **MSR**



NEW Increased Axial Loads

Name	Dimensions in mm								Clamping screws				Calculation factor A	Calculation factor B	Performance Data Breaking Load	Moment of inertia J
	d_1	d_2	d_3 1)	d_4	d_7	h	l	e	ISO 4017	ISO 4014	M_A	No.				
	ISO-5H	h11			h11						Nm		mm	N	kN	kg cm²
MSR 210x3	M210x3	270	12	232	250	44	13	27	M8	-	25	8	12.515	5280	1038	926
MSR 220x3	M220x3	282	12	242	260	44	13	27	M8	-	25	8	13.097	5148	1086	1090
MSR 230x3	M230x3	295	12	252	270	44	13	27	M8	-	25	8	13.677	5016	1153	1280
MSR 240x3	M240x3	308	12	262	280	44	13	27	M8	-	25	8	14.256	4884	1220	1510
MSR 250x3	M250x3	322	12	272	290	44	13	27	M8	-	25	8	14.833	4752	1305	1790
MSR 260x3	M260x3	336	12	282	300	44	13	27	M8	-	25	10	15.408	5775	1388	2100
MSR 270x3	M270x3	350	12	292	310	44	13	27	M8	-	25	10	15.982	5610	1473	2460
MSR 280x3	M280x3	364	12	302	320	44	13	27	M8	-	25	10	16.578	5445	1557	2870
MSR 290x3	M290x3	376	12	312	330	44	13	27	M8	-	25	10	17.149	5280	1605	3230
MSR 300x3	M300x3	390	12	322	340	44	13	27	M8	-	25	10	17.717	5115	1689	3730
MSR 310x4	M310x4	400	14	337	360	54	16	32	-	M10	49	10	18.437	7860	1910	5290
MSR 320x4	M320x4	412	14	347	370	54	16	32	-	M10	49	10	19.008	7598	1967	5900
MSR 330x4	M330x4	424	14	357	380	54	16	32	-	M10	49	10	19.578	7336	2023	9560
MSR 340x4	M340x4	436	14	367	390	54	16	32	-	M10	49	10	20.176	7074	2080	7270
MSR 350x4	M350x4	450	14	377	400	54	16	32	-	M10	49	10	20.743	6812	2180	8220
MSR 360x4	M360x4	466	14	387	410	54	16	32	-	M10	49	12	21.309	7860	2319	9460
MSR 370x4	M370x4	478	14	397	420	54	16	32	-	M10	49	12	21.905	7546	2377	10400
MSR 380x4	M380x4	490	14	407	430	54	16	32	-	M10	49	12	22.468	7231	2434	11400

1) The number of holes corresponds to the number of clamping screws.

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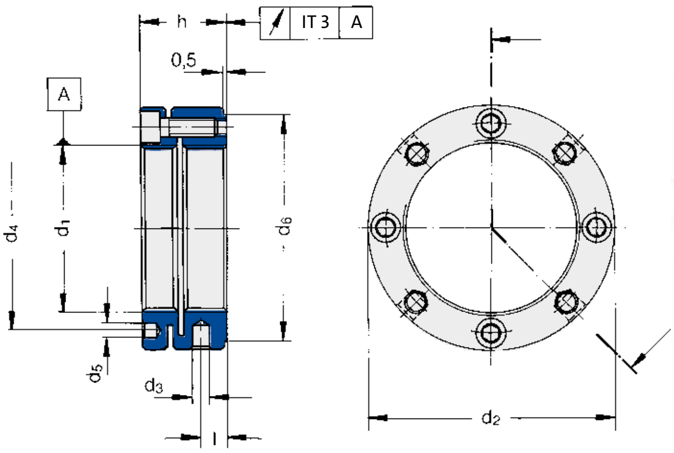
SPIETH LOCKNUTS SERIES **MSA**



NEW

Increased Axial Loads & Display of Breakaway Torques

Name	Dimensions in mm								Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1]	d_4	d_5	d_6	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11				Nm		mm	N	kN	Nm	kg cm²
MSA 20x1	M20x1	35	4	27.5	3.2	31	17	5	M3	2	5	1.281	3938	60	44	0.142
MSA 25x1.5	M25x1.5	40	4	32.5	3.2	36	19	6.5	M3	2	5	1.633	3859	83	46	0.265
MSA 30x1.5	M30x1.5	45	5	37.5	3.2	41	19	6.5	M3	2	5	1.921	3780	100	59	0.4
MSA 35x1.5	M35x1.5	53	5	45.5	4.3	48	22	7	M4	2.9	4	2.21	3666	118	82	0.904
MSA 40x1.5	M40x1.5	58	5	50.5	4.3	54	22	7	M4	2.9	4	2.5	3588	123	95	1.24
MSA 45x1.5	M45x1.5	64	6	54	4.3	59	23	7	M4	2.9	5	2.789	4388	134	133	1.89
MSA 50x1.5	M50x1.5	69	6	59	4.3	64	24	8	M4	2.9	6	3.079	5148	149	172	2.56
MSA 55x1.5	M55x1.5	73	6	64	4.3	69	24	8	M4	2.9	6	3.369	5031	141	188	3
MSA 60x1.5	M60x1.5	78	6	69	4.3	74	24	8	M4	2.9	6	3.655	4914	143	203	3.76
MSA 65x1.5	M65x1.5	83	6	74	4.3	79	24	8	M4	2.9	7	3.948	5597	273	248	4.61
MSA 70x1.5	M70x1.5	93	8	83	5.3	88	27	9	M5	6	6	4.238	7620	396	395	9.09
MSA 75x1.5	M75x1.5	98	8	88	5.3	93	27	9	M5	6	6	4.525	7430	401	422	10.9
MSA 80x2	M80x2	103	8	93	5.3	98	28	10	M5	6	6	4.873	7239	430	385	13.4
MSA 85x2	M85x2	112	8	100	6.4	106	30	10	M6	10	6	5.168	9990	496	554	21.3
MSA 90x2	M90x2	117	8	105	6.4	111	30	10	M6	10	6	5.453	9720	501	596	24.7
MSA 95x2	M95x2	122	8	110	6.4	116	30	10	M6	10	6	5.744	9450	508	605	28.4
MSA 100x2	M100x2	130	8	118	6.4	123	32	11	M6	10	6	6.033	9180	594	728	38.6
MSA 105x2	M105x2	135	8	123	6.4	128	32	11	M6	10	6	6.321	8910	599	753	43.9
MSA 110x2	M110x2	140	8	128	6.4	133	32	11	M6	10	6	6.616	8640	606	773	49.5
MSA 120x2	M120x2	155	8	140	6.4	145	36	13	M6	10	6	7.193	8100	886	928	89.1
MSA 130x3	M130x3	165	8	153	6.4	155	36	13	M6	10	6	7.895	7560	875	1049	110
MSA 140x3	M140x3	180	10	165	6.4	170	36	12	M6	10	8	9.05	9360	1032	1357	160
MSA 150x3	M150x3	190	10	175	6.4	180	36	12	M6	10	8	45.055	8640	1050	1468	192
MSA 160x3	M160x3	205	10	185	8.4	195	40	14	M8	25	8	9.633	14520	1199	3136	300
MSA 170x3	M170x3	215	10	195	8.4	205	40	14	M8	25	8	10.213	13200	1213	3241	352
MSA 180x3	M180x3	230	10	210	8.4	220	40	14	M8	25	8	10.789	11880	1399	3598	476
MSA 190x3	M190x3	240	10	224	8.4	230	40	14	M8	25	8	11.362	10560	1158	3803	548
MSA 200x3	M200x3	245	10	229	8.4	235	40	14	M8	25	8	11.948	9240	1021	3810	543

[1] The number of holes corresponds to the number of clamping screws.

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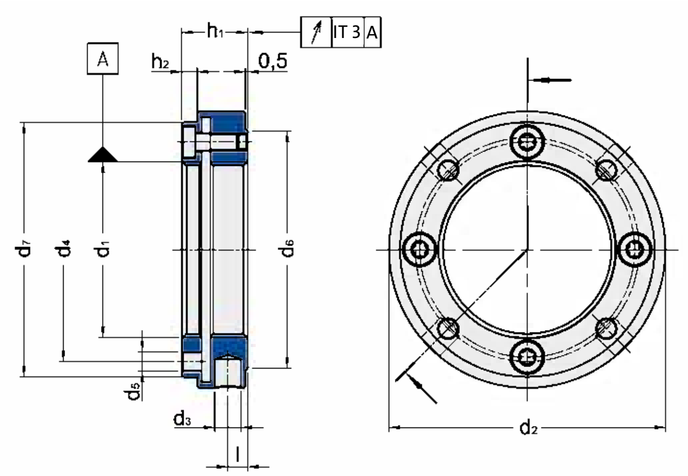
SPIETH LOCKNUTS SERIES **MSF**

For applications with limited installation space.



Increased Axial Loads &
Display of Breakaway Torques

Name	Dimensions in mm										Clamping screws			Calcu-lation factor A	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1]	d_4	d_5 [1]	d_6	d_7	h_1	h_2	l	ISR	M_A	No.		Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11					Size	Nm		mm	kN	Nm	kg cm²
MSF 25x1.5	M25x1.5	48	5	36	4.3	39	43	14	3.5	4	20	2.9	4	1.633	56	30	0.338
MSF 30x1.5	M30x1.5	53	5	41	4.3	44	48	15	3.5	4.5	20	2.9	4	1.921	79	38	0.624
MSF 35x1.5	M35x1.5	58	5	46	4.3	49	53	15	3.5	4.5	20	2.9	4	2.21	93	46	0.876
MSF 40x1.5	M40x1.5	63	6	51	4.3	54	58	15	3.5	4.5	20	2.9	4	2.5	96	52	1.19
MSF 45x1.5	M45x1.5	70	6	56	4.3	59	63	15	3.5	4.5	20	2.9	6	2.789	122	89	1.7
MSF 50x1.5	M50x1.5	75	6	61	4.3	64	68	16	3.5	5	20	2.9	6	3.079	136	99	2.39
MSF 55x1.5	M55x1.5	80	6	66	4.3	69	73	16	3.5	5	20	2.9	6	3.369	279	110	3.02
MSF 55x2	M55x2	80	6	66	4.3	69	73	16	3.5	5	20	2.9	6	3.43	271	116	3.02
MSF 60x1.5	M60x1.5	89	6	74	5.3	77	82	18	5	5.25	25	6	6	3.655	327	188	5.34
MSF 60x2	M60x2	89	6	74	5.3	77	82	18	5	5.25	25	6	6	3.719	317	192	5.34
MSF 65x1.5	M65x1.5	94	8	79	5.3	82	87	18	5	5.25	25	6	6	3.948	334	205	6.51
MSF 65x2	M65x2	94	8	79	5.3	82	87	18	5	5.25	25	6	6	4.008	325	208	6.51
MSF 70x1.5	M70x1.5	99	8	84	5.3	87	92	18	5	5.25	25	6	6	4.238	338	221	7.55
MSF 70x2	M70x2	99	8	84	5.3	87	92	18	5	5.25	25	6	6	4.297	328	224	7.55
MSF 75x1.5	M75x1.5	106	8	89	6.4	94	99	20	5	5.75	30	10	6	4.525	382	321	11.2
MSF 75x2	M75x2	106	8	89	6.4	94	99	20	5	5.75	30	10	6	4.587	372	318	11.2
MSF 80x2	M80x2	111	8	94	6.4	99	104	20	5	5.75	30	10	6	4.873	378	343	13.4
MSF 90x2	M90x2	121	8	104	6.4	109	114	20	5	5.75	30	10	6	5.453	388	384	18.1
MSF 100x2	M100x2	131	8	114	6.4	119	124	20	5	5.75	30	10	6	6.033	396	433	24

[1] The number of holes corresponds to the number of clamping screws.

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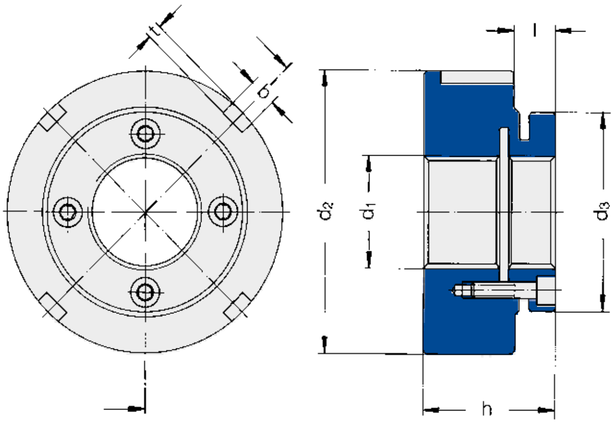
SPIETH LOCKNUTS SERIES **MSW**



NEW

Increased Axial Loads & Display of Breakaway Torques

Name	Dimensions in mm							Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3	h	l	b [1]	t	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	c11							Nm		mm	N	kN	Nm	kg cm^2
MSW 20.28	M20x1.5	42	38	28	11	6	2.5	M4	2.9	4	1.344	1560	194	40	0.486
MSW 20.40	M20x1.5	52	42	40	11	7	3	M4	2.9	4	1.344	936	375	42	1.74
MSW 25.28	M25x1.5	47	43	28	11	7	3	M4	2.9	4	1.633	1560	245	54	0.742
MSW 25.40	M25x1.5	62	47	40	11	8	3.5	M4	2.9	4	1.633	936	470	59	3.41
MSW 30.28	M30x1.5	52	48	28	11	7	3	M4	2.9	4	1.921	1560	295	68	1.09
MSW 30.44	M30x1.5	68	52	44	11	8	3.5	M4	2.9	4	1.921	936	655	83	5.54
MSW 35.28	M35x1.5	60	53	28	11	8	3.5	M4	2.9	4	2.21	1560	346	83	1.8
MSW 35.44	M35x1.5	73	60	44	11	8	3.5	M4	2.9	4	2.21	936	767	97	7.41
MSW 40.28	M40x1.5	65	58	28	11	8	3.5	M4	2.9	6	2.5	1560	398	134	2.43
MSW 40.44	M40x1.5	75	62	44	11	8	3.5	M4	2.9	6	2.5	936	878	139	7.98
MSW 45.28	M45x1.5	70	63	28	11	8	3.5	M4	2.9	6	2.789	2340	443	149	3.14
MSW 45.44	M45x1.5	90	70	44	11	10	4	M4	2.9	6	2.789	1404	982	171	16.4
MSW 50.32	M50x1.5	75	68	32	11	8	3.5	M4	2.9	6	3.079	2340	642	167	4.78
MSW 50.46	M50x1.5	95	75	46	11	10	4	M4	2.9	6	3.079	1404	1168	204	21.3
MSW 55.46	M55x1.5	100	80	46	12	10	4	M5	6	6	3.369	2286	1208	326	23.6
MSW 60.46	M60x1.5	100	85	46	12	10	4	M5	6	6	3.655	2286	1321	438	24.8
MSW 65.46	M65x1.5	110	90	46	12	10	4	M5	6	6	3.948	2286	1433	386	35.9
MSW 70.46	M70x1.5	115	95	46	12	10	4	M5	6	6	4.238	2286	1551	390	42.2

[1] The number of grooves for hook spanner DIN 1810-A corresponds to the number of clamping screws.

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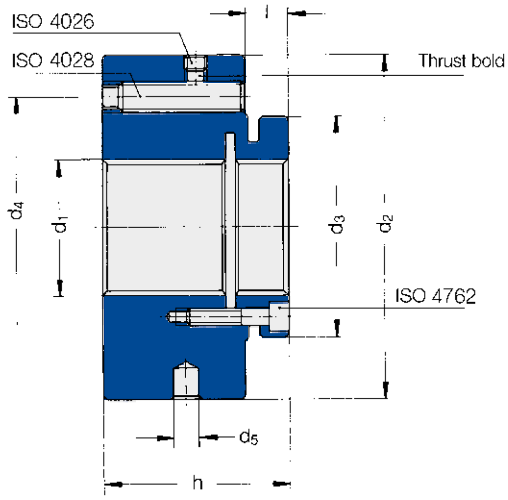

NEW
Increased Axial Loads

Name	Dimensions in mm								Clamping screws			Performance Data
	d_1	d_2	d_3	h	l	d_4	d_5		ISO 4762	M_A	No.	Breaking Load
	ISO-5H	c11					øH11	No.		Nm		kN
MSW 72.60	M72x1.5	135	95	60	14	105	8	4	M5	6	6	2390
MSW 85.60	M85x2	160	110	60	14	124	8	4	M6	10	6	2600
MSW 105.66	M105x2	190	136	66	15	150	10	4	M6	10	6	3670
MSW 125.72	M125x2	215	154	72	16	172	10	4	M6	10	6	4830
MSW 140.78	M140x3	240	176	78	17	196	10	4	M6	10	8	5810

Name	Set screws					Lock screws		Alu thrust bolt		
	ISO 4028-45H	d_6	M_D [2)]	No.	Calculation factor A	ISO 4026	No.	ø	Length	No.
		mm	Nm		mm			mm	mm	
MSW 72.60	M10x45	7	34	8	0.92064	M6x8	8	4.5	3	8
MSW 85.60	M12x45	8.5	60	8	1.09913	M8x8	8	6	3	8
MSW 105.66	M12X50	8.5	60	9	1.09913	M8x8	9	6	4	9
MSW 125.72	M16x55	12	140	9	1.42613	M8x8	9	6	4	9
MSW 140.78	M16x60	12	140	9	1.42613	M8x8	9	6	4	9

[2)] Manufacturer's max. permissible tightening torque.

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The locknut is deformable in the axial direction and must therefore be handled with care. The clamping screws should only be tightened when the locknut has been screwed completely onto the spindle thread. If these instructions are ignored, inadmissible plastic deformation could render the locknut unusable.

Assembly

1. Carefully clean the locknut and connecting components and wet slightly with low-viscosity machine oil that does not contain friction-reducing additives.
2. Screw the locknut onto the spindle thread, but without making contact with the end face (Fig. 1).
3. Tighten the clamping screws evenly in diagonal sequence while turning the locknut forwards and backwards. Stop tightening when flank play is almost eliminated (Fig. 2).
4. Now tighten the locknut against the end contact surface initially by exerting a higher level of preliminary torque. Then release again and finally tighten using the prescribed degree of torque (Fig. 3). This sequence prevents subsequent seizure at the contact surfaces (thread flanks, end contact surfaces).
5. Then secure the locknut by evenly tightening the clamping screws. In applications that impose strict requirements in terms of spindle concentricity, it is possible to adjust the concentricity after testing by tightening the clamping screws individually. This eliminates any unilateral tensions caused by minimal axial run-out errors in the connecting components.

Dismantling

First slightly relieve the tension of the clamping screws in diagonal sequence. Only then should the clamping screws be fully released. This prevents all of the tension of the diaphragm from acting on the last clamping screw to be released and causing it to jam.

Once a locknut has been secured on a spindle thread, after removal it may only be used again on the same spindle. Adjustments carried out between the spindle and locknut can otherwise lead to problems if the locknut is used on a different spindle.

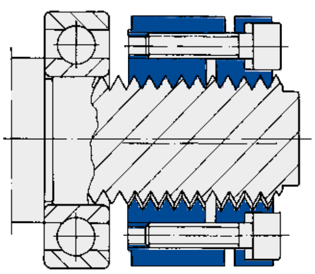

Fig. 1

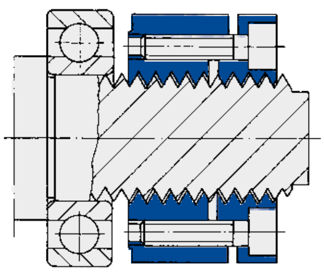

Fig. 2

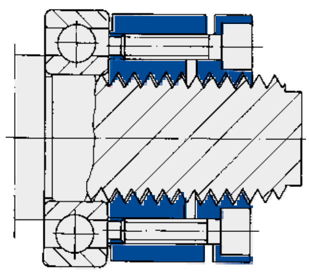

Fig. 3

Assembly

1. Carefully clean the locknut and connecting components and wet slightly with low-viscosity machine oil that does not contain friction-reducing additives.
2. Screw the locknut onto the spindle thread, but without making contact with the end face. The set screws should not protrude from the end face. (Fig. 4).
3. Tighten the clamping screws evenly in diagonal sequence while turning the locknut forwards and backwards. Stop tightening when flank play is almost eliminated (Fig. 5).
4. Now screw the locknut until it makes contact with the end face. Then tighten the clamping screws evenly to fix the lock.
5. Then tighten the set screws against the contact surface step by step in the sequence shown at a higher level of preliminary torque. Loosen them again and finally tighten them using the prescribed preliminary torque (Fig. 6). This sequence prevents subsequent seizure at the contact surfaces (thread flanks, end contact surfaces).
6. Finally tighten the lock screws and check the clamping screws again for the prescribed preliminary torque and adjust if necessary.

Dismantling

1. Release the lock screws, then slightly loosen the set screws in the sequence shown before fully releasing them.
2. First slightly relieve the tension of the clamping screws in diagonal sequence. Only then should the clamping screws be fully released. This prevents all of the tension of the diaphragm from acting on the last clamping screw to be released and causing it to jam.

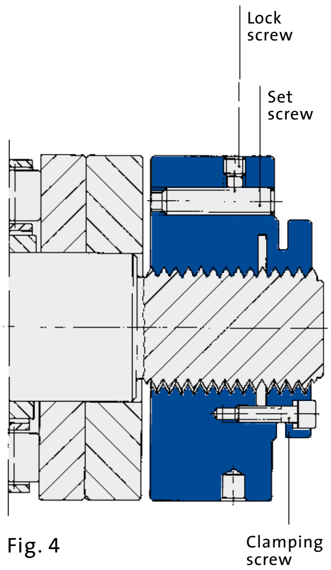

Fig. 4

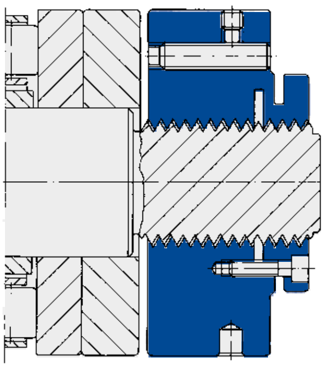

Fig. 5

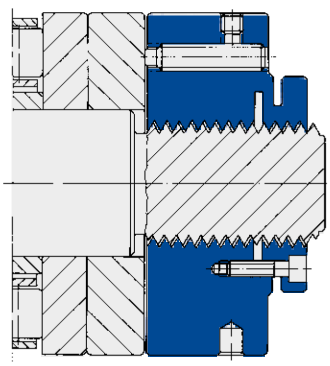

Fig. 6

GENERAL DESIGN

The specified performance data are subject to the dispersion of the friction values of the different contact partners. The components are designed to be reusable, with frequent assembly and disassembly we recommend reducing the tightening torque. Please note that this can also reduce the transmissible torque.

The locknuts are made of burnished steel. The metric ISO thread is manufactured to tolerance class "fine" (tolerance zone 5H, DIN 13 parts 21 ... 25) in a single work process with the end face of the locknut. All locknuts are fitted with integrated clamping screws to lock the thread. Radial installation is carried out with the aid of a hook spanner DIN 1810 shape A or shape B.

MSW DESIGN

These locknuts are generally required to withstand high pretension forces. In the upper dimension range, these pretension forces can no longer be achieved in practice using the locknut's own pretension moment due to the size of the friction radii. For this reason, the MSW locknut series is divided into 2 different versions: Up to locknut size MSW 70.46, axial pretension is set by using the preliminary torque of the locknut. From size MSW 72.60 upwards, this is done using the tightening torque of the integrated set screws.

CLAMPING SCREWS

Cheese-head screws with a hexagon socket ISO 4762 (DIN 912) or hexalobular socket cheese head screws (similar to TORX) with strength class 12.9, as well as hexagon bolts ISO 4014 and ISO 4017 with strength class 10.9 are used.

M_A: Tightening torque per clamping screw
The tightening torque is based on a friction coefficient of $\mu = 0.14$. As the effective friction coefficients depend on a range of factors which are often beyond the control of the manufacturer, the values specified here should only be regarded as non-binding recommendations.

CONNECTING COMPONENTS

The metric bolt thread must normally be manufactured to tolerance class "medium" (tolerance zone 6g, DIN 13 parts 21 ... 25), for higher precision requirements, to tolerance class "fine" (tolerance zone 4h, DIN 13 parts 21 ... 25).

The contact surfaces of the connecting components are essential to optimum functioning and must be manufactured with particular care and precision. To avoid surface seizure, all contact surfaces should be finished with a low level of surface roughness.

CONNECTING COMPONENTS MSW > M70

For this locknut size, the axial pretension applied by the hardened threaded pins requires a specially configured thrust collar to absorb the extremely high local pressure loads. This thrust ring must be hardened. The reason for the prescribed minimum height is to ensure distribution of locally occurring pressure forces to the following end contact surface. In certain cases, an already existing machine component, such as a gear, may be able to assume the function of the thrust collar (Fig. 1+2).

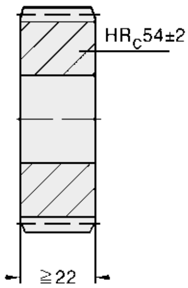

Fig. 1

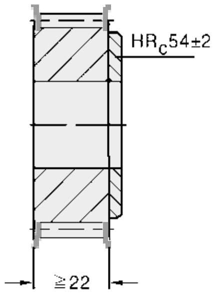

Fig. 2

SETTING THE AXIAL PRETENSIONING FORCES

The axial pretension of a screw connection often plays a decisive role for successful function, and must therefore be set with particular accuracy. However, in most assembly workshops, direct measurement of this variable is not possible, raising the need for indirect methods of setting. For this purpose, the locknut preliminary torque corresponding to the required pre-tensioning force is calculated. This factor can be determined using the following equation:

The locking process places the spindle thread under stress and in this case brings about intensive surface contact (= high axial rigidity). At the same time, this serves to relieve tension on the end contact surface of the locknut. This effect can easily be compensated by increasing preliminary torque accordingly during installation. This higher preliminary torque is ascertained using the allowance B relative to the required pre-tensioning force F_V.

General

$$M_V = \frac{(F_V + B) \cdot (A + \mu_A \cdot r_A)}{1000} \text{ [Nm]}$$

M_V = Pre-tensioning torque of the locknut [Nm]
F_V = Required axial pretension force of the threaded connection [N]
B = Locknut-specific allowance [N], compensates face end relief due to the locking process
A = Constant [mm], includes the calculation factors for the respective thread width (catalogue value)
μ_A = Frictional coefficient for the end contact surface of the locknut Approximate value $\mu_A = 0.1$ steel/steel
r_A = Effective friction radius for the end contact face of the locknut [mm]

From locknut size MSW > M70

The tightening torque for the set screw is determined according to the following formula:

$$M_D = \frac{F_V \cdot (4 \cdot A + \mu_D \cdot d_6)}{n \cdot 4000} \text{ [Nm]}$$

M_D = Tightening torque per set screw [Nm]
F_V = Required axial pretension force of the threaded connection [N]
A = Constant [mm], includes the Calculation factors for the respective thread width (catalogue value)
μ_D = Frictional coefficient for the end contact face of the set screw Approximate value = 0.13
d_6 = Dog point dia. of the set screw [mm] (catalogue value)
n = number of set screws