SNR Linear Motion : Ball screws

Industry

SNR – A global manufacturer of bearings.

For almost a century, SNR has designed, developed and manufactured bearings to meet the most demanding of applications. In April 2008, SNR and the Japanese Group NTN joined forces.

As one the 3 largest companies in the manufacture of bearings, our group offers its customers added value in terms of service, quality and products.

The NTN-SNR Group is distinguished by its global presence and by its company-wide quality assurance system.

We have been active in linear ball rail systems since 1985 and our complete range, based on innovative, high-quality products, has developed significantly.

Today, we can offer a solution for a vast range of applications that need linear motion systems.

This catalogue aims to help you discover our new standard range of ball screw products in rolled and ground versions.

The large range of nuts, options for custom machining and our knowledgeable technical service enable us to design and propose custom-made solutions for our customers.

Ball rail systems find applications in a diverse range of industries such as machine tools for metal, wood, plastic, specialist machinery, aeronautics, automated assembly lines and semi-conductor industries.

Our technical department draws on many years of experience in all these areas and is available to help you develop solutions suited to your needs.

With that in mind, this technical documentation was designed as a basis for dialogue. Our technical and sales engineers will provide you with any technical information you may require.

SNR cannot be held responsible for consequences arising from any errors or omissions that may be contained in this documentation, although every care has been taken in its preparation. As part of our programme of continuous research and development, we reserve the right to make comprehensive or partial modifications to products and data appearing in this technical catalogue without prior notice.

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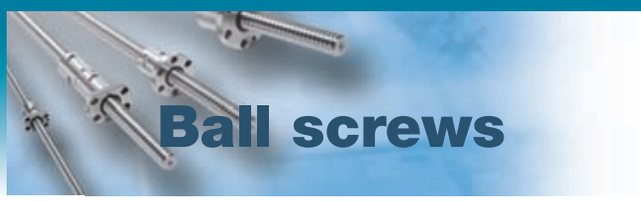


Ball screws

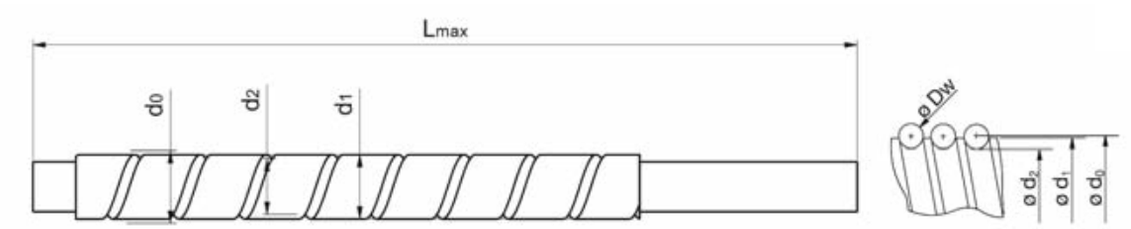
Rolled (T7, T10) and ground (T5, T3) screws for DIN compact nuts (types SC/DC)

Ø	Pitch [mm]														
mm	1	2	2,5	3	4	5	10	16	20	24	25	32	40	50	63
12						GR	G								
16						GR	GR	GR	GR						
20						GR	GR		GR						
25						GR	GR				GR				
32						GR	GR		GR			GR			
40						GR	GR		GR				GR		
50						GR	GR		GR					G	
63							G	G	G						
80							G		G						
100									G						

R: rolled, G: ground

Standard T7 precision class stock products.

T7 precision class rolled ball screws (other than standard dimensions), T10 and ground versions in class T5 and T3 are available on consultation.



d Reference diameter [mm]
d_0 Nominal diameter [mm]
d_1 Outside diameter [mm]
d_2 Diameter at the thread root [mm]
P Pitch [mm]
$L_{max.}$ Maximum length of screw [mm]

References	Dimensions [mm]						Moment of inertia	Mass
	d	d_0	P	d_1	d_2	L_{max}	kg • m2/m	kg/m
BSH01205	12	12,30	5	12	9,80	1000	$7,64x10^{-6}$	0,61
BSH01210	12	12,30	10	12	9,80	1000	$1,42x10^{-5}$	0,83
BSH01605	16	15,67	5	15	12,89	3000	$3,17x10^{-5}$	1,24
BSH01610	16	15,67	10	15	12,89	3000	$3,54x10^{-5}$	1,32
BSH01616	16	15,67	16	15	12,89	2900	$3,45x10^{-5}$	1,30
BSH01620	16	15,67	20	15	12,89	3000	$3,54x10^{-5}$	1,32
BSH02005	20	21,08	5	20	17,90	3000	$1,04x10^{-4}$	2,25
BSH02010	20	21,08	10	20	17,90	3000	$1,14x10^{-4}$	2,36
BSH02020	20	20,75	20	20	17,60	3000	$1,12x10^{-4}$	2,34
BSH02505	25	26,08	5	25	22,90	5800	$2,62x10^{-4}$	3,59
BSH02510	25	26,08	10	25	22,90	5800	$2,82x10^{-4}$	3,72
BSH02525	25	26,08	25	25	22,90	5500	$2,62x10^{-4}$	3,59
BSH03205	32	33,08	5	32	29,90	6000	$7,24x10^{-4}$	5,97
BSH03210	32	32,35	10	31	28,38	5600	$6,54x10^{-4}$	5,97
BSH03220	32	32,35	20	31	28,38	5500	$6,54x10^{-4}$	5,67
BSH03232	32	32,35	32	31	28,38	5000	$6,76x10^{-4}$	5,77
BSH04005	40	41,08	5	40	37,90	6000	$1,80x10^{-3}$	9,44
BSH04010	40	39,52	10	38	33,17	6000	$1,29x10^{-3}$	7,93
BSH04020	40	39,52	20	38	33,17	6000	$1,29x10^{-3}$	7,93
BSH04040	40	39,52	40	38	33,17	5000	$1,45x10^{-3}$	8,42
BSH05005	50	51,09	5	50	47,92	6000	$4,49x10^{-3}$	14,88
BSH05010	50	50,16	10	48	43,81	6000	$3,54x10^{-3}$	13,18
BSH05020	50	50,16	20	48	43,81	6000	$3,54x10^{-3}$	13,18
BSH05050	50	50,16	50	48	43,81	6000	$3,87x10^{-3}$	13,80
BSH06310	63	63,16	10	61	56,81	7000	$9,22x10^{-3}$	21,64
BSH06320	63	63,43	20	61	56,29	7000	$9,51x10^{-3}$	21,29
BSH08010	80	79,16	10	77	72,80	7000	$2,47x10^{-2}$	34,92
BSH08020	80	80,24	20	77	70,71	7000	$2,45x10^{-2}$	34,72
BSH10020	100	100,00	20	96	87,30	6000	$4,8x10^{-2}$	48,67

Ball screws

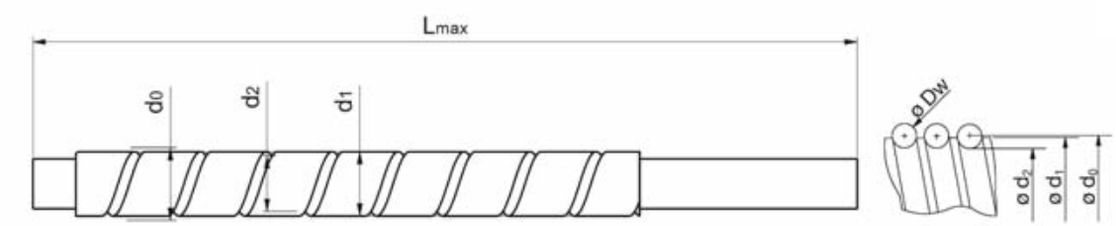
Rolled (T7, T10) and ground (T5, T3) screws for special nuts

Ø	Pitch [mm]												
mm	1	2	2,5	4	5	10	16	20	25	32	40	50	63
4	G												
6	GR	G											
8	GR	GR	GR										
10		GR		GR									
12		GR	G	GR	GR	GR							
14		GR		G									
16		G		GR	GR	GR	GR			G			
20		G		GR	GR	G		GR			G		
25		G	G	GR	GR	GR		G	GR			G	
32				GR	GR	GR	G	G		GR			G
40					GR	GR	G	G			GR		
50					GR	GR	G	GR				GR	
63						GR		GR			G		
80						GR		GR			G		
100								G					

R: rolled, G: ground

Standard T7 precision class stock products.

T7 precision class rolled ball screws (other than standard dimensions), T10 and ground versions in class T5 and T3 are available on consultation.



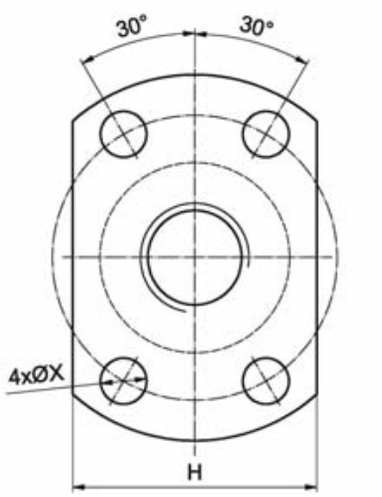
d Reference diameter [mm]
d_0 Nominal diameter [mm]
d_1 Outside diameter [mm]
d_2 Diameter at the root [mm]
P Pitch [mm]
$L_{max.}$ Maximum length of screw [mm]

References	Dimensions [mm]						Moment of inertia	Mass
	d	d_0	P	d_1	d_2	L_{max}	kg • m2/m	kg/m
BSH00601	6	6,27	1	6	5,47	900	$0,83x10^{-7}$	0,20
BSH00801	8	8,20	1	8	7,40	1200	$2,67x10^{-6}$	0,36
BSH00802	8	8,41	2	8	7,21	1000	$2,71x10^{-6}$	0,36
BSH00802.5	8	8,41	2,5	10	7,21	1000	$2,80x10^{-6}$	0,37
BSH01002	10	10,41	2	10	9,21	1200	$5,11x10^{-6}$	0,58
BSH01004	10	10,68	4	12	8,68	1200	$6,53x10^{-6}$	0,57
BSH01202	12	12,41	2	12	11,21	1200	$1,07x10^{-5}$	0,62
BSH01204	12	12,30	4	12	9,80	1000	$1,51x10^{-5}$	0,86
BSH01205	12	12,30	5	12	9,80	1000	$7,64x10^{-6}$	0,78
BSH01402	14	14,41	2	14	13,21	1200	$2,01x10^{-5}$	0,85
BSH01604	16	16,82	4	16	14,40	3000	$4,35x10^{-5}$	1,46
BSH01605	16	17,08	5	16	13,90	3000	$4,45x10^{-5}$	1,41
BSH01610	16	17,08	10	16	12,90	3000	$4,36x10^{-5}$	1,46
BSH01616	16	15,67	16	16	12,90	3000	$3,34x10^{-5}$	1,27
BSH02004	20	20,82	4	20	18,40	3000	$1,09x10^{-4}$	2,32
BSH02005	20	21,08	5	20	17,90	3000	$1,12x10^{-4}$	2,35
BSH02010	20	21,08	10	20	17,90	3000	$1,18x10^{-4}$	2,41
BSH02020	20	20,76	20	20	17,60	3000	$1,00x10^{-4}$	2,21
BSH02504	25	25,82	4	25	23,40	6000	$2,73x10^{-4}$	3,65
BSH02505	25	26,08	5	25	22,90	5800	$2,62x10^{-4}$	3,59
BSH02510	25	27,15	10	25	20,80	5800	$2,94x10^{-4}$	3,81
BSH02525	25	26,09	25	25	22,90	5000	$2,60x10^{-4}$	3,64
BSH03204	32	32,82	4	32	30,40	6000	$7,48x10^{-4}$	6,08
BSH03205	32	33,08	5	32	29,90	6000	$7,25x10^{-4}$	5,98
BSH03210	32	34,15	10	32	27,80	5900	$7,69x10^{-4}$	6,16
BSH03220	32	33,35	20	32	29,38	6000	$7,76x10^{-4}$	6,37
BSH03232	32	32,35	32	32	28,40	5000	$6,89x10^{-4}$	5,81
BSH04005	40	41,08	5	40	37,90	6000	$1,81x10^{-3}$	9,44
BSH04010	40	42,15	10	40	35,80	6000	$1,66x10^{-3}$	9,02
BSH04040	40	39,52	40	38	33,20	5500	$1,43x10^{-3}$	8,29
BSH05010	50	52,15	10	50	45,80	6000	$4,19x10^{-3}$	14,35
BSH05020	50	53,58	20	50	44,05	6000	$4,45x10^{-3}$	14,82
BSH05050	50	52,25	50	50	44,31	6000	$4,33x10^{-3}$	14,59
BSH06310	63	65,15	10	63	58,80	7000	$1,09x10^{-2}$	23,12
BSH06320	63	66,24	20	63	56,72	7000	$1,15x10^{-2}$	23,83
BSH08010	80	82,15	10	80	75,80	7000	$2,89x10^{-2}$	37,76
BSH08020	80	83,25	20	80	73,72	7000	$2,87x10^{-2}$	37,56
BSH10020	100	103,24	20	100	93,72	6000	$6,50x10^{-1}$	56,65

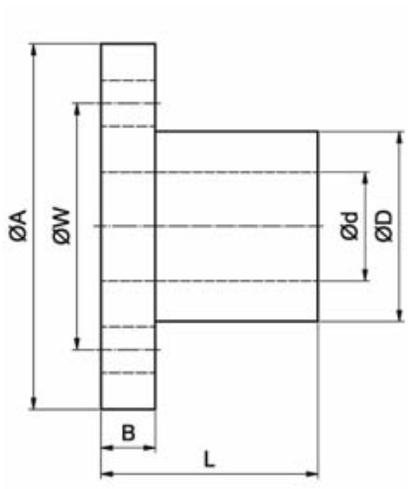
Nuts for ball screws

Type SK single miniature flange nut for rolled screws

Available from stock



Form B



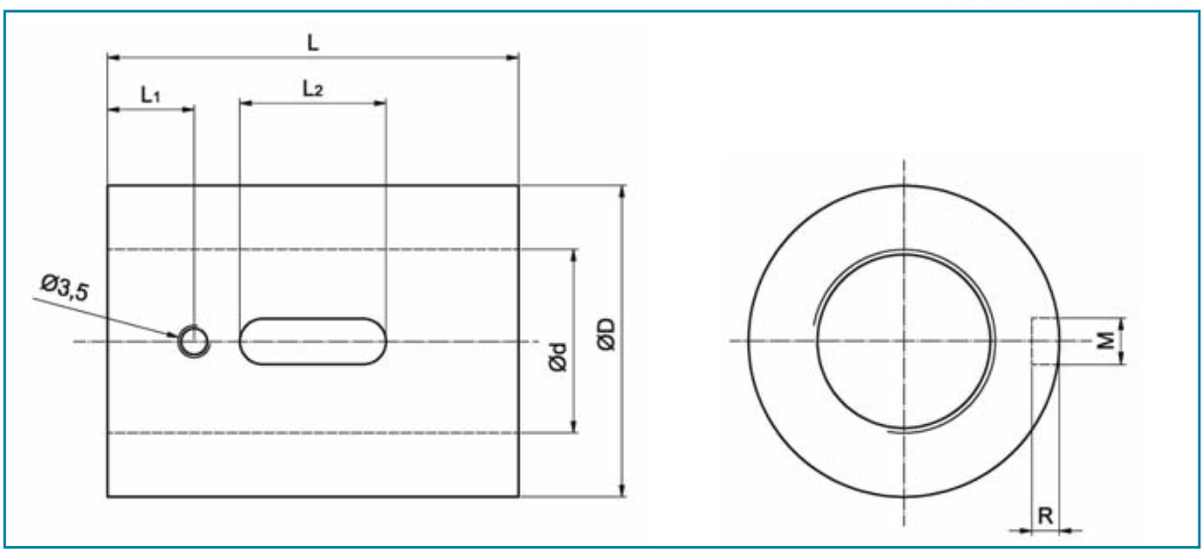
Size	Pitch	Dimensions [mm]													Qty *	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H ±0,10	X	Y	Z	Q		dyn. C_a	stat. C_{a0}	
601	R	6	1	0,800	12	24	3.5	15	18	16	3,4	-	-	-	3	716	1187	67
801	R	8	1	0,800	14	27	4	16	21	18	3,4	-	-	-	4	912	1697	105
802	R		2	1,200	14	27	4	16	21	18	3,4	-	-	-	3	1324	2206	80
1002	R	10	2	1,200	18	35	5	28	27	22	4,5	-	-	-	3	1814	2991	99
1004	R		4	2,000	26	46	10	34	36	28	4,5	8	4,5	M6	3	3874	5786	102
1202	R	12	2	1,200	20	37	5	28	29	24	4,5	-	-	-	4	1697	3109	158
1402	R	14	2	1,200	21	40	6	23	31	26	5,5	-	-	-	4	2815	6208	182

* Number of circuits

Ground on request.

Type CI single cylindrical nut for rolled screws

Available from stock



Size	Pitch	Dimensions [mm]									Qty *	Load capacities [N]		Rigidityty K, [N/µm]
		d	p	Ball ø	D g6	L	L1	L2	M	R		dyn. C_a	stat. C_{a0}	
01604-4	R	16	4	2,381	30	40	9	15	3	±0,05	1,5	4	6276	13141	157
01605-4	R/L		5	3,175	30	45	9	20	5	±0,05	3	4	7649	17554	196
02004-4	R	20	4	2,381	34	40	9	15	3	±0,05	1,5	4	6570	14514	245
02005-4	R/L		5	3,175	34	45	9	20	5	±0,05	3	4	11082	23340	245
02504-4	R	25	4	2,381	40	40	9	15	3	±0,05	1,5	4	7453	19123	304
02505-4	R/L		5	3,175	40	45	9	20	5	±0,05	3	4	12553	30499	343
02510-4	R		10	4,762	46	85	13	30	5	±0,05	3	4	19064	38020	324
03204-4	R	32	4	2,381	46	40	9	15	3	±0,05	1,5	4	8434	29910	392
03205-4	R/L		5	3,175	46	45	9	20	5	±0,05	3	4	14220	40698	392
03210-4	R		10	6,350	54	85	13	30	5	±0,05	3	4	33245	70314	392
04005-4	R/L	40	5	3,175	56	45	9	20	5	±0,05	3	4	15789	52269	481
04010-4	R/L		10	6,350	62	85	13	30	5	±0,05	3	4	38344	93359	490
05010-4	R	50	10	6,350	72	85	13	30	5	±0,05	3	4	43640	122583	637
06310-4	R	63	10	6,350	85	85	13	30	6	±0,05	3,5	4	49720	162790	785
08010-4	R	80	10	6,350	105	85	13	30	8	±0,10	4,5	4	55113	208882	883

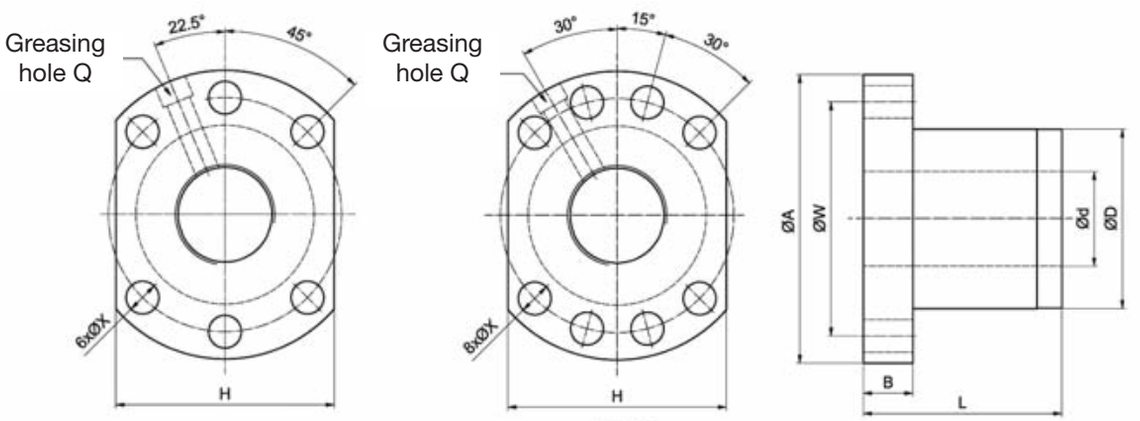
* Number of circuits

Ground on request.

Nuts for ball screws

Type SC single compact flange nut to DIN 69051, for rolled screws

Available from stock



up to 03232

Form B

from size 04005

Form B

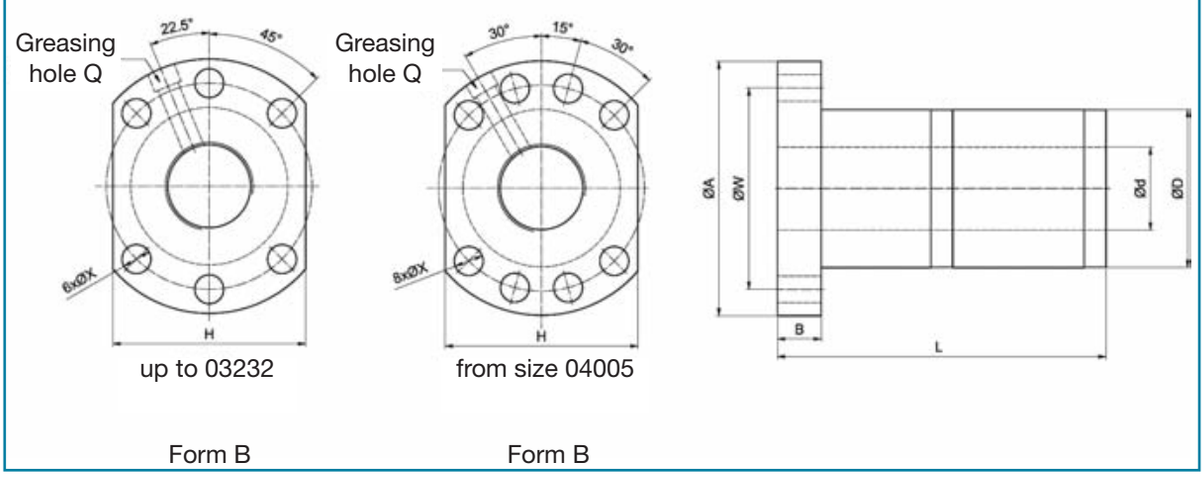
Size	Pitch	Dimensions [mm]												Qty *	Load capacities [N]		Rigidityty K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Q		dyn. C_a	stat. C_{a0}	
01205-2,8	R	12	5	2,500	24	40	10	31	32	30	±0,10	4,5		2,8x1	4256	7728	108
01605-3,8	R	15	5	2,778	28	48	10	38	38	40	±0,15	5,5	M6x1P	3,8x1	7159	14720	167
01610-2,8	R		10	2,778	28	48	10	47	38	40	±0,15	5,5	M6x1P	2,8x1	5403	10689	127
01616-1,8	R		16	2,778	28	48	10	45	38	40	±0,15	5,5	M6x1P	1,8x1	3560	6678	78
01616-2,8	R		16	2,778	28	48	10	61	38	40	±0,15	5,5	M6x1P	2,8x1	5198	10385	118
01620-1,8	R		20	2,778	28	48	10	57	38	40	±0,15	5,5	M6x1P	1,8x1	3570	6865	78
02005-3,8	R	20	5	3,175	36	58	10	40	47	44	±0,15	6,6	M6x1P	3,8x1	9561	21633	206
02010-3,8	R		10	3,175	36	58	10	60	47	44	±0,15	6,6	M6x1P	3,8x1	9767	22516	216
02020-1,8	R		20	3,175	36	58	11	57	47	44	±0,15	6,6	M6x1P	1,8x1	4923	10326	98
02020-2,8	R		20	3,175	36	58	11	77	47	44	±0,15	6,6	M6x1P	2,8x1	7198	16063	157
02505-3,8	R	25	5	3,175	40	62	10	40	51	48	±0,15	6,6	M6x1P	3,8x1	10630	27370	245
02510-3,8	R		10	3,175	40	62	12	62	51	48	±0,15	6.6	M6x1P	3,8x1	10552	27223	255
02525-1,8	R		25	3,175	40	62	12	70	51	48	±0,15	6,6	M6x1P	1,8x1	5433	12925	118
02525-2,8	R		25	3,175	40	62	12	95	51	48	±0,15	6,6	M6x1P	2,8x1	7943	20104	186
03205-3,8	R	32	5	3,175	50	80	12	42	65	62	±0,15	9,0	M6x1P	3,8x1	11856	35412	284
03210-3,8	R	31	10	3,969	50	80	13	62	65	62	±0,15	9,0	M6x1P	3,8x1	15857	42630	304
03220-2,8	R		20	3,969	50	80	12	80	65	62	±0,15	9,0	M6x1P	2,8x1	12288	32215	235
03232-1,8	R		32	3,969	50	80	13	84	65	62	±0,15	9,0	M6x1P	1,8x1	8100	20133	147
03232-2,8	R		32	3,969	50	80	13	116	65	62	±0,15	9,0	M6x1P	2,8x1	11846	31313	226
04005-3,8	R	40	5	3,175	63	93	15	45	78	70	±0,15	9,0	M8x1P	3,8x1	13004	44591	343
04010-3,8	R	38	10	6,350	63	93	14	63	78	70	±0,15	9,0	M8x1P	3,8x1	37736	98920	422
04020-2,8	R		20	6,350	63	93	14	82	78	70	±0,15	9,0	M8x1P	2,8x1	29675	75717	343
04040-1,8	R		40	6,350	63	93	14	105	78	70	±0,15	9,0	M8x1P	1,8x1	19378	46974	216
04040-2,8	R		40	6,350	63	93	14	145	78	70	±0,15	9,0	M8x1P	2,8x1	28331	73079	324
05005-3,8	R	50	5	3,175	75	110	15	45	93	85	±0,15	11,0	M8x1P	3,8x1	14220	56065	392
05010-3,8	R	48	10	6,350	75	110	18	68	93	85	±0,15	11,0	M8x1P	3,8x1	42257	126153	500
05020-3,8	R		50	6,350	75	110	18	108	93	85	±0,15	11,0	M8x1P	3,8x1	43090	130625	539

* Number of circuits

Ground on request.

Type DC double compact flange nut to DIN 69051, for rolled screws

Available from stock



Size	Pitch	Dimensions [mm]												Qty *	Load capacities [N]		Rigidityty K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Q		dyn. C_a	stat. C_{a0}	
01605-3,8	R	15	5	2,778	28	48	10	73	38	40	±0,15	5,5	M6x1P	3,8x1	7159	14720	333
01610-2,8	R		10	2,778	28	48	10	97	38	40	±0,15	5,5	M6x1P	2,8x1	5403	10689	245
02005-3,8	R	20	5	3,175	36	58	10	75	47	44	±0,15	6,6	M6x1P	3,8x1	9561	21633	412
02010-3,8	R		10	3,175	36	58	10	120	47	44	±0,15	6,6	M6x1P	3,8x1	9767	22516	431
02505-3,8	R	25	5	3,175	40	62	10	75	51	48	±0,15	6,6	M6x1P	3,8x1	10630	27370	490
02510-3,8	R		10	3,175	40	62	12	122	51	48	±0,15	6,6	M6x1P	3,8x1	10552	27223	500
03205-3,8	R	32	5	3,175	50	80	12	82	65	62	±0,15	9,0	M6x1P	3,8x1	11856	34431	588
03210-3,8	R	31	10	3,969	50	80	13	122	65	62	±0,15	9,0	M6x1P	3,8x1	15857	42630	618
03220-2,8	R		20	3,969	50	80	12	160	65	62	±0,15	9,0	M6x1P	2,8x1	12288	32215	471
04005-3,8	R	40	5	3,175	63	93	15	85	78	70	±0,15	9,0	M8x1P	3,8x1	13004	44591	696
04010-3,8	R	38	10	6,350	63	93	14	123	78	70	±0,15	9,0	M8x1P	3,8x1	37736	98527	853
04020-2,8	R		20	6,350	63	93	14	162	78	70	±0,15	9,0	M8x1P	2,8x1	29675	75717	677
05005-3,8	R	50	5	3,175	75	110	15	85	93	85	±0,15	11,0	M8x1P	3,8x1	14220	56065	814
05010-3,8	R	48	10	6,350	75	110	18	138	93	85	±0,15	11,0	M8x1P	3,8x1	42257	126153	1020
05020-3,8	R		20	6,350	75	110	18	218	93	85	±0,15	11,0	M8x1P	3,8x1	43090	130625	1089

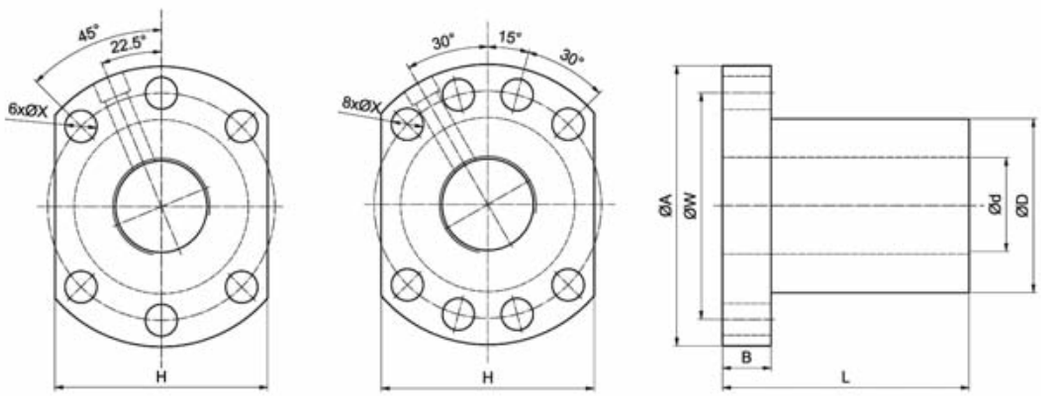
* Number of circuits

Ground on request.

Nuts for ball screws

Type SU single flange nut to DIN 69051, for rolled screws

Available from stock



up to 03210
Form B

from size 04005
Form B

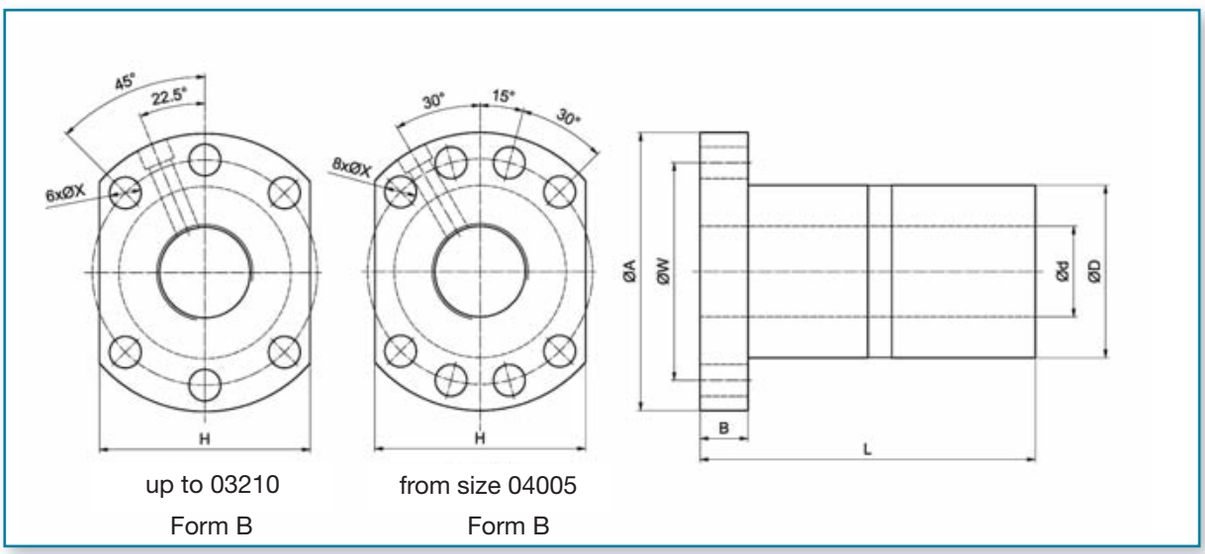
Size	Pitch	Dimensions [mm]												Qty *	Load capacities [N]		Rigidityty K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Q		dyn. C_a	stat. C_{a0}	
01604-4	R	16	4	2,381	28	48	10	40	38	40	±0,15	5,5	M6	4	6168	12454	343
01605-4	R/L		5	3,175	28	48	10	50	38	40	±0,15	5,5	M6	4	7649	17554	196
01610-3	R		10	3,175	28	48	10	57	38	40	±0,15	5,5	M6	3	7071	12249	147
02004-4	R	20	4	2,381	36	58	10	42	47	44	±0,15	6,6	M6	4	6855	15857	402
02005-4	R/L		5	3,175	36	58	10	51	47	44	±0,15	6,6	M6	4	11082	23340	245
02504-4	R	25	4	2,381	40	62	10	42	51	48	±0,15	6,6	M6	4	7620	20123	471
02505-4	R/L		5	3,175	40	62	10	51	51	48	±0,15	6,6	M6	4	12553	30499	343
02510-4	R		10	4,762	40	62	12	85	51	48	±0,15	6,6	M6	4	19064	38020	324
03204-4	R	32	4	2,381	50	80	12	44	65	62	±0,15	9,0	M6	4	8542	26095	549
03205-4	R/L		5	3,175	50	80	12	52	65	62	±0,15	9,0	M6	4	14220	40698	392
03210-4	R/L		10	6,350	50	80	12	90	65	62	±0,15	9,0	M6	4	33245	70314	775
04005-4	R/L	40	5	3,175	63	93	14	55	78	70	±0,15	9,0	M8	4	15789	52269	481
04010-4	R/L		10	6,350	63	93	14	93	78	70	±0,15	9,0	M8	4	38344	93359	490
05010-4	R/L	50	10	6,350	75	110	16	93	93	85	±0,15	11,0	M8	4	43640	122583	637
06310-4	R	63	10	6,350	90	125	18	98	108	95	±0,15	11,0	M8	4	49720	162790	785
06320-4	R		20	9,525	95	135	20	149	115	100	±0,15	13,5	M8	4	74266	233987	825
08010-4	R	80	10	6,350	105	145	20	98	125	110	±0,15	13,5	M8	4	55113	208882	883
08020-4	R		20	9,525	125	165	25	154	145	130	±0,20	13,5	M8	4	83209	302976	825

* Number of circuits

Ground on request.

Type DU double flange nut to DIN 69051, for rolled screws

Available from stock



up to 03210
Form B

from size 04005
Form B

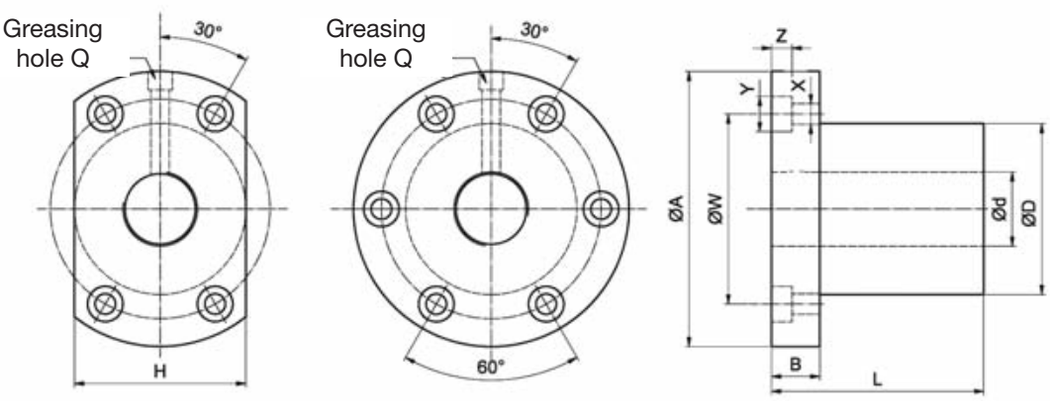
Size	Pitch	Dimensions [mm]												Qty *	Load capacities [N]		Rigidityty K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Q		dyn. C_a	stat. C_{a0}	
01604-4	R	16	4	2,381	28	48	10	80	38	40	±0,15	5,5	M6	4	6168	12454	416
01605-4	R/L		5	3,175	28	48	10	100	38	40	±0,15	5,5	M6	4	7649	17554	423
01610-3	R		10	3,175	28	48	10	118	38	40	±0,15	5,5	M6	3	7071	12249	317
02004-4	R	20	4	2,381	36	58	10	80	47	44	±0,15	6,6	M6	4	6855	15857	515
02005-4	R/L		5	3,175	36	58	10	101	47	44	±0,15	6,6	M6	4	11082	23340	522
02504-4	R	25	4	2,381	40	62	10	80	51	48	±0,15	6,6	M6	4	7620	20123	638
02505-4	R/L		5	3,175	40	62	10	101	51	48	±0,15	6,6	M6	4	12553	30499	645
02510-4	R		10	4,762	40	62	12	145	51	48	±0,15	6,6	M6	4	19064	38020	659
03204-4	R	32	4	2,381	50	80	12	80	65	62	±0,15	9,0	M6	4	8542	26095	812
03205-4	R/L		5	3,175	50	80	12	102	65	62	±0,15	9,0	M6	4	14220	40698	819
03210-4	R/L		10	6,350	50	80	12	162	65	62	±0,15	9,0	M6	4	33245	70314	845
04005-4	R/L	40	5	3,175	63	93	14	105	78	70	±0,15	9,0	M8	4	15789	52269	1017
04010-4	R/L		10	6,350	63	93	14	165	78	70	±0,15	9,0	M8	4	38344	93359	1043
05010-4	R/L	50	10	6,350	75	110	16	171	93	85	±0,15	11,0	M8	4	43640	122583	1291
06310-4	R	63	10	6,350	90	125	18	182	108	95	±0,15	11,0	M8	4	49720	162790	1613
06320-4	R		20	9,525	95	135	20	290	115	100	±0,15	13,5	M8	4	74266	233987	1640
08010-4	R	80	10	6,350	105	145	20	182	125	110	±0,15	13,5	M8	4	55113	208882	2034
08020-4	R		20	9,525	125	165	25	295	145	130	±0,20	13,5	M8	4	83209	302976	2060

* Number of circuits

Ground on request.

Nuts for ball screws

Type SV single compact flange nut, for rolled screws



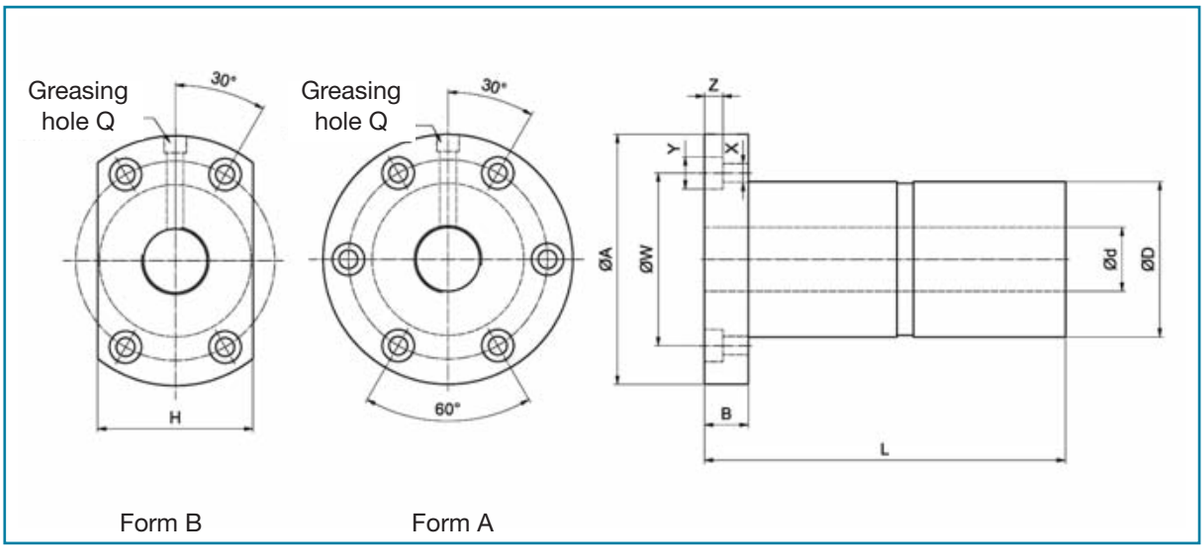
Form B Form B

Size	Pitch	Dimensions [mm]														Qty*	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Y	Z	Q		dyn. C_a	stat. C_{a0}	
01205-2,8	R	12	5	2,500	30	50	10	42	40	32	±0,15	4,5	8	4,5	M6	2,8x1	4256	7728	127
01210-2,7	R	12	10	2,500	30	50	10	53	40	32	±0,15	4,5	8	4,5	M6	2,7x1	4011	7286	98
01604-3,8	R	16	4	2,381	34	57	11	45	45	34	±0,15	5,5	9,5	5,5	M6	3,8x1	5982	13406	177
01605-4,8	R		5	3,175	40	63	11	58	51	42	±0,15	5,5	9,5	5,5	M6	4,8x1	10395	21516	216
01610-2,7	R		10	3,175	40	63	11	56	51	42	±0,15	5,5	9,5	5,5	M6	2,7x1	6492	12700	167
02004-4,8	R	20	4	2,381	40	60	10	50	50	40	±0,15	4.5	8	4	M6	4,8x1	8022	21016	255
02005-4,8	R		5	3,175	44	67	11	57	55	52	±0,15	5,5	9,5	5,5	M6	4,8x1	11690	27321	265
02020-1,8	R		20	3,175	46	74	13	70	59	46	±0,15	6,6	11	6,5	M6	1,8x1	4923	10326	127
02505-4,8	R	25	5	3,175	50	73	11	55	61	52	±0,15	5,5	9,5	5,5	M8	4,8x1	12994	34578	382
02510-2,7	R		10	6,350	68	102	15	70	84	82	±0,15	9	14	8,5	M8	2,7x1	22781	46258	226
02525-1,8	R		25	3,175	50	73	13	83	61	52	±0,15	9,5	5,5	5,5	M8	1,8x1	5433	12925	157
03204-4,8	R	32	4	2,381	54	81	12	50	67	64	±0,15	6,6	11	6,5	M6	4,8x1	9767	31166	353
03205-4,8	R		5	3,175	58	85	12	56	71	64	±0,15	6,6	11	6,5	M8	4,8x1	14484	44728	373
03210-4,8	R		10	6,350	74	108	15	96	90	82	±0,15	9	14	9	M8	4,8x1	42129	103519	588
04005-4,8	R	40	5	3,175	67	101	15	59	83	72	±0,15	9	14	8,5	M8	4,8x1	15897	56320	431
04010-4,8	R		10	6,350	82	124	18	100	102	94	±0,15	11	17,5	11	M8	4,8x1	47347	131439	569
04020-2,7	R		20	6,350	82	124	18	100	102	90	±0,15	11	17,5	11	M8	2,7x1	29489	76972	343
05005-4,8	R	50	5	3,175	80	114	15	60	96	82	±0,15	9	14	8,5	M8	4,8x1	17387	70824	500
05010-4,8	R		10	6,350	93	135	16	93	113	98	±0,15	11	17,5	11	M8	4,8x1	52642	166321	667
05020-2,7	R		20	9,525	105	152	28	121	128	110	±0,15	14	20	13	M8	2,7x1	54996	139205	422
06310-4,8	R	63	10	6,350	108	154	22	105	130	110	±0,15	14	20	13	M8	4,8x1	58918	215030	794
06320-2,7	R		20	9,525	122	180	28	120	150	130	±0,20	18	26	17,5	M8	2,7x1	61184	174833	628
08010-4,8	R	80	10	6,350	130	176	22	105	152	132	±0,20	14	26	13	M8	4,8x1	64410	270958	1157
08020-4,8	R		20	9,525	143	204	28	180	172	148	±0,20	18	26	18	M8	4,8x1	113208	404877	1049
08020-7,6	R		20	9,525	143	204	28	240	172	148	±0,20	18	26	18	M8	3,8x2	168076	641061	1628

* Number of circuits

Ground on request.

Type DC double compact flange nut, for rolled screws



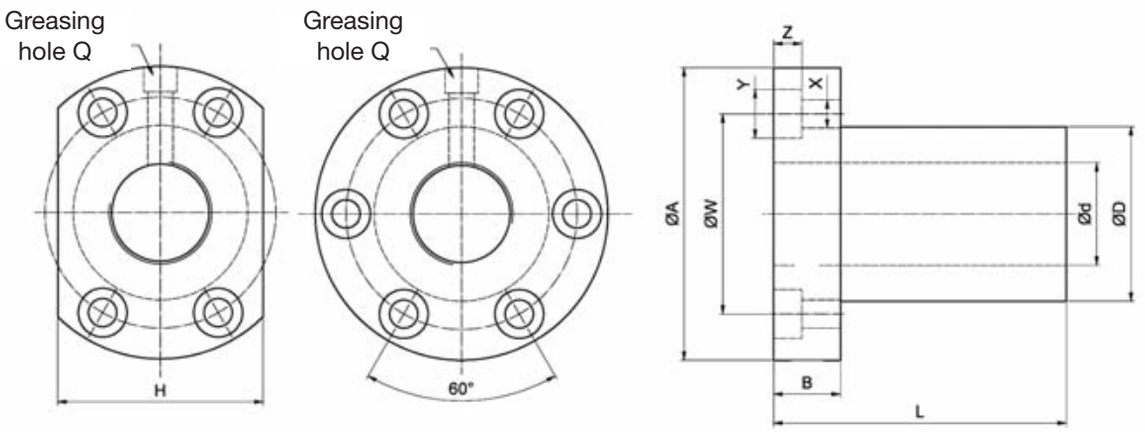
Size	Pitch	Dimensions [mm]														Qty *	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Y	Z	Q		dyn. C_a	stat. C_{a0}	
01604-3,8	R	16	4	2,381	34	57	11	89	45	34	±0,15	5,5	9,5	5,5	M6	3,8x1	5982	13406	343
01605-4,8	R		5	3,175	40	63	11	113	51	42	±0,15	5,5	9,5	5,5	M6	4,8x1	10395	21516	431
01610-2,7	R		10	3,175	40	63	11	106	51	42	±0,15	5,5	9,5	5,5	M6	2,7x1	6492	12700	265
02004-4,8	R	20	4	2,381	40	60	10	94	50	40	±0,15	4,5	8	4	M6	4,8x1	8022	21016	510
02005-4,8	R		5	3,175	44	67	11	112	55	52	±0,15	5,5	9,5	5,5	M6	4,8x1	11690	27321	520
02505-4,8	R	25	5	3,175	50	73	11	105	61	52	±0,15	5,5	9,5	5,5	M8	4,8x1	12994	34578	618
02510-2,7	R		10	6,350	68	102	15	130	84	82	±0,15	9,0	14	8,5	M8	2,7x1	22781	46258	461
03204-4,8	R	32	4	2,381	54	81	12	94	67	64	±0,15	6,6	11	6,5	M6	4,8x1	9767	31166	716
03205-4,8	R		5	3,175	58	85	12	106	71	64	±0,15	6,6	11	6,5	M8	4,8x1	14484	44728	745
03210-4,8	R		10	6,350	74	108	15	189	90	82	±0,15	9,0	14	9	M8	4,8x1	42129	103519	941
04005-4,8	R	40	5	3,175	67	101	15	109	83	72	±0,15	9,0	14	8,5	M8	4,8x1	15897	56320	883
04010-4,8	R		10	6,350	82	124	18	188	102	94	±0,15	11,0	17,5	11	M8	4,8x1	47347	131439	1128
04020-2,7	R		20	6,350	82	124	18	200	102	90	±0,15	11,0	17,5	11	M8	2,7x1	29489	76972	686
05005-4,8	R	50	5	3,175	80	114	15	115	96	82	±0,15	9,0	14	8,5	M8	4,8x1	17387	70824	1030
05010-4,8	R		10	6,350	93	135	16	173	113	98	±0,15	11,0	17,5	11	M8	4,8x1	52642	166321	1344
05020-2,7	R		20	9,525	105	152	28	221	128	110	±0,15	14,0	20	13	M8	2,7x1	54996	139205	843
06310-4,8	R	63	10	6,350	108	154	22	195	130	110	±0,15	14,0	20	13	M8	4,8x1	58918	215030	1618
06320-2,7	R		20	9,525	122	180	28	220	150	130	±0,20	18,0	26	17,5	M8	2,7x1	61184	174833	1000
08010-4,8	R	80	10	6,350	130	176	22	195	152	132	±0,20	14,0	26	13	M8	4,8x1	64410	270958	1902
08020-4,8	R		20	9,525	143	204	28	340	172	148	±0,20	18,0	26	18	M8	4,8x1	113208	404877	2108
08020-7,6	R		20	9,525	143	204	28	460	172	148	±0,20	18,0	26	18	M8	3,8x2	168076	641061	3275

* Number of circuits

Ground on request.

Nuts for ball screws

SI type single flange nut, for rolled screws



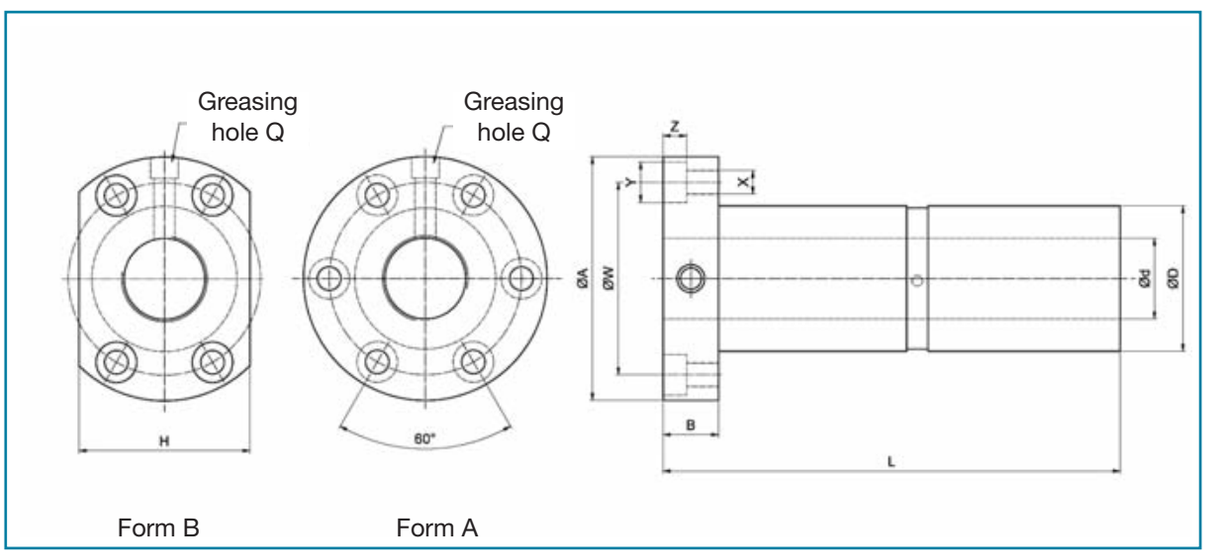
Form B Form A

Size	Pitch	Dimensions [mm]														Qty *	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Y	Z	Q		dyn. C_a	stat. C_{a0}	
01604-4	R	16	4	2,381	30	49	10	45	39	34	±0,15	4,5	8,0	4,5	M6	4	6276	13141	157
01605-4	R/L		5	3,175	30	49	10	50	39	34	±0,15	4,5	8,0	4,5	M6	4	7649	17554	196
01610-3	R		10	3,175	34	58	10	57	45	34	±0,15	5,5	9,5	5,5	M6	3	8169	12249	147
02004-4	R	20	4	2,381	34	57	11	46	45	40	±0,15	5,5	9,5	5,5	M6	4	6570	14514	245
02005-4	R/L		5	3,175	34	57	11	51	45	40	±0,15	5,5	9,5	5,5	M6	4	11082	23340	245
02504-4	R	25	4	2,381	40	63	11	46	51	46	±0,15	5,5	9,5	5,5	M6	4	7453	19123	304
02505-4	R/L		5	3,175	40	63	11	51	51	46	±0,15	5,5	9,5	5,0	M8	4	12553	30499	343
02510-4	R		10	4,762	46	72	12	85	58	52	±0,15	6,5	11,0	6.5	M6	4	19064	38020	324
03204-4	R	32	4	2,381	46	72	12	47	58	52	±0,15	6,5	11,0	6.5	M6	4	8434	29910	392
03205-4	R/L		5	3,175	46	72	12	52	58	52	±0,15	6,5	11,0	6,0	M8	4	14220	40698	392
03210-4	R/L		10	6,350	54	88	15	90	70	62	±0,15	9,0	14,0	8,5	M8	4	33245	70314	392
04005-4	R/L	40	5	3,175	56	90	15	55	72	64	±0,15	9,0	14,0	8,5	M8	4	15789	52269	481
04010-4	R/L		10	6,350	62	104	18	93	82	70	±0,15	11,0	17,5	11,0	M8	4	38344	93359	490
05010-4	R/L	50	10	6,350	72	114	18	93	92	82	±0,15	11,0	17,5	11,0	M8	4	43640	122583	637
06310-4	R	63	10	6,350	85	131	22	98	107	95	±0,15	14,0	20,0	13,0	M8	4	49720	162790	785
08010-4	R	80	10	6,350	105	150	22	98	127	115	±0,15	14,0	20,0	13,0	M8	4	55113	208882	883

* Number of circuits

Ground on request.

Type DI double flange nut, for rolled screws



Size	Pitch	Dimensions [mm]													Qty *	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	B	L	W	H		X	Y	Z	Q		dyn. C_a	stat. C_{a0}	
01604-4	R	16	4	2,381	30	49	10	80	39	34	±0,15	4,5	8	4,5	M6	4	6276	13141	343
01605-4	R/L		5	3,175	30	49	10	100	39	34	±0,15	4,5	8	4,5	M6	4	7649	17554	353
02004-4	R	20	4	2,381	34	57	11	80	45	40	±0,15	5,5	9,5	5,5	M6	4	6570	14514	402
02005-4	R/L		5	3,175	34	57	11	101	45	40	±0,15	5,5	9,5	5,5	M6	4	11082	23340	441
02504-4	R	25	4	2,381	40	63	11	80	51	46	±0,15	5,5	9,5	5,5	M6	4	7453	19123	471
02505-4	R/L		5	3,175	40	63	11	101	51	46	±0,15	5,5	9,5	5,5	M8	4	12553	30499	618
02510-4	R		10	4,762	46	72	12	145	58	52	±0,15	6,5	11	6,5	M6	4	19064	38020	637
03204-4	R	32	4	2,381	46	72	12	80	58	52	±0,15	6,5	11	6,5	M6	4	8434	29910	549
03205-4	R/L		5	3,175	46	72	12	102	58	52	±0,15	6,5	11	6,5	M8	4	14220	40698	706
03210-4	R/L		10	6,350	54	88	15	162	70	62	±0,15	9,0	14	8,5	M8	4	33245	70314	706
04005-4	R/L	40	5	3,175	56	90	15	105	72	64	±0,15	9,0	14	8,5	M8	4	15789	52269	961
04010-4	R/L		10	6,350	62	104	18	165	82	70	±0,15	11,0	17,5	11	M8	4	38344	93359	883
05010-4	R/L	50	10	6,350	72	114	18	171	92	82	±0,15	11,0	17,5	11	M8	4	43640	122583	1147
06310-4	R	63	10	6,350	85	131	22	182	107	95	±0,15	14,0	20	13	M8	4	49720	162790	1118
08010-4	R	80	10	6,350	105	150	22	182	127	115	±0,15	14,0	20	13	M8	4	55113	208882	1589

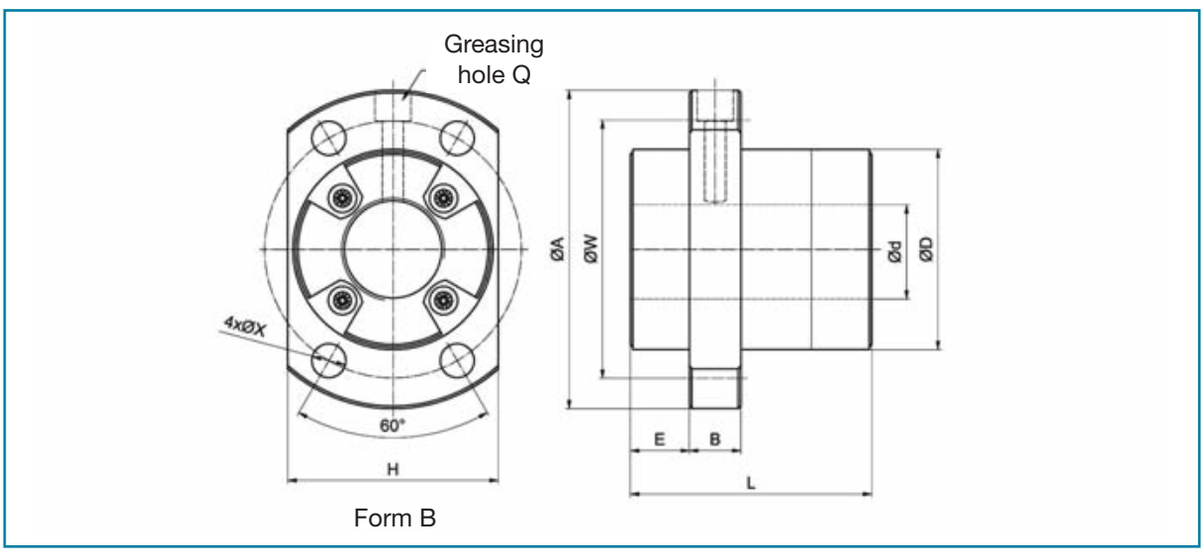
* Number of circuits

Ground on request.

Nuts for ball screws

Type SE single wide pitch nut for rolled screws

Available from stock



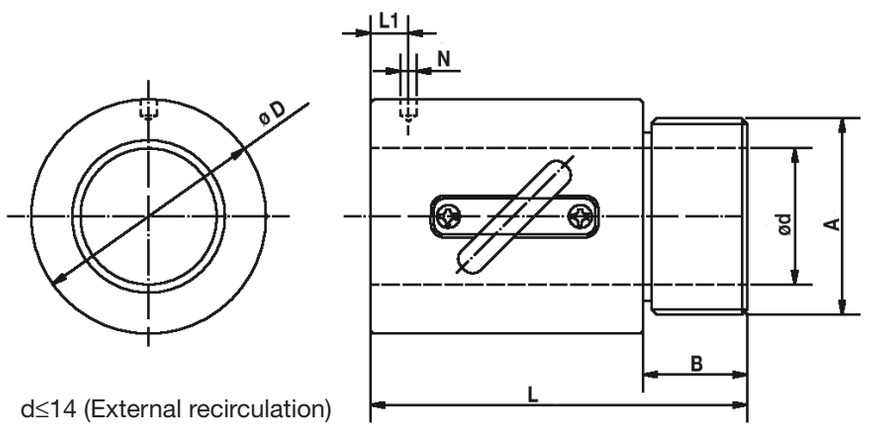
Form B

Size	Pitch	Dimensions [mm]												Qty *	Load capacities [N]		Rigidity K, [N/µm]
		d	p	Ball ø	D g6	A	E	B	L	W	H		X	Q		dyn. C_a	stat. C_{a0}	
01616-3	R	16	16	2,778	32	53	10,1	10	38	42	34	±0,15	4,5	M6	1,7x2	6374	12553	186
01616-6	R			2,778	32	53	10,1	10	38	42	34	±0,15	4,5	M6	1,7x4	11572	25007	353
02020-3	R	20	20	3,175	39	62	11,5	10	47	50	41	±0,15	5,5	M6	1,7x2	9611	20986	245
02020-6	R			3,175	39	62	11,5	10	47	50	41	±0,15	5,5	M6	1,7x4	17456	41972	481
02525-3	R	25	25	3,969	47	74	13	12	57	60	49	±0,15	6,6	M6	1,7x2	14416	32852	304
02525-6	R			3,969	47	74	13	12	57	60	49	±0,15	6,6	M6	1,7x4	26086	65606	588
02550-3	R		50	3,969	46	70	13	12	50	58	48	±0,15	6,6	M6	0,7x2	6718	13533	304
02550-6	R			3,969	46	70	13	12	50	58	48	±0,15	6,6	M6	0,7x4	13435	27066	588
03232-3	R	32	32	4,762	58	92	16	12	71	74	60	±0,15	9,0	M6	1,7x2	20986	51583	392
03232-6	R			4,762	58	92	16	12	71	74	60	±0,15	9,0	M6	1,7x4	38148	102970	745
04040-3	R	40	40	6,350	73	114	19	15	89	93	75	±0,15	11,0	M6	1,7x2	33441	86495	481
04040-6	R			6,350	73	114	19	15	89	93	75	±0,15	11,0	M6	1,7x4	60801	172597	932
05050-3	R	50	50	7,938	90	135	21,5	20	107	112	92	±0,15	14,0	M6	1,7x2	50014	135332	588
05050-6	R			7,938	90	135	21,5	20	107	112	92	±0,15	14,0	M6	1,7x4	71196	270664	1147

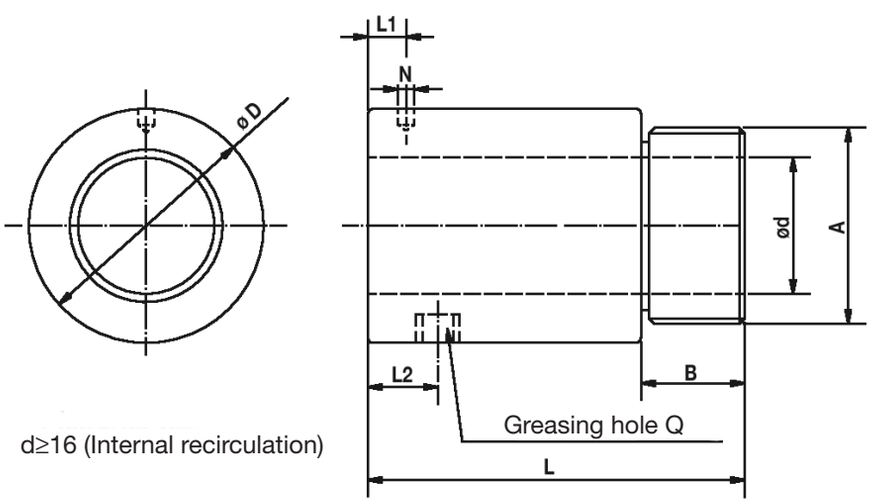
* Number of circuits

Ground on request.

Type SH single threaded nose nuts for rolled screws



d≤14 (External recirculation)



d≥16 (Internal recirculation)

Size	Pitch	Dimensions [mm]											Qty *	Load capacities [N]	
		d	p	Ball ø	D	A	B	L	L1	N	L2	Q		dyn. C_a	stat. C_{a0}
1002	R	10	2	1,20	19,5	M17x1P	7,5	22,0	3,0	3,2	-	-	3,5x1	2177	3923
1004	R		4	2,00	25,0	M20x1P	10,0	34,0	3,0	3,0	-	-	2,5x1	3305	4825
1204	R	12	4	2,50	25,5	M20x1P	10,0	34,0	13,0	3,0	-	-	3,5x1	4168	7237
1205	R		5	2,50	25,5	M20x1P	10,0	39,0	16,25	3,0	-	-	3,5x1	6374	9728
1404	R	14	4	2,38	32,1	M25x1,5P	10,0	35,0	13,0	3,0	-	-	3,5x1	3119	4756
1604	R	16	4	2,38	29,0	M22x1,5P	8,0	32,0	4,0	3,2	-	-	1x3	4815	9336
1605	R		5	3,18	32,5	M26x1,5P	12,0	42,0	19,25	3,0	-	-	1x3	7022	12062
2005	R	20	5	3,18	38,0	M35x1,5P	15,0	45,0	20,30	3,0	-	-	1x3	7836	15465
2505	R	25	5	3,18	43,0	M40x1,5P	19,0	69,0	32,11	3,0	8	M6	1x4	12553	30499

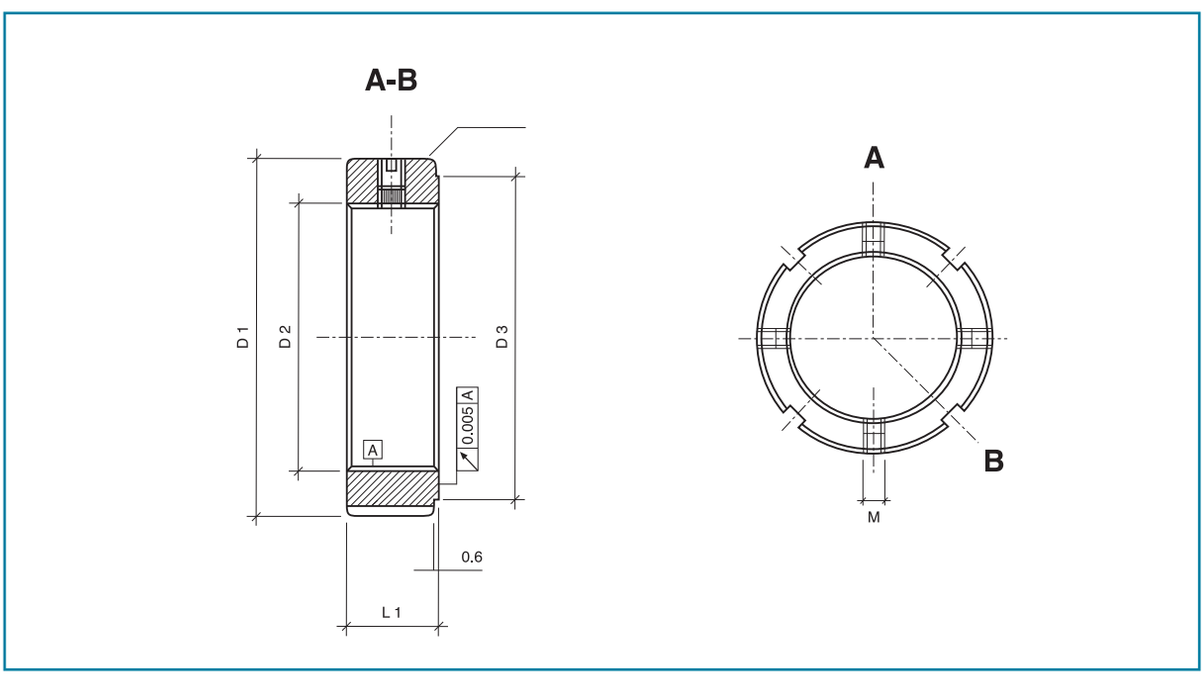
* Number of circuits

Precision self-locking nuts

Precision nuts enable the preloading of support bearing assemblies. These nuts are machined in a single operation to 0.002 mm between the thread and nut contact faces which provides a positive fit. Two machined locking inserts provide optimum locking of the nut.

Material:

Burnished high-strength steel (Strength: 1,000 N/mm²)



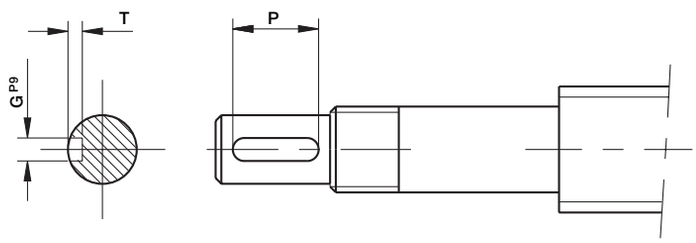
Pitch	Reference	Dimensions [mm]				Tightening torque [Nm]	Mass [kg]
		D1	L1	D3	M		
M20x1	B20/1	32	10	28	M5	4-5	0,04
M20x1,5	B20/1,5	32	10	28	M5	4-5	0,04
M25x1,5	B 25	38	12	33	M5	4-5	0,06
M30x1,5	B 30	45	12	40	M5	4-5	0,08
M40x1,5	B 40	58	14	52	M6	8-10	0,15
M50x1,5	B 50	70	14	64	M6	8-10	0,20
M60x2	B 60	80	16	73	M8	16-18	0,27
M80x2	B 80	105	18	95	M8	16-18	0,49

Special products on request.

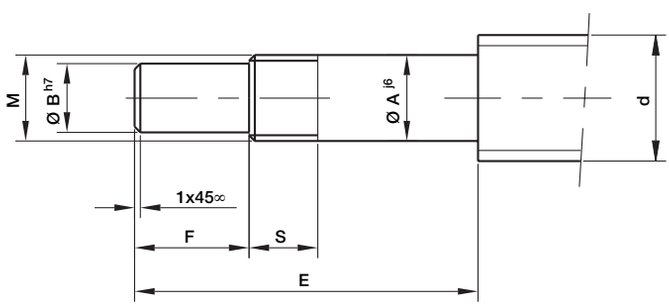
Standard end machining of shafts

Machining for fixed bearings

Typ F2



Typ F1

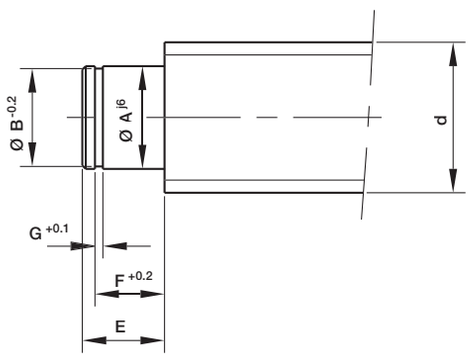


Dimensions							Typ F2 (with cotter pin)			
d	A	B	E	F	M	S	G	T	P	Housing reference
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
6	4	3	28	5	M4x0,5	7	-	-	-	-
8	5	4	31	6	M5x0,5	7	-	-	-	EK5
10	6	4	38	8	M6x0,75	8	-	-	-	EK6
12	8	6	44	9	M8x1	10	-	-	-	EK8
16	12	10	54	15	M12x1	14	3	1,8	12	BK12
20	15	12	60	20	M15x1	15	4	2,5	16	BK15
25	17	15	76	23	M17x1	20	5	3,0	21	BK17
32	25	20	95	30	M25x1,5	18	6	3,5	25	BK25
40	30	25	110	38	M30x1,5	25	8	4,0	32	BK30
50	40	35	148	50	M40x1,5	35	10	5,0	45	BK40

Special products on request.

Machining for supported housing

Form S1



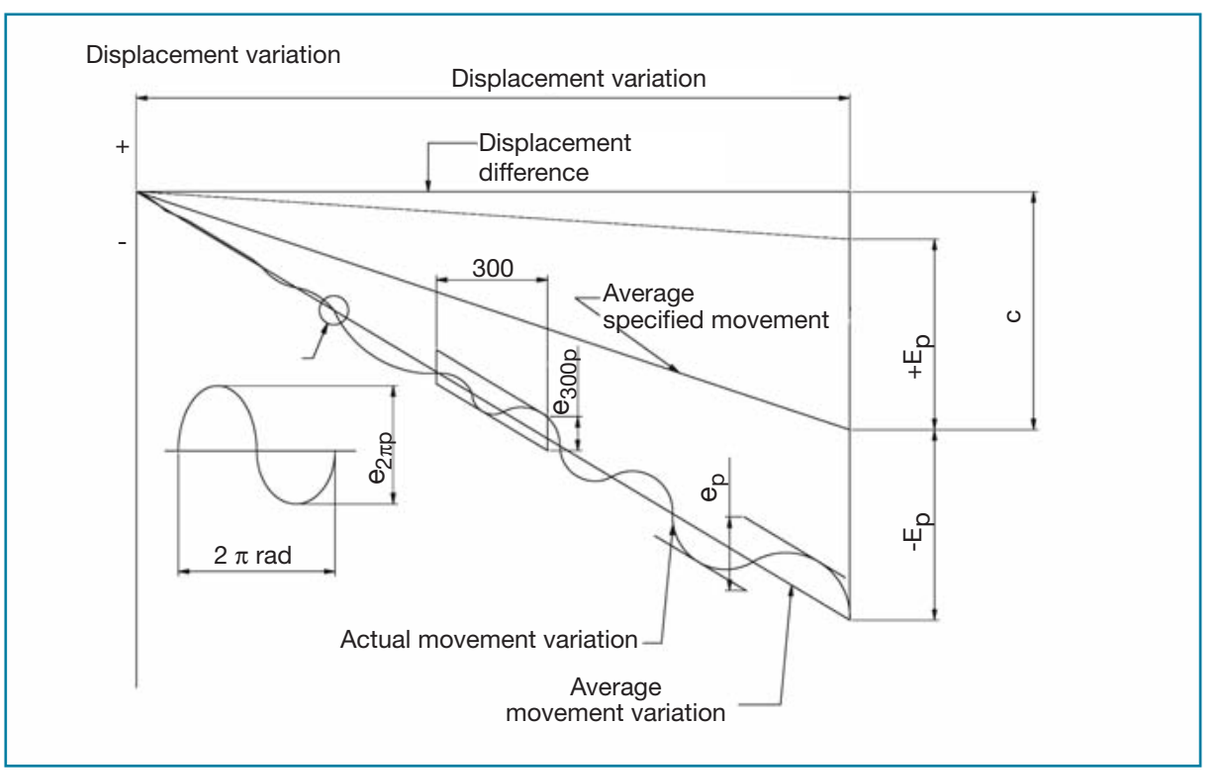
Groove dimensions						Housing reference
d	A	E	B	G	F	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
16	10	11	9,6	1,15	9,15	BF10
20	15	13	14,3	1,15	10,15	BF15
25	17	16	16,2	1,15	13,15	BF17
32	25	20	23,9	1,35	16,35	BF25
40	30	21	28,6	1,75	17,75	BF30
50	40	24	38,0	1,95	19,95	BF40

Special products on request.

Tolerance classes

Pitch precision and movement variation

Tolerance classes for SNR ball screws are defined in accordance with DIN standard 69051
Tolerance classes T0 to T5 are defined according to the average precision of the pitch and the tolerance applied to the movement variation over the whole of the usable stroke (l_u).
In the case of tolerance classes T7 to T10, the average difference is measured along a length of 300 mm at any point on the ball screw.



c	Compensation for movement over the usable stroke. Difference between the specified and the nominal movement. To be defined by the user (e.g. to compensate for expansion). Standard c=0
E_p	Average limit of difference tolerated between the specified and actual movements
e_p	Difference in movement variation on a specific stroke
e_{300p}	Difference in movement variation tolerated on a 300 mm stroke
$e_{2\pi p}$	Difference in movement variation tolerated on a screw revolution
l_u	Usable stroke (equal to the possible stroke increased by the length of the nut)

Tolerance class

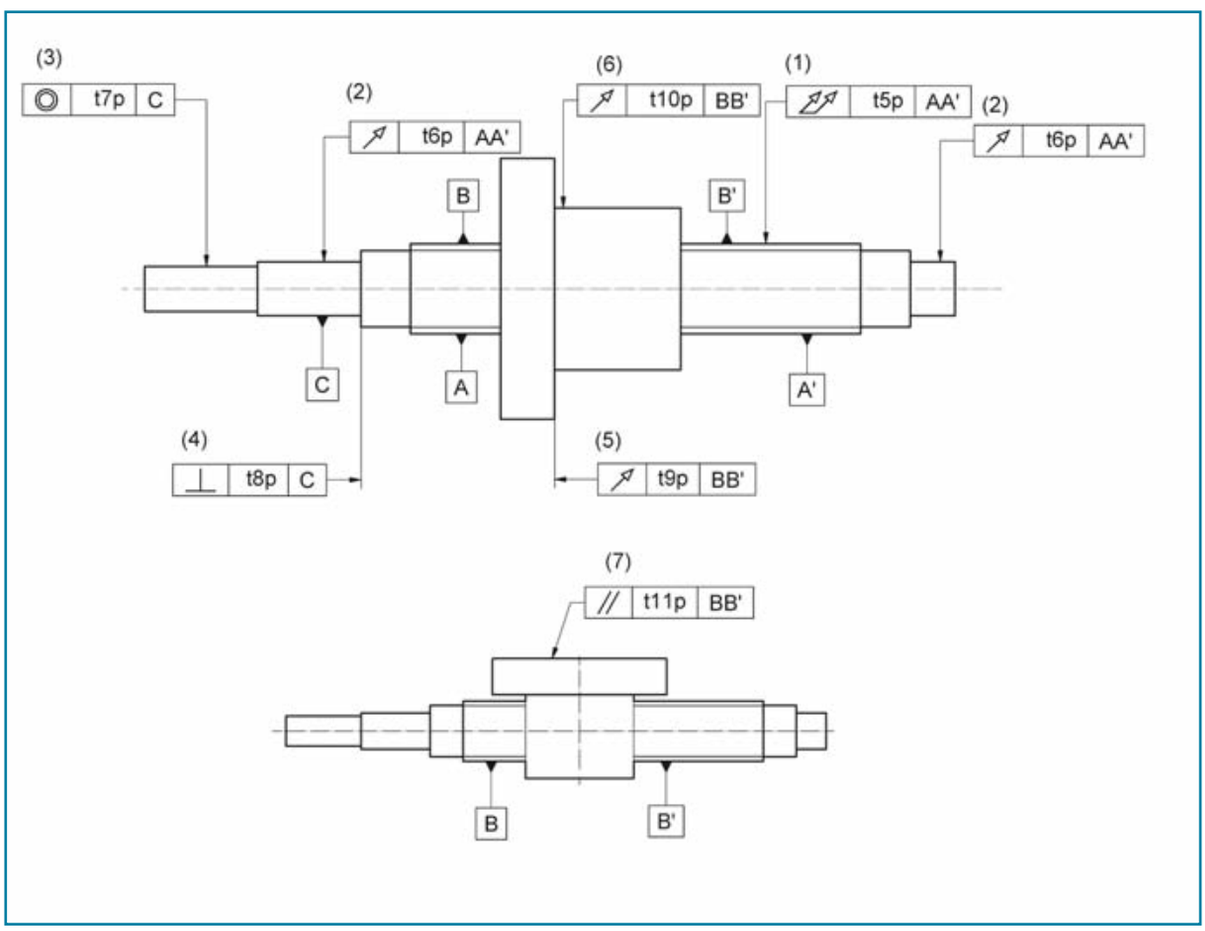
Tolerance class			T0		T1		T2		T3		T5		T7	T10
Screw length [mm]	Up	to	±E	±e	±E	±e	±E	±e	±E	±e	±E	±e	±e	±e
		100	3	3	3,5	5	5	7	8	8	18	18		
	100	200	3,5	3	4,5	5	7	7	10	8	20	18		
	200	315	4	3,5	6	5	8	7	12	8	23	18		
	315	400	5	3,5	7	5	9	7	13	10	25	20		
	400	500	6	4	8	5	10	7	15	10	27	20		
	500	630	6	4	9	6	11	8	16	12	30	23		
	630	800	7	5	10	7	13	9	18	13	35	25		
	800	1000	8	6	11	8	15	10	21	15	40	27		
	1000	1250	9	6	13	9	18	11	24	16	46	30		
	1250	1600	11	7	15	10	21	13	29	18	54	35	52/300mm	210/300mm
	1600	2000			18	11	25	15	35	21	65	40		
	2000	2500			22	13	30	18	41	24	77	46		
	2500	3150			26	15	36	21	50	29	93	54		
	3150	4000			30	18	44	25	60	35	115	65		
	4000	5000					52	30	72	41	140	77		
	5000	6300					65	36	90	50	170	93		
	6300	8000							110	60	210	115		
	8000	1000									260	140		
	10000	12500									320	170		

Tolerance of the variation in movement for a 300 mm stroke and for a screw revolution (international standards).

Tolerance class	T0	T1	T2	T3	T5	T7	T10
e300 DIN, ISO		6		12	23	52	210
e300 JIS B 1192	3,5	5	7	8	18	50	210
e2x	2,5	4	5	6	8		

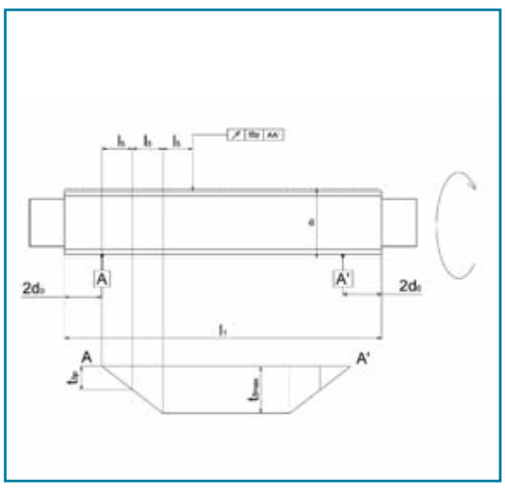
Manufacturing tolerances

These tolerances are defined according to DIN standard 69051, Section 3.



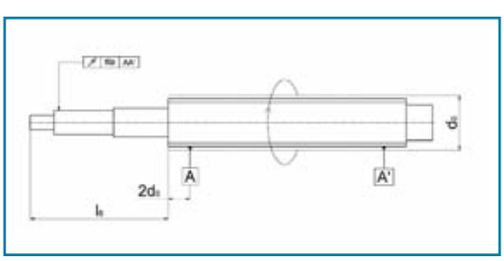
Geometric tolerances according to DIN 69051, section 5

(1) T5 radial movement of the external diameter of the screw in relation to the reference axis AA'



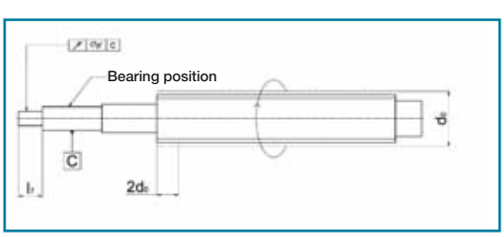
Nominal diameter d_0		l_5	t_{5p} in µm per l_5 interval per tolerance class				
Above	to		1	3	5	7	10
6	12	80	20	25	32	40	80
12	25	160					
25	50	315					
50	100	630					
100	200	1250					
$l_1 l_d$			t_{5max} in µm for $l_1 \geq 4l_5$ per tolerance class				
Above	to		1	3	5	7	10
	40		40	50	64	80	60
40	60		60	75	96	120	240
60	80		100	125	160	200	400
80	100		160	200	256	320	640

(2) T6 radial movement of the external diameter of the bearing seat in relation to axis AA' for $l_6 \leq l$. For $l_6 > l$ apply $t_{6a} \leq t_{6p} * \frac{l_6}{l}$



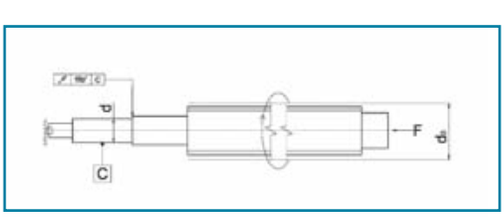
Nominal diameter d_0		Reference length l	t_{6p} in µm for $l_6 < l$ per tolerance class				
Above	to		1	3	5	7	10
6	20	80	10	12	20	40	63
20	50	125	12	16	25	50	80
50	125	200	16	20	32	63	100
125	200	315	-	25	40	80	125

(3) T7 radial movement of the screw end diameter in relation to the diameter of the bearing seat for $l_7 \leq l$. For $l_7 > l$ apply $t_{7a} \leq t_{7p} * \frac{l_7}{l}$



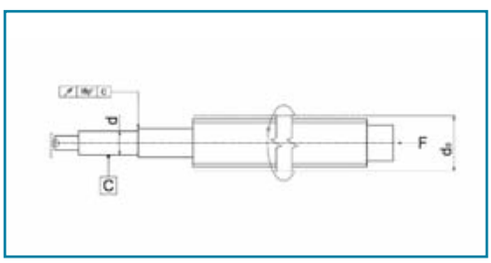
Nominal diameter d_0		Reference length l	t_{7p} in µm for $l_7 < l$ per tolerance class				
Above	to		1	3	5	7	10
6	20	80	5	6	8	12	16
20	50	125	6	8	10	16	20
50	125	200	8	10	12	20	25
125	200	315	-	12	16	25	32

(4) T8 axial movement of the contact face of the bearing in relation to the reference axis AA'



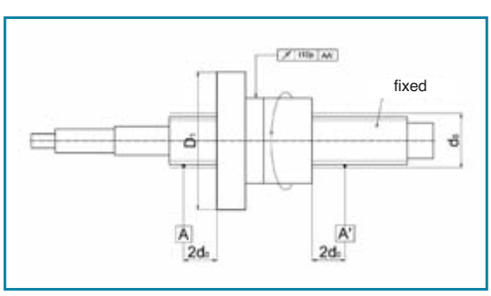
Nominal diameter d_0		t_{8p} in µm per tolerance class				
Above	to	1	3	5	7	10
6	63	3	4	5	6	10
63	125	4	5	6	8	12
125	200	-	6	8	10	18

(5) T9 axial movement of the contact face of the screw nut in relation to the reference axis AA' (only for preloaded nuts)



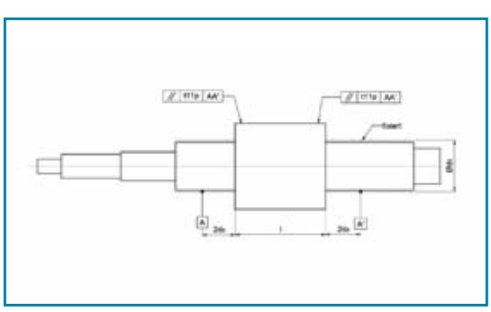
Flange diameter D_2		t_{9p} in µm per tolerance class				
Above	to	1	3	5	7	10
16	32	10	12	16	20	-
32	63	12	16	20	25	-
63	125	16	20	25	32	-
125	250	20	25	32	40	-
250	500	-	32	40	50	-

(6)T10 radial movement of the outside diameter D1 of the screw nut in relation to the AA' axis (only for preloaded screws in rotation)



Outside diameter D_1		t_{10p} in µm per tolerance class				
Above	to	1	3	5	7	10
16	32	10	12	16	20	-
32	63	12	16	20	25	-
63	125	16	20	25	32	-
125	250	20	25	32	40	-
250	500	-	32	40	50	-

(7) T11 parallel fault in the flat faces of the screw nuts in relation to the AA' axis (only for preloaded nuts)



t_{11p} in µm per 100 mm (cumulative) per tolerance class				
1	3	5	7	10
16	20	25	32	-

Axial play and preload

Preload allows axial play in the ball screw to be eliminated and thus an increase in rigidity. The precision of its positioning is also improved due to reduction/elimination of free play.

Single nuts are preloaded by selecting the ball diameter.

Double nuts are preloaded by pushing them apart through the use of a spacer.

Coding of the axial play and the preloads

Code	0	1	2	3	4
Axial play	ja	nein	nein	nein	nein
Preload	nein	nein	leicht	mittel	hoch

Preloads for rolled screws

	CI, SI/DI	SU/DU	SE	SV/DV	SC/DC	SK
0	●	●	●	●	●	●
1	●	●	●	●	●	●
2	●	●		●	●	
3				●		
4						

Preloads for ground screws

	CI, SI/DI	SU/DU	SE	SV/DV	SC/DC	SK
0	●	●	●	●	●	●
1	●	●	●	●	●	●
2	●	●	●	●	●	
3	●	●		●	●	
4				●		

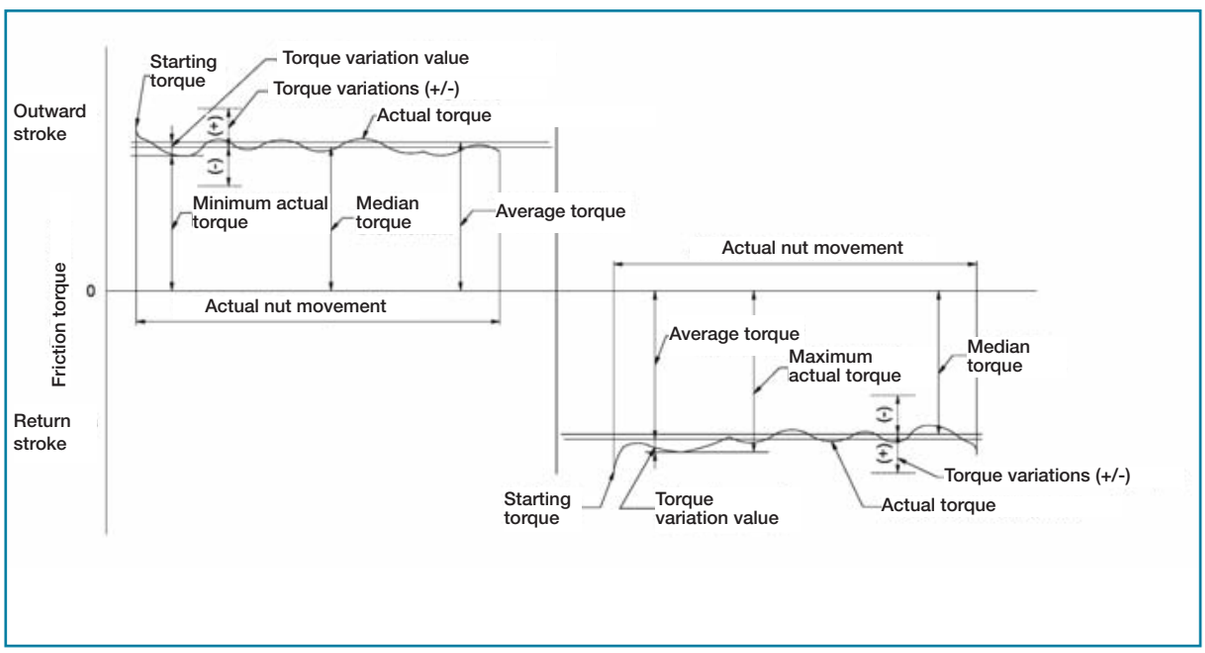
Play value for preload code 0

Screw diameter [mm]	rolled screw axial play [mm]	ground screw axial play [mm]
04-14	0,05	0,015
15-40	0,08	0,025
50-100	0,12	0,050

Code 1

No play, no preload

Dynamic torque due to the preload



No-load torque

Torque necessary to turn the nut against the screw (or vice versa) with no external load.

Actual torque

Torque actually measured on the ball screw.

Torque variation

No-load torque variation under preload. Positive or negative value in relation to the average torque.

Degree of variation of torque

Relationship of torque variation in relation to the average torque.

Average torque

Average no-load torque under preload.

Degree of variation of torque

Average torque [Nm]		Total length [mm]										
		Up to 4,000								From 4,000 to 1,0000		
		Threaded length / Screw diameter ≤ 40				40< Threaded length / Screw diameter ≤ 60				-		
		Tolerance class				Tolerance class				Tolerance class		
Up	to	T0	T1	T2,T3	T5	T0	T1	T2, T3	T5	T1	T2, T3	T5
0,2	0,4	±35%	±40%	±45%	±55%	±45%	±45%	±55%	±65%	-	-	-
0,4	0,6	±25%	±30%	±35%	±45%	±38%	±38%	±45%	±50%	-	-	-
0,6	1	±20%	±25%	±30%	±35%	±30%	±30%	±35%	±40%	-	±40%	±45%
1,0	2,5	±15%	±20%	±25%	±30%	±25%	±25%	±30%	±35%	-	±35%	±40%
2,5	6,3	±10%	±15%	±20%	±25%	±20%	±20%	±25%	±30%	-	±30%	±35%
6,3	10	-	-	±15%	±20%	-	-	±20%	±25%	-	±25%	±30%

Calculation of average torque

The average torque of a preloaded ball screw is calculated using the following formula:

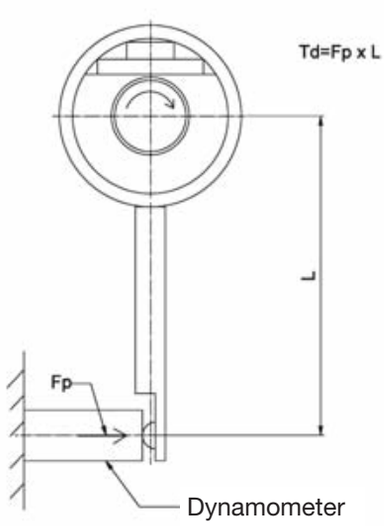
$$T_p = 0{,}05 * 10^{-3} * (\tan\beta)^{0,5} * \frac{F_{a0} * l}{2_\pi}$$

T_p	average torque (Nm)
β	angle of helix
F_{a0}	Preload force [N]
l	Pitch [mm]

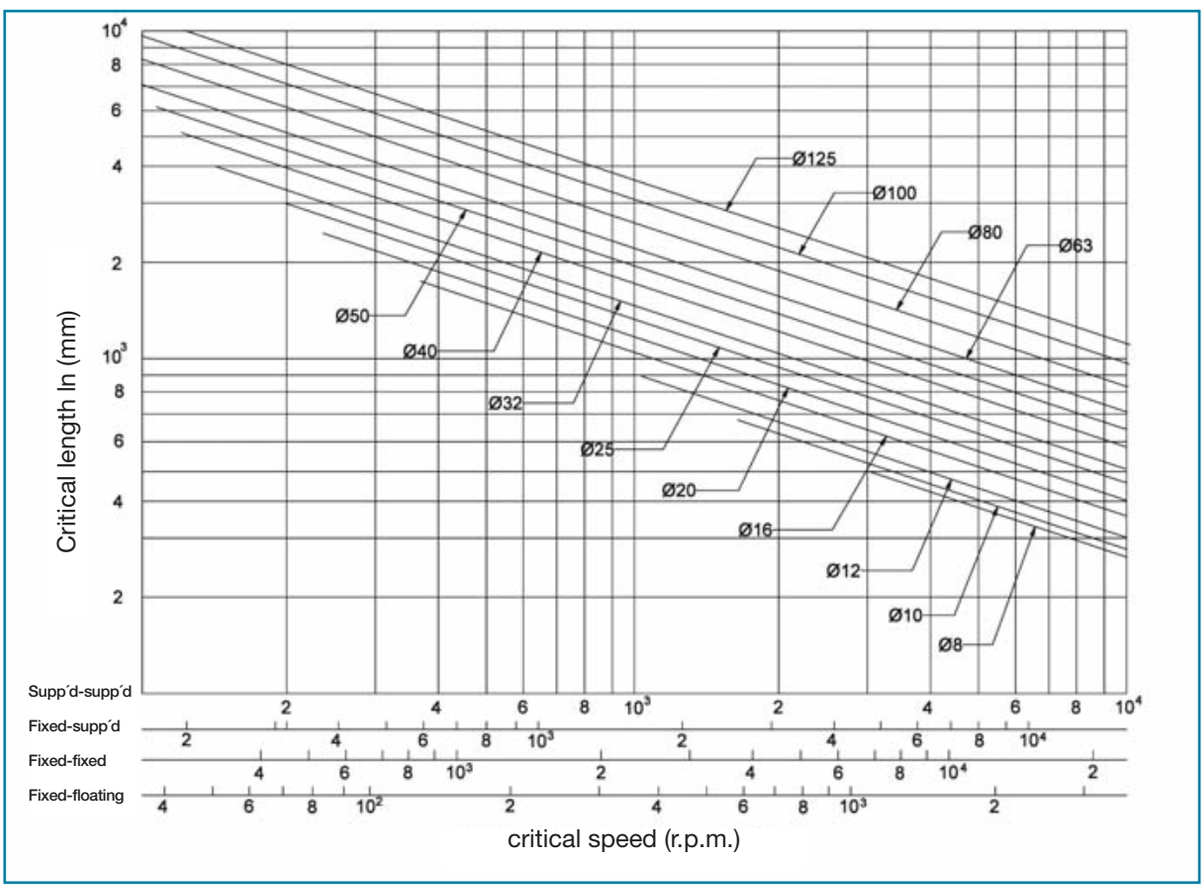
$$\tan\beta = \frac{\text{Pitch}}{\pi * \text{Ball center diameter}}$$

Method of measurement

The preload generates a drag torque between the nut and the screw pitch. To measure this torque, the ball screw is moved at a constant speed, whilst the nut is held. The Fp force measured by the dynamometer is used to calculate the drag torque of the ball screw.



Critical speed of ball screws



Like any rotating shaft, a ball screw has a critical speed, which is a harmonic vibration. Running the ballscrew in the critical speed area consistently will shorten its operational life, and could affect the performance of a machine as the vibration passes through the machine chassis. For example: On a machine tool it could cause flaws in the surface finish as ball screw reaches its critical speed, as the vibration is transmitted to other parts of the machine. The critical speed is a function of the diameter and length of the ball screw shaft, and the mounting configuration. The axial play of the nut has no influence on the critical speed n_k.

The operating speed should be kept at or below 80% of the critical speed. The formula below, for calculating the admissible speed n_{kzyl}, takes account of this 0.8 safety factor.

$$n_{kzyl} = \alpha * \frac{60 * \lambda^2}{2 * \pi * L^2} \sqrt{\frac{E * I * g}{\gamma * A}} = f * \frac{d_2}{L^2} * 10^7$$

(1/min)

n_k	critical speed (r.p.m.)
n_{kzyl}	permissible operating speed (r.p.m.)
α	safety factor (=0.8)
E	elasticity modulus (E=2.06x105 N/mm²)
I	geometric moment of inertia (mm²)
d_2	diameter at the ball screw root (mm)
γ	specific material density (7,6x10^{-5} N/mm³)
g	earth's gravitational constant (9,8x10³ mm/s²)
A	cross section of the ball screw (mm²)
L	unsupported length between the two housings)
f	correction factor due to mounting

supported-supported	λ=3,14	f=9,7
fixed-supported	λ=3,927	f=15,1
fixed-fixed	λ=4,730	f=21,9
fixed-floating	λ=1,875	f=3,4

Other than the critical speed, the maximum permissible speed of ball screws is also limited by the nominal speed of rotation called DN (max rotation speed in relation to the diameter)

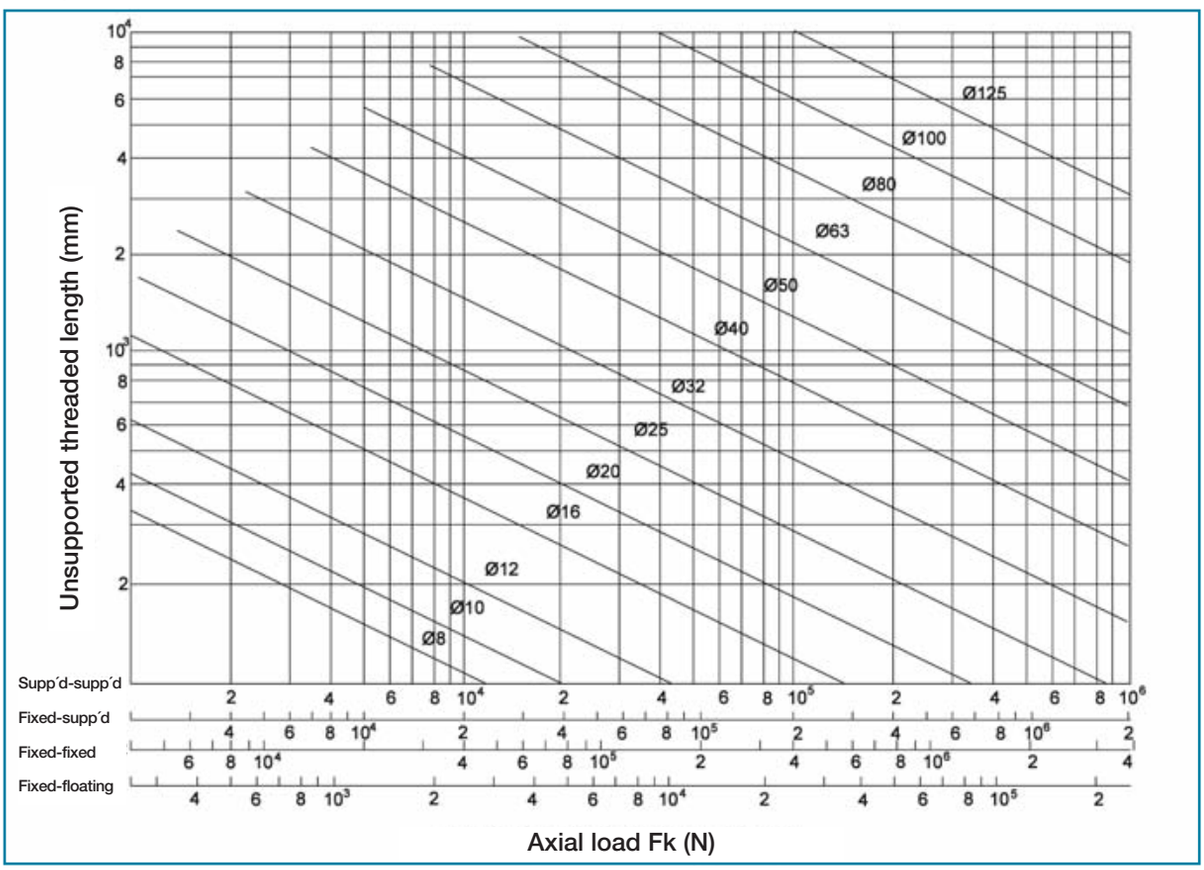
For tolerance classes (T0 to T7) $d_0 * n_{kzyl} \leq 70.000$

For tolerance class T10 $d_0 * n_{kzyl} \leq 50.000$

For any required speed greater than the mentioned values, or for the use of ball screws at high speeds, please consult SNR.

Permissible axial load for the screw (buckling)

As with any shaft, ball screws can only withstand a limited buckling load. Any stress greater than the maximum defined values can lead to failure of the screw. The permissible axial compression is a function of the length, diameter and the type of mounting of the screw. The maximum axial compression load should be 50% or less of the theoretical permissible load. The calculation made using the formula below takes this safety factor into account.



$$F_{kzyl} = \alpha * \frac{N * \pi^2 * E}{L^2} = m * \frac{d_2^4}{L^2} * 10^3 \,(N)$$

F_k theoretical maximum permissible axial load (N)
F_{kzyl} maximum permissible working axial load (N)
α safety factor (=0,5)
E modulus of elasticity
($E = 2{,}06 * 10^5$ N/mm²)

I geometric moment of inertia
$I = \frac{\pi}{64} * d_2$ (mm⁴)

d_2 diameter at the ball screw root (mm)
L unsupported length between the two housings (mm)
m, N factor linked to the

supported-supported	m=5,1	N=1
fixed-supported	m=10,2	N=2
fixed-fixed	m=20,3	N=4
fixed-floating	m=1,3	N=0,25

Calculation basis

Average speed and average load:

In the event of variable operating conditions (speed and load), the working life calculations will rely on the average values Fm and nm

For the **average speed** nm, in the case of variable speed, apply

$$n_m = \frac{q_a}{100} \cdot n1 + \frac{q_2}{100} \cdot n2 + ... + \frac{q_n}{100}$$

n_m = average speed (r.p.m.)
q = time (%)

For the **average load Fm**, in the case of a variable load, apply

$$F_m = \sqrt[3]{F_1^3 \cdot \frac{q_1}{100} + F_2^3 \cdot \frac{q_2}{100} + ... + F_n^3 \cdot \frac{q_n}{100}}$$

Fm= average load (kN)
q = movement or time at constant speed (%)

For the **average load Fm**, in the case of both variable load and speed, apply

$$F_m = \sqrt[3]{F_1^3 \cdot \frac{n_1}{n_m} \cdot \frac{q_1}{100} + F_2^3 \cdot \frac{n_2}{n_m} \cdot \frac{q_2}{100} + ... + F_n^3 \cdot \frac{n_m}{n_m} \cdot \frac{q_n}{100}}$$

Fm= average load (kN)
q = time (%)
n_m = average speed (r.p.m.)

Nominal working life

Working life L, expressed in revolutions

$$L = \left(\frac{C_a}{F_m}\right)^3 \cdot 10^6 \Rightarrow C_{amin} = F_m \cdot \sqrt[3]{\frac{L}{10^6}}$$

L = working life (in r.p.m.)
F_m = average load (kN)
C_a = dynamic load capacity (kN)

Working life, expressed in hours L_h

$$L_h = \frac{L}{n_m \cdot 60 \cdot ED}$$

L_h = working life (h)
L = working life (in revolutions)
nm= average speed (r.p.m.)
ED= operating time (%)

Motor torque and output power

Output torque M_{ta}
for the transformation of rotational movement into linear movement

$$M_{ta} = \frac{F \cdot P}{2 \cdot \pi \cdot \eta'}$$

Resistive torque M_{te}
for the transformation of linear movement into rotational movement

$$M_{te} = \frac{F \cdot P \cdot \eta'}{2 \cdot \pi}$$

M_{ta} = output torque (Nm)
M_{te} = resistive torque (Nm)
F = actual load (kN)
P = pitch (mm)
η = yield (approx. 0.9)
η´ = yield (approx. 0.8)

For preloaded double nuts, take no-load torque into account.

Output power P_a

$$P_a = \frac{M_{ta} \cdot n}{9550}$$

P_a = output power (kW)
M_{ta} = output torque (Nm)
n = speed of rotation (1/min)

Mounting the nut on the screw

Rolled ball screws, with a single nut, must be mounted using the mounting sleeve supplied with the nut. The angles at the start of the thread will be reduced to avoid damaging the scrapers and nut components.

Note:
Ground ball screws, with a single or double nut are always delivered with the nut assembly mounted, similarly to rolled double nut screws.

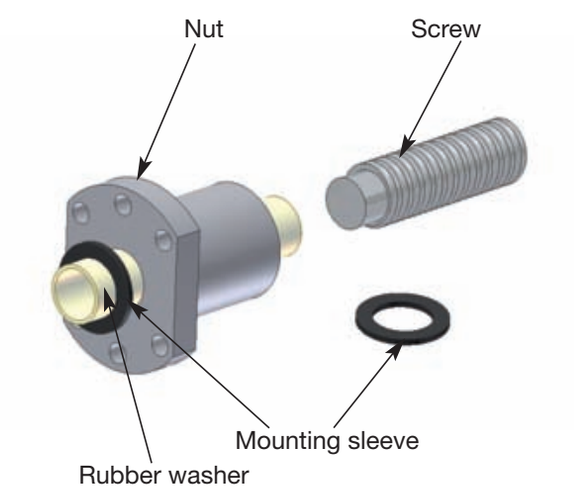
Please contact us if you absolutely must dismantle a nut assembly.

Proceed with the mounting as follows:

Remove the rubber washer from one side of the sleeve. Push on the nut with the sleeve on the end of the screw. Press the sleeve against the start of the screw thread

Screw the nut on to the thread, using a slight axial pressure. Then screw the nut on for its entire length.

Remove the mounting sleeve only when the nut is completely threaded on to the screw. Lock the nut to prevent any unscrewing (using a rubber washer or fixing the sleeve axially).



What do I do when…
Balls escape while threading on the nut?

1. Pick up the balls (the nut is only compatible with the original balls). The load capacity is then ensured, even if two or three balls are missing.

2. Carefully clean all the components.

3. Use the sleeve as a mounting jig.

4. Replace the balls.

5. Start with the lowest circuit. Insert the balls into the nut circuit, the sleeve prevents the balls from falling inside.

Important:
Use only original balls!

Important:
Do not place the balls in the empty circuit located between the two deflectors!

Instructions for the servicing, mounting and maintenance of ball screws

Conditions for use
Other than the load capacities, it is appropriate to take account of the maximum nominal speed (DN), the critical speed and also the permissible buckling effort.

Ball screws are drive mechanisms designed to transmit axial loads. Any radial loads acting on the ball screw nut will reduce its useful life.

To protect the ball screw from radial loads a linear guidance system should be used.

Mounting
When mounting a ball screw it is important to accurately align it with the other components in the system. These factors will affect the performance and operational life of the system.

Flatness of the mounting base plate/chassis
The materials of construction
Straightness of the linear guidance system
Alignment of the ball screw support bearings
Rigidity of the overall system

Guidance
The machine function, materials of construction and workshop facilities all affect the final performance. The key aim is ensure the ball screw runs free along its stroke and is not subjected to radial loads caused by misalignment.

If possible move the system full stroke regularly during the assembly process to check for easy running. Using instruments such as dial gauges can assist, but feel is as important particularly on relatively un-flat surfaces such as aluminium extrusion. When mounting on aluminum extrusion there is a limit to what can be achieved, compared to precision ground surfaces used on higher precision applications.

For high precision applications such as machine tools and semi-conductors the use of instruments such as dial gauges assist in the overall performance.

During mounting, take the parallel alignment with the linear guide elements into consideration. Take special care over the concentricity of the mounting of the nut relative to the screw.

The cumulative tolerances of the mounting base, linear guide elements, ball screw and frame all combine together to affect the final performance of the system. Remember you are looking the straightness and flatness of the table or work piece as the end result.

Provide adjustment systems for the nut or the housings to obtain a good level of alignment at minimum cost.
For mounting the bearings, see the **SNR Roulements general catalogue.**

Lubrication and maintenance
To preserve all their operating qualities, ball screws must be lubricated with oil or grease. The types of lubricant are identical to those recommended for bearings.

The lubricant, as well as the method of lubrication, must be chosen according to the products used in other parts of the installation.

The use of MoS2 and graphite lubricants is not recommended and could dramatically shorten the product life.

Our experience shows that an initial lubrication, at the beginning of use, is insufficient to ensure the product reaches it expected operational life. Regular lubrication is recommended.

Lubrication using grease
We recommend the use of lithium-soap- and grade 2 mineral-oil-based greases.
Where loads experienced by the screws are greater than 10% of the dynamic load capacity, use greases containing extreme pressure additives (SNR LUB EP).
For high speeds (Nominal speed DN >50,000), opt for low viscosity oil based greases (SNR LUB GV)

Speed factors lower than 2,000 require grade 3 greases.
Re-lubrication intervals depend on ambient conditions.
Under normal use, lubrication should be carried out after every 200 to 600 hours of service.

As a general guide, the volume of lubricant required for each nut will be ≥ 1 cm3 ? of grease per cm of screw diameter.
Most grease in general use may be mixed together. However, to obtain the best results, please keep to one type of grease.

Lubrication using oil
For lubrication with oil, choose class CL mineral oils to DIN 51517, section 2.

For standard applications, we recommend the use of ISO VG 68 viscosity class oil. For high-speed applications (Nominal speed DN > 50,000), it is better to use ISO VG 46, even VG 22 viscosity class oil.

For nominal speeds below 2,000 revolutions per minute use ISO VG 150-460 viscosity class oils. If the load is greater than 10% of the dynamic load capacity, we recommend the use of oils containing high-pressure additives.

In the case of lubrication using an oil bath, the screw must be situated between 0.5 and 1 mm above the level of the oil. The volume of oil required for re-lubrication is between 3 and 6 cm3/h per ball circuit.

Ball screw coding

(1) Product
- BSC Screw + Nut assembly
- BSH Ball screw
- BNU Nut alone

(2) Nominal diameter (mm)

(3) Pitch (mm)

(4) Direction of pitch
- D right
- G left

(5) Type of nut
- CI Single cylindrical nut (Page 7)
- SK Single flanged miniature nut (Page 6)
- SE Single flanged nut (wide pitch) (Page 16)
- SC Single flanged compact nut to DIN 69051 (Page 8)
- DC Double flanged compact nut to DIN 69051 (Page 9)
- SV Single flanged compact nut (Page 12)
- DV Double flanged compact nut (Page 13)
- SI Single flanged nut (Page 14)
- DI Double flanged nut (Page 15)
- SU Single flanged nut to DIN 69051 (Page 10)
- DU Double flanged nut to DIN 69051 (Page 11)

For the coding of screws alone:
- 01 Screw for compact series DIN nut
- 00 Screw for special nut types

(6) Number of circuits

(7) Type of flange
- A DIN 69051 section 5 form A (round)
- B DIN 69051 section 5 form B
- Z Cylindrical nut

(8) Precision class (Page 22)
T0, T1, T2, T3, T5, T7, T10

(9) Model
- G ground
- R rolled

(10) Preload types (Page 26)
- 0 Standard axial play
- 1 No axial play
- 2 Light preload
- 3 Medium preload
- 4 High preload

(11) Total length (mm)

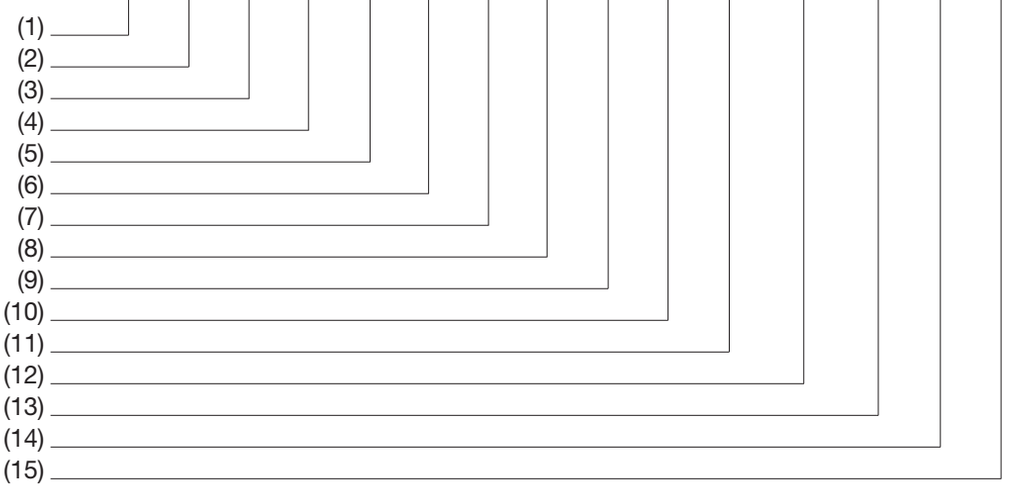
(12) Right side screw end (Pages 19-20)
- F, S Form F, S (X depending on customer drawing, 0 with no end machining)
- 1, 2 Model
- 6…60 Diameter of the bearing seat

(13) Left side screw end, see right side screw end

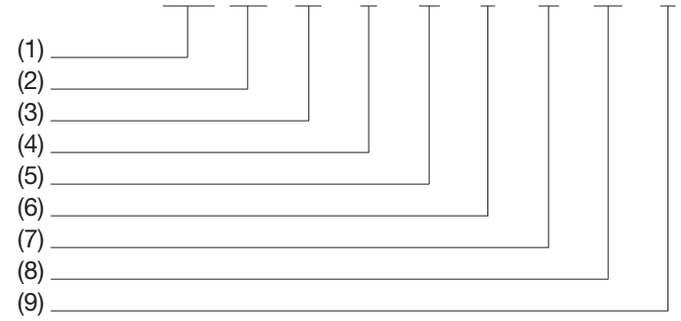
(14) Lubrication
- 0 Standard nut greasing
- 1 Anti-corrosion greasing
- 2 Greasing to customer instructions

(15) Special
- 0 None
- 1 Taking account of drive torque measurement
- 2 Taking account of pitch error

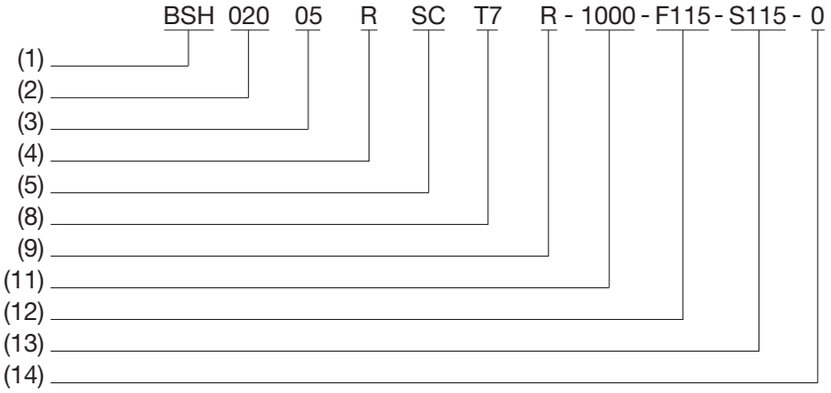
Screw + Nut assembly BSC 020 05 R CI 2 A T7 R 0 - 1000 - F115 - S115 - 0 - 0



Nut alone BNU 020 05 R CI 2 A T7 R



Screw BSH 020 05 R SC T7 R - 1000 - F115 - S115 - 0



Your enquiry form

Company

Address | Contact

Position | Telephone | Fax

Description of the application

☐ Isolated need | No. of pieces | ☐ New construction

☐ Production need | Required delivery Weeks | ☐ Technical improvement

Pieces per year | ☐ Cost reduction / Current price €

Delivery of pieces required in Weeks

Application parameters

Type of mounting: ☐ Horizontal ☐ Vertical | Usable stroke:

Maximum usable load: kg | Additional axial load:

Maximum movement speed: m/s | Maximum acceleration:

Positioning accuracy: mm | Reproducibility: mm

Maximum inversion play: mm | Cycle time: sec

Required working life strokes or hours

Ambient conditions of use: | Special circumstances:

Dimensions and features, if existing application

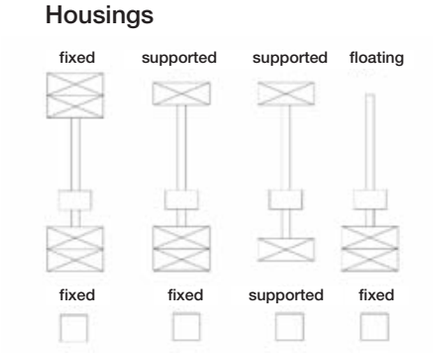
☐ Flange nut: | Maximum dimensions of the nut:

☐ Cylindrical nut | Nominal screw diameter: mm

☐ DIN nut | Pitch: mm

Total length: mm

Housings



☐ With machining of the ends to drawing no.

☐ Machining of the ends for use with SNR housings

☐ No end machining

The consultation of SNR WÄLZLAGER GMBH is exclusive for the function of the ball screws. As a supplier of a component SNR accepts no liability for the function, operation or performance for the machine, system or assembly to which the ball screw is mounted. This responsibility lies with the machine designer, manufacturer, operator or other relevant parties.

Other catalogues

SNR, your guide
to linear modules

Our new general catalogue presents our full range of linear actuators and stages.

It is available in PDF format on our web site:
www.snr-bearings.com/Downloads

You can also order a printed version by email from:
linear@snr.de

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