Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth
Bosch Group

Miniature Ball Screw Assemblies
Single Nut with Flange

The Drive & Control Company

Ball Screw Assemblies

Product Overview

Miniature Ball Screw Assemblies

Miniature Ball Screws are available from stock as complete assemblies with flanged nuts.

The prefabricated end machining makes an easy combination with the fixed bearing (support block with bearing) LGL possible as a complete package.

The load capacity of the support bearing is critical. By friction welding the bearing journal we were able to enlarge smaller screw diameters and increase load capacity.

This can simplify the choices for many customer specific positioning and transport applications.

The construction and ordering process for new applications can also be handled more effectively.

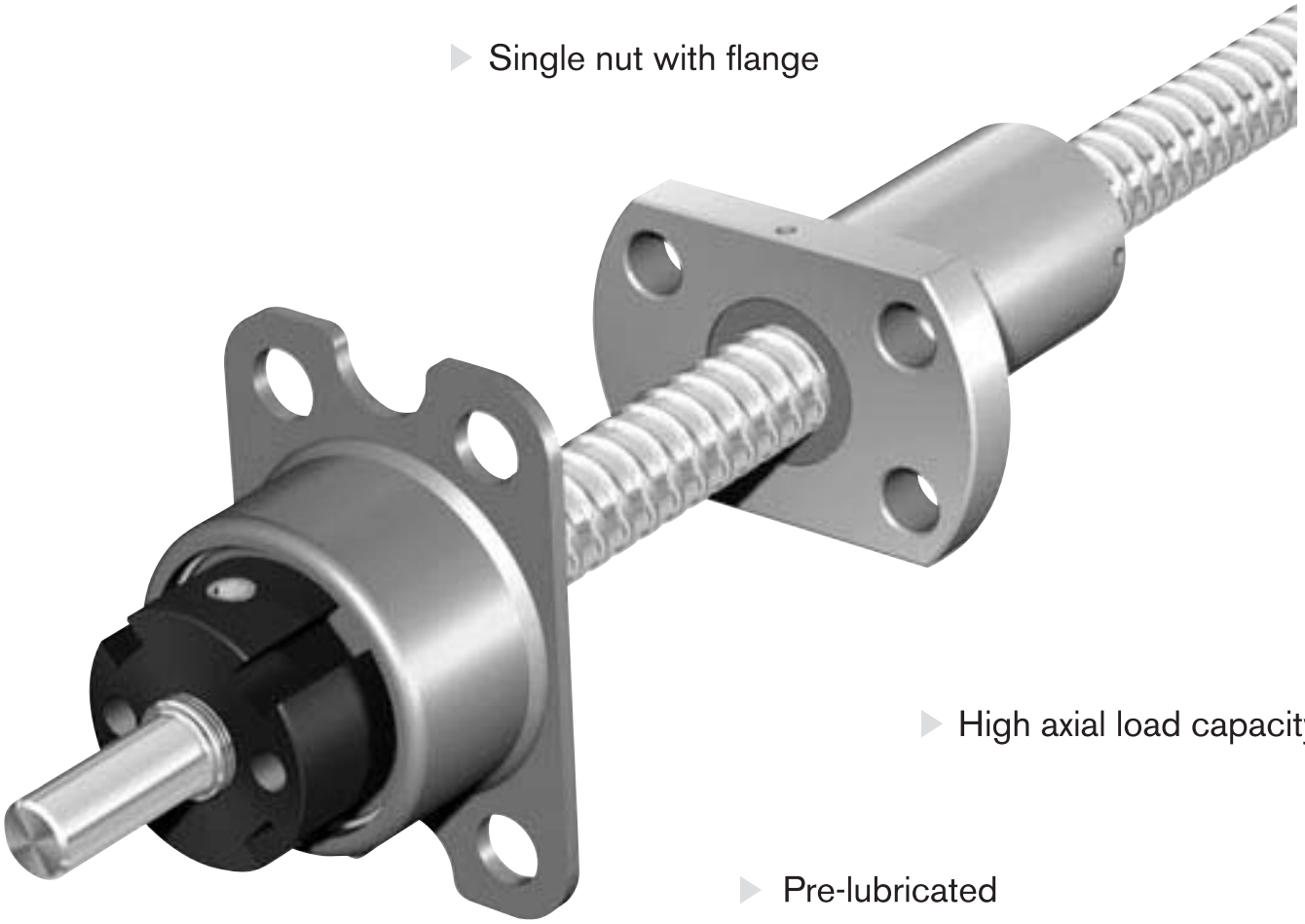
Every nut comes pre-assembled with clearance and seals.

End Bearing LGL

The end bearing LGL with angular contact ball bearing in an "X" arrangement makes an ideal accessory.

- High load capacity
- Very easy mounting with the flanged housing
- Corrosion resistant housing
- Seals provide protection from contaminants
- Simple preload of the fixed bearing
- Maintenance free for most applications due to the large lubricant reservoir with initial greasing

Economical turnkey solutions made easy.



- Single nut with flange
- High axial load capacity
- Pre-lubricated
- Bearing and slotted nut optional
- From stock

Ball Screw Assemblies

Miniature Ball Screw Assemblies with Single Nut with Flange

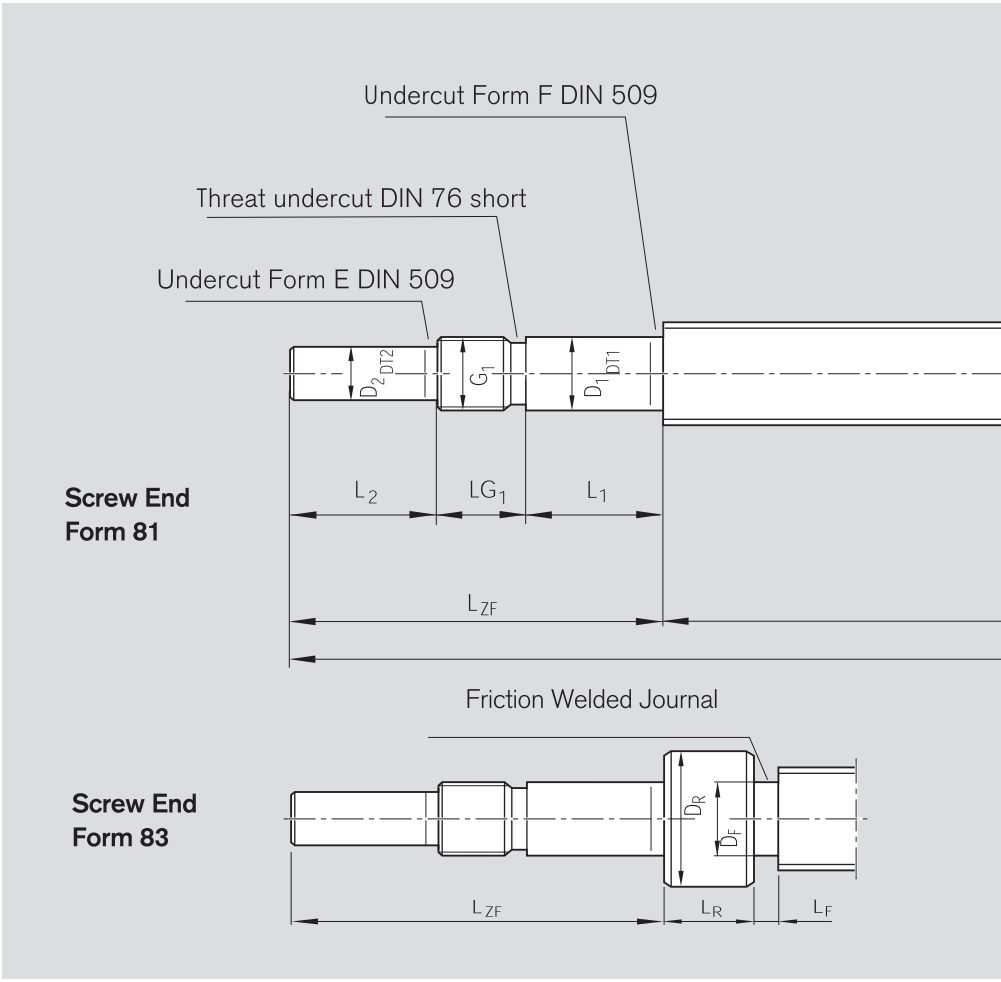
Miniature Line

Single Nut with Flange FEM-E-B
with Rexroth mounting dimensions

With Seals

With backlash or reduced backlash
Screw tolerance class T7

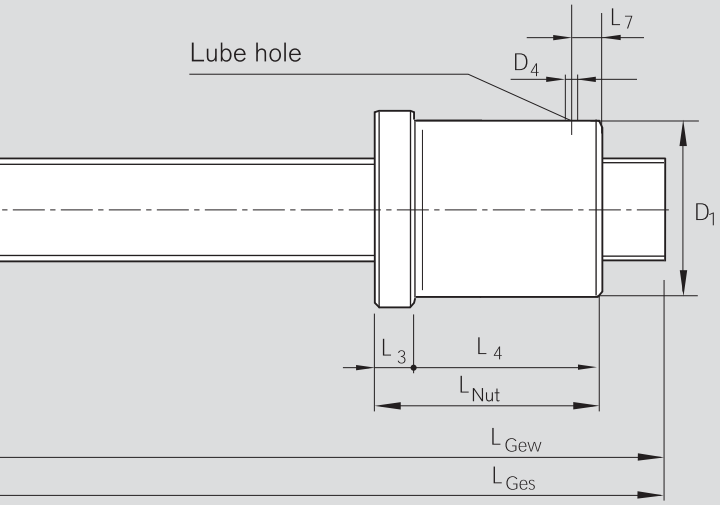
d_0 = Nominal diameter
P = Lead
(R = Right, L = Left)
D_W = Ball diameter
i = No. of turns

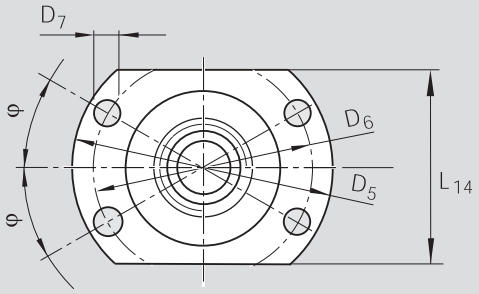


Size d_0 x P x Dw - i	Part No.	Basic load rating dyn. C (N)	Basic load rating stat. C_0 (N)	Max. Speed v_{max} [m/min]	L_{Ges}	L_{Gew}	
6 x 1 R x 0,8-4	1530-1-0040	900	1290	3	255	191	
6 x 2 R x 0,8-4	1530-1-0041	890	1280	6	255	191	
8 x 1 R x 0,8-4	1530-2-0720	1020	1740	3	355	291	
8 x 2 R x 1,2-4	1530-2-0721	1870	2760	6	355	291	
8 x 2,5R x 1,588-3	1530-2-0722	2200	2800	15	355	291	
12 x 2 R x 1,2-4	1530-4-1090	2240	4160	12	400	359	
12 x 5 R x 2-3	1530-4-1091	3800	5800	30	400	359	
12 x 10 R x 2-2	1530-4-1092	2500	3600	60	400	359	

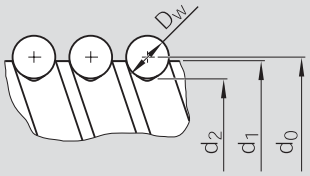
Ordering Codes

FEM-E-B	**6x1Rx0,8-4**	**1**	**1**	**T7**	**R**	**83K061**	**00K060**	**255**	**0**	**1**
FEM-E-B	**6x2Rx0,8-4**	**1**	**1**	**T7**	**R**	**83K061**	**00K060**	**255**	**0**	**1**
FEM-E-B	**8x1Rx0,8-4**	**1**	**1**	**T7**	**R**	**83K062**	**00K080**	**355**	**0**	**1**
FEM-E-B	**8x2Rx1,2-4**	**1**	**1**	**T7**	**R**	**83K063**	**00K080**	**355**	**0**	**1**
FEM-E-B	**8x2,5Rx1,588-3**	**1**	**1**	**T7**	**R**	**83K064**	**00K080**	**355**	**0**	**1**
FEM-E-B	**12x2Rx1,2-4**	**1**	**1**	**T7**	**R**	**81K061**	**00K120**	**400**	**0**	**1**
FEM-E-B	**12x5Rx2-3**	**1**	**1**	**T7**	**R**	**81K061**	**00K120**	**400**	**0**	**1**
FEM-E-B	**12x10Rx2-2**	**1**	**1**	**T7**	**R**	**81K061**	**00K120**	**400**	**0**	**1**





Single Nut with Flange FEM-E-B



Nut Dimensions (mm)

D_1 g6	D_4	D_5	D_6	D_7	L	L_3	L_4	L_7	L_{14}	φ (°)	Backlash (mm)
12	2	24	18	3,4	19,5	3,5	16	3,5	16	30	0,01
12	2	24	18	3,4	22,5	3,5	19	3	16	30	0,01
16	2	28	22	3,4	22	6	16	3,5	19	30	0,01
16	2	28	22	3,4	25	6	19	3	19	30	0,01
16	2	28	22	3,4	16	6	10	3	19	30	0,01
20	2	37	29	4,5	19	8	11	2,5	24	30	0,01
22	2	37	29	4,5	28	8	20	6	24	30	0,01
20	2	37	29	4,5	33	8	25	8	24	30	0,01

Screw Dimensions (mm)

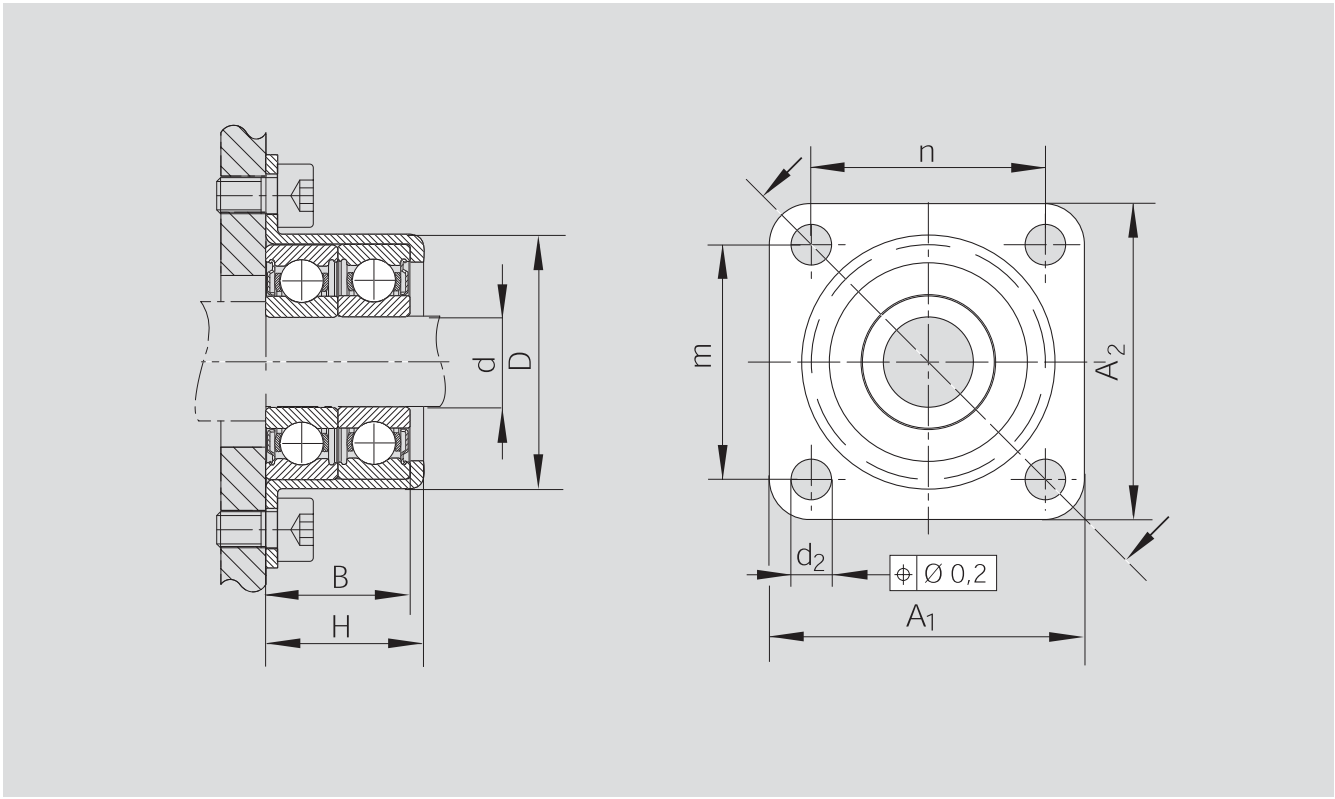
Size d_0	P	Form	Version	d_1	d_2	L_{ZF}	D_R	L_R	D_F	L_F	D_1	DT1	L_1	D_2	DT2	L_2	G_1	LG_1
6	1	83	061	6	5,3	41	12	15	5,2	8	6	h6	10	5	h7	16	M6x0,5	15
6	2		061	6	5,3	41	12	15	5,2	8	6	h6	10	5	h7	16	M6x0,5	15
8	1		062	8	7,3	41	12	15	7,2	8	6	h6	10	5	h7	16	M6x0,5	15
8	2		063	8	7,0	41	12	15	6,9	8	6	h6	10	5	h7	16	M6x0,5	15
8	2,5		064	7,5	6,3	41	12	15	6,2	8	6	h6	10	5	h7	16	M6x0,5	15
12	2	81	061	11,7	6,9	41	-	-	-	-	6	h6	10	5	h7	16	M6x0,5	15
12	5		061	11,4	9,9	41	-	-	-	-	6	h6	10	5	h7	16	M6x0,5	15
12	10		061	11,4	9,9	41	-	-	-	-	6	h6	10	5	h7	16	M6x0,5	15

Ball Screw Assemblies
Bearing LGL

Fixed bearing with angular-contact thrust ball bearing LGL

Suitable for screw end forms on page 4

Size	Angular-contact thrust ball bearing				Slotted Nut		
			Load ratings (axial) dyn.	stat.			
d_o x P	Part number	Designation	C (N)	C_o (N)	Designation	Part number	
6x1/2	8414-038-06	LGL-D-0624	1340	1250	NMG 6x0,5	8446-010-02	
8x1/2/2,5	8414-038-06	LGL-D-0624	1340	1250	NMG 6x0,5	8446-010-02	
12x2/5/10	8414-038-06	LGL-D-0624	1340	1250	NMG 6x0,5	8446-010-02	



Dimensions (mm)									Weight bearing
d	D +0,03 -0,01	A_1	A_2	n	m	H	B -0,25	d_2	(kg)
6	20,5	24	35	15	26	13	12	4,5	0,023
6	20,5	24	35	15	26	13	12	4,5	0,023
6	20,5	24	35	15	26	13	12	4,5	0,023

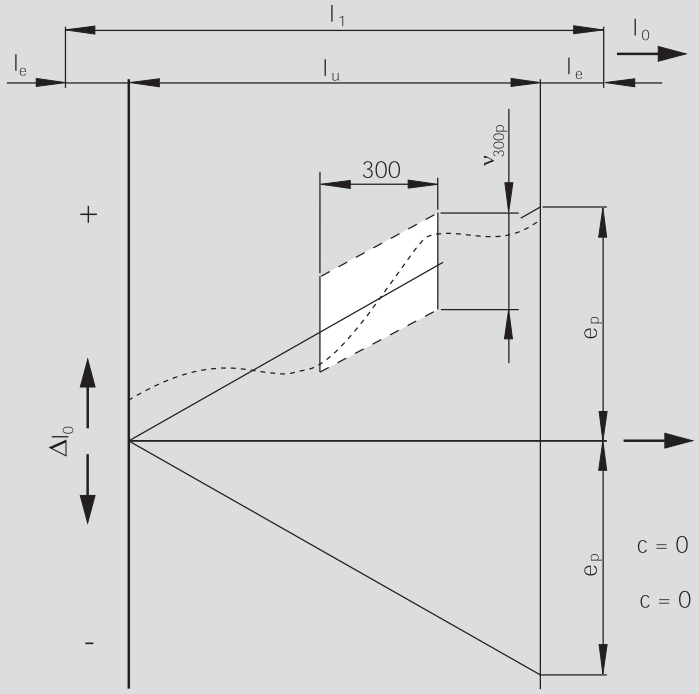
Ball Screw Assemblies

Acceptable Conditions and Tolerance Grades

Permissible travel deviation

simillar to DIN 69 051, Part 3
and ISO 3408-3

Ball screw with rolled precision screw SN-R



Symbol definitions

l_0 = Nominal travel
l_1 = Thread length
Δl_0 = Travel deviation

l_u = Useful travel
l_e = Excess travel
c = Travel compensation for useful travel, defined by use (standard: c = 0)

e_p = tolerance for actual mean travel deviation

l_u		e_p (µm) Tolerance grade				
>	≤	1	3	5	7	9
0	100	-	8	18	44	110
100	200	-	10	20	48	130
200	315	6	12	23	52	150
315	400	7	13	25	57	170

v_{up} = permissible travel variation within useful travel l_u

v_{300p} = permissible travel deviation within 300 mm travel

$v_{2\pi p}$ = permissible travel deviation within 1 revolution

Minimum number of measurements within 300 mm (measuring interval) and permissible excess travel.

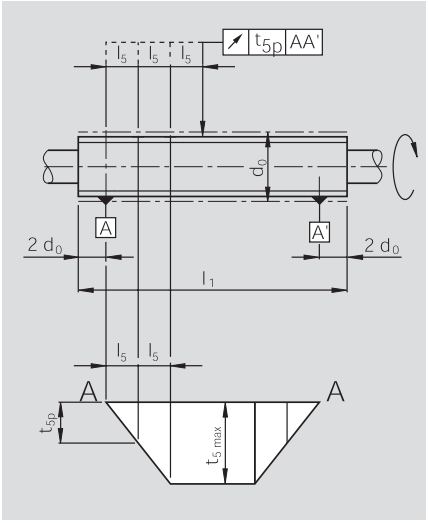
Subindices:
p = permissible
a = actual

Lead P	Min. no measurements for tolerance grades 1	3	5	7	9	Excess Travel l_{emax} (mm)
2,5	30	20	10	5	5	10
5	15	10	6	3	3	20
10	10	5	3	1	1	40
16	8	5	3	1	1	50
20	5	5	3	1	1	60
25	4	4	3	1	1	70
32	3	3	2	1	1	80
40	-	2	1	1	1	100

Run-outs and Location Deviations

Based on DIN 69 051, Part 3 and ISO 3408-3

Radial run-out t_5 of the outer diameter of the ball screw shaft over the length l_5 used to determine the straightness in relation to AA'.

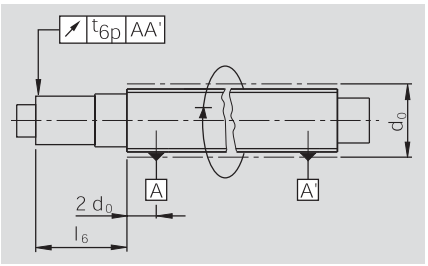


d_0 above	d_0 up to	l_5	t_{5p} in µm for l_5 for Tolerance grade 1	3	5	7; 9
= 6	12	80	20	25	32	40
12	25	160	20	25	32	40

l_1/d_0 above	l_1/d_0 up to	t_{5max} in µm for $l_1 \geq 4 l_5$ Tolerance grade 1	3	5	7; 9
	40	40	50	64	80
40	60	60	75	96	120

Radial run-out t_6 of the bearing diameter in relation to AA« for $l_6 \leq l$.

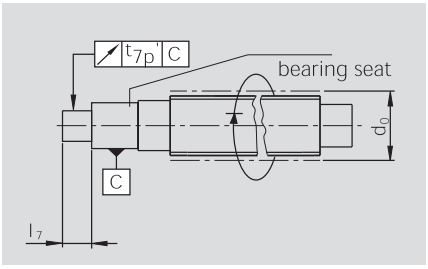
Where $l_6 > l$ then $t_{6a} \leq t_{6a} \cdot \frac{l_{6a}}{l}$



Nominal diameter d_0 above	Nominal diameter d_0 up to	length l	t_{6p} in µm for $l_6 \leq l$ Tolerance grade 1	3	5; 7; 9
= 6	20	80	10	12	20

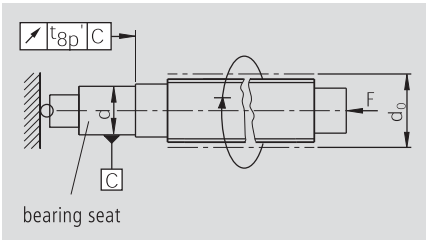
Coaxial deviation t_7' of the journal diameter of the ball screw shaft in relation to the bearing diameter for $l_7 \leq l$.

Where $l_7 > l$ then $t_{7a} \leq t_{7a} \cdot \frac{l_{7a}}{l}$



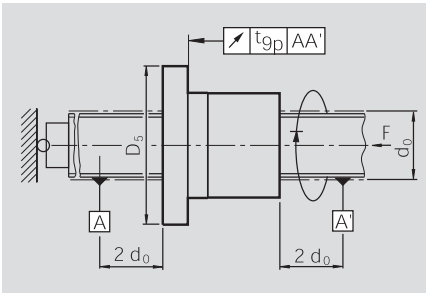
Nominal diameter d_0 above	Nominal diameter d_0 up to	length l	$t_{7p'}$ in µm for $l_7 \leq l$ Tolerance grade 1	3	5; 7; 9
= 6	20	80	5	5	6

Axial run-out t_8' of the shaft (bearing) face of the ball screw shaft in relation to the bearing diameter.



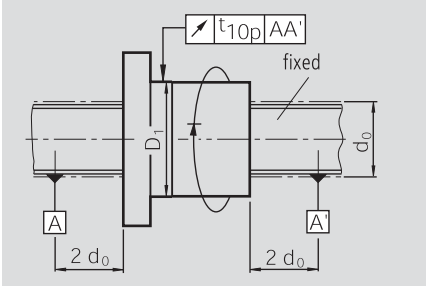
Nominal diameter d_0 above	Nominal diameter d_0 up to	$t_{8p'}$ in µm for Tolerance grade 1	3	5; 7; 9
= 6	63	3	4	5

Axial run-out t_9 of the ball nut location face in relation to A and A'(for preloaded ball nuts only)



Flange diameter D_5 above	Flange diameter D_5 up to	t_{9p} in µm for Tolerance grade 1	3	5; 7; 9
16	32	10	12	16
32	63	12	16	20

Radial run-out t_{10} of the outer diameter D_1 of the ball nut in relation to A und A' (for preloaded and rotating ball nuts only). Fix screw against rotation.



Outer diameter D_1 above	Outer diameter D_1 up to	t_{10p} in µm for Tolerance grade 1	3	5; 7; 9
16	32	10	12	16
32	63	12	16	20

Ball Screw Assemblies

Preload and Rigidity
Single nut

Size d_o x P x D_w - i	Load ratings		Backlash of Single nut		Stiffness of the Screw
	dyn. C (N)	stat. C_0 (N)	Standard	Reduced	R_S N× m / µm
6 x 1R x 0,8 - 4	900	1290	0,01	0	5
6 x 2R x 0,8 - 4	890	1280	0,01	0	5
8 x 1R x 0,8 - 4	1020	1740	0,01	0	9
8 x 2R x 1,2 - 4	1870	2760	0,01	0	9
8 x 2,5R x 1,588 - 3	2200	2800	0,02	0,010	8
12 x 2R x 1,2 - 4	2240	4160	0,01	0	21
12 x 5R x 2 - 3	3800	5800	0,02	0,010	18
12 x 10R x 2 - 2	2500	3600	0,02	0,010	18

Dynamic drag torque, preload and rigidity for screws with miniature single nut

T_0 = overall dynamic drag torque
T_0 = $T_{pr0} + T_{RD}$
C = basic dynamic load rating
C_0 = basic static load rating
T_{RD} = dynamic drag torque of 2 seals
R_S = rigidity of the screw
R_{nu} = rigidity of the nut
T_{pr0} = dynamic drag torque without a seal

d_0 = Nominal diameter
P = Lead (R = Right, L = Left)
Dw = Ball Diameter
i = No. of Turns

Size d_o x P x D_w - i	Dynamic drag torque of 2 seals T_{RD} ca. (Nm) Standard seal
6 x 1R x 0,8 - 4	0,010
6 x 2R x 0,8 - 4	0,010
8 x 1R x 0,8 - 4	0,010
8 x 2R x 1,2 - 4	0,020
8 x 2,5R x 1,588 - 3	0,015
12 x 2R x 1,2 - 4	0,030
12 x 5R x 2 - 3	0,030
12 x 10R x 2 - 2	0,030

Relubrication

Quantities and Intervals

The nut must be lubricated with lubricant via the lube port prior to operation.

Oil Lubrication

d_o	Initial lubrication oil V_e(ml)	Relubrication oil V_n (ml)/10h	Revolutions U (Mio/Mill)	Travel (km) with lead P = 5	10	16	20	25	32	40
6	0,300	0,030	1,3	7	13	21	26	33	42	52
8	0,300	0,030	1,3	7	13	21	26	33	42	52
12	0,300	0,030	1,3	7	13	21	26	33	42	52

Relubrication intervals for NLGI 0 resp. 00-Greases

Size d_0 x P x D_w -i	Relubrication quantity of grease (g) FEM-E-B Miniature
6 x 1R x 0,8- 4	0,06
6 x 2R x 0,8- 4	0,12
8 x 1R x 0,8 - 4	0,12
8 x 2R x 1,2 - 4	0,24
8 x 2,5R x 1,588 - 3	0,10
12 x 2R x 1,2 - 4	0,15
12 x 5R x 2 - 3	0,30
12 x 10R x 2 - 2	0,30

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