

Ball Screw Assemblies

ECO-Line

The Drive & Control Company



Ball Screw Assemblies

Product Overview

ECO-Line Ball Screw Assemblies

ECO-Line Ball Screws are available from stock as complete assemblies, with screw-in or flanged nuts.

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

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 the load capacity.

This can simplify the choices for many customer specific transport applications. The construction and ordering process for new applications can also be handled more effectively.

Relaxed tolerances provide economical solutions. Every nut is assembled with clearance. The flanged nut comes standard with seals; the screw-in version offers seals as an option.

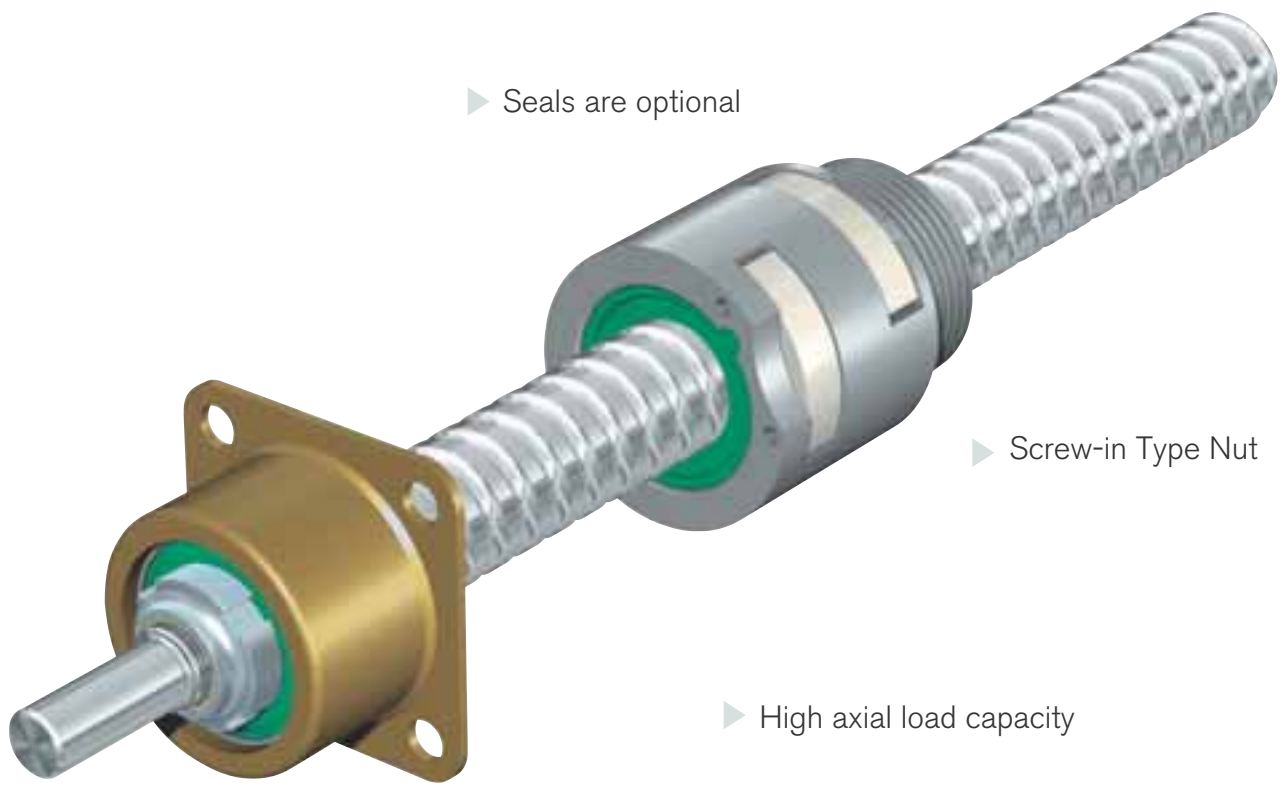
The ECO-Line Series is intended to be a very cost effective solution.

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 application due to the large lubricant reservoir with initial greasing

Economical turnkey solutions made easy.



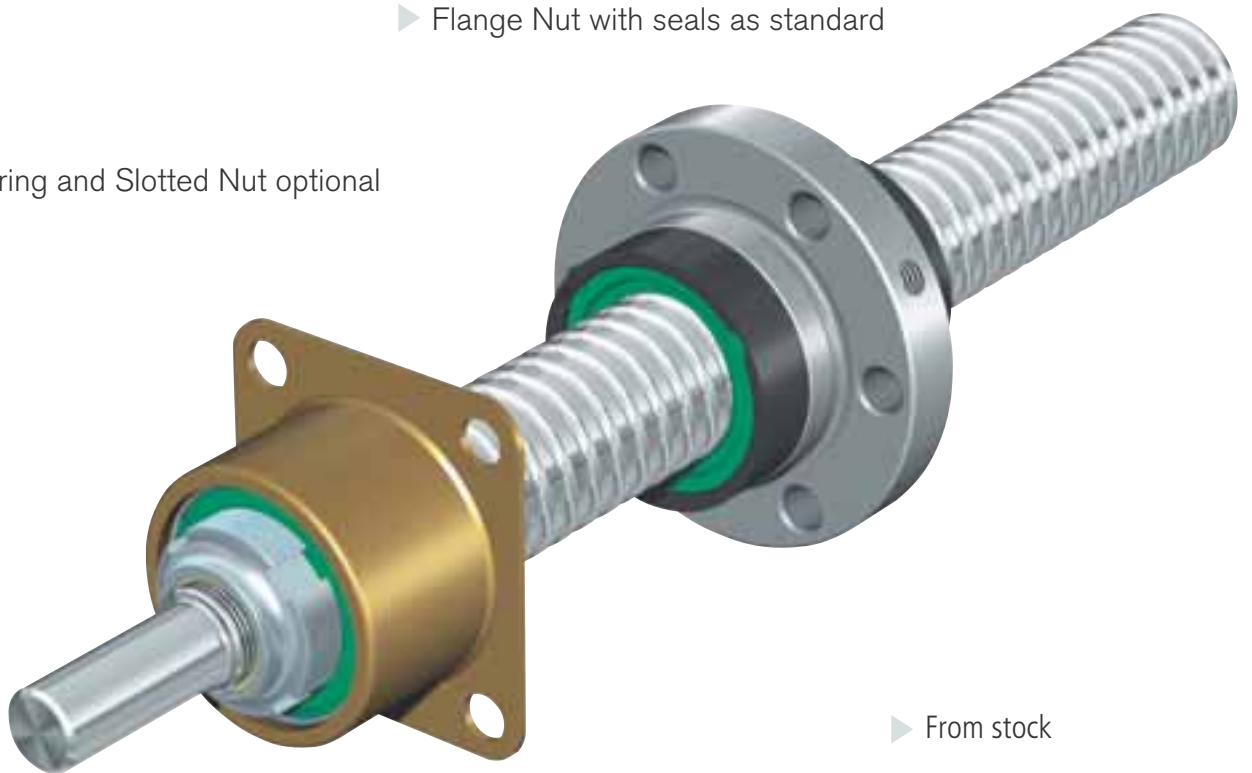
▶ Seals are optional

▶ Screw-in Type Nut

▶ High axial load capacity

▶ Flange Nut with seals as standard

▶ Bearing and Slotted Nut optional



▶ From stock

Ball Screw Assemblies

With Screw-in Single Nut

ECO Line

Screw-in Single Nut ZEV-E-S with Rexroth mounting dimensions

Without seals

With backlash

Screw tolerance class T10

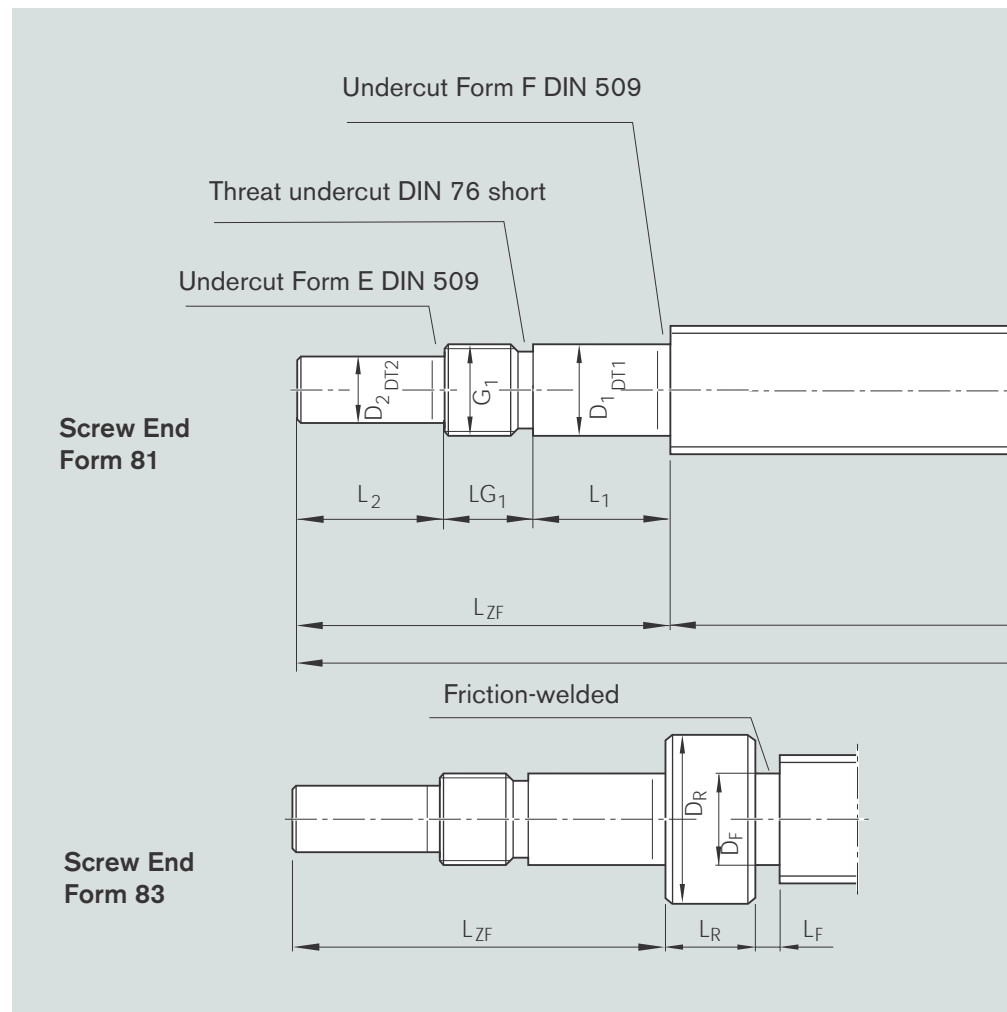
d = Nominal diameter

P = Lead

(R = Right, L = Left)

D_w = Ball diameter

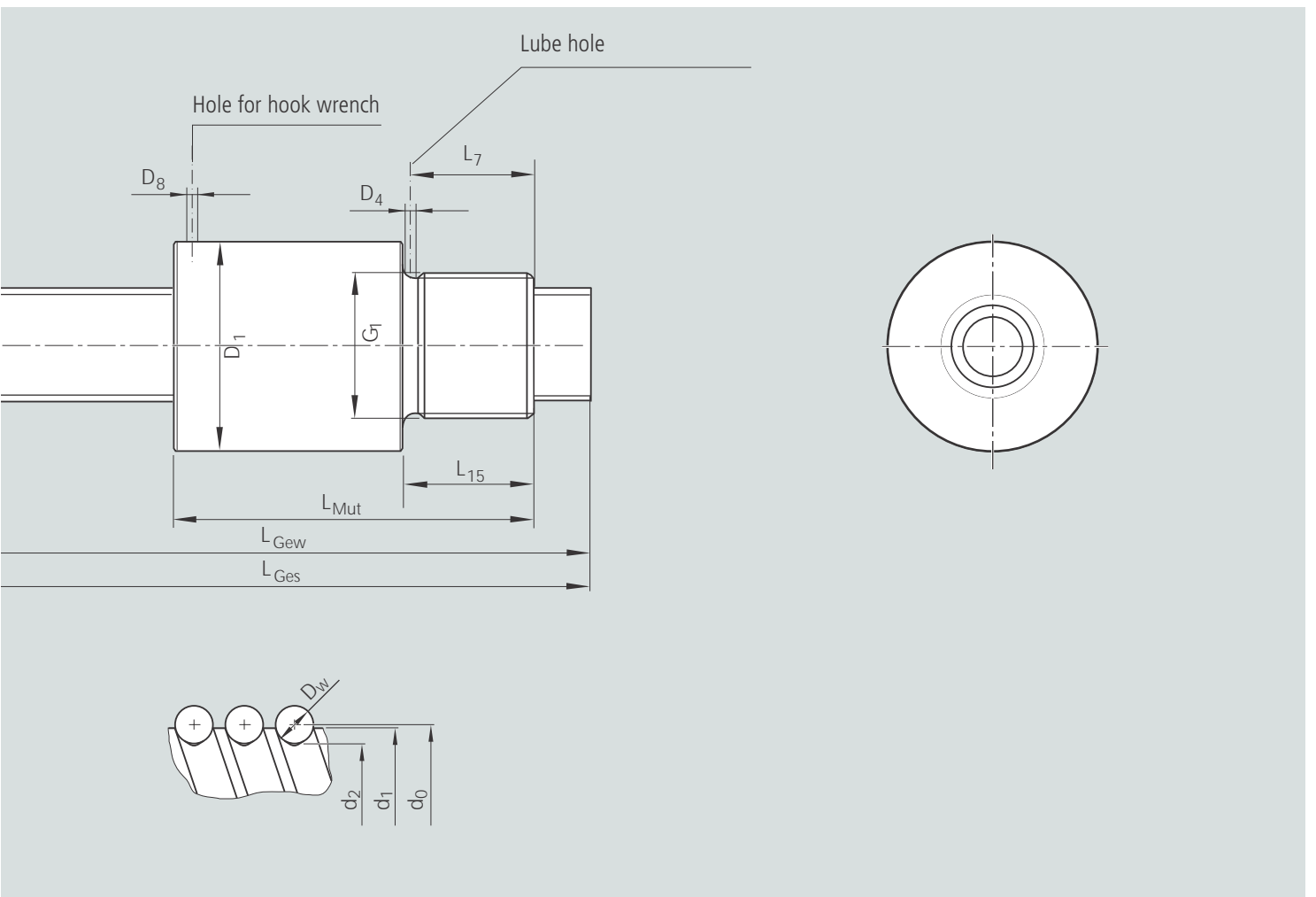
i = No. of turns



Size $d_0 \times P \times D_w - i$	Part No.	Basic load rating		Max.Speed v_{max} [m/min]	L_{Ges}	L_{Gew}	
		dyn. C (N)	stat. C_0 (N)				
12 x 5R x 2 - 3	2540-000-01	2300	3500	30	400	317	
12 x 10R x 2 - 2	2540-000-02	1500	2200	60	400	317	
16 x 5R x 3 - 3	2540-000-03	5600	7100	25	550	467	
16 x 10R x 3 - 3	2540-000-04	5800	7400	50	550	467	
20 x 5R x 3 - 4	2540-000-05	8600	12900	20	550	490	

Ordering Code

ZEV-E-S	12x5Rx2-3	0	0	T10	R	83K121	00K120	400	0	1
ZEV-E-S	12x10Rx2-2	0	0	T10	R	83K121	00K120	400	0	1
ZEV-E-S	16x5Rx3-3	0	0	T10	R	83K122	00K160	550	0	1
ZEV-E-S	16x10Rx3-3	0	0	T10	R	83K122	00K160	550	0	1
ZEV-E-S	20x5Rx3-4	0	0	T10	R	81K122	00K200	550	0	1



Nut Dimensions (mm)								Backlash (mm)
D ₁ h10	D ₄	D ₈	G ₁	L _{Mut} ±0,3	L ₇	L ₁₅		
25,5	2,7	3,2	M20 x 1	36	8,5	10	0,1	
25,5	2,7	3,2	M20 x 1	40	8,5	10	0,1	
32,5	2,7	4,2	M26 x 1,5	40	10,5	12	0,1	
32,5	2,7	4,2	M26 x 1,5	54	10,5	12	0,1	
38	2,7	8	M35 x 1,5	50	12,5	14	0,1	

Size	Form	Version	Screw Dimensions (mm)																
			d ₀	P	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
12	5	121	12	5	11,4	9,9	60	15	15	9,5	8	12	h6	17	10	h7	25	M12x1	18
12	10		12	5	11,4	9,9	60	15	15	9,5	8	12	h6	17	10	h7	25	M12x1	18
16	5	122	16	5	15,0	12,9	60	15	15	12,5	8	12	h6	17	10	h7	25	M12x1	18
16	10		16	5	15,0	12,9	60	15	15	12,5	8	12	h6	17	10	h7	25	M12x1	18
20	5	122	20	5	19,0	16,9	60	-	-	-	-	12	h6	17	10	h7	25	M12x1	18

Ball Screw Assemblies

With Single Nut with Flange

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Single Nut FBZ-E-S with Flange with Rexroth mounting dimensions

with seals

with backlash

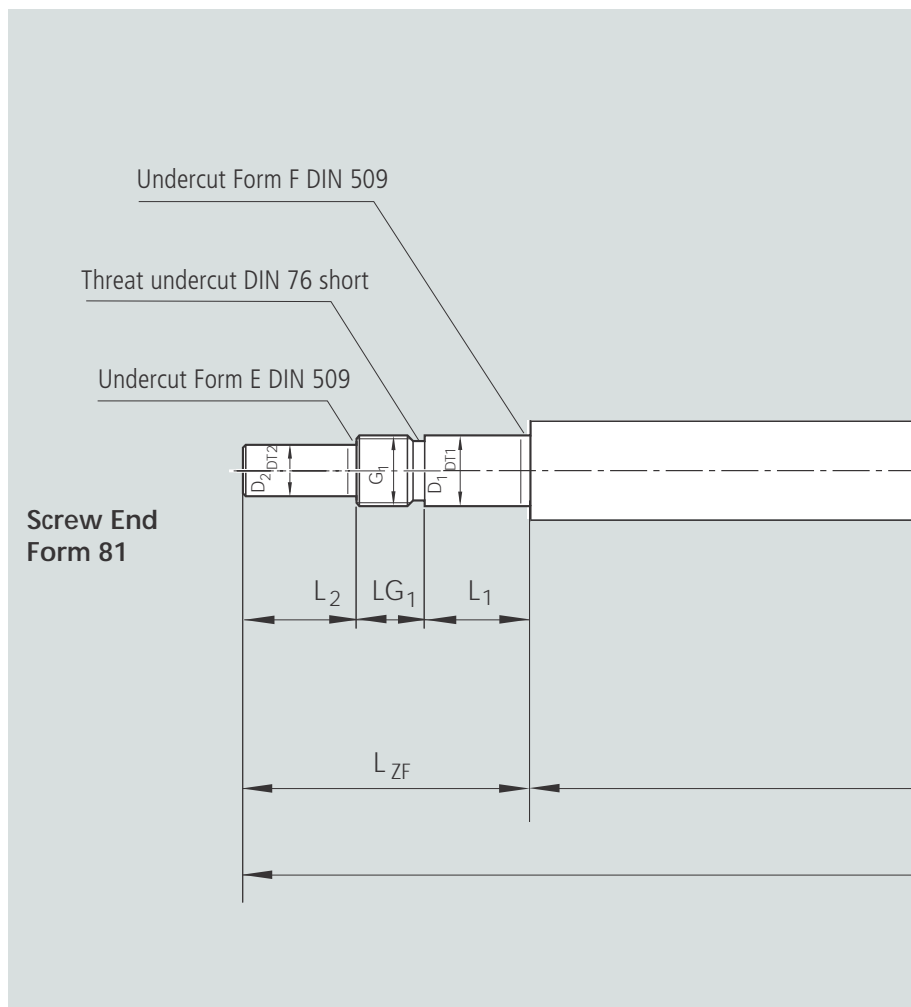
Screw tolerance class T10

d = Nominal diameter

P = Lead (R=Right, L=Left)

D_w = Ball diameter

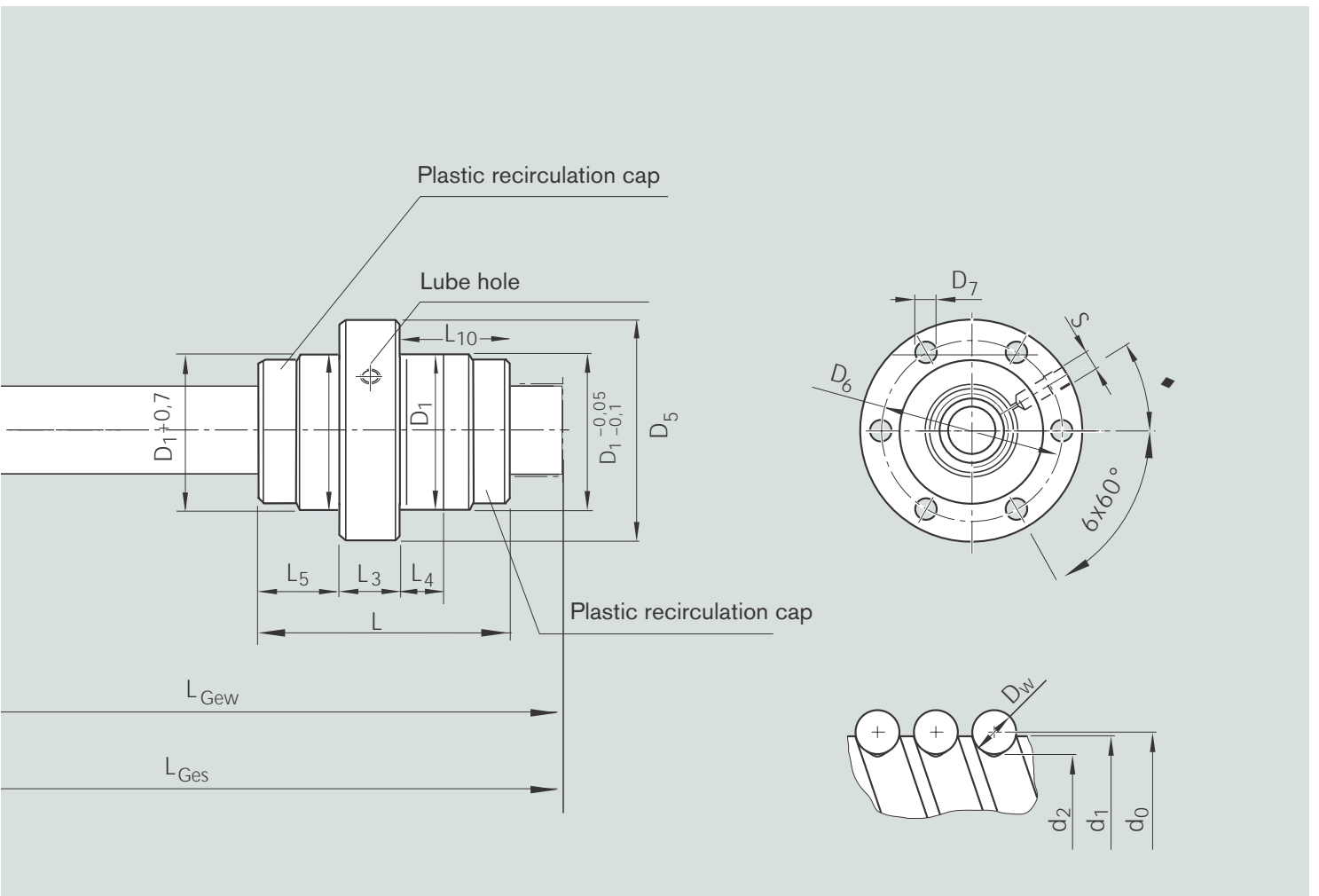
i = No. of turns



Size $d_0 \times P \times D_w - i$	Part number	Basic load rating		Max. Speed v_{max} [m/min]	L_{Ges}	L_{Gew}
		dyn. C (N)	stat. C_0 (N)			
20 x 5R x 3 - 4	2540-000-06	8600	12900	20	550	490
25 x 5R x 3 - 4	2540-000-07	9500	16300	16	700	640
25 x 10R x 3 - 4	2540-000-08	9400	16200	32	700	640
32 x 5R x 3,5 - 4	2540-000-09	13000	24000	13	1200	1120
32 x 10R x 3,969 - 5	2540-000-10	19000	35000	25	1200	1120

Ordering Code

FBZ-E-S	20x5Rx3-4	1	0	T10	R	81K122	00K200	550	0	1
FBZ-E-S	25x5Rx3-4	1	0	T10	R	81K151	00K250	700	0	1
FBZ-E-S	25x10Rx3-4	1	0	T10	R	81K151	00K250	700	0	1
FBZ-E-S	32x5Rx3,5-4	1	0	T10	R	81K204	00K320	1200	0	1
FBZ-E-S	32x10Rx3,969-5	1	0	T10	R	81K204	00K320	1200	0	1



Nut Dimensions (mm)

D_1	D_5	D_6	D_7	$L \pm 0,5$	L_3	L_4	L_5	L_{10}	S	\diamond (°)
33	58	45	6,6	40	10	6	15	15	M6	30
38	63	50	6,6	43	10	6	16,5	16,5	M6	30
38	63	50	6,6	62	10	16	16	36	M6	30
48	73	60	6,6	46	12	6	17	17	M6	30
48	73	60	6,6	77	12	16	20	45	M6	30

Screw Dimensions (mm)

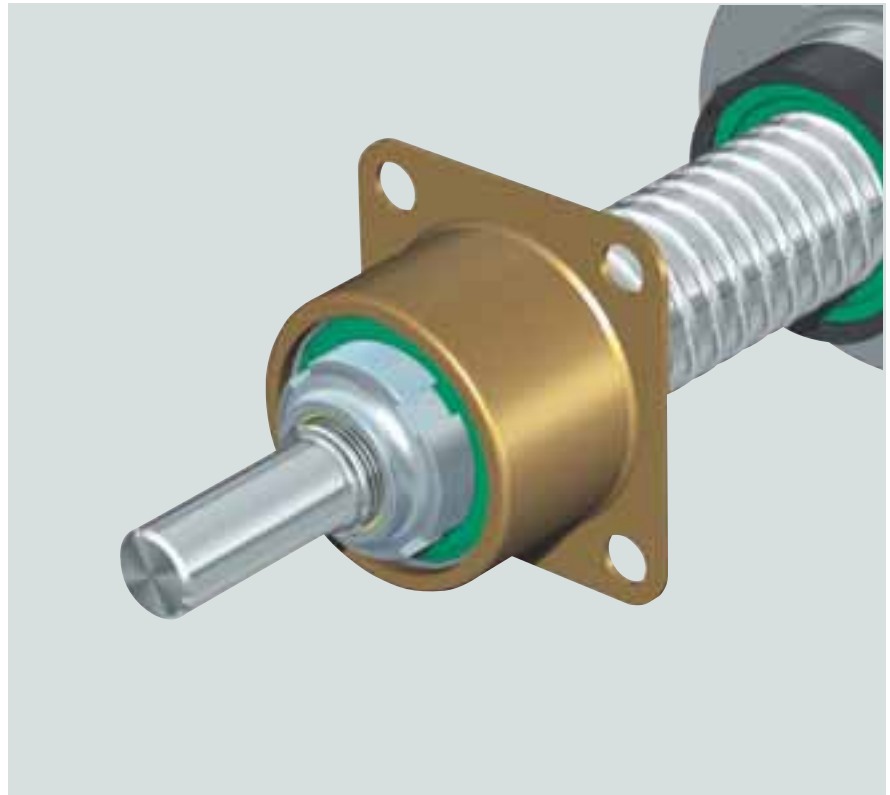
Size		Form	Version	Screw Dimensions (mm)															
d_0	P			d_1	d_2	L_{ZF}	D_R	L_R	D_F	L_F	D_1	DT1	L_1	D_2	DT2	L_2	G_1	LG_1	
20	5		122	19,0	16,9	60	-	-	-	-	12	h6	17	10	h7	25	M12x1	18	
25	5		151	24,0	21,9	60	-	-	-	-	15	h6	19	12	h7	25	M15x1	16	
25	10		151	24,0	21,9	60	-	-	-	-	15	h6	19	12	h7	25	M15x1	16	
32	5		204	31,0	28,4	80	-	-	-	-	20	h6	25	18	h7	40	M20x1	15	
32	10		204	31,0	27,9	80	-	-	-	-	20	h6	25	18	h7	40	M20x1	15	

Ball Screw Assemblies

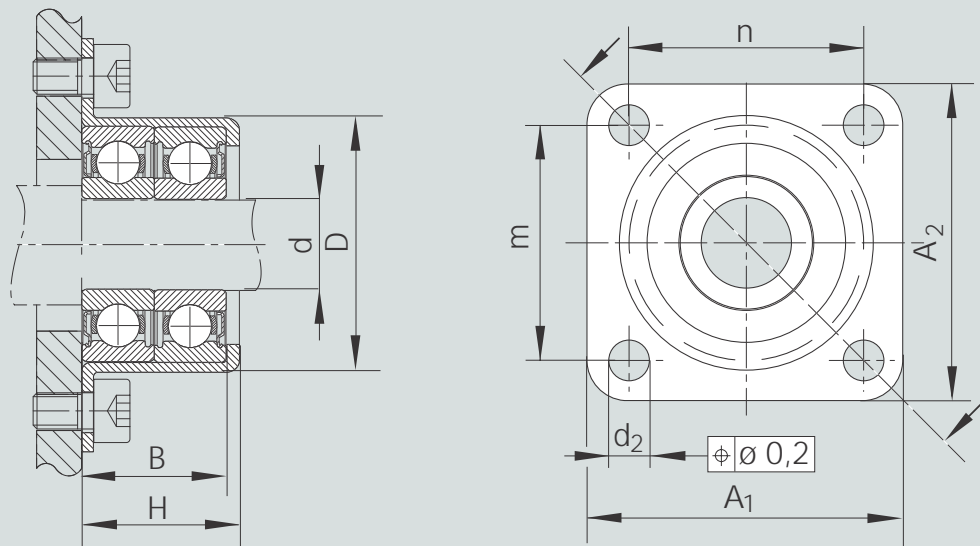
Bearing LGL

Fixed bearing with Angular-contact thrust ball bearing LGL

Suitable for Screw End
Forms on page 4-7



Size	Angular-contact thrust ball bearing				Slotted Nut	
	Part number	Designation	Load ratings (axial)		Designation	Part number
dyn. C (N)			stat. C ₀ (N)			
d ₀ x P						
12x5/10	8414-040-06	LGL-A-1244	13200	17900	NMG 12x1	8446-002-02
16x5/10	8414-040-06	LGL-A-1244	13200	17900	NMG 12x1	8446-002-02
20x5	8414-040-06	LGL-A-1244	13200	17900	NMG 12x1	8446-002-02
25x5/10	8414-041-06	LGL-A-1547	16400	22400	NMG 15x1	8446-011-02
32x5	8414-042-06	LGL-A-2060	27500	40000	NMG 20x1	8446-005-02



Dimensions (mm)										Weight bearing
d	D +0,03 -0,01	A ₁	A ₂	n	m	H	B	d ₂		(kg)
12	35,45	44	50	32	38	22	20	6,6		0,12
12	35,45	44	50	32	38	22	20	6,6		0,12
12	35,45	44	50	32	38	22	20	6,6		0,12
15	38,45	47	51	35	39	24	22	6,6		0,14
20	50,45	60	60	47	47	30	28	6,6		0,30

Ball Screw Assemblies

Acceptance Conditions and Tolerance Grades

Permissible travel deviation

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

Symbol definitions

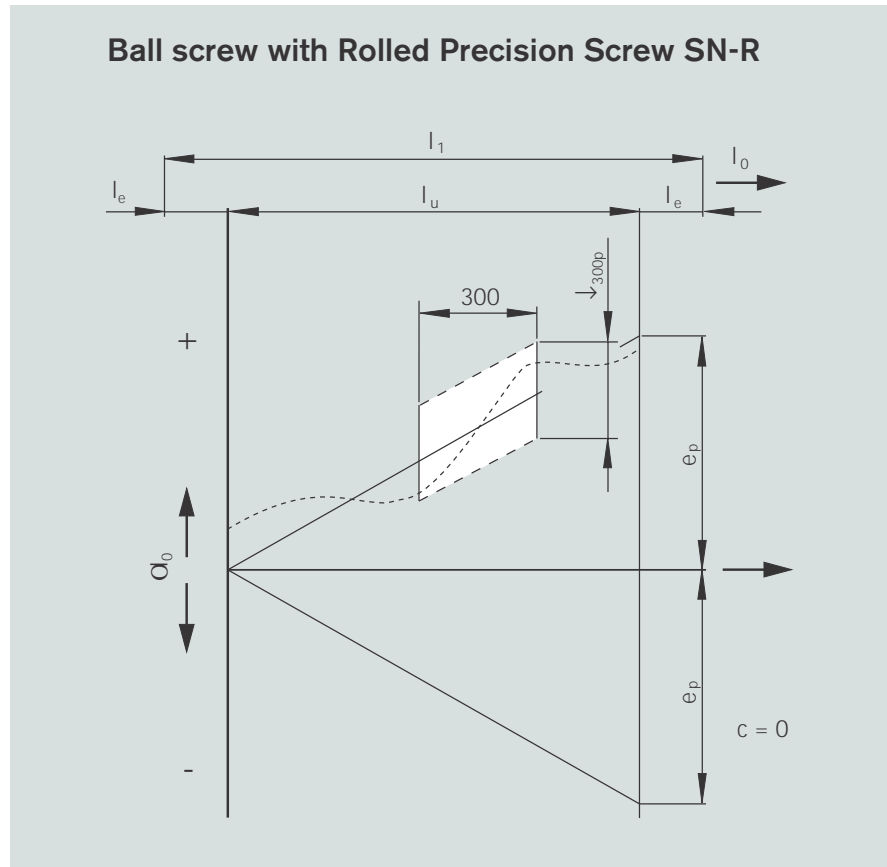
- l = Nominal travel
- l = Thread length
- Ol = Travel deviation
- l_u = Useful travel
- l_e = Excess travel
- c = Travel compensation for useful travel, defined by use (standard: $c = 0$)
- e_p = Tolerance for actual mean travel deviation
- \downarrow_{up} = Permissible travel variation within useful travel l
- \downarrow_p = Permissible travel deviation within 300 mm travel
- \downarrow_{ep} = Permissible travel deviation within 1 revolution

Subindices:

- p = Permissible
- a = Actual

Improved values

Values are more accurate than those defined in DIN 69 051, Part 3 and ISO 3408-3 (tolerance reduced by half).



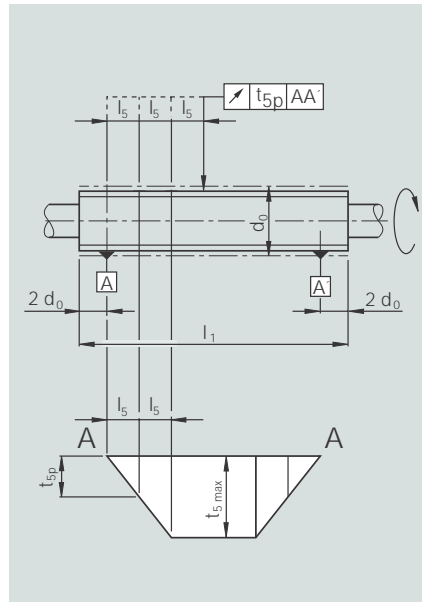
Tolerance grade T10

$$e_p = \frac{l_u}{300} \cdot \downarrow_{300p} \quad \downarrow_{300p} = 210 \mu\text{m}$$

Run-outs and location deviations

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

Radial run-out t of the outer diameter of the ball screw shaft over the length l used to determine the straightness in relation to AA' .

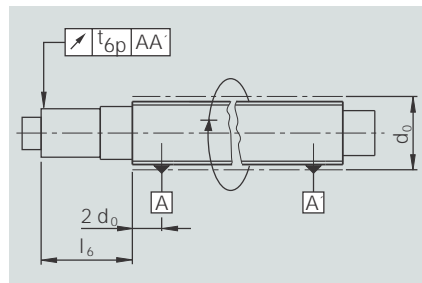


d		l	t_p in μm for tolerance grade
über above	bis up to		
= 6	12	80	80
12	25	160	80
25	50	315	80
50	100	630	80
100	200	1250	80

l d		t_{max} in μm for I B I for tolerance grade
above	up to	
	40	160
40	60	240
60	80	400
80	100	640

Radial run out t of the bearing diameter in relation to AA' for I A I

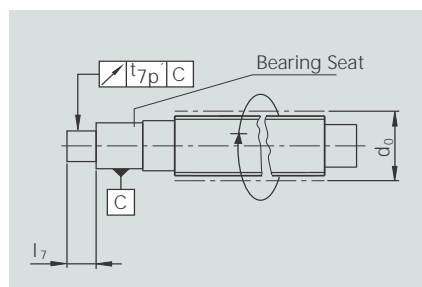
Where $l_6 > l$ then $t_{6a} \text{ At } t_{6a} \cdot \frac{l_{6a}}{l}$



Nominal diameter d		Ref length l	t_p in μm for I A I for tolerance grade
above	up to		
6	20	80	40
20	50	125	50
50	125	200	50
125	200	315	50

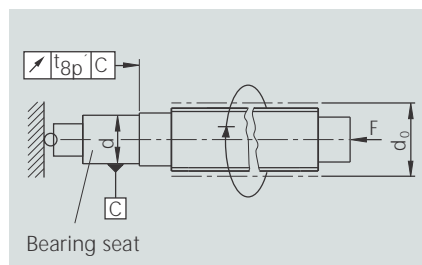
Coaxial deviation t of the journal diameter of the ball screw shaft in relation to the bearing diameter for I A I

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



Nominal diameter d		Ref length l	t_p in μm for I A I for tolerance grade
above	up to		
= 6	20	80	12
20	50	125	12
50	125	200	16
125	200	315	25

Axial run out t of the shaft bearing face of the ball screw shaft in relation to the bearing diameter



Nominal diameter d		t_p in μm for tolerance grade
above	up to	
= 6	63	10
63	125	12
125	200	16

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